UNIVERSIDAD POLITECNICA DE VALENCIA

Análisis de las alternativas de diseño hidráulico de las redes del proyecto de modernización de los regadíos de los sectores 42, 43 y 44 de la Acequia Real del Júcar (Valencia).

ANEXOS: CÁLCULOS Y MATERIAL COMPLEMENTARIO

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CAPÍTULO I: CÁLCULO DE LOS RESULTADOS

En este capítulo se observa cómo se realizan los cálculos y resultados del diseño por el método de la pendiente hidráulica con cabecera conocida con la variación en la selección del diámetro, normalizándolos al superior o al inferior, cumpliendo con los requerimientos hidráulicos mencionados en el documento del proyecto. También se observan los cálculos y resultados del porcentaje de garantía suministro por el método de Clement, de los resultados del diseño en cada alternativa por el método de la pendiente hidráulica con cabecera conocida.

Cabe destacar que en cada sector se mostrará únicamente el cálculo del diseño de la red por el método de la pendiente hidráulica con cabecera conocida con la variación en la selección del diámetro y en las demás alternativas se evidenciarán solo los resultados. Esto es con la finalidad de que el documento no sea tan extenso. Así mismo se evidenciará el cálculo de la garantía suministro por el método de Clement.

Es importante mencionar que el método de la pendiente hidráulica con la variación en la selección del diámetro se realiza de la misma manera en cada alternativa, el diseño cambia en función del caudal para el diseño que trasiega cada tubería, verificando la presión mínima en hidrante de 25mca y velocidad en las conducciones entre 0.5m/s y 2m/s.

1.1 Sector 42

1.1.1 Revisión y mejora de proyecto original

Después de verificar que el diseño original no cumple con la presión mínima de 25mca en hidrantes. Se ha decidido realizar un ajuste mínimo por el método de la pendiente hidráulica con cabecera conocida y con la variación de la selección del diámetro, el cual se muestra a continuación.

En los cálculos se puede observar el cálculo del diámetro teórico en función de un factor de fricción estimado, del caudal de diseño para 5 turnos y la pendiente de diseño. Además, se observa el cálculo de los diámetros D1 (diámetros inferiores al teórico), y D2 (diámetros superiores al teórico), el cálculo de Reynolds, el factor de fricción, las perdidas por fricción y la altura piezométrica, y finalmente el cálculo de la presión P1 (presión en función del resultado de la solución del D1) y P2 (presión en función del resultado de la solución del D2). Finalmente, al obtener las presiones calculadas para cada solución de diámetros, se selecciona la solución del diámetro que permite mantener la presión mínima de 25mca en hidrante. Esto se realiza para todos los hidrantes después de conocer la solución de la serie critica que es el nudo critico de la red.

Serie critica	P00_A-P00_B-P01_A-P01_B-P01_C-P01_D-P0103_A-P0103_B_H18
Jcritica	1.30
Longtotal	1941.1
Pmin	25
Hcab	50.89
Visc	1.10E-06
Rug	0.01

																								19.57	25.61
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						0															50.89	50.89		
P00_A	UGD_42	J30	260.3	0	66.33	260.30	99.46	0.016	338.78	0.74	237.40	379.80	1.50	0.59	323404.99	202149.41	0.015	0.016	1.84	0.19	49.05	50.70	49.05	50.70
P00_B	J30	J31	168.5	0	62.062	428.80	60.38	0.016	329.89	0.73	237.40	379.80	1.40	0.55	302595.51	189142.11	0.015	0.016	1.05	0.11	47.99	50.59	47.99	50.59
P01_A	J31	J32	497.7	0	23.09	926.50	27.94	0.016	222.13	0.60	190.00	237.40	0.81	0.52	140665.56	112579.85	0.017	0.018	1.51	0.51	46.49	50.08	46.49	50.08
P01_B	J32	H900	141	0	18.506	1067.50	24.25	0.016	203.31	0.57	152.00	213.60	1.02	0.52	140924.47	100283.33	0.017	0.018	0.84	0.16	45.64	49.92	45.64	49.92
P01_C	H900	J88	9.2	0	14.636	1076.70	24.05	0.016	185.10	0.54	132.40	190.00	1.06	0.52	127953.41	89163.32	0.017	0.019	0.07	0.01	45.57	49.90	45.57	49.90
P01_D	J88	J36	412.8	0	7.258	1489.50	17.38	0.016	139.82	0.47	117.80	152.00	0.67	0.40	71316.35	55270.17	0.020	0.021	1.55	0.46	44.02	49.45	44.02	49.45
P0103_A	J36	H	201.6	0	5.772	1691.10	15.31	0.016	127.57	0.45	104.40	132.40	0.67	0.42	63994.59	50460.99	0.020	0.021	0.90	0.29	43.12	49.16	43.12	49.16
P0103_B_H18	H	H18	250	23.36	2.15	1941.10	1.30	0.016	85.94	0.37	104.40	104.40	0.25	0.25	23837.21	23837.21	0.025	0.025	0.19	0.19	42.93	48.97	19.57	25.61

Solución escogida (diametro superior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P00_A	UGD_42	J30	260.3	379.8	400	€ 21,711.62
P00_B	J30	J31	168.5	379.8	400	€ 14,054.59
P01_A	J31	J32	497.7	237.4	250	€ 16,374.33
P01_B	J32	H900	141	213.6	225	€ 3,869.04
P01_C	H900	J88	9.2	190	200	€ 201.94
P01_D	J88	J36	412.8	152	160	€ 5,411.81
P0103_A	J36	H	201.6	132.4	140	€ 2,469.60
P0103_B_H18	H	H18	250	104.4	110	€ 2,247.50
						€ 66,340.43

CONJUNTO DE RAMALES POR HIDRANTES

HIDRANTE 1

Serie	P00_A;P00_B;P02_A;P0202_A;P0202_B;P0202_C;P0202_E;P0202-F;P0202_G;P0202_H_H1
Jcritica	2.73
Longtotal	1582.5
Pmin	25
Hcab	50.5933914 J31
Visc	1.10E-06
Rug	0.01

																								15.8993	26.5081
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						428.8															50.59339	50.5934		
P02_A	J31	J42	395.4	0	38.972	824.2	31.05	0.016	236.28	0.89	190.00	237.40	1.37	0.88	237419.58	190015.67	0.015542	0.01606	3.11466	1.0565	47.47873	49.5368	47.4787	49.5368
P0202_A	J42	HFHF	123.8	0	18.862	948	27.00	0.016	176.75	0.77	132.40	190.00	1.37	0.67	164898.68	114908.35	0.016727	0.0177	1.49619	0.2601	45.98254	49.2767	45.9825	49.2767
P0202_B	HFHF	J44	165.2	0	15.782	1113.2	22.99	0.016	164.59	0.74	132.40	190.00	1.15	0.56	137972.17	96144.82	0.017257	0.01832	1.44209	0.2515	44.54045	49.0252	44.5404	49.0252
P0202_C	J44	HRJF9	70.5	0	13.054	1183.7	21.62	0.016	152.56	0.71	132.40	190.00	0.95	0.46	114122.97	79525.69	0.017864	0.01903	0.43585	0.0763	44.1046	48.9489	44.1046	48.9489
P0202_E	HRJF9	H113	167.4	0	10.674	1351.1	18.94	0.016	140.76	0.69	117.80	152.00	0.98	0.59	104881.61	81283.25	0.018203	0.01901	1.26462	0.3693	42.83998	48.5796	42.84	48.5796
P0202-F	H113	H456	491.9	0	9.122	1843	13.89	0.016	132.18	0.66	104.40	132.40	1.07	0.66	101136.29	79747.95	0.01839	0.01914	5.01485	1.5907	37.82513	46.9889	37.8251	46.9889
P0202_G	H456	J103	73.5	0	6.274	1916.5	13.35	0.016	113.80	0.62	104.40	117.80	0.73	0.58	69560.30	61647.67	0.019763	0.0202	0.38093	0.2129	37.4442	46.7761	37.4442	46.7761
P0202_H_H1	J103	H1	94.8	20.11	3.328	2011.3	2.73	0.016	88.31	0.54	66.00	104.40	0.97	0.39	58365.58	36897.78	0.020713	0.02259	1.43492	0.158	36.00928	46.6181	15.8993	26.5081

Solución escogida (diametro superior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P02_A	J31	J42	395.4	237.4	250	€ 13,008.66
P0202_A	J42	HFHF	123.8	190	200	€ 2,717.41
P0202_B	HFHF	J44	165.2	190	200	€ 3,626.14
P0202_C	J44	HRJF9	70.5	190	200	€ 1,547.48
P0202_E	HRJF9	H113	167.4	152	160	€ 2,194.61
P0202-F	H113	H456	491.9	132.4	140	€ 6,025.78
P0202_G	H456	J103	73.5	117.8	125	€ 745.29
P0202_H_H1	J103	H1	94.8	104.4	110	€ 852.25
						€ 30,717.62

HIDRANTE 2	
Serie	P00_A;P00_B;P02_A;P0202_A;P0202_B;P0202_C;P0202_E;P0202-F;P0202_G;P0202_G_H2
Jcritica	1.70
Longtotal	4.4
Pmin	25
Hcab	46.7760605
Visc	1.10E-06
Rug	0.01

J103

28.2602 28.2627

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1916.5															46.77606	46.7761		
P0202_G_H2	J103	H2	4.4	18.51	2.946	1920.9	1.70	0.016	92.4352133	0.439003483	104.4	117.8	0.3441	0.27	32662.52	28947.09	0.023214	0.02383	0.00591	0.0033	46.77015	46.7727	28.2602	28.2627

Solución escogida (diametro inferior)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0202_G_H2	J103	H2	4.4	104.4	110	€	39.56
						€	39.56

HIDRANTE 3	
Serie	P00_A;P00_B;P02_A;P0202_A;P0202_B;P0202_C;P0202_E;P0202-F;P0202_F_H3
Jcritica	2.41
Longtotal	5.5
Pmin	25
Hcab	46.9889483
Visc	1.10E-06
Rug	0.01

H456

29.452 29.455

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1843															46.98895	46.9889		
P0202_F_H3	H456	H3	5.5	17.53	2.848	1848.5	2.41	0.016	82.97547729	0.526684558	104.4	117.8	0.3327	0.261	31575.99	27984.15	0.023393	0.02402	0.00695	0.0039	46.982	46.985	29.452	29.455

Solución escogida (diametro inferior)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0202_F_H3	H456	H3	5.5	104.4	110	€	49.45
						€	49.45

HIDRANTE 4	
Serie	P00_A;P00_B;P02_A;P0202_A;P0202_B;P0202_C;P0202_E;P0202_E_H4
Jcritica	4.22
Longtotal	3
Pmin	25
Hcab	48.5796092
Visc	1.10E-06
Rug	0.01

H113

30.7183 30.7189

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1351.1															48.57961	48.5796		
P0202_E_H4	H113	H4	3	17.86	1.552	1354.1	4.22	0.016	59.62958764	0.555748403	104.4	117.8	0.1813	0.142	17207.14	15249.79	0.027039	0.02785	0.0013	0.0007	48.57831	48.5789	30.7183	30.7189

Solución escogida (diametro inferior)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0202_E_H4	H113	H4	3	104.4	110	€	26.97
						€	26.97

HIDRANTE 5	
Serie	P00_A;P00_B;P02_A;P0202_A;P0202_B;P0202_C;P0202_C_H5
Jcritica	4.52
Longtotal	1.5
Pmin	25
Hcab	48.9488949
Visc	1.10E-06
Rug	0.01

HRJF9

																								30.3575	30.3581
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1183.7															48.94889	48.9489		
P0202_C_H5	HRJF9	H5	1.5	18.59	2.38	1185.2	4.52	0.016	69.79467773	0.622074592	104.4	117.8	0.278	0.218	26387.24	23385.63	0.024383	0.02506	0.00138	0.0008	48.94751	48.9481	30.3575	30.3581

Solución escogida (diametro inferior)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0202_C_H5	HRJF9	H5	1.5	104.4	110	€	13.49
						€	13.49

HIDRANTE 6	
Serie	P00_A;P00_B;P02_A;P02_B;P02_C;P0204_H6
Jcritica	5.25
Longtotal	447.6
Pmin	25
Hcab	49.536844
Visc	1.10E-06
Rug	0.01

J42

																								26.6367	30.3165
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						824.2															49.53684	49.5368		
P02_B	J42	HJ	84.9	0	20.11	909.1	26.99	0.016	159.0679154	1.011945236	132.4	190	1.4607	0.709	175809.17	122511.23	0.016545	0.01748	1.15365	0.2003	48.38319	49.3365	48.3832	49.3365
P02_C	HJ	J92	211.7	0	17.08	1120.8	21.89	0.016	149.0091399	0.979427219	117.8	152	1.5671	0.941	167826.30	130065.38	0.016746	0.01738	3.76712	1.0929	44.61607	48.2437	44.6161	48.2437
P0204_H6	J92	H6	151	17.86	2.184	1271.8	5.25	0.016	65.45138107	0.649120198	104.4	117.8	0.2551	0.2	24214.17	21459.76	0.024881	0.02558	0.11939	0.0671	44.49668	48.1765	26.6367	30.3165

Solución escogida (diametro SUPERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P02_B	J42	HJ	84.9	190	200	€	1,863.56
P02_C	HJ	J92	211.7	152	160	€	2,775.39
P0204_H6	J92	H6	151	117.8	125	€	1,531.14

HIDRANTE 7	
Serie	P00_A;P00_B;P02_A;P0202_A;P0202_B;P020202_H7
Jcritica	4.79
Longtotal	71.1
Pmin	25
Hcab	49.0251776
Visc	1.10E-06
Rug	0.01

J44

																								30.5919	30.6284
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1113.2															49.02518	49.0252		
P020202_H7	J44	H7	71.1	18.35	2.728	1184.3	4.79	0.016	72.85887222	0.654319097	104.4	117.8	0.3187	0.25	30245.54	26805.04	0.023624	0.02426	0.08328	0.0468	48.9419	48.9784	30.5919	30.6284

Solución escogida (diametro inferior)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P020202_H7	J44	H7	71.1	104.4	110	€	639.19

HIDRANTE 8	
Serie	P00_A;P00_B;P02_A;P0202_A;P0202_A_H8
Jcritica	4.82
Longtotal	3
Pmin	25
Hcab	49.2767257
Visc	1.10E-06
Rug	0.01

HFHF

29.5824 29.5843

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						948															49.27673	49.2767		
P0202_A_H8	HFHF	H8	3	19.69	3.08	951	4.82	0.016	76.384296	0.672129063	104.4	117.8	0.3598	0.283	34148.19	30263.76	0.022982	0.02359	0.00436	0.0024	49.27237	49.2743	29.5824	29.5843

Solución escogida (diametro inferior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0202_A_H8	HFHF	H8	3	104.4	110	€ 26.97

HIDRANTE 9	
Serie	P00_A;P00_B;P02_A;P02_B;P02_C;P02_D_H9
Jcritica	4.44
Longtotal	3.9
Pmin	25
Hcab	48.243657
Visc	1.10E-06
Rug	0.01

J92

29.9902 29.9917

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1120.8															48.24366	48.2437		
P02_D_H9	J92	H9	3.9	18.25	2.346	1124.7	4.44	0.016	69.64710096	0.615789159	104.4	117.8	0.2741	0.215	26010.27	23051.55	0.024465	0.02515	0.0035	0.002	48.24016	48.2417	29.9902	29.9917

Solución escogida (diametro inferior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P02_D_H9	J92	H9	3.9	104.4	110	€ 35.06

HIDRANTE 10	
Serie	P00_A;P00_B;P02_A;P02_B;P02_B_H10
Jcritica	3.33
Longtotal	4.4
Pmin	25
Hcab	48.3831935
Visc	1.10E-06
Rug	0.01

HJ

28.037 28.0397

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						909.1															48.38319	48.3832		
P02_B_H10	HJ	H10	4.4	20.34	3.03	913.5	3.33	0.016	81.71486931	0.577764118	104.4	117.8	0.354	0.278	33593.83	29772.46	0.023067	0.02368	0.00621	0.0035	48.37699	48.3797	28.037	28.0397

Solución escogida (diametro inferior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P02_B_H10	HJ	H10	4.4	104.4	110	€ 39.56

HIDRANTE 11	
Serie	P00_A;P00_B;P02_A;P02_B;P02_C;P02_D;P02_E;P0201_A;P0201_A_H11
Jcritica	3.20
Longtotal	296.1
Pmin	25
Hcab	48.243657 J92
Visc	1.10E-06
Rug	0.01

48.1818 48.2256

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1120.8															48.24366	48.2437		
P02_D	J92	J94	6.1	0	12.55	1126.9	20.63	0.016	145.4399919	0.755415968	117.8	152	1.1515	0.692	123314.99	95569.12	0.017671	0.01842	0.06184	0.018	48.18182	48.2256	48.1818	48.2256
P02_E	J94	J54	267.5	0	12.55	1394.4	16.67	0.016	145.4399919	0.755415968	117.8	152	1.1515	0.692	123314.99	95569.12	0.017671	0.01842	2.71186	0.7902	45.46995	47.4354	45.47	47.4354
P0201_A	J54	J97	18.5	0	8.808	1412.9	16.45	0.016	126.2342703	0.703773447	104.4	132.4	1.0289	0.64	97654.95	77002.84	0.01851	0.01927	0.17699	0.0562	45.29296	47.3793	45.293	47.3793
P0201_A_H11	J97	H11	4	18.71	2.296	1416.9	3.20	0.016	73.72505495	0.537838383	104.4	117.8	0.2682	0.211	25455.92	22560.26	0.024589	0.02528	0.00345	0.0019	45.28951	47.3773	26.5795	28.6673

Solución escogida (diametro SUPERIOR)						
Tuberia	Nudo Ini	Nudo Fin	Long (m)	Dint	DN	Coste
P02_D	J92	J94	6.1	152	160	€ 79.97
P02_E	J94	J54	267.5	152	160	€ 3,506.93
P0201_A	J54	J97	18.5	132.4	140	€ 226.63
P0201_A_H11	J97	H11	4	117.8	125	€ 40.56

HIDRANTE 12	
Serie	P00_A;P00_B;P02_A;P02_B;P02_C;P02_D;P02_E;P0201_A;P0201_B;P0201_C;P0201_D_H12
Jcritica	1.11
Longtotal	349.7
Pmin	25
Hcab	47.3792752 J97
Visc	1.10E-06
Rug	0.01

46.8275 47.2172

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1412.9															47.37928	47.3793		
P0201_B	J97	HSDS	178.2	0	6.512	1591.1	14.07	0.016	138.3534912	0.433155931	117.8	152	0.5975	0.359	63986.23	49589.33	0.020048	0.02107	0.55182	0.1621	46.82745	47.2172	46.8275	47.2172
P0201_C	HSDS	H79	91.5	0	4.366	1682.6	13.30	0.016	117.9065301	0.399869365	104.4	132.4	0.51	0.317	48406.16	38169.21	0.021294	0.02235	0.24744	0.0792	46.58001	47.138	46.58	47.138
P0201_D_H12	H79	H12	80	20.43	2.332	1762.6	1.11	0.016	91.74782645	0.352733815	104.4	117.8	0.2724	0.214	25855.06	22913.99	0.024499	0.02518	0.07101	0.0399	46.509	47.0981	26.079	26.6681

Solución escogida (diametro inferior)						
Tuberia	Nudo Ini	Nudo Fin	Long (m)	Dint	DN	Coste
P0201_B	J97	HSDS	178.2	117.8	125	€ 1,806.95
P0201_C	HSDS	H79	91.5	104.4	110	€ 822.59
P0201_D_H12	H79	H12	80	104.4	110	€ 719.20

HIDRANTE 13	
Serie	P00_A;P00_B;P02_A;P02_B;P02_C;P02_D;P02_E;P0201_A;P0201_B;P0201_B_H13
Jcritica	1.48
Longtotal	3.7
Pmin	25
Hcab	46.8274519 HSDS
Visc	1.10E-06
Rug	0.01

27.3546 27.3559

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1591.1															46.82745	46.8275		
P0201_B_H13	HSDS	H13	3.7	19.47	2.146	1594.8	1.48	0.016	83.74382786	0.3896137	104.4	117.8	0.2507	0.197	23792.86	21086.37	0.024985	0.02569	0.00284	0.0016	46.82462	46.8259	27.3546	27.3559

Solución escogida (diametro inferior)						
Tuberia	Nudo Ini	Nudo Fin	Long (m)	Dint	DN	Coste
P0201_B_H13	HSDS	H13	3.7	104.4	110	€ 33.26

HIDRANTE 14	
Serie	P00_A;P00_B;P02_A;P02_B;P02_C;P02_D;P02_E;P0201_A;P0201_B;P0201_C;P0201_C_H14
Jcritica	0.61
Longtotal	2.5
Pmin	25
Hcab	46.5800112 H79
Visc	1.10E-06
Rug	0.01

																							26.0283	26.029	
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2	
						1682.6															46.58001	46.58			
P0201_C_H14	H79	H14	2.5	20.55	2.034	1685.1	0.61	0.016	97.80146708	0.270751161	104.4	117.8	0.2376	0.187	22551.11	19985.87	0.025307	0.02603	0.00174	0.001	46.57827	46.579	26.0283	26.029	

Solución escogida (diametro inferior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0201_C_H14	H79	H14	2.5	104.4	110	€ 22.48

HIDRANTE 15	
Serie	P00_A;P00_B;P02_A;P02_B;P02_C;P02_D;P02_E;P0206_H15
Jcritica	2.33
Longtotal	461.8
Pmin	25
Hcab	47.4354407 J54
Visc	1.10E-06
Rug	0.01

																							28.3771	28.7939	
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2	
						1394.4															47.43544	47.4354			
P0206_H15	J54	H15	461.8	18.11	3.742	1856.2	2.33	0.016	95.50115799	0.522392131	104.4	117.8	0.4371	0.343	41487.83	36768.50	0.022013	0.02257	0.94832	0.5316	46.48712	46.9039	28.3771	28.7939	

Solución escogida (diametro inferior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0206_H15	J54	H15	461.8	104.4	110	€ 4,151.58

HIDRANTE 16	
Serie	P00_A;P00_B;P01_A;P01_B;P01_C;P01_D;P0104_H16
Jcritica	3.34
Longtotal	561.5
Pmin	25
Hcab	49.4479293 J36
Visc	1.10E-06
Rug	0.01

																							31.6221	31.7207	
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2	
						1489.5															49.44793	49.4479			
P0104_H16	J36	H16	561.5	17.6	1.486	2051	3.34	0.016	61.42385166	0.501481408	104.4	117.8	0.1736	0.136	16475.39	14601.28	0.027335	0.02816	0.2258	0.1272	49.22213	49.3207	31.6221	31.7207	

Solución escogida (diametro inferior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0104_H16	J36	H16	561.5	104.4	110	€ 5,047.89

HIDRANTE 19

Serie	P00_A;P00_B;P01_A;P0101_H19
Jcritica	0.97
Longtotal	140
Pmin	25
Hcab	50.0787147
Visc	1.10E-06
Rug	0.01

J32

25.6256 25.9066

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						926.5															50.07871	50.0787		
P0101_H19	J32	H19	140	24.04	4.584	1066.5	0.97	0.016	123.3215572	0.383775042	104.4	132.4	0.5355	0.333	50823.15	40075.05	0.021076	0.02211	0.41307	0.1321	49.66564	49.9466	25.6256	25.9066

Solución escogida (diametro inferior)

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Dint	DN	Coste
P0101_H19	J32	H19	140	104.4	110	€ 1,258.60

HIDRANTE 20

Serie	P00_A;P00_B;P01_A;P01_B;P01_C;P01_C_H20
Jcritica	2.10
Longtotal	2.3
Pmin	25
Hcab	49.9037498
Visc	1.10E-06
Rug	0.01

J88

27.2478 27.2587

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1076.7															49.90375	49.9037		
P01_C_H20	J88	H20	2.3	22.64	7.378	1079	2.10	0.016	127.9564873	0.573751919	104.4	132.4	0.8619	0.536	81800.43	64501.25	0.019144	0.01997	0.01597	0.0051	49.88778	49.8987	27.2478	27.2587

Solución escogida (diametro inferior)

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Dint	DN	Coste
P01_C_H20	J88	H20	2.3	104.4	110	€ 20.68

HIDRANTE 21

Serie	P00_A;P00_B;P01_A;P01_B;P0102_H21
Jcritica	2.59
Longtotal	230.1
Pmin	25
Hcab	49.915979
Visc	1.10E-06
Rug	0.01

H900

27.8543 28.0748

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1067.5															49.91598	49.916		
P0102_H21	H900	H21	230.1	21.56	3.87	1297.6	2.59	0.016	94.79751427	0.548311285	104.4	117.8	0.4521	0.355	42906.98	38026.22	0.021852	0.0224	0.50171	0.2812	49.41426	49.6348	27.8543	28.0748

Solución escogida (diametro inferior)

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Dint	DN	Coste
P0102_H21	H900	H21	230.1	104.4	110	€ 2,068.60

HIDRANTE 22	
Serie	P00_A;P00_A_H22
Jcritica	12.25
Longtotal	36.1
Pmin	25
Hcab	50.7015176
Visc	1.10E-06
Rug	0.01

J30

																						28.5378	28.579
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						260.3															50.70152	50.7015		
P00_A_H22	J30	H22	36.1	22.07	4.268	296.4	12.25	0.016	72.22640803	1.041699595	104.4	117.8	0.4986	0.392	47319.63	41936.92	0.021397	0.02192	0.09374	0.0525	50.60778	50.649	28.5378	28.579

Solución escogida (diametro inferior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P00_A_H22	J30	H22	36.1	104.4	110	€ 324.54

1.1.1.1 Cálculo de la garantía suministro del modelo original

GS_global
83%

Rug	0.01
Visc	1.10E-06

Hcab	50.89

25.000
0.000

Tuberia	**Nudo Ini**	**Nudo Fin**	**Diam (mm)**	**Long (m)**	**Coste**	**z(fin)**	**Qinst**	**∑pi·Qi**	**GS**	**U**	**∑pi·(1-pi)·Qi^2**	**Q diseño**	**ks**	**V (m/s)**	**Re**	**f**	**hf**	**∑hf**	**H(fin)**	**P(fin)**
					€ 120,030.13															
P00_A	UGD_42	J30	299.2	260.3	€ 12,431.93	0	331.65	55.26209734	83%	0.9503	99.30198611	64.7321791	0.195182208	0.920676732	2.50E+05	0.0152	0.572	0.572	50.318	50.318
P00_A_H22	J30	H22	152	36.1	€ 473.27	22.07	21.34	3.555836446	83%	0.9503	9.380722222	6.46650599	0.303022774	0.356363017	4.92E+04	0.0211	0.032	0.604	50.286	28.216
P00_B	J30	J31	299.2	168.5	€ 8,047.56	0	310.31	51.70626089	83%	0.9503	89.92126389	60.7179451	0.19566867	0.863582843	2.35E+05	0.0154	0.329	0.901	49.989	49.989
P01_A	J31	J32	237.4	497.7	€ 16,374.33	0	115.45	19.23717515	83%	0.9503	48.36398611	25.846176	0.22387333	0.583908754	1.26E+05	0.0173	0.631	1.532	49.358	49.358
P01_B	J32	H900	190	141	€ 3,094.95	0	92.53	15.41806684	83%	0.9503	41.832875	21.564648	0.233055744	0.760580681	1.31E+05	0.0173	0.378	1.910	48.980	48.980
P01_C	H900	J88	190	9.2	€ 201.94	0	73.18	12.19381964	83%	0.9503	33.93513889	17.7298642	0.242277456	0.625328649	1.08E+05	0.0179	0.017	1.927	48.963	48.963
P01_C_H20	J88	H20	104.4	2.3	€ 20.68	22.64	36.89	6.146898148	83%	0.9503	24.33348611	10.8347829	0.293705149	1.265695792	1.20E+05	0.0178	0.032	1.959	48.931	26.291
P01_D	J88	J36	190	412.8	€ 9,060.96	0	36.29	6.046921491	83%	0.9503	9.601652778	8.99166695	0.247772581	0.317134237	5.48E+04	0.0206	0.229	2.156	48.734	48.734
P0101_H19	J32	H19	152	140	€ 1,835.40	24.04	22.92	3.81910831	83%	0.9503	6.531111111	6.24777714	0.272590626	0.344309077	4.76E+04	0.0213	0.118	1.651	49.239	25.199
P0102_H21	H900	H21	152	230.1	€ 3,016.61	21.56	19.35	3.224247199	83%	0.9503	7.897736111	5.89495314	0.304648741	0.324865281	4.49E+04	0.0215	0.175	2.085	48.805	27.245
P0103_A	J36	H	152	201.6	€ 2,642.98	0	28.86	4.808877218	83%	0.9503	8.963694444	7.65411315	0.265215286	0.421810922	5.83E+04	0.0204	0.245	2.401	48.489	48.489
P0103_A_H17	H	H17	132.4	3.2	€ 39.20	20.78	18.11	3.017628774	83%	0.9503	6.574319444	5.45431812	0.301177146	0.396163639	4.77E+04	0.0213	0.004	2.405	48.485	27.705
P0103_B_H18	H	H18	132.4	250	€ 3,062.50	23.36	10.75	1.791248444	83%	0.9503	2.389375	3.26023195	0.303277391	0.236800518	2.85E+04	0.0239	0.129	2.530	48.360	25.000
P0104_H16	J36	H16	104.4	561.5	€ 5,047.89	17.6	7.43	1.238044273	83%	0.9503	0.637958333	1.99709521	0.26878805	0.233296322	2.21E+04	0.0254	0.379	2.536	48.354	30.754
P02_A	J31	J42	213.6	395.4	€ 10,849.78	0	194.86	32.46908575	83%	0.9503	41.55727778	38.5953864	0.198067261	1.077067733	2.09E+05	0.0158	1.732	2.634	48.256	48.256
P02_B	J42	HJ	190	84.9	€ 1,863.56	0	100.55	16.75442149	83%	0.9503	20.75076389	21.0834636	0.209681388	0.743609406	1.28E+05	0.0173	0.218	3.143	47.747	47.747
P02_B_H10	HJ	H10	132.4	4.4	€ 53.90	20.34	15.15	2.524410598	83%	0.9503	3.375125	4.27031192	0.281868774	0.310165684	3.73E+04	0.0225	0.004	3.146	47.744	27.404
P02_C	HJ	J92	190	211.7	€ 4,646.82	0	85.4	14.23001089	83%	0.9503	17.37563889	18.1913786	0.213013801	0.641606166	1.11E+05	0.0178	0.417	3.559	47.331	47.331
P02_D	J92	J94	190	6.1	€ 133.90	0	62.75	10.45589208	83%	0.9503	15.26927778	14.1693971	0.225807125	0.499751708	8.63E+04	0.0187	0.008	3.567	47.323	47.323
P02_D_H9	J92	H9	117.8	3.9	€ 39.55	18.25	11.73	1.954543651	83%	0.9503	1.663708333	3.18032599	0.271127535	0.291803956	3.12E+04	0.0234	0.003	3.562	47.328	29.078
P02_E	J94	J54	190	267.5	€ 5,871.63	0	62.75	10.45589208	83%	0.9503	13.60556944	13.9612561	0.222490137	0.492410619	8.51E+04	0.0188	0.327	3.893	46.997	46.997
P0201_A	J54	J97	152	18.5	€ 242.54	0	44.04	7.338286648	83%	0.9503	7.690027778	9.97363917	0.226467738	0.549637803	7.59E+04	0.0193	0.036	3.930	46.960	46.960
P0201_A_H11	J97	H11	132.4	4	€ 49.00	18.71	11.48	1.91288671	83%	0.9503	2.194722222	3.32076316	0.289265083	0.241197083	2.90E+04	0.0238	0.002	3.932	46.958	28.248
P0201_B	J97	HSDS	152	178.2	€ 2,336.20	0	32.56	5.425399938	83%	0.9503	5.495305556	7.65317165	0.235048269	0.421759037	5.83E+04	0.0204	0.216	4.146	46.744	46.744
P0201_B_H13	HSDS	H13	117.8	3.7	€ 37.52	19.47	10.73	1.787915889	83%	0.9503	1.230291667	2.84200859	0.264865665	0.260762372	2.79E+04	0.0240	0.003	4.148	46.742	27.272
P0201_C	HSDS	H79	152	91.5	€ 1,199.57	0	21.83	3.637484049	83%	0.9503	4.265013889	5.60009848	0.256532225	0.30861612	4.26E+04	0.0218	0.064	4.209	46.681	46.681
P0201_C_H14	H79	H14	117.8	2.5	€ 25.35	20.55	10.17	1.694604342	83%	0.9503	1.454458333	2.84071198	0.279322711	0.260643405	2.79E+04	0.0240	0.002	4.211	46.679	26.129
P0201_D_H12	H79	H12	117.8	80	€ 811.20	20.43	11.66	1.942879707	83%	0.9503	2.810555556	3.53608173	0.303266015	0.324445558	3.47E+04	0.0229	0.083	4.293	46.597	26.167
P0202_A	HFHF	J42	190	123.8	€ 2,717.41	0	-94.31	15.71466425	83%	0.9503	20.80651389	20.0495177	-0.212591642	0.70714235	1.22E+05	0.0175	0.291	0.291	50.599	50.599
P0202_A_H8	HFHF	H8	132.4	3	€ 36.75	19.69	15.4	2.566067538	83%	0.9503	3.996722222	4.46595005	0.289996757	0.324375474	3.90E+04	0.0222	0.003	0.003	50.887	31.197
P0202_B	HFHF	J44	190	165.2	€ 3,626.14	0	78.91	13.14859672	83%	0.9503	16.80979167	17.0449285	0.21600467	0.601171107	1.04E+05	0.0180	0.289	0.289	50.601	50.601
P0202_C	J44	HRJF9	152	70.5	€ 924.26	0	65.27	10.87579404	83%	0.9503	12.86451389	14.284358	0.218850284	0.787197435	1.09E+05	0.0180	0.263	0.552	50.338	50.338
P0202_C_H5	HRJF9	H5	117.8	1.5	€ 15.21	18.59	11.9	1.98287037	83%	0.9503	1.973305556	3.31784168	0.278810225	0.304421412	3.26E+04	0.0232	0.001	0.554	50.336	31.746
P0202_E	HRJF9	H113	152	167.4	€ 2,194.61	0	53.37	8.892923669	83%	0.9503	10.89120833	12.029189	0.225392336	0.662917205	9.16E+04	0.0186	0.458	1.010	49.880	49.880
P0202_E_H4	H113	H4	104.4	3	€ 26.97	17.86	7.76	1.293031435	83%	0.9503	0.767888889	2.12579929	0.273943208	0.248331253	2.36E+04	0.0250	0.002	1.013	49.877	32.017
P0202_F_H3	H456	H3	132.4	5.5	€ 67.38	17.53	14.24	2.372779334	83%	0.9503	2.598277778	3.90463396	0.274201823	0.283605387	3.41E+04	0.0229	0.004	2.090	48.800	31.270
P0202_G	H456	J103	152	73.5	€ 963.59	0	31.37	5.227112901	83%	0.9503	7.525041667	7.83404199	0.249730379	0.43172663	5.97E+04	0.0203	0.093	2.179	48.711	48.711
P0202_G_H2	J103	H2	132.4	4.4	€ 53.90	18.51	14.73	2.454426937	83%	0.9503	3.361680556	4.19684749	0.284918363	0.30482974	3.67E+04	0.0225	0.004	2.183	48.707	30.197
P0202_H_H1	J103	H1	132.4	94.8	€ 1,161.30	20.11	16.64	2.772685963	83%	0.9503	4.163361111	4.71177077	0.283159301	0.342230177	4.12E+04	0.0220	0.094	2.273	48.617	28.507
P020202_H7	J44	H7	132.4	71.1	€ 870.98	18.35	13.64	2.272802677	83%	0.9503	3.945277778	4.16041827	0.305016002	0.302183776	3.64E+04	0.0226	0.056	0.345	50.545	32.195
P0202-F	H113	H456	152	491.9	€ 6,448.81	0	45.61	7.599892235	83%	0.9503	10.12331944	10.6235751	0.232922058	0.585455154	8.09E+04	0.0190	1.076	2.086	48.804	48.804
P0204_H6	J92	H6	104.4	151	€ 1,357.49	17.86	10.92	1.819575163	83%	0.9503	2.106361111	3.1988194	0.292932179	0.373679129	3.55E+04	0.0228	0.235	3.794	47.096	29.236
P0206_H15	J54	H15	152	461.8	€ 6,054.20	18.11	18.71	3.117605431	83%	0.9503	5.915541667	5.428989	0.290165099	0.299186439	4.13E+04	0.0219	0.304	4.197	46.693	28.583

1.1.1.2 Cálculo de la garantía suministro del ajuste modelo original

GS_global
80.14%

Rug	0.01
Visc	1.10E-06

Hcab	50.89

25.000
0.000

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	Long (m)	Coste	z(fin)	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
					€ 124,258.04															
P00_A	UGD_42	J30	379.8	260.3	€ 21,711.62	0	331.65	55.26209734	80%	0.8466	99.30198611	63.69882241	0.192066403	0.562252767	1.94E+05	0.0159	0.175	0.175	50.715	50.715
P00_A_H22	J30	H22	104.4	36.1	€ 324.54	22.07	21.34	3.555836446	80%	0.8466	9.380722222	6.14889944	0.288139618	0.718301068	6.82E+04	0.0198	0.180	0.356	50.534	28.464
P00_B	J30	J31	379.8	168.5	€ 14,054.59	0	310.31	51.70626089	80%	0.8466	89.92126389	59.73460781	0.192499783	0.527261687	1.82E+05	0.0160	0.101	0.276	50.614	50.614
P01_A	J31	J32	237.4	497.7	€ 16,374.33	0	115.45	19.23717515	80%	0.8466	48.36398611	25.12501479	0.217626806	0.567616505	1.23E+05	0.0174	0.600	0.876	50.014	50.014
P01_B	J32	H900	213.6	141	€ 3,869.04	0	92.53	15.41806684	80%	0.8466	41.832875	20.89394512	0.225807253	0.583079901	1.13E+05	0.0177	0.203	1.078	49.812	49.812
P01_C	H900	J88	190	9.2	€ 201.94	0	73.18	12.19381964	80%	0.8466	33.93513889	17.1257819	0.23402271	0.604022791	1.04E+05	0.0180	0.016	1.094	49.796	49.796
P01_C_H20	J88	H20	104.4	2.3	€ 20.68	22.64	36.89	6.146898148	80%	0.8466	24.33348611	10.32325015	0.279838714	1.205939644	1.14E+05	0.0180	0.029	1.124	49.766	27.126
P01_D	J88	J36	152	412.8	€ 5,411.81	0	36.29	6.046921491	80%	0.8466	9.601652778	8.670342111	0.238918217	0.477814337	6.60E+04	0.0198	0.627	1.721	49.169	49.169
P0101_H19	J32	H19	104.4	140	€ 1,258.60	24.04	22.92	3.81910831	80%	0.8466	6.531111111	5.982765566	0.261028166	0.69889367	6.63E+04	0.0200	0.666	1.542	49.348	25.308
P0102_H21	H900	H21	104.4	230.1	€ 2,068.60	21.56	19.35	3.224247199	80%	0.8466	7.897736111	5.60353095	0.289588163	0.654592306	6.21E+04	0.0202	0.973	2.051	48.839	27.279
P0103_A	J36	H	132.4	201.6	€ 2,469.60	0	28.86	4.808877218	80%	0.8466	8.963694444	7.343646592	0.254457609	0.533391287	6.42E+04	0.0200	0.441	2.163	48.727	48.727
P0103_A_H17	H	H17	104.4	3.2	€ 28.77	20.78	18.11	3.017628774	80%	0.8466	6.574319444	5.188431362	0.286495382	0.606101274	5.75E+04	0.0205	0.012	2.174	48.716	27.936
P0103_B_H18	H	H18	104.4	250	€ 2,247.50	23.36	10.75	1.791248444	80%	0.8466	2.389375	3.099939358	0.288366452	0.362128178	3.44E+04	0.0229	0.367	2.530	48.360	25.000
P0104_H16	J36	H16	104.4	561.5	€ 5,047.89	17.6	7.43	1.238044273	80%	0.8466	0.637958333	1.914269062	0.25764052	0.223620751	2.12E+04	0.0257	0.352	2.073	48.817	31.217
P02_A	J31	J42	237.4	395.4	€ 13,008.66	0	194.86	32.46908575	80%	0.8466	41.55727778	37.92689653	0.194636644	0.856832628	1.85E+05	0.0161	1.006	1.282	49.608	49.608
P02_B	J42	HJ	190	84.9	€ 1,863.56	0	100.55	16.75442149	80%	0.8466	20.75076389	20.611087	0.204983461	0.726948782	1.26E+05	0.0174	0.209	1.769	49.121	49.121
P02_B_H10	HJ	H10	104.4	4.4	€ 39.56	20.34	15.15	2.524410598	80%	0.8466	3.375125	4.079802596	0.269293901	0.476593672	4.52E+04	0.0216	0.011	1.780	49.110	28.770
P02_C	HJ	J92	152	211.7	€ 2,775.39	0	85.4	14.23001089	80%	0.8466	17.37563889	17.75912191	0.207952247	0.978688379	1.35E+05	0.0173	1.173	2.942	47.948	47.948
P02_D	J92	J94	152	6.1	€ 79.97	0	62.75	10.45589208	80%	0.8466	15.26927778	13.76418669	0.219349589	0.758531284	1.05E+05	0.0181	0.021	2.964	47.926	47.926
P02_D_H9	J92	H9	104.4	3.9	€ 35.06	18.25	11.73	1.954543651	80%	0.8466	1.663708333	3.046571026	0.259724725	0.355893805	3.38E+04	0.0230	0.006	2.948	47.942	29.692
P02_E	J94	J54	152	267.5	€ 3,506.93	0	62.75	10.45589208	80%	0.8466	13.60556944	13.57875766	0.216394544	0.748312466	1.03E+05	0.0181	0.911	3.875	47.015	47.015
P0201_A	J54	J97	132.4	18.5	€ 226.63	0	44.04	7.338286648	80%	0.8466	7.690027778	9.686074676	0.219938117	0.703528931	8.47E+04	0.0189	0.067	3.941	46.949	46.949
P0201_A_H11	J97	H11	117.8	4	€ 40.56	18.71	11.48	1.91288671	80%	0.8466	2.194722222	3.167138444	0.27588314	0.290593962	3.11E+04	0.0234	0.003	3.945	46.945	28.235
P0201_B	J97	HSDS	117.8	178.2	€ 1,806.95	0	32.56	5.425399938	80%	0.8466	5.495305556	7.410081578	0.227582358	0.679896064	7.28E+04	0.0195	0.696	4.638	46.252	46.252
P0201_B_H13	HSDS	H13	104.4	3.7	€ 33.26	19.47	10.73	1.787915889	80%	0.8466	1.230291667	2.72698806	0.254146138	0.318560818	3.02E+04	0.0236	0.004	4.642	46.248	26.778
P0201_C	HSDS	H79	104.4	91.5	€ 822.59	0	21.83	3.637484049	80%	0.8466	4.265013889	5.385941847	0.246722027	0.62917402	5.97E+04	0.0204	0.360	4.998	45.892	45.892
P0201_C_H14	H79	H14	104.4	2.5	€ 22.48	20.55	10.17	1.694604342	80%	0.8466	1.454458333	2.715650961	0.26702566	0.317236443	3.01E+04	0.0236	0.003	5.001	45.889	25.339
P0201_D_H12	H79	H12	104.4	80	€ 719.20	20.43	11.66	1.942879707	80%	0.8466	2.810555556	3.362234657	0.288356317	0.392768945	3.73E+04	0.0225	0.136	5.134	45.756	25.326
P0202_A	HFHF	J42	190	123.8	€ 2,717.41	0	-94.31	15.71466425	80%	0.8466	20.80651389	19.57650704	-0.207576154	0.69045936	1.19E+05	0.0176	0.278	0.278	50.612	50.612
P0202_A_H8	HFHF	H8	104.4	3	€ 26.97	19.69	15.4	2.566067538	80%	0.8466	3.996722222	4.258638602	0.276534974	0.497484905	4.72E+04	0.0214	0.008	0.008	50.882	31.192
P0202_B	HFHF	J44	190	165.2	€ 3,626.14	0	78.91	13.14859672	80%	0.8466	16.80979167	16.6197684	0.210616758	0.586175799	1.01E+05	0.0181	0.276	0.276	50.614	50.614
P0202_C	J44	HRJF9	190	70.5	€ 1,547.48	0	65.27	10.87579404	80%	0.8466	12.86451389	13.91242223	0.213151865	0.490688259	8.48E+04	0.0188	0.086	0.362	50.528	50.528
P0202_C_H5	HRJF9	H5	104.4	1.5	€ 13.49	18.59	11.9	1.98287037	80%	0.8466	1.973305556	3.172172232	0.266569095	0.370566265	3.52E+04	0.0228	0.002	0.364	50.526	31.936
P0202_E	HRJF9	H113	152	167.4	€ 2,194.61	0	53.37	8.892923669	80%	0.8466	10.89120833	11.68696588	0.218980061	0.644057614	8.90E+04	0.0187	0.435	0.797	50.093	50.093
P0202_E_H4	H113	H4	104.4	3	€ 26.97	17.86	7.76	1.293031435	80%	0.8466	0.767888889	2.0349293	0.262233157	0.237716018	2.26E+04	0.0253	0.002	0.799	50.091	32.231
P0202_F_H3	H456	H3	104.4	5.5	€ 49.45	17.53	14.24	2.372779334	80%	0.8466	2.598277778	3.737480991	0.262463553	0.436604406	4.14E+04	0.0220	0.011	2.786	48.104	30.574
P0202_G	H456	J103	117.8	73.5	€ 745.29	0	31.37	5.227112901	80%	0.8466	7.525041667	7.549579003	0.240662385	0.692695349	7.42E+04	0.0195	0.297	3.072	47.818	47.818
P0202_G_H2	J103	H2	104.4	4.4	€ 39.56	18.51	14.73	2.454426937	80%	0.8466	3.361680556	4.006717977	0.272010725	0.468056085	4.44E+04	0.0217	0.010	3.082	47.808	29.298
P0202_H_H1	J103	H1	104.4	94.8	€ 852.25	20.11	16.64	2.772685963	80%	0.8466	4.163361111	4.500181643	0.270443608	0.525701438	4.99E+04	0.0212	0.271	3.342	47.548	27.438
P020202_H7	J44	H7	104.4	71.1	€ 639.19	18.35	13.64	2.272802677	80%	0.8466	3.945277778	3.954445362	0.289915349	0.461949712	4.38E+04	0.0218	0.161	0.437	50.453	32.103
P0202-F	H113	H456	132.4	491.9	€ 6,025.78	0	45.61	7.599892235	80%	0.8466	10.12331944	10.29363673	0.225688155	0.747658002	9.00E+04	0.0187	1.978	2.775	48.115	48.115
P0204_H6	J92	H6	117.8	151	€ 1,531.14	17.86	10.92	1.819575163	80%	0.8466	2.106361111	3.048318975	0.279150089	0.279691937	3.00E+04	0.0236	0.121	3.063	47.827	29.967
P0206_H15	J54	H15	104.4	461.8	€ 4,151.58	18.11	18.71	3.117605431	80%	0.8466	5.915541667	5.176775364	0.276684947	0.604739646	5.74E+04	0.0205	1.694	5.569	45.321	27.211

1.1.1.3 Resultados del ajuste mínimo del proyecto original

En este subcapítulo se pueden observar los resultados obtenidos del diseño realizado en el ajuste mínimo del proyecto original. En la tabla adjunta se identifican las columnas por cada tubería, en el cual se observa el diámetro seleccionado, la velocidad y la presión en el nudo final, en función del caudal de diseño para 5 turnos. La última columna es el coste del tramo de tubería, siendo el producto del precio unitario del diámetro seleccionado y la longitud de la tubería.

Tubería	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P00_A	UGD_42	J30	260.3	66.33	379.8	400	0.59	50.70	€ 21,711.62
P00_A_H22	J30	H22	36.1	4.27	104.4	110	0.50	28.54	€ 324.54
P00_B	J30	J31	168.5	62.06	379.8	400	0.55	50.59	€ 14,054.59
P01_A	J31	J32	497.7	23.09	237.4	250	0.52	50.08	€ 16,374.33
P01_B	J32	H900	141	18.51	213.6	225	0.52	49.92	€ 3,869.04
P01_C	H900	J88	9.2	14.64	190	200	0.52	49.90	€ 201.94
P01_C_H20	J88	H20	2.3	7.38	104.4	110	0.86	27.25	€ 20.68
P01_D	J88	J36	412.8	7.26	152	160	0.40	49.45	€ 5,411.81
P0101_H19	J32	H19	140	4.58	104.4	110	0.54	25.63	€ 1,258.60
P0102_H21	H900	H21	230.1	3.87	104.4	110	0.45	27.85	€ 2,068.60
P0103_A	J36	H	201.6	5.77	132.4	140	0.42	49.16	€ 2,469.60
P0103_A_H17	H	H17	3.2	3.62	104.4	110	0.42	28.37	€ 28.77
P0103_B_H18	H	H18	250	2.15	104.4	110	0.25	25.61	€ 2,247.50
P0104_H16	J36	H16	561.5	1.49	104.4	110	0.17	31.62	€ 5,047.89
P02_A	J31	J42	395.4	38.97	237.4	250	0.88	49.54	€ 13,008.66
P02_B	J42	HJ	84.9	20.11	190	200	1.46	48.38	€ 1,863.56
P02_B_H10	HJ	H10	4.4	3.03	104.4	110	0.35	28.04	€ 39.56
P02_C	HJ	J92	211.7	17.08	152	160	1.57	44.62	€ 2,775.39
P02_D	J92	J94	6.1	12.55	152	160	0.69	48.23	€ 79.97
P02_D_H9	J92	H9	3.9	2.35	104.4	110	0.27	29.99	€ 35.06
P02_E	J94	J54	267.5	12.55	152	160	0.69	47.44	€ 3,506.93
P0201_A	J54	J97	18.5	8.81	132.4	140	0.64	47.38	€ 226.63
P0201_A_H11	J97	H11	4	2.3	117.8	125	0.21	28.67	€ 40.56
P0201_B	J97	HSDS	178.2	6.51	117.8	125	0.60	46.83	€ 1,806.95
P0201_B_H13	HSDS	H13	3.7	2.15	104.4	110	0.25	27.35	€ 33.26
P0201_C	HSDS	H79	91.5	4.37	104.4	110	0.51	46.58	€ 822.59
P0201_C_H14	H79	H14	2.5	2.03	104.4	110	0.24	26.03	€ 22.48
P0201_D_H12	H79	H12	80	2.33	104.4	110	0.27	26.08	€ 719.20
P0202_A	J42	HFHF	123.8	18.86	190	200	0.67	49.28	€ 2,717.41
P0202_A_H8	HFHF	H8	3	3.08	104.4	110	0.36	29.58	€ 26.97
P0202_B	HFHF	J44	165.2	15.78	190	200	0.56	49.03	€ 3,626.14
P0202_C	J44	HRJF9	70.5	13.05	190	200	0.46	48.95	€ 1,547.48
P0202_C_H5	HRJF9	H5	1.5	2.38	104.4	110	0.28	30.36	€ 13.49
P0202_E	HRJF9	H113	167.4	10.67	152	160	0.59	48.58	€ 2,194.61
P0202_E_H4	H113	H4	3	1.55	104.4	110	0.18	30.72	€ 26.97
P0202_F_H3	H456	H3	5.5	2.85	104.4	110	0.33	29.45	€ 49.45
P0202_G	H456	J103	73.5	6.27	117.8	125	0.58	46.78	€ 745.29
P0202_G_H2	J103	H2	4.4	2.95	104.4	110	0.34	28.26	€ 39.56
P0202_H_H1	J103	H1	94.8	3.33	104.4	110	0.39	26.51	€ 852.25
P020202_H7	J44	H7	71.1	2.73	104.4	110	0.32	30.59	€ 639.19
P0202-F	H113	H456	491.9	9.12	132.4	140	0.66	46.99	€ 6,025.78
P0204_H6	J92	H6	151	2.18	117.8	125	0.26	26.64	€ 1,531.14
P0206_H15	J54	H15	461.8	3.74	104.4	110	0.44	28.38	€ 4,151.58

1.1.2 Análisis de alternativas sin modificación del trazado

1.1.2.1 Diseño a la demanda con garantía suministro del 99%

1.1.2.1.1 Calculo del caudal de diseño por el método de Clement

A continuación se puede observar el cálculo del caudal de diseño para una GS del 99%, a partir de la sumatoria de caudales demandados en las parcelas y la probabilidad de apertura de la toma.

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Coste	Qinst	∑pi·Qi	U	∑pi·(1-pi)·Qi^2	Q diseño	ks
P00_A	UGD_42	J30	299.2	315	260.3	0	12,431.93 €	331.65	55.26209734	2.3263	99.30	78.44	0.24
P00_A_H22	J30	H22	152	160	36.1	22.07	473.27 €	21.34	3.555836446	2.3263	9.38	10.68	0.50
P00_B	J30	J31	299.2	315	168.5	0	8,047.56 €	310.31	51.70626089	2.3263	89.92	73.77	0.24
P01_A	J31	J32	237.4	250	497.7	0	16,374.33 €	115.45	19.23717515	2.3263	48.36	35.42	0.31
P01_B	J32	H900	190	200	141	0	3,094.95 €	92.53	15.41806684	2.3263	41.83	30.46	0.33
P01_C	H900	J88	190	200	9.2	0	201.94 €	73.18	12.19381964	2.3263	33.94	25.75	0.35
P01_C_H20	J88	H20	104.4	110	2.3	22.64	20.68 €	36.89	6.146898148	2.3263	24.33	17.62	0.48
P01_D	J88	J36	190	200	412.8	0	9,060.96 €	36.29	6.046921491	2.3263	9.60	13.26	0.37
P0101_H19	J32	H19	152	160	140	24.04	1,835.40 €	22.92	3.81910831	2.3263	6.53	9.76	0.43
P0102_H21	H900	H21	152	160	230.1	21.56	3,016.61 €	19.35	3.224247199	2.3263	7.90	9.76	0.50
P0103_A	J36	H	152	160	201.6	0	2,642.98 €	28.86	4.808877218	2.3263	8.96	11.77	0.41
P0103_A_H17	H	H17	132.4	140	3.2	20.78	39.20 €	18.11	3.017628774	2.3263	6.57	8.98	0.50
P0103_B_H18	H	H18	132.4	140	250	23.36	3,062.50 €	10.75	1.791248444	2.3263	2.39	5.39	0.50
P0104_H16	J36	H16	104.4	110	561.5	17.6	5,047.89 €	7.43	1.238044273	2.3263	0.64	3.10	0.42
P02_A	J31	J42	213.6	225	395.4	0	10,849.78 €	194.86	32.46908575	2.3263	41.56	47.47	0.24
P02_B	J42	HJ	190	200	84.9	0	1,863.56 €	100.55	16.75442149	2.3263	20.75	27.35	0.27
P02_B_H10	HJ	H10	132.4	140	4.4	20.34	53.90 €	15.15	2.524410598	2.3263	3.38	6.80	0.45
P02_C	HJ	J92	190	200	211.7	0	4,646.82 €	85.4	14.23001089	2.3263	17.38	23.93	0.28
P02_D	J92	J94	190	200	6.1	0	133.90 €	62.75	10.45589208	2.3263	15.27	19.55	0.31
P02_D_H9	J92	H9	117.8	125	3.9	18.25	39.55 €	11.73	1.954543651	2.3263	1.66	4.96	0.42
P02_E	J94	J54	190	200	267.5	0	5,871.63 €	62.75	10.45589208	2.3263	13.61	19.04	0.30
P0201_A	J54	J97	152	160	18.5	0	242.54 €	44.04	7.338286648	2.3263	7.69	13.79	0.31
P0201_A_H11	J97	H11	132.4	140	4	18.71	49.00 €	11.48	1.91288671	2.3263	2.19	5.36	0.47
P0201_B	J97	HSDS	152	160	178.2	0	2,336.20 €	32.56	5.425399938	2.3263	5.50	10.88	0.33
P0201_B_H13	HSDS	H13	117.8	125	3.7	19.47	37.52 €	10.73	1.787915889	2.3263	1.23	4.37	0.41
P0201_C	HSDS	H79	152	160	91.5	0	1,199.57 €	21.83	3.637484049	2.3263	4.27	8.44	0.39
P0201_C_H14	H79	H14	117.8	125	2.5	20.55	25.35 €	10.17	1.694604342	2.3263	1.45	4.50	0.44
P0201_D_H12	H79	H12	117.8	125	80	20.43	811.20 €	11.66	1.942879707	2.3263	2.81	5.84	0.50
P0202_A	J42	HFHF	190	200	123.8	0	2,717.41 €	94.31	15.71466425	2.3263	20.81	26.33	0.28
P0202_A_H8	HFHF	H8	132.4	140	3	19.69	36.75 €	15.4	2.566067538	2.3263	4.00	7.22	0.47
P0202_B	HFHF	J44	190	200	165.2	0	3,626.14 €	78.91	13.14859672	2.3263	16.81	22.69	0.29
P0202_C	J44	HRJF9	152	160	70.5	0	924.26 €	65.27	10.87579404	2.3263	12.86	19.22	0.29
P0202_C_H5	HRJF9	H5	117.8	125	1.5	18.59	15.21 €	11.9	1.98287037	2.3263	1.97	5.25	0.44
P0202_E	HRJF9	H113	152	160	167.4	0	2,194.61 €	53.37	8.892923669	2.3263	10.89	16.57	0.31
P0202_E_H4	H113	H4	104.4	110	3	17.86	26.97 €	7.76	1.293031435	2.3263	0.77	3.33	0.43
P0202_F_H3	H456	H3	132.4	140	5.5	17.53	67.38 €	14.24	2.372779334	2.3263	2.60	6.12	0.43
P0202_G	H456	J103	152	160	73.5	0	963.59 €	31.37	5.227112901	2.3263	7.53	11.61	0.37
P0202_G_H2	J103	H2	132.4	140	4.4	18.51	53.90 €	14.73	2.454426937	2.3263	3.36	6.72	0.46
P0202_H_H1	J103	H1	132.4	140	94.8	20.11	1,161.30 €	16.64	2.772685963	2.3263	4.16	7.52	0.45
P020202_H7	J44	H7	132.4	140	71.1	18.35	870.98 €	13.64	2.272802677	2.3263	3.95	6.89	0.51
P0202-F	H113	H456	152	160	491.9	0	6,448.81 €	45.61	7.599892235	2.3263	10.12	15.00	0.33
P0204_H6	J92	H6	104.4	110	151	17.86	1,357.49 €	10.92	1.819575163	2.3263	2.11	5.20	0.48
P0206_H15	J54	H15	152	160	461.8	18.11	6,054.20 €	18.71	3.117605431	2.3263	5.92	8.78	0.47

1.1.2.1.2 Resultado del diseño por pendiente hidráulica con cabecera conocida Qdis 99%

En este subcapítulo se pueden observar los resultados obtenidos del diseño realizado por el método de la pendiente hidráulica con cabecera conocida. En la tabla adjunta se identifican las columnas por cada tubería, en el cual se observa el diámetro seleccionado, la velocidad y la presión en el nudo final, en función del caudal de diseño para una GS del 99%, obtenido por el método de Clement. La última columna es el coste del tramo de tubería, siendo el producto del precio unitario del diámetro seleccionado y la longitud de la tubería.

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN(mm)	Velocidad (m/s)	Presion (mca)	Coste
P00_A	UGD_42	J30	260.3	78.44	379.8	400	0.69	50.63	€ 21,711.62
P00_A_H22	J30	H22	36.1	10.68	104.4	110	1.25	28.07	€ 324.54
P00_B	J30	J31	168.5	73.77	379.8	400	0.65	50.49	€ 14,054.59
P01_A	J31	J32	497.7	35.42	299.2	315	0.50	50.12	€ 23,770.15
P01_B	J32	H900	141	30.46	299.2	315	0.43	50.04	€ 6,734.16
P01_C	H900	J88	9.2	25.75	237.4	250	0.58	50.03	€ 302.68
P01_C_H20	J88	H20	2.3	17.62	132.4	140	1.28	27.37	€ 28.18
P01_D	J88	J36	412.8	13.26	190	200	0.47	49.57	€ 9,060.96
P0101_H19	J32	H19	140	9.76	132.4	140	0.71	25.57	€ 1,715.00
P0102_H21	H900	H21	230.1	9.76	117.8	125	0.90	27.00	€ 2,333.21
P0103_A	J36	H	201.6	11.77	190	200	0.42	49.39	€ 4,425.12
P0103_A_H17	H	H17	3.2	8.98	117.8	125	0.82	28.59	€ 32.45
P0103_B_H18	H	H18	250	5.39	132.4	140	0.39	25.72	€ 3,062.50
P0104_H16	J36	H16	561.5	3.1	104.4	110	0.36	31.15	€ 5,047.89
P02_A	J31	J42	395.4	47.47	299.2	315	0.68	49.99	€ 18,884.30
P02_B	J42	HJ	84.9	27.35	190	200	0.96	49.64	€ 1,863.56
P02_B_H10	HJ	H10	4.4	6.8	104.4	110	0.79	27.60	€ 39.56
P02_C	HJ	J92	211.7	23.93	190	200	0.84	48.96	€ 4,646.82
P02_D	J92	J94	6.1	19.55	190	200	0.69	48.94	€ 133.90
P02_D_H9	J92	H9	3.9	4.96	104.4	110	0.58	30.69	€ 35.06
P02_E	J94	J54	267.5	19.04	190	200	0.67	48.37	€ 5,871.63
P0201_A	J54	J97	18.5	13.79	152	160	0.76	48.31	€ 242.54
P0201_A_H11	J97	H11	4	5.36	117.8	125	0.49	29.59	€ 40.56
P0201_B	J97	HSDS	178.2	10.88	132.4	140	0.79	47.52	€ 2,182.95
P0201_B_H13	HSDS	H13	3.7	4.37	104.4	110	0.51	28.04	€ 33.26
P0201_C	HSDS	H79	91.5	8.44	117.8	125	0.77	47.06	€ 927.81
P0201_C_H14	H79	H14	2.5	4.5	104.4	110	0.53	26.51	€ 22.48
P0201_D_H12	H79	H12	80	5.84	104.4	110	0.68	26.27	€ 719.20
P0202_A	J42	HFHF	123.8	26.33	213.6	225	0.73	49.72	€ 3,397.07
P0202_A_H8	HFHF	H8	3	7.22	104.4	110	0.84	30.01	€ 26.97
P0202_B	HFHF	J44	165.2	22.69	213.6	225	0.63	49.45	€ 4,533.09
P0202_C	J44	HRJF9	70.5	19.22	190	200	0.68	49.29	€ 1,547.48
P0202_C_H5	HRJF9	H5	1.5	5.25	104.4	110	0.61	30.70	€ 13.49
P0202_E	HRJF9	H113	167.4	16.57	190	200	0.58	49.02	€ 3,674.43
P0202_E_H4	H113	H4	3	3.33	104.4	110	0.39	31.15	€ 26.97
P0202_F_H3	H456	H3	5.5	6.12	104.4	110	0.72	30.77	€ 49.45
P0202_G	H456	J103	73.5	11.61	152	160	0.64	48.14	€ 963.59
P0202_G_H2	J103	H2	4.4	6.72	104.4	110	0.78	29.61	€ 39.56
P0202_H_H1	J103	H1	94.8	7.52	132.4	140	0.55	27.82	€ 1,161.30
P020202_H7	J44	H7	71.1	6.89	104.4	110	0.81	30.66	€ 639.19
P0202-F	H113	H456	491.9	15	190	200	0.53	48.33	€ 10,797.21
P0204_H6	J92	H6	151	5.2	117.8	125	0.48	30.79	€ 1,531.14
P0206_H15	J54	H15	461.8	8.78	104.4	110	1.03	25.87	€ 4,151.58

1.1.2.2 Diseño a la demanda con garantía suministro del 95%

1.1.2.2.1 Calculo del caudal de diseño por el método de Clement

A continuación se puede observar el cálculo del caudal de diseño para una GS del 95%, a partir de la sumatoria de caudales demandados en las parcelas y la probabilidad de apertura de la toma.

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Coste	Qinst	∑pi·Qi	U	∑pi·(1-pi)·Qi^2	Q diseño	ks
P00_A	UGD_42	J30	299.2	315	260.3	0	12,431.93 €	331.65	55.26209734	1.6449	99.30	71.65	0.22
P00_A_H22	J30	H22	152	160	36.1	22.07	473.27 €	21.34	3.555836446	1.6449	9.38	8.59	0.40
P00_B	J30	J31	299.2	315	168.5	0	8,047.56 €	310.31	51.70626089	1.6449	89.92	67.30	0.22
P01_A	J31	J32	237.4	250	497.7	0	16,374.33 €	115.45	19.23717515	1.6449	48.36	30.68	0.27
P01_B	J32	H900	190	200	141	0	3,094.95 €	92.53	15.41806684	1.6449	41.83	26.06	0.28
P01_C	H900	J88	190	200	9.2	0	201.94 €	73.18	12.19381964	1.6449	33.94	21.78	0.30
P01_C_H20	J88	H20	104.4	110	2.3	22.64	20.68 €	36.89	6.146898148	1.6449	24.33	14.26	0.39
P01_D	J88	J36	190	200	412.8	0	9,060.96 €	36.29	6.046921491	1.6449	9.60	11.14	0.31
P0101_H19	J32	H19	152	160	140	24.04	1,835.40 €	22.92	3.81910831	1.6449	6.53	8.02	0.35
P0102_H21	H900	H21	152	160	230.1	21.56	3,016.61 €	19.35	3.224247199	1.6449	7.90	7.85	0.41
P0103_A	J36	H	152	160	201.6	0	2,642.98 €	28.86	4.808877218	1.6449	8.96	9.73	0.34
P0103_A_H17	H	H17	132.4	140	3.2	20.78	39.20 €	18.11	3.017628774	1.6449	6.57	7.24	0.40
P0103_B_H18	H	H18	132.4	140	250	23.36	3,062.50 €	10.75	1.791248444	1.6449	2.39	4.33	0.40
P0104_H16	J36	H16	104.4	110	561.5	17.6	5,047.89 €	7.43	1.238044273	1.6449	0.64	2.55	0.34
P02_A	J31	J42	213.6	225	395.4	0	10,849.78 €	194.86	32.46908575	1.6449	41.56	43.07	0.22
P02_B	J42	HJ	190	200	84.9	0	1,863.56 €	100.55	16.75442149	1.6449	20.75	24.25	0.24
P02_B_H10	HJ	H10	132.4	140	4.4	20.34	53.90 €	15.15	2.524410598	1.6449	3.38	5.55	0.37
P02_C	HJ	J92	190	200	211.7	0	4,646.82 €	85.4	14.23001089	1.6449	17.38	21.09	0.25
P02_D	J92	J94	190	200	6.1	0	133.90 €	62.75	10.45589208	1.6449	15.27	16.88	0.27
P02_D_H9	J92	H9	117.8	125	3.9	18.25	39.55 €	11.73	1.954543651	1.6449	1.66	4.08	0.35
P02_E	J94	J54	190	200	267.5	0	5,871.63 €	62.75	10.45589208	1.6449	13.61	16.52	0.26
P0201_A	J54	J97	152	160	18.5	0	242.54 €	44.04	7.338286648	1.6449	7.69	11.90	0.27
P0201_A_H11	J97	H11	132.4	140	4	18.71	49.00 €	11.48	1.91288671	1.6449	2.19	4.35	0.38
P0201_B	J97	HSDS	152	160	178.2	0	2,336.20 €	32.56	5.425399938	1.6449	5.50	9.28	0.29
P0201_B_H13	HSDS	H13	117.8	125	3.7	19.47	37.52 €	10.73	1.787915889	1.6449	1.23	3.61	0.34
P0201_C	HSDS	H79	152	160	91.5	0	1,199.57 €	21.83	3.637484049	1.6449	4.27	7.03	0.32
P0201_C_H14	H79	H14	117.8	125	2.5	20.55	25.35 €	10.17	1.694604342	1.6449	1.45	3.68	0.36
P0201_D_H12	H79	H12	117.8	125	80	20.43	811.20 €	11.66	1.942879707	1.6449	2.81	4.70	0.40
P0202_A	J42	HFHF	190	200	123.8	0	2,717.41 €	94.31	15.71466425	1.6449	20.81	23.22	0.25
P0202_A_H8	HFHF	H8	132.4	140	3	19.69	36.75 €	15.4	2.566067538	1.6449	4.00	5.85	0.38
P0202_B	HFHF	J44	190	200	165.2	0	3,626.14 €	78.91	13.14859672	1.6449	16.81	19.89	0.25
P0202_C	J44	HRJF9	152	160	70.5	0	924.26 €	65.27	10.87579404	1.6449	12.86	16.78	0.26
P0202_C_H5	HRJF9	H5	117.8	125	1.5	18.59	15.21 €	11.9	1.98287037	1.6449	1.97	4.29	0.36
P0202_E	HRJF9	H113	152	160	167.4	0	2,194.61 €	53.37	8.892923669	1.6449	10.89	14.32	0.27
P0202_E_H4	H113	H4	104.4	110	3	17.86	26.97 €	7.76	1.293031435	1.6449	0.77	2.73	0.35
P0202_F_H3	H456	H3	132.4	140	5.5	17.53	67.38 €	14.24	2.372779334	1.6449	2.60	5.02	0.35
P0202_G	H456	J103	152	160	73.5	0	963.59 €	31.37	5.227112901	1.6449	7.53	9.74	0.31
P0202_G_H2	J103	H2	132.4	140	4.4	18.51	53.90 €	14.73	2.454426937	1.6449	3.36	5.47	0.37
P0202_H_H1	J103	H1	132.4	140	94.8	20.11	1,161.30 €	16.64	2.772685963	1.6449	4.16	6.13	0.37
P020202_H7	J44	H7	132.4	140	71.1	18.35	870.98 €	13.64	2.272802677	1.6449	3.95	5.54	0.41
P0202-F	H113	H456	152	160	491.9	0	6,448.81 €	45.61	7.599892235	1.6449	10.12	12.83	0.28
P0204_H6	J92	H6	104.4	110	151	17.86	1,357.49 €	10.92	1.819575163	1.6449	2.11	4.21	0.39
P0206_H15	J54	H15	152	160	461.8	18.11	6,054.20 €	18.71	3.117605431	1.6449	5.92	7.12	0.38

1.1.2.2.2 Resultado del diseño por pendiente hidráulica con cabecera conocida Qdis 95%

En este subcapítulo se pueden observar los resultados obtenidos del diseño realizado por el método de la pendiente hidráulica con cabecera conocida. En la tabla adjunta se identifican las columnas por cada tubería, en el cual se observa el diámetro seleccionado, la velocidad y la presión en el nudo final, en función del caudal de diseño para una GS del 95%, obtenido por el método de Clement. La última columna es el coste del tramo de tubería, siendo el producto del precio unitario del diámetro seleccionado y la longitud de la tubería.

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P00_A	UGD_42	J30	260.3	71.65	379.8	400	0.63	50.67	€ 21,711.62
P00_A_H22	J30	H22	36.1	8.59	104.4	110	1.00	28.27	€ 324.54
P00_B	J30	J31	168.5	67.3	379.8	400	0.59	50.55	€ 14,054.59
P01_A	J31	J32	497.7	30.68	299.2	315	0.44	50.27	€ 23,770.15
P01_B	J32	H900	141	26.06	237.4	250	0.59	50.08	€ 4,638.90
P01_C	H900	J88	9.2	21.78	237.4	250	0.49	50.08	€ 302.68
P01_C_H20	J88	H20	2.3	14.26	132.4	140	1.04	27.42	€ 28.18
P01_D	J88	J36	412.8	11.14	190	200	0.39	49.74	€ 9,060.96
P0101_H19	J32	H19	140	8.02	117.8	125	0.74	25.59	€ 1,419.60
P0102_H21	H900	H21	230.1	7.85	104.4	110	0.92	26.74	€ 2,068.60
P0103_A	J36	H	201.6	9.73	190	200	0.34	49.61	€ 4,425.12
P0103_A_H17	H	H17	3.2	7.24	104.4	110	0.85	28.81	€ 28.77
P0103_B_H18	H	H18	250	4.33	117.8	125	0.40	25.88	€ 2,535.00
P0104_H16	J36	H16	561.5	2.55	104.4	110	0.30	31.56	€ 5,047.89
P02_A	J31	J42	395.4	43.07	299.2	315	0.61	50.13	€ 18,884.30
P02_B	J42	HJ	84.9	24.25	190	200	0.86	49.85	€ 1,863.56
P02_B_H10	HJ	H10	4.4	5.55	104.4	110	0.65	28.15	€ 39.56
P02_C	HJ	J92	211.7	21.09	190	200	0.74	49.31	€ 4,646.82
P02_D	J92	J94	6.1	16.88	190	200	0.60	49.30	€ 133.90
P02_D_H9	J92	H9	3.9	4.08	104.4	110	0.48	31.05	€ 35.06
P02_E	J94	J54	267.5	16.52	190	200	0.58	48.86	€ 5,871.63
P0201_A	J54	J97	18.5	11.9	152	160	0.66	48.81	€ 242.54
P0201_A_H11	J97	H11	4	4.35	117.8	125	0.40	30.09	€ 40.56
P0201_B	J97	HSDS	178.2	9.28	117.8	125	0.85	47.76	€ 1,806.95
P0201_B_H13	HSDS	H13	3.7	3.61	104.4	110	0.42	28.28	€ 33.26
P0201_C	HSDS	H79	91.5	7.03	104.4	110	0.82	47.18	€ 822.59
P0201_C_H14	H79	H14	2.5	3.68	104.4	110	0.43	26.62	€ 22.48
P0201_D_H12	H79	H12	80	4.7	104.4	110	0.55	26.50	€ 719.20
P0202_A	J42	HFHF	123.8	23.22	213.6	225	0.65	49.92	€ 3,397.07
P0202_A_H8	HFHF	H8	3	5.85	104.4	110	0.68	30.21	€ 26.97
P0202_B	HFHF	J44	165.2	19.89	190	200	0.70	49.54	€ 3,626.14
P0202_C	J44	HRJF9	70.5	16.78	190	200	0.59	49.42	€ 1,547.48
P0202_C_H5	HRJF9	H5	1.5	4.29	104.4	110	0.50	30.82	€ 13.49
P0202_E	HRJF9	H113	167.4	14.32	190	200	0.51	49.20	€ 3,674.43
P0202_E_H4	H113	H4	3	2.73	104.4	110	0.32	31.34	€ 26.97
P0202_F_H3	H456	H3	5.5	5.02	104.4	110	0.59	30.14	€ 49.45
P0202_G	H456	J103	73.5	9.74	152	160	0.54	47.55	€ 963.59
P0202_G_H2	J103	H2	4.4	5.47	104.4	110	0.64	29.02	€ 39.56
P0202_H_H1	J103	H1	94.8	6.13	117.8	125	0.56	27.18	€ 961.27
P020202_H7	J44	H7	71.1	5.54	104.4	110	0.65	30.89	€ 639.19
P0202-F	H113	H456	491.9	12.83	152	160	0.71	47.69	€ 6,448.81
P0204_H6	J92	H6	151	4.21	117.8	125	0.39	31.23	€ 1,531.14
P0206_H15	J54	H15	461.8	7.12	104.4	110	0.83	27.74	€ 4,151.58

1.1.2.2.3 Resultado del diseño por pendiente hidráulica con cabecera conocida Qdis 4 turnos.

En este subcapítulo se pueden observar los resultados obtenidos del diseño realizado por el método de la pendiente hidráulica con cabecera conocida. En la tabla adjunta se identifican las columnas por cada tubería, en el cual se observa el diámetro seleccionado, la velocidad y la presión en el nudo final, en función del caudal de diseño para 4 turnos. La última columna es el coste del tramo de tubería, siendo el producto del precio unitario del diámetro seleccionado y la longitud de la tubería.

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P00_A	UGD_42	J30	260.3	82.91	379.8	400	0.73	50.61	€ 21,711.62
P00_A_H22	J30	H22	36.1	5.34	104.4	110	0.62	28.40	€ 324.54
P00_B	J30	J31	168.5	77.58	379.8	400	0.68	50.44	€ 14,054.59
P01_A	J31	J32	497.7	28.86	299.2	315	0.41	50.19	€ 23,770.15
P01_B	J32	H900	141	23.13	237.4	250	0.52	50.05	€ 4,638.90
P01_C	H900	J88	9.2	18.3	213.6	225	0.51	50.04	€ 252.45
P01_C_H20	J88	H20	2.3	9.22	117.8	125	0.85	27.38	€ 23.32
P01_D	J88	J36	412.8	9.07	190	200	0.32	49.80	€ 9,060.96
P0101_H19	J32	H19	140	5.73	104.4	110	0.67	25.54	€ 1,258.60
P0102_H21	H900	H21	230.1	4.84	104.4	110	0.57	27.74	€ 2,068.60
P0103_A	J36	H	201.6	7.22	152	160	0.40	49.58	€ 2,642.98
P0103_A_H17	H	H17	3.2	4.53	104.4	110	0.53	28.79	€ 28.77
P0103_B_H18	H	H18	250	2.69	104.4	110	0.31	25.94	€ 2,247.50
P0104_H16	J36	H16	561.5	1.86	104.4	110	0.22	31.87	€ 5,047.89
P02_A	J31	J42	395.4	48.72	299.2	315	0.69	49.93	€ 18,884.30
P02_B	J42	HJ	84.9	25.14	190	200	0.89	49.63	€ 1,863.56
P02_B_H10	HJ	H10	4.4	3.79	104.4	110	0.44	27.84	€ 39.56
P02_C	HJ	J92	211.7	21.35	190	200	0.75	49.07	€ 4,646.82
P02_D	J92	J94	6.1	15.69	190	200	0.55	49.06	€ 133.90
P02_D_H9	J92	H9	3.9	2.93	104.4	110	0.34	30.82	€ 35.06
P02_E	J94	J54	267.5	15.69	190	200	0.55	48.66	€ 5,871.63
P0201_A	J54	J97	18.5	11.01	152	160	0.61	48.61	€ 242.54
P0201_A_H11	J97	H11	4	2.87	117.8	125	0.26	29.90	€ 40.56
P0201_B	J97	HSDS	178.2	8.14	117.8	125	0.75	47.79	€ 1,806.95
P0201_B_H13	HSDS	H13	3.7	2.68	104.4	110	0.31	28.32	€ 33.26
P0201_C	HSDS	H79	91.5	5.46	104.4	110	0.64	47.42	€ 822.59
P0201_C_H14	H79	H14	2.5	2.54	104.4	110	0.30	26.87	€ 22.48
P0201_D_H12	H79	H12	80	2.92	104.4	110	0.34	26.89	€ 719.20
P0202_A	J42	HFHF	123.8	23.58	213.6	225	0.66	49.71	€ 3,397.07
P0202_A_H8	HFHF	H8	3	3.85	104.4	110	0.45	30.01	€ 26.97
P0202_B	HFHF	J44	165.2	19.73	190	200	0.70	49.33	€ 3,626.14
P0202_C	J44	HRJF9	70.5	16.32	190	200	0.58	49.22	€ 1,547.48
P0202_C_H5	HRJF9	H5	1.5	2.98	104.4	110	0.35	30.62	€ 13.49
P0202_E	HRJF9	H113	167.4	13.34	190	200	0.47	49.03	€ 3,674.43
P0202_E_H4	H113	H4	3	1.94	104.4	110	0.23	31.17	€ 26.97
P0202_F_H3	H456	H3	5.5	3.56	104.4	110	0.42	30.26	€ 49.45
P0202_G	H456	J103	73.5	7.84	132.4	140	0.57	47.62	€ 900.38
P0202_G_H2	J103	H2	4.4	3.68	104.4	110	0.43	29.10	€ 39.56
P0202_H_H1	J103	H1	94.8	4.16	104.4	110	0.49	27.28	€ 852.25
P020202_H7	J44	H7	71.1	3.41	104.4	110	0.40	30.86	€ 639.19
P0202-F	H113	H456	491.9	11.4	152	160	0.63	47.80	€ 6,448.81
P0204_H6	J92	H6	151	2.73	117.8	125	0.25	31.11	€ 1,531.14
P0206_H15	J54	H15	461.8	4.68	104.4	110	0.55	29.14	€ 4,151.58

1.1.2.2.4 Cálculo de la garantía suministro del diseño con caudal para 4 turnos.

A continuación, se observa el cálculo de la garantía suministro para el diseño de la red de 4 turnos:

											Rug	0.01			Hcab	50.89		
						GS_global	96.03%				Visc	1.10E-06						25.000
																		0.000
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑pi·Qi**	**GS**	**U**	**∑pi·(1-pi)·Qi^2**	**Q diseño**	**ks**	**V (m/s)**	**Re**	**f**	**hf**	**∑hf**	**H(fin)**	**P(fin)**
																		25.000
P00_A	UGD_42	J30	260.3	0	331.65	55.2620973	96%	1.754	99.302	72.743	0.219	0.642	221692.493	0.0155	0.223	0.223	50.667	50.667
P00_A_H22	J30	H22	36.1	22.07	21.34	3.55583645	96%	1.754	9.381	8.929	0.418	1.043	98991.235	0.0185	0.354	0.577	50.313	28.243
P00_B	J30	J31	168.5	0	310.31	51.7062609	96%	1.754	89.921	68.341	0.220	0.603	208276.896	0.0157	0.129	0.352	50.538	50.538
P01_A	J31	J32	497.7	0	115.45	19.2371751	96%	1.754	48.364	31.436	0.272	0.447	121615.692	0.0174	0.295	0.646	50.244	50.244
P01_B	J32	H900	141	0	92.53	15.4180668	96%	1.754	41.833	26.764	0.289	0.605	130492.178	0.0172	0.190	0.837	50.053	50.053
P01_C	H900	J88	9.2	0	73.18	12.1938196	96%	1.754	33.935	22.413	0.306	0.625	121452.977	0.0175	0.015	0.852	50.038	50.038
P01_C_H20	J88	H20	2.3	22.64	36.89	6.14689815	96%	1.754	24.333	14.800	0.401	1.358	145424.043	0.0172	0.031	0.883	50.007	27.367
P01_D	J88	J36	412.8	0	36.29	6.04692149	96%	1.754	9.602	11.483	0.316	0.405	69952.093	0.0195	0.355	1.207	49.683	49.683
P0101_H19	J32	H19	140	24.04	22.92	3.81910831	96%	1.754	6.531	8.302	0.362	0.970	92045.912	0.0187	1.203	1.850	49.040	25.000
P0102_H21	H900	H21	230.1	21.56	19.35	3.2242472	96%	1.754	7.898	8.154	0.421	0.953	90403.979	0.0188	1.914	2.751	48.139	26.579
P0103_A	J36	H	201.6	0	28.86	4.80887722	96%	1.754	8.964	10.061	0.349	0.554	76613.582	0.0192	0.400	1.606	49.284	49.284
P0103_A_H17	H	H17	3.2	20.78	18.11	3.01762877	96%	1.754	6.574	7.515	0.415	0.878	83323.991	0.0191	0.023	1.629	49.261	28.481
P0103_B_H18	H	H18	250	23.36	10.75	1.79124844	96%	1.754	2.389	4.503	0.419	0.526	49922.735	0.0212	0.714	2.321	48.569	25.209
P0104_H16	J36	H16	561.5	17.6	7.43	1.23804427	96%	1.754	0.638	2.639	0.355	0.308	29260.412	0.0238	0.620	1.827	49.063	31.463
P02_A	J31	J42	395.4	0	194.86	32.4690857	96%	1.754	41.557	43.777	0.225	0.623	169357.971	0.0163	0.426	0.778	50.112	50.112
P02_B	J42	HJ	84.9	0	100.55	16.7544215	96%	1.754	20.751	24.745	0.246	0.873	150749.308	0.0168	0.292	1.294	49.596	49.596
P02_B_H10	HJ	H10	4.4	20.34	15.15	2.5244106	96%	1.754	3.375	5.747	0.379	0.671	63718.534	0.0201	0.019	1.313	49.577	29.237
P02_C	HJ	J92	211.7	0	85.4	14.2300109	96%	1.754	17.376	21.542	0.252	0.760	131235.929	0.0173	0.566	1.859	49.031	49.031
P02_D	J92	J94	6.1	0	62.75	10.4558921	96%	1.754	15.269	17.311	0.276	0.611	105456.552	0.0180	0.011	1.870	49.020	49.020
P02_D_H9	J92	H9	3.9	18.25	11.73	1.95454365	96%	1.754	1.664	4.217	0.360	0.493	46756.042	0.0215	0.010	1.869	49.021	30.771
P02_E	J94	J54	267.5	0	62.75	10.4558921	96%	1.754	13.606	16.926	0.270	0.597	103115.989	0.0181	0.462	2.332	48.558	48.558
P0201_A	J54	J97	18.5	0	44.04	7.33828665	96%	1.754	7.690	12.203	0.277	0.672	92925.014	0.0185	0.052	2.384	48.506	48.506
P0201_A_H11	J97	H11	4	18.71	11.48	1.91288671	96%	1.754	2.195	4.512	0.393	0.414	44330.810	0.0217	0.006	2.391	48.499	29.789
P0201_B	J97	HSDS	178.2	0	32.56	5.42539994	96%	1.754	5.495	9.538	0.293	0.875	93715.030	0.0186	1.098	3.482	47.408	47.408
P0201_B_H13	HSDS	H13	3.7	19.47	10.73	1.78791589	96%	1.754	1.230	3.734	0.348	0.436	41394.966	0.0220	0.008	3.490	47.400	27.930
P0201_C	HSDS	H79	91.5	0	21.83	3.63748405	96%	1.754	4.265	7.260	0.333	0.848	80494.337	0.0192	0.617	4.099	46.791	46.791
P0201_C_H14	H79	H14	2.5	20.55	10.17	1.69460434	96%	1.754	1.454	3.810	0.375	0.445	42243.517	0.0219	0.005	4.105	46.785	26.235
P0201_D_H12	H79	H12	80	20.43	11.66	1.94287971	96%	1.754	2.811	4.884	0.419	0.571	54146.038	0.0208	0.264	4.364	46.526	26.096
P0202_A	HFHF	J42	123.8	0	-94.31	15.7146643	96%	1.754	20.807	23.716	-0.251	0.662	128517.209	0.0173	0.224	0.224	50.666	50.666
P0202_A_H8	HFHF	H8	3	19.69	15.4	2.56606754	96%	1.754	3.997	6.073	0.394	0.709	67331.643	0.0199	0.015	0.015	50.875	31.185
P0202_B	HFHF	J44	165.2	0	78.91	13.1485967	96%	1.754	16.810	20.341	0.258	0.717	123916.560	0.0174	0.398	0.398	50.492	50.492
P0202_C	J44	HRJF9	70.5	0	65.27	10.875794	96%	1.754	12.865	17.168	0.263	0.605	104585.530	0.0180	0.125	0.523	50.367	50.367
P0202_C_H5	HRJF9	H5	1.5	18.59	11.9	1.98287037	96%	1.754	1.973	4.447	0.374	0.519	49304.676	0.0212	0.004	0.527	50.363	31.773
P0202_E	HRJF9	H113	167.4	0	53.37	8.89292367	96%	1.754	10.891	14.682	0.275	0.518	89443.753	0.0186	0.224	0.747	50.143	50.143
P0202_E_H4	H113	H4	3	17.86	7.76	1.29303143	96%	1.754	0.768	2.830	0.365	0.331	31378.690	0.0234	0.004	0.750	50.140	32.280
P0202_F_H3	H456	H3	5.5	17.53	14.24	2.37277933	96%	1.754	2.598	5.200	0.365	0.607	57656.880	0.0205	0.020	2.355	48.535	31.005
P0202_G	H456	J103	73.5	0	31.37	5.2271129	96%	1.754	7.525	10.039	0.320	0.729	87765.936	0.0188	0.283	2.617	48.273	48.273
P0202_G_H2	J103	H2	4.4	18.51	14.73	2.45442694	96%	1.754	3.362	5.671	0.385	0.662	62871.386	0.0202	0.019	2.636	48.254	29.744
P0202_H_H1	J103	H1	94.8	20.11	16.64	2.77268596	96%	1.754	4.163	6.352	0.382	0.742	70424.719	0.0197	0.502	3.119	47.771	27.661
P020202_H7	J44	H7	71.1	18.35	13.64	2.27280268	96%	1.754	3.945	5.757	0.422	0.673	63829.149	0.0201	0.316	0.714	50.176	31.826
P0202-F	H113	H456	491.9	0	45.61	7.59989223	96%	1.754	10.123	13.181	0.289	0.726	100375.668	0.0182	1.588	2.334	48.556	48.556
P0204_H6	J92	H6	151	17.86	10.92	1.81957516	96%	1.754	2.106	4.365	0.400	0.401	42894.631	0.0218	0.229	2.088	48.802	30.942
P0206_H15	J54	H15	461.8	18.11	18.71	3.11760543	96%	1.754	5.916	7.384	0.395	0.863	81868.033	0.0191	3.211	5.543	45.347	27.237

1.1.2.2.4 Resultado del diseño por pendiente hidráulica con cabecera conocida Qdis 6 turnos.

En este subcapítulo se pueden observar los resultados obtenidos del diseño realizado por el método de la pendiente hidráulica con cabecera conocida. En la tabla adjunta se identifican las columnas por cada tubería, en el cual se observa el diámetro seleccionado, la velocidad y la presión en el nudo final, en función del caudal de diseño para 6 turnos. La última columna es el coste del tramo de tubería, siendo el producto del precio unitario del diámetro seleccionado y la longitud de la tubería.

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P00_A	UGD_42	J30	260.3	55.28	379.8	400	0.49	50.75	€ 21,711.62
P00_A_H22	J30	H22	36.1	3.56	104.4	110	0.42	28.62	€ 324.54
P00_B	J30	J31	168.5	51.72	379.8	400	0.46	50.68	€ 14,054.59
P01_A	J31	J32	497.7	19.24	213.6	225	0.54	50.06	€ 13,656.89
P01_B	J32	H900	141	15.42	190	200	0.54	49.85	€ 3,094.95
P01_C	H900	J88	9.2	12.2	190	200	0.43	49.85	€ 201.94
P01_C_H20	J88	H20	2.3	6.15	104.4	110	0.72	27.19	€ 20.68
P01_D	J88	J36	412.8	6.05	132.4	140	0.44	49.21	€ 5,056.80
P0101_H19	J32	H19	140	3.82	104.4	110	0.45	25.72	€ 1,258.60
P0102_H21	H900	H21	230.1	3.23	104.4	110	0.38	27.93	€ 2,068.60
P0103_A	J36	H	201.6	4.81	132.4	140	0.35	49.00	€ 2,469.60
P0103_A_H17	H	H17	3.2	3.02	104.4	110	0.35	28.22	€ 28.77
P0103_B_H18	H	H18	250	1.79	104.4	110	0.21	25.50	€ 2,247.50
P0104_H16	J36	H16	561.5	1.24	104.4	110	0.14	31.44	€ 5,047.89
P02_A	J31	J42	395.4	32.48	237.4	250	0.73	49.92	€ 13,008.66
P02_B	J42	HJ	84.9	16.76	152	160	0.92	49.50	€ 1,113.04
P02_B_H10	HJ	H10	4.4	2.53	104.4	110	0.29	28.12	€ 39.56
P02_C	HJ	J92	211.7	14.23	152	160	0.78	48.71	€ 2,775.39
P02_D	J92	J94	6.1	10.46	152	160	0.58	48.70	€ 79.97
P02_D_H9	J92	H9	3.9	1.96	104.4	110	0.23	30.46	€ 35.06
P02_E	J94	J54	267.5	10.46	152	160	0.58	48.13	€ 3,506.93
P0201_A	J54	J97	18.5	7.34	117.8	125	0.67	48.06	€ 187.59
P0201_A_H11	J97	H11	4	1.91	117.8	125	0.18	29.35	€ 40.56
P0201_B	J97	HSDS	178.2	5.43	104.4	110	0.63	47.35	€ 1,602.02
P0201_B_H13	HSDS	H13	3.7	1.79	104.4	110	0.21	27.87	€ 33.26
P0201_C	HSDS	H79	91.5	3.64	104.4	110	0.43	47.17	€ 822.59
P0201_C_H14	H79	H14	2.5	1.7	104.4	110	0.20	26.62	€ 22.48
P0201_D_H12	H79	H12	80	1.94	104.4	110	0.23	26.69	€ 719.20
P0202_A	J42	HFHF	123.8	15.72	190	200	0.55	49.73	€ 2,717.41
P0202_A_H8	HFHF	H8	3	2.57	104.4	110	0.30	30.04	€ 26.97
P0202_B	HFHF	J44	165.2	13.15	190	200	0.46	49.55	€ 3,626.14
P0202_C	J44	HRJF9	70.5	10.88	152	160	0.60	49.39	€ 924.26
P0202_C_H5	HRJF9	H5	1.5	1.98	104.4	110	0.23	30.80	€ 13.49
P0202_E	HRJF9	H113	167.4	8.9	132.4	140	0.65	48.87	€ 2,050.65
P0202_E_H4	H113	H4	3	1.29	104.4	110	0.15	31.01	€ 26.97
P0202_F_H3	H456	H3	5.5	2.37	104.4	110	0.28	30.19	€ 49.45
P0202_G	H456	J103	73.5	5.23	117.8	125	0.48	47.57	€ 745.29
P0202_G_H2	J103	H2	4.4	2.46	104.4	110	0.29	29.06	€ 39.56
P0202_H_H1	J103	H1	94.8	2.77	104.4	110	0.32	27.35	€ 852.25
P020202_H7	J44	H7	71.1	2.27	104.4	110	0.27	31.14	€ 639.19
P0202-F	H113	H456	491.9	7.6	132.4	140	0.55	47.73	€ 6,025.78
P0204_H6	J92	H6	151	1.82	117.8	125	0.17	30.80	€ 1,531.14
P0206_H15	J54	H15	461.8	3.12	104.4	110	0.36	29.33	€ 4,151.58

1.1.2.2.5 Cálculo de la garantía suministro del diseño con caudal para 6 turnos.

A continuación, se observa el cálculo de la garantía suministro para el diseño de la red de 6 turnos:

									GS_global					Rug	0.01		Hcab	50.89			
									61.23%					Visc	1.10E-06						25.000
																					0.000
Tuberia	**Nudo Ini**	**Nudo Fin**	**Diam (mm)**	**Long (m)**	**Coste**	**z(fin)**	**Qinst**	**∑pi·Qi**	**GS**	**U**	**∑pi·(1-pi)·Qi^2**	**Q diseño**	**ks**	**V (m/s)**	**Re**	**f**	**hf**	**∑hf**	**H(fin)**	**P(fin)**
					€ 118,650.19															
P00_A	UGD_42	J30	379.8	260.3	€ 21,711.62	0	331.65	55.2620973	61%	0.2854	99.30198611	58.11	0.18	0.51	177085.97	0.02	0.15	0.15	50.74	50.74
P00_A_H22	J30	H22	104.4	36.1	€ 324.54	22.07	21.34	3.55583645	61%	0.2854	9.380722222	4.43	0.21	0.52	49115.19	0.02	0.10	0.25	50.64	28.57
P00_B	J30	J31	379.8	168.5	€ 14,054.59	0	310.31	51.7062609	61%	0.2854	89.92126389	54.41	0.18	0.48	165829.54	0.02	0.09	0.23	50.66	50.66
P01_A	J31	J32	213.6	497.7	€ 13,656.89	0	115.45	19.2371751	61%	0.2854	48.36398611	21.22	0.18	0.59	115000.96	0.02	0.74	0.97	49.92	49.92
P01_B	J32	H900	190	141	€ 3,094.95	0	92.53	15.4180668	61%	0.2854	41.832875	17.26	0.19	0.61	105173.06	0.02	0.25	1.22	49.67	49.67
P01_C	H900	J88	190	9.2	€ 201.94	0	73.18	12.1938196	61%	0.2854	33.93513889	13.86	0.19	0.49	84413.77	0.02	0.01	1.23	49.66	49.66
P01_C_H20	J88	H20	104.4	2.3	€ 20.68	22.64	36.89	6.14689815	61%	0.2854	24.33348611	7.55	0.20	0.88	83759.90	0.02	0.02	1.25	49.64	27.00
P01_D	J88	J36	132.4	412.8	€ 5,056.80	0	36.29	6.04692149	61%	0.2854	9.601652778	6.93	0.19	0.50	60595.75	0.02	0.81	2.05	48.84	48.84
P0101_H19	J32	H19	104.4	140	€ 1,258.60	24.04	22.92	3.81910831	61%	0.2854	6.531111111	4.55	0.20	0.53	50429.23	0.02	0.41	1.38	49.51	25.47
P0102_H21	H900	H21	104.4	230.1	€ 2,068.60	21.56	19.35	3.2242472	61%	0.2854	7.897736111	4.03	0.21	0.47	44639.85	0.02	0.54	1.76	49.13	27.57
P0103_A	J36	H	132.4	201.6	€ 2,469.60	0	28.86	4.80887722	61%	0.2854	8.963694444	5.66	0.20	0.41	49511.05	0.02	0.28	2.32	48.57	48.57
P0103_A_H17	H	H17	104.4	3.2	€ 28.77	20.78	18.11	3.01762877	61%	0.2854	6.574319444	3.75	0.21	0.44	41569.87	0.02	0.01	2.33	48.56	27.78
P0103_B_H18	H	H18	104.4	250	€ 2,247.50	23.36	10.75	1.79124844	61%	0.2854	2.389375	2.23	0.21	0.26	24750.83	0.02	0.21	2.53	48.36	25.00
P0104_H16	J36	H16	104.4	561.5	€ 5,047.89	17.6	7.43	1.23804427	61%	0.2854	0.637958333	1.47	0.20	0.17	16253.62	0.03	0.22	2.27	48.62	31.02
P02_A	J31	J42	237.4	395.4	€ 13,008.66	0	194.86	32.4690857	61%	0.2854	41.55727778	34.31	0.18	0.78	167279.79	0.02	0.84	1.07	49.82	49.82
P02_B	J42	HJ	152	84.9	€ 1,113.04	0	100.55	16.7544215	61%	0.2854	20.75076389	18.05	0.18	0.99	137486.21	0.02	0.48	1.77	49.12	49.12
P02_B_H10	HJ	H10	104.4	4.4	€ 39.56	20.34	15.15	2.5244106	61%	0.2854	3.375125	3.05	0.20	0.36	33801.48	0.02	0.01	1.78	49.11	28.77
P02_C	HJ	J92	152	211.7	€ 2,775.39	0	85.4	14.2300109	61%	0.2854	17.37563889	15.42	0.18	0.85	117421.81	0.02	0.91	2.68	48.21	48.21
P02_D	J92	J94	152	6.1	€ 79.97	0	62.75	10.4558921	61%	0.2854	15.26927778	11.57	0.18	0.64	88114.79	0.02	0.02	2.70	48.19	48.19
P02_D_H9	J92	H9	104.4	3.9	€ 35.06	18.25	11.73	1.95454365	61%	0.2854	1.663708333	2.32	0.20	0.27	25751.53	0.02	0.00	2.68	48.21	29.96
P02_E	J94	J54	152	267.5	€ 3,506.93	0	62.75	10.4558921	61%	0.2854	13.60556944	11.51	0.18	0.63	87638.79	0.02	0.68	3.37	47.52	47.52
P0201_A	J54	J97	117.8	18.5	€ 187.59	0	44.04	7.33828665	61%	0.2854	7.690027778	8.13	0.18	0.75	79881.77	0.02	0.09	3.46	47.43	47.43
P0201_A_H11	J97	H11	117.8	4	€ 40.56	18.71	11.48	1.91288671	61%	0.2854	2.194722222	2.34	0.20	0.21	22950.26	0.03	0.00	3.46	47.43	28.72
P0201_B	J97	HSDS	104.4	178.2	€ 1,602.02	0	32.56	5.42539994	61%	0.2854	5.495305556	6.09	0.19	0.71	67569.40	0.02	0.88	4.33	46.56	46.56
P0201_B_H13	HSDS	H13	104.4	3.7	€ 33.26	19.47	10.73	1.78791589	61%	0.2854	1.230291667	2.10	0.20	0.25	23332.46	0.03	0.00	4.34	46.55	27.08
P0201_C	HSDS	H79	104.4	91.5	€ 822.59	0	21.83	3.63748405	61%	0.2854	4.265013889	4.23	0.19	0.49	46863.78	0.02	0.23	4.57	46.32	46.32
P0201_C_H14	H79	H14	104.4	2.5	€ 22.48	20.55	10.17	1.69460434	61%	0.2854	1.454458333	2.04	0.20	0.24	22604.28	0.03	0.00	4.57	46.32	25.77
P0201_D_H12	H79	H12	104.4	80	€ 719.20	20.43	11.66	1.94287971	61%	0.2854	2.810555556	2.42	0.21	0.28	26845.58	0.02	0.08	4.64	46.25	25.82
P0202_A	HFHF	J42	190	123.8	€ 2,717.41	0	-94.31	15.7146643	61%	0.2854	20.80651389	17.02	-0.18	0.60	103665.34	0.02	0.22	0.22	50.67	50.67
P0202_A_H8	HFHF	H8	104.4	3	€ 26.97	19.69	15.4	2.56606754	61%	0.2854	3.996722222	3.14	0.20	0.37	34776.03	0.02	0.00	0.00	50.89	31.20
P0202_B	HFHF	J44	190	165.2	€ 3,626.14	0	78.91	13.1485967	61%	0.2854	16.80979167	14.32	0.18	0.51	87230.42	0.02	0.21	0.21	50.68	50.68
P0202_C	J44	HRJF9	152	70.5	€ 924.26	0	65.27	10.875794	61%	0.2854	12.86451389	11.90	0.18	0.66	90615.00	0.02	0.19	0.40	50.49	50.49
P0202_C_H5	HRJF9	H5	104.4	1.5	€ 13.49	18.59	11.9	1.98287037	61%	0.2854	1.973305556	2.38	0.20	0.28	26429.15	0.02	0.00	0.40	50.49	31.90
P0202_E	HRJF9	H113	132.4	167.4	€ 2,050.65	0	53.37	8.89292367	61%	0.2854	10.89120833	9.83	0.18	0.71	85979.40	0.02	0.62	1.02	49.87	49.87
P0202_E_H4	H113	H4	104.4	3	€ 26.97	17.86	7.76	1.29303143	61%	0.2854	0.767888889	1.54	0.20	0.18	17108.72	0.03	0.00	1.02	49.87	32.01
P0202_F_H3	H456	H3	104.4	5.5	€ 49.45	17.53	14.24	2.37277933	61%	0.2854	2.598277778	2.83	0.20	0.33	31407.64	0.02	0.01	2.43	48.46	30.93
P0202_G	H456	J103	117.8	73.5	€ 745.29	0	31.37	5.2271129	61%	0.2854	7.525041667	6.01	0.19	0.55	59053.73	0.02	0.20	2.62	48.27	48.27
P0202_G_H2	J103	H2	104.4	4.4	€ 39.56	18.51	14.73	2.45442694	61%	0.2854	3.361680556	2.98	0.20	0.35	33013.98	0.02	0.01	2.63	48.26	29.75
P0202_H_H1	J103	H1	104.4	94.8	€ 852.25	20.11	16.64	2.77268596	61%	0.2854	4.163361111	3.36	0.20	0.39	37197.35	0.02	0.16	2.78	48.11	28.00
P020202_H7	J44	H7	104.4	71.1	€ 639.19	18.35	13.64	2.27280268	61%	0.2854	3.945277778	2.84	0.21	0.33	31483.74	0.02	0.09	0.30	50.59	32.24
P0202-F	H113	H456	132.4	491.9	€ 6,025.78	0	45.61	7.59989223	61%	0.2854	10.12331944	8.51	0.19	0.62	74379.65	0.02	1.40	2.42	48.47	48.47
P0204_H6	J92	H6	117.8	151	€ 1,531.14	17.86	10.92	1.81957516	61%	0.2854	2.106361111	2.23	0.20	0.20	21948.90	0.03	0.07	2.75	48.14	30.28
P0206_H15	J54	H15	104.4	461.8	€ 4,151.58	18.11	18.71	3.11760543	61%	0.2854	5.915541667	3.81	0.20	0.45	42261.10	0.02	0.98	4.35	46.54	28.43

1.1.2.2.6 Calculo de la garantía suministro de la alternativa con modificación de ubicación del cabezal.

A continuación, se observa el cálculo de la garantía suministro para el diseño de la red con la modificación de ubicación del cabezal:

								GS_global				Rug	0.01		Hcab	50.89		
								85.08%				Visc	1.10E-06					24.999
																		0.001
Tuberia	**Nudo Ini**	**Nudo Fin**	**Diam (mm)**	**Long (m)**	**z(fin)**	**Qinst**	**∑pi·Qi**	**GS**	**U**	**∑pi·(1-pi)·Qi^2**	**Q diseño**	**ks**	**V (m/s)**	**Re**	**f**	**hf**	**∑hf**	**H(fin)**	**P(fin)**
P00_A_H22	J30	H22	152	36.1	22.07	21.34	3.55583645	85%	1.0400	9.38	6.74	0.32	0.37	5.13E+04	0.0209	0.035	0.220	50.670	28.600
P00_B	J30	J31	299.2	168.5	0	310.31	51.7062609	85%	1.0400	89.92	61.57	0.20	0.88	2.38E+05	0.0154	0.338	0.523	50.367	50.367
P01_A	J31	J32	237.4	497.7	0	115.45	19.2371751	85%	1.0400	48.36	26.47	0.23	0.60	1.29E+05	0.0172	0.659	1.182	49.708	49.708
P01_B	J32	H900	190	141	0	92.53	15.4180668	85%	1.0400	41.83	22.14	0.24	0.78	1.35E+05	0.0172	0.396	1.578	49.312	49.312
P01_C	H900	J88	190	9.2	0	73.18	12.1938196	85%	1.0400	33.94	18.25	0.25	0.64	1.11E+05	0.0178	0.018	1.596	49.294	49.294
P01_C_H20	J88	H20	104.4	2.3	22.64	36.89	6.14689815	85%	1.0400	24.33	11.28	0.31	1.32	1.25E+05	0.0177	0.034	1.630	49.260	26.620
P01_D	J88	J36	190	412.8	0	36.29	6.04692149	85%	1.0400	9.60	9.27	0.26	0.33	5.65E+04	0.0204	0.242	1.838	49.052	49.052
P0101_H19	J32	H19	152	140	24.04	22.92	3.81910831	85%	1.0400	6.53	6.48	0.28	0.36	4.93E+04	0.0211	0.126	1.308	49.582	25.542
P0102_H21	H900	H21	152	230.1	21.56	19.35	3.2242472	85%	1.0400	7.90	6.15	0.32	0.34	4.68E+04	0.0213	0.189	1.767	49.123	27.563
P0103_A	J36	H	152	201.6	0	28.86	4.80887722	85%	1.0400	8.96	7.92	0.27	0.44	6.03E+04	0.0202	0.260	2.098	48.792	48.792
P0103_A_H17	H	H17	132.4	3.2	20.78	18.11	3.01762877	85%	1.0400	6.57	5.68	0.31	0.41	4.97E+04	0.0211	0.004	2.103	48.787	28.007
P0103_B_H18	H	H18	104.4	250	23.36	10.75	1.79124844	85%	1.0400	2.39	3.40	0.32	0.40	3.77E+04	0.0225	0.433	2.531	48.359	24.999
P0104_H16	J36	H16	104.4	561.5	17.6	7.43	1.23804427	85%	1.0400	0.64	2.07	0.28	0.24	2.29E+04	0.0252	0.404	2.241	48.649	31.049
P02_A	J31	J42	213.6	395.4	0	194.86	32.4690857	85%	1.0400	41.56	39.17	0.20	1.09	2.12E+05	0.0158	1.780	2.303	48.587	48.587
P02_B	J42	HJ	190	84.9	0	100.55	16.7544215	85%	1.0400	20.75	21.49	0.21	0.76	1.31E+05	0.0173	0.226	2.830	48.060	48.060
P02_B_H10	HJ	H10	132.4	4.4	20.34	15.15	2.5244106	85%	1.0400	3.38	4.44	0.29	0.32	3.88E+04	0.0223	0.004	2.834	48.056	27.716
P02_C	HJ	J92	190	211.7	0	85.4	14.2300109	85%	1.0400	17.38	18.57	0.22	0.65	1.13E+05	0.0178	0.432	3.262	47.628	47.628
P02_D	J92	J94	190	6.1	0	62.75	10.4558921	85%	1.0400	15.27	14.52	0.23	0.51	8.85E+04	0.0186	0.008	3.270	47.620	47.620
P02_D_H9	J92	H9	117.8	3.9	18.25	11.73	1.95454365	85%	1.0400	1.66	3.30	0.28	0.30	3.24E+04	0.0232	0.004	3.266	47.624	29.374
P02_E	J94	J54	190	267.5	0	62.75	10.4558921	85%	1.0400	13.61	14.29	0.23	0.50	8.71E+04	0.0187	0.341	3.611	47.279	47.279
P0201_A	J54	J97	152	18.5	0	44.04	7.33828665	85%	1.0400	7.69	10.22	0.23	0.56	7.78E+04	0.0192	0.038	3.649	47.241	47.241
P0201_A_H11	J97	H11	132.4	4	18.71	11.48	1.91288671	85%	1.0400	2.19	3.45	0.30	0.25	3.02E+04	0.0236	0.002	3.651	47.239	28.529
P0201_B	J97	HSDS	152	178.2	0	32.56	5.42539994	85%	1.0400	5.50	7.86	0.24	0.43	5.99E+04	0.0202	0.227	3.876	47.014	47.014
P0201_B_H13	HSDS	H13	117.8	3.7	19.47	10.73	1.78791589	85%	1.0400	1.23	2.94	0.27	0.27	2.89E+04	0.0238	0.003	3.879	47.011	27.541
P0201_C	HSDS	H79	152	91.5	0	21.83	3.63748405	85%	1.0400	4.27	5.79	0.27	0.32	4.41E+04	0.0216	0.067	3.943	46.947	46.947
P0201_C_H14	H79	H14	117.8	2.5	20.55	10.17	1.69460434	85%	1.0400	1.45	2.95	0.29	0.27	2.90E+04	0.0238	0.002	3.945	46.945	26.395
P0201_D_H12	H79	H12	117.8	80	20.43	11.66	1.94287971	85%	1.0400	2.81	3.69	0.32	0.34	3.62E+04	0.0226	0.090	4.033	46.857	26.427
P0202_A	HFHF	J42	190	123.8	0	-94.31	15.7146643	85%	1.0400	20.81	20.46	-0.22	0.72	1.25E+05	0.0174	0.301	0.301	50.589	50.589
P0202_A_H8	HFHF	H8	132.4	3	19.69	15.4	2.56606754	85%	1.0400	4.00	4.65	0.30	0.34	4.06E+04	0.0220	0.003	0.003	50.887	31.197
P0202_B	HFHF	J44	190	165.2	0	78.91	13.1485967	85%	1.0400	16.81	17.41	0.22	0.61	1.06E+05	0.0180	0.300	0.300	50.590	50.590
P0202_C	J44	HRJF9	152	70.5	0	65.27	10.875794	85%	1.0400	12.86	14.61	0.22	0.80	1.11E+05	0.0179	0.274	0.574	50.316	50.316
P0202_C_H5	HRJF9	H5	117.8	1.5	18.59	11.9	1.98287037	85%	1.0400	1.97	3.44	0.29	0.32	3.38E+04	0.0230	0.001	0.576	50.314	31.724
P0202_E	HRJF9	H113	152	167.4	0	53.37	8.89292367	85%	1.0400	10.89	12.33	0.23	0.68	9.39E+04	0.0185	0.479	1.053	49.837	49.837
P0202_E_H4	H113	H4	104.4	3	17.86	7.76	1.29303143	85%	1.0400	0.77	2.20	0.28	0.26	2.44E+04	0.0248	0.002	1.055	49.835	31.975
P0202_F_H3	H456	H3	132.4	5.5	17.53	14.24	2.37277933	85%	1.0400	2.60	4.05	0.28	0.29	3.54E+04	0.0227	0.004	3.254	47.636	30.106
P0202_G	H456	J103	132.4	73.5	0	31.37	5.2271129	85%	1.0400	7.53	8.08	0.26	0.59	7.06E+04	0.0196	0.191	3.441	47.449	47.449
P0202_G_H2	J103	H2	132.4	4.4	18.51	14.73	2.45442694	85%	1.0400	3.36	4.36	0.30	0.32	3.81E+04	0.0224	0.004	3.445	47.445	28.935
P0202_H_H1	J103	H1	104.4	94.8	20.11	16.64	2.77268596	85%	1.0400	4.16	4.89	0.29	0.57	5.43E+04	0.0208	0.315	3.755	47.135	27.025
P020202_H7	J44	H7	132.4	71.1	18.35	13.64	2.27280268	85%	1.0400	3.95	4.34	0.32	0.32	3.79E+04	0.0224	0.061	0.361	50.529	32.179
P0202-F	H113	H456	132.4	491.9	0	45.61	7.59989223	85%	1.0400	10.12	10.91	0.24	0.79	9.54E+04	0.0185	2.197	3.250	47.640	47.640
P0204_H6	J92	H6	104.4	151	17.86	10.92	1.81957516	85%	1.0400	2.11	3.33	0.30	0.39	3.69E+04	0.0226	0.252	3.514	47.376	29.516
P0206_H15	J54	H15	152	461.8	18.11	18.71	3.11760543	85%	1.0400	5.92	5.65	0.30	0.31	4.30E+04	0.0217	0.326	3.937	46.953	28.843

1.1.3 Análisis de alternativas con modificación del trazado

1.1.3.1 Resultados de las tuberías secundarias modificación de ubicación del cabezal

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN(mm)	Presión (mca)
P00_A_H22	J30	H22	36.1	152	160	28.79
P00_B	J30	J31	168.5	299.2	315	50.89
P01_A	J31	J32	497.7	237.4	250	50.11
P01_B	J32	H900	141	190	200	49.64
P01_C	H900	J88	9.2	190	200	49.62
P01_C_H20	J88	H20	2.3	104.4	110	26.96
P01_D	J88	J36	412.8	190	200	49.32
P0101_H19	J32	H19	140	152	160	26.01
P0102_H21	H900	H21	230.1	152	160	27.9
P0103_A	J36	H	201.6	152	160	49.01
P0103_A_H17	H	H17	3.2	132.4	140	28.22
P0103_B_H18	H	H18	250	104.4	110	25.33
P0104_H16	J36	H16	561.5	104.4	110	31.43
P02_A	J31	J42	395.4	213.6	225	48.87
P02_B	J42	HJ	84.9	190	200	48.63
P02_B_10	HJ	H10	4.4	132.4	140	28.29
P02_C	HJ	J92	211.7	190	200	48.18
P02_D	J92	J94	6.1	190	200	48.17
P02_D_H9	J92	H9	3.9	117.8	125	29.93
P02_E	J94	J54	267.5	190	200	47.83
P0201_A	J54	J97	18.5	152	160	47.8
P0201_A_H11	J97	H11	4	132.4	140	29.08
P0201_B	J97	HSDS	178.2	152	160	47.61
P0201_B_H13	HSDS	H13	3.7	117.8	125	28.13
P0201_C	HSDS	H79	91.5	152	160	47.56
P0201_C_H14	H79	H14	2.5	117.8	125	27.01
P0201_D_H12	H79	H12	80	117.8	125	27.07
P0202_A	HFHF	J42	123.8	190	200	48.87
P0202_A_H8	HFHF	H8	3	132.4	140	28.89
P0202_B	HFHF	J44	165.2	190	200	48.3
P0202_C	J44	HRJF9	70.5	152	160	48.07
P0202_C_H5	HRJF9	H5	1.5	117.8	125	29.48
P0202_E	HRJF9	H113	167.4	152	160	47.72
P0202_E_H4	H113	H4	3	104.4	110	29.86
P0202_F_H3	H456	H3	5.5	132.4	140	28.68
P0202_G	H456	J103	73.5	132.4	140	46.09
P0202_G_H2	J103	H2	4.4	132.4	140	27.58
P0202_H_H1	J103	H1	94.8	104.4	110	25.83
P020202_H7	J44	H7	71.1	132.4	140	29.91
P0202-F	H113	H456	491.9	132.4	140	46.21
P0204_H6	J92	H6	151	104.4	110	30.16
P0206_H15	J54	H15	461.8	152	160	29.54

1.1.3.2 Resultados de las tuberías terciarias modificación de ubicación del cabezal

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
H-01-T-1	H1	H-01-P-1	237.2	55.4	63	20.69
H-01-T-10	H1	H-01-P-10	505.7	35.2	40	25.4
H-01-T-11	H1	H-01-P-11	512.5	55.4	63	23.79
H-01-T-12	H1	H-01-P-12	58.2	44	50	22.51
H-01-T-13	H1	H-01-P-13	387.2	44	50	23.12
H-01-T-14	H1	H-01-P-14	360.2	35.2	40	24.05
H-01-T-2	H1	H-01-P-2	90.8	66	75	21.05
H-01-T-3	H1	H-01-P-3	57	55.4	63	22.19
H-01-T-4	H1	H-01-P-4	6	79.2	90	20.94
H-01-T-5	H1	H-01-P-5	9.8	44	50	22.46
H-01-T-6	H1	H-01-P-6	445.2	35.2	40	23.22
H-01-T-7	H1	H-01-P-7	455.7	55.4	63	23.46
H-01-T-8	H1	H-01-P-8	13	55.4	63	21.45
H-01-T-9	H1	H-01-P-9	555	44	50	26.39
H-02-T-1	H2	H-02-P-1	255.3	44	50	25.72
H-02-T-10	H2	H-02-P-10	61.1	35.2	40	21.28
H-02-T-11	H2	H-02-P-11	34.9	35.2	40	24.37
H-02-T-2	H2	H-02-P-2	2.4	35.2	40	23.92
H-02-T-3	H2	H-02-P-3	92.3	35.2	40	26.32
H-02-T-4	H2	H-02-P-4	379.6	44	50	23.59
H-02-T-5	H2	H-02-P-5	8.4	55.4	63	23.41
H-02-T-6	H2	H-02-P-6	116.6	55.4	63	24.63
H-02-T-7	H2	H-02-P-7	135.1	44	50	23.04

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
H-02-T-8	H2	H-02-P-8	79.7	55.4	63	20.6
H-02-T-9	H2	H-02-P-9	143.7	44	50	24.34
H-03-T-1	H3	H-03-P-1	170.1	44	50	26.26
H-03-T-10	H3	H-03-P-10	127.6	35.2	40	25.72
H-03-T-11	H3	H-03-P-11	154.9	35.2	40	26.21
H-03-T-12	H3	H-03-P-12	77.9	35.2	40	20.13
H-03-T-13	H3	H-03-P-13	168.2	44	50	24.06
H-03-T-14	H3	H-03-P-14	186.2	35.2	40	24.32
H-03-T-2	H3	H-03-P-2	40.7	44	50	24.38
H-03-T-3	H3	H-03-P-3	13.6	55.4	63	25.26
H-03-T-4	H3	H-03-P-4	3.2	44	50	25.43
H-03-T-5	H3	H-03-P-5	211.2	35.2	40	26.63
H-03-T-6	H3	H-03-P-6	94.1	35.2	40	26.08
H-03-T-7	H3	H-03-P-7	107.8	44	50	20.69
H-03-T-8	H3	H-03-P-8	245.2	35.2	40	27.99
H-03-T-9	H3	H-03-P-9	293.1	44	50	23.22
H-04-T-1	H4	H-04-P-1	97.8	35.2	40	28.23
H-04-T-10	H4	H-04-P-10	115.8	35.2	40	29.3
H-04-T-11	H4	H-04-P-11	115.3	35.2	40	27.95
H-04-T-12	H4	H-04-P-12	97.9	35.2	40	27
H-04-T-13	H4	H-04-P-13	100	35.2	40	29.62
H-04-T-2	H4	H-04-P-2	44	35.2	40	24.59
H-04-T-3	H4	H-04-P-3	148.3	35.2	40	30.05

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
H-04-T-4	H4	H-04-P-4	105.2	35.2	40	30.58
H-04-T-5	H4	H-04-P-5	77.2	35.2	40	27.37
H-04-T-6	H4	H-04-P-6	83.7	35.2	40	30.18
H-04-T-7	H4	H-04-P-7	5	35.2	40	24.91
H-04-T-8	H4	H-04-P-8	6.1	35.2	40	22.66
H-04-T-9	H4	H-04-P-9	103.2	35.2	40	28.28
H-05-T-1	H5	H-05-P-1	111.5	35.2	40	25.69
H-05-T-10	H5	H-05-P-10	83.6	44	50	26.8
H-05-T-11	H5	H-05-P-11	126.8	44	50	27.67
H-05-T-2	H5	H-05-P-2	38.6	35.2	40	25.13
H-05-T-3	H5	H-05-P-3	5	35.2	40	26.92
H-05-T-4	H5	H-05-P-4	5	35.2	40	27.92
H-05-T-5	H5	H-05-P-5	214.5	35.2	40	20.83
H-05-T-6	H5	H-05-P-6	40.5	35.2	40	22.11
H-05-T-7	H5	H-05-P-7	5.3	35.2	40	28.92
H-05-T-8	H5	H-05-P-8	46.5	35.2	40	22.93
H-05-T-9	H5	H-05-P-9	69.2	35.2	40	21.7
H-06-T-1	H6	H-06-P-1	100.3	35.2	40	26.02
H-06-T-10	H6	H-06-P-10	5	55.4	63	24.11
H-06-T-11	H6	H-06-P-11	120.1	35.2	40	30.94
H-06-T-12	H6	H-06-P-12	109.2	35.2	40	26.1
H-06-T-2	H6	H-06-P-2	9.3	35.2	40	30.42
H-06-T-3	H6	H-06-P-3	78.3	44	50	25.67
H-06-T-4	H6	H-06-P-4	44.8	35.2	40	30.12

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
H-06-T-5	H6	H-06-P-5	44.1	44	50	24.62
H-06-T-6	H6	H-06-P-6	18.9	35.2	40	27.88
H-06-T-7	H6	H-06-P-7	79.2	44	50	26.21
H-06-T-8	H6	H-06-P-8	17	35.2	40	30.22
H-06-T-9	H6	H-06-P-9	54.5	35.2	40	27.55
H-07-T-1	H7	H-07-P-1	93	35.2	40	27.88
H-07-T-2	H7	H-07-P-2	57.4	35.2	40	26.8
H-07-T-3	H7	H-07-P-3	71.1	44	50	20.49
H-07-T-4	H7	H-07-P-4	99.4	35.2	40	22.76
H-07-T-5	H7	H-07-P-5	78.3	35.2	40	20.75
H-07-T-6	H7	H-07-P-6	101.3	35.2	40	27.06
H-07-T-7	H7	H-07-P-7	8.6	44	50	25.4
H-07-T-8	H7	H-07-P-8	7.6	35.2	40	28.33
H-07-T-9	H7	H-07-P-9	1.9	44	50	24.9
H-08-T-1	H8	H-08-P-1	59	35.2	40	24.7
H-08-T-10	H8	H-08-P-10	97.6	35.2	40	27.52
H-08-T-11	H8	H-08-P-11	5	35.2	40	27.67
H-08-T-12	H8	H-08-P-12	131.9	44	50	23.78
H-08-T-13	H8	H-08-P-13	11.5	35.2	40	29.5
H-08-T-2	H8	H-08-P-2	95.9	35.2	40	28.14
H-08-T-3	H8	H-08-P-3	5.1	55.4	63	20.9
H-08-T-4	H8	H-08-P-4	42.9	55.4	63	21.54
H-08-T-5	H8	H-08-P-5	6.9	35.2	40	22.31
H-08-T-6	H8	H-08-P-6	79.6	44	50	23.05

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
H-08-T-7	H8	H-08-P-7	119.2	35.2	40	28.86
H-08-T-8	H8	H-08-P-8	89.4	35.2	40	27.23
H-08-T-9	H8	H-08-P-9	55.6	35.2	40	23.69
H-09-T-1	H9	H-09-P-1	71.6	44	50	26.48
H-09-T-10	H9	H-09-P-10	9.1	35.2	40	27.87
H-09-T-11	H9	H-09-P-11	188.1	35.2	40	27.84
H-09-T-12	H9	H-09-P-12	83	35.2	40	26.23
H-09-T-13	H9	H-09-P-13	169	35.2	40	29.84
H-09-T-2	H9	H-09-P-2	18.5	35.2	40	28.55
H-09-T-3	H9	H-09-P-3	5	35.2	40	29.12
H-09-T-4	H9	H-09-P-4	52.3	35.2	40	23.85
H-09-T-5	H9	H-09-P-5	114.7	35.2	40	27.9
H-09-T-6	H9	H-09-P-6	102.4	44	50	26.74
H-09-T-7	H9	H-09-P-7	67.6	35.2	40	25.38
H-09-T-8	H9	H-09-P-8	135.7	35.2	40	26.91
H-09-T-9	H9	H-09-P-9	44.8	35.2	40	24.92
H-10-T-1	H10	H-10-P-1	62.5	44	50	25.12
H-10-T-10	H10	H-10-P-10	108.7	44	50	25.31
H-10-T-11	H10	H-10-P-11	124.2	35.2	40	27.94
H-10-T-2	H10	H-10-P-2	220.9	55.4	63	20.94
H-10-T-3	H10	H-10-P-3	195.4	44	50	23.47
H-10-T-4	H10	H-10-P-4	88	55.4	63	26.2
H-10-T-5	H10	H-10-P-5	8.1	35.2	40	22.47
H-10-T-6	H10	H-10-P-6	233.3	35.2	40	23.78

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
H-10-T-7	H10	H-10-P-7	5	35.2	40	21.55
H-10-T-8	H10	H-10-P-8	39.5	44	50	24.26
H-10-T-9	H10	H-10-P-9	134.3	55.4	63	24.58
H-11-T-1	H11	H-11-P-1	97.3	35.2	40	25.3
H-11-T-10	H11	H-11-P-10	51	35.2	40	23.49
H-11-T-11	H11	H-11-P-11	11.2	35.2	40	25.44
H-11-T-12	H11	H-11-P-12	5.4	35.2	40	22.27
H-11-T-13	H11	H-11-P-13	87.1	35.2	40	26.65
H-11-T-14	H11	H-11-P-14	227.5	35.2	40	29.86
H-11-T-2	H11	H-11-P-2	13.5	35.2	40	28.82
H-11-T-3	H11	H-11-P-3	5	35.2	40	29.09
H-11-T-4	H11	H-11-P-4	32.8	35.2	40	28.36
H-11-T-5	H11	H-11-P-5	26.7	44	50	21.8
H-11-T-6	H11	H-11-P-6	63.9	35.2	40	26.61
H-11-T-7	H11	H-11-P-7	118.7	35.2	40	28.75
H-11-T-8	H11	H-11-P-8	9	35.2	40	29.05
H-11-T-9	H11	H-11-P-9	133.5	35.2	40	25.25
H-12-T-1	H12	H-12-P-1	6.5	44	50	20.3
H-12-T-2	H12	H-12-P-2	14.4	35.2	40	22.18
H-12-T-3	H12	H-12-P-3	141.3	35.2	40	22.63
H-12-T-4	H12	H-12-P-4	284.4	55.4	63	23.53
H-12-T-5	H12	H-12-P-5	71.1	44	50	27.08
H-12-T-6	H12	H-12-P-6	98.5	55.4	63	24.48
H-12-T-7	H12	H-12-P-7	161.9	35.2	40	25.47

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
H-12-T-8	H12	H-12-P-8	126.7	35.2	40	26.57
H-12-T-9	H12	H-12-P-9	179.4	44	50	21.25
H-13-T-1	H13	H-13-P-1	5	35.2	40	26.36
H-13-T-10	H13	H-13-P-10	116.5	35.2	40	28.55
H-13-T-11	H13	H-13-P-11	167.4	44	50	24.92
H-13-T-12	H13	H-13-P-12	79.7	35.2	40	23.73
H-13-T-13	H13	H-13-P-13	52.3	35.2	40	27.69
H-13-T-14	H13	H-13-P-14	5	35.2	40	26.4
H-13-T-15	H13	H-13-P-15	108.9	35.2	40	22.62
H-13-T-2	H13	H-13-P-2	45.4	35.2	40	22.01
H-13-T-3	H13	H-13-P-3	45.7	35.2	40	27.22
H-13-T-4	H13	H-13-P-4	142.1	44	50	25.86
H-13-T-5	H13	H-13-P-5	74.1	35.2	40	28.04
H-13-T-6	H13	H-13-P-6	57.2	35.2	40	28.66
H-13-T-7	H13	H-13-P-7	138.9	35.2	40	24.42
H-13-T-8	H13	H-13-P-8	82.5	35.2	40	27.93
H-13-T-9	H13	H-13-P-9	25.6	35.2	40	27.17
H-14-T-1	H14	H-14-P-1	26.5	44	50	24.7
H-14-T-10	H14	H-14-P-10	28.5	35.2	40	28.17
H-14-T-11	H14	H-14-P-11	32.9	35.2	40	23.01
H-14-T-12	H14	H-14-P-12	83.4	35.2	40	25.33
H-14-T-13	H14	H-14-P-13	184.3	35.2	40	27.9
H-14-T-14	H14	H-14-P-14	185.4	35.2	40	27.28
H-14-T-2	H14	H-14-P-2	88.5	35.2	40	27.44

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
H-14-T-3	H14	H-14-P-3	24.5	35.2	40	27.11
H-14-T-4	H14	H-14-P-4	120.5	35.2	40	28.19
H-14-T-5	H14	H-14-P-5	175	35.2	40	26.86
H-14-T-6	H14	H-14-P-6	103	35.2	40	26.23
H-14-T-7	H14	H-14-P-7	133.9	35.2	40	21.48
H-14-T-8	H14	H-14-P-8	5	35.2	40	23.55
H-14-T-9	H14	H-14-P-9	93.7	35.2	40	20.51
H-15-T-1	H15	H-15-P-1	55.4	35.2	40	27.56
H-15-T-10	H15	H-15-P-10	111.8	44	50	25.75
H-15-T-11	H15	H-15-P-11	5	35.2	40	29.49
H-15-T-12	H15	H-15-P-12	194.2	44	50	22.3
H-15-T-13	H15	H-15-P-13	148.3	35.2	40	27.49
H-15-T-14	H15	H-15-P-14	256.2	35.2	40	25.43
H-15-T-15	H15	H-15-P-15	57.8	35.2	40	25
H-15-T-2	H15	H-15-P-2	37.7	55.4	63	21.06
H-15-T-3	H15	H-15-P-3	66.1	55.4	63	21.1
H-15-T-4	H15	H-15-P-4	5	35.2	40	27.35
H-15-T-5	H15	H-15-P-5	67.6	35.2	40	26.9
H-15-T-6	H15	H-15-P-6	194	35.2	40	27.21
H-15-T-7	H15	H-15-P-7	170.7	35.2	40	29.35
H-15-T-8	H15	H-15-P-8	160.9	35.2	40	21.71
H-15-T-9	H15	H-15-P-9	68.7	35.2	40	22.62
H-16-T-1	H16	H-16-P-1	73.3	35.2	40	26.58
H-16-T-10	H16	H-16-P-10	347	35.2	40	30.08

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
H-16-T-11	H16	H-16-P-11	5	35.2	40	30.54
H-16-T-12	H16	H-16-P-12	33.5	35.2	40	31.46
H-16-T-13	H16	H-16-P-13	51.4	35.2	40	29.73
H-16-T-14	H16	H-16-P-14	185.2	35.2	40	31.16
H-16-T-2	H16	H-16-P-2	5	35.2	40	31.05
H-16-T-3	H16	H-16-P-3	271.2	35.2	40	28.46
H-16-T-4	H16	H-16-P-4	307.9	35.2	40	29.05
H-16-T-5	H16	H-16-P-5	330.1	35.2	40	28.86
H-16-T-6	H16	H-16-P-6	51.1	35.2	40	24.63
H-16-T-7	H16	H-16-P-7	235.2	35.2	40	24.02
H-16-T-8	H16	H-16-P-8	367	35.2	40	24.8
H-16-T-9	H16	H-16-P-9	31.4	35.2	40	30.29
H-17-T-1	H17	H-17-P-1	49.4	35.2	40	25.87
H-17-T-10	H17	H-17-P-10	399.7	35.2	40	29.58
H-17-T-11	H17	H-17-P-11	293.9	35.2	40	21.73
H-17-T-12	H17	H-17-P-12	327.4	44	50	21.57
H-17-T-13	H17	H-17-P-13	383.2	44	50	28.13
H-17-T-14	H17	H-17-P-14	438.1	44	50	26.27
H-17-T-15	H17	H-17-P-15	177.4	35.2	40	21.74
H-17-T-2	H17	H-17-P-2	7.4	35.2	40	28.31
H-17-T-3	H17	H-17-P-3	75.3	35.2	40	24.75
H-17-T-4	H17	H-17-P-4	23.9	44	50	25.52
H-17-T-5	H17	H-17-P-5	24.9	79.2	90	24.14
H-17-T-6	H17	H-17-P-6	105	44	50	24.35

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
H-17-T-7	H17	H-17-P-7	84.4	44	50	22.15
H-17-T-8	H17	H-17-P-8	5	35.2	40	23.59
H-17-T-9	H17	H-17-P-9	109.8	35.2	40	24.75
H-18-T-1	H18	H-18-P-1	88.1	55.4	63	22.31
H-18-T-10	H18	H-18-p-10	250.5	35.2	40	27.09
H-18-T-11	H18	H-18-P-11	278	35.2	40	27.08
H-18-T-12	H18	H-18-P-12	217.8	35.2	40	26.42
H-18-T-2	H18	H-18-P-2	53.8	66	75	21.08
H-18-T-3	H18	H-18-P-3	159.8	44	50	24.18
H-18-T-4	H18	H-18-P-4	22.3	35.2	40	24.13
H-18-T-5	H18	H-18-P-5	152	35.2	40	25.53
H-18-T-6	H18	H-18-P-6	197.9	44	50	22.89
H-18-T-7	H18	H-18-P-7	5	44	50	22
H-18-T-8	H18	H-18-P-8	31.8	35.2	40	25.81
H-18-T-9	H18	H-18-P-9	89.7	35.2	40	24.48
H-19-T-1	H19	H-19-P-1	192.8	55.4	63	23.28
H-19-T-10	H19	H-19-P-10	61.9	44	50	21.62
H-19-T-11	H19	H-19-P-11	335.4	44	50	22.51
H-19-T-12	H19	H-19-P-12	6.2	66	75	20.97
H-19-T-13	H19	H-19-P-13	17.7	35.2	40	22.07
H-19-T-14	H19	H-19-P-14	263.1	66	75	22.79
H-19-T-15	H19	H-19-P-15	346.4	44	50	20.42
H-19-T-2	H19	H-19-P-2	72	55.4	63	23.65
H-19-T-3	H19	H-19-P-3	21	35.2	40	23.94

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
H-19-T-4	H19	H-19-P-4	61.9	44	50	23.24
H-19-T-5	H19	H-19-P-5	71.5	35.2	40	22.28
H-19-T-6	H19	H-19-P-6	317.3	55.4	63	24.76
H-19-T-7	H19	H-19-P-7	263.4	44	50	20.8
H-19-T-8	H19	H-19-P-8	404.7	66	75	22.62
H-19-T-9	H19	H-19-P-9	17.4	35.2	40	22.04
H-20-P-1	H20	H-20-P-1	5	55.4	63	24.76
H-20-T-10	H20	H-20-P-10	326.5	44	50	24.87
H-20-T-11	H20	H-20-P-11	243.3	44	50	25.28
H-20-T-12	H20	H-20-P-12	423	66	75	23.11
H-20-T-2	H20	H-20-P-2	358.7	44	50	21.41
H-20-T-3	H20	H-20-P-3	177.7	66	75	21.55
H-20-T-4	H20	H-20-P-4	10.5	66	75	22.01
H-20-T-5	H20	H-20-P-5	54.1	96.8	110	25.62
H-20-T-6	H20	H-20-P-6	258.1	44	50	22.25
H-20-T-7	H20	H-20-P-7	170.1	66	75	20.15
H-20-T-8	H20	H-20-P-8	144.8	79.2	90	24.81
H-20-T-9	H20	H-20-P-9	291	55.4	63	24.77
H-21-T-1	H21	H-21-P-1	5	35.2	40	26.19
H-21-T-10	H21	H-21-P-10	788.9	44	50	20.24
H-21-T-11	H21	H-21-P-11	102.9	35.2	40	25.63
H-21-T-12	H21	H-21-P-12	140.6	35.2	40	24.45

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
H-21-T-13	H21	H-21-P-13	392.7	35.2	40	26.51
H-21-T-14	H21	H-21-P-14	344.9	35.2	40	24.69
H-21-T-2	H21	H-21-P-2	141.2	44	50	20.86
H-21-T-3	H21	H-21-P-3	5	79.2	90	22.24
H-21-T-4	H21	H-21-P-4	617.8	79.2	90	23.96
H-21-T-5	H21	H-21-P-5	159.2	55.4	63	24.99
H-21-T-6	H21	H-21-P-6	276.1	55.4	63	22.73
H-21-T-7	H21	H-21-P-7	739.9	35.2	40	20
H-21-T-8	H21	H-21-P-8	488.9	66	75	22.66
H-21-T-9	H21	H-21-P-9	7	35.2	40	26.89
H-22-T-1	H22	H22-P1	332.6	35.2	40	26.01
H-22-T-10	H22	H-22-P-10	5	35.2	40	25.8
H-22-T-11	H22	H-22-P-11	278.1	44	50	25.26
H-22-T-2	H22	H-22-P-2	42.1	66	75	23.99
H-22-T-3	H22	H-22-P-3	43.8	55.4	63	20.35
H-22-T-4	H22	H-22-P-4	11.6	35.2	40	26.97
H-22-T-5	H22	H-22-P-5	214.9	44	50	24.83
H-22-T-6	H22	H-22-P-6	86.5	44	50	24.53
H-22-T-7	H22	H-22-P-7	106.7	55.4	63	24.13
H-22-T-8	H22	H-22-P-8	268.4	35.2	40	22.84
H-22-T-9	H22	H-22-P-9	170	55.4	63	24.58

1.2 Sector 43

Como en este sector no hubo un ajuste mínimo del modelo original en las tuberías secundarias, entonces se procede al diseño de redes en la alternativa sin modificación del trazado.

1.2.1 Análisis de alternativas sin modificación del trazado

1.2.1.1 Diseño a la demanda con garantía suministro del 99%

1.2.1.1.1 Calculo del caudal de diseño por el método de Clement

A continuación se puede observar el cálculo del caudal de diseño para una GS del 99%, a partir de la sumatoria de caudales demandados en las parcelas y la probabilidad de apertura de la toma.

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Coste	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks
P00'	UGD_43	J250	474.6	500	16	19.23	1,881.92 €	949.44	158.2030626	99%	2.326	1551.249	249.828	0.263
P01_A'	J250	J147	427.6	450	89.5	0	8,753.10 €	709.1	118.1557462	99%	2.326	266.118	156.106	0.220
P01_A_H2'	J147	H2'	152	160	22.6	19.17	296.29 €	18.96	3.159262372	99%	2.326	6.644	9.156	0.483
P01_B'	J147	J148	379.8	400	103.1	0	8,599.57 €	690.14	114.9964838	99%	2.326	203.191	148.157	0.215
P01_B_H3'	J148	H3'	132.4	140	124.5	18.73	1,525.13 €	14.97	2.4944176	99%	2.326	4.028	7.164	0.479
P01_C'	J148	J149	379.8	400	150.7	0	12,569.89 €	675.17	112.5020662	99%	2.326	199.163	145.333	0.215
P01_C_H4'	J149	H4'	152	160	9	17.15	117.99 €	18.93	3.154263539	99%	2.326	4.329	7.994	0.422
P01_D'	J149	J150	299.2	315	110.3	0	5,267.93 €	391.69	65.26642818	99%	2.326	132.474	92.042	0.235
P01_D_H6'	J150	H6'	132.4	140	138.9	16.18	1,701.53 €	14.48	2.412769997	99%	2.326	3.166	6.552	0.453
P01_E'	J150	J151	299.2	315	123.3	0	5,888.81 €	377.21	62.85365819	99%	2.326	129.308	89.307	0.237
P01_E_H5'	J151	H5'	132.4	140	5	15.59	61.25 €	14.48	2.412769997	99%	2.326	2.443	6.049	0.418
P01_F'	J151	J152	299.2	315	246.5	0	11,772.84 €	362.73	60.44088819	99%	2.326	126.865	86.644	0.239
P01_F_H32'	J152	H32'	132.4	140	51.8	14.17	634.55 €	14.29	2.381110722	99%	2.326	2.555	6.100	0.427
P01_G'	J152	J153	299.2	315	388.5	0	18,554.76 €	348.44	58.05977747	99%	2.326	124.309	83.997	0.241
P0101_A'	J149	J161	237.4	250	233.1	0	7,668.99 €	264.55	44.08137449	99%	2.326	62.360	62.452	0.236
P0101_B'	J161	J172	237.4	250	110.8	0	3,645.32 €	193.11	32.17748716	99%	2.326	47.900	48.278	0.250
P0101_B_H26'	J172	H26'	117.8	125	5	18.39	50.70 €	11.56	1.926216931	99%	2.326	2.055	5.261	0.455
P0101_C'	J172	J174	237.4	250	58.1	0	1,911.49 €	181.55	30.25127023	99%	2.326	45.845	46.003	0.253
P0101_D'	J174	J175	237.4	250	22.1	0	727.09 €	131.25	21.86989379	99%	2.326	31.929	35.015	0.267
P0101_E'	J175	J176	213.6	225	124.3	0	3,151.01 €	98.86	16.47282057	99%	2.326	23.400	27.726	0.280
P0101_F'	J176	J177	213.6	225	157	0	3,979.95 €	56.66	9.441129007	99%	2.326	16.399	18.862	0.333
P0101_F_H18'	J177	H18'	152	160	5	17.38	65.55 €	19.03	3.170926315	99%	2.326	8.852	10.092	0.530
P0101_G'	J177	J178	213.6	225	403.1	0	10,218.59 €	37.63	6.270202692	99%	2.326	7.547	12.661	0.336
P0101_G_H19'	J178	H19'	132.4	140	5	18.27	61.25 €	15.46	2.576065204	99%	2.326	3.399	6.865	0.444
P0101_H'	J178	J179	152	160	176.5	0	2,313.92 €	22.17	3.694137488	99%	2.326	4.148	8.432	0.380
P0101_H_H20'	J179	H20'	117.8	125	5	17.7	50.70 €	12.58	2.096177249	99%	2.326	2.567	5.824	0.463
P0101_I_H21'	J179	H21'	104.4	110	127.1	16.68	1,142.63 €	9.59	1.59796024	99%	2.326	1.581	4.523	0.472
P010101_A'	J174	J191	190	200	30.3	0	665.09 €	50.3	8.381376439	99%	2.326	13.916	17.060	0.339
P010101_A_H17'	J191	H17'	190	200	5	19.9	109.75 €	28.63	4.770552832	99%	2.326	10.451	12.291	0.429
P010101_B'	J191	J193	152	160	236.9	0	3,105.76 €	21.67	3.610823607	99%	2.326	3.465	7.942	0.366
P010101_B_H66'	J193	H66'	117.8	125	93.4	20.96	947.08 €	11.24	1.872896047	99%	2.326	1.713	4.918	0.438
P010101_C_H65'	J193	H65'	152	160	228.5	21.77	2,995.64 €	10.43	1.73792756	99%	2.326	1.753	4.818	0.462
P010102_A'	J161	J162	213.6	225	150	0	3,802.50 €	71.44	11.90388733	99%	2.326	14.460	20.750	0.290
P010102_A_H27'	J162	H27'	152	160	5	17.33	65.55 €	19.68	3.27923436	99%	2.326	5.016	8.490	0.431
P010102_B'	J162	J163	213.6	225	155.9	0	3,952.07 €	51.76	8.624652972	99%	2.326	9.444	15.774	0.305
P010102_B_H28'	J163	H28'	132.4	140	77.8	16.73	953.05 €	15.21	2.534408263	99%	2.326	3.155	6.666	0.438
P010102_C'	J163	J164	213.6	225	123.1	0	3,120.59 €	36.55	6.090244709	99%	2.326	6.289	11.924	0.326
P010102_D'	J164	J166	152	160	55.1	0	722.36 €	25.22	4.202352163	99%	2.326	4.643	9.215	0.365
P010102_D_H29'	J164	H29'	117.8	125	156.9	15	1,590.97 €	11.33	1.887892546	99%	2.326	1.646	4.873	0.430
P010102_D_H30'	J166	H30'	117.8	125	86.8	15.1	880.15 €	11.16	1.859565826	99%	2.326	1.565	4.770	0.427
P010102_D_H31'	J166	H31'	132.4	140	247.8	14.25	3,035.55 €	14.06	2.342786337	99%	2.326	3.078	6.424	0.457
P010103_A'	J175	J196	190	200	537.8	0	11,804.71 €	32.39	5.397073218	99%	2.326	8.529	12.191	0.376
P010103_A_H67'	J196	H67'	132.4	140	6.9	21.63	84.53 €	16.54	2.756023187	99%	2.326	3.205	6.921	0.418

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Coste	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks
P010103_B_H68'	J196	H68'	152	160	103.7	22.11	1,359.51 €	15.85	2.641050031	99%	2.326	5.324	8.009	0.505
P010104_A'	J176	J181	213.6	225	86.4	0	2,190.24 €	42.2	7.031691566	99%	2.326	7.000	13.187	0.312
P010104_A_H22'	J181	H22'	104.4	110	5	18.41	44.95 €	10.43	1.73792756	99%	2.326	1.413	4.503	0.432
P010104_B'	J181	J182	190	200	131.6	0	2,888.62 €	31.77	5.293764006	99%	2.326	5.587	10.793	0.340
P010104_B_H23'	J182	H23'	104.4	110	33.6	17.8	302.06 €	9.34	1.556303299	99%	2.326	1.124	4.023	0.431
P010104_C'	J182	J183	152	160	73.7	0	966.21 €	22.43	3.737460707	99%	2.326	4.463	8.652	0.386
P010104_C_H25'	J183	H25'	104.4	110	138.9	16.81	1,248.71 €	9.75	1.624620682	99%	2.326	1.138	4.107	0.421
P010104_D_H24'	J183	H24'	117.8	125	145.5	16.89	1,475.37 €	12.68	2.112840025	99%	2.326	3.325	6.355	0.501
P0102_A'	J153	J223	190	200	193.4	0	4,245.13 €	157.37	26.22221094	99%	2.326	28.319	38.602	0.245
P0102_A_H33'	J223	H33'	132.4	140	5	13.35	61.25 €	14.48	2.412769997	99%	2.326	2.912	6.382	0.441
P0102_B'	J223	J225	190	200	122	0	2,677.90 €	142.89	23.80944094	99%	2.326	25.407	35.536	0.249
P0102_B_H34'	J225	H34'	117.8	125	5	13.81	50.70 €	11.58	1.929549486	99%	2.326	1.765	5.020	0.433
P0102_C'	J225	J227	190	200	248.6	0	5,456.77 €	131.31	21.87989146	99%	2.326	23.643	33.191	0.253
P0102_C_H35'	J227	H35'	104.4	110	5	13.13	44.95 €	9.43	1.571299798	99%	2.326	1.315	4.239	0.450
P0102_D'	J227	J243	152	160	148.9	0	1,952.08 €	46.46	7.741525833	99%	2.326	9.632	14.962	0.322
P0102_E'	J243	J247	152	160	161.7	0	2,119.89 €	25.3	4.215682384	99%	2.326	6.308	10.059	0.398
P0102_E_H38'	J247	H38'	104.4	110	20.2	10.2	181.60 €	10.16	1.692938064	99%	2.326	1.483	4.526	0.445
P0102_F_H39'	J247	H39'	132.4	140	221.9	9.86	2,718.28 €	15.14	2.52274432	99%	2.326	4.825	7.633	0.504
P010201_A'	J243	J244	152	160	42.4	0	555.86 €	21.16	3.525843448	99%	2.326	3.324	7.767	0.367
P010201_A_H36'	J244	H36'	104.4	110	5	11.39	44.95 €	7.93	1.321358154	99%	2.326	0.764	3.355	0.423
P010201_B_H37'	J244	H37'	117.8	125	137	11.68	1,389.18 €	13.23	2.204485294	99%	2.326	2.560	5.926	0.448
P010202_A'	J227	J229	190	200	74.9	0	1,644.06 €	75.42	12.56706583	99%	2.326	12.695	20.856	0.277
P010202_B'	J229	J234	190	200	50	0	1,097.50 €	53.02	8.834603953	99%	2.326	8.857	15.758	0.297
P010202_B_H42'	J234	H42'	104.4	110	5	13.14	44.95 €	7.77	1.294697712	99%	2.326	0.968	3.583	0.461
P010202_C'	J234	J236	190	200	109.2	0	2,396.94 €	45.25	7.53990624	99%	2.326	7.889	14.074	0.311
P010202_C_H43'	J236	H43'	104.4	110	5	14.1	44.95 €	10.42	1.736261282	99%	2.326	1.667	4.740	0.455
P010202_D'	J236	J238	190	200	237.7	0	5,217.52 €	34.83	5.803644958	99%	2.326	6.222	11.607	0.333
P010202_D_H46'	J238	H46'	132.4	140	530.5	12.32	6,498.63 €	15.53	2.587729147	99%	2.326	2.722	6.426	0.414
P010202_E'	J238	J239	152	160	14.3	0	187.47 €	19.3	3.215915811	99%	2.326	3.500	7.568	0.392
P010202_E_H45'	J239	H45'	104.4	110	5.7	14.68	51.24 €	9.45	1.574632353	99%	2.326	1.828	4.720	0.499
P010202_F_H44'	J239	H44'	104.4	110	194.6	16.18	1,749.45 €	9.85	1.641283458	99%	2.326	1.672	4.649	0.472
P01020201_A'	J229	J230	152	160	242.2	0	3,175.24 €	22.4	3.732461874	99%	2.326	3.839	8.290	0.370
P01020201_A_H41'	J230	H41'	104.4	110	129.7	11.55	1,166.00 €	10.42	1.736261282	99%	2.326	1.755	4.818	0.462
P01020201_B_H40'	J230	H40'	117.8	125	209.7	10.33	2,126.36 €	11.98	1.996200591	99%	2.326	2.084	5.355	0.447
P0103_A'	J153	J200	213.6	225	191.9	0	4,864.67 €	191.07	31.83756653	99%	2.326	89.270	53.818	0.282
P0103_A_H57'	J200	H57'	132.4	140	5	13	61.25 €	16.79	2.797680128	99%	2.326	4.035	7.471	0.445
P0103_B'	J200	J202	213.6	225	186.7	0	4,732.85 €	174.28	29.0398864	99%	2.326	85.235	50.517	0.290
P0103_B_H56'	J202	H56'	152	160	5.3	11.98	69.48 €	18.52	3.085946156	99%	2.326	4.354	7.940	0.429
P0103_C'	J202	J205	213.6	225	176.1	0	4,464.14 €	155.76	25.95394024	99%	2.326	80.881	46.876	0.301
P0103_C_H55'	J205	H55'	132.4	140	5	11.32	61.25 €	16.14	2.689372082	99%	2.326	3.171	6.832	0.423
P0103_D'	J205	J207	213.6	225	160.1	0	4,058.54 €	139.62	23.26456816	99%	2.326	77.711	43.772	0.314
P0103_D_H54'	J207	H54'	132.4	140	5.1	10.38	62.48 €	15.79	2.631052365	99%	2.326	4.077	7.328	0.464
P0103_E'	J207	J209	213.6	225	259	0	6,565.65 €	123.83	20.6335158	99%	2.326	73.633	40.596	0.328

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Coste	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks
P0103_F'	J209	J210	213.6	225	169.6	0	4,299.36 €	58.63	9.769385699	99%	2.326	35.770	23.683	0.404
P0103_F_H50'	J210	H50'	117.8	125	75.7	9.28	767.60 €	11.81	1.967873872	99%	2.326	2.709	5.797	0.491
P0103_G'	J210	J212	213.6	225	64.1	0	1,624.94 €	46.82	7.801511827	99%	2.326	33.061	21.178	0.452
P0103_G_H49'	J212	H49'	104.4	110	102.8	10.5	924.17 €	7.68	1.279701214	99%	2.326	1.057	3.672	0.478
P0103_H'	J212	J214	213.6	225	132.7	0	3,363.95 €	39.14	6.521810613	99%	2.326	32.004	19.682	0.503
P0103_H_H48'	J214	H48'	132.4	140	73.6	10.33	901.60 €	17.37	2.89432423	99%	2.326	4.439	7.796	0.449
P0103_I_H47'	J214	H47'	190	200	303.2	12.41	6,655.24 €	21.77	3.627486383	99%	2.326	27.565	15.841	0.728
P010301_A'	J209	J217	152	160	101	0	1,324.11 €	65.2	10.8641301	99%	2.326	37.863	25.179	0.386
P010301_A_H51'	J217	H51'	132.4	140	5	9.98	61.25 €	15.9	2.649381419	99%	2.326	3.411	6.946	0.437
P010301_B'	J217	J219	152	160	128.4	0	1,683.32 €	49.3	8.214748677	99%	2.326	34.452	21.869	0.444
P010301_B_H52'	J219	H52'	152	160	5	10.72	65.55 €	23.41	3.900755913	99%	2.326	14.587	12.786	0.546
P010301_C_H53'	J219	H53'	152	160	229.9	12.11	3,013.99 €	25.89	4.313992764	99%	2.326	19.865	14.683	0.567
P02_A'	J250	J109	190	200	115.2	0	2,528.64 €	78.8	13.13026766	99%	2.326	29.792	25.828	0.328
P02_A_H1'	J109	H1'	190	200	5	20.18	109.75 €	28.28	4.712233115	99%	2.326	20.540	15.256	0.539
P02_B'	J109	J112	190	200	190.1	0	4,172.70 €	50.52	8.418034547	99%	2.326	9.252	15.494	0.307
P02_B_H64'	J112	H64'	117.8	125	5.8	21.9	58.81 €	11.44	1.9062216	99%	2.326	1.595	4.845	0.423
P02_C'	J112	J118	190	200	187.4	0	4,113.43 €	39.08	6.511812947	99%	2.326	7.656	12.949	0.331
P02_C_H61'	J118	H61'	117.8	125	111.4	22.14	1,129.60 €	12.02	2.002865702	99%	2.326	1.647	4.988	0.415
P02_D'	J118	J119	190	200	68.5	0	1,503.58 €	27.06	4.508947246	99%	2.326	6.010	10.212	0.377
P02_D_H62'	J119	H62'	117.8	125	18.3	24.31	185.56 €	11.07	1.844569328	99%	2.326	1.507	4.700	0.425
P02_F_H63'	J119	H63'	132.4	140	154.9	23.96	1,897.53 €	15.99	2.664377918	99%	2.326	4.503	7.601	0.475
P04_A'	J250	J124	190	200	357.4	0	7,844.93 €	161.54	26.91704871	99%	2.326	33.135	40.308	0.250
P04_B'	J124	J125	190	200	407	0	8,933.65 €	29.54	4.922184096	99%	2.326	7.103	11.122	0.377
P04_B_H15'	J125	H15'	117.8	125	5	20.69	50.70 €	13.08	2.17949113	99%	2.326	2.096	5.548	0.424
P04_C_H16'	J125	H16'	152	160	210.1	19.47	2,754.41 €	16.46	2.742692966	99%	2.326	5.007	7.948	0.483
P0401_A'	J124	J138	190	200	94.9	0	2,083.06 €	59.89	9.979336679	99%	2.326	11.316	17.805	0.297
P0401_A_H11'	J138	H11'	132.4	140	7.3	18.57	89.43 €	14.73	2.454426937	99%	2.326	3.246	6.646	0.451
P0401_B'	J138	J140	190	200	134.1	0	2,943.50 €	45.16	7.524909742	99%	2.326	8.070	14.133	0.313
P0401_B_H10'	J140	H10'	117.8	125	111.4	16.48	1,129.60 €	12.08	2.012863368	99%	2.326	2.086	5.373	0.445
P0401_C'	J140	J141	190	200	60.9	0	1,336.76 €	33.08	5.512046374	99%	2.326	5.983	11.202	0.339
P0401_C_H9'	J141	H9'	132.4	140	5	17.37	61.25 €	14.23	2.371113056	99%	2.326	3.128	6.485	0.456
P0401_D'	J141	J143	152	160	252.6	0	3,311.59 €	18.85	3.140933318	99%	2.326	2.855	7.072	0.375
P0401_D_H7'	J143	H7'	117.8	125	6.5	15.6	65.91 €	11.91	1.984536648	99%	2.326	2.004	5.278	0.443
P0401_D_H8'	J143	H8'	104.4	110	8.2	15.19	73.72 €	6.94	1.15639667	99%	2.326	0.851	3.303	0.476
P0403_A'	J124	J133	190	200	30.5	0	669.48 €	30.21	5.033824697	99%	2.326	5.279	10.379	0.344
P0403_A_H12'	J133	H12'	104.4	110	5	19.16	44.95 €	7.44	1.239710551	99%	2.326	1.039	3.611	0.485
P0403_B'	J133	J135	152	160	178.8	0	2,344.07 €	22.77	3.794114146	99%	2.326	4.241	8.585	0.377
P0403_B_H13'	J135	H13'	104.4	110	5	18.5	44.95 €	10.1	1.682940398	99%	2.326	1.582	4.609	0.456
P0403_C_H14'	J135	H14'	117.8	125	159.3	16.88	1,615.30 €	12.67	2.111173747	99%	2.326	2.659	5.904	0.466
P0404_A'	J124	J128	213.6	225	16.3	0	413.21 €	41.9	6.981703237	99%	2.326	9.437	14.128	0.337
P0404_A_H58'	J130	H58'	132.4	140	76.2	21.69	933.45 €	15	2.499416433	99%	2.326	2.776	6.375	0.425
P0404_A_H59'	J128	H59'	132.4	140	146.9	20.99	1,799.53 €	13.86	2.309460784	99%	2.326	2.663	6.106	0.441
P0404_B'	J128	J130	152	160	189.3	0	2,481.72 €	28.04	4.672242453	99%	2.326	6.773	10.727	0.383
P0404_C_H60'	J130	H60'	152	160	69.8	22.68	915.08 €	13.04	2.172826019	99%	2.326	3.998	6.824	0.523

1.2.1.1.2 Diseño por pendiente hidráulica con cabecera conocida Qdis 99%

En este subcapítulo se puede observar cómo se realiza el diseño de la pendiente hidráulica con cabecera conocida con la variación en la selección del diámetro superior e inferior del diámetro teórico calculado. En los cálculos se puede observar el cálculo del diámetro teórico en función de un factor de fricción estimado, del caudal de diseño para la GS de 99% y la pendiente de diseño. Además, se observa el cálculo de los diámetros D1 (diámetros inferiores al teórico), y D2 (diámetros superiores al teórico), el cálculo de Reynolds, el factor de fricción, las perdidas por fricción y la altura piezométrica, y finalmente el cálculo de la presión P1 (presión en función del resultado de la solución del D1) y P2 (presión en función del resultado de la solución del D2). Finalmente, al obtener las presiones calculadas para cada solución de diámetros, se selecciona la solución del diámetro que permite mantener la presión mínima de 25mca en hidrante. Esto se realiza para todos los hidrantes después de conocer la solución de la serie critica que es el nudo critico de la red.

Serie critica	P419-P418-P416-P00'-P04_A'-P0403_A'-P0403_A_H12
Jcritica	12.38
Longtotal	461.9
Pmin	25
Hcab	49.88
Visc	1.10E-06
Rug	0.01

																								12.3032	28.4136
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						0															49.88	49.88		
P00'	UGD_43	J250	16	19.23	249.828378	69	81.88	0.016	367.06	2.36	299.20	379.80	3.55	2.21	966490.55	761384.87	0.012	0.013	0.43	0.13	49.38	49.67	30.15	30.44
P04_A'	J250	J124	357.4	0	40.3081734	426.4	58.35	0.016	176.94	1.64	132.40	213.60	2.93	1.12	352389.18	218428.50	0.015	0.016	17.51	1.70	31.87	47.98	31.87	47.98
P0403_A'	J124	J133	30.5	0	10.3789925	456.9	54.45	0.016	102.83	1.25	104.40	104.40	1.21	1.21	115072.65	115072.65	0.018	0.018	0.39	0.39	31.47	47.58	31.47	47.58
P0403_A_H12'	J133	H12'	5	19.16	3.61067133	461.9	12.38	0.016	67.41	1.01	104.40	104.40	0.42	0.42	40031.78	40031.78	0.022	0.022	0.01	0.01	31.46	47.57	12.30	28.41

Solución escogida (diametro superior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P00'	UGD_43	J250	16	379.8	400	€ 1,334.56
P04_A'	J250	J124	357.4	213.6	225	€ 9,060.09
P0403_A'	J124	J133	30.5	104.4	110	€ 274.20
P0403_A_H12'	J133	H12'	5	104.4	110	€ 44.95
						€ 10,713.80

CONJUNTO DE RAMALES POR HIDRANTES

HIDRANTE 1

Serie	P00';P02_A';P02_A_H1'
Jcritica	23.74
Longtotal	120.2
Pmin	25
Hcab	49.6715311 J250
Visc	1.10E-06
Rug	0.01

																								21.4266	29.2733
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						69															49.6715	49.67153		
P02_A'	J250	J109	115.2	0	25.8279272	184.2	133.94	0.016	130.013787	1.9454535	104.4	237.4	3.01716	0.583496	286356.13	125929.15	0.0155	0.01732	7.934688	0.14587	41.7368	49.52566	41.7368	49.5257
P02_A_H1'	J109	H1'	5	20.18	15.2555207	189.2	23.74	0.016	105.323286	1.75100889	104.4	117.8	1.78212	1.399737	169139.08	149899.15	0.01681	0.01707	0.130282	0.07236	41.6066	49.4533	21.4266	29.2733

Solución escogida (diametro superior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P02_A'	J250	J109	115.2	237.4	250	€ 3,790.08
P02_A_H1'	J109	H1'	5	117.8	125	€ 50.70
						€ 3,840.78

HIDRANTE 2

Serie	P00';P01_A';P01_A_H2'
Jcritica	30.38
Longtotal	112.1
Pmin	25
Hcab	49.6715311
Visc	1.10E-06
Rug	0.01

J250

																								25.0513	29.7433
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						69															49.6715	49.67153		
P01_A'	J250	J147	89.5	0	156.105754	158.5	155.66	0.016	254.157415	3.07697142	213.6	340.8	4.35639	1.711315	845931.31	530196.38	0.01288	0.01342	5.21826	0.52625	44.4533	49.14528	44.4533	49.1453
P01_A_H2'	J147	H2'	22.6	19.17	9.15569697	181.1	30.38	0.016	81.7356994	1.74492981	104.4	104.4	1.06955	1.069549	101509.89	101509.89	0.01838	0.01838	0.231951	0.23195	44.2213	48.91333	25.0513	29.7433

Solución escogida (diametro superior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P01_A'	J250	J147	89.5	340.8	355	€ 5,249.18
P01_A_H2'	J147	H2'	22.6	104.4	110	€ 203.17
						€ 5,452.35

HIDRANTE 3

Serie	P00';P01_A';P01_B';P01_B_H3'
Jcritica	14.03
Longtotal	227.6
Pmin	25
Hcab	49.1452761
Visc	1.10E-06
Rug	0.01

J147

																								24.1467	29.0453
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						158.5															49.1453	49.14528		
P01_B'	J147	J148	103.1	0	148.15746	261.6	92.30	0.016	290.50492	2.23525286	213.6	340.8	4.13458	1.624181	802859.79	503200.86	0.01296	0.01353	5.449075	0.55043	43.6962	48.59485	43.6962	48.5949
P01_B_H3'	J148	H3'	124.5	18.73	7.16361891	386.1	14.03	0.016	86.480277	1.21957482	104.4	104.4	0.83684	0.836838	79423.57	79423.57	0.01925	0.01925	0.819531	0.81953	42.8767	47.77532	24.1467	29.0453

Solución escogida (diametro superior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P01_B'	J147	J148	103.1	340.8	355	€ 6,046.82
P01_B_H3'	J148	H3'	124.5	104.4	110	€ 1,119.26
						€ 7,166.07

HIDRANTE 4

Serie	P00';P01_A';P01_B';P01_C';P01_C_H4'
Jcritica	15.30
Longtotal	159.7
Pmin	25
Hcab	48.5948508
Visc	1.10E-06
Rug	0.01

J148

																								23.6905	30.5962
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						261.6															48.5949	48.59485		
P01_C'	J148	J149	150.7	0	145.332675	412.3	57.23	0.016	283.314805	2.30533927	213.6	340.8	4.05575	1.593214	787552.39	493606.78	0.01299	0.01357	7.682157	0.77645	40.9127	47.8184	40.9127	47.8184
P01_C_H4'	J149	H4'	9	17.15	7.99449757	421.3	15.30	0.016	88.8056162	1.2906855	104.4	104.4	0.9339	0.9339	88635.58	88635.58	0.01885	0.01885	0.072242	0.07224	40.8405	47.74615	23.6905	30.5962

Solución escogida (diametro superior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P01_C'	J148	J149	150.7	340.8	355	€ 8,838.56
P01_C_H4'	J149	H4'	9	104.4	110	€ 80.91
						€ 8,919.47

HIDRANTE 5

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_E_H5'
Jcritica	11.11
Longtotal	233.6
Pmin	25
Hcab	47.8183961
Visc	1.10E-06
Rug	0.01

J149

42.89 46.8679

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						412.3															47.8184	47.8184		
P01_D'	J149	J150	110.3	0	92.0421024	522.6	43.66	0.016	251.61546	1.85106644	213.6	299.2	2.56859	1.309102	498772.75	356075.73	0.0138	0.01435	2.395983	0.46195	45.4224	47.35645	45.4224	47.3564
P01_E'	J150	J151	123.3	0	89.3073993	645.9	35.33	0.016	248.598032	1.83993376	213.6	299.2	2.49227	1.270207	483953.49	345496.21	0.01386	0.01442	2.532427	0.48855	42.89	46.86789	42.89	46.8679
P01_E_H5'	J151	H5'	5	15.59	6.04901949	650.9	11.11	0.016	84.6869911	1.07389469	104.4	104.4	0.70663	0.706633	67065.93	67065.93	0.01991	0.01991	0.024265	0.02426	42.8657	46.84363	27.2757	31.2536
								0.016																

Solución escogida (diametro superior)

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Dint	DN	Coste
P01_D'	J149	J150	110.3	299.2	315	€ 5,267.93
P01_E'	J150	J151	123.3	299.2	315	€ 5,888.81
P01_E_H5'	J151	H5'	5	104.4	110	€ 44.95
						€ 11,201.69

HIDRANTE 6

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_D_H6'
Jcritica	9.34
Longtotal	138.9
Pmin	25
Hcab	47.3564467
Visc	1.10E-06
Rug	0.01

J150

30.398 30.398

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						522.6															47.3564	47.35645		
P01_D_H6'	J150	H6'	138.9	16.18	6.55237296	661.5	9.34	0.016	90.5244547	1.01806825	104.4	104.4	0.76543	0.765434	72646.64	72646.64	0.01959	0.01959	0.778439	0.77844	46.578	46.57801	30.398	30.398

Solución escogida (diametro superior)

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Dint	DN	Coste
P01_D_H6'	J150	H6'	138.9	104.4	110	€ 1,248.71
						€ 1,248.71

HIDRANTE 7

Serie	P00';P04_A';P0401_A';P0401_B';P0401_C';P0401_D';P0401_D_H7'
Jcritica	7.56
Longtotal	94.9
Pmin	25
Hcab	47.9763606
Visc	1.10E-06
Rug	0.01

J124

46.154 47.448

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						426.4															47.9764	47.97636		
P0401_A'	J124	J138	94.9	0	17.8049658	521.3	44.08	0.016	140.842208	1.14284048	117.8	152	1.63366	0.981215	174949.73	135586.04	0.01663	0.01725	1.82237	0.52835	46.154	47.44801	46.154	47.448
P0401_B'	J138	J140	134.1	0	14.1333462	655.4	35.06	0.016	128.414589	1.09125535	104.4	132.4	1.65103	1.026548	156697.45	123559.02	0.01702	0.0176	3.037409	0.9577	43.1166	46.49031	43.1166	46.4903
P0401_C'	J140	J141	60.9	0	11.2024389	716.3	32.08	0.016	117.014963	1.04169338	104.4	117.8	1.30864	1.027856	124202.27	110073.99	0.01772	0.01804	0.902115	0.50223	42.2145	45.98808	42.2145	45.9881
P0401_D'	J141	J143	252.6	0	7.07194308	968.9	23.71	0.016	97.3490839	0.95013461	104.4	104.4	0.82613	0.826129	78407.15	78407.15	0.0193	0.0193	1.624541	1.62454	40.5899	44.36354	40.5899	44.3635
P0401_D_H7'	J143	H7'	6.5	15.6	5.27794885	975.4	7.56	0.016	86.5969183	0.89612877	104.4	104.4	0.61656	0.616559	58517.01	58517.01	0.02047	0.02047	0.024689	0.02469	40.5652	44.33885	24.9652	28.7388

Solución escogida (diametro SUPERIOR)

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Dint	DN	Coste
P0401_A'	J124	J138	94.9	152	160	€ 1,244.14
P0401_B'	J138	J140	134.1	132.4	140	€ 1,642.73
P0401_C'	J140	J141	60.9	117.8	125	€ 617.53
P0401_D'	J141	J143	252.6	104.4	110	€ 2,270.87
P0401_D_H7'	J143	H7'	6.5	104.4	110	€ 58.44
						€ 5,833.70

HIDRANTE 8

Serie	P00';P04_A';P0401_A';P0401_B';P0401_C';P0401_D';P0401_D_H8'
Jcritica	4.27
Longtotal	8.2
Pmin	25
Hcab	44.3635387
Visc	1.10E-06
Rug	0.01

J143

29.1601 29.1601

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						968.9															44.3635	44.36354		
P0401_D_H8'	J143	H8'	8.2	15.19	3.30261982	977.1	4.27	0.016	80.4782624	0.64924934	104.4	104.4	0.3858	0.385805	36616.39	36616.39	0.02263	0.02263	0.013482	0.01348	44.3501	44.35006	29.1601	29.1601

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0401_D_H8'	J143	H8'	8.2	104.4	110	€	73.72
						€	73.72

HIDRANTE 9

Serie	P00';P04_A';P0401_A';P0401_B';P0401_C';P0401_C_H9'
Jcritica	5.02
Longtotal	5
Pmin	25
Hcab	45.9880798
Visc	1.10E-06
Rug	0.01

J141

28.5906 28.5906

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						716.3															45.9881	45.98808		
P0401_C_H9'	J141	H9'	5	17.37	6.48544524	721.3	5.02	0.016	102.082599	0.79240366	104.4	104.4	0.75762	0.757616	71904.61	71904.61	0.01963	0.01963	0.027508	0.02751	45.9606	45.96057	28.5906	28.5906

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0401_C_H9'	J141	H9'	5	104.4	110	€	44.95
						€	44.95

HIDRANTE 10

Serie	P00';P04_A';P0401_A';P0401_B';P0401_B_H10'
Jcritica	6.53
Longtotal	111.4
Pmin	25
Hcab	46.4903057
Visc	1.10E-06
Rug	0.01

J140

29.5734 29.5734

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						655.4															46.4903	46.49031		
P0401_B_H10'	J140	H10'	111.4	16.48	5.37305167	766.8	6.53	0.016	89.8049399	0.84826331	104.4	104.4	0.62767	0.627668	59571.42	59571.42	0.02039	0.02039	0.43692	0.43692	46.0534	46.05339	29.5734	29.5734

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0401_B_H10'	J140	H10'	111.4	104.4	110	€	1,001.49
						€	1,001.49

HIDRANTE 11

Serie	P00';P04_A';P0401_A';P0401_A_H11'
Jcritica	7.34
Longtotal	7.3
Pmin	25
Hcab	47.4480088
Visc	1.10E-06
Rug	0.01

J138

28.836 28.836

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						521.3															47.448	47.44801		
P0401_A_H11'	J138	H11'	7.3	18.57	6.64597066	528.6	7.34	0.016	95.5378109	0.92708161	104.4	104.4	0.77637	0.776368	73684.37	73684.37	0.01954	0.01954	0.041971	0.04197	47.406	47.40604	28.836	28.836

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0401_A_H11'	J138	H11'	7.3	104.4	110	€	65.63
						€	65.63

HIDRANTE 13

Serie	P00';P04_A';P0403_A';P0403_A';P0403_B';P0403_B_H13'
Jcritica	6.37
Longtotal	178.8
Pmin	25
Hcab	47.5832087
Visc	1.10E-06
Rug	0.01

J133

45.9504 46.6725

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						456.9															47.5832	47.58321		
P0403_B'	J133	J135	178.8	0	8.58466357	635.7	35.52	0.016	108.859964	0.92235271	104.4	117.8	1.00284	0.787667	95178.80	84352.01	0.0186	0.01897	1.632796	0.91069	45.9504	46.67252	45.9504	46.6725
P0403_B_H13'	J135	H13'	5	18.5	4.60899018	640.7	6.37	0.016	84.883091	0.81446707	104.4	104.4	0.53841	0.538412	51100.21	51100.21	0.02105	0.02105	0.014897	0.0149	45.9355	46.65762	27.4355	28.1576

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0403_B'	J133	J135	178.8	104.4	110	€	1,607.41
P0403_B_H13'	J135	H13'	5	104.4	110	€	44.95
						€	1,652.36

HIDRANTE 14

Serie	P00';P04_A';P0403_A';P0403_A';P0403_B';P0403_C'_H14'
Jcritica	5.12
Longtotal	159.3
Pmin	25
Hcab	45.9504126
Visc	1.10E-06
Rug	0.01

J135

28.3303 28.3303

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						635.7															45.9504	45.95041		
P0403_C_H14'	J135	H14'	159.3	16.88	5.90427228	795	5.12	0.016	97.9175489	0.78407107	104.4	104.4	0.68972	0.689724	65461.10	65461.10	0.02	0.02	0.74012	0.74012	45.2103	45.21029	28.3303	28.3303

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0403_C_H14'	J135	H14'	159.3	104.4	110	€	1,432.11
						€	1,432.11

HIDRANTE 15

Serie	P00';P04_A';P04_B';P04_B_H15'
Jcritica	2.73
Longtotal	407
Pmin	25
Hcab	47.9763606 J124
Visc	1.10E-06
Rug	0.01

44.6634 47.0095

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						426.4															47.9764	47.97636		
P04_B'	J124	J125	407	0	11.1222273	833.4	27.57	0.016	143.082414	0.69171846	117.8	152	1.0205	0.612935	109285.84	84696.53	0.01807	0.01886	3.31292	0.9669	44.6634	47.00946	44.6634	47.0095
P04_B_H15'	J125	H15'	5	20.69	5.54770045	838.4	2.73	0.016	108.3315	0.60188513	104.4	117.8	0.64807	0.509017	61507.76	54511.13	0.02026	0.02072	0.02077	0.01162	44.6427	46.99785	23.9527	26.3078

Solución escogida (diametro SUUPERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P04_B'	J124	J125	407	152	160	€ 5,335.77
P04_B_H15'	J125	H15'	5	117.8	125	€ 50.70
						€ 5,386.47

HIDRANTE 16

Serie	P00';P04_A';P04_B';P04_C_H16'
Jcritica	2.43
Longtotal	210.1
Pmin	25
Hcab	47.0094615 J125
Visc	1.10E-06
Rug	0.01

25.8707 27.0092

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						833.4															47.0095	47.00946		
P04_C_H16'	J125	H16'	210.1	19.47	7.94804615	1043.5	2.43	0.016	127.968347	0.61796714	104.4	132.4	0.92847	0.577291	88120.57	69484.80	0.01887	0.01967	1.668753	0.53023	45.3407	46.47923	25.8707	27.0092

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P04_C_H16'	J125	H16'	210.1	104.4	110	€ 1,888.80
						€ 1,888.80

HIDRANTE 17

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P0101_B';P0101_C';P010101_A';P010101_A_H17'
Jcritica	3.44
Longtotal	233.1
Pmin	25
Hcab	47.8183961 J149
Visc	1.10E-06
Rug	0.01

47.3386 47.563

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						412.3															47.8184	47.8184		
P0101_A'	J149	J161	233.1	0	62.4521205	645.4	35.36	0.016	272.446462	1.07126018	299.2	340.8	0.88825	0.684633	241603.40	212111.90	0.01531	0.01563	0.479749	0.25542	47.3386	47.56297	47.3386	47.563
P0101_B'	J161	J172	110.8	0	48.2780746	756.2	30.18	0.016	245.788905	1.01750256	299.2	340.8	0.68665	0.52925	186769.43	163971.28	0.01603	0.01639	0.142672	0.07607	47.196	47.48691	47.196	47.4869
P0101_C'	J172	J174	58.1	0	46.0027552	814.3	28.02	0.016	241.088133	1.0077256	299.2	340.8	0.65429	0.504307	177967.09	156243.40	0.01617	0.01654	0.068529	0.03655	47.1274	47.45036	47.1274	47.4504
P010101_A'	J174	J191	30.3	0	17.0597592	844.6	27.02	0.016	162.125548	0.82638058	213.6	237.4	0.47608	0.385409	92446.20	83178.22	0.01843	0.0188	0.030201	0.01817	47.0972	47.43219	47.0972	47.4322
P010101_A_H17'	J191	H17'	5	19.9	12.2911567	849.6	3.44	0.016	142.199936	0.77393427	117.8	117.8	1.12775	1.127749	120771.62	120771.62	0.01774	0.01774	0.048803	0.0488	47.0484	47.38339	27.1484	27.4834

Solución escogida (diametro SUPERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0101_A'	J149	J161	233.1	340.8	355	€ 13,671.32
P0101_B'	J161	J172	110.8	340.8	355	€ 6,498.42
P0101_C'	J172	J174	58.1	340.8	355	€ 3,407.57
P010101_A'	J174	J191	30.3	237.4	250	€ 996.87
P010101_A_H17'	J191	H17'	5	117.8	125	€ 50.70
						€ 24,624.87

HIDRANTE 18

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P0101_B';P0101_C';P0101_D';P0101_E';P0101_F';P0101_F_H18'
Jcritica	4.52
Longtotal	22.1
Pmin	25
Hcab	47.4503609 J174
Visc	1.10E-06
Rug	0.01

																						47.0261	47.4345
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						814.3															47.4504	47.45036		
P0101_D'	J174	J175	22.1	0	35.0150431	836.4	26.84	0.016	204.642145	1.06457099	152	299.2	1.92965	0.498014	266641.97	135459.82	0.01538	0.01702	0.424304	0.01589	47.0261	47.43447	47.0261	47.4345
P0101_E'	J175	J176	124.3	0	27.72607	960.7	23.37	0.016	186.401129	1.01601789	132.4	190	2.01383	0.977893	242391.71	168908.75	0.0157	0.01648	3.046717	0.52555	43.9793	46.90891	43.9793	46.9089
P0101_F'	J176	J177	157	0	18.8619204	1117.7	20.09	0.016	159.781898	0.94067776	132.4	190	1.37	0.665256	164897.99	114907.86	0.01673	0.0177	1.897417	0.32987	42.0819	46.57904	42.0819	46.579
P0101_F_H18'	J177	H18'	5	17.38	10.0923	1122.7	4.52	0.016	124.419735	0.83008339	104.4	132.4	1.17896	0.733034	111894.07	88230.67	0.01805	0.01876	0.061249	0.0194	42.0207	46.55964	24.6407	29.1796

Solución escogida (diametro SUPERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0101_D'	J174	J175	22.1	299.2	315	€ 1,055.50
P0101_E'	J175	J176	124.3	190	200	€ 2,728.39
P0101_F'	J176	J177	157	190	200	€ 3,446.15
P0101_F_H18'	J177	H18'	5	132.4	140	€ 61.25
						€ 7,291.28

HIDRANTE 19

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P0101_B';P0101_C';P0101_D';P0101_E';P0101_F';P0101_G';P0101_G_H19'
Jcritica	2.17
Longtotal	403.1
Pmin	25
Hcab	46.5790383 J177
Visc	1.10E-06
Rug	0.01

																						27.8657	27.8865
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1117.7															46.579	46.57904		
P0101_G'	J177	J178	403.1	0	12.6612822	1520.8	14.19	0.016	157.760576	0.64772527	190	190	0.44656	0.446561	77133.23	77133.23	0.01915	0.01915	0.41287	0.41287	46.1662	46.16617	46.1662	46.1662
P0101_G_H19'	J178	H19'	5	18.27	6.86514807	1525.8	2.17	0.016	123.500118	0.57309324	104.4	132.4	0.80197	0.498636	76114.40	60017.70	0.01941	0.02027	0.03048	0.0097	46.1357	46.15647	27.8657	27.8865

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0101_G'	J177	J178	403.1	190	200	€ 8,848.05
P0101_G_H19'	J178	H19'	5	104.4	110	€ 44.95
						€ 8,893.00

HIDRANTE 20

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P0101_B';P0101_C';P0101_D';P0101_E';P0101_F';P0101_G';P0101_H';P0101_H_20'
Jcritica	2.04
Longtotal	176.5
Pmin	25
Hcab	46.1661681 J178
Visc	1.10E-06
Rug	0.01

																						27.5731	28.1986
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1520.8															46.1662	46.16617		
P0101_H'	J178	J179	176.5	0	8.43224529	1697.3	12.47	0.016	135.78845	0.58227439	117.8	152	0.77368	0.464693	82854.36	64212.13	0.01904	0.01995	0.870364	0.25492	45.2958	45.91125	45.2958	45.9113
P0101_H_H20'	J179	H20'	5	17.7	5.82366125	1702.3	2.04	0.016	117.101911	0.54072726	104.4	117.8	0.68031	0.534337	64567.36	57222.69	0.02006	0.02051	0.022663	0.01267	45.2731	45.89858	27.5731	28.1986

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0101_H'	J178	J179	176.5	117.8	125	€ 1,789.71
P0101_H_H20'	J179	H20'	5	104.4	110	€ 44.95
						€ 1,834.66

HIDRANTE 21

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P0101_B';P0101_C';P0101_D';P0101_E';P0101_F';P0101_G';P0101_H';P0101_I_H21'
Jcritica	1.98
Longtotal	127.1
Pmin	25
Hcab	45.2958044 J179
Visc	1.10E-06
Rug	0.01

28.2497 28.4108

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1697.3															45.2958	45.2958		
P0101_I_H21'	J179	H21'	127.1	16.68	4.52294376	1824.4	1.98	0.016	106.414239	0.50854784	104.4	117.8	0.52836	0.414993	50146.21	44441.97	0.02114	0.02165	0.366119	0.20501	44.9297	45.0908	28.2497	28.4108

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0101_I_H21'	J179	H21'	127.1	104.4	110	€ 1,142.63
						€ 1,142.63

HIDRANTE 22

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P0101_B';P0101_C';P0101_D';P0101_E';P010104_A';P010104_A_H22'
Jcritica	3.33
Longtotal	86.4
Pmin	25
Hcab	46.9089112 J176
Visc	1.10E-06
Rug	0.01

45.9504 46.6298

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						960.7															46.9089	46.90891		
P010104_A'	J176	J181	86.4	0	13.186715	1047.1	20.92	0.016	147.206745	0.77480304	117.8	152	1.20992	0.726707	129571.28	100417.75	0.01751	0.01824	0.958491	0.2791	45.9504	46.62981	45.9504	46.6298
P010104_A_H22'	J181	H22'	5	18.41	4.50299152	1052.1	3.33	0.016	95.7797094	0.62497726	104.4	104.4	0.52603	0.52603	49925.00	49925.00	0.02116	0.02116	0.014289	0.01429	45.9361	46.61552	27.5261	28.2055

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010104_A'	J176	J181	86.4	117.8	125	€ 876.10
P010104_A_H22'	J181	H22'	5	104.4	110	€ 44.95
						€ 921.05

HIDRANTE 23

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P0101_B';P0101_C';P0101_D';P0101_E';P010104_A';P010104_B';P010104_B_H23'
Jcritica	2.60
Longtotal	131.6
Pmin	25
Hcab	45.9504201 J181
Visc	1.10E-06
Rug	0.01

27.0576 27.7758

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1047.1															45.9504	45.95042		
P010104_B'	J181	J182	131.6	0	10.7927398	1178.7	17.77	0.016	142.741171	0.67444	117.8	152	0.99026	0.594778	106048.33	82187.46	0.01817	0.01897	1.014317	0.29615	44.9361	45.65427	44.9361	45.6543
P010104_B_H23'	J182	H23'	33.6	17.8	4.02297568	1212.3	2.60	0.016	96.1868129	0.55363872	104.4	104.4	0.46996	0.469955	44603.03	44603.03	0.02167	0.02167	0.078508	0.07851	44.8576	45.57576	27.0576	27.7758

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010104_B'	J181	J182	131.6	117.8	125	€ 1,334.42
P010104_B_H23'	J182	H23'	33.6	104.4	110	€ 302.06
						€ 1,636.49

HIDRANTE 24

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P0101_B';P0101_C';P0101_D';P0101_E';P010104_A';P010104_B';P010104_C';P010104_D_H24''
Jcritica	2.18
Longtotal	73.7
Pmin	25
Hcab	44.9361034 J182
Visc	1.10E-06
Rug	0.01

																							26.8937	27.6888
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1178.7															44.9361	44.9361		
P010104_C'	J182	J183	73.7	0	8.65215927	1252.4	15.92	0.016	135.345661	0.6013758	117.8	152	0.79386	0.476812	85015.21	65886.79	0.01895	0.01984	0.380725	0.11147	44.5554	44.82463	44.5554	44.8246
P010104_D_H24'	J183	H24'	145.5	16.89	6.35466106	1397.9	2.18	0.016	119.627628	0.56537881	104.4	132.4	0.74234	0.461558	70454.60	55554.83	0.01971	0.0206	0.771633	0.24584	43.7837	44.5788	26.8937	27.6888

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010104_C'	J182	J183	73.7	117.8	125	€ 747.32
P010104_D_H24'	J183	H24'	145.5	104.4	110	€ 1,308.05
						€ 2,055.36

HIDRANTE 25

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P0101_B';P0101_C';P0101_D';P0101_E';P010104_A';P010104_B';P010104_C';P010104_C_H25'
Jcritica	1.97
Longtotal	138.9
Pmin	25
Hcab	44.5553782 J183
Visc	1.10E-06
Rug	0.01

																							27.4087	27.4087
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1252.4															44.5554	44.55538		
P010104_C_H25'	J183	H25'	138.9	16.81	4.10680043	1391.3	1.97	0.016	102.473933	0.49795134	104.4	104.4	0.47975	0.479748	45532.40	45532.40	0.02157	0.02157	0.336718	0.33672	44.2187	44.21866	27.4087	27.4087

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010104_C_H25'	J183	H25'	138.9	104.4	110	€ 1,248.71
						€ 1,248.71

HIDRANTE 26

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P0101_B';P0101_B_H26'
Jcritica	5.00
Longtotal	5
Pmin	25
Hcab	47.1959748 J172
Visc	1.10E-06
Rug	0.01

																							28.7871	28.7871
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						756.2															47.196	47.19597		
P0101_B_H26'	J172	H26'	5	18.39	5.26082922	761.2	5.00	0.016	93.9456117	0.75894678	104.4	104.4	0.61456	0.614559	58327.20	58327.20	0.02048	0.02048	0.018881	0.01888	47.1771	47.17709	28.7871	28.7871

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0101_B_H26'	J172	H26'	5	104.4	110	€ 44.95
						€ 44.95

HIDRANTE 27

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P010102_A';P010102_A_H27'
Jcritica	6.26
Longtotal	150
Pmin	25
Hcab	47.3386469
Visc	1.10E-06
Rug	0.01

J161

45.18 46.9641

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						645.4															47.3386	47.33865		
P010102_A'	J161	J162	150	0	20.7500951	795.4	28.08	0.016	155.515475	1.09240326	132.4	190	1.50714	0.731852	181405.12	126410.73	0.01646	0.01738	2.158621	0.37459	45.18	46.96406	45.18	46.9641
P010102_A_H27'	J162	H27'	5	17.33	8.48956696	800.4	6.26	0.016	108.77267	0.91359997	104.4	117.8	0.99173	0.778942	94124.45	83417.60	0.01864	0.01902	0.044747	0.02496	45.1353	46.9391	27.8053	29.6091

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010102_A'	J161	J162	150	132.4	140	€ 1,837.50
P010102_A_H27'	J162	H27'	5	104.4	110	€ 44.95
						€ 1,882.45

HIDRANTE 28

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P010102_A';P010102_B';P010102_B_H28'
Jcritica	3.35
Longtotal	155.9
Pmin	25
Hcab	45.1800263
Visc	1.10E-06
Rug	0.01

J162

43.8204 44.9429

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						795.4															45.18	45.18003		
P010102_B'	J162	J163	155.9	0	15.7736268	951.3	21.21	0.016	157.887556	0.80564901	132.4	190	1.14569	0.556333	137898.97	96093.81	0.01726	0.01832	1.359594	0.23716	43.8204	44.94287	43.8204	44.9429
P010102_B_H28'	J163	H28'	77.8	16.73	6.66633253	1029.1	3.35	0.016	111.874232	0.67816748	117.8	117.8	0.61165	0.611655	65502.69	65502.69	0.01995	0.01995	0.251272	0.25127	43.5692	44.69159	26.8392	27.9616

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010102_B'	J162	J163	155.9	132.4	140	€ 1,909.78
P010102_B_H28'	J163	H28'	77.8	117.8	125	€ 788.89
						€ 2,698.67

HIDRANTE 29

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P010102_A';P010102_B';P010102_C';P010102_D_H29'
Jcritica	3.10
Longtotal	123.1
Pmin	25
Hcab	43.820432
Visc	1.10E-06
Rug	0.01

J163

42.6833 43.4889

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						951.3															43.8204	43.82043		
P010102_C'	J163	J164	123.1	0	11.9241995	1074.4	17.52	0.016	143.373939	0.73858234	117.8	152	1.09408	0.657131	117165.94	90803.60	0.01784	0.0186	1.137103	0.33156	42.6833	43.48887	42.6833	43.4889
P010102_D_H29'	J164	H29'	156.9	15	4.87250359	1231.3	3.10	0.016	100.230383	0.61753774	104.4	104.4	0.5692	0.569195	54021.81	54021.81	0.02081	0.02081	0.516392	0.51639	42.1669	42.97248	27.1669	27.9725

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010102_C'	J163	J164	123.1	117.8	125	€ 1,248.23
P010102_D_H29'	J164	H29'	156.9	104.4	110	€ 1,410.53
						€ 2,658.77

HIDRANTE 30

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P010102_A';P010102_B';P010102_C';P010102_D';P010102_D_H30'
Jcritica	2.12
Longtotal	55.1
Pmin	25
Hcab	42.6833288 J164
Visc	1.10E-06
Rug	0.01

42.3643 42.59

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1074.4															42.6833	42.68333		
P010102_D'	J164	J166	55.1	0	9.21504856	1129.5	15.66	0.016	139.514549	0.60279376	117.8	152	0.84551	0.507833	90546.10	70173.23	0.01872	0.01959	0.318979	0.09332	42.3643	42.59001	42.3643	42.59
P010102_D_H30'	J166	H30'	86.8	15.1	4.7697486	1216.3	2.12	0.016	107.205889	0.5284067	104.4	117.8	0.55719	0.437638	52882.55	46867.05	0.0209	0.0214	0.274977	0.15393	42.0894	42.43608	26.9894	27.3361

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010102_D'	J164	J166	55.1	117.8	125	€ 558.71
P010102_D_H30'	J166	H30'	86.8	104.4	110	€ 780.33
						€ 1,339.05

HIDRANTE 31

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P010102_A';P010102_B';P010102_C';P010102_D';P010102_D_H31'
Jcritica	2.26
Longtotal	247.8
Pmin	25
Hcab	42.3643495 J166
Visc	1.10E-06
Rug	0.01

26.7742 27.6874

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1129.5															42.3643	42.36435		
P010102_D_H31'	J166	H31'	247.8	14.25	6.42420293	1377.3	2.26	0.016	119.263674	0.57505979	104.4	132.4	0.75046	0.466609	71225.61	56162.79	0.01967	0.02056	1.340183	0.42692	41.0242	41.93743	26.7742	27.6874

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010102_D_H31'	J166	H31'	247.8	104.4	110	€ 2,227.72
						€ 2,227.72

HIDRANTE 32

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_F_H32'
Jcritica	8.15
Longtotal	246.5
Pmin	25
Hcab	46.8678932 J151
Visc	1.10E-06
Rug	0.01

42.0819 45.944

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						645.9															46.8679	46.86789		
P01_F'	J151	J152	246.5	0	86.6435237	892.4	24.50	0.016	261.264924	1.61615871	213.6	299.2	2.41793	1.232319	469518.05	335190.69	0.01392	0.01449	4.786025	0.92387	42.0819	45.94402	42.0819	45.944
P01_F_H32'	J152	H32'	51.8	14.17	6.09986308	944.2	8.15	0.016	90.3888166	0.95060655	104.4	104.4	0.71257	0.712573	67629.63	67629.63	0.01987	0.01987	0.2552	0.2552	41.8267	45.68882	27.6567	31.5188

Solución escogida (diametro superior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P01_F'	J151	J152	246.5	299.2	315	€ 11,772.84
P01_F_H32'	J152	H32'	51.8	104.4	110	€ 465.68
						€ 12,238.52

HIDRANTE 33

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0102_A';P0102_A_H33'
Jcritica	5.13
Longtotal	388.5
Pmin	25
Hcab	45.9440187 J152
Visc	1.10E-06
Rug	0.01

38.8228 44.5685

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						892.4															45.944	45.94402		
P01_G'	J152	J153	388.5	0	83.9971827	1280.9	16.35	0.016	283.055143	1.33485083	213.6	299.2	2.34408	1.19468	455177.62	324953.01	0.01398	0.01456	7.121229	1.3755	38.8228	44.56852	38.8228	44.5685
P0102_A'	J153	J223	193.4	0	38.6020197	1474.3	14.21	0.016	207.400201	1.14261994	152	299.2	2.12732	0.549031	293957.05	149336.47	0.01515	0.01671	4.445228	0.16595	34.3776	44.40257	34.3776	44.4026
P0102_A_H33'	J223	H33'	5	13.35	6.38241527	1479.3	5.13	0.016	100.962288	0.79721747	104.4	104.4	0.74558	0.74558	70762.31	70762.31	0.0197	0.0197	0.026726	0.02673	34.3508	44.37584	21.0008	31.0258

Solución escogida (diametro superior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P01_G'	J152	J153	388.5	299.2	315	€ 18,554.76
P0102_A'	J153	J223	193.4	299.2	315	€ 9,236.78
P0102_A_H33'	J223	H33'	5	104.4	110	€ 44.95
						€ 27,836.49

HIDRANTE 34

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0102_A';P0102_B';P0102_B_H34'
Jcritica	3.49
Longtotal	122
Pmin	25
Hcab	44.4025693 J223
Visc	1.10E-06
Rug	0.01

43.9429 44.3125

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1474.3															44.4026	44.40257		
P0102_B'	J223	J225	122	0	35.5355477	1596.3	12.15	0.016	216.713375	0.96338904	213.6	299.2	0.99168	0.505417	192565.82	137473.46	0.01606	0.01698	0.459701	0.09012	43.9429	44.31245	43.9429	44.3125
P0102_B_H34'	J225	H34'	5	13.81	5.01983896	1601.3	3.49	0.016	99.0595666	0.65133896	104.4	104.4	0.58641	0.586407	55655.32	55655.32	0.02068	0.02068	0.017358	0.01736	43.9255	44.29509	30.1155	30.4851

Solución escogida (diametro SUPERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0102_B'	J223	J225	122	299.2	315	€ 5,826.72
P0102_B_H34'	J225	H34'	5	104.4	110	€ 44.95
						€ 5,871.67

HIDRANTE 35

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0102_A';P0102_B';P0102_C';P0102_C_H35'
Jcritica	3.34
Longtotal	248.6
Pmin	25
Hcab	44.3124504 J225
Visc	1.10E-06
Rug	0.01

39.9874 44.1501

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1596.3															44.3125	44.31245		
P0102_C'	J225	J227	248.6	0	33.1914648	1844.9	10.47	0.016	212.743516	0.9337355	152	299.2	1.82915	0.472078	252755.30	128405.10	0.01551	0.0172	4.325087	0.16232	39.9874	44.15013	39.9874	44.1501
P0102_C_H35'	J227	H35'	5	13.13	4.23921446	1849.9	3.34	0.016	93.4028054	0.61869366	104.4	104.4	0.49522	0.495216	47000.48	47000.48	0.02143	0.02143	0.012828	0.01283	39.9745	44.1373	26.8445	31.0073

Solución escogida (diametro SUPERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0102_C'	J225	J227	248.6	299.2	315	€ 11,873.14
P0102_C_H35'	J227	H35'	5	104.4	110	€ 44.95
						€ 11,918.09

HIDRANTE 36

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0102_A';P0102_B';P0102_C';P0102_D';P010201_A';P010201_A_H36'
Jcritica	3.80
Longtotal	148.9
Pmin	25
Hcab	44.1501293 J227
Visc	1.10E-06
Rug	0.01

42.0705 43.5456

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1844.9															44.1501	44.15013		
P0102_D'	J227	J243	148.9	0	14.9615168	1993.8	9.60	0.016	150.744617	0.83830512	117.8	152	1.37276	0.824515	147010.30	113932.98	0.01713	0.01781	2.079669	0.6045	42.0705	43.54563	42.0705	43.5456
P010201_A'	J243	J244	42.4	0	7.76723918	2036.2	9.40	0.016	115.973359	0.73529282	104.4	117.8	0.90735	0.712666	86115.95	76320.08	0.01896	0.01935	0.323037	0.18029	41.7474	43.36534	41.7474	43.3653
P010201_A_H36'	J244	H36'	5	11.39	3.35521323	2041.2	3.80	0.016	82.8971526	0.62165727	104.4	104.4	0.39195	0.391949	37199.50	37199.50	0.02255	0.02255	0.008455	0.00846	41.739	43.35689	30.349	31.9669

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0102_D'	J227	J243	148.9	117.8	125	€ 1,509.85
P010201_A'	J243	J244	42.4	104.4	110	€ 381.18
P010201_A_H36'	J244	H36'	5	104.4	110	€ 44.95
						€ 1,935.97

HIDRANTE 37

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0102_A';P0102_B';P0102_C';P0102_D';P010201_A';P010201_B_H37'
Jcritica	2.33
Longtotal	137
Pmin	25
Hcab	41.747423 J244
Visc	1.10E-06
Rug	0.01

29.4266 29.7092

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2036.2															41.7474	41.74742		
P010201_B_H37'	J244	H37'	137	11.68	5.92642985	2173.2	2.33	0.016	114.769902	0.57285835	104.4	117.8	0.69231	0.543767	65706.76	58232.48	0.01999	0.02044	0.640815	0.35825	41.1066	41.38917	29.4266	29.7092

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010201_B_H37'	J244	H37'	137	104.4	110	€ 1,231.63
						€ 1,231.63

HIDRANTE 38

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0102_A';P0102_B';P0102_C';P0102_D';P0102_E';P0102_E_H38'
Jcritica	3.16
Longtotal	161.7
Pmin	25
Hcab	42.0704604 J243
Visc	1.10E-06
Rug	0.01

40.9736 41.7499

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1993.8															42.0705	42.07046		
P0102_E'	J243	J247	161.7	0	10.0585268	2155.5	7.92	0.016	133.470298	0.71891118	117.8	152	0.9229	0.554316	98834.03	76596.38	0.01841	0.01924	1.096888	0.32055	40.9736	41.74991	40.9736	41.7499
P0102_E_H38'	J247	H38'	20.2	10.2	4.52574359	2175.7	3.16	0.016	96.9721123	0.6127825	104.4	104.4	0.52869	0.528688	50177.25	50177.25	0.02113	0.02113	0.058252	0.05825	40.9153	41.69166	30.7153	31.4917

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0102_E'	J243	J247	161.7	117.8	125	€ 1,639.64
P0102_E_H38'	J247	H38'	20.2	104.4	110	€ 181.60
						€ 1,821.24

HIDRANTE 39

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0102_A';P0102_B';P0102_C';P0102_D';P0102_E';P0102_F_H39'
Jcritica	2.57
Longtotal	221.9
Pmin	25
Hcab	40.9735726 J243
Visc	1.10E-06
Rug	0.01

29.4755 30.5928

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2155.5															40.9736	40.97357		
P0102_F_H39'	J247	H39'	221.9	9.86	7.63293456	2377.4	2.57	0.016	124.533529	0.6266558	104.4	132.4	0.89166	0.554403	84626.91	66729.98	0.01902	0.01983	1.638122	0.52075	39.3355	40.45282	29.4755	30.5928

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0102_F_H39'	J247	H39'	221.9	104.4	110	€ 1,994.88
						€ 1,994.88

HIDRANTE 40

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0102_A';P0102_B';P0102_C';P010202_A';P01020201_A';P01020201_A_H40'
Jcritica	3.72
Longtotal	74.9
Pmin	25
Hcab	44.1501293 J227
Visc	1.10E-06
Rug	0.01

43.5939 44.0429

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1844.9															44.1501	44.15013		
P010202_A'	J227	J229	74.9	0	20.8559532	1919.8	9.98	0.016	172.924775	0.88802608	152	213.6	1.14935	0.58202	158819.52	113017.64	0.01676	0.01772	0.556181	0.10727	43.5939	44.04286	43.5939	44.0429
P01020201_A'	J229	J230	242.2	0	8.29039555	2162	8.86	0.016	119.562587	0.73840523	104.4	132.4	0.96847	0.602157	91916.23	72477.75	0.01872	0.0195	2.076322	0.65938	41.5176	43.38348	41.5176	43.3835
P01020201_B_H40'	J230	H40'	209.7	10.33	5.35464363	2371.7	3.72	0.016	100.382367	0.67659039	104.4	104.4	0.62552	0.625518	59367.33	59367.33	0.02041	0.02041	0.817409	0.81741	40.7002	42.56607	30.3702	32.2361

Solución escogida (diametro SUPERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010202_A'	J227	J229	74.9	213.6	225	€ 1,898.72
P01020201_A'	J229	J230	242.2	132.4	140	€ 2,966.95
P01020201_B_H40'	J230	H40'	209.7	104.4	110	€ 1,885.20
						€ 6,750.87

HIDRANTE 41

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0102_A';P0102_B';P0102_C';P010202_A';P01020201_A';P01020201_A_H41'
Jcritica	2.17
Longtotal	129.7
Pmin	25
Hcab	41.5176265 J230
Visc	1.10E-06
Rug	0.01

29.5493 29.7335

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2162															41.5176	41.51763		
P01020201_A_H41'	J230	H41'	129.7	11.55	4.81775763	2291.7	2.17	0.016	107.198322	0.53380064	104.4	117.8	0.5628	0.442043	53414.83	47338.78	0.02086	0.02135	0.418318	0.23415	41.0993	41.28348	29.5493	29.7335

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P01020201_A_H41'	J230	H41'	129.7	104.4	110	€ 1,166.00
						€ 1,166.00

HIDRANTE 42

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0102_A';P0102_B';P0102_C';P010202_A';P010202_B';P010202_B_H42'
Jcritica	2.99
Longtotal	50
Pmin	25
Hcab	44.0428639 J229
Visc	1.10E-06
Rug	0.01

																							43.8199	43.9997	
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2	
						1919.8															44.0429	44.04286			
P010202_B'	J229	J234	50	0	15.7578181	1969.8	9.67	0.016	161.487439	0.76935842	152	213.6	0.8684	0.439748	119996.87	85391.03	0.01764	0.01873	0.222997	0.0432	43.8199	43.99966	43.8199	43.9997	
P010202_B_H42'	J234	H42'	5	13.14	3.58320938	1974.8	2.99	0.016	89.299533	0.57211578	104.4	104.4	0.41858	0.418583	39727.31	39727.31	0.02222	0.02222	0.009504	0.0095	43.8104	43.99016	30.6704	30.8502	

Solución escogida (diametro SUPERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010202_B'	J229	J234	50	213.6	225	€ 1,267.50
P010202_B_H42'	J234	H42'	5	104.4	110	€ 44.95
						€ 1,312.45

HIDRANTE 43

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0102_A';P0102_B';P0102_C';P010202_A';P010202_B';P010202_C';P010202_C_H43'
Jcritica	2.37
Longtotal	109.2
Pmin	25
Hcab	43.999661 J234
Visc	1.10E-06
Rug	0.01

																							43.6028	43.8644	
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2	
						1969.8															43.9997	43.99966			
P010202_C'	J234	J236	109.2	0	14.0739409	2079	9.14	0.016	161.658425	0.68569211	152	190	0.7756	0.496385	107174.03	85739.23	0.01802	0.01874	0.396846	0.13528	43.6028	43.86439	43.6028	43.8644	
P010202_C_H43'	J236	H43'	5	14.1	4.7395885	2084	2.37	0.016	104.599187	0.55156174	104.4	117.8	0.55367	0.434871	52548.17	46570.70	0.02093	0.02143	0.015661	0.00877	43.5872	43.85562	29.4872	29.7556	

Solución escogida (diametro SUPERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010202_C'	J234	J236	109.2	190	200	€ 2,396.94
P010202_C_H43'	J236	H43'	5	117.8	125	€ 50.70
						€ 2,447.64

HIDRANTE 44

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0102_A';P0102_B';P0102_C';P010202_A';P010202_B';P010202_C';P010202_D';P010202_E';P010202_F_H44'
Jcritica	0.96
Longtotal	237.7
Pmin	25
Hcab	43.6028147 J236
Visc	1.10E-06
Rug	0.01

																							42.4152	43.3945	
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2	
						2079															43.6028	43.60281			
P010202_D'	J236	J238	237.7	0	11.6065437	2316.7	8.03	0.016	179.365239	0.45934233	132.4	190	0.84302	0.40936	101468.76	70707.71	0.01826	0.01949	1.187602	0.20827	42.4152	43.39454	42.4152	43.3945	
P010202_E'	J238	J239	14.3	0	7.56813143	2331	7.98	0.016	151.165464	0.42169031	117.8	152	0.6944	0.417073	74363.67	57631.84	0.01945	0.0204	0.058027	0.01702	42.3572	43.37753	42.3572	43.3775	
P010202_F_H44'	J239	H44'	194.6	16.18	4.64917469	2525.6	0.96	0.016	124.3963	0.3825349	117.8	132.4	0.42658	0.337684	45682.30	40644.83	0.02152	0.02204	0.329677	0.18827	42.0275	43.18926	25.8475	27.0093	

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010202_D'	J236	J238	237.7	132.4	140	€ 2,911.83
P010202_E'	J238	J239	14.3	117.8	125	€ 145.00
P010202_F_H44'	J239	H44'	194.6	117.8	125	€ 1,973.24
						€ 5,030.07

HIDRANTE 45

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0102_A';P0102_B';P0102_C';P010202_A';P010202_B';P010202_C';P010202_D';P010202_E';P010202_E_H45'
Jcritica	1.15
Longtotal	5.7
Pmin	25
Hcab	42.3571863 J239
Visc	1.10E-06
Rug	0.01

27.6595 27.6715

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2331															42.3572	42.35719		
P010202_E_H45'	J239	H45'	5.7	14.68	4.72016429	2336.7	1.15	0.016	120.785823	0.41194127	104.4	132.4	0.5514	0.34284	52332.81	41265.45	0.02095	0.02197	0.017722	0.00567	42.3395	42.35152	27.6595	27.6715

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010202_E_H45'	J239	H45'	5.7	104.4	110	€ 51.24
						€ 51.24

HIDRANTE 46

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0102_A';P0102_B';P0102_C';P010202_A';P010202_B';P010202_C';P010202_D';P010202_D_H46'
Jcritica	1.79
Longtotal	530.5
Pmin	25
Hcab	42.4152128 J238
Visc	1.10E-06
Rug	0.01

27.2247 29.1808

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2316.7															42.4152	42.41521		
P010202_D_H46'	J238	H46'	530.5	12.32	6.42593877	2847.2	1.79	0.016	124.989637	0.52371943	104.4	132.4	0.75066	0.466735	71244.86	56177.97	0.01967	0.02055	2.870513	0.9144	39.5447	41.50081	27.2247	29.1808

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010202_D_H46'	J238	H46'	530.5	104.4	110	€ 4,769.20
						€ 4,769.20

HIDRANTE 47

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0103_A';P0103_B';P0103_C';P0103_D';P0103_E';P0103_F';P0103_G';P0103_H';P0103_I_H47'
Jcritica	2.45
Longtotal	191.9
Pmin	25
Hcab	44.5685212 J153
Visc	1.10E-06
Rug	0.01

43.0224 44.2674

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1280.9															44.5685	44.56852		
P0103_A'	J153	J200	191.9	0	53.8175686	1472.8	13.29	0.016	274.699327	0.90806932	213.6	299.2	1.50187	0.76544	291635.41	208199.61	0.01497	0.01572	1.546169	0.3011	43.0224	44.26742	43.0224	44.2674
P0103_B'	J200	J202	186.7	0	50.5173681	1659.5	11.79	0.016	267.833102	0.89664872	213.6	299.2	1.40977	0.718501	273751.75	195432.40	0.01512	0.0159	1.339171	0.26107	41.6832	44.00635	41.6832	44.0064
P0103_C'	J202	J205	176.1	0	46.8757109	1835.6	10.66	0.016	259.936407	0.88333159	213.6	299.2	1.30814	0.666707	254017.74	181344.22	0.01531	0.01612	1.101124	0.21493	40.5821	43.79143	40.5821	43.7914
P0103_D'	J205	J207	160.1	0	43.7721563	1995.7	9.81	0.016	252.910664	0.87131216	213.6	299.2	1.22153	0.622565	237199.70	169337.75	0.01549	0.01632	0.882998	0.17254	39.6991	43.61888	39.6991	43.6189
P0103_E'	J207	J209	259	0	40.5958629	2254.7	8.68	0.016	245.403457	0.85828306	213.6	299.2	1.13289	0.577389	219987.48	157049.88	0.01569	0.01655	1.244531	0.24348	38.4545	43.37541	38.4545	43.3754
P0103_F'	J209	J210	169.6	0	23.6828537	2424.3	8.07	0.016	197.816074	0.77058579	152	213.6	1.30514	0.660909	180346.57	128336.51	0.0164	0.01729	1.588422	0.30568	36.8661	43.06973	36.8661	43.0697
P0103_G'	J210	J212	64.1	0	21.1778042	2488.4	7.86	0.016	189.164805	0.75354705	132.4	190	1.53821	0.746937	185144.31	129016.35	0.0164	0.01731	0.957585	0.1661	35.9085	42.90362	35.9085	42.9036
P0103_H'	J212	J214	132.7	0	19.6824439	2621.1	7.47	0.016	183.704407	0.74259153	132.4	190	1.4296	0.694196	172071.31	119906.54	0.01661	0.01756	1.733631	0.30115	34.1749	42.60247	34.1749	42.6025
P0103_I_H47'	J214	H47'	303.2	12.41	15.8412774	2924.3	2.45	0.016	168.424026	0.71103704	132.4	190	1.1506	0.558719	138490.39	96505.94	0.01725	0.01831	2.664882	0.46481	31.51	42.13766	19.1	29.7277

Solución escogida (diametro SUPERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0103_A'	J153	J200	191.9	299.2	315	€ 9,165.14
P0103_B'	J200	J202	186.7	299.2	315	€ 8,916.79
P0103_C'	J202	J205	176.1	299.2	315	€ 8,410.54
P0103_D'	J205	J207	160.1	299.2	315	€ 7,646.38
P0103_E'	J207	J209	259	299.2	315	€ 12,369.84
P0103_F'	J209	J210	169.6	213.6	225	€ 4,299.36
P0103_G'	J210	J212	64.1	190	200	€ 1,407.00
P0103_H'	J212	J214	132.7	190	200	€ 2,912.77
P0103_I_H47'	J214	H47'	303.2	190	200	€ 6,655.24
						€ 61,783.05

HIDRANTE 48

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0103_A';P0103_B';P0103_C';P0103_D';P0103_E';P0103_F';P0103_G';P0103_H';P0103_H_H48'
Jcritica	2.70
Longtotal	73.6
Pmin	25
Hcab	42.6024739 J214
Visc	1.10E-06
Rug	0.01

																						31.708	32.0931
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2621.1															42.6025	42.60247		
P0103_H_H48'	J214	H48'	73.6	10.33	7.79591368	2694.7	2.70	0.016	124.382907	0.64158727	104.4	132.4	0.9107	0.566241	86433.87	68154.80	0.01894	0.01975	0.564494	0.1794	42.038	42.42307	31.708	32.0931

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0103_H_H48'	J214	H48'	73.6	104.4	110	€	661.66
						€	661.66

HIDRANTE 49

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0103_A';P0103_B';P0103_C';P0103_D';P0103_E';P0103_F';P0103_G';P0103_G_H49'
Jcritica	2.86
Longtotal	102.8
Pmin	25
Hcab	42.9036249 J212
Visc	1.10E-06
Rug	0.01

																						32.1995	32.1995
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2488.4															42.9036	42.90362		
P0103_G_H49'	J212	H49'	102.8	10.5	3.67196542	2591.2	2.86	0.016	90.9953044	0.56463882	104.4	104.4	0.42895	0.428951	40711.35	40711.35	0.0221	0.0221	0.204114	0.20411	42.6995	42.69951	32.1995	32.1995

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0103_G_H49'	J212	H49'	102.8	104.4	110	€	924.17
						€	924.17

HIDRANTE 50

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0103_A';P0103_B';P0103_C';P0103_D';P0103_E';P0103_F';P0103_F_H50'
Jcritica	3.52
Longtotal	75.7
Pmin	25
Hcab	43.0697295 J210
Visc	1.10E-06
Rug	0.01

																						33.4495	33.5995
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2424.3															43.0697	43.06973		
P0103_F_H50'	J210	H50'	75.7	9.28	5.79663266	2500	3.52	0.016	104.787977	0.67214502	104.4	117.8	0.67715	0.531858	64267.69	56957.11	0.02008	0.02053	0.340262	0.19025	42.7295	42.87948	33.4495	33.5995

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0103_F_H50'	J210	H50'	75.7	104.4	110	€	680.54
						€	680.54

HIDRANTE 51

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0103_A';P0103_B';P0103_C';P0103_D';P0103_E';P010301_A';P010301_A_H51'
Jcritica	3.56
Longtotal	101
Pmin	25
Hcab	43.3754065 J209
Visc	1.10E-06
Rug	0.01

41.3023 43.0171

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2254.7															43.3754	43.37541		
P010301_A'	J209	J217	101	0	25.1788326	2355.7	7.80	0.016	188.131836	0.90577665	132.4	190	1.82881	0.888052	220122.81	153390.84	0.01594	0.01677	2.073098	0.35834	41.3023	43.01707	41.3023	43.0171
P010301_A_H51'	J217	H51'	5	9.98	6.94604581	2360.7	3.56	0.016	112.393997	0.70010234	104.4	117.8	0.81142	0.637319	77011.32	68251.12	0.01937	0.01979	0.031131	0.01739	41.2712	42.99968	31.2912	33.0197

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010301_A'	J209	J217	101	190	200	€ 2,216.95
P010301_A_H51'	J217	H51'	5	117.8	125	€ 50.70
						€ 2,216.95

HIDRANTE 52

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0103_A';P0103_B';P0103_C';P0103_D';P0103_E';P010301_A';P010301_B';P010301_B_H52'
Jcritica	2.93
Longtotal	128.4
Pmin	25
Hcab	43.0170675 J217
Visc	1.10E-06
Rug	0.01

40.9825 42.6644

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2355.7															43.0171	43.01707		
P010301_B'	J217	J219	128.4	0	21.8693957	2484.1	7.25	0.016	184.825441	0.81512347	132.4	190	1.58844	0.771329	191190.47	133229.57	0.01631	0.01721	2.034549	0.35269	40.9825	42.66438	40.9825	42.6644
P010301_B_H52'	J219	H52'	5	10.72	12.7856631	2489.1	2.93	0.016	149.113286	0.73215105	117.8	152	1.17312	0.704606	125630.59	97363.71	0.01761	0.01835	0.052435	0.01527	40.9301	42.6491	30.2101	31.9291

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010301_B'	J217	J219	128.4	132.4	140	€ 1,572.90
P010301_B_H52'	J219	H52'	5	117.8	125	€ 50.70
						€ 1,572.90

HIDRANTE 53

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0103_A';P0103_B';P0103_C';P0103_D';P0103_E';P010301_A';P010301_B';P010301_C_H53'
Jcritica	1.43
Longtotal	229.9
Pmin	25
Hcab	40.9825188 J219
Visc	1.10E-06
Rug	0.01

27.1128 28.5652

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2484.1															40.9825	40.98252		
P010301_C_H53'	J219	H53'	229.9	12.11	14.68259	2714	1.43	0.016	182.008878	0.56432286	132.4	190	1.06644	0.517852	128360.71	89447.15	0.01748	0.01858	1.759724	0.30735	39.2228	40.67517	27.1128	28.5652

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010301_C_H53'	J219	H53'	229.9	132.4	140	€ 2,816.28
						€ 2,816.28

HIDRANTE 54

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0103_A';P0103_B';P0103_C';P0103_D';P0103_D_H54'
Jcritica	4.12
Longtotal	5.1
Pmin	25
Hcab	43.6188842
Visc	1.10E-06
Rug	0.01

J207

33.2039 33.2194

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1995.7															43.6189	43.61888		
P0103_D_H54'	J207	H54'	5.1	10.38	7.32848486	2000.8	4.12	0.016	111.511839	0.75038191	104.4	117.8	0.8561	0.672409	81251.45	72008.93	0.01917	0.01958	0.034979	0.01953	43.5839	43.59935	33.2039	33.2194

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0103_D_H54'	J207	H54'	5.1	104.4	110	€	45.85
						€	45.85

HIDRANTE 55

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0103_A';P0103_B';P0103_C';P0103_C_H55'
Jcritica	4.06
Longtotal	5
Pmin	25
Hcab	43.7914265
Visc	1.10E-06
Rug	0.01

J205

32.4412 32.4546

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1835.6															43.7914	43.79143		
P0103_C_H55'	J205	H55'	5	11.32	6.83175223	1840.6	4.06	0.016	108.735727	0.73569482	104.4	117.8	0.79807	0.626833	75744.14	67128.08	0.01943	0.01985	0.030213	0.01688	43.7612	43.77455	32.4412	32.4546

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0103_C_H55'	J205	H55'	5	104.4	110	€	44.95
						€	44.95

HIDRANTE 56

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0103_A';P0103_B';P0103_B_H56'
Jcritica	4.22
Longtotal	5.3
Pmin	25
Hcab	44.0063535
Visc	1.10E-06
Rug	0.01

J202

31.9843 32.0029

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1659.5															44.0064	44.00635		
P0103_B_H56'	J202	H56'	5.3	11.98	7.93998929	1664.8	4.22	0.016	114.578366	0.77006039	104.4	117.8	0.92753	0.728517	88031.25	78017.51	0.01888	0.01927	0.042019	0.02345	43.9643	43.98291	31.9843	32.0029

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0103_B_H56'	J202	H56'	5.3	104.4	110	€	47.65
						€	47.65

HIDRANTE 57

Serie	P00';P01_A';P01_B';P01_C';P01_D';P01_E';P01_F';P01_G';P0103_A';P0103_A_H57'
Jcritica	4.24
Longtotal	5
Pmin	25
Hcab	44.2674214 J200
Visc	1.10E-06
Rug	0.01

																								31.2319	31.2476
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1472.8															44.2674	44.26742		
P0103_A_H57'	J200	H57'	5	13	7.47082381	1477.8	4.24	0.016	111.7123	0.76221348	104.4	117.8	0.87273	0.685469	82829.57	73407.53	0.0191	0.0195	0.035506	0.01982	44.2319	44.2476	31.2319	31.2476

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0103_A_H57'	J200	H57'	5	104.4	110	€	44.95
						€	44.95

HIDRANTE 58

Serie	P00';P04_A';P0404_A';P0404_B';P0404_A_H58'
Jcritica	1.82
Longtotal	16.3
Pmin	25
Hcab	47.9763606 J124
Visc	1.10E-06
Rug	0.01

																								47.86	47.956
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						426.4															47.9764	47.97636		
P0404_A'	J124	J128	16.3	0	14.1280585	442.7	51.90	0.016	170.781129	0.61675524	132.4	190	1.02616	0.498294	123512.79	86068.91	0.01761	0.01873	0.116331	0.02033	47.86	47.95603	47.86	47.956
P0404_B'	J128	J130	189.3	0	10.7266593	632	36.36	0.016	152.965214	0.5836994	132.4	190	0.77911	0.378327	93776.48	65347.40	0.01854	0.01981	0.820082	0.14401	47.0399	47.81202	47.0399	47.812
P0404_A_H58'	J130	H58'	76.2	21.69	6.37516986	708.2	1.82	0.016	124.223451	0.52601085	104.4	132.4	0.74473	0.463048	70681.98	55734.13	0.0197	0.02059	0.406465	0.12949	46.6335	47.68253	24.9435	25.9925

Solución escogida (diametro SUPERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0404_A'	J124	J128	16.3	190	200	€	357.79
P0404_B'	J128	J130	189.3	190	200	€	4,155.14
P0404_A_H58'	J130	H58'	76.2	132.4	140	€	933.45
						€	5,446.37

HIDRANTE 59

Serie	P00';P04_A';P0404_A';P0404_A_H59'
Jcritica	3.33
Longtotal	146.9
Pmin	25
Hcab	47.9560284 J128
Visc	1.10E-06
Rug	0.01

																								26.241	26.5608
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						442.7															47.956	47.95603		
P0404_A_H59'	J128	H59'	146.9	20.99	6.10609488	589.6	3.33	0.016	108.130248	0.66493512	104.4	117.8	0.7133	0.560252	67698.72	59997.85	0.01987	0.02031	0.725053	0.40527	47.231	47.55075	26.241	26.5608

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0404_A_H59'	J128	H59'	146.9	104.4	110	€	1,320.63
						€	1,320.63

HIDRANTE 60

Serie	P00';P04_A';P0404_A';P0404_B';P0404_C_H60'
Jcritica	0.19
Longtotal	69.8
Pmin	25
Hcab	47.8120221
Visc	1.10E-06
Rug	0.01

J130

25.063 25.1185

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						632															47.812	47.81202		
P0404_C_H60'	J130	H60'	69.8	22.68	6.82411605	701.8	0.19	0.016	200.900105	0.21527629	152	213.6	0.37607	0.190438	51966.11	36979.63	0.02086	0.02241	0.069036	0.01354	47.743	47.79849	25.063	25.1185

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0404_C_H60'	J130	H60'	69.8	152	160	€ 915.08
						€ 915.08

HIDRANTE 61

Serie	P00';P02_A';P02_B';P02_C';P02_C_H61'
Jcritica	3.54
Longtotal	190.1
Pmin	25
Hcab	49.5256595
Visc	1.10E-06
Rug	0.01

J109

47.9209 49.4298

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						184.2															49.5257	49.52566		
P02_B'	J109	J112	190.1	0	15.4940253	374.3	65.52	0.016	155.027296	0.82083909	132.4	237.4	1.12538	0.350036	135454.58	75544.17	0.01731	0.01917	1.604724	0.09589	47.9209	49.42977	47.9209	49.4298
P02_C'	J112	J118	187.4	0	12.9488712	561.7	43.66	0.016	144.289668	0.79190222	117.8	237.4	1.1881	0.292537	127234.26	63134.77	0.01757	0.01991	2.011165	0.06855	45.9098	49.36123	45.9098	49.3612
P02_C_H61'	J118	H61'	111.4	22.14	4.98826994	673.1	3.54	0.016	98.5195566	0.65435763	104.4	104.4	0.58272	0.582719	55305.32	55305.32	0.02071	0.02071	0.382398	0.3824	45.5274	48.97883	23.3874	26.8388

Solución escogida (diametro SUPERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P02_B'	J109	J112	190.1	237.4	250	€ 6,254.29
P02_C'	J112	J118	187.4	237.4	250	€ 6,165.46
P02_C_H61'	J118	H61'	111.4	104.4	110	€ 1,001.49
						€ 13,421.24

HIDRANTE 62

Serie	P00';P02_A';P02_B';P02_C';P02_D';P02_D_H62'
Jcritica	0.08
Longtotal	68.5
Pmin	25
Hcab	49.3612267
Visc	1.10E-06
Rug	0.01

J118

49.334 49.3558

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						561.7															49.3612	49.36123		
P02_D'	J118	J119	68.5	0	10.2118483	630.2	38.66	0.016	280.784223	0.16491838	213.6	299.2	0.28498	0.145242	55337.63	39505.74	0.0205	0.02203	0.027209	0.00542	49.334	49.3558	49.334	49.3558
P02_D_H62'	J119	H62'	18.3	24.31	4.70006329	648.5	0.08	0.016	205.860225	0.14121113	213.6	213.6	0.13116	0.131163	25469.47	25469.47	0.02445	0.02445	0.001837	0.00184	49.3322	49.35397	25.0222	25.044

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P02_D'	J118	J119	68.5	213.6	225	€ 1,736.48
P02_D_H62'	J119	H62'	18.3	213.6	225	€ 463.91
						€ 2,200.38

HIDRANTE 63

Serie	P00';P02_A';P02_B';P02_C';P02_D';P02_F_H63'
Jcritica	0.48
Longtotal	154.9
Pmin	25
Hcab	49.3340179
Visc	1.10E-06
Rug	0.01

J119

																							25.0132	25.3376
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						630.2															49.334	49.33402		
P02_F_H63'	J119	H63'	154.9	23.96	7.6008984	785.1	0.48	0.016	174.180982	0.31898743	132.4	213.6	0.55208	0.212116	66449.91	41188.99	0.01985	0.02187	0.360782	0.03637	48.9732	49.29765	25.0132	25.3376

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P02_F_H63'	J119	H63'	154.9	132.4	140	€ 1,897.53
						€ 1,897.53

HIDRANTE 64

Serie	P00';P02_A';P02_B';P02_B_H64'
Jcritica	6.66
Longtotal	5.8
Pmin	25
Hcab	49.4297724
Visc	1.10E-06
Rug	0.01

J112

																							27.5109	27.5109
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						374.3															49.4298	49.42977		
P02_B_H64'	J112	H64'	5.8	21.9	4.84457589	380.1	6.66	0.016	85.844768	0.8370246	104.4	104.4	0.56593	0.565933	53712.17	53712.17	0.02083	0.02083	0.018894	0.01889	49.4109	49.41088	27.5109	27.5109

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P02_B_H64'	J112	H64'	5.8	104.4	110	€ 52.14
						€ 52.14

HIDRANTE 65

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P0101_B';P0101_C';P010101_A';P010101_B';P010101_C_H65'
Jcritica	0.25
Longtotal	236.9
Pmin	25
Hcab	47.0972443
Visc	1.10E-06
Rug	0.01

J191

																							46.9919	47.0371
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						844.6															47.0972	47.09724		
P010101_B'	J191	J193	236.9	0	7.94151004	1081.5	20.43	0.016	201.6923	0.24856191	190	213.6	0.2801	0.221621	48380.12	43034.75	0.02113	0.02166	0.105333	0.06013	46.9919	47.03711	46.9919	47.0371
P010101_C_H65'	J193	H65'	228.5	21.77	4.81770377	1310	0.25	0.016	165.144502	0.22491684	152	190	0.2655	0.169919	36687.15	29349.72	0.02251	0.02366	0.121602	0.04187	46.8703	46.99525	25.1003	25.2252

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010101_B'	J191	J193	236.9	190	200	€ 5,199.96
P010101_C_H65'	J193	H65'	228.5	152	160	€ 2,995.64
						€ 8,195.59

HIDRANTE 66

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P0101_B';P0101_C';P010101_A';P010101_B';P010101_B_H66'
Jcritica	0.88
Longtotal	93.4
Pmin	25
Hcab	46.9919113
Visc	1.10E-06
Rug	0.01

J193

25.7194 26.0218

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1081.5															46.9919	46.99191		
P010101_B_H66'	J193	H66'	93.4	20.96	4.91753453	1174.9	0.88	0.016	129.484837	0.37343903	104.4	213.6	0.57446	0.137232	54521.07	26647.94	0.02077	0.02419	0.312509	0.01015	46.6794	46.98176	25.7194	26.0218

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010101_B_H66'	J193	H66'	93.4	104.4	110	€ 839.67
						€ 839.67

HIDRANTE 67

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P0101_B';P0101_C';P0101_D';P010103_A';P010103_A_H67'
Jcritica	0.58
Longtotal	537.8
Pmin	25
Hcab	47.434466
Visc	1.10E-06
Rug	0.01

J175

47.1413 47.1413

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						836.4															47.4345	47.43447		
P010103_A'	J175	J196	537.8	0	12.1911387	1374.2	16.33	0.016	202.120067	0.37995794	213.6	213.6	0.34021	0.340214	66063.33	66063.33	0.01974	0.01974	0.293213	0.29321	47.1413	47.14125	47.1413	47.1413
P010103_A_H67'	J196	H67'	6.9	21.63	6.92062629	1381.1	0.58	0.016	161.157263	0.33927804	132.4	190	0.50267	0.244089	60502.71	42160.84	0.02024	0.02178	0.013583	0.0024	47.1277	47.13885	25.4977	25.5089

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010103_A'	J175	J196	537.8	213.6	225	€ 13,633.23
P010103_A_H67'	J196	H67'	6.9	132.4	140	€ 84.53
						€ 13,717.76

HIDRANTE 68

Serie	P00';P01_A';P01_B';P01_C';P0101_A';P0101_B';P0101_C';P0101_D';P010103_A';P010103_B_H68'
Jcritica	0.02
Longtotal	103.7
Pmin	25
Hcab	47.1412526
Visc	1.10E-06
Rug	0.01

J196

25.0045 25.0151

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1374.2															47.1413	47.14125		
P010103_B_H68'	J196	H68'	103.7	22.11	8.00904839	1477.9	0.02	0.016	331.613548	0.09273133	213.6	237.4	0.22351	0.180938	43400.74	39049.69	0.02162	0.02212	0.02672	0.01612	47.1145	47.12513	25.0045	25.0151

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P010103_B_H68'	J196	H68'	103.7	213.6	225	€ 2,628.80
						€ 2,628.80

1.2.1.1.3 Resultado del diseño por pendiente hidráulica con cabecera conocida Qdis 99%

En este subcapítulo se pueden observar los resultados obtenidos del diseño realizado por el método de la pendiente hidráulica con cabecera conocida. En la tabla adjunta se identifican las columnas por cada tubería, en el cual se observa el diámetro seleccionado, la velocidad y la presión en el nudo final, en función del caudal de diseño para una GS del 99%, obtenido por el método de Clement. La última columna es el coste del tramo de tubería, siendo el producto del precio unitario del diámetro seleccionado y la longitud de la tubería.

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P00'	UGD_43	J250	16	249.83	379.8	400	2.21	30.44	€ 1,334.56
P01_A'	J250	J147	89.5	156.11	340.8	355	1.71	49.15	€ 5,249.18
P01_A_H2'	J147	H2'	22.6	9.16	104.4	110	1.07	29.74	€ 203.17
P01_B'	J147	J148	103.1	148.16	340.8	355	1.62	48.59	€ 6,046.82
P01_B_H3'	J148	H3'	124.5	7.16	104.4	110	0.84	29.05	€ 1,119.26
P01_C'	J148	J149	150.7	145.33	340.8	355	1.59	47.82	€ 8,838.56
P01_C_H4'	J149	H4'	9	7.99	104.4	110	0.93	30.60	€ 80.91
P01_D'	J149	J150	110.3	92.04	299.2	315	1.31	47.36	€ 5,267.93
P01_D_H6'	J150	H6'	138.9	6.55	104.4	110	0.77	30.40	€ 1,248.71
P01_E'	J150	J151	123.3	89.31	299.2	315	1.27	46.87	€ 5,888.81
P01_E_H5'	J151	H5'	5	6.05	104.4	110	0.71	31.25	€ 44.95
P01_F'	J151	J152	246.5	86.64	299.2	315	1.23	45.94	€ 11,772.84
P01_F_H32'	J152	H32'	51.8	6.1	104.4	110	0.71	31.52	€ 465.68
P01_G'	J152	J153	388.5	84	299.2	315	1.19	44.57	€ 18,554.76
P0101_A'	J149	J161	233.1	62.45	340.8	355	0.68	47.56	€ 13,671.32
P0101_B'	J161	J172	110.8	48.28	340.8	355	0.53	47.49	€ 6,498.42
P0101_B_H26'	J172	H26'	5	5.26	104.4	110	0.61	28.79	€ 44.95
P0101_C'	J172	J174	58.1	46	340.8	355	0.50	47.45	€ 3,407.57
P0101_D'	J174	J175	22.1	35.02	299.2	315	0.50	47.43	€ 1,055.50
P0101_E'	J175	J176	124.3	27.73	190	200	0.98	46.91	€ 2,728.39
P0101_F'	J176	J177	157	18.86	190	200	0.67	46.58	€ 3,446.15
P0101_F_H18'	J177	H18'	5	10.09	132.4	140	0.73	29.18	€ 61.25
P0101_G'	J177	J178	403.1	12.66	190	200	0.45	46.17	€ 8,848.05
P0101_G_H19'	J178	H19'	5	6.87	104.4	110	0.80	27.87	€ 44.95
P0101_H'	J178	J179	176.5	8.43	117.8	125	0.77	45.30	€ 1,789.71
P0101_H_H20'	J179	H20'	5	5.82	104.4	110	0.68	27.57	€ 44.95
P0101_I_H21'	J179	H21'	127.1	4.52	104.4	110	0.53	28.25	€ 1,142.63
P010101_A'	J174	J191	30.3	17.06	237.4	250	0.39	47.43	€ 996.87
P010101_A_H17'	J191	H17'	5	12.29	117.8	125	1.13	27.48	€ 50.70
P010101_B'	J191	J193	236.9	7.94	190	200	0.28	46.99	€ 5,199.96
P010101_B_H66'	J193	H66'	93.4	4.92	104.4	110	0.57	25.72	€ 839.67
P010101_C_H65'	J193	H65'	228.5	4.82	152	160	0.27	25.10	€ 2,995.64
P010102_A'	J161	J162	150	20.75	132.4	140	1.51	45.18	€ 1,837.50
P010102_A_H27'	J162	H27'	5	8.49	104.4	110	0.99	27.81	€ 44.95
P010102_B'	J162	J163	155.9	15.77	132.4	140	1.15	43.82	€ 1,909.78
P010102_B_H28'	J163	H28'	77.8	6.67	117.8	125	0.61	26.84	€ 788.89
P010102_C'	J163	J164	123.1	11.92	117.8	125	1.09	42.68	€ 1,248.23
P010102_D'	J164	J166	55.1	9.22	117.8	125	0.85	42.36	€ 558.71
P010102_D_H29'	J164	H29'	156.9	4.87	104.4	110	0.57	27.17	€ 1,410.53
P010102_D_H30'	J166	H30'	86.8	4.77	104.4	110	0.56	26.99	€ 780.33
P010102_D_H31'	J166	H31'	247.8	6.42	104.4	110	0.75	26.77	€ 2,227.72

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P010103_A'	J175	J196	537.8	12.19	213.6	225	0.34	47.14	€ 13,633.23
P010103_A_H67'	J196	H67'	6.9	6.92	132.4	140	0.50	25.50	€ 84.53
P010103_B_H68'	J196	H68'	103.7	8.01	213.6	225	0.22	25.00	€ 2,628.80
P010104_A'	J176	J181	86.4	13.19	117.8	125	1.21	45.95	€ 876.10
P010104_A_H22'	J181	H22'	5	4.5	104.4	110	0.53	27.53	€ 44.95
P010104_B'	J181	J182	131.6	10.79	117.8	125	0.99	44.94	€ 1,334.42
P010104_B_H23'	J182	H23'	33.6	4.02	104.4	110	0.47	27.06	€ 302.06
P010104_C'	J182	J183	73.7	8.65	117.8	125	0.79	44.56	€ 747.32
P010104_C_H25'	J183	H25'	138.9	4.11	104.4	110	0.48	27.41	€ 1,248.71
P010104_D_H24'	J183	H24'	145.5	6.35	104.4	110	0.74	26.89	€ 1,308.05
P0102_A'	J153	J223	193.4	38.6	299.2	315	0.55	44.40	€ 9,236.78
P0102_A_H33'	J223	H33'	5	6.38	104.4	110	0.75	31.03	€ 44.95
P0102_B'	J223	J225	122	35.54	299.2	315	0.51	44.31	€ 5,826.72
P0102_B_H34'	J225	H34'	5	5.02	104.4	110	0.59	30.49	€ 44.95
P0102_C'	J225	J227	248.6	33.19	299.2	315	0.47	44.15	€ 11,873.14
P0102_C_H35'	J227	H35'	5	4.24	104.4	110	0.50	31.01	€ 44.95
P0102_D'	J227	J243	148.9	14.96	117.8	125	1.37	42.07	€ 1,509.85
P0102_E'	J243	J247	161.7	10.06	117.8	125	0.92	40.97	€ 1,639.64
P0102_E_H38'	J247	H38'	20.2	4.53	104.4	110	0.53	30.72	€ 181.60
P0102_F_H39'	J247	H39'	221.9	7.63	104.4	110	0.89	29.48	€ 1,994.88
P010201_A'	J243	J244	42.4	7.77	104.4	110	0.91	41.75	€ 381.18
P010201_A_H36'	J244	H36'	5	3.36	104.4	110	0.39	30.35	€ 44.95
P010201_B_H37'	J244	H37'	137	5.93	104.4	110	0.69	29.43	€ 1,231.63
P010202_A'	J227	J229	74.9	20.86	213.6	225	0.58	44.04	€ 1,898.72
P010202_B'	J229	J234	50	15.76	213.6	225	0.44	44.00	€ 1,267.50
P010202_B_H42'	J234	H42'	5	3.58	104.4	110	0.42	30.85	€ 44.95
P010202_C'	J234	J236	109.2	14.07	190	200	0.50	43.86	€ 2,396.94
P010202_C_H43'	J236	H43'	5	4.74	117.8	125	0.43	29.76	€ 50.70
P010202_D'	J236	J238	237.7	11.61	132.4	140	0.84	42.42	€ 2,911.83
P010202_D_H46'	J238	H46'	530.5	6.43	104.4	110	0.75	27.22	€ 4,769.20
P010202_E'	J238	J239	14.3	7.57	117.8	125	0.69	42.36	€ 145.00
P010202_E_H45'	J239	H45'	5.7	4.72	104.4	110	0.55	27.66	€ 51.24
P010202_F_H44'	J239	H44'	194.6	4.65	117.8	125	0.43	25.85	€ 1,973.24
P01020201_A'	J229	J230	242.2	8.29	132.4	140	0.60	43.38	€ 2,966.95
P01020201_A_H41'	J230	H41'	129.7	4.82	104.4	110	0.56	29.55	€ 1,166.00
P01020201_B_H40'	J230	H40'	209.7	5.35	104.4	110	0.63	32.24	€ 1,885.20
P0103_A'	J153	J200	191.9	53.82	299.2	315	0.77	44.27	€ 9,165.14
P0103_A_H57'	J200	H57'	5	7.47	104.4	110	0.87	31.23	€ 44.95
P0103_B'	J200	J202	186.7	50.52	299.2	315	0.72	44.01	€ 8,916.79
P0103_B_H56'	J202	H56'	5.3	7.94	104.4	110	0.93	31.98	€ 47.65
P0103_C'	J202	J205	176.1	46.88	299.2	315	0.67	43.79	€ 8,410.54
P0103_C_H55'	J205	H55'	5	6.83	104.4	110	0.80	32.44	€ 44.95

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P0103_D'	J205	J207	160.1	43.77	299.2	315	0.62	43.62	€ 7,646.38
P0103_D_H54'	J207	H54'	5.1	7.33	104.4	110	0.86	33.20	€ 45.85
P0103_E'	J207	J209	259	40.6	299.2	315	0.58	43.38	€ 12,369.84
P0103_F'	J209	J210	169.6	23.68	213.6	225	0.66	43.07	€ 4,299.36
P0103_F_H50'	J210	H50'	75.7	5.8	104.4	110	0.68	33.45	€ 680.54
P0103_G'	J210	J212	64.1	21.18	190	200	0.75	42.90	€ 1,407.00
P0103_G_H49'	J212	H49'	102.8	3.67	104.4	110	0.43	32.20	€ 924.17
P0103_H'	J212	J214	132.7	19.68	190	200	0.69	42.60	€ 2,912.77
P0103_H_H48'	J214	H48'	73.6	7.8	104.4	110	0.91	31.71	€ 661.66
P0103_I_H47'	J214	H47'	303.2	15.84	190	200	0.56	29.73	€ 6,655.24
P010301_A'	J209	J217	101	25.18	190	200	1.83	41.30	€ 2,216.95
P010301_A_H51'	J217	H51'	5	6.95	117.8	125	0.81	31.29	€ 50.70
P010301_B'	J217	J219	128.4	21.87	132.4	140	1.59	40.98	€ 1,572.90
P010301_B_H52'	J219	H52'	5	12.79	117.8	125	1.17	30.21	€ 50.70
P010301_C_H53'	J219	H53'	229.9	14.68	132.4	140	1.07	27.11	€ 2,816.28
P02_A'	J250	J109	115.2	25.83	237.4	250	0.58	49.53	€ 3,790.08
P02_A_H1'	J109	H1'	5	15.26	117.8	125	1.40	29.27	€ 50.70
P02_B'	J109	J112	190.1	15.49	237.4	250	0.35	49.43	€ 6,254.29
P02_B_H64'	J112	H64'	5.8	4.84	104.4	110	0.57	27.51	€ 52.14
P02_C'	J112	J118	187.4	12.95	237.4	250	0.29	49.36	€ 6,165.46
P02_C_H61'	J118	H61'	111.4	4.99	104.4	110	0.58	26.84	€ 1,001.49
P02_D'	J118	J119	68.5	10.21	213.6	225	0.28	49.33	€ 1,736.48
P02_D_H62'	J119	H62'	18.3	4.7	213.6	225	0.13	25.02	€ 463.91
P02_F_H63'	J119	H63'	154.9	7.6	132.4	140	0.55	25.01	€ 1,897.53
P04_A'	J250	J124	357.4	40.31	213.6	225	1.12	47.98	€ 9,060.09
P04_B'	J124	J125	407	11.12	152	160	0.61	47.01	€ 5,335.77
P04_B_H15'	J125	H15'	5	5.55	117.8	125	0.51	26.31	€ 50.70
P04_C_H16'	J125	H16'	210.1	7.95	104.4	110	0.93	25.87	€ 1,888.80
P0401_A'	J124	J138	94.9	17.8	152	160	0.98	47.45	€ 1,244.14
P0401_A_H11'	J138	H11'	7.3	6.65	104.4	110	0.78	28.84	€ 65.63
P0401_B'	J138	J140	134.1	14.13	132.4	140	1.03	46.49	€ 1,642.73
P0401_B_H10'	J140	H10'	111.4	5.37	104.4	110	0.63	29.57	€ 1,001.49
P0401_C'	J140	J141	60.9	11.2	117.8	125	1.03	45.99	€ 617.53
P0401_C_H9'	J141	H9'	5	6.49	104.4	110	0.76	28.59	€ 44.95
P0401_D'	J141	J143	252.6	7.07	104.4	110	0.83	44.36	€ 2,270.87
P0401_D_H7'	J143	H7'	6.5	5.28	104.4	110	0.62	28.74	€ 58.44
P0401_D_H8'	J143	H8'	8.2	3.3	104.4	110	0.39	29.16	€ 73.72
P0403_A'	J124	J133	30.5	10.38	104.4	110	1.21	47.58	€ 274.20
P0403_A_H12'	J133	H12'	5	3.61	104.4	110	0.42	28.41	€ 44.95
P0403_B'	J133	J135	178.8	8.58	104.4	110	1.00	45.95	€ 1,607.41
P0403_B_H13'	J135	H13'	5	4.61	104.4	110	0.54	27.44	€ 44.95
P0403_C_H14'	J135	H14'	159.3	5.9	104.4	110	0.69	28.33	€ 1,432.11
P0404_A'	J124	J128	16.3	14.13	190	200	0.50	47.96	€ 357.79
P0404_A_H58'	J130	H58'	76.2	6.38	132.4	140	0.46	25.99	€ 933.45
P0404_A_H59'	J128	H59'	146.9	6.11	104.4	110	0.71	26.24	€ 1,320.63
P0404_B'	J128	J130	189.3	10.73	190	200	0.38	47.81	€ 4,155.14
P0404_C_H60'	J130	H60'	69.8	6.82	152	160	0.38	25.06	€ 915.08

1.2.1.2 Diseño a la demanda con garantía suministro del 95%

1.2.1.2.1 Calculo del caudal de diseño por el método de Clement

A continuación se puede observar el cálculo del caudal de diseño para una GS del 95%, a partir de la sumatoria de caudales demandados en las parcelas y la probabilidad de apertura de la toma.

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Coste	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks
P00'	UGD_43	J250	474.6	500	16	19.23	1,881.92 €	949.44	158.2030626	95%	1.645	1551.249	222.987	0.235
P01_A'	J250	J147	427.6	450	89.5	0	8,753.10 €	709.1	118.1557462	95%	1.645	266.118	144.988	0.204
P01_A_H2'	J147	H2'	152	160	22.6	19.17	296.29 €	18.96	3.159262372	95%	1.645	6.644	7.399	0.390
P01_B'	J147	J148	379.8	400	103.1	0	8,599.57 €	690.14	114.9964838	95%	1.645	203.191	138.443	0.201
P01_B_H3'	J148	H3'	132.4	140	124.5	18.73	1,525.13 €	14.97	2.4944176	95%	1.645	4.028	5.796	0.387
P01_C'	J148	J149	379.8	400	150.7	0	12,569.89 €	675.17	112.5020662	95%	1.645	199.163	135.715	0.201
P01_C_H4'	J149	H4'	152	160	9	17.15	117.99 €	18.93	3.154263539	95%	1.645	4.329	6.577	0.347
P01_D'	J149	J150	299.2	315	110.3	0	5,267.93 €	391.69	65.26642818	95%	1.645	132.474	84.198	0.215
P01_D_H6'	J150	H6'	132.4	140	138.9	16.18	1,701.53 €	14.48	2.412769997	95%	1.645	3.166	5.340	0.369
P01_E'	J150	J151	299.2	315	123.3	0	5,888.81 €	377.21	62.85365819	95%	1.645	129.308	81.558	0.216
P01_E_H5'	J151	H5'	132.4	140	5	15.59	61.25 €	14.48	2.412769997	95%	1.645	2.443	4.984	0.344
P01_F'	J151	J152	299.2	315	246.5	0	11,772.84 €	362.73	60.44088819	95%	1.645	126.865	78.968	0.218
P01_F_H32'	J152	H32'	132.4	140	51.8	14.17	634.55 €	14.29	2.381110722	95%	1.645	2.555	5.010	0.351
P01_G'	J152	J153	299.2	315	388.5	0	18,554.76 €	348.44	58.05977747	95%	1.645	124.309	76.399	0.219
P0101_A'	J149	J161	237.4	250	233.1	0	7,668.99 €	264.55	44.08137449	95%	1.645	62.360	57.070	0.216
P0101_B'	J161	J172	237.4	250	110.8	0	3,645.32 €	193.11	32.17748716	95%	1.645	47.900	43.561	0.226
P0101_B_H26'	J172	H26'	117.8	125	5	18.39	50.70 €	11.56	1.926216931	95%	1.645	2.055	4.284	0.371
P0101_C'	J172	J174	237.4	250	58.1	0	1,911.49 €	181.55	30.25127023	95%	1.645	45.845	41.388	0.228
P0101_D'	J174	J175	237.4	250	22.1	0	727.09 €	131.25	21.86989379	95%	1.645	31.929	31.164	0.237
P0101_E'	J175	J176	213.6	225	124.3	0	3,151.01 €	98.86	16.47282057	95%	1.645	23.400	24.429	0.247
P0101_F'	J176	J177	213.6	225	157	0	3,979.95 €	56.66	9.441129007	95%	1.645	16.399	16.102	0.284
P0101_F_H18'	J177	H18'	152	160	5	17.38	65.55 €	19.03	3.170926315	95%	1.645	8.852	8.065	0.424
P0101_G'	J177	J178	213.6	225	403.1	0	10,218.59 €	37.63	6.270202692	95%	1.645	7.547	10.789	0.287
P0101_G_H19'	J178	H19'	132.4	140	5	18.27	61.25 €	15.46	2.576065204	95%	1.645	3.399	5.609	0.363
P0101_H'	J178	J179	152	160	176.5	0	2,313.92 €	22.17	3.694137488	95%	1.645	4.148	7.044	0.318
P0101_H_H20'	J179	H20'	117.8	125	5	17.7	50.70 €	12.58	2.096177249	95%	1.645	2.567	4.732	0.376
P0101_I_H21'	J179	H21'	104.4	110	127.1	16.68	1,142.63 €	9.59	1.59796024	95%	1.645	1.581	3.666	0.382
P010101_A'	J174	J191	190	200	30.3	0	665.09 €	50.3	8.381376439	95%	1.645	13.916	14.517	0.289
P010101_A_H17'	J191	H17'	190	200	5	19.9	109.75 €	28.63	4.770552832	95%	1.645	10.451	10.088	0.352
P010101_B'	J191	J193	152	160	236.9	0	3,105.76 €	21.67	3.610823607	95%	1.645	3.465	6.673	0.308
P010101_B_H66'	J193	H66'	117.8	125	93.4	20.96	947.08 €	11.24	1.872896047	95%	1.645	1.713	4.026	0.358
P010101_C_H65'	J193	H65'	152	160	228.5	21.77	2,995.64 €	10.43	1.73792756	95%	1.645	1.753	3.915	0.375
P010102_A'	J161	J162	213.6	225	150	0	3,802.50 €	71.44	11.90388733	95%	1.645	14.460	18.159	0.254
P010102_A_H27'	J162	H27'	152	160	5	17.33	65.55 €	19.68	3.27923436	95%	1.645	5.016	6.963	0.354
P010102_B'	J162	J163	213.6	225	155.9	0	3,952.07 €	51.76	8.624652972	95%	1.645	9.444	13.679	0.264
P010102_B_H28'	J163	H28'	132.4	140	77.8	16.73	953.05 €	15.21	2.534408263	95%	1.645	3.155	5.456	0.359
P010102_C'	J163	J164	213.6	225	123.1	0	3,120.59 €	36.55	6.090244709	95%	1.645	6.289	10.215	0.279
P010102_D'	J164	J166	152	160	55.1	0	722.36 €	25.22	4.202352163	95%	1.645	4.643	7.747	0.307
P010102_D_H29'	J164	H29'	117.8	125	156.9	15	1,590.97 €	11.33	1.887892546	95%	1.645	1.646	3.998	0.353
P010102_D_H30'	J166	H30'	117.8	125	86.8	15.1	880.15 €	11.16	1.859565826	95%	1.645	1.565	3.917	0.351
P010102_D_H31'	J166	H31'	132.4	140	247.8	14.25	3,035.55 €	14.06	2.342786337	95%	1.645	3.078	5.229	0.372
P010103_A'	J175	J196	190	200	537.8	0	11,804.71 €	32.39	5.397073218	95%	1.645	8.529	10.201	0.315
P010103_A_H67'	J196	H67'	132.4	140	6.9	21.63	84.53 €	16.54	2.756023187	95%	1.645	3.205	5.701	0.345

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Coste	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks
P010103_B_H68'	J196	H68'	152	160	103.7	22.11	1,359.51 €	15.85	2.641050031	95%	1.645	5.324	6.437	0.406
P010104_A'	J176	J181	213.6	225	86.4	0	2,190.24 €	42.2	7.031691566	95%	1.645	7.000	11.384	0.270
P010104_A_H22'	J181	H22'	104.4	110	5	18.41	44.95 €	10.43	1.73792756	95%	1.645	1.413	3.693	0.354
P010104_B'	J181	J182	190	200	131.6	0	2,888.62 €	31.77	5.293764006	95%	1.645	5.587	9.182	0.289
P010104_B_H23'	J182	H23'	104.4	110	33.6	17.8	302.06 €	9.34	1.556303299	95%	1.645	1.124	3.300	0.353
P010104_C'	J182	J183	152	160	73.7	0	966.21 €	22.43	3.737460707	95%	1.645	4.463	7.212	0.322
P010104_C_H25'	J183	H25'	104.4	110	138.9	16.81	1,248.71 €	9.75	1.624620682	95%	1.645	1.138	3.380	0.347
P010104_D_H24'	J183	H24'	117.8	125	145.5	16.89	1,475.37 €	12.68	2.112840025	95%	1.645	3.325	5.112	0.403
P0102_A'	J153	J223	190	200	193.4	0	4,245.13 €	157.37	26.22221094	95%	1.645	28.319	34.975	0.222
P0102_A_H33'	J223	H33'	132.4	140	5	13.35	61.25 €	14.48	2.412769997	95%	1.645	2.912	5.220	0.360
P0102_B'	J223	J225	190	200	122	0	2,677.90 €	142.89	23.80944094	95%	1.645	25.407	32.100	0.225
P0102_B_H34'	J225	H34'	117.8	125	5	13.81	50.70 €	11.58	1.929549486	95%	1.645	1.765	4.115	0.355
P0102_C'	J225	J227	190	200	248.6	0	5,456.77 €	131.31	21.87989146	95%	1.645	23.643	29.878	0.228
P0102_C_H35'	J227	H35'	104.4	110	5	13.13	44.95 €	9.43	1.571299798	95%	1.645	1.315	3.458	0.367
P0102_D'	J227	J243	152	160	148.9	0	1,952.08 €	46.46	7.741525833	95%	1.645	9.632	12.846	0.277
P0102_E'	J243	J247	152	160	161.7	0	2,119.89 €	25.3	4.215682384	95%	1.645	6.308	8.347	0.330
P0102_E_H38'	J247	H38'	104.4	110	20.2	10.2	181.60 €	10.16	1.692938064	95%	1.645	1.483	3.696	0.364
P0102_F_H39'	J247	H39'	132.4	140	221.9	9.86	2,718.28 €	15.14	2.52274432	95%	1.645	4.825	6.136	0.405
P010201_A'	J243	J244	152	160	42.4	0	555.86 €	21.16	3.525843448	95%	1.645	3.324	6.525	0.308
P010201_A_H36'	J244	H36'	104.4	110	5	11.39	44.95 €	7.93	1.321358154	95%	1.645	0.764	2.759	0.348
P010201_B_H37'	J244	H37'	117.8	125	137	11.68	1,389.18 €	13.23	2.204485294	95%	1.645	2.560	4.836	0.366
P010202_A'	J227	J229	190	200	74.9	0	1,644.06 €	75.42	12.56706583	95%	1.645	12.695	18.428	0.244
P010202_B'	J229	J234	190	200	50	0	1,097.50 €	53.02	8.834603953	95%	1.645	8.857	13.730	0.259
P010202_B_H42'	J234	H42'	104.4	110	5	13.14	44.95 €	7.77	1.294697712	95%	1.645	0.968	2.913	0.375
P010202_C'	J234	J236	190	200	109.2	0	2,396.94 €	45.25	7.53990624	95%	1.645	7.889	12.160	0.269
P010202_C_H43'	J236	H43'	104.4	110	5	14.1	44.95 €	10.42	1.736261282	95%	1.645	1.667	3.860	0.370
P010202_D'	J236	J238	190	200	237.7	0	5,217.52 €	34.83	5.803644958	95%	1.645	6.222	9.907	0.284
P010202_D_H46'	J238	H46'	132.4	140	530.5	12.32	6,498.63 €	15.53	2.587729147	95%	1.645	2.722	5.302	0.341
P010202_E'	J238	J239	152	160	14.3	0	187.47 €	19.3	3.215915811	95%	1.645	3.500	6.293	0.326
P010202_E_H45'	J239	H45'	104.4	110	5.7	14.68	51.24 €	9.45	1.574632353	95%	1.645	1.828	3.799	0.402
P010202_F_H44'	J239	H44'	104.4	110	194.6	16.18	1,749.45 €	9.85	1.641283458	95%	1.645	1.672	3.768	0.383
P01020201_A'	J229	J230	152	160	242.2	0	3,175.24 €	22.4	3.732461874	95%	1.645	3.839	6.955	0.310
P01020201_A_H41'	J230	H41'	104.4	110	129.7	11.55	1,166.00 €	10.42	1.736261282	95%	1.645	1.755	3.915	0.376
P01020201_B_H40'	J230	H40'	117.8	125	209.7	10.33	2,126.36 €	11.98	1.996200591	95%	1.645	2.084	4.371	0.365
P0103_A'	J153	J200	213.6	225	191.9	0	4,864.67 €	191.07	31.83756653	95%	1.645	89.270	47.379	0.248
P0103_A_H57'	J200	H57'	132.4	140	5	13	61.25 €	16.79	2.797680128	95%	1.645	4.035	6.102	0.363
P0103_B'	J200	J202	213.6	225	186.7	0	4,732.85 €	174.28	29.0398864	95%	1.645	85.235	44.226	0.254
P0103_B_H56'	J202	H56'	152	160	5.3	11.98	69.48 €	18.52	3.085946156	95%	1.645	4.354	6.518	0.352
P0103_C'	J202	J205	213.6	225	176.1	0	4,464.14 €	155.76	25.95394024	95%	1.645	80.881	40.747	0.262
P0103_C_H55'	J205	H55'	132.4	140	5	11.32	61.25 €	16.14	2.689372082	95%	1.645	3.171	5.618	0.348
P0103_D'	J205	J207	213.6	225	160.1	0	4,058.54 €	139.62	23.26456816	95%	1.645	77.711	37.765	0.270
P0103_D_H54'	J207	H54'	132.4	140	5.1	10.38	62.48 €	15.79	2.631052365	95%	1.645	4.077	5.952	0.377
P0103_E'	J207	J209	213.6	225	259	0	6,565.65 €	123.83	20.6335158	95%	1.645	73.633	34.748	0.281

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Coste	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks
P0103_F'	J209	J210	213.6	225	169.6	0	4,299.36 €	58.63	9.769385699	95%	1.645	35.770	19.607	0.334
P0103_F_H50'	J210	H50'	117.8	125	75.7	9.28	767.60 €	11.81	1.967873872	95%	1.645	2.709	4.675	0.396
P0103_G'	J210	J212	213.6	225	64.1	0	1,624.94 €	46.82	7.801511827	95%	1.645	33.061	17.259	0.369
P0103_G_H49'	J212	H49'	104.4	110	102.8	10.5	924.17 €	7.68	1.279701214	95%	1.645	1.057	2.971	0.387
P0103_H'	J212	J214	213.6	225	132.7	0	3,363.95 €	39.14	6.521810613	95%	1.645	32.004	15.827	0.404
P0103_H_H48'	J214	H48'	132.4	140	73.6	10.33	901.60 €	17.37	2.89432423	95%	1.645	4.439	6.360	0.366
P0103_I_H47'	J214	H47'	190	200	303.2	12.41	6,655.24 €	21.77	3.627486383	95%	1.645	27.565	12.263	0.563
P010301_A'	J209	J217	152	160	101	0	1,324.11 €	65.2	10.8641301	95%	1.645	37.863	20.985	0.322
P010301_A_H51'	J217	H51'	132.4	140	5	9.98	61.25 €	15.9	2.649381419	95%	1.645	3.411	5.687	0.358
P010301_B'	J217	J219	152	160	128.4	0	1,683.32 €	49.3	8.214748677	95%	1.645	34.452	17.869	0.362
P010301_B_H52'	J219	H52'	152	160	5	10.72	65.55 €	23.41	3.900755913	95%	1.645	14.587	10.183	0.435
P010301_C_H53'	J219	H53'	152	160	229.9	12.11	3,013.99 €	25.89	4.313992764	95%	1.645	19.865	11.645	0.450
P02_A'	J250	J109	190	200	115.2	0	2,528.64 €	78.8	13.13026766	95%	1.645	29.792	22.108	0.281
P02_A_H1'	J109	H1'	190	200	5	20.18	109.75 €	28.28	4.712233115	95%	1.645	20.540	12.167	0.430
P02_B'	J109	J112	190	200	190.1	0	4,172.70 €	50.52	8.418034547	95%	1.645	9.252	13.421	0.266
P02_B_H64'	J112	H64'	117.8	125	5.8	21.9	58.81 €	11.44	1.9062216	95%	1.645	1.595	3.984	0.348
P02_C'	J112	J118	190	200	187.4	0	4,113.43 €	39.08	6.511812947	95%	1.645	7.656	11.063	0.283
P02_C_H61'	J118	H61'	117.8	125	111.4	22.14	1,129.60 €	12.02	2.002865702	95%	1.645	1.647	4.114	0.342
P02_D'	J118	J119	190	200	68.5	0	1,503.58 €	27.06	4.508947246	95%	1.645	6.010	8.541	0.316
P02_D_H62'	J119	H62'	117.8	125	18.3	24.31	185.56 €	11.07	1.844569328	95%	1.645	1.507	3.864	0.349
P02_F_H63'	J119	H63'	132.4	140	154.9	23.96	1,897.53 €	15.99	2.664377918	95%	1.645	4.503	6.155	0.385
P04_A'	J250	J124	190	200	357.4	0	7,844.93 €	161.54	26.91704871	95%	1.645	33.135	36.385	0.225
P04_B'	J124	J125	190	200	407	0	8,933.65 €	29.54	4.922184096	95%	1.645	7.103	9.306	0.315
P04_B_H15'	J125	H15'	117.8	125	5	20.69	50.70 €	13.08	2.17949113	95%	1.645	2.096	4.561	0.349
P04_C_H16'	J125	H16'	152	160	210.1	19.47	2,754.41 €	16.46	2.742692966	95%	1.645	5.007	6.423	0.390
P0401_A'	J124	J138	190	200	94.9	0	2,083.06 €	59.89	9.979336679	95%	1.645	11.316	15.512	0.259
P0401_A_H11'	J138	H11'	132.4	140	7.3	18.57	89.43 €	14.73	2.454426937	95%	1.645	3.246	5.418	0.368
P0401_B'	J138	J140	190	200	134.1	0	2,943.50 €	45.16	7.524909742	95%	1.645	8.070	12.197	0.270
P0401_B_H10'	J140	H10'	117.8	125	111.4	16.48	1,129.60 €	12.08	2.012863368	95%	1.645	2.086	4.389	0.363
P0401_C'	J140	J141	190	200	60.9	0	1,336.76 €	33.08	5.512046374	95%	1.645	5.983	9.535	0.288
P0401_C_H9'	J141	H9'	132.4	140	5	17.37	61.25 €	14.23	2.371113056	95%	1.645	3.128	5.280	0.371
P0401_D'	J141	J143	152	160	252.6	0	3,311.59 €	18.85	3.140933318	95%	1.645	2.855	5.920	0.314
P0401_D_H7'	J143	H7'	117.8	125	6.5	15.6	65.91 €	11.91	1.984536648	95%	1.645	2.004	4.313	0.362
P0401_D_H8'	J143	H8'	104.4	110	8.2	15.19	73.72 €	6.94	1.15639667	95%	1.645	0.851	2.674	0.385
P0403_A'	J124	J133	190	200	30.5	0	669.48 €	30.21	5.033824697	95%	1.645	5.279	8.813	0.292
P0403_A_H12'	J133	H12'	104.4	110	5	19.16	44.95 €	7.44	1.239710551	95%	1.645	1.039	2.916	0.392
P0403_B'	J133	J135	152	160	178.8	0	2,344.07 €	22.77	3.794114146	95%	1.645	4.241	7.181	0.315
P0403_B_H13'	J135	H13'	104.4	110	5	18.5	44.95 €	10.1	1.682940398	95%	1.645	1.582	3.752	0.371
P0403_C_H14'	J135	H14'	117.8	125	159.3	16.88	1,615.30 €	12.67	2.111173747	95%	1.645	2.659	4.793	0.378
P0404_A'	J124	J128	213.6	225	16.3	0	413.21 €	41.9	6.981703237	95%	1.645	9.437	12.035	0.287
P0404_A_H58'	J130	H58'	132.4	140	76.2	21.69	933.45 €	15	2.499416433	95%	1.645	2.776	5.240	0.349
P0404_A_H59'	J128	H59'	132.4	140	146.9	20.99	1,799.53 €	13.86	2.309460784	95%	1.645	2.663	4.994	0.360
P0404_B'	J128	J130	152	160	189.3	0	2,481.72 €	28.04	4.672242453	95%	1.645	6.773	8.953	0.319
P0404_C_H60'	J130	H60'	152	160	69.8	22.68	915.08 €	13.04	2.172826019	95%	1.645	3.998	5.462	0.419

1.2.1.2.2 Resultado del diseño por pendiente hidráulica con cabecera conocida Qdis 95%

En este subcapítulo se pueden observar los resultados obtenidos del diseño realizado por el método de la pendiente hidráulica con cabecera conocida, se realiza de la misma manera en que se muestra en el capítulo 1.2.1.1.2. En la tabla adjunta se identifican las columnas por cada tubería, en el cual se observa el diámetro seleccionado, la velocidad y la presión en el nudo final, en función del caudal de diseño para una GS del 95%, obtenido por el método de Clement. La última columna es el coste del tramo de tubería, siendo el producto del precio unitario del diámetro seleccionado y la longitud de la tubería.

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P00'	UGD_43	J250	16	222.99	379.8	400	1.97	30.47	€ 1,334.56
P01_A'	J250	J147	89.5	144.99	340.8	355	1.59	49.24	€ 5,249.18
P01_A_H2'	J147	H2'	22.6	7.4	104.4	110	0.86	29.91	€ 203.17
P01_B'	J147	J148	103.1	138.44	340.8	355	1.52	48.75	€ 6,046.82
P01_B_H3'	J148	H3'	124.5	5.8	104.4	110	0.68	29.46	€ 1,119.26
P01_C'	J148	J149	150.7	135.72	340.8	355	1.49	48.07	€ 8,838.56
P01_C_H4'	J149	H4'	9	6.58	104.4	110	0.77	30.87	€ 80.91
P01_D'	J149	J150	110.3	84.2	299.2	315	1.20	47.68	€ 5,267.93
P01_D_H6'	J150	H6'	138.9	5.34	104.4	110	0.62	30.96	€ 1,248.71
P01_E'	J150	J151	123.3	81.56	299.2	315	1.16	47.26	€ 5,888.81
P01_E_H5'	J151	H5'	5	4.98	104.4	110	0.58	31.65	€ 44.95
P01_F'	J151	J152	246.5	78.97	299.2	315	1.12	46.48	€ 11,772.84
P01_F_H32'	J152	H32'	51.8	5.01	104.4	110	0.59	32.13	€ 465.68
P01_G'	J152	J153	388.5	76.4	299.2	315	1.09	45.33	€ 18,554.76
P0101_A'	J149	J161	233.1	57.07	340.8	355	0.63	47.85	€ 13,671.32
P0101_B'	J161	J172	110.8	43.56	299.2	315	0.62	47.73	€ 5,291.81
P0101_B_H26'	J172	H26'	5	4.28	104.4	110	0.50	26.50	€ 44.95
P0101_C'	J172	J174	58.1	41.39	237.4	250	0.94	47.56	€ 1,911.49
P0101_D'	J174	J175	22.1	31.16	237.4	250	0.70	47.52	€ 727.09
P0101_E'	J175	J176	124.3	24.43	190	200	0.86	47.10	€ 2,728.39
P0101_F'	J176	J177	157	16.1	152	160	0.89	46.37	€ 2,058.27
P0101_F_H18'	J177	H18'	5	8.06	117.8	125	0.74	28.97	€ 50.70
P0101_G'	J177	J178	403.1	10.79	152	160	0.59	45.47	€ 5,284.64
P0101_G_H19'	J178	H19'	5	5.61	117.8	125	0.51	27.19	€ 50.70
P0101_H'	J178	J179	176.5	7.04	132.4	140	0.82	44.34	€ 2,162.13
P0101_H_H20'	J179	H20'	5	4.73	132.4	140	0.55	26.62	€ 61.25
P0101_I_H21'	J179	H21'	127.1	3.67	104.4	110	0.43	27.41	€ 1,142.63
P010101_A'	J174	J191	30.3	14.52	190	200	0.51	47.52	€ 665.09
P010101_A_H17'	J191	H17'	5	10.09	132.4	140	0.73	27.60	€ 61.25
P010101_B'	J191	J193	236.9	6.67	190	200	0.24	47.44	€ 5,199.96
P010101_B_H66'	J193	H66'	93.4	4.03	104.4	110	0.47	25.90	€ 839.67
P010101_C_H65'	J193	H65'	228.5	3.92	132.4	140	0.28	25.51	€ 2,799.13
P010102_A'	J161	J162	150	18.16	152	160	1.00	46.99	€ 1,966.50
P010102_A_H27'	J162	H27'	5	6.96	104.4	110	0.81	29.62	€ 44.95
P010102_B'	J162	J163	155.9	13.68	132.4	140	1.26	45.14	€ 1,909.78
P010102_B_H28'	J163	H28'	77.8	5.46	104.4	110	0.64	28.09	€ 699.42
P010102_C'	J163	J164	123.1	10.22	117.8	125	1.19	43.59	€ 1,248.23
P010102_D'	J164	J166	55.1	7.75	104.4	110	0.90	43.18	€ 495.35
P010102_D_H29'	J164	H29'	156.9	4	104.4	110	0.47	28.23	€ 1,410.53
P010102_D_H30'	J166	H30'	86.8	3.92	104.4	110	0.46	27.88	€ 780.33
P010102_D_H31'	J166	H31'	247.8	5.23	104.4	110	0.61	28.00	€ 2,227.72

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P010103_A'	J175	J196	537.8	10.2	190	200	0.36	47.15	€ 11,804.71
P010103_A_H67'	J196	H67'	6.9	5.7	117.8	125	0.31	25.51	€ 69.97
P010103_B_H68'	J196	H68'	103.7	6.44	190	200	0.23	25.00	€ 2,276.22
P010104_A'	J176	J181	86.4	11.38	117.8	125	1.04	46.37	€ 876.10
P010104_A_H22'	J181	H22'	5	3.69	104.4	110	0.43	27.95	€ 44.95
P010104_B'	J181	J182	131.6	9.18	104.4	110	1.07	45.01	€ 1,183.08
P010104_B_H23'	J182	H23'	33.6	3.3	104.4	110	0.39	27.16	€ 302.06
P010104_C'	J182	J183	73.7	7.21	104.4	110	0.84	44.52	€ 662.56
P010104_C_H25'	J183	H25'	138.9	3.38	104.4	110	0.39	27.47	€ 1,248.71
P010104_D_H24'	J183	H24'	145.5	5.11	104.4	110	0.60	27.11	€ 1,308.05
P0102_A'	J153	J223	193.4	34.98	213.6	225	0.98	44.62	€ 4,902.69
P0102_A_H33'	J223	H33'	5	5.22	104.4	110	0.61	31.25	€ 44.95
P0102_B'	J223	J225	122	32.1	213.6	225	0.90	44.24	€ 3,092.70
P0102_B_H34'	J225	H34'	5	4.11	104.4	110	0.48	30.41	€ 44.95
P0102_C'	J225	J227	248.6	29.88	213.6	225	0.83	43.55	€ 6,302.01
P0102_C_H35'	J227	H35'	5	3.46	104.4	110	0.40	30.41	€ 44.95
P0102_D'	J227	J243	148.9	12.85	117.8	125	1.18	41.98	€ 1,509.85
P0102_E'	J243	J247	161.7	8.35	104.4	110	0.98	40.58	€ 1,453.68
P0102_E_H38'	J247	H38'	20.2	3.7	104.4	110	0.43	30.33	€ 181.60
P0102_F_H39'	J247	H39'	221.9	6.14	104.4	110	0.72	29.61	€ 1,994.88
P010201_A'	J243	J244	42.4	6.52	104.4	110	0.76	41.74	€ 381.18
P010201_A_H36'	J244	H36'	5	2.76	104.4	110	0.32	30.35	€ 44.95
P010201_B_H37'	J244	H37'	137	4.84	104.4	110	0.56	29.62	€ 1,231.63
P010202_A'	J227	J229	74.9	18.43	190	200	0.65	43.40	€ 1,644.06
P010202_B'	J229	J234	50	13.73	190	200	0.48	43.34	€ 1,097.50
P010202_B_H42'	J234	H42'	5	2.91	104.4	110	0.34	30.20	€ 44.95
P010202_C'	J234	J236	109.2	12.16	190	200	0.43	43.24	€ 2,396.94
P010202_C_H43'	J236	H43'	5	3.86	104.4	110	0.45	29.13	€ 44.95
P010202_D'	J236	J238	237.7	9.91	132.4	140	0.72	41.86	€ 2,911.83
P010202_D_H46'	J238	H46'	530.5	5.3	104.4	110	0.62	27.51	€ 4,769.20
P010202_E'	J238	J239	14.3	6.29	132.4	140	0.46	41.83	€ 175.18
P010202_E_H45'	J239	H45'	5.7	3.8	104.4	110	0.44	27.14	€ 51.24
P010202_F_H44'	J239	H44'	194.6	3.77	104.4	110	0.44	25.25	€ 1,749.45
P01020201_A'	J229	J230	242.2	6.96	117.8	125	0.64	42.56	€ 2,455.91
P01020201_A_H41'	J230	H41'	129.7	3.92	104.4	110	0.46	29.34	€ 1,166.00
P01020201_B_H40'	J230	H40'	209.7	4.37	104.4	110	0.51	31.66	€ 1,885.20
P0103_A'	J153	J200	191.9	47.38	299.2	315	0.67	45.09	€ 9,165.14
P0103_A_H57'	J200	H57'	5	6.1	104.4	110	0.71	32.06	€ 44.95
P0103_B'	J200	J202	186.7	44.23	299.2	315	0.63	44.88	€ 8,916.79
P0103_B_H56'	J202	H56'	5.3	6.52	104.4	110	0.76	32.87	€ 47.65
P0103_C'	J202	J205	176.1	40.75	299.2	315	0.58	44.72	€ 8,410.54
P0103_C_H55'	J205	H55'	5	5.62	104.4	110	0.66	33.37	€ 44.95

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P0103_D'	J205	J207	160.1	37.76	237.4	250	0.85	44.31	€ 5,267.29
P0103_D_H54'	J207	H54'	5.1	5.95	104.4	110	0.70	33.91	€ 45.85
P0103_E'	J207	J209	259	34.75	237.4	250	0.79	43.75	€ 8,521.10
P0103_F'	J209	J210	169.6	19.61	190	200	0.69	43.37	€ 3,722.72
P0103_F_H50'	J210	H50'	75.7	4.68	104.4	110	0.55	33.86	€ 680.54
P0103_G'	J210	J212	64.1	17.26	190	200	0.61	43.25	€ 1,407.00
P0103_G_H49'	J212	H49'	102.8	2.97	104.4	110	0.35	32.61	€ 924.17
P0103_H'	J212	J214	132.7	15.83	190	200	0.56	43.05	€ 2,912.77
P0103_H_H48'	J214	H48'	73.6	6.36	104.4	110	0.74	32.33	€ 661.66
P0103_I_H47'	J214	H47'	303.2	12.26	152	160	0.68	29.78	€ 3,974.95
P010301_A'	J209	J217	101	20.99	132.4	140	1.52	42.27	€ 1,237.25
P010301_A_H51'	J217	H51'	5	5.69	104.4	110	0.66	32.26	€ 44.95
P010301_B'	J217	J219	128.4	17.87	132.4	140	1.30	40.86	€ 1,572.90
P010301_B_H52'	J219	H52'	5	10.18	117.8	125	0.93	30.11	€ 50.70
P010301_C_H53'	J219	H53'	229.9	11.65	132.4	140	0.85	27.60	€ 2,816.28
P02_A'	J250	J109	115.2	22.11	237.4	250	0.50	49.59	€ 3,790.08
P02_A_H1'	J109	H1'	5	12.17	104.4	110	1.42	29.32	€ 44.95
P02_B'	J109	J112	190.1	13.42	213.6	225	0.37	49.46	€ 4,819.04
P02_B_H64'	J112	H64'	5.8	3.98	104.4	110	0.47	27.55	€ 52.14
P02_C'	J112	J118	187.4	11.06	213.6	225	0.31	49.38	€ 4,750.59
P02_C_H61'	J118	H61'	111.4	4.11	104.4	110	0.48	26.97	€ 1,001.49
P02_D'	J118	J119	68.5	8.54	213.6	225	0.24	49.36	€ 1,736.48
P02_D_H62'	J119	H62'	18.3	3.86	132.4	140	0.28	25.04	€ 224.18
P02_F_H63'	J119	H63'	154.9	6.15	132.4	140	0.45	25.15	€ 1,897.53
P04_A'	J250	J124	357.4	36.39	213.6	225	1.02	48.29	€ 9,060.09
P04_B'	J124	J125	407	9.31	132.4	140	0.68	46.93	€ 4,985.75
P04_B_H15'	J125	H15'	5	4.56	104.4	110	0.53	26.22	€ 44.95
P04_C_H16'	J125	H16'	210.1	6.42	104.4	110	0.75	26.32	€ 1,888.80
P0401_A'	J124	J138	94.9	15.51	132.4	140	1.13	47.49	€ 1,162.53
P0401_A_H11'	J138	H11'	7.3	5.42	104.4	110	0.63	28.89	€ 65.63
P0401_B'	J138	J140	134.1	12.2	132.4	140	0.89	46.75	€ 1,642.73
P0401_B_H10'	J140	H10'	111.4	4.39	104.4	110	0.51	29.97	€ 1,001.49
P0401_C'	J140	J141	60.9	9.54	117.8	125	0.87	46.38	€ 617.53
P0401_C_H9'	J141	H9'	5	5.28	104.4	110	0.62	28.99	€ 44.95
P0401_D'	J141	J143	252.6	5.92	104.4	110	0.69	45.20	€ 2,270.87
P0401_D_H7'	J143	H7'	6.5	4.31	104.4	110	0.50	29.58	€ 58.44
P0401_D_H8'	J143	H8'	8.2	2.67	104.4	110	0.31	30.00	€ 73.72
P0403_A'	J124	J133	30.5	8.81	104.4	110	1.03	48.00	€ 274.20
P0403_A_H12'	J133	H12'	5	2.92	104.4	110	0.34	28.83	€ 44.95
P0403_B'	J133	J135	178.8	7.18	104.4	110	0.84	46.82	€ 1,607.41
P0403_B_H13'	J135	H13'	5	3.75	104.4	110	0.44	28.31	€ 44.95
P0403_C_H14'	J135	H14'	159.3	4.79	104.4	110	0.56	29.43	€ 1,432.11
P0404_A'	J124	J128	16.3	12.03	190	200	0.42	48.28	€ 357.79
P0404_A_H58'	J130	H58'	76.2	5.24	117.8	125	0.48	26.12	€ 772.67
P0404_A_H59'	J128	H59'	146.9	4.99	104.4	110	0.58	26.78	€ 1,320.63
P0404_B'	J128	J130	189.3	8.95	152	160	0.49	47.97	€ 2,481.72
P0404_C_H60'	J130	H60'	69.8	5.46	132.4	140	0.40	25.20	€ 855.05

1.2.1.3 Resultado del diseño por pendiente hidráulica con cabecera conocida Qdis 4 turnos.

En este subcapítulo se pueden observar los resultados obtenidos del diseño realizado por el método de la pendiente hidráulica con cabecera conocida, se realiza de la misma manera en que se muestra en el capítulo 1.2.1.1.2. En la tabla adjunta se identifican las columnas por cada tubería, en el cual se observa el diámetro seleccionado, la velocidad y la presión en el nudo final, en función del caudal de diseño para 4 turnos. La última columna es el coste del tramo de tubería, siendo el producto del precio unitario del diámetro seleccionado y la longitud de la tubería.

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P00'	UGD_43	J250	16	237.36	379.8	400	2.10	30.46	€ 1,334.56
P01_A'	J250	J147	89.5	177.28	379.8	400	1.56	49.30	€ 7,465.20
P01_A_H2'	J147	H2'	22.6	4.74	104.4	110	0.55	30.06	€ 203.17
P01_B'	J147	J148	103.1	172.54	379.8	400	1.52	48.87	€ 8,599.57
P01_B_H3'	J148	H3'	124.5	3.74	104.4	110	0.44	29.88	€ 1,119.26
P01_C'	J148	J149	150.7	168.79	340.8	355	1.85	47.84	€ 8,838.56
P01_C_H4'	J149	H4'	9	4.73	104.4	110	0.55	30.67	€ 80.91
P01_D'	J149	J150	110.3	97.92	299.2	315	1.39	47.33	€ 5,267.93
P01_D_H6'	J150	H6'	138.9	3.62	104.4	110	0.42	30.88	€ 1,248.71
P01_E'	J150	J151	123.3	94.3	299.2	315	1.34	46.79	€ 5,888.81
P01_E_H5'	J151	H5'	5	3.62	104.4	110	0.42	31.19	€ 44.95
P01_F'	J151	J152	246.5	90.68	299.2	315	1.29	45.78	€ 11,772.84
P01_F_H32'	J152	H32'	51.8	3.57	104.4	110	0.42	31.51	€ 465.68
P01_G'	J152	J153	388.5	87.11	299.2	315	1.24	44.31	€ 18,554.76
P0101_A'	J149	J161	233.1	66.14	340.8	355	0.73	47.56	€ 13,671.32
P0101_B'	J161	J172	110.8	48.28	340.8	355	0.53	47.48	€ 6,498.42
P0101_B_H26'	J172	H26'	5	2.89	104.4	110	0.34	25.97	€ 44.95
P0101_C'	J172	J174	58.1	45.39	340.8	355	0.50	47.45	€ 3,407.57
P0101_D'	J174	J175	22.1	32.81	237.4	250	0.74	47.41	€ 727.09
P0101_E'	J175	J176	124.3	24.72	190	200	0.87	46.98	€ 2,728.39
P0101_F'	J176	J177	157	14.17	152	160	0.78	46.40	€ 2,058.27
P0101_F_H18'	J177	H18'	5	4.76	104.4	110	0.56	29.01	€ 44.95
P0101_G'	J177	J178	403.1	9.41	152	160	0.52	45.69	€ 5,284.64
P0101_G_H19'	J178	H19'	5	3.87	104.4	110	0.45	27.41	€ 44.95
P0101_H'	J178	J179	176.5	5.54	104.4	110	0.65	44.96	€ 1,586.74
P0101_H_H20'	J179	H20'	5	3.15	104.4	110	0.37	27.25	€ 44.95
P0101_I_H21'	J179	H21'	127.1	2.4	104.4	110	0.28	28.16	€ 1,142.63
P010101_A'	J174	J191	30.3	12.58	237.4	250	0.28	47.44	€ 996.87
P010101_A_H17'	J191	H17'	5	7.16	117.8	125	0.66	27.52	€ 50.70
P010101_B'	J191	J193	236.9	5.42	152	160	0.30	47.28	€ 3,105.76
P010101_B_H66'	J193	H66'	93.4	2.81	104.4	110	0.33	25.84	€ 839.67
P010101_C_H65'	J193	H65'	228.5	2.61	117.8	125	0.24	25.37	€ 2,316.99
P010102_A'	J161	J162	150	17.86	152	160	0.98	46.72	€ 1,966.50
P010102_A_H27'	J162	H27'	5	4.92	104.4	110	0.57	29.37	€ 44.95
P010102_B'	J162	J163	155.9	12.94	117.8	125	1.19	45.05	€ 1,580.83
P010102_B_H28'	J163	H28'	77.8	3.8	104.4	110	0.44	28.16	€ 699.42
P010102_C'	J163	J164	123.1	9.14	104.4	110	1.07	43.79	€ 1,106.67
P010102_D'	J164	J166	55.1	6.31	104.4	110	0.74	43.50	€ 495.35
P010102_D_H29'	J164	H29'	156.9	2.83	104.4	110	0.33	28.59	€ 1,410.53
P010102_D_H30'	J166	H30'	86.8	2.79	104.4	110	0.33	28.30	€ 780.33
P010102_D_H31'	J166	H31'	247.8	3.52	104.4	110	0.41	28.80	€ 2,227.72

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P010103_A'	J175	J196	537.8	8.1	190	200	0.29	47.16	€ 11,804.71
P010103_A_H67'	J196	H67'	6.9	4.14	104.4	110	0.30	25.52	€ 62.03
P010103_B_H68'	J196	H68'	103.7	3.96	190	200	0.14	25.03	€ 2,276.22
P010104_A'	J176	J181	86.4	10.55	117.8	125	0.97	46.34	€ 876.10
P010104_A_H22'	J181	H22'	5	2.61	104.4	110	0.30	27.93	€ 44.95
P010104_B'	J181	J182	131.6	7.94	104.4	110	0.93	45.30	€ 1,183.08
P010104_B_H23'	J182	H23'	33.6	2.34	104.4	110	0.27	27.47	€ 302.06
P010104_C'	J182	J183	73.7	5.61	104.4	110	0.66	44.98	€ 662.56
P010104_C_H25'	J183	H25'	138.9	2.44	104.4	110	0.28	28.04	€ 1,248.71
P010104_D_H24'	J183	H24'	145.5	3.17	104.4	110	0.37	27.87	€ 1,308.05
P0102_A'	J153	J223	193.4	39.34	237.4	250	0.89	43.79	€ 6,362.86
P0102_A_H33'	J223	H33'	5	3.62	104.4	110	0.42	30.43	€ 44.95
P0102_B'	J223	J225	122	35.72	237.4	250	0.81	43.51	€ 4,013.80
P0102_B_H34'	J225	H34'	5	2.9	104.4	110	0.34	29.69	€ 44.95
P0102_C'	J225	J227	248.6	32.83	237.4	250	0.74	43.02	€ 8,178.94
P0102_C_H35'	J227	H35'	5	2.36	104.4	110	0.28	29.89	€ 44.95
P0102_D'	J227	J243	148.9	11.62	117.8	125	1.07	41.71	€ 1,509.85
P0102_E'	J243	J247	161.7	6.33	104.4	110	0.74	40.86	€ 1,453.68
P0102_E_H38'	J247	H38'	20.2	2.54	104.4	110	0.30	30.64	€ 181.60
P0102_F_H39'	J247	H39'	221.9	3.79	104.4	110	0.44	30.53	€ 1,994.88
P010201_A'	J243	J244	42.4	5.29	104.4	110	0.62	41.55	€ 381.18
P010201_A_H36'	J244	H36'	5	1.98	104.4	110	0.23	30.16	€ 44.95
P010201_B_H37'	J244	H37'	137	3.31	104.4	110	0.39	29.64	€ 1,231.63
P010202_A'	J227	J229	74.9	18.86	190	200	0.67	42.86	€ 1,644.06
P010202_B'	J229	J234	50	13.26	190	200	0.47	42.81	€ 1,097.50
P010202_B_H42'	J234	H42'	5	1.94	104.4	110	0.23	29.67	€ 44.95
P010202_C'	J234	J236	109.2	11.31	190	200	0.40	42.72	€ 2,396.94
P010202_C_H43'	J236	H43'	5	2.61	104.4	110	0.30	28.61	€ 44.95
P010202_D'	J236	J238	237.7	8.71	152	160	0.63	41.58	€ 3,116.25
P010202_D_H46'	J238	H46'	530.5	3.88	104.4	110	0.45	28.10	€ 4,769.20
P010202_E'	J238	J239	14.3	4.83	132.4	140	0.44	41.55	€ 175.18
P010202_E_H45'	J239	H45'	5.7	2.36	104.4	110	0.28	26.87	€ 51.24
P010202_F_H44'	J239	H44'	194.6	2.46	104.4	110	0.29	25.18	€ 1,749.45
P01020201_A'	J229	J230	242.2	5.6	117.8	125	0.51	42.29	€ 2,455.91
P01020201_A_H41'	J230	H41'	129.7	2.61	104.4	110	0.30	29.40	€ 1,166.00
P01020201_B_H40'	J230	H40'	209.7	3	104.4	110	0.35	31.67	€ 1,885.20
P0103_A'	J153	J200	191.9	47.77	299.2	315	0.68	44.07	€ 9,165.14
P0103_A_H57'	J200	H57'	5	4.2	104.4	110	0.49	31.06	€ 44.95
P0103_B'	J200	J202	186.7	43.57	299.2	315	0.62	43.87	€ 8,916.79
P0103_B_H56'	J202	H56'	5.3	4.63	104.4	110	0.54	31.87	€ 47.65
P0103_C'	J202	J205	176.1	38.94	299.2	315	0.55	43.72	€ 8,410.54
P0103_C_H55'	J205	H55'	5	4.04	104.4	110	0.47	32.38	€ 44.95

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P0103_D'	J205	J207	160.1	34.91	237.4	250	0.79	43.37	€ 5,267.29
P0103_D_H54'	J207	H54'	5.1	3.95	104.4	110	0.46	32.97	€ 45.85
P0103_E'	J207	J209	259	30.96	237.4	250	0.70	42.91	€ 8,521.10
P0103_F'	J209	J210	169.6	14.66	190	200	0.52	42.68	€ 3,722.72
P0103_F_H50'	J210	H50'	75.7	2.95	104.4	110	0.34	33.30	€ 680.54
P0103_G'	J210	J212	64.1	11.71	152	160	0.65	42.52	€ 840.35
P0103_G_H49'	J212	H49'	102.8	1.92	104.4	110	0.22	31.95	€ 924.17
P0103_H'	J212	J214	132.7	9.79	152	160	0.54	42.27	€ 1,739.70
P0103_H_H48'	J214	H48'	73.6	4.34	104.4	110	0.51	31.74	€ 661.66
P0103_I_H47'	J214	H47'	303.2	5.44	117.8	125	0.50	29.18	€ 3,074.45
P010301_A'	J209	J217	101	16.3	132.4	140	1.18	41.98	€ 1,237.25
P010301_A_H51'	J217	H51'	5	3.98	104.4	110	0.46	31.98	€ 44.95
P010301_B'	J217	J219	128.4	12.33	117.8	125	1.13	40.72	€ 1,301.98
P010301_B_H52'	J219	H52'	5	5.85	104.4	110	0.68	29.97	€ 44.95
P010301_C_H53'	J219	H53'	229.9	6.47	117.8	125	0.59	27.90	€ 2,331.19
P02_A'	J250	J109	115.2	19.7	237.4	250	0.45	49.60	€ 3,790.08
P02_A_H1'	J109	H1'	5	7.07	104.4	110	0.83	29.39	€ 44.95
P02_B'	J109	J112	190.1	12.63	213.6	225	0.35	49.49	€ 4,819.04
P02_B_H64'	J112	H64'	5.8	2.86	104.4	110	0.33	27.58	€ 52.14
P02_C'	J112	J118	187.4	9.77	213.6	225	0.27	49.42	€ 4,750.59
P02_C_H61'	J118	H61'	111.4	3.01	104.4	110	0.35	27.13	€ 1,001.49
P02_D'	J118	J119	68.5	6.77	152	160	0.37	49.36	€ 898.04
P02_D_H62'	J119	H62'	18.3	2.77	117.8	125	0.25	25.03	€ 185.56
P02_F_H63'	J119	H63'	154.9	4	117.8	125	0.37	25.19	€ 1,570.69
P04_A'	J250	J124	357.4	40.39	213.6	225	1.13	47.99	€ 9,060.09
P04_B'	J124	J125	407	7.39	132.4	140	0.54	47.09	€ 4,985.75
P04_B_H15'	J125	H15'	5	3.27	104.4	110	0.38	26.39	€ 44.95
P04_C_H16'	J125	H16'	210.1	4.12	104.4	110	0.48	27.11	€ 1,888.80
P0401_A'	J124	J138	94.9	14.97	132.4	140	1.09	47.24	€ 1,162.53
P0401_A_H11'	J138	H11'	7.3	3.68	104.4	110	0.43	28.65	€ 65.63
P0401_B'	J138	J140	134.1	11.29	117.8	125	1.04	46.11	€ 1,359.77
P0401_B_H10'	J140	H10'	111.4	3.02	104.4	110	0.35	29.48	€ 1,001.49
P0401_C'	J140	J141	60.9	8.27	104.4	110	0.97	45.60	€ 547.49
P0401_C_H9'	J141	H9'	5	3.56	104.4	110	0.42	28.22	€ 44.95
P0401_D'	J141	J143	252.6	4.71	104.4	110	0.55	44.81	€ 2,270.87
P0401_D_H7'	J143	H7'	6.5	2.98	104.4	110	0.35	29.20	€ 58.44
P0401_D_H8'	J143	H8'	8.2	1.74	104.4	110	0.20	29.62	€ 73.72
P0403_A'	J124	J133	30.5	7.55	104.4	110	0.88	47.77	€ 274.20
P0403_A_H12'	J133	H12'	5	1.86	104.4	110	0.22	28.61	€ 44.95
P0403_B'	J133	J135	178.8	5.69	104.4	110	0.66	46.99	€ 1,607.41
P0403_B_H13'	J135	H13'	5	2.53	104.4	110	0.29	28.49	€ 44.95
P0403_C_H14'	J135	H14'	159.3	3.17	104.4	110	0.37	29.87	€ 1,432.11
P0404_A'	J124	J128	16.3	10.48	152	160	0.58	47.95	€ 213.69
P0404_A_H58'	J130	H58'	76.2	3.75	104.4	110	0.44	25.73	€ 685.04
P0404_A_H59'	J128	H59'	146.9	3.47	104.4	110	0.40	26.70	€ 1,320.63
P0404_B'	J128	J130	189.3	7.01	132.4	140	0.51	47.57	€ 2,318.93
P0404_C_H60'	J130	H60'	69.8	3.26	132.4	140	0.24	24.86	€ 855.05

1.2.1.3.1 Cálculo de la garantía suministro del diseño con caudal para 4 turnos.

A continuación, se observa el cálculo de la garantía suministro para el diseño de la red de 4 turnos:

								GS_global			Rug	0.01		Hcab	49.88		
								94.07%			Visc	1.10E-06					25.000
																	0.000
Tuberia	**Nudo Ini**	**Nudo Fin**	**Diam (mm)**	**Long (m)**	**z(fin)**	**Qinst**	**∑pi·Qi**	**GS**	**U**	**∑pi·(1-pi)·Qi^2**	**Q diseño**	**ks**	**V (m/s)**	**Re**	**f**	**hf**	**∑hf**	**H(fin)**	**P(fin)**
P00'	UGD_43	J250	379.8	16	19.23	949.44	158.20	94%	1.5608	1551.249	219.677	0.231	1.939	669495.946	0.0129	0.104	0.104	49.776	30.546
P01_A'	J250	J147	379.8	89.5	0	709.1	118.16	94%	1.5608	266.118	143.618	0.203	1.268	437693.645	0.0138	0.266	0.370	49.510	49.510
P01_A_H2'	J147	H2'	104.4	22.6	19.17	18.96	3.16	94%	1.5608	6.644	7.182	0.379	0.839	79632.511	0.0192	0.149	0.520	49.360	30.190
P01_B'	J147	J148	379.8	103.1	0	690.14	115.00	94%	1.5608	203.191	137.245	0.199	1.211	418272.982	0.0139	0.282	0.652	49.228	49.228
P01_B_H3'	J148	H3'	104.4	124.5	18.73	14.97	2.49	94%	1.5608	4.028	5.627	0.376	0.657	62388.469	0.0202	0.531	1.183	48.697	29.967
P01_C'	J148	J149	340.8	150.7	0	675.17	112.50	94%	1.5608	199.163	134.529	0.199	1.475	456913.884	0.0137	0.673	1.326	48.554	48.554
P01_C_H4'	J149	H4'	104.4	9	17.15	18.93	3.15	94%	1.5608	4.329	6.402	0.338	0.748	70976.487	0.0197	0.048	1.374	48.506	31.356
P01_D'	J149	J150	299.2	110.3	0	391.69	65.27	94%	1.5608	132.474	83.231	0.212	1.184	321989.305	0.0146	0.384	1.710	48.170	48.170
P01_D_H6'	J150	H6'	104.4	138.9	16.18	14.48	2.41	94%	1.5608	3.166	5.190	0.358	0.606	57543.725	0.0205	0.512	2.222	47.658	31.478
P01_E'	J150	J151	299.2	123.3	0	377.21	62.85	94%	1.5608	129.308	80.602	0.214	1.146	311819.617	0.0147	0.405	2.114	47.766	47.766
P01_E_H5'	J151	H5'	104.4	5	15.59	14.48	2.41	94%	1.5608	2.443	4.852	0.335	0.567	53799.442	0.0208	0.016	2.131	47.749	32.159
P01_F'	J151	J152	299.2	246.5	0	362.73	60.44	94%	1.5608	126.865	78.021	0.215	1.110	301833.766	0.0147	0.762	2.877	47.003	47.003
P01_F_H32'	J152	H32'	104.4	51.8	14.17	14.29	2.38	94%	1.5608	2.555	4.876	0.341	0.570	54062.145	0.0208	0.171	3.047	46.833	32.663
P01_G'	J152	J153	299.2	388.5	0	348.44	58.06	94%	1.5608	124.309	75.462	0.217	1.073	291933.732	0.0148	1.130	4.007	45.873	45.873
P0101_A'	J149	J161	340.8	233.1	0	264.55	44.08	94%	1.5608	62.360	56.407	0.213	0.618	191579.968	0.0159	0.212	1.538	48.342	48.342
P0101_B'	J161	J172	340.8	110.8	0	193.11	32.18	94%	1.5608	47.900	42.980	0.223	0.471	145976.574	0.0168	0.062	1.600	48.280	48.280
P0101_B_H26'	J172	H26'	104.4	5	18.39	11.56	1.93	94%	1.5608	2.055	4.164	0.360	0.486	46161.211	0.0215	0.012	1.612	48.268	29.878
P0101_C'	J172	J174	340.8	58.1	0	181.55	30.25	94%	1.5608	45.845	40.819	0.225	0.447	138638.869	0.0169	0.029	1.629	48.251	48.251
P0101_D'	J174	J175	237.4	22.1	0	131.25	21.87	94%	1.5608	31.929	30.689	0.234	0.693	149632.217	0.0168	0.038	1.667	48.213	48.213
P0101_E'	J175	J176	190	124.3	0	98.86	16.47	94%	1.5608	23.400	24.023	0.243	0.847	146349.380	0.0169	0.405	2.072	47.808	47.808
P0101_F'	J176	J177	152	157	0	56.66	9.44	94%	1.5608	16.399	15.762	0.278	0.869	120027.520	0.0176	0.701	2.773	47.107	47.107
P0101_F_H18'	J177	H18'	104.4	5	17.38	19.03	3.17	94%	1.5608	8.852	7.815	0.411	0.913	86642.152	0.0189	0.039	2.811	47.069	29.689
P0101_G'	J177	J178	152	403.1	0	37.63	6.27	94%	1.5608	7.547	10.558	0.281	0.582	80401.305	0.0191	0.872	3.645	46.235	46.235
P0101_G_H19'	J178	H19'	104.4	5	18.27	15.46	2.58	94%	1.5608	3.399	5.454	0.353	0.637	60466.124	0.0203	0.020	3.665	46.215	27.945
P0101_H'	J178	J179	104.4	176.5	0	22.17	3.69	94%	1.5608	4.148	6.873	0.310	0.803	76202.425	0.0194	1.078	4.723	45.157	45.157
P0101_H_H20'	J179	H20'	104.4	5	17.7	12.58	2.10	94%	1.5608	2.567	4.597	0.365	0.537	50968.019	0.0211	0.015	4.738	45.142	27.442
P0101_I_H21'	J179	H21'	104.4	127.1	16.68	9.59	1.60	94%	1.5608	1.581	3.560	0.371	0.416	39474.709	0.0223	0.239	4.962	44.918	28.238
P010101_A'	J174	J191	237.4	30.3	0	50.3	8.38	94%	1.5608	13.916	14.204	0.282	0.321	69254.324	0.0195	0.013	1.642	48.238	48.238
P010101_A_H17'	J191	H17'	117.8	5	19.9	28.63	4.77	94%	1.5608	10.451	9.816	0.343	0.901	96454.619	0.0185	0.032	1.675	48.205	28.305
P010101_B'	J191	J193	152	236.9	0	21.67	3.61	94%	1.5608	3.465	6.516	0.301	0.359	49622.997	0.0211	0.216	1.858	48.022	48.022
P010101_B_H66'	J193	H66'	104.4	93.4	20.96	11.24	1.87	94%	1.5608	1.713	3.916	0.348	0.457	43413.017	0.0218	0.208	2.066	47.814	26.854
P010101_C_H65'	J193	H65'	117.8	228.5	21.77	10.43	1.74	94%	1.5608	1.753	3.804	0.365	0.349	37380.153	0.0225	0.271	2.129	47.751	25.981
P010102_A'	J161	J162	152	150	0	71.44	11.90	94%	1.5608	14.460	17.839	0.250	0.983	135845.934	0.0172	0.838	2.376	47.504	47.504
P010102_A_H27'	J162	H27'	104.4	5	17.33	19.68	3.28	94%	1.5608	5.016	6.775	0.344	0.791	75115.091	0.0195	0.030	2.406	47.474	30.144
P010102_B'	J162	J163	117.8	155.9	0	51.76	8.62	94%	1.5608	9.444	13.421	0.259	1.231	131874.628	0.0175	1.786	4.162	45.718	45.718
P010102_B_H28'	J163	H28'	104.4	77.8	16.73	15.21	2.53	94%	1.5608	3.155	5.307	0.349	0.620	58835.218	0.0204	0.298	4.460	45.420	28.690
P010102_C'	J163	J164	104.4	123.1	0	36.55	6.09	94%	1.5608	6.289	10.004	0.274	1.169	110919.893	0.0181	1.484	5.646	44.234	44.234
P010102_D'	J164	J166	104.4	55.1	0	25.22	4.20	94%	1.5608	4.643	7.566	0.300	0.884	83879.614	0.0191	0.400	6.046	43.834	43.834
P010102_D_H29'	J164	H29'	104.4	156.9	15	11.33	1.89	94%	1.5608	1.646	3.890	0.343	0.454	43132.759	0.0218	0.345	5.991	43.889	28.889
P010102_D_H30'	J166	H30'	104.4	86.8	15.1	11.16	1.86	94%	1.5608	1.565	3.812	0.342	0.445	42265.051	0.0219	0.184	6.231	43.649	28.549
P010102_D_H31'	J166	H31'	104.4	247.8	14.25	14.06	2.34	94%	1.5608	3.078	5.081	0.361	0.594	56334.982	0.0206	0.879	6.926	42.954	28.704

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	Long (m)	z(fin)	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P010103_A'	J175	J196	190	537.8	0	32.39	5.40	94%	1.5608	8.529	9.955	0.307	0.351	60649.038	0.0201	0.358	2.025	47.855	47.855
P010103_A_H67'	J196	H67'	104.4	6.9	21.63	16.54	2.76	94%	1.5608	3.205	5.550	0.336	0.648	61535.367	0.0203	0.029	2.054	47.826	26.196
P010103_B_H68'	J196	H68'	190	103.7	22.11	15.85	2.64	94%	1.5608	5.324	6.243	0.394	0.220	38030.348	0.0223	0.030	2.055	47.825	25.715
P010104_A'	J176	J181	117.8	86.4	0	42.2	7.03	94%	1.5608	7.000	11.161	0.264	1.024	109669.727	0.0181	0.708	2.780	47.100	47.100
P010104_A_H22'	J181	H22'	104.4	5	18.41	10.43	1.74	94%	1.5608	1.413	3.593	0.344	0.420	39836.947	0.0222	0.010	2.790	47.090	28.680
P010104_B'	J181	J182	104.4	131.6	0	31.77	5.29	94%	1.5608	5.587	8.983	0.283	1.049	99597.453	0.0184	1.305	4.085	45.795	45.795
P010104_B_H23'	J182	H23'	104.4	33.6	17.8	9.34	1.56	94%	1.5608	1.124	3.211	0.344	0.375	35603.627	0.0228	0.053	4.137	45.743	27.943
P010104_C'	J182	J183	104.4	73.7	0	22.43	3.74	94%	1.5608	4.463	7.035	0.314	0.822	77996.354	0.0193	0.470	4.554	45.326	45.326
P010104_C_H25'	J183	H25'	104.4	138.9	16.81	9.75	1.62	94%	1.5608	1.138	3.290	0.337	0.384	36476.421	0.0226	0.227	4.781	45.099	28.289
P010104_D_H24'	J183	H24'	104.4	145.5	16.89	12.68	2.11	94%	1.5608	3.325	4.959	0.391	0.579	54978.747	0.0207	0.494	5.049	44.831	27.941
P0102_A'	J153	J223	237.4	193.4	0	157.37	26.22	94%	1.5608	28.319	34.528	0.219	0.780	168349.167	0.0164	0.415	4.422	45.458	45.458
P0102_A_H33'	J223	H33'	104.4	5	13.35	14.48	2.41	94%	1.5608	2.912	5.076	0.351	0.593	56279.465	0.0206	0.018	4.439	45.441	32.091
P0102_B'	J223	J225	237.4	122	0	142.89	23.81	94%	1.5608	25.407	31.677	0.222	0.716	154446.800	0.0167	0.224	4.645	45.235	45.235
P0102_B_H34'	J225	H34'	104.4	5	13.81	11.58	1.93	94%	1.5608	1.765	4.003	0.346	0.468	44380.721	0.0217	0.012	4.657	45.223	31.413
P0102_C'	J225	J227	237.4	248.6	0	131.31	21.88	94%	1.5608	23.643	29.469	0.224	0.666	143682.854	0.0169	0.400	5.045	44.835	44.835
P0102_C_H35'	J227	H35'	104.4	5	13.13	9.43	1.57	94%	1.5608	1.315	3.361	0.356	0.393	37266.870	0.0225	0.008	5.053	44.827	31.697
P0102_D'	J227	J243	117.8	148.9	0	46.46	7.74	94%	1.5608	9.632	12.586	0.271	1.155	123665.295	0.0177	1.517	6.562	43.318	43.318
P0102_E'	J243	J247	104.4	161.7	0	25.3	4.22	94%	1.5608	6.308	8.136	0.322	0.950	90202.610	0.0188	1.340	7.902	41.978	41.978
P0102_E_H38'	J247	H38'	104.4	20.2	10.2	10.16	1.69	94%	1.5608	1.483	3.594	0.354	0.420	39842.052	0.0222	0.039	7.941	41.939	31.739
P0102_F_H39'	J247	H39'	104.4	221.9	9.86	15.14	2.52	94%	1.5608	4.825	5.951	0.393	0.695	65982.903	0.0200	1.046	8.948	40.932	31.072
P010201_A'	J243	J244	104.4	42.4	0	21.16	3.53	94%	1.5608	3.324	6.372	0.301	0.744	70641.656	0.0197	0.226	6.788	43.092	43.092
P010201_A_H36'	J244	H36'	104.4	5	11.39	7.93	1.32	94%	1.5608	0.764	2.686	0.339	0.314	29779.185	0.0237	0.006	6.794	43.086	31.696
P010201_B_H37'	J244	H37'	104.4	137	11.68	13.23	2.20	94%	1.5608	2.560	4.702	0.355	0.549	52127.632	0.0210	0.423	7.211	42.669	30.989
P010202_A'	J227	J229	190	74.9	0	75.42	12.57	94%	1.5608	12.695	18.128	0.240	0.639	110438.900	0.0178	0.146	5.191	44.689	44.689
P010202_B'	J229	J234	190	50	0	53.02	8.83	94%	1.5608	8.857	13.480	0.254	0.475	82118.542	0.0189	0.057	5.249	44.631	44.631
P010202_B_H42'	J234	H42'	104.4	5	13.14	7.77	1.29	94%	1.5608	0.968	2.830	0.364	0.331	31377.907	0.0234	0.006	5.255	44.625	31.485
P010202_C'	J234	J236	190	109.2	0	45.25	7.54	94%	1.5608	7.889	11.924	0.264	0.421	72640.457	0.0194	0.100	5.349	44.531	44.531
P010202_C_H43'	J236	H43'	104.4	5	14.1	10.42	1.74	94%	1.5608	1.667	3.751	0.360	0.438	41590.836	0.0220	0.010	5.359	44.521	30.421
P010202_D'	J236	J238	152	237.7	0	34.83	5.80	94%	1.5608	6.222	9.697	0.278	0.534	73843.305	0.0194	0.441	5.790	44.090	44.090
P010202_D_H46'	J238	H46'	104.4	530.5	12.32	15.53	2.59	94%	1.5608	2.722	5.163	0.332	0.603	57241.543	0.0206	1.937	7.727	42.153	29.833
P010202_E'	J238	J239	132.4	14.3	0	19.3	3.22	94%	1.5608	3.500	6.136	0.318	0.446	53642.848	0.0208	0.023	5.813	44.067	44.067
P010202_E_H45'	J239	H45'	104.4	5.7	14.68	9.45	1.57	94%	1.5608	1.828	3.685	0.390	0.430	40856.659	0.0221	0.011	5.824	44.056	29.376
P010202_F_H44'	J239	H44'	104.4	194.6	16.18	9.85	1.64	94%	1.5608	1.672	3.659	0.372	0.427	40571.760	0.0221	0.384	6.197	43.683	27.503
P01020201_A'	J229	J230	117.8	242.2	0	22.4	3.73	94%	1.5608	3.839	6.791	0.303	0.623	66723.009	0.0199	0.809	6.000	43.880	43.880
P01020201_A_H41'	J230	H41'	104.4	129.7	11.55	10.42	1.74	94%	1.5608	1.755	3.804	0.365	0.444	42172.311	0.0219	0.274	6.274	43.606	32.056
P01020201_B_H40'	J230	H40'	104.4	209.7	10.33	11.98	2.00	94%	1.5608	2.084	4.249	0.355	0.496	47114.394	0.0214	0.540	6.540	43.340	33.010
P0103_A'	J153	J200	299.2	191.9	0	191.07	31.84	94%	1.5608	89.270	46.585	0.244	0.663	180218.256	0.0161	0.232	4.239	45.641	45.641
P0103_A_H57'	J200	H57'	104.4	5	13	16.79	2.80	94%	1.5608	4.035	5.933	0.353	0.693	65780.089	0.0200	0.023	4.262	45.618	32.618
P0103_B'	J200	J202	299.2	186.7	0	174.28	29.04	94%	1.5608	85.235	43.450	0.249	0.618	168090.768	0.0163	0.199	4.437	45.443	45.443
P0103_B_H56'	J202	H56'	104.4	5.3	11.98	18.52	3.09	94%	1.5608	4.354	6.343	0.342	0.741	70321.768	0.0197	0.028	4.465	45.415	33.435
P0103_C'	J202	J205	299.2	176.1	0	155.76	25.95	94%	1.5608	80.881	39.991	0.257	0.569	154710.028	0.0166	0.161	4.598	45.282	45.282
P0103_C_H55'	J205	H55'	104.4	5	11.32	16.14	2.69	94%	1.5608	3.171	5.469	0.339	0.639	60631.092	0.0203	0.020	4.618	45.262	33.942

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	Long (m)	z(fin)	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P0103_D'	J205	J207	237.4	160.1	0	139.62	23.26	94%	1.5608	77.711	37.024	0.265	0.836	180516.700	0.0162	0.390	4.988	44.892	44.892
P0103_D_H54'	J207	H54'	104.4	5.1	10.38	15.79	2.63	94%	1.5608	4.077	5.783	0.366	0.676	64113.351	0.0201	0.023	5.011	44.869	34.489
P0103_E'	J207	J209	237.4	259	0	123.83	20.63	94%	1.5608	73.633	34.027	0.275	0.769	165904.858	0.0165	0.541	5.528	44.352	44.352
P0103_F'	J209	J210	190	169.6	0	58.63	9.77	94%	1.5608	35.770	19.104	0.326	0.674	116384.946	0.0177	0.365	5.893	43.987	43.987
P0103_F_H50'	J210	H50'	104.4	75.7	9.28	11.81	1.97	94%	1.5608	2.709	4.537	0.384	0.530	50298.860	0.0211	0.219	6.112	43.768	34.488
P0103_G'	J210	J212	152	64.1	0	46.82	7.80	94%	1.5608	33.061	16.776	0.358	0.925	127751.152	0.0174	0.320	6.213	43.667	43.667
P0103_G_H49'	J212	H49'	104.4	102.8	10.5	7.68	1.28	94%	1.5608	1.057	2.885	0.376	0.337	31983.421	0.0233	0.133	6.346	43.534	33.034
P0103_H'	J212	J214	152	132.7	0	39.14	6.52	94%	1.5608	32.004	15.352	0.392	0.846	116904.295	0.0177	0.564	6.778	43.102	43.102
P0103_H_H48'	J214	H48'	104.4	73.6	10.33	17.37	2.89	94%	1.5608	4.439	6.183	0.356	0.722	68550.923	0.0198	0.372	7.149	42.731	32.401
P0103_I_H47'	J214	H47'	117.8	303.2	12.41	21.77	3.63	94%	1.5608	27.565	11.822	0.543	1.085	116162.855	0.0179	2.757	9.535	40.345	27.935
P010301_A'	J209	J217	132.4	101	0	65.2	10.86	94%	1.5608	37.863	20.468	0.314	1.487	178941.797	0.0165	1.418	6.946	42.934	42.934
P010301_A_H51'	J217	H51'	104.4	5	9.98	15.9	2.65	94%	1.5608	3.411	5.532	0.348	0.646	61335.383	0.0203	0.021	6.967	42.913	32.933
P010301_B'	J217	J219	117.8	128.4	0	49.3	8.21	94%	1.5608	34.452	17.376	0.352	1.594	170735.674	0.0167	2.358	9.304	40.576	40.576
P010301_B_H52'	J219	H52'	104.4	5	10.72	23.41	3.90	94%	1.5608	14.587	9.862	0.421	1.152	109339.917	0.0181	0.059	9.363	40.517	29.797
P010301_C_H53'	J219	H53'	117.8	229.9	12.11	25.89	4.31	94%	1.5608	19.865	11.271	0.435	1.034	110743.935	0.0180	1.917	11.221	38.659	26.549
P02_A'	J250	J109	237.4	115.2	0	78.8	13.13	94%	1.5608	29.792	21.650	0.275	0.489	105556.590	0.0179	0.106	0.210	49.670	49.670
P02_A_H1'	J109	H1'	104.4	5	20.18	28.28	4.71	94%	1.5608	20.540	11.786	0.417	1.377	130672.980	0.0176	0.081	0.292	49.588	29.408
P02_B'	J109	J112	213.6	190.1	0	50.52	8.42	94%	1.5608	9.252	13.166	0.261	0.367	71343.604	0.0194	0.119	0.329	49.551	49.551
P02_B_H64'	J112	H64'	104.4	5.8	21.9	11.44	1.91	94%	1.5608	1.595	3.878	0.339	0.453	42991.886	0.0218	0.013	0.342	49.538	27.638
P02_C'	J112	J118	213.6	187.4	0	39.08	6.51	94%	1.5608	7.656	10.831	0.277	0.302	58690.856	0.0202	0.083	0.412	49.468	49.468
P02_C_H61'	J118	H61'	104.4	111.4	22.14	12.02	2.00	94%	1.5608	1.647	4.006	0.333	0.468	44413.375	0.0217	0.258	0.670	49.210	27.070
P02_D'	J118	J119	152	68.5	0	27.06	4.51	94%	1.5608	6.010	8.335	0.308	0.459	63473.184	0.0200	0.097	0.509	49.371	49.371
P02_D_H62'	J119	H62'	117.8	18.3	24.31	11.07	1.84	94%	1.5608	1.507	3.760	0.340	0.345	36949.421	0.0225	0.021	0.530	49.350	25.040
P02_F_H63'	J119	H63'	117.8	154.9	23.96	15.99	2.66	94%	1.5608	4.503	5.976	0.374	0.548	58723.965	0.0204	0.411	0.920	48.960	25.000
P04_A'	J250	J124	213.6	357.4	0	161.54	26.92	94%	1.5608	33.135	35.902	0.222	1.002	194549.373	0.0160	1.372	1.476	48.404	48.404
P04_B'	J124	J125	132.4	407	0	29.54	4.92	94%	1.5608	7.103	9.082	0.307	0.660	79398.197	0.0192	1.306	2.782	47.098	47.098
P04_B_H15'	J125	H15'	104.4	5	20.69	13.08	2.18	94%	1.5608	2.096	4.439	0.339	0.519	49219.198	0.0212	0.014	2.796	47.084	26.394
P04_C_H16'	J125	H16'	104.4	210.1	19.47	16.46	2.74	94%	1.5608	5.007	6.235	0.379	0.728	69129.377	0.0198	1.077	3.859	46.021	26.551
P0401_A'	J124	J138	132.4	94.9	0	59.89	9.98	94%	1.5608	11.316	15.230	0.254	1.106	133144.666	0.0174	0.776	2.253	47.627	47.627
P0401_A_H11'	J138	H11'	104.4	7.3	18.57	14.73	2.45	94%	1.5608	3.246	5.267	0.358	0.615	58391.949	0.0205	0.028	2.280	47.600	29.030
P0401_B'	J138	J140	117.8	134.1	0	45.16	7.52	94%	1.5608	8.070	11.959	0.265	1.097	117505.168	0.0178	1.245	3.498	46.382	46.382
P0401_B_H10'	J140	H10'	104.4	111.4	16.48	12.08	2.01	94%	1.5608	2.086	4.267	0.353	0.498	47312.118	0.0214	0.289	3.787	46.093	29.613
P0401_C'	J140	J141	104.4	60.9	0	33.08	5.51	94%	1.5608	5.983	9.330	0.282	1.090	103441.453	0.0183	0.647	4.145	45.735	45.735
P0401_C_H9'	J141	H9'	104.4	5	17.37	14.23	2.37	94%	1.5608	3.128	5.132	0.361	0.599	56893.891	0.0206	0.018	4.163	45.717	28.347
P0401_D'	J141	J143	104.4	252.6	0	18.85	3.14	94%	1.5608	2.855	5.778	0.307	0.675	64065.268	0.0201	1.129	5.274	44.606	44.606
P0401_D_H7'	J143	H7'	104.4	6.5	15.6	11.91	1.98	94%	1.5608	2.004	4.194	0.352	0.490	46501.331	0.0215	0.016	5.290	44.590	28.990
P0401_D_H8'	J143	H8'	104.4	8.2	15.19	6.94	1.16	94%	1.5608	0.851	2.596	0.374	0.303	28786.114	0.0239	0.009	5.283	44.597	29.407
P0403_A'	J124	J133	104.4	30.5	0	30.21	5.03	94%	1.5608	5.279	8.620	0.285	1.007	95571.359	0.0186	0.281	1.757	48.123	48.123
P0403_A_H12'	J133	H12'	104.4	5	19.16	7.44	1.24	94%	1.5608	1.039	2.830	0.380	0.331	31381.572	0.0234	0.006	1.763	48.117	28.957
P0403_B'	J133	J135	104.4	178.8	0	22.77	3.79	94%	1.5608	4.241	7.008	0.308	0.819	77700.970	0.0193	1.131	2.888	46.992	46.992
P0403_B_H13'	J135	H13'	104.4	5	18.5	10.1	1.68	94%	1.5608	1.582	3.646	0.361	0.426	40424.821	0.0221	0.010	2.898	46.982	28.482
P0403_C_H14'	J135	H14'	104.4	159.3	16.88	12.67	2.11	94%	1.5608	2.659	4.656	0.367	0.544	51622.371	0.0210	0.483	3.372	46.508	29.628
P0404_A'	J124	J128	152	16.3	0	41.9	6.98	94%	1.5608	9.437	11.776	0.281	0.649	89678.283	0.0186	0.043	1.519	48.361	48.361
P0404_A_H58'	J130	H58'	104.4	76.2	21.69	15	2.50	94%	1.5608	2.776	5.100	0.340	0.596	56541.689	0.0206	0.272	2.358	47.522	25.832
P0404_A_H59'	J128	H59'	104.4	146.9	20.99	13.86	2.31	94%	1.5608	2.663	4.857	0.350	0.567	53847.094	0.0208	0.481	2.000	47.880	26.890
P0404_B'	J128	J130	132.4	189.3	0	28.04	4.67	94%	1.5608	6.773	8.734	0.311	0.634	76358.936	0.0193	0.566	2.085	47.795	47.795
P0404_C_H60'	J130	H60'	132.4	69.8	22.68	13.04	2.17	94%	1.5608	3.998	5.294	0.406	0.384	46277.999	0.0214	0.085	2.171	47.709	25.029

1.2.1.4 Resultado del diseño por pendiente hidráulica con cabecera conocida Qdis 6 turnos.

En este subcapítulo se pueden observar los resultados obtenidos del diseño realizado por el método de la pendiente hidráulica con cabecera conocida, se realiza de la misma manera en que se muestra en el capítulo 1.2.1.1.2. En la tabla adjunta se identifican las columnas por cada tubería, en el cual se observa el diámetro seleccionado, la velocidad y la presión en el nudo final, en función del caudal de diseño para 6 turnos. La última columna es el coste del tramo de tubería, siendo el producto del precio unitario del diámetro seleccionado y la longitud de la tubería.

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P00'	UGD_43	J250	16	158.24	340.8	355	1.73	30.52	€ 938.40
P01_A'	J250	J147	89.5	118.18	340.8	355	1.30	49.44	€ 5,249.18
P01_A_H2'	J147	H2'	22.6	3.16	104.4	110	0.37	30.23	€ 203.17
P01_B'	J147	J148	103.1	115.02	340.8	355	1.26	49.09	€ 6,046.82
P01_B_H3'	J148	H3'	124.5	2.5	104.4	110	0.29	30.24	€ 1,119.26
P01_C'	J148	J149	150.7	112.53	340.8	355	1.23	48.61	€ 8,838.56
P01_C_H4'	J149	H4'	9	3.16	104.4	110	0.37	31.44	€ 80.91
P01_D'	J149	J150	110.3	65.28	237.4	250	1.47	47.85	€ 3,628.87
P01_D_H6'	J150	H6'	138.9	2.41	104.4	110	0.28	31.54	€ 1,248.71
P01_E'	J150	J151	123.3	62.87	237.4	250	1.42	47.06	€ 4,056.57
P01_E_H5'	J151	H5'	5	2.41	104.4	110	0.28	31.46	€ 44.95
P01_F'	J151	J152	246.5	60.46	237.4	250	1.37	45.59	€ 8,109.85
P01_F_H32'	J152	H32'	51.8	2.38	104.4	110	0.28	31.37	€ 465.68
P01_G'	J152	J153	388.5	58.07	237.4	250	1.31	43.43	€ 12,781.65
P0101_A'	J149	J161	233.1	44.09	237.4	250	1.00	47.83	€ 7,668.99
P0101_B'	J161	J172	110.8	32.19	213.6	225	0.90	47.48	€ 2,808.78
P0101_B_H26'	J172	H26'	5	1.93	104.4	110	0.23	26.09	€ 44.95
P0101_C'	J172	J174	58.1	30.26	213.6	225	0.84	47.31	€ 1,472.84
P0101_D'	J174	J175	22.1	21.88	190	200	0.77	47.25	€ 485.10
P0101_E'	J175	J176	124.3	16.48	190	200	0.58	47.05	€ 2,728.39
P0101_F'	J176	J177	157	9.44	132.4	140	0.69	46.51	€ 1,923.25
P0101_F_H18'	J177	H18'	5	3.17	104.4	110	0.37	29.12	€ 44.95
P0101_G'	J177	J178	403.1	6.27	132.4	140	0.46	45.84	€ 4,937.98
P0101_G_H19'	J178	H19'	5	2.58	104.4	110	0.30	27.57	€ 44.95
P0101_H'	J178	J179	176.5	3.7	104.4	110	0.43	45.49	€ 1,586.74
P0101_H_H20'	J179	H20'	5	2.1	104.4	110	0.24	27.78	€ 44.95
P0101_I_H21'	J179	H21'	127.1	1.6	104.4	110	0.19	28.75	€ 1,142.63
P010101_A'	J174	J191	30.3	8.38	152	160	0.46	47.27	€ 397.23
P010101_A_H17'	J191	H17'	5	4.77	104.4	110	0.56	27.35	€ 44.95
P010101_B'	J191	J193	236.9	3.61	152	160	0.20	47.19	€ 3,105.76
P010101_B_H66'	J193	H66'	93.4	1.87	104.4	110	0.22	26.00	€ 839.67
P010101_C_H65'	J193	H65'	228.5	1.74	117.8	125	0.20	25.30	€ 2,316.99
P010102_A'	J161	J162	150	11.91	132.4	140	0.86	47.04	€ 1,837.50
P010102_A_H27'	J162	H27'	5	3.28	104.4	110	0.38	29.70	€ 44.95
P010102_B'	J162	J163	155.9	8.63	104.4	110	1.01	45.60	€ 1,401.54
P010102_B_H28'	J163	H28'	77.8	2.54	104.4	110	0.30	28.79	€ 699.42
P010102_C'	J163	J164	123.1	6.09	104.4	110	0.71	45.00	€ 1,106.67
P010102_D'	J164	J166	55.1	4.2	104.4	110	0.49	44.86	€ 495.35
P010102_D_H29'	J164	H29'	156.9	1.89	104.4	110	0.22	29.90	€ 1,410.53
P010102_D_H30'	J166	H30'	86.8	1.86	104.4	110	0.22	29.71	€ 780.33
P010102_D_H31'	J166	H31'	247.8	2.34	104.4	110	0.27	30.39	€ 2,227.72

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P010103_A'	J175	J196	537.8	5.4	190	200	0.19	47.13	€ 11,804.71
P010103_A_H67'	J196	H67'	6.9	2.76	104.4	110	0.25	25.50	€ 62.03
P010103_B_H68'	J196	H68'	103.7	2.64	152	160	0.15	25.00	€ 1,359.51
P010104_A'	J176	J181	86.4	7.03	104.4	110	0.82	46.50	€ 776.74
P010104_A_H22'	J181	H22'	5	1.74	104.4	110	0.20	28.09	€ 44.95
P010104_B'	J181	J182	131.6	5.3	104.4	110	0.62	46.00	€ 1,183.08
P010104_B_H23'	J182	H23'	33.6	1.56	104.4	110	0.18	28.18	€ 302.06
P010104_C'	J182	J183	73.7	3.74	104.4	110	0.44	45.84	€ 662.56
P010104_C_H25'	J183	H25'	138.9	1.63	104.4	110	0.19	28.97	€ 1,248.71
P010104_D_H24'	J183	H24'	145.5	2.11	104.4	110	0.25	28.85	€ 1,308.05
P0102_A'	J153	J223	193.4	26.23	213.6	225	0.73	43.02	€ 4,902.69
P0102_A_H33'	J223	H33'	5	2.41	104.4	110	0.28	29.66	€ 44.95
P0102_B'	J223	J225	122	23.82	213.6	225	0.66	42.79	€ 3,092.70
P0102_B_H34'	J225	H34'	5	1.93	104.4	110	0.23	28.98	€ 44.95
P0102_C'	J225	J227	248.6	21.89	190	200	0.61	42.40	€ 5,456.77
P0102_C_H35'	J227	H35'	5	1.57	104.4	110	0.18	29.27	€ 44.95
P0102_D'	J227	J243	148.9	7.74	104.4	110	0.90	41.28	€ 1,338.61
P0102_E'	J243	J247	161.7	4.22	104.4	110	0.49	40.87	€ 1,453.68
P0102_E_H38'	J247	H38'	20.2	1.69	104.4	110	0.20	30.66	€ 181.60
P0102_F_H39'	J247	H39'	221.9	2.52	104.4	110	0.29	30.78	€ 1,994.88
P010201_A'	J243	J244	42.4	3.53	104.4	110	0.41	41.20	€ 381.18
P010201_A_H36'	J244	H36'	5	1.32	104.4	110	0.15	29.81	€ 44.95
P010201_B_H37'	J244	H37'	137	2.21	104.4	110	0.26	29.41	€ 1,231.63
P010202_A'	J227	J229	74.9	12.57	152	160	0.69	42.18	€ 981.94
P010202_B'	J229	J234	50	8.84	152	160	0.49	42.10	€ 655.50
P010202_B_H42'	J234	H42'	5	1.3	104.4	110	0.15	28.96	€ 44.95
P010202_C'	J234	J236	109.2	7.54	152	160	0.42	41.98	€ 1,431.61
P010202_C_H43'	J236	H43'	5	1.74	104.4	110	0.20	27.87	€ 44.95
P010202_D'	J236	J238	237.7	5.81	132.4	140	0.42	41.32	€ 2,911.83
P010202_D_H46'	J238	H46'	530.5	2.59	104.4	110	0.30	28.44	€ 4,769.20
P010202_E'	J238	J239	14.3	3.22	117.8	125	0.30	41.31	€ 145.00
P010202_E_H45'	J239	H45'	5.7	1.58	104.4	110	0.18	26.63	€ 51.24
P010202_F_H44'	J239	H44'	194.6	1.64	104.4	110	0.19	25.04	€ 1,749.45
P01020201_A'	J229	J230	242.2	3.73	104.4	110	0.44	41.69	€ 2,177.38
P01020201_A_H41'	J230	H41'	129.7	1.74	104.4	110	0.20	29.53	€ 1,166.00
P01020201_B_H40'	J230	H40'	209.7	2	104.4	110	0.23	31.22	€ 1,885.20
P0103_A'	J153	J200	191.9	31.85	237.4	250	0.72	43.08	€ 6,313.51
P0103_A_H57'	J200	H57'	5	2.8	104.4	110	0.33	30.07	€ 44.95
P0103_B'	J200	J202	186.7	29.05	237.4	250	0.66	42.79	€ 6,142.43
P0103_B_H56'	J202	H56'	5.3	3.09	104.4	110	0.36	30.80	€ 47.65
P0103_C'	J202	J205	176.1	25.96	213.6	225	0.72	42.41	€ 4,464.14
P0103_C_H55'	J205	H55'	5	2.69	104.4	110	0.31	31.09	€ 44.95

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P0103_D'	J205	J207	160.1	23.27	213.6	225	0.65	42.13	€ 4,058.54
P0103_D_H54'	J207	H54'	5.1	2.63	104.4	110	0.31	31.75	€ 45.85
P0103_E'	J207	J209	259	20.64	190	200	0.58	41.77	€ 5,685.05
P0103_F'	J209	J210	169.6	9.77	152	160	0.54	41.45	€ 2,223.46
P0103_F_H50'	J210	H50'	75.7	1.97	104.4	110	0.23	32.12	€ 680.54
P0103_G'	J210	J212	64.1	7.8	132.4	140	0.57	41.29	€ 785.23
P0103_G_H49'	J212	H49'	102.8	1.28	104.4	110	0.15	30.76	€ 924.17
P0103_H'	J212	J214	132.7	6.52	132.4	140	0.47	41.06	€ 1,625.58
P0103_H_H48'	J214	H48'	73.6	2.9	104.4	110	0.34	30.63	€ 661.66
P0103_I_H47'	J214	H47'	303.2	3.63	104.4	110	0.42	28.06	€ 2,725.77
P010301_A'	J209	J217	101	10.87	117.8	125	1.00	40.98	€ 1,024.14
P010301_A_H51'	J217	H51'	5	2.65	104.4	110	0.31	31.00	€ 44.95
P010301_B'	J217	J219	128.4	8.22	104.4	110	0.75	40.38	€ 1,154.32
P010301_B_H52'	J219	H52'	5	3.9	104.4	110	0.46	29.65	€ 44.95
P010301_C_H53'	J219	H53'	229.9	4.32	104.4	110	0.50	27.66	€ 2,066.80
P02_A'	J250	J109	115.2	13.13	190	200	0.46	49.62	€ 2,528.64
P02_A_H1'	J109	H1'	5	4.71	104.4	110	0.55	29.43	€ 44.95
P02_B'	J109	J112	190.1	8.42	190	200	0.30	49.53	€ 4,172.70
P02_B_H64'	J112	H64'	5.8	1.91	104.4	110	0.22	27.63	€ 52.14
P02_C'	J112	J118	187.4	6.51	190	200	0.23	49.47	€ 4,113.43
P02_C_H61'	J118	H61'	111.4	2	104.4	110	0.23	27.26	€ 1,001.49
P02_D'	J118	J119	68.5	4.51	132.4	140	0.33	49.41	€ 839.13
P02_D_H62'	J119	H62'	18.3	1.85	104.4	110	0.22	25.09	€ 164.52
P02_F_H63'	J119	H63'	154.9	2.67	104.4	110	0.31	25.28	€ 1,392.55
P04_A'	J250	J124	357.4	26.92	190	200	0.95	48.32	€ 7,844.93
P04_B'	J124	J125	407	4.92	104.4	110	0.58	46.95	€ 3,658.93
P04_B_H15'	J125	H15'	5	2.18	104.4	110	0.25	26.26	€ 44.95
P04_C_H16'	J125	H16'	210.1	2.74	104.4	110	0.32	27.24	€ 1,888.80
P0401_A'	J124	J138	94.9	9.98	117.8	125	0.92	47.68	€ 962.29
P0401_A_H11'	J138	H11'	7.3	2.46	104.4	110	0.29	29.11	€ 65.63
P0401_B'	J138	J140	134.1	7.53	104.4	110	0.88	46.72	€ 1,205.56
P0401_B_H10'	J140	H10'	111.4	2.01	104.4	110	0.24	30.16	€ 1,001.49
P0401_C'	J140	J141	60.9	5.51	104.4	110	0.64	46.47	€ 547.49
P0401_C_H9'	J141	H9'	5	2.37	104.4	110	0.28	29.09	€ 44.95
P0401_D'	J141	J143	252.6	3.14	104.4	110	0.37	46.09	€ 2,270.87
P0401_D_H7'	J143	H7'	6.5	1.99	104.4	110	0.23	30.48	€ 58.44
P0401_D_H8'	J143	H8'	8.2	1.16	104.4	110	0.14	30.90	€ 73.72
P0403_A'	J124	J133	30.5	5.04	104.4	110	0.59	48.21	€ 274.20
P0403_A_H12'	J133	H12'	5	1.24	104.4	110	0.14	29.05	€ 44.95
P0403_B'	J133	J135	178.8	3.8	104.4	110	0.44	47.84	€ 1,607.41
P0403_B_H13'	J135	H13'	5	1.68	104.4	110	0.20	29.33	€ 44.95
P0403_C_H14'	J135	H14'	159.3	2.11	104.4	110	0.25	30.84	€ 1,432.11
P0404_A'	J124	J128	16.3	6.98	132.4	140	0.51	48.29	€ 199.68
P0404_A_H58'	J130	H58'	76.2	2.5	104.4	110	0.29	26.20	€ 685.04
P0404_A_H59'	J128	H59'	146.9	2.31	104.4	110	0.27	27.17	€ 1,320.63
P0404_B'	J128	J130	189.3	4.67	117.8	125	0.43	47.96	€ 1,919.50
P0404_C_H60'	J130	H60'	69.8	2.17	104.4	110	0.25	25.23	€ 627.50

1.2.1.4.1 Cálculo de la garantía suministro del diseño con caudal para 6 turnos.

A continuación, se observa el cálculo de la garantía suministro para el diseño de la red de 6 turnos:

								GS_global				Rug	0.01		Hcab	49.88		25.000
								51.09%				Visc	1.10E-06					0.000
Tuberia	**Nudo Ini**	**Nudo Fin**	**Diam (mm)**	**Long (m)**	**z(fin)**	**Qinst**	**∑pi·Qi**	**GS**	**U**	**∑pi·(1-pi)·Qi^2**	**Q diseño**	**ks**	**V (m/s)**	**Re**	**f**	**hf**	**∑hf**	**H(fin)**	**P(fin)**
P00'	UGD_43	J250	340.8	16	19.23	949.44	158.203063	51%	0.0274	1551.25	159.28	0.17	1.75	540986.34	0.0134	0.098	0.098	49.782	30.552
P01_A'	J250	J147	340.8	89.5	0	709.1	118.155746	51%	0.0274	266.12	118.60	0.17	1.30	402821.96	0.0140	0.317	0.415	49.465	49.465
P01_A_H2'	J147	H2'	104.4	22.6	19.17	18.96	3.15926237	51%	0.0274	6.64	3.23	0.17	0.38	35810.31	0.0227	0.036	0.450	49.430	30.260
P01_B'	J147	J148	340.8	103.1	0	690.14	114.996484	51%	0.0274	203.19	115.39	0.17	1.26	391900.21	0.0141	0.347	0.762	49.118	49.118
P01_B_H3'	J148	H3'	104.4	124.5	18.73	14.97	2.4944176	51%	0.0274	4.03	2.55	0.17	0.30	28265.75	0.0240	0.129	0.891	48.989	30.259
P01_C'	J148	J149	340.8	150.7	0	675.17	112.502066	51%	0.0274	199.16	112.89	0.17	1.24	383414.97	0.0141	0.488	1.250	48.630	48.630
P01_C_H4'	J149	H4'	104.4	9	17.15	18.93	3.15426354	51%	0.0274	4.33	3.21	0.17	0.38	35603.85	0.0228	0.014	1.264	48.616	31.466
P01_D'	J149	J150	237.4	110.3	0	391.69	65.2664282	51%	0.0274	132.47	65.58	0.17	1.48	319757.55	0.0147	0.764	2.014	47.866	47.866
P01_D_H6'	J150	H6'	104.4	138.9	16.18	14.48	2.41277	51%	0.0274	3.17	2.46	0.17	0.29	27291.33	0.0242	0.136	2.149	47.731	31.551
P01_E'	J150	J151	237.4	123.3	0	377.21	62.8536582	51%	0.0274	129.31	63.17	0.17	1.43	307975.12	0.0148	0.797	2.811	47.069	47.069
P01_E_H5'	J151	H5'	104.4	5	15.59	14.48	2.41277	51%	0.0274	2.44	2.46	0.17	0.29	27225.58	0.0242	0.005	2.816	47.064	31.474
P01_F'	J151	J152	237.4	246.5	0	362.73	60.4408882	51%	0.0274	126.86	60.75	0.17	1.37	296196.76	0.0149	1.484	4.294	45.586	45.586
P01_F_H32'	J152	H32'	104.4	51.8	14.17	14.29	2.38111072	51%	0.0274	2.56	2.42	0.17	0.28	26885.35	0.0243	0.049	4.344	45.536	31.366
P01_G'	J152	J153	237.4	388.5	0	348.44	58.0597775	51%	0.0274	124.31	58.37	0.17	1.32	284571.95	0.0150	2.172	6.467	43.413	43.413
P0101_A'	J149	J161	237.4	233.1	0	264.55	44.0813745	51%	0.0274	62.36	44.30	0.17	1.00	215982.80	0.0157	0.787	2.036	47.844	47.844
P0101_B'	J161	J172	213.6	110.8	0	193.11	32.1774872	51%	0.0274	47.90	32.37	0.17	0.90	175396.62	0.0163	0.352	2.388	47.492	47.492
P0101_B_H26'	J172	H26'	104.4	5	18.39	11.56	1.92621693	51%	0.0274	2.05	1.97	0.17	0.23	21791.72	0.0255	0.003	2.392	47.488	29.098
P0101_C'	J172	J174	213.6	58.1	0	181.55	30.2512702	51%	0.0274	45.85	30.44	0.17	0.85	164936.23	0.0165	0.165	2.554	47.326	47.326
P0101_D'	J174	J175	190	22.1	0	131.25	21.8698938	51%	0.0274	31.93	22.02	0.17	0.78	134176.16	0.0172	0.061	2.615	47.265	47.265
P0101_E'	J175	J176	190	124.3	0	98.86	16.4728206	51%	0.0274	23.40	16.61	0.17	0.59	101161.09	0.0181	0.207	2.823	47.057	47.057
P0101_F'	J176	J177	132.4	157	0	56.66	9.44112901	51%	0.0274	16.40	9.55	0.17	0.69	83508.31	0.0190	0.552	3.374	46.506	46.506
P0101_F_H18'	J177	H18'	104.4	5	17.38	19.03	3.17092631	51%	0.0274	8.85	3.25	0.17	0.38	36060.46	0.0227	0.008	3.382	46.498	29.118
P0101_G'	J177	J178	132.4	403.1	0	37.63	6.27020269	51%	0.0274	7.55	6.35	0.17	0.46	55474.79	0.0206	0.679	4.054	45.826	45.826
P0101_G_H19'	J178	H19'	104.4	5	18.27	15.46	2.5760652	51%	0.0274	3.40	2.63	0.17	0.31	29121.32	0.0238	0.005	4.059	45.821	27.551
P0101_H'	J178	J179	104.4	176.5	0	22.17	3.69413749	51%	0.0274	4.15	3.75	0.17	0.44	41576.13	0.0220	0.364	4.417	45.463	45.463
P0101_H_H20'	J179	H20'	104.4	5	17.7	12.58	2.09617725	51%	0.0274	2.57	2.14	0.17	0.25	23727.41	0.0250	0.004	4.421	45.459	27.759
P0101_I_H21'	J179	H21'	104.4	127.1	16.68	9.59	1.59796024	51%	0.0274	1.58	1.63	0.17	0.19	18098.81	0.0267	0.060	4.478	45.402	28.722
P010101_A'	J174	J191	152	30.3	0	50.3	8.38137644	51%	0.0274	13.92	8.48	0.17	0.47	64603.43	0.0199	0.044	2.598	47.282	47.282
P010101_A_H17'	J191	H17'	104.4	5	19.9	28.63	4.77055283	51%	0.0274	10.45	4.86	0.17	0.57	53873.92	0.0208	0.016	2.614	47.266	27.366
P010101_B'	J191	J193	152	236.9	0	21.67	3.61082361	51%	0.0274	3.47	3.66	0.17	0.20	27885.24	0.0240	0.078	2.675	47.205	47.205
P010101_B_H66'	J193	H66'	104.4	93.4	20.96	11.24	1.87289605	51%	0.0274	1.71	1.91	0.17	0.22	21162.67	0.0257	0.058	2.734	47.146	26.186
P010101_C_H65'	J193	H65'	117.8	228.5	21.77	10.43	1.73792756	51%	0.0274	1.75	1.77	0.17	0.16	17433.25	0.0269	0.071	2.746	47.134	25.364
P010102_A'	J161	J162	132.4	150	0	71.44	11.9038873	51%	0.0274	14.46	12.01	0.17	0.87	104979.48	0.0181	0.797	2.833	47.047	47.047
P010102_A_H27'	J162	H27'	104.4	5	17.33	19.68	3.27923436	51%	0.0274	5.02	3.34	0.17	0.39	37037.76	0.0226	0.008	2.842	47.038	29.708
P010102_B'	J162	J163	104.4	155.9	0	51.76	8.62465297	51%	0.0274	9.44	8.71	0.17	1.02	96556.06	0.0185	1.461	4.295	45.585	45.585
P010102_B_H28'	J163	H28'	104.4	77.8	16.73	15.21	2.53440826	51%	0.0274	3.15	2.58	0.17	0.30	28638.94	0.0239	0.083	4.377	45.503	28.773
P010102_C'	J163	J164	104.4	123.1	0	36.55	6.09024471	51%	0.0274	6.29	6.16	0.17	0.72	68285.10	0.0198	0.617	4.912	44.968	44.968
P010102_D'	J164	J166	104.4	55.1	0	25.22	4.20235216	51%	0.0274	4.64	4.26	0.17	0.50	47246.62	0.0214	0.143	5.054	44.826	44.826
P010102_D_H29'	J164	H29'	104.4	156.9	15	11.33	1.88789255	51%	0.0274	1.65	1.92	0.17	0.22	21321.10	0.0257	0.099	5.011	44.869	29.869
P010102_D_H30'	J166	H30'	104.4	86.8	15.1	11.16	1.85956583	51%	0.0274	1.56	1.89	0.17	0.22	20997.31	0.0257	0.053	5.108	44.772	29.672
P010102_D_H31'	J166	H31'	104.4	247.8	14.25	14.06	2.34278634	51%	0.0274	3.08	2.39	0.17	0.28	26507.82	0.0244	0.230	5.284	44.596	30.346
P010103_A'	J175	J196	190	537.8	0	32.39	5.39707322	51%	0.0274	8.53	5.48	0.17	0.19	33366.95	0.0230	0.124	2.739	47.141	47.141
P010103_A_H67'	J196	H67'	104.4	6.9	21.63	16.54	2.75602319	51%	0.0274	3.20	2.81	0.17	0.33	31100.27	0.0235	0.008	2.747	47.133	25.503

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	Long (m)	z(fin)	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P010103_B_H68'	J196	H68'	152	103.7	22.11	15.85	2.64105003	51%	0.0274	5.32	2.70	0.17	0.15	20593.42	0.0258	0.020	2.759	47.121	25.011
P010104_A'	J176	J181	104.4	86.4	0	42.2	7.03169157	51%	0.0274	7.00	7.10	0.17	0.83	78764.94	0.0193	0.560	3.383	46.497	46.497
P010104_A_H22'	J181	H22'	104.4	5	18.41	10.43	1.73792756	51%	0.0274	1.41	1.77	0.17	0.21	19629.74	0.0262	0.003	3.386	46.494	28.084
P010104_B'	J181	J182	104.4	131.6	0	31.77	5.29376401	51%	0.0274	5.59	5.36	0.17	0.63	59410.70	0.0204	0.514	3.896	45.984	45.984
P010104_B_H23'	J182	H23'	104.4	33.6	17.8	9.34	1.5563033	51%	0.0274	1.12	1.59	0.17	0.19	17577.08	0.0269	0.015	3.912	45.968	28.168
P010104_C'	J182	J183	104.4	73.7	0	22.43	3.73746071	51%	0.0274	4.46	3.80	0.17	0.44	42079.53	0.0219	0.155	4.052	45.828	45.828
P010104_C_H25'	J183	H25'	104.4	138.9	16.81	9.75	1.62462068	51%	0.0274	1.14	1.65	0.17	0.19	18336.55	0.0266	0.067	4.119	45.761	28.951
P010104_D_H24'	J183	H24'	104.4	145.5	16.89	12.68	2.11284002	51%	0.0274	3.32	2.16	0.17	0.25	23979.34	0.0249	0.113	4.165	45.715	28.825
P0102_A'	J153	J223	213.6	193.4	0	157.37	26.2222109	51%	0.0274	28.32	26.37	0.17	0.74	142887.63	0.0169	0.423	6.890	42.990	42.990
P0102_A_H33'	J223	H33'	104.4	5	13.35	14.48	2.41277	51%	0.0274	2.91	2.46	0.17	0.29	27269.13	0.0242	0.005	6.895	42.985	29.635
P0102_B'	J223	J225	213.6	122	0	142.89	23.8094409	51%	0.0274	25.41	23.95	0.17	0.67	129771.18	0.0173	0.224	7.115	42.765	42.765
P0102_B_H34'	J225	H34'	104.4	5	13.81	11.58	1.92954949	51%	0.0274	1.76	1.97	0.17	0.23	21796.75	0.0255	0.003	7.118	42.762	28.952
P0102_C'	J225	J227	190	248.6	0	131.31	21.8798915	51%	0.0274	23.64	22.01	0.17	0.78	134105.45	0.0172	0.691	7.806	42.074	42.074
P0102_C_H35'	J227	H35'	104.4	5	13.13	9.43	1.5712998	51%	0.0274	1.32	1.60	0.17	0.19	17769.64	0.0268	0.002	7.808	42.072	28.942
P0102_D'	J227	J243	104.4	148.9	0	46.46	7.74152583	51%	0.0274	9.63	7.83	0.17	0.91	86774.04	0.0189	1.150	8.956	40.924	40.924
P0102_E'	J243	J247	104.4	161.7	0	25.3	4.21568238	51%	0.0274	6.31	4.28	0.17	0.50	47502.86	0.0214	0.423	9.379	40.501	40.501
P0102_E_H38'	J247	H38'	104.4	20.2	10.2	10.16	1.69293806	51%	0.0274	1.48	1.73	0.17	0.20	19139.79	0.0263	0.011	9.389	40.491	30.291
P0102_F_H39'	J247	H39'	104.4	221.9	9.86	15.14	2.52274432	51%	0.0274	4.83	2.58	0.17	0.30	28637.42	0.0239	0.236	9.615	40.265	30.405
P010201_A'	J243	J244	104.4	42.4	0	21.16	3.52584345	51%	0.0274	3.32	3.58	0.17	0.42	39645.36	0.0222	0.080	9.036	40.844	40.844
P010201_A_H36'	J244	H36'	104.4	5	11.39	7.93	1.32135815	51%	0.0274	0.76	1.35	0.17	0.16	14915.69	0.0280	0.002	9.038	40.842	29.452
P010201_B_H37'	J244	H37'	104.4	137	11.68	13.23	2.20448529	51%	0.0274	2.56	2.25	0.17	0.26	24927.50	0.0247	0.114	9.150	40.730	29.050
P010202_A'	J227	J229	152	74.9	0	75.42	12.5670658	51%	0.0274	12.70	12.66	0.17	0.70	96442.79	0.0184	0.225	8.031	41.849	41.849
P010202_B'	J229	J234	152	50	0	53.02	8.83460395	51%	0.0274	8.86	8.92	0.17	0.49	67897.30	0.0197	0.080	8.110	41.770	41.770
P010202_B_H42'	J234	H42'	104.4	5	13.14	7.77	1.29469771	51%	0.0274	0.97	1.32	0.17	0.15	14653.37	0.0282	0.002	8.112	41.768	28.628
P010202_C'	J234	J236	152	109.2	0	45.25	7.53990624	51%	0.0274	7.89	7.62	0.17	0.42	58003.17	0.0204	0.131	8.242	41.638	41.638
P010202_C_H43'	J236	H43'	104.4	5	14.1	10.42	1.73626128	51%	0.0274	1.67	1.77	0.17	0.21	19642.39	0.0262	0.003	8.245	41.635	27.535
P010202_D'	J236	J238	132.4	237.7	0	34.83	5.80364496	51%	0.0274	6.22	5.87	0.17	0.43	51335.38	0.0209	0.349	8.591	41.289	41.289
P010202_D_H46'	J238	H46'	104.4	530.5	12.32	15.53	2.58772915	51%	0.0274	2.72	2.63	0.17	0.31	29191.74	0.0238	0.584	9.174	40.706	28.386
P010202_E'	J238	J239	117.8	14.3	0	19.3	3.21591581	51%	0.0274	3.50	3.27	0.17	0.30	32103.13	0.0233	0.013	8.604	41.276	41.276
P010202_E_H45'	J239	H45'	104.4	5.7	14.68	9.45	1.57463235	51%	0.0274	1.83	1.61	0.17	0.19	17868.98	0.0268	0.003	8.606	41.274	26.594
P010202_F_H44'	J239	H44'	104.4	194.6	16.18	9.85	1.64128346	51%	0.0274	1.67	1.68	0.17	0.20	18589.96	0.0265	0.097	8.700	41.180	25.000
P01020201_A'	J229	J230	104.4	242.2	0	22.4	3.73246187	51%	0.0274	3.84	3.79	0.17	0.44	41977.50	0.0220	0.508	8.538	41.342	41.342
P01020201_A_H41'	J230	H41'	104.4	129.7	11.55	10.42	1.73626128	51%	0.0274	1.75	1.77	0.17	0.21	19652.60	0.0262	0.071	8.610	41.270	29.720
P01020201_B_H40'	J230	H40'	104.4	209.7	10.33	11.98	1.99620059	51%	0.0274	2.08	2.04	0.17	0.24	22570.75	0.0253	0.146	8.685	41.195	30.865
P0103_A'	J153	J200	237.4	191.9	0	191.07	31.8375665	51%	0.0274	89.27	32.10	0.17	0.73	156493.04	0.0166	0.360	6.827	43.053	43.053
P0103_A_H57'	J200	H57'	104.4	5	13	16.79	2.79768013	51%	0.0274	4.04	2.85	0.17	0.33	31628.56	0.0234	0.006	6.833	43.047	30.047
P0103_B'	J200	J202	237.4	186.7	0	174.28	29.0398864	51%	0.0274	85.23	29.29	0.17	0.66	142823.53	0.0169	0.297	7.124	42.756	42.756
P0103_B_H56'	J202	H56'	104.4	5.3	11.98	18.52	3.08594616	51%	0.0274	4.35	3.14	0.17	0.37	34848.22	0.0229	0.008	7.132	42.748	30.768
P0103_C'	J202	J205	213.6	176.1	0	155.76	25.9539402	51%	0.0274	80.88	26.20	0.17	0.73	141979.28	0.0170	0.381	7.505	42.375	42.375
P0103_C_H55'	J205	H55'	104.4	5	11.32	16.14	2.68937208	51%	0.0274	3.17	2.74	0.17	0.32	30358.40	0.0236	0.006	7.511	42.369	31.049
P0103_D'	J205	J207	213.6	160.1	0	139.62	23.2645682	51%	0.0274	77.71	23.51	0.17	0.66	127379.23	0.0173	0.285	7.790	42.090	42.090
P0103_D_H54'	J207	H54'	104.4	5.1	10.38	15.79	2.63105237	51%	0.0274	4.08	2.69	0.17	0.31	29784.32	0.0237	0.006	7.796	42.084	31.704
P0103_E'	J207	J209	190	259	0	123.83	20.6335158	51%	0.0274	73.63	20.87	0.17	0.74	127133.41	0.0174	0.654	8.443	41.437	41.437

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	Long (m)	z(fin)	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P0103_F'	J209	J210	152	169.6	0	58.63	9.7693857	51%	0.0274	35.77	9.93	0.17	0.55	75642.93	0.0193	0.329	8.772	41.108	41.108
P0103_F_H50'	J210	H50'	104.4	75.7	9.28	11.81	1.96787387	51%	0.0274	2.71	2.01	0.17	0.24	22318.13	0.0254	0.052	8.824	41.056	31.776
P0103_G'	J210	J212	132.4	64.1	0	46.82	7.80151183	51%	0.0274	33.06	7.96	0.17	0.58	69581.60	0.0197	0.162	8.934	40.946	40.946
P0103_G_H49'	J212	H49'	104.4	102.8	10.5	7.68	1.27970121	51%	0.0274	1.06	1.31	0.17	0.15	14500.65	0.0282	0.033	8.967	40.913	30.413
P0103_H'	J212	J214	132.4	132.7	0	39.14	6.52181061	51%	0.0274	32.00	6.68	0.17	0.48	58371.76	0.0204	0.245	9.179	40.701	40.701
P0103_H_H48'	J214	H48'	104.4	73.6	10.33	17.37	2.89432423	51%	0.0274	4.44	2.95	0.17	0.34	32729.90	0.0232	0.099	9.278	40.602	30.272
P0103_I_H47'	J214	H47'	104.4	303.2	12.41	21.77	3.62748638	51%	0.0274	27.56	3.77	0.17	0.44	41813.75	0.0220	0.631	9.811	40.069	27.659
P010301_A'	J209	J217	117.8	101	0	65.2	10.8641301	51%	0.0274	37.86	11.03	0.17	1.01	108407.08	0.0181	0.810	9.254	40.626	40.626
P010301_A_H51'	J217	H51'	104.4	5	9.98	15.9	2.64938142	51%	0.0274	3.41	2.70	0.17	0.32	29935.18	0.0237	0.006	9.259	40.621	30.641
P010301_B'	J217	J219	104.4	128.4	0	49.3	8.21474868	51%	0.0274	34.45	8.38	0.17	0.98	92861.29	0.0187	1.121	10.375	39.505	39.505
P010301_B_H52'	J219	H52'	104.4	5	10.72	23.41	3.90075591	51%	0.0274	14.59	4.01	0.17	0.47	44408.64	0.0217	0.012	10.386	39.494	28.774
P010301_C_H53'	J219	H53'	104.4	229.9	12.11	25.89	4.31399276	51%	0.0274	19.87	4.44	0.17	0.52	49184.05	0.0212	0.640	11.015	38.865	26.755
P02_A'	J250	J109	190	115.2	0	78.8	13.1302677	51%	0.0274	29.79	13.28	0.17	0.47	80901.75	0.0190	0.129	0.226	49.654	49.654
P02_A_H1'	J109	H1'	104.4	5	20.18	28.28	4.71223312	51%	0.0274	20.54	4.84	0.17	0.56	53622.19	0.0208	0.016	0.242	49.638	29.458
P02_B'	J109	J112	190	190.1	0	50.52	8.41803455	51%	0.0274	9.25	8.50	0.17	0.30	51791.05	0.0208	0.095	0.322	49.558	49.558
P02_B_H64'	J112	H64'	104.4	5.8	21.9	11.44	1.9062216	51%	0.0274	1.60	1.94	0.17	0.23	21518.27	0.0256	0.004	0.325	49.555	27.655
P02_C'	J112	J118	190	187.4	0	39.08	6.51181295	51%	0.0274	7.66	6.59	0.17	0.23	40132.38	0.0220	0.060	0.381	49.499	49.499
P02_C_H61'	J118	H61'	104.4	111.4	22.14	12.02	2.0028657	51%	0.0274	1.65	2.04	0.17	0.24	22595.91	0.0253	0.078	0.459	49.421	27.281
P02_D'	J118	J119	132.4	68.5	0	27.06	4.50894725	51%	0.0274	6.01	4.58	0.17	0.33	40006.35	0.0221	0.064	0.446	49.434	49.434
P02_D_H62'	J119	H62'	104.4	18.3	24.31	11.07	1.84456933	51%	0.0274	1.51	1.88	0.17	0.22	20823.90	0.0258	0.011	0.457	49.423	25.113
P02_F_H63'	J119	H63'	104.4	154.9	23.96	15.99	2.66437792	51%	0.0274	4.50	2.72	0.17	0.32	30185.03	0.0236	0.181	0.627	49.253	25.293
P04_A'	J250	J124	190	357.4	0	161.54	26.9170487	51%	0.0274	33.13	27.07	0.17	0.95	164941.36	0.0166	1.447	1.545	48.335	48.335
P04_B'	J124	J125	104.4	407	0	29.54	4.9221841	51%	0.0274	7.10	5.00	0.17	0.58	55382.55	0.0207	1.401	2.945	46.935	46.935
P04_B_H15'	J125	H15'	104.4	5	20.69	13.08	2.17949113	51%	0.0274	2.10	2.22	0.17	0.26	24604.18	0.0248	0.004	2.949	46.931	26.241
P04_C_H16'	J125	H16'	104.4	210.1	19.47	16.46	2.74269297	51%	0.0274	5.01	2.80	0.17	0.33	31088.44	0.0235	0.258	3.204	46.676	27.206
P0401_A'	J124	J138	117.8	94.9	0	59.89	9.97933668	51%	0.0274	11.32	10.07	0.17	0.92	98961.92	0.0184	0.645	2.190	47.690	47.690
P0401_A_H11'	J138	H11'	104.4	7.3	18.57	14.73	2.45442694	51%	0.0274	3.25	2.50	0.17	0.29	27759.97	0.0241	0.007	2.197	47.683	29.113
P0401_B'	J138	J140	104.4	134.1	0	45.16	7.52490974	51%	0.0274	8.07	7.60	0.17	0.89	84292.52	0.0190	0.983	3.173	46.707	46.707
P0401_B_H10'	J140	H10'	104.4	111.4	16.48	12.08	2.01286337	51%	0.0274	2.09	2.05	0.17	0.24	22755.72	0.0253	0.079	3.252	46.628	30.148
P0401_C'	J140	J141	104.4	60.9	0	33.08	5.51204637	51%	0.0274	5.98	5.58	0.17	0.65	61855.82	0.0202	0.256	3.428	46.452	46.452
P0401_C_H9'	J141	H9'	104.4	5	17.37	14.23	2.37111306	51%	0.0274	3.13	2.42	0.17	0.28	26826.18	0.0243	0.005	3.433	46.447	29.077
P0401_D'	J141	J143	104.4	252.6	0	18.85	3.14093332	51%	0.0274	2.86	3.19	0.17	0.37	35337.28	0.0228	0.390	3.818	46.062	46.062
P0401_D_H7'	J143	H7'	104.4	6.5	15.6	11.91	1.98453665	51%	0.0274	2.00	2.02	0.17	0.24	22432.94	0.0253	0.004	3.823	46.057	30.457
P0401_D_H8'	J143	H8'	104.4	8.2	15.19	6.94	1.15639667	51%	0.0274	0.85	1.18	0.17	0.14	13101.42	0.0290	0.002	3.821	46.059	30.869
P0403_A'	J124	J133	104.4	30.5	0	30.21	5.0338247	51%	0.0274	5.28	5.10	0.17	0.60	56508.65	0.0206	0.109	1.654	48.226	48.226
P0403_A_H12'	J133	H12'	104.4	5	19.16	7.44	1.23971055	51%	0.0274	1.04	1.27	0.17	0.15	14054.49	0.0285	0.002	1.655	48.225	29.065
P0403_B'	J133	J135	104.4	178.8	0	22.77	3.79411415	51%	0.0274	4.24	3.85	0.17	0.45	42691.43	0.0219	0.386	2.040	47.840	47.840
P0403_B_H13'	J135	H13'	104.4	5	18.5	10.1	1.6829404	51%	0.0274	1.58	1.72	0.17	0.20	19041.13	0.0264	0.003	2.043	47.837	29.337
P0403_C_H14'	J135	H14'	104.4	159.3	16.88	12.67	2.11117375	51%	0.0274	2.66	2.16	0.17	0.25	23902.25	0.0250	0.123	2.163	47.717	30.837
P0404_A'	J124	J128	132.4	16.3	0	41.9	6.98170324	51%	0.0274	9.44	7.07	0.17	0.51	61772.80	0.0202	0.033	1.578	48.302	48.302
P0404_A_H58'	J130	H58'	104.4	76.2	21.69	15	2.49941643	51%	0.0274	2.78	2.55	0.17	0.30	28217.52	0.0240	0.079	1.989	47.891	26.201
P0404_A_H59'	J128	H59'	104.4	146.9	20.99	13.86	2.30946078	51%	0.0274	2.66	2.35	0.17	0.28	26101.13	0.0244	0.133	1.711	48.169	27.179
P0404_B'	J128	J130	117.8	189.3	0	28.04	4.67224245	51%	0.0274	6.77	4.74	0.17	0.44	46609.91	0.0214	0.332	1.910	47.970	47.970
P0404_C_H60'	J130	H60'	104.4	69.8	22.68	13.04	2.17282602	51%	0.0274	4.00	2.23	0.17	0.26	24697.90	0.0248	0.057	1.968	47.912	25.232

1.2.1.5 Calculo de la garantía suministro del modelo original.

A continuación, se observa el cálculo de la garantía suministro del modelo original:

								GS_global				Rug	0.01			Hcab	49.88	
								80.57%				Visc	1.10E-06					25.000
																		0.000
Tuberia	**Nudo Ini**	**Nudo Fin**	**Diam (mm)**	**Long (m)**	**z(fin)**	**Qinst**	**∑pi·Qi**	**GS**	**U**	**∑pi·(1-pi)·Qi^2**	**Q diseño**	**ks**	**V (m/s)**	**Re**	**f**	**hf**	**∑hf**	**H(fin)**	**P(fin)**
P00'	UGD_43	J250	474.6	16	19.23	949.44	158.20	81%	0.8622	1551.25	192.16	0.20	1.09	468661.63	0.0136	0.027	0.027	49.853	30.623
P01_A'	J250	J147	427.6	89.5	0	709.1	118.16	81%	0.8622	266.12	132.22	0.19	0.92	357916.57	0.0142	0.129	0.156	49.724	49.724
P01_A_H2'	J147	H2'	152	22.6	19.17	18.96	3.16	81%	0.8622	6.64	5.38	0.28	0.30	40982.58	0.0220	0.015	0.171	49.709	30.539
P01_B'	J147	J148	379.8	103.1	0	690.14	115.00	81%	0.8622	203.19	127.29	0.18	1.12	387924.59	0.0141	0.246	0.402	49.478	49.478
P01_B_H3'	J148	H3'	132.4	124.5	18.73	14.97	2.49	81%	0.8622	4.03	4.23	0.28	0.31	36936.58	0.0225	0.102	0.503	49.377	30.647
P01_C'	J148	J149	379.8	150.7	0	675.17	112.50	81%	0.8622	199.16	124.67	0.18	1.10	379949.36	0.0141	0.345	0.747	49.133	49.133
P01_C_H4'	J149	H4'	152	9	17.15	18.93	3.15	81%	0.8622	4.33	4.95	0.26	0.27	37681.21	0.0224	0.005	0.752	49.128	31.978
P01_D'	J149	J150	299.2	110.3	0	391.69	65.27	81%	0.8622	132.47	75.19	0.19	1.07	290883.45	0.0148	0.319	1.066	48.814	48.814
P01_D_H6'	J150	H6'	132.4	138.9	16.18	14.48	2.41	81%	0.8622	3.17	3.95	0.27	0.29	34506.75	0.0229	0.100	1.166	48.714	32.534
P01_E'	J150	J151	299.2	123.3	0	377.21	62.85	81%	0.8622	129.31	72.66	0.19	1.03	281087.76	0.0149	0.335	1.400	48.480	48.480
P01_E_H5'	J151	H5'	132.4	5	15.59	14.48	2.41	81%	0.8622	2.44	3.76	0.26	0.27	32875.75	0.0231	0.003	1.404	48.476	32.886
P01_F'	J151	J152	299.2	246.5	0	362.73	60.44	81%	0.8622	126.86	70.15	0.19	1.00	271393.63	0.0150	0.627	2.028	47.852	47.852
P01_F_H32'	J152	H32'	132.4	51.8	14.17	14.29	2.38	81%	0.8622	2.56	3.76	0.26	0.27	32866.30	0.0231	0.034	2.062	47.818	33.648
P01_G'	J152	J153	299.2	388.5	0	348.44	58.06	81%	0.8622	124.31	67.67	0.19	0.96	261801.71	0.0151	0.926	2.954	46.926	46.926
P0101_A'	J149	J161	237.4	233.1	0	264.55	44.08	81%	0.8622	62.36	50.89	0.19	1.15	248125.63	0.0153	1.014	1.761	48.119	48.119
P0101_B'	J161	J172	237.4	110.8	0	193.11	32.18	81%	0.8622	47.90	38.14	0.20	0.86	185983.42	0.0161	0.285	2.046	47.834	47.834
P0101_B_H26'	J172	H26'	117.8	5	18.39	11.56	1.93	81%	0.8622	2.05	3.16	0.27	0.29	31070.99	0.0234	0.004	2.050	47.830	29.440
P0101_C'	J172	J174	237.4	58.1	0	181.55	30.25	81%	0.8622	45.85	36.09	0.20	0.82	175960.90	0.0163	0.135	2.181	47.699	47.699
P0101_D'	J174	J175	237.4	22.1	0	131.25	21.87	81%	0.8622	31.93	26.74	0.20	0.60	130385.88	0.0172	0.030	2.211	47.669	47.669
P0101_E'	J175	J176	213.6	124.3	0	98.86	16.47	81%	0.8622	23.40	20.64	0.21	0.58	111867.51	0.0178	0.175	2.385	47.495	47.495
P0101_F'	J176	J177	213.6	157	0	56.66	9.44	81%	0.8622	16.40	12.93	0.23	0.36	70082.59	0.0195	0.095	2.480	47.400	47.400
P0101_F_H18'	J177	H18'	152	5	17.38	19.03	3.17	81%	0.8622	8.85	5.74	0.30	0.32	43681.99	0.0217	0.004	2.484	47.396	30.016
P0101_G'	J177	J178	213.6	403.1	0	37.63	6.27	81%	0.8622	7.55	8.64	0.23	0.24	46814.34	0.0213	0.119	2.599	47.281	47.281
P0101_G_H19'	J178	H19'	132.4	5	18.27	15.46	2.58	81%	0.8622	3.40	4.17	0.27	0.30	36418.69	0.0226	0.004	2.603	47.277	29.007
P0101_H'	J178	J179	152	176.5	0	22.17	3.69	81%	0.8622	4.15	5.45	0.25	0.30	41504.14	0.0219	0.117	2.716	47.164	47.164
P0101_H_H20'	J179	H20'	117.8	5	17.7	12.58	2.10	81%	0.8622	2.57	3.48	0.28	0.32	34171.79	0.0229	0.005	2.721	47.159	29.459
P0101_I_H21'	J179	H21'	104.4	127.1	16.68	9.59	1.60	81%	0.8622	1.58	2.68	0.28	0.31	29736.34	0.0237	0.144	2.861	47.019	30.339
P010101_A'	J174	J191	190	30.3	0	50.3	8.38	81%	0.8622	13.92	11.60	0.23	0.41	70655.19	0.0195	0.027	2.207	47.673	47.673
P010101_A_H17'	J191	H17'	190	5	19.9	28.63	4.77	81%	0.8622	10.45	7.56	0.26	0.27	46043.64	0.0214	0.002	2.209	47.671	27.771
P010101_B'	J191	J193	152	236.9	0	21.67	3.61	81%	0.8622	3.47	5.22	0.24	0.29	39719.78	0.0221	0.145	2.352	47.528	47.528
P010101_B_H66'	J193	H66'	117.8	93.4	20.96	11.24	1.87	81%	0.8622	1.71	3.00	0.27	0.28	29491.03	0.0237	0.073	2.425	47.455	26.495
P010101_C_H65'	J193	H65'	152	228.5	21.77	10.43	1.74	81%	0.8622	1.75	2.88	0.28	0.16	21926.92	0.0254	0.049	2.401	47.479	25.709
P010102_A'	J161	J162	213.6	150	0	71.44	11.90	81%	0.8622	14.46	15.18	0.21	0.42	82274.14	0.0189	0.121	1.882	47.998	47.998
P010102_A_H27'	J162	H27'	152	5	17.33	19.68	3.28	81%	0.8622	5.02	5.21	0.26	0.29	39677.45	0.0221	0.003	1.885	47.995	30.665
P010102_B'	J162	J163	213.6	155.9	0	51.76	8.62	81%	0.8622	9.44	11.27	0.22	0.31	61095.24	0.0201	0.074	1.956	47.924	47.924
P010102_B_H28'	J163	H28'	132.4	77.8	16.73	15.21	2.53	81%	0.8622	3.15	4.07	0.27	0.30	35545.28	0.0227	0.059	2.015	47.865	31.135
P010102_C'	J163	J164	213.6	123.1	0	36.55	6.09	81%	0.8622	6.29	8.25	0.23	0.23	44720.18	0.0215	0.033	1.990	47.890	47.890
P010102_D'	J164	J166	152	55.1	0	25.22	4.20	81%	0.8622	4.64	6.06	0.24	0.33	46149.24	0.0214	0.044	2.034	47.846	47.846
P010102_D_H29'	J164	H29'	117.8	156.9	15	11.33	1.89	81%	0.8622	1.65	2.99	0.26	0.27	29419.77	0.0237	0.122	2.111	47.769	32.769
P010102_D_H30'	J166	H30'	117.8	86.8	15.1	11.16	1.86	81%	0.8622	1.56	2.94	0.26	0.27	28870.38	0.0238	0.065	2.099	47.781	32.681
P010102_D_H31'	J166	H31'	132.4	247.8	14.25	14.06	2.34	81%	0.8622	3.08	3.86	0.27	0.28	33706.39	0.0230	0.172	2.206	47.674	33.424
P010103_A'	J175	J196	190	537.8	0	32.39	5.40	81%	0.8622	8.53	7.92	0.24	0.28	48219.95	0.0211	0.238	2.448	47.432	47.432
P010103_A_H67'	J196	H67'	132.4	6.9	21.63	16.54	2.76	81%	0.8622	3.20	4.30	0.26	0.31	37588.60	0.0224	0.006	2.454	47.426	25.796

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	Long (m)	z(fin)	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P010103_B_H68'	J196	H68'	152	103.7	22.11	15.85	2.64	81%	0.8622	5.32	4.63	0.29	0.26	35262.64	0.0227	0.051	2.500	47.380	25.270
P010104_A'	J176	J181	213.6	86.4	0	42.2	7.03	81%	0.8622	7.00	9.31	0.22	0.26	50466.71	0.0209	0.029	2.414	47.466	47.466
P010104_A_H22'	J181	H22'	104.4	5	18.41	10.43	1.74	81%	0.8622	1.41	2.76	0.26	0.32	30631.01	0.0236	0.006	2.420	47.460	29.050
P010104_B'	J181	J182	190	131.6	0	31.77	5.29	81%	0.8622	5.59	7.33	0.23	0.26	44666.33	0.0215	0.051	2.465	47.415	47.415
P010104_B_H23'	J182	H23'	104.4	33.6	17.8	9.34	1.56	81%	0.8622	1.12	2.47	0.26	0.29	27391.15	0.0242	0.033	2.498	47.382	29.582
P010104_C'	J182	J183	152	73.7	0	22.43	3.74	81%	0.8622	4.46	5.56	0.25	0.31	42332.47	0.0218	0.051	2.516	47.364	47.364
P010104_C_H25'	J183	H25'	104.4	138.9	16.81	9.75	1.62	81%	0.8622	1.14	2.54	0.26	0.30	28212.31	0.0240	0.144	2.660	47.220	30.410
P010104_D_H24'	J183	H24'	117.8	145.5	16.89	12.68	2.11	81%	0.8622	3.32	3.69	0.29	0.34	36208.66	0.0226	0.163	2.679	47.201	30.311
P0102_A'	J153	J223	190	193.4	0	157.37	26.22	81%	0.8622	28.32	30.81	0.20	1.09	187700.18	0.0162	0.991	3.945	45.935	45.935
P0102_A_H33'	J223	H33'	132.4	5	13.35	14.48	2.41	81%	0.8622	2.91	3.88	0.27	0.28	33956.04	0.0229	0.004	3.949	45.931	32.581
P0102_B'	J223	J225	190	122	0	142.89	23.81	81%	0.8622	25.41	28.16	0.20	0.99	171525.42	0.0164	0.530	4.475	45.405	45.405
P0102_B_H34'	J225	H34'	117.8	5	13.81	11.58	1.93	81%	0.8622	1.76	3.07	0.27	0.28	30213.95	0.0236	0.004	4.480	45.400	31.590
P0102_C'	J225	J227	190	248.6	0	131.31	21.88	81%	0.8622	23.64	26.07	0.20	0.92	158834.50	0.0167	0.940	5.415	44.465	44.465
P0102_C_H35'	J227	H35'	104.4	5	13.13	9.43	1.57	81%	0.8622	1.32	2.56	0.27	0.30	28384.38	0.0240	0.005	5.420	44.460	31.330
P0102_D'	J227	J243	152	148.9	0	46.46	7.74	81%	0.8622	9.63	10.42	0.22	0.57	79330.25	0.0191	0.314	5.730	44.150	44.150
P0102_E'	J243	J247	152	161.7	0	25.3	4.22	81%	0.8622	6.31	6.38	0.25	0.35	48593.80	0.0212	0.142	5.872	44.008	44.008
P0102_E_H38'	J247	H38'	104.4	20.2	10.2	10.16	1.69	81%	0.8622	1.48	2.74	0.27	0.32	30410.58	0.0236	0.024	5.895	43.985	33.785
P0102_F_H39'	J247	H39'	132.4	221.9	9.86	15.14	2.52	81%	0.8622	4.83	4.42	0.29	0.32	38613.15	0.0223	0.196	6.068	43.812	33.952
P010201_A'	J243	J244	152	42.4	0	21.16	3.53	81%	0.8622	3.32	5.10	0.24	0.28	38820.63	0.0222	0.025	5.755	44.125	44.125
P010201_A_H36'	J244	H36'	104.4	5	11.39	7.93	1.32	81%	0.8622	0.76	2.08	0.26	0.24	23007.72	0.0252	0.004	5.758	44.122	32.732
P010201_B_H37'	J244	H37'	117.8	137	11.68	13.23	2.20	81%	0.8622	2.56	3.58	0.27	0.33	35215.84	0.0228	0.146	5.901	43.979	32.299
P010202_A'	J227	J229	190	74.9	0	75.42	12.57	81%	0.8622	12.70	15.64	0.21	0.55	95275.17	0.0184	0.112	5.527	44.353	44.353
P010202_B'	J229	J234	190	50	0	53.02	8.83	81%	0.8622	8.86	11.40	0.22	0.40	69453.19	0.0196	0.042	5.570	44.310	44.310
P010202_B_H42'	J234	H42'	104.4	5	13.14	7.77	1.29	81%	0.8622	0.97	2.14	0.28	0.25	23758.59	0.0250	0.004	5.574	44.306	31.166
P010202_C'	J234	J236	190	109.2	0	45.25	7.54	81%	0.8622	7.89	9.96	0.22	0.35	60687.07	0.0201	0.073	5.643	44.237	44.237
P010202_C_H43'	J236	H43'	104.4	5	14.1	10.42	1.74	81%	0.8622	1.67	2.85	0.27	0.33	31591.63	0.0234	0.006	5.649	44.231	30.131
P010202_D'	J236	J238	190	237.7	0	34.83	5.80	81%	0.8622	6.22	7.95	0.23	0.28	48458.80	0.0211	0.106	5.749	44.131	44.131
P010202_D_H46'	J238	H46'	132.4	530.5	12.32	15.53	2.59	81%	0.8622	2.72	4.01	0.26	0.29	35059.71	0.0228	0.395	6.143	43.737	31.417
P010202_E'	J238	J239	152	14.3	0	19.3	3.22	81%	0.8622	3.50	4.83	0.25	0.27	36773.29	0.0225	0.008	5.756	44.124	44.124
P010202_E_H45'	J239	H45'	104.4	5.7	14.68	9.45	1.57	81%	0.8622	1.83	2.74	0.29	0.32	30384.00	0.0236	0.007	5.763	44.117	29.437
P010202_F_H44'	J239	H44'	104.4	194.6	16.18	9.85	1.64	81%	0.8622	1.67	2.76	0.28	0.32	30557.36	0.0236	0.232	5.988	43.892	27.712
P01020201_A'	J229	J230	152	242.2	0	22.4	3.73	81%	0.8622	3.84	5.42	0.24	0.30	41287.45	0.0219	0.159	5.686	44.194	44.194
P01020201_A_H41'	J230	H41'	104.4	129.7	11.55	10.42	1.74	81%	0.8622	1.75	2.88	0.28	0.34	31912.85	0.0233	0.167	5.853	44.027	32.477
P01020201_B_H40'	J230	H40'	117.8	209.7	10.33	11.98	2.00	81%	0.8622	2.08	3.24	0.27	0.30	31845.44	0.0233	0.187	5.873	44.007	33.677
P0103_A'	J153	J200	213.6	191.9	0	191.07	31.84	81%	0.8622	89.27	39.98	0.21	1.12	216672.96	0.0157	0.897	3.851	46.029	46.029
P0103_A_H57'	J200	H57'	132.4	5	13	16.79	2.80	81%	0.8622	4.04	4.53	0.27	0.33	39600.59	0.0222	0.005	3.855	46.025	33.025
P0103_B'	J200	J202	213.6	186.7	0	174.28	29.04	81%	0.8622	85.23	37.00	0.21	1.03	200503.13	0.0159	0.757	4.608	45.272	45.272
P0103_B_H56'	J202	H56'	152	5.3	11.98	18.52	3.09	81%	0.8622	4.35	4.89	0.26	0.27	37199.94	0.0224	0.003	4.611	45.269	33.289
P0103_C'	J202	J205	213.6	176.1	0	155.76	25.95	81%	0.8622	80.88	33.71	0.22	0.94	182664.37	0.0162	0.603	5.211	44.669	44.669
P0103_C_H55'	J205	H55'	132.4	5	11.32	16.14	2.69	81%	0.8622	3.17	4.22	0.26	0.31	36933.91	0.0225	0.004	5.215	44.665	33.345
P0103_D'	J205	J207	213.6	160.1	0	139.62	23.26	81%	0.8622	77.71	30.87	0.22	0.86	167258.88	0.0165	0.467	5.677	44.203	44.203
P0103_D_H54'	J207	H54'	132.4	5.1	10.38	15.79	2.63	81%	0.8622	4.08	4.37	0.28	0.32	38222.57	0.0223	0.004	5.682	44.198	33.818
P0103_E'	J207	J209	213.6	259	0	123.83	20.63	81%	0.8622	73.63	28.03	0.23	0.78	151906.20	0.0168	0.634	6.311	43.569	43.569

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	Long (m)	z(fin)	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P0103_F'	J209	J210	213.6	169.6	0	58.63	9.77	81%	0.8622	35.77	14.93	0.25	0.42	80884.84	0.0189	0.133	6.444	43.436	43.436
P0103_F_H50'	J210	H50'	117.8	75.7	9.28	11.81	1.97	81%	0.8622	2.71	3.39	0.29	0.31	33279.92	0.0231	0.073	6.517	43.363	34.083
P0103_G'	J210	J212	213.6	64.1	0	46.82	7.80	81%	0.8622	33.06	12.76	0.27	0.36	69142.10	0.0196	0.038	6.482	43.398	43.398
P0103_G_H49'	J212	H49'	104.4	102.8	10.5	7.68	1.28	81%	0.8622	1.06	2.17	0.28	0.25	24018.68	0.0249	0.080	6.562	43.318	32.818
P0103_H'	J212	J214	213.6	132.7	0	39.14	6.52	81%	0.8622	32.00	11.40	0.29	0.32	61774.30	0.0200	0.064	6.546	43.334	43.334
P0103_H_H48'	J214	H48'	132.4	73.6	10.33	17.37	2.89	81%	0.8622	4.44	4.71	0.27	0.34	41185.71	0.0220	0.073	6.619	43.261	32.931
P0103_I_H47'	J214	H47'	190	303.2	12.41	21.77	3.63	81%	0.8622	27.56	8.15	0.37	0.29	49677.01	0.0210	0.141	6.687	43.193	30.783
P010301_A'	J209	J217	152	101	0	65.2	10.86	81%	0.8622	37.86	16.17	0.25	0.89	123133.50	0.0176	0.472	6.783	43.097	43.097
P010301_A_H51'	J217	H51'	132.4	5	9.98	15.9	2.65	81%	0.8622	3.41	4.24	0.27	0.31	37084.22	0.0225	0.004	6.787	43.093	33.113
P010301_B'	J217	J219	152	128.4	0	49.3	8.21	81%	0.8622	34.45	13.28	0.27	0.73	101095.31	0.0182	0.420	7.203	42.677	42.677
P010301_B_H52'	J219	H52'	152	5	10.72	23.41	3.90	81%	0.8622	14.59	7.19	0.31	0.40	54781.65	0.0206	0.005	7.208	42.672	31.952
P010301_C_H53'	J219	H53'	152	229.9	12.11	25.89	4.31	81%	0.8622	19.87	8.16	0.32	0.45	62116.11	0.0201	0.313	7.516	42.364	30.254
P02_A'	J250	J109	190	115.2	0	78.8	13.13	81%	0.8622	29.79	17.84	0.23	0.63	108661.03	0.0179	0.219	0.246	49.634	49.634
P02_A_H1'	J109	H1'	190	5	20.18	28.28	4.71	81%	0.8622	20.54	8.62	0.30	0.30	52513.43	0.0208	0.003	0.249	49.631	29.451
P02_B'	J109	J112	190	190.1	0	50.52	8.42	81%	0.8622	9.25	11.04	0.22	0.39	67260.38	0.0197	0.152	0.399	49.481	49.481
P02_B_H64'	J112	H64'	117.8	5.8	21.9	11.44	1.91	81%	0.8622	1.60	3.00	0.26	0.27	29431.41	0.0237	0.004	0.403	49.477	27.577
P02_C'	J112	J118	190	187.4	0	39.08	6.51	81%	0.8622	7.66	8.90	0.23	0.31	54204.90	0.0206	0.102	0.501	49.379	49.379
P02_C_H61'	J118	H61'	117.8	111.4	22.14	12.02	2.00	81%	0.8622	1.65	3.11	0.26	0.29	30552.37	0.0235	0.092	0.593	49.287	27.147
P02_D'	J118	J119	190	68.5	0	27.06	4.51	81%	0.8622	6.01	6.62	0.24	0.23	40345.64	0.0220	0.022	0.523	49.357	49.357
P02_D_H62'	J119	H62'	117.8	18.3	24.31	11.07	1.84	81%	0.8622	1.51	2.90	0.26	0.27	28523.85	0.0239	0.013	0.536	49.344	25.034
P02_F_H63'	J119	H63'	132.4	154.9	23.96	15.99	2.66	81%	0.8622	4.50	4.49	0.28	0.33	39288.62	0.0222	0.141	0.664	49.216	25.256
P04_A'	J250	J124	190	357.4	0	161.54	26.92	81%	0.8622	33.13	31.88	0.20	1.12	194216.67	0.0161	1.949	1.977	47.903	47.903
P04_B'	J124	J125	190	407	0	29.54	4.92	81%	0.8622	7.10	7.22	0.24	0.25	43985.62	0.0216	0.153	2.130	47.750	47.750
P04_B_H15'	J125	H15'	117.8	5	20.69	13.08	2.18	81%	0.8622	2.10	3.43	0.26	0.31	33682.00	0.0230	0.005	2.135	47.745	27.055
P04_C_H16'	J125	H16'	152	210.1	19.47	16.46	2.74	81%	0.8622	5.01	4.67	0.28	0.26	35577.60	0.0227	0.106	2.236	47.644	28.174
P0401_A'	J124	J138	190	94.9	0	59.89	9.98	81%	0.8622	11.32	12.88	0.22	0.45	78464.57	0.0191	0.100	2.077	47.803	47.803
P0401_A_H11'	J138	H11'	132.4	7.3	18.57	14.73	2.45	81%	0.8622	3.25	4.01	0.27	0.29	35039.23	0.0228	0.005	2.083	47.797	29.227
P0401_B'	J138	J140	190	134.1	0	45.16	7.52	81%	0.8622	8.07	9.97	0.22	0.35	60763.70	0.0201	0.090	2.167	47.713	47.713
P0401_B_H10'	J140	H10'	117.8	111.4	16.48	12.08	2.01	81%	0.8622	2.09	3.26	0.27	0.30	32015.52	0.0233	0.100	2.267	47.613	31.133
P0401_C'	J140	J141	190	60.9	0	33.08	5.51	81%	0.8622	5.98	7.62	0.23	0.27	46428.33	0.0213	0.025	2.192	47.688	47.688
P0401_C_H9'	J141	H9'	132.4	5	17.37	14.23	2.37	81%	0.8622	3.13	3.90	0.27	0.28	34060.68	0.0229	0.004	2.195	47.685	30.315
P0401_D'	J141	J143	152	252.6	0	18.85	3.14	81%	0.8622	2.86	4.60	0.24	0.25	35013.47	0.0228	0.124	2.316	47.564	47.564
P0401_D_H7'	J143	H7'	117.8	6.5	15.6	11.91	1.98	81%	0.8622	2.00	3.21	0.27	0.29	31493.99	0.0234	0.006	2.321	47.559	31.959
P0401_D_H8'	J143	H8'	104.4	8.2	15.19	6.94	1.16	81%	0.8622	0.85	1.95	0.28	0.23	21640.53	0.0256	0.005	2.321	47.559	32.369
P0403_A'	J124	J133	190	30.5	0	30.21	5.03	81%	0.8622	5.28	7.01	0.23	0.25	42735.47	0.0217	0.011	1.988	47.892	47.892
P0403_A_H12'	J133	H12'	104.4	5	19.16	7.44	1.24	81%	0.8622	1.04	2.12	0.28	0.25	23487.75	0.0251	0.004	1.992	47.888	28.728
P0403_B'	J133	J135	152	178.8	0	22.77	3.79	81%	0.8622	4.24	5.57	0.24	0.31	42413.48	0.0218	0.123	2.111	47.769	47.769
P0403_B_H13'	J135	H13'	104.4	5	18.5	10.1	1.68	81%	0.8622	1.58	2.77	0.27	0.32	30682.90	0.0235	0.006	2.117	47.763	29.263
P0403_C_H14'	J135	H14'	117.8	159.3	16.88	12.67	2.11	81%	0.8622	2.66	3.52	0.28	0.32	34558.10	0.0229	0.164	2.275	47.605	30.725
P0404_A'	J124	J128	213.6	16.3	0	41.9	6.98	81%	0.8622	9.44	9.63	0.23	0.27	52186.89	0.0208	0.006	1.983	47.897	47.897
P0404_A_H58'	J130	H58'	132.4	76.2	21.69	15	2.50	81%	0.8622	2.78	3.94	0.26	0.29	34409.30	0.0229	0.055	2.229	47.651	25.961
P0404_A_H59'	J128	H59'	132.4	146.9	20.99	13.86	2.31	81%	0.8622	2.66	3.72	0.27	0.27	32492.27	0.0232	0.096	2.078	47.802	26.812
P0404_B'	J128	J130	152	189.3	0	28.04	4.67	81%	0.8622	6.77	6.92	0.25	0.38	52667.68	0.0208	0.192	2.174	47.706	47.706
P0404_C_H60'	J130	H60'	152	69.8	22.68	13.04	2.17	81%	0.8622	4.00	3.90	0.30	0.21	29674.21	0.0236	0.026	2.200	47.680	25.000

1.2.2 Calculo de la garantía suministro de la alternativa con modificación de ubicación de hidrantes

A continuación, se observa el cálculo de la garantía suministro para el diseño de la red con la modificación de ubicación de los hidrantes:

									GS_global				Rug	0.01					
									93.25%				Visc	1.10E-06					25.004
																			0.004
Tuberia	**Nudo Ini**	**Nudo Fin**	**Diam (mm)**	**Long (m)**	**z(fin)**	**Qinst**	**∑pi·Qi**	**GS**	**U**	**∑pi·(1-pi)·Qi^2**	**Q diseño**	**ks**	**V (m/s)**	**Re**	**f**	**hf**	**∑hf**	**H(fin)**	**P(fin)**
P00'	UGD_43	J250	474.6	16	19.23	949.44	158.203063	93%	1.4947	1551.25	217.07	0.23	1.23	529411.86	0.0133	0.034	0.034	54.846	35.616
P01_A'	J250	J147	379.8	89.5	0	709.1	118.155746	93%	1.4947	266.12	142.54	0.20	1.26	434404.92	0.0138	0.262	0.297	54.583	54.583
P01_A_H2'	J147	H2'	152	4	19.17	18.96	3.15926237	93%	1.4947	6.64	7.01	0.37	0.39	53396.53	0.0207	0.004	0.301	54.579	35.409
P01_B'	J147	J148	379.8	103.1	0	690.14	114.996484	93%	1.4947	203.19	136.30	0.20	1.20	415399.27	0.0139	0.278	0.575	54.305	54.305
P01_B_H3'	J148	H3'	132.4	80.5	18.73	14.97	2.4944176	93%	1.4947	4.03	5.49	0.37	0.40	48033.82	0.0213	0.105	0.680	54.200	35.470
P01_C'	J148	J149	299.2	150.7	0	675.17	112.502066	93%	1.4947	199.16	133.60	0.20	1.90	516830.51	0.0135	1.255	1.830	53.050	53.050
P01_C_H4'	J149	H4'	152	5	17.15	18.93	3.15426354	93%	1.4947	4.33	6.26	0.33	0.35	47701.56	0.0212	0.004	1.834	53.046	35.896
P01_D'	J149	J150	299.2	110.3	0	391.69	65.2664282	93%	1.4947	132.47	82.47	0.21	1.17	319043.87	0.0146	0.378	2.208	52.672	52.672
P01_D_H6'	J150	H6'	132.4	78.9	16.18	14.48	2.41277	93%	1.4947	3.17	5.07	0.35	0.37	44345.29	0.0216	0.089	2.297	52.583	36.403
P01_E'	J150	J151	299.2	123.3	0	377.21	62.8536582	93%	1.4947	129.31	79.85	0.21	1.14	308909.59	0.0147	0.398	2.605	52.275	52.275
P01_E_H5'	J151	H5'	132.4	5	15.59	14.48	2.41277	93%	1.4947	2.44	4.75	0.33	0.34	41517.98	0.0219	0.005	2.610	52.270	36.680
P01_F'	J151	J152	299.2	246.5	0	362.73	60.4408882	93%	1.4947	126.86	77.28	0.21	1.10	298951.36	0.0148	0.749	3.354	51.526	51.526
P01_F_H32'	J152	H32'	132.4	51.8	14.17	14.29	2.38111072	93%	1.4947	2.56	4.77	0.33	0.35	41704.62	0.0219	0.052	3.407	51.473	37.303
P01_G'	J152	J153	299.2	388.5	0	348.44	58.0597775	93%	1.4947	124.31	74.72	0.21	1.06	289080.51	0.0148	1.110	4.464	50.416	50.416
P0101_A'	J149	J161	237.4	233.1	0	264.55	44.0813745	93%	1.4947	62.36	55.88	0.21	1.26	272476.04	0.0151	1.204	3.034	51.846	51.846
P0101_B'	J161	J172	213.6	110.8	0	193.11	32.1774872	93%	1.4947	47.90	42.52	0.22	1.19	230425.53	0.0156	0.580	3.613	51.267	51.267
P0101_B_H26'	J172	H26'	117.8	5	18.39	11.56	1.92621693	93%	1.4947	2.05	4.07	0.35	0.37	39978.59	0.0222	0.007	3.620	51.260	32.870
P0101_C'	J172	J174	213.6	58.1	0	181.55	30.2512702	93%	1.4947	45.85	40.37	0.22	1.13	218771.97	0.0157	0.276	3.890	50.990	50.990
P0101_D'	J174	J175	152	22.1	0	131.25	21.8698938	93%	1.4947	31.93	30.32	0.23	1.67	230855.52	0.0157	0.325	4.215	50.665	50.665
P0101_E'	J175	J176	152	124.3	0	98.86	16.4728206	93%	1.4947	23.40	23.70	0.24	1.31	180500.01	0.0164	1.166	5.381	49.499	49.499
P0101_F'	J176	J177	132.4	157	0	56.66	9.44112901	93%	1.4947	16.40	15.49	0.27	1.13	135454.03	0.0173	1.325	6.706	48.174	48.174
P0101_F_H18'	J177	H18'	104.4	5	17.38	19.03	3.17092631	93%	1.4947	8.85	7.62	0.40	0.89	84460.11	0.0190	0.037	6.743	48.137	30.757
P0101_G'	J177	J178	117.8	225.7	0	37.63	6.27020269	93%	1.4947	7.55	10.38	0.28	0.95	101957.95	0.0183	1.620	8.326	46.554	46.554
P0101_G_H19'	J178	H19'	104.4	5	18.27	15.46	2.5760652	93%	1.4947	3.40	5.33	0.34	0.62	59113.94	0.0204	0.019	8.345	46.535	28.265
P0101_H'	J178	J179	117.8	378.9	0	22.17	3.69413749	93%	1.4947	4.15	6.74	0.30	0.62	66210.41	0.0199	1.248	9.574	45.306	45.306
P0101_H_H20'	J179	H20'	104.4	5	17.7	12.58	2.09617725	93%	1.4947	2.57	4.49	0.36	0.52	49792.89	0.0212	0.014	9.588	45.292	27.592
P0101_I_H21'	J179	H21'	104.4	102.1	16.68	9.59	1.59796024	93%	1.4947	1.58	3.48	0.36	0.41	38552.57	0.0224	0.184	9.758	45.122	28.442
P010101_A'	J174	J191	117.8	30.3	0	50.3	8.38137644	93%	1.4947	13.92	13.96	0.28	1.28	137142.13	0.0173	0.373	4.262	50.618	50.618
P010101_A_H17'	J191	H17'	104.4	5	19.9	28.63	4.77055283	93%	1.4947	10.45	9.60	0.34	1.12	106463.85	0.0182	0.056	4.318	50.562	30.662
P010101_B'	J191	J193	117.8	236.9	0	21.67	3.61082361	93%	1.4947	3.47	6.39	0.30	0.59	62819.68	0.0201	0.710	4.972	49.908	49.908
P010101_B_H66'	J193	H66'	104.4	6	20.96	11.24	1.87289605	93%	1.4947	1.71	3.83	0.34	0.45	42453.16	0.0219	0.013	4.985	49.895	28.935
P010101_C_H65'	J193	H65'	104.4	66.5	21.77	10.43	1.73792756	93%	1.4947	1.75	3.72	0.36	0.43	41207.06	0.0220	0.135	5.107	49.773	28.003
P010102_A'	J161	J162	132.4	150	0	71.44	11.9038873	93%	1.4947	14.46	17.59	0.25	1.28	153756.98	0.0169	1.595	4.629	50.251	50.251
P010102_A_H27'	J162	H27'	104.4	5	17.33	19.68	3.27923436	93%	1.4947	5.02	6.63	0.34	0.77	73472.47	0.0195	0.029	4.658	50.222	32.892
P010102_B'	J162	J163	117.8	155.9	0	51.76	8.62465297	93%	1.4947	9.44	13.22	0.26	1.21	129877.21	0.0175	1.737	6.366	48.514	48.514
P010102_B_H28'	J163	H28'	104.4	4	16.73	15.21	2.53440826	93%	1.4947	3.15	5.19	0.34	0.61	57532.58	0.0205	0.015	6.381	48.499	31.769
P010102_C'	J163	J164	117.8	123.1	0	36.55	6.09024471	93%	1.4947	6.29	9.84	0.27	0.90	96672.52	0.0185	0.802	7.168	47.712	47.712
P010102_D'	J164	J166	117.8	55.1	0	25.22	4.20235216	93%	1.4947	4.64	7.42	0.29	0.68	72937.58	0.0195	0.216	7.384	47.496	47.496
P010102_D_H29'	J164	H29'	104.4	30	15	11.33	1.88789255	93%	1.4947	1.65	3.81	0.34	0.44	42191.83	0.0219	0.063	7.232	47.648	32.648
P010102_D_H30'	J166	H30'	104.4	30	15.1	11.16	1.85956583	93%	1.4947	1.56	3.73	0.33	0.44	41347.58	0.0220	0.061	7.445	47.435	32.335
P010102_D_H31'	J166	H31'	104.4	202.8	14.25	14.06	2.34278634	93%	1.4947	3.08	4.97	0.35	0.58	55048.27	0.0207	0.690	8.075	46.805	32.555
P010103_A'	J175	J196	152	403.8	0	32.39	5.39707322	93%	1.4947	8.53	9.76	0.30	0.54	74340.15	0.0194	0.759	4.974	49.906	49.906
P010103_A_H67'	J196	H67'	132.4	5	21.63	16.54	2.75602319	93%	1.4947	3.20	5.43	0.33	0.39	47486.57	0.0213	0.006	4.980	49.900	28.270

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	Long (m)	z(fin)	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P010103_B_H68'	J196	H68'	132.4	237.7	22.11	15.85	2.64105003	93%	1.4947	5.32	6.09	0.38	0.44	53240.84	0.0208	0.372	5.346	49.534	27.424
P010104_A'	J176	J181	132.4	86.4	0	42.2	7.03169157	93%	1.4947	7.00	10.99	0.26	0.80	96046.16	0.0185	0.391	5.772	49.108	49.108
P010104_A_H22'	J181	H22'	104.4	5	18.41	10.43	1.73792756	93%	1.4947	1.41	3.51	0.34	0.41	38965.23	0.0223	0.009	5.781	49.099	30.689
P010104_B'	J181	J182	117.8	131.6	0	31.77	5.29376401	93%	1.4947	5.59	8.83	0.28	0.81	86731.62	0.0189	0.705	6.477	48.403	48.403
P010104_B_H23'	J182	H23'	104.4	3.5	17.8	9.34	1.5563033	93%	1.4947	1.12	3.14	0.34	0.37	34825.98	0.0229	0.005	6.482	48.398	30.598
P010104_C'	J182	J183	117.8	73.7	0	22.43	3.73746071	93%	1.4947	4.46	6.90	0.31	0.63	67750.94	0.0198	0.253	6.730	48.150	48.150
P010104_C_H25'	J183	H25'	104.4	91.9	16.81	9.75	1.62462068	93%	1.4947	1.14	3.22	0.33	0.38	35693.89	0.0228	0.144	6.874	48.006	31.196
P010104_D_H24'	J183	H24'	104.4	29	16.89	12.68	2.11284002	93%	1.4947	3.32	4.84	0.38	0.57	53641.46	0.0208	0.094	6.824	48.056	31.166
P0102_A'	J153	J223	237.4	142.4	0	157.37	26.2222109	93%	1.4947	28.32	34.18	0.22	0.77	166632.82	0.0164	0.300	4.764	50.116	50.116
P0102_A_H33'	J223	H33'	104.4	5	13.35	14.48	2.41277	93%	1.4947	2.91	4.96	0.34	0.58	55027.99	0.0207	0.017	4.781	50.099	36.749
P0102_B'	J223	J225	237.4	173	0	142.89	23.8094409	93%	1.4947	25.41	31.34	0.22	0.71	152821.09	0.0167	0.311	5.075	49.805	49.805
P0102_B_H34'	J225	H34'	104.4	5	13.81	11.58	1.92954949	93%	1.4947	1.76	3.92	0.34	0.46	43406.47	0.0218	0.011	5.086	49.794	35.984
P0102_C'	J225	J227	190	248.6	0	131.31	21.8798915	93%	1.4947	23.64	29.15	0.22	1.03	177568.47	0.0163	1.151	6.227	48.653	48.653
P0102_C_H35'	J227	H35'	104.4	4	13.13	9.43	1.5712998	93%	1.4947	1.32	3.29	0.35	0.38	36425.78	0.0227	0.007	6.233	48.647	35.517
P0102_D'	J227	J243	152	148.9	0	46.46	7.74152583	93%	1.4947	9.63	12.38	0.27	0.68	94277.22	0.0185	0.429	6.656	48.224	48.224
P0102_E'	J243	J247	152	287.7	0	25.3	4.21568238	93%	1.4947	6.31	7.97	0.32	0.44	60689.77	0.0202	0.376	7.031	47.849	47.849
P0102_E_H38'	J247	H38'	104.4	4	10.2	10.16	1.69293806	93%	1.4947	1.48	3.51	0.35	0.41	38948.98	0.0223	0.007	7.039	47.841	37.641
P0102_F_H39'	J247	H39'	132.4	95.9	9.86	15.14	2.52274432	93%	1.4947	4.83	5.81	0.38	0.42	50758.47	0.0210	0.138	7.169	47.711	37.851
P010201_A'	J243	J244	152	42.4	0	21.16	3.52584345	93%	1.4947	3.32	6.25	0.30	0.34	47601.25	0.0213	0.036	6.692	48.188	48.188
P010201_A_H36'	J244	H36'	104.4	5	11.39	7.93	1.32135815	93%	1.4947	0.76	2.63	0.33	0.31	29137.99	0.0238	0.005	6.697	48.183	36.793
P010201_B_H37'	J244	H37'	117.8	137	11.68	13.23	2.20448529	93%	1.4947	2.56	4.60	0.35	0.42	45158.09	0.0216	0.227	6.919	47.961	36.281
P010202_A'	J227	J229	190	74.9	0	75.42	12.5670658	93%	1.4947	12.70	17.89	0.24	0.63	109003.03	0.0179	0.143	6.370	48.510	48.510
P010202_B'	J229	J234	190	10	0	53.02	8.83460395	93%	1.4947	8.86	13.28	0.25	0.47	80919.25	0.0190	0.011	6.381	48.499	48.499
P010202_B_H42'	J234	H42'	104.4	5	13.14	7.77	1.29469771	93%	1.4947	0.97	2.77	0.36	0.32	30656.43	0.0236	0.006	6.387	48.493	35.353
P010202_C'	J234	J236	190	149.2	0	45.25	7.53990624	93%	1.4947	7.89	11.74	0.26	0.41	71508.58	0.0194	0.133	6.514	48.366	48.366
P010202_C_H43'	J236	H43'	104.4	5	14.1	10.42	1.73626128	93%	1.4947	1.67	3.67	0.35	0.43	40644.00	0.0221	0.010	6.524	48.356	34.256
P010202_D'	J236	J238	190	237.7	0	34.83	5.80364496	93%	1.4947	6.22	9.53	0.27	0.34	58069.42	0.0203	0.146	6.661	48.219	48.219
P010202_D_H46'	J238	H46'	132.4	416.5	12.32	15.53	2.58772915	93%	1.4947	2.72	5.05	0.33	0.37	44181.94	0.0216	0.467	7.128	47.752	35.432
P010202_E'	J238	J239	152	14.3	0	19.3	3.21591581	93%	1.4947	3.50	6.01	0.31	0.33	45783.34	0.0214	0.011	6.672	48.208	48.208
P010202_E_H45'	J239	H45'	104.4	5.7	14.68	9.45	1.57463235	93%	1.4947	1.83	3.60	0.38	0.42	39864.99	0.0222	0.011	6.683	48.197	33.517
P010202_F_H44'	J239	H44'	104.4	184.6	16.18	9.85	1.64128346	93%	1.4947	1.67	3.57	0.36	0.42	39623.49	0.0222	0.349	7.021	47.859	31.679
P01020201_A'	J229	J230	152	242.2	0	22.4	3.73246187	93%	1.4947	3.84	6.66	0.30	0.37	50723.38	0.0210	0.229	6.599	48.281	48.281
P01020201_A_H41'	J230	H41'	104.4	5	11.55	10.42	1.73626128	93%	1.4947	1.75	3.72	0.36	0.43	41200.83	0.0220	0.010	6.609	48.271	36.721
P01020201_B_H40'	J230	H40'	117.8	112.7	10.33	11.98	1.99620059	93%	1.4947	2.08	4.15	0.35	0.38	40816.68	0.0221	0.156	6.755	48.125	37.795
P0103_A'	J153	J200	299.2	106.9	0	191.07	31.8375665	93%	1.4947	89.27	45.96	0.24	0.65	177800.36	0.0162	0.126	4.590	50.290	50.290
P0103_A_H57'	J200	H57'	117.8	5	13	16.79	2.79768013	93%	1.4947	4.04	5.80	0.35	0.53	56991.79	0.0205	0.013	4.603	50.277	37.277
P0103_B'	J200	J202	299.2	271.7	0	174.28	29.0398864	93%	1.4947	85.23	42.84	0.25	0.61	165728.15	0.0164	0.282	4.872	50.008	50.008
P0103_B_H56'	J202	H56'	117.8	5.3	11.98	18.52	3.08594616	93%	1.4947	4.35	6.20	0.34	0.57	60966.30	0.0202	0.015	4.887	49.993	38.013
P0103_C'	J202	J205	213.6	176.1	0	155.76	25.9539402	93%	1.4947	80.88	39.40	0.25	1.10	213486.12	0.0158	0.801	5.673	49.207	49.207
P0103_C_H55'	J205	H55'	117.8	5	11.32	16.14	2.68937208	93%	1.4947	3.17	5.35	0.33	0.49	52576.80	0.0209	0.011	5.684	49.196	37.876
P0103_D'	J205	J207	213.6	160.1	0	139.62	23.2645682	93%	1.4947	77.71	36.44	0.26	1.02	197470.47	0.0160	0.632	6.305	48.575	48.575
P0103_D_H54'	J207	H54'	117.8	5.1	10.38	15.79	2.63105237	93%	1.4947	4.08	5.65	0.36	0.52	55507.86	0.0206	0.012	6.317	48.563	38.183

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	Long (m)	z(fin)	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P0103_E'	J207	J209	190	259	0	123.83	20.6335158	93%	1.4947	73.63	33.46	0.27	1.18	203835.72	0.0159	1.543	7.848	47.032	47.032
P0103_F'	J209	J210	190	169.6	0	58.63	9.7693857	93%	1.4947	35.77	18.71	0.32	0.66	113974.75	0.0177	0.351	8.199	46.681	46.681
P0103_F_H50'	J210	H50'	117.8	75.7	9.28	11.81	1.96787387	93%	1.4947	2.71	4.43	0.37	0.41	43507.50	0.0217	0.118	8.316	46.564	37.284
P0103_G'	J210	J212	190	64.1	0	46.82	7.80151183	93%	1.4947	33.06	16.40	0.35	0.58	99883.78	0.0182	0.105	8.303	46.577	46.577
P0103_G_H49'	J212	H49'	104.4	20	10.5	7.68	1.27970121	93%	1.4947	1.06	2.82	0.37	0.33	31229.23	0.0235	0.025	8.328	46.552	36.052
P0103_H'	J212	J214	190	132.7	0	39.14	6.52181061	93%	1.4947	32.00	14.98	0.38	0.53	91243.65	0.0185	0.184	8.487	46.393	46.393
P0103_H_H48'	J214	H48'	132.4	3.5	10.33	17.37	2.89432423	93%	1.4947	4.44	6.04	0.35	0.44	52835.26	0.0208	0.005	8.493	46.387	36.057
P0103_I_H47'	J214	H47'	190	193.2	12.41	21.77	3.62748638	93%	1.4947	27.56	11.47	0.53	0.40	69905.20	0.0195	0.166	8.653	46.227	33.817
P010301_A'	J209	J217	152	101	0	65.2	10.8641301	93%	1.4947	37.86	20.06	0.31	1.11	152768.09	0.0169	0.699	8.546	46.334	46.334
P010301_A_H51'	J217	H51'	132.4	5	9.98	15.9	2.64938142	93%	1.4947	3.41	5.41	0.34	0.39	47296.05	0.0213	0.006	8.553	46.327	36.347
P010301_B'	J217	J219	152	128.4	0	49.3	8.21474868	93%	1.4947	34.45	16.99	0.34	0.94	129363.44	0.0174	0.656	9.203	45.677	45.677
P010301_B_H52'	J219	H52'	152	5	10.72	23.41	3.90075591	93%	1.4947	14.59	9.61	0.41	0.53	73175.37	0.0194	0.009	9.212	45.668	34.948
P010301_C_H53'	J219	H53'	152	229.9	12.11	25.89	4.31399276	93%	1.4947	19.87	10.98	0.42	0.60	83581.39	0.0189	0.533	9.736	45.144	33.034
P02_A'	J250	J109	132.4	115.2	0	78.8	13.1302677	93%	1.4947	29.79	21.29	0.27	1.55	186111.88	0.0164	1.737	1.772	53.108	53.108
P02_A_H1'	J109	H1'	190	5	20.18	28.28	4.71223312	93%	1.4947	20.54	11.49	0.41	0.41	69974.97	0.0195	0.004	1.776	53.104	32.924
P02_B'	J109	J112	117.8	190.1	0	50.52	8.41803455	93%	1.4947	9.25	12.96	0.26	1.19	127386.25	0.0176	2.045	3.816	51.064	51.064
P02_B_H64'	J112	H64'	117.8	5.8	21.9	11.44	1.9062216	93%	1.4947	1.60	3.79	0.33	0.35	37280.49	0.0225	0.007	3.823	51.057	29.157
P02_C'	J112	J118	117.8	187.4	0	39.08	6.51181295	93%	1.4947	7.66	10.65	0.27	0.98	104622.26	0.0182	1.409	5.226	49.654	49.654
P02_C_H61'	J118	H61'	117.8	114.4	22.14	12.02	2.0028657	93%	1.4947	1.65	3.92	0.33	0.36	38527.14	0.0223	0.143	5.369	49.511	27.371
P02_D'	J118	J119	117.8	68.5	0	27.06	4.50894725	93%	1.4947	6.01	8.17	0.30	0.75	80307.49	0.0192	0.319	5.545	49.335	49.335
P02_D_H62'	J119	H62'	117.8	18.3	24.31	11.07	1.84456933	93%	1.4947	1.51	3.68	0.33	0.34	36151.60	0.0227	0.020	5.566	49.314	25.004
P02_F_H63'	J119	H63'	117.8	63	23.96	15.99	2.66437792	93%	1.4947	4.50	5.84	0.36	0.54	57344.70	0.0205	0.160	5.705	49.175	25.215
P04_A'	J250	J124	190	357.4	0	161.54	26.9170487	93%	1.4947	33.13	35.52	0.22	1.25	216394.74	0.0158	2.376	2.410	52.470	52.470
P04_B'	J124	J125	132.4	407	0	29.54	4.9221841	93%	1.4947	7.10	8.91	0.30	0.65	77856.93	0.0192	1.260	3.670	51.210	51.210
P04_B_H15'	J125	H15'	104.4	5	20.69	13.08	2.17949113	93%	1.4947	2.10	4.34	0.33	0.51	48157.33	0.0213	0.013	3.684	51.196	30.506
P04_C_H16'	J125	H16'	104.4	166.1	19.47	16.46	2.74269297	93%	1.4947	5.01	6.09	0.37	0.71	67488.33	0.0199	0.815	4.486	50.394	30.924
P0401_A'	J124	J138	117.8	94.9	0	59.89	9.97933668	93%	1.4947	11.32	15.01	0.25	1.38	147459.99	0.0171	1.333	3.743	51.137	51.137
P0401_A_H11'	J138	H11'	132.4	7.3	18.57	14.73	2.45442694	93%	1.4947	3.25	5.15	0.35	0.37	45001.22	0.0216	0.008	3.751	51.129	32.559
P0401_B'	J138	J140	117.8	134.1	0	45.16	7.52490974	93%	1.4947	8.07	11.77	0.26	1.08	115658.77	0.0179	1.210	4.953	49.927	49.927
P0401_B_H10'	J140	H10'	104.4	111.4	16.48	12.08	2.01286337	93%	1.4947	2.09	4.17	0.35	0.49	46252.78	0.0215	0.278	5.230	49.650	33.170
P0401_C'	J140	J141	117.8	60.9	0	33.08	5.51204637	93%	1.4947	5.98	9.17	0.28	0.84	90084.87	0.0187	0.349	5.302	49.578	49.578
P0401_C_H9'	J141	H9'	104.4	5	17.37	14.23	2.37111306	93%	1.4947	3.13	5.01	0.35	0.59	55596.80	0.0207	0.017	5.319	49.561	32.191
P0401_D'	J141	J143	117.8	177.6	0	18.85	3.14093332	93%	1.4947	2.86	5.67	0.30	0.52	55679.39	0.0206	0.429	5.731	49.149	49.149
P0401_D_H7'	J143	H7'	104.4	4.5	15.6	11.91	1.98453665	93%	1.4947	2.00	4.10	0.34	0.48	45463.05	0.0216	0.011	5.741	49.139	33.539
P0401_D_H8'	J143	H8'	104.4	4	15.19	6.94	1.15639667	93%	1.4947	0.85	2.54	0.37	0.30	28109.49	0.0240	0.004	5.735	49.145	33.955
P0403_A'	J124	J133	117.8	30.5	0	30.21	5.0338247	93%	1.4947	5.28	8.47	0.28	0.78	83206.48	0.0190	0.152	2.561	52.319	52.319
P0403_A_H12'	J133	H12'	104.4	5	19.16	7.44	1.23971055	93%	1.4947	1.04	2.76	0.37	0.32	30634.10	0.0236	0.006	2.567	52.313	33.153
P0403_B'	J133	J135	117.8	178.8	0	22.77	3.79411415	93%	1.4947	4.24	6.87	0.30	0.63	67523.84	0.0198	0.610	3.171	51.709	51.709
P0403_B_H13'	J135	H13'	104.4	5	18.5	10.1	1.6829404	93%	1.4947	1.58	3.56	0.35	0.42	39502.35	0.0223	0.009	3.181	51.699	33.199
P0403_C_H14'	J135	H14'	117.8	159.3	16.88	12.67	2.11117375	93%	1.4947	2.66	4.55	0.36	0.42	44690.43	0.0216	0.260	3.431	51.449	34.569
P0404_A'	J124	J128	117.8	16.3	0	41.9	6.98170324	93%	1.4947	9.44	11.57	0.28	1.06	113717.22	0.0179	0.143	2.553	52.327	52.327
P0404_A_H58'	J130	H58'	104.4	2.5	21.69	15	2.49941643	93%	1.4947	2.78	4.99	0.33	0.58	55319.81	0.0207	0.009	2.957	51.923	30.233
P0404_A_H59'	J128	H59'	104.4	146.9	20.99	13.86	2.30946078	93%	1.4947	2.66	4.75	0.34	0.55	52650.16	0.0209	0.462	3.014	51.866	30.876
P0404_B'	J128	J130	117.8	78.06	0	28.04	4.67224245	93%	1.4947	6.77	8.56	0.31	0.79	84131.17	0.0190	0.396	2.948	51.932	51.932
P0404_C_H60'	J130	H60'	104.4	120	22.68	13.04	2.17282602	93%	1.4947	4.00	5.16	0.40	0.60	57223.35	0.0206	0.438	3.386	51.494	28.814

1.2.3 Resultados de las tuberías terciarias del sector 43

Tubería	Long (m)	DN (mm)	Presión (mca)
H-1-T-1	76.4	40	29.21
H-1-T-2	15.2	90	20.81
H-1-T-3	97.3	90	24.04
H-1-T-4	2.8	50	26.28
H-1-T-5	192.1	40	27.47
H-1-T-6	320.5	50	26.13
H-1-T-7	222.1	50	25.82
H-1-T-8	14.1	40	25.8
H-1-T-9	64.2	40	24.41
H-1-T-10	147.2	40	28.57
H-1-T-11	308.8	63	25.83
H-1-T-12	186.5	75	22.92
H-2-T-1	282.6	40	24.77
H-2-T-2	6.7	40	29.58
H-2-T-3	195.6	40	24.11
H-2-T-4	34.5	40	24.96
H-2-T-5	139.5	75	23.97
H-2-T-6	73.6	40	28.03
H-2-T-7	279.6	75	25.95
H-2-T-8	169	50	26.29
H-2-T-9	34	40	29.99

Tubería	Long (m)	DN (mm)	Presión (mca)
H-2-T-10	170.1	40	29.71
H-2-T-11	38.5	50	25.5
H-2-T-12	367.1	75	23.12
H-2-T-13	8.4	40	30.18
H-2-T-14	55.2	40	29.72
H-3-T-1	16.1	40	29.92
H-3-T-2	3.4	40	26.58
H-3-T-3	47	40	29.08
H-3-T-4	67.4	40	28.14
H-3-T-5	52.5	50	21.43
H-3-T-6	157.8	40	28.55
H-3-T-7	40.8	40	28.55
H-3-T-8	86.3	40	27.33
H-3-T-9	3.7	40	27.02
H-3-T-10	66.8	40	27.63
H-3-T-11	12.6	63	25.69
H-3-T-12	88.4	40	23.76
H-3-T-13	100.4	63	26.13
H-4-T-1	119.3	40	27.36
H-4-T-2	13.1	50	24.94
H-4-T-3	2.6	40	27.42

Tubería	Long (m)	DN (mm)	Presión (mca)
H-4-T-4	156.5	50	26.46
H-4-T-5	19.9	40	28.34
H-4-T-6	112.9	40	30.56
H-4-T-7	123.8	50	26.37
H-4-T-8	75	40	22.58
H-4-T-9	118.7	40	27.68
H-4-T-10	58.7	50	22.88
H-4-T-11	59.9	40	26.29
H-4-T-12	117.1	50	20.87
H-4-T-13	24.6	63	25.58
H-4-T-14	63.3	50	22.08
H-5-T-1	82.5	40	26.04
H-5-T-2	57.6	40	23.5
H-5-T-3	154.7	50	21.78
H-5-T-4	45	40	30.43
H-5-T-5	89.7	40	29.42
H-5-T-6	199.7	40	26.14
H-5-T-7	8.6	40	31.64
H-5-T-8	43.6	40	30.52
H-5-T-9	9.2	40	21.05
H-5-T-10	2.1	40	31.88

Tubería	Long (m)	DN (mm)	Presión (mca)
H-5-T-11	145.1	40	27.22
H-5-T-12	205.1	40	33.38
H-5-T-13	201.8	40	28.25
H-5-T-14	122.4	40	24.13
H-5-T-15	199.5	40	31.38
H-6-T-1	117.8	40	30.26
H-6-T-2	49.4	63	26.98
H-6-T-3	4.9	40	21.22
H-6-T-4	70.4	50	25.67
H-6-T-5	158.4	40	21.53
H-6-T-6	148	40	24.15
H-6-T-7	176.2	40	29.64
H-6-T-8	87.5	40	31.19
H-6-T-9	108.9	40	31.25
H-6-T-10	130.2	40	30.23
H-6-T-11	32.5	40	29.91
H-6-T-12	3	40	30.77
H-6-T-13	9.9	50	25.14
H-7-T-1	117.4	40	29.96
H-7-T-2	110.7	40	22.57
H-7-T-3	112.6	40	27.41
H-7-T-4	48.6	40	31.05

Tubería	Long (m)	DN (mm)	Presión (mca)
H-7-T-5	32.9	40	31.69
H-7-T-6	119.1	40	31.11
H-7-T-7	2.8	50	24.53
H-7-T-8	96	40	25.24
H-7-T-9	75	50	25.37
H-7-T-10	35.6	40	30.52
H-7-T-11	70.2	40	27.32
H-7-T-12	155.8	40	22.36
H-8-T-1	174	40	30.71
H-8-T-2	25.1	40	32.1
H-8-T-3	207.7	40	30.43
H-8-T-4	237.7	40	32.32
H-8-T-5	251.7	50	27.97
H-8-T-6	277	40	26.44
H-8-T-7	4.7	50	25.26
H-8-T-8	282.5	40	26.4
H-8-T-9	172	40	28.92
H-8-T-10	24.5	40	32.99
H-8-T-11	294.7	40	25.97
H-9-T-1	205.5	40	28.68
H-9-T-2	154.2	40	31.07
H-9-T-3	193	40	27.04

Tubería	Long (m)	DN (mm)	Presión (mca)
H-9-T-4	242.8	75	25.63
H-9-T-5	168.9	40	27.37
H-9-T-6	3.9	40	31.06
H-9-T-7	11.5	40	21.48
H-9-T-8	165.6	40	22.27
H-9-T-9	169.3	40	28.15
H-9-T-10	44.2	40	27.26
H-9-T-11	152.8	40	22.38
H-9-T-12	2.4	40	30.76
H-9-T-13	46.2	40	29.78
H-9-T-14	194.1	50	26.06
H-10-T-1	155.8	40	31.07
H-10-T-2	120.8	63	25.09
H-10-T-3	149	50	26.47
H-10-T-4	108	40	30.9
H-10-T-5	83.4	40	28.71
H-10-T-6	44.5	40	29.15
H-10-T-7	7.9	40	27.02
H-10-T-8	3	40	31.34
H-10-T-9	56	40	21.82
H-10-T-10	106.7	63	28.43
H-10-T-11	89.3	40	28.61

Tubería	Long (m)	DN (mm)	Presión (mca)
H-10-T-12	160.2	40	21.47
H-11-T-1	216.2	40	24.23
H-11-T-2	138.9	50	26.75
H-11-T-3	150.2	40	21.35
H-11-T-4	9	50	26.77
H-11-T-5	75.4	40	21.95
H-11-T-6	119.2	75	24.48
H-11-T-7	153.3	50	24.54
H-11-T-8	64.6	40	26.67
H-11-T-9	79.6	40	23.53
H-11-T-10	2.2	40	29.54
H-11-T-11	60.6	40	28.72
H-11-T-12	51.5	40	28.97
H-11-T-13	86.8	40	28.04
H-12-T-1	31.6	50	24.66
H-12-T-2	41.7	40	29.28
H-12-T-3	94.5	40	27.84
H-12-T-4	29.9	40	28.13
H-12-T-5	53.2	40	27.39
H-12-T-6	166	40	25.89
H-12-T-7	162.9	40	27.89
H-12-T-8	64.9	40	28.58

Tubería	Long (m)	DN (mm)	Presión (mca)
H-12-T-9	1.6	40	28.66
H-12-T-10	91.4	40	23.04
H-12-T-11	191	40	27.61
H-13-T-1	15.9	50	24.25
H-13-T-2	6.6	40	24.51
H-13-T-3	61.5	40	26.78
H-13-T-4	122.2	40	28.1
H-13-T-5	96	50	26.13
H-13-T-6	2.5	40	25.59
H-13-T-7	9.4	40	29.49
H-13-T-8	45.8	40	29.73
H-13-T-9	36	40	29.84
H-13-T-10	60.9	40	28.55
H-13-T-11	86.5	50	26.29
H-13-T-12	53.2	40	28.27
H-14-T-1	13.1	40	30.16
H-14-T-2	9.9	63	24.98
H-14-T-3	157.2	40	30.12
H-14-T-4	18.9	40	30.99
H-14-T-5	49.7	63	28.65
H-14-T-6	149.2	50	27.58
H-14-T-7	1.8	40	31.35

Tubería	Long (m)	DN (mm)	Presión (mca)
H-14-T-8	88.6	40	26.8
H-14-T-9	83.6	40	27.34
H-14-T-10	184.4	40	27.64
H-14-T-11	48.7	40	28.17
H-14-T-12	120.7	40	26.4
H-14-T-13	41.2	40	26.97
H-15-T-1	159.5	63	24.91
H-15-T-2	111.8	50	24.42
H-15-T-3	119.4	40	23.69
H-15-T-4	86.7	40	25.43
H-15-T-5	44.2	40	25.56
H-15-T-6	6.6	40	26.59
H-15-T-7	2.7	40	24.52
H-15-T-8	121.6	40	22.79
H-15-T-9	14.4	40	26.12
H-15-T-10	9.3	40	25.55
H-15-T-11	142.7	63	25.28
H-15-T-12	112.6	40	24.82
H-15-T-13	163.7	40	25.4
H-15-T-14	190.2	63	23.12
H-16-T-1	53.5	40	28.13
H-16-T-2	4.5	63	24.2

Tubería	Long (m)	DN (mm)	Presión (mca)
H-16-T-3	27.1	63	23.13
H-16-T-4	52.3	50	23.08
H-16-T-5	72.7	63	25.64
H-16-T-6	132.2	40	28.16
H-16-T-7	10.8	40	27.83
H-16-T-8	4.7	40	25.12
H-16-T-9	212.1	40	27.27
H-16-T-10	55.4	40	26.77
H-16-T-11	182.6	40	26.62
H-16-T-12	201.2	40	26.19
H-16-T-13	215.3	50	24.99
H-16-T-14	182.4	40	23.3
H-17-T-1	189.7	40	23.1
H-17-T-2	11.7	50	25.02
H-17-T-3	130.8	75	23.56
H-17-T-4	62.9	50	25.58
H-17-T-5	150.8	40	24.72
H-17-T-6	196.7	63	22.12
H-17-T-7	338.1	75	21.6
H-17-T-8	87.5	75	24.01
H-17-T-9	22.2	63	23.05
H-17-T-10	194.8	75	22.62

Tubería	Long (m)	DN (mm)	Presión (mca)
H-17-T-11	111.2	75	23.14
H-17-T-12	2.7	40	27.48
H-17-T-13	19.4	50	23.96
H-17-T-14	343	63	21.76
H-18-T-1	3.5	40	26.92
H-18-T-2	234.7	40	30.81
H-18-T-3	243.7	40	27.02
H-18-T-4	75.9	90	23.67
H-18-T-5	168.8	63	25.28
H-18-T-6	6.9	50	25.71
H-18-T-7	164.9	40	31.09
H-18-T-8	125.4	40	28.35
H-18-T-9	281.9	40	24.59
H-18-T-10	245.7	40	26.45
H-18-T-11	156.3	63	23.59
H-18-T-12	38.2	40	27.11
H-18-T-13	18.1	40	25.93
H-19-T-1	2.2	40	25.49
H-19-T-2	5.9	50	22.42
H-19-T-3	123	50	24.4
H-19-T-4	118.2	40	27.37
H-19-T-5	158.4	40	24.36

Tubería	Long (m)	DN (mm)	Presión (mca)
H-19-T-6	181.4	40	23.76
H-19-T-7	61.9	50	20.88
H-19-T-8	227.7	40	25.99
H-19-T-9	4.7	50	22.75
H-19-T-10	29.9	40	23.74
H-19-T-11	89.7	75	25.51
H-19-T-12	181.4	50	27.37
H-20-T-1	268.4	40	23.4
H-20-T-2	181	40	24.68
H-20-T-3	81.3	50	26.14
H-20-T-4	52.9	50	26.08
H-20-T-5	40.8	40	21.07
H-20-T-6	223.2	40	24.29
H-20-T-7	130.5	50	24.71
H-20-T-8	11.6	40	24.05
H-20-T-9	25.3	50	25.41
H-20-T-10	4.8	50	25.45
H-21-T-1	294	40	27.49
H-21-T-2	262.1	40	26.82
H-21-T-3	227.7	40	28.11
H-21-T-4	109.5	40	27.19
H-21-T-5	2	40	30.14

Tubería	Long (m)	DN (mm)	Presión (mca)
H-21-T-6	173.3	40	26.19
H-21-T-7	167.3	40	26.19
H-21-T-8	214	40	21.5
H-21-T-9	179.8	63	26.86
H-21-T-10	261.6	50	22.57
H-21-T-11	179.6	63	26.06
H-22-T-1	67.9	50	25.78
H-22-T-2	72.3	40	26.72
H-22-T-3	14.8	40	27.6
H-22-T-4	29.4	40	22.02
H-22-T-5	3.6	40	25.9
H-22-T-6	136.7	40	25.09
H-22-T-7	12.1	40	27.04
H-22-T-8	9.1	40	28.77
H-22-T-9	73.6	40	22.85
H-22-T-10	49.2	40	27.61
H-22-T-11	37.9	40	27.61
H-22-T-12	56.1	40	28.26
H-23-T-1	102.3	50	25.28
H-23-T-2	8.1	40	28.7
H-23-T-3	72.6	40	26.83
H-23-T-4	68.8	40	28.76

Tubería	Long (m)	DN (mm)	Presión (mca)
H-23-T-5	4.4	40	28.83
H-23-T-6	33.3	40	28.47
H-23-T-7	174.4	50	26.44
H-23-T-8	37.3	40	23.32
H-23-T-9	135.7	50	26.68
H-23-T-10	135.2	40	27.16
H-23-T-11	3	40	29.31
H-23-T-12	5.5	40	29.34
H-23-T-13	58.1	40	29.23
H-23-T-14	58.8	40	28.31
H-24-T-1	7.8	40	29.48
H-24-T-2	53.1	63	23.31
H-24-T-3	30.2	40	29.32
H-24-T-4	11.1	40	25.86
H-24-T-5	32.8	40	28.65
H-24-T-6	140.8	40	21.37
H-24-T-7	99.9	40	28.32
H-24-T-8	115.8	40	26.17
H-24-T-9	3.4	40	29.2
H-24-T-10	11.8	40	29.57
H-24-T-11	57.3	40	25.35
H-24-T-12	151	40	26.95

Tubería	Long (m)	DN (mm)	Presión (mca)
H-24-T-13	127.1	40	28.67
H-25-T-1	14	50	23.6
H-25-T-2	9.2	40	28.92
H-25-T-3	2.4	40	29.92
H-25-T-4	41.6	40	29.43
H-25-T-5	131.7	40	23.32
H-25-T-6	93.5	40	25.21
H-25-T-7	157.2	40	29.85
H-25-T-8	11.8	40	29.73
H-25-T-9	75.9	40	29.58
H-25-T-10	47.8	40	28.72
H-25-T-11	110.7	40	28.74
H-25-T-12	77.2	40	28.87
H-25-T-13	52.8	40	29.12
H-25-T-14	83.1	40	28.24
H-26-T-1	83.4	40	23.94
H-26-T-2	52.6	40	28.4
H-26-T-3	11.1	40	29.35
H-26-T-4	84.7	40	26.92
H-26-T-5	14.5	50	22.5
H-26-T-6	23.1	40	28.94
H-26-T-7	120.3	40	26.46

Tubería	Long (m)	DN (mm)	Presión (mca)
H-26-T-8	3.9	63	25.12
H-26-T-9	110.6	50	26.15
H-26-T-10	162.9	40	25.88
H-26-T-11	141.6	40	27.18
H-26-T-12	144.4	40	27.58
H-26-T-13	121.8	40	27.1
H-27-T-1	112.9	40	25.5
H-27-T-2	54.3	40	28.05
H-27-T-3	112.5	40	25.66
H-27-T-4	2.5	40	23.14
H-27-T-5	54	40	29.56
H-27-T-6	3.8	40	28.1
H-27-T-7	84.7	40	29.05
H-27-T-8	12.3	40	26.64
H-27-T-9	37.3	63	23.86
H-27-T-10	68.2	63	24.9
H-27-T-11	107.7	50	29.66
H-27-T-12	16.4	50	23.43
H-27-T-13	106.4	50	23.02
H-27-T-14	110	40	27.5
H-28-T-1	67.1	50	24.45
H-28-T-2	6	40	30.22

Tubería	Long (m)	DN (mm)	Presión (mca)
H-28-T-3	19.8	50	25.57
H-28-T-4	19.5	40	29.58
H-28-T-5	26.1	40	29.51
H-28-T-6	3.2	40	31.39
H-28-T-7	8	40	30.87
H-28-T-8	38.3	40	30.44
H-28-T-9	26.2	40	29.97
H-28-T-10	178.4	40	21.31
H-28-T-11	119.3	50	21.3
H-28-T-12	85.8	50	21.44
H-28-T-13	162.8	63	28.14
H-28-T-14	96.8	40	25.16
H-29-T-1	109.7	50	27.75
H-29-T-2	1.4	40	32.82
H-29-T-3	16.3	40	31.92
H-29-T-4	69.1	40	23.4
H-29-T-5	36.4	40	26.12
H-29-T-6	198.8	40	30.17
H-29-T-7	147.3	40	29.55
H-29-T-8	21.6	40	32.62
H-29-T-9	171.7	40	33.71
H-29-T-10	5.2	40	32.86

Tubería	Long (m)	DN (mm)	Presión (mca)
H-29-T-11	39.8	40	31.51
H-29-T-12	9.4	40	31
H-29-T-13	163.4	50	25.9
H-29-T-14	9.4	40	32.43
H-29-T-15	113.2	50	28.25
H-30-T-1	206.5	63	28.6
H-30-T-2	79.3	40	33.49
H-30-T-3	115.2	40	31.59
H-30-T-4	130.5	40	33.46
H-30-T-5	30	40	31.36
H-30-T-6	68.3	40	31.09
H-30-T-7	101.7	40	31.26
H-30-T-8	124.4	40	21.31
H-30-T-9	178.7	40	29.01
H-30-T-10	87.1	40	30.12
H-30-T-11	174.9	40	27.13
H-30-T-12	6.9	50	26.23
H-30-T-13	76	40	30.58
H-30-T-14	124.8	50	27.58
H-30-T-15	86.3	40	30.88
H-31-T-1	4.8	40	31.32
H-31-T-2	7.4	40	33.94

Tubería	Long (m)	DN (mm)	Presión (mca)
H-31-T-3	2.4	40	24.67
H-31-T-4	81.4	40	31.72
H-31-T-5	121.6	40	23.7
H-31-T-6	159.1	40	21.94
H-31-T-7	41.5	40	32.14
H-31-T-8	170.3	63	23.58
H-31-T-9	85.7	40	31.48
H-31-T-10	53.3	40	32.51
H-31-T-11	119.5	40	24.23
H-31-T-12	16.1	40	29.05
H-32-T-1	201	40	28.07
H-32-T-2	217.2	63	27.54
H-32-T-3	237.4	40	27.81
H-32-T-4	118.6	40	25.42
H-32-T-5	256.7	40	30.74
H-32-T-6	61.3	50	26.02
H-32-T-7	20.8	40	32.66
H-32-T-8	193.3	40	29.35
H-32-T-9	11.1	40	28.46
H-32-T-10	164.5	40	27.67
H-32-T-11	164.2	40	23.49
H-32-T-12	108.6	50	25.57

Tubería	Long (m)	DN (mm)	Presión (mca)
H-32-T-13	191.5	40	29.18
H-32-T-14	153.2	40	32.59
H-32-T-15	259.7	40	28.29
H-33-T-1	54.9	40	31.86
H-33-T-2	107.2	50	21.24
H-33-T-3	17.9	40	31.83
H-33-T-4	8.4	40	29.92
H-33-T-5	32.6	40	27.68
H-33-T-6	124.5	40	28.51
H-33-T-7	162.9	40	28.59
H-33-T-8	122.4	63	23.16
H-33-T-9	173.3	40	21.15
H-33-T-10	1.9	40	31.58
H-33-T-11	210.1	40	22.64
H-33-T-12	131.1	40	29.27
H-33-T-13	6.1	40	28.55
H-34-T-1	70.2	40	24.99
H-34-T-2	79.6	40	29.38
H-34-T-3	9.1	40	30.91
H-34-T-4	49.2	50	21.17
H-34-T-5	34	40	25.29
H-34-T-6	79.4	50	26.54

Tubería	Long (m)	DN (mm)	Presión (mca)
H-34-T-7	5.4	40	26.31
H-34-T-8	76.9	40	28.36
H-34-T-9	56.7	40	28.17
H-34-T-10	33.4	40	29.47
H-34-T-11	71.2	40	26.89
H-34-T-12	158.2	40	24.81
H-34-T-13	1.7	40	30.42
H-35-T-1	112.5	40	23.09
H-35-T-2	125.5	40	27.27
H-35-T-3	31.1	40	29.86
H-35-T-4	40	40	29.59
H-35-T-5	81.9	40	29.69
H-35-T-6	61.3	40	25.87
H-35-T-7	132.3	40	26.46
H-35-T-8	110.2	50	27.95
H-35-T-9	86.3	50	26.04
H-35-T-10	2.7	40	30.23
H-35-T-11	226.8	50	25.04
H-36-T-1	9.1	40	31.38
H-36-T-2	113.3	40	29.93
H-36-T-3	133.7	40	27.2
H-36-T-4	140.3	40	27.19

Tubería	Long (m)	DN (mm)	Presión (mca)
H-36-T-5	43.4	40	31.06
H-36-T-6	2.4	40	31.6
H-36-T-7	84.8	40	28.86
H-36-T-8	104.1	40	27.98
H-36-T-9	83.8	40	30.56
H-36-T-10	42.3	40	31.19
H-36-T-11	7.4	40	31.68
H-36-T-12	21.8	40	31.99
H-37-T-1	63.8	40	31.01
H-37-T-2	50.6	40	30.64
H-37-T-3	94.7	40	29.65
H-37-T-4	12.9	40	31.33
H-37-T-5	1.8	63	25.44
H-37-T-6	129.9	40	28.89
H-37-T-7	107.7	40	27.65
H-37-T-8	131.8	40	29.21
H-37-T-9	65.7	40	22.14
H-37-T-10	107.1	40	23.68
H-37-T-11	92.7	40	21.56
H-37-T-12	13.6	40	29.17
H-37-T-13	23.6	40	31.27
H-38-T-1	55.7	50	23.21

Tubería	Long (m)	DN (mm)	Presión (mca)
H-38-T-2	237.9	50	26.67
H-38-T-3	94.2	40	30.2
H-38-T-4	359.5	50	28.85
H-38-T-5	361.4	40	25.23
H-38-T-6	8.6	50	27.69
H-38-T-7	66.2	40	30.92
H-38-T-8	6.9	40	32.65
H-38-T-9	340.7	40	30.78
H-38-T-10	17.9	40	32.31
H-38-T-11	172.2	40	27.06
H-38-T-12	3	40	32.3
H-39-T-1	82.8	40	32.72
H-39-T-2	172.8	40	31.51
H-39-T-3	3.3	40	23.11
H-39-T-4	51.2	63	28.12
H-39-T-5	251.3	63	28.27
H-39-T-6	97.3	50	25.56
H-39-T-7	293.6	50	27.64
H-39-T-8	31.6	50	21.47
H-39-T-9	12	40	32.94
H-40-T-1	58.7	40	31.24
H-40-T-2	98.8	40	30.31

Tubería	Long (m)	DN (mm)	Presión (mca)
H-40-T-3	212.2	40	21.8
H-40-T-4	76.5	40	30.73
H-40-T-5	2.1	40	23.3
H-40-T-6	17.7	50	24.26
H-40-T-7	57.2	40	32.74
H-40-T-8	3.7	40	29.94
H-40-T-9	94.7	40	28.38
H-40-T-10	58.9	40	27.28
H-40-T-11	102.6	40	29.42
H-40-T-12	144.9	40	26.45
H-41-T-1	54.3	40	25.9
H-41-T-2	89.4	40	30.86
H-41-T-3	96	50	27.59
H-41-T-4	3	40	31.53
H-41-T-5	98.3	40	24.08
H-41-T-6	45.9	40	30.48
H-41-T-7	8.2	50	26.96
H-41-T-8	46.6	40	31.96
H-41-T-9	59.3	40	30.35
H-41-T-10	88.6	40	29.95
H-42-T-1	129.1	40	30.81
H-42-T-2	37	40	29.22

Tubería	Long (m)	DN (mm)	Presión (mca)
H-42-T-3	15.8	40	29.74
H-42-T-4	4.3	40	30
H-42-T-5	101	40	24.68
H-42-T-6	2	40	29.96
H-42-T-7	6.6	40	28.02
H-42-T-8	47.7	40	30.28
H-42-T-9	102.6	40	28.86
H-42-T-10	106.7	40	31.05
H-42-T-11	171.7	50	24.6
H-43-T-1	19.7	63	25.1
H-43-T-2	12.1	40	27.14
H-43-T-3	42.3	40	29.29
H-43-T-4	65.4	40	23.72
H-43-T-5	12.1	40	29.68
H-43-T-6	113.5	40	29.69
H-43-T-7	115.5	40	28.29
H-43-T-8	134.9	40	25.13
H-43-T-9	130.3	40	25.17
H-43-T-10	65	40	23.53
H-43-T-11	4.7	40	24.49
H-44-T-1	201.7	40	23.72
H-44-T-2	269.9	40	26.16

Tubería	Long (m)	DN (mm)	Presión (mca)
H-44-T-3	142.2	40	24.06
H-44-T-4	12.6	40	26.65
H-44-T-5	281.2	63	25.28
H-44-T-6	56.7	50	25.34
H-44-T-7	102.6	50	25.45
H-44-T-8	293.5	40	27.38
H-44-T-9	3.4	40	23.73
H-44-T-10	6.5	50	23.15
H-44-T-11	56.7	40	26.31
H-44-T-12	91.2	40	26
H-44-T-13	1.8	40	26.45
H-45-T-1	119.8	40	28.13
H-45-T-2	82.1	40	27.64
H-45-T-3	61.3	40	26.67
H-45-T-4	4.3	50	22.88
H-45-T-5	26.2	40	27.17
H-45-T-6	85.4	40	27.36
H-45-T-7	78.9	40	27.21
H-45-T-8	3.1	40	28.29
H-45-T-9	60.5	40	27.55
H-45-T-10	73.3	40	28.68
H-45-T-11	2.6	40	28.31

Tubería	Long (m)	DN (mm)	Presión (mca)
H-45-T-12	115.4	75	25.39
H-46-T-1	46	40	29.94
H-46-T-2	102.9	50	27.75
H-46-T-3	24.5	40	30.42
H-46-T-4	98.2	40	26.79
H-46-T-5	9.6	40	30.64
H-46-T-6	92.7	40	21.36
H-46-T-7	124.4	40	27.52
H-46-T-8	64.9	40	29.6
H-46-T-9	9.1	50	23.65
H-46-T-10	13.4	50	21.53
H-46-T-11	146.4	50	26.35
H-46-T-12	2.3	40	29.44
H-46-T-13	50.5	40	23.44
H-46-T-14	93.2	50	21.22
H-46-T-15	35.9	40	30.54
H-47-T-1	22.2	110	24.48
H-47-T-2	15.7	110	23.88
H-47-T-3	160	63	28.86
H-48-T-1	6.3	50	23.57
H-48-T-2	56.6	40	31.44
H-48-T-3	4	40	28.38

Tubería	Long (m)	DN (mm)	Presión (mca)
H-48-T-4	16.7	40	28.77
H-48-T-5	88.5	40	30.25
H-48-T-6	173.1	40	23.41
H-48-T-7	90	40	31.29
H-48-T-8	121.4	50	30.96
H-48-T-9	42.1	40	27.6
H-48-T-10	216.1	40	23.06
H-48-T-11	87.5	50	26.1
H-48-T-12	247.2	50	23.27
H-48-T-13	6.5	50	25.13
H-49-T-1	257.2	40	32.38
H-49-T-2	13.6	40	31.44
H-49-T-3	1.8	40	31.47
H-49-T-4	24.9	40	31.58
H-49-T-5	177.5	40	25.61
H-49-T-6	12	40	30.87
H-49-T-7	111.7	40	30.42
H-49-T-8	26.4	50	23.85
H-49-T-9	16.3	40	30.97
H-49-T-10	171.9	40	28.98
H-50-T-1	8.5	40	32.71
H-50-T-2	75.6	50	26.61

Tubería	Long (m)	DN (mm)	Presión (mca)
H-50-T-3	4.1	63	26.43
H-50-T-4	133.6	40	30.55
H-50-T-5	323.7	40	27.62
H-50-T-6	151.2	40	30.84
H-50-T-7	122.8	40	30.49
H-50-T-8	171.4	50	30.08
H-50-T-9	299.9	40	31.23
H-50-T-10	74.6	40	32.62
H-50-T-11	54.2	40	32.38
H-51-T-1	142.7	40	30.22
H-51-T-2	11.3	40	28.15
H-51-T-3	9.8	40	30.86
H-51-T-4	81	63	23.49
H-51-T-5	9.1	40	31.2
H-51-T-6	77	40	30.77
H-51-T-7	1.1	40	28.45
H-51-T-8	118.6	63	28.79
H-51-T-9	87.8	50	24.83
H-51-T-10	64.2	50	24.28
H-51-T-11	96.9	40	24.62
H-51-T-12	78.6	40	31.08
H-51-T-13	76	40	31.54

Tubería	Long (m)	DN (mm)	Presión (mca)
H-51-T-14	50.6	40	31.58
H-52-T-1	48.2	50	26.84
H-52-T-2	46.9	40	28.98
H-52-T-3	105.4	50	27.43
H-52-T-4	155.5	50	22.32
H-52-T-5	156.8	50	27.19
H-52-T-6	7.9	40	30.12
H-52-T-7	2.6	40	29.84
H-52-T-8	46.3	40	24.77
H-52-T-9	30	40	29.91
H-52-T-10	213	40	29.15
H-52-T-11	11.2	110	25.76
H-52-T-12	98.1	50	26.93
H-52-T-13	62.5	40	29.82
H-52-T-14	142.4	40	22.47
H-53-T-1	15.2	110	23.75
H-53-T-2	2.6	40	22.09
H-53-T-3	116.9	50	26.47
H-53-T-4	60.3	50	26.59
H-53-T-5	178.7	40	27.99
H-53-T-6	12.9	40	27.76
H-53-T-7	193.9	40	25.42

Tubería	Long (m)	DN (mm)	Presión (mca)
H-53-T-8	14.2	90	26.34
H-53-T-9	10	40	24.39
H-53-T-10	108.4	40	23.95
H-53-T-11	79.5	40	22.68
H-54-T-1	113.9	63	23.34
H-54-T-2	54.6	40	29.35
H-54-T-3	49.9	40	28.73
H-54-T-4	1.3	40	31.89
H-54-T-5	48	40	24.48
H-54-T-6	106.3	40	30.29
H-54-T-7	14.3	40	23.09
H-54-T-8	128.2	40	32.09
H-54-T-9	61.1	40	32.14
H-54-T-10	137.5	50	22.07
H-54-T-11	11.5	50	32.08
H-54-T-12	141.6	50	28.2
H-55-T-1	157.3	40	28.37
H-55-T-2	175.3	40	28.3
H-55-T-3	179	40	28.94
H-55-T-4	15.8	40	29.38
H-55-T-5	84	63	25.44
H-55-T-6	14.9	40	22.55

Tubería	Long (m)	DN (mm)	Presión (mca)
H-55-T-7	3.7	40	32.12
H-55-T-8	123.7	40	23.34
H-55-T-9	44.3	40	31.82
H-55-T-10	66.8	40	29.11
H-55-T-11	59.7	50	32.66
H-55-T-12	43	50	25.87
H-55-T-13	11.1	40	29.31
H-55-T-14	93.7	40	24.87
H-55-T-15	46.8	40	31.26
H-56-T-1	83.1	40	28.3
H-56-T-2	147	40	30.99
H-56-T-3	67.8	40	26.64
H-56-T-4	14	50	23.16
H-56-T-5	195.1	40	22.48
H-56-T-6	49.2	40	24.88
H-56-T-7	146.8	63	27.62
H-56-T-8	4.2	40	25.6
H-56-T-9	222.4	75	26.57
H-56-T-10	51.7	40	30.52
H-56-T-11	14.6	40	27.76
H-56-T-12	191.8	50	25.78
H-56-T-13	123.3	40	28.43

Tubería	Long (m)	DN (mm)	Presión (mca)
H-56-T-14	170.7	40	31.71
H-57-T-1	62	50	24.13
H-57-T-2	7.4	40	30.76
H-57-T-3	79.1	40	24.98
H-57-T-4	129.5	63	28.44
H-57-T-5	199.6	40	27.57
H-57-T-6	106.5	63	21.54
H-57-T-7	141.9	50	29.4
H-57-T-8	3.7	50	26.54
H-57-T-9	79.6	40	26.4
H-57-T-10	111.7	50	28.15
H-57-T-11	75.8	50	22.9
H-57-T-12	121.4	40	23.6
H-58-T-1	226.2	40	22.66
H-58-T-2	266.3	50	24.52
H-58-T-3	314.4	50	24.79
H-58-T-4	82.1	40	24.1
H-58-T-5	235.7	50	24.79
H-58-T-6	8.7	40	26.74
H-58-T-7	68.1	50	23.84
H-58-T-8	19.2	50	23.27
H-58-T-9	52.1	50	24.88

Tubería	Long (m)	DN (mm)	Presión (mca)
H-58-T-10	4.6	40	23.09
H-58-T-11	2.3	40	22.01
H-58-T-12	179	63	25.03
H-58-T-13	118.1	63	22.7
H-59-T-1	11.2	63	24.5
H-59-T-2	2.7	63	22.98
H-59-T-3	59.1	40	26.79
H-59-T-4	85	40	23.26
H-59-T-5	101.7	40	26.16
H-59-T-6	11.5	40	22.27
H-59-T-7	72.6	63	23.31
H-59-T-8	28.4	40	27.51
H-59-T-9	102.1	40	25.86
H-59-T-10	112.5	40	24.72
H-59-T-11	107.6	40	23.51
H-59-T-12	101.7	40	25.61
H-59-T-13	18.1	40	26.03
H-59-T-14	40.4	40	22.16
H-60-T-1	35	40	25.35
H-60-T-2	79.3	40	25.33
H-60-T-3	164.5	50	24.05
H-60-T-4	50.8	75	22.78

Tubería	Long (m)	DN (mm)	Presión (mca)
H-60-T-5	108.5	40	22.99
H-60-T-6	85.1	40	22.99
H-60-T-7	125.9	40	21.68
H-60-T-8	2.9	40	23.93
H-60-T-9	10.6	40	24.96
H-60-T-10	210.6	63	23.76
H-60-T-11	4.3	40	21.65
H-60-T-12	174	75	23.64
H-61-T-1	1.9	40	26.01
H-61-T-2	105	40	24.2
H-61-T-3	54.2	40	25.14
H-61-T-4	43.7	40	23.73
H-61-T-5	108.2	50	21.28
H-61-T-6	60.7	63	22.53
H-61-T-7	8.7	40	26.76
H-61-T-8	77.4	40	23.5
H-61-T-9	41	40	24.58
H-61-T-10	14.2	40	24.26
H-61-T-11	146.6	40	22.11
H-61-T-12	57.1	40	24.87
H-61-T-13	111	40	20.38
H-61-T-14	105.2	50	25.25

Tubería	Long (m)	DN (mm)	Presión (mca)
H-62-T-1	125.7	40	24.06
H-62-T-2	122.4	50	21.43
H-62-T-3	20.5	40	21.1
H-62-T-4	92.5	50	23.38
H-62-T-5	63.3	50	22.17
H-62-T-6	70.5	40	23.25
H-62-T-7	59.2	40	21.73
H-62-T-8	3.8	40	20.51
H-62-T-9	307.3	40	22.9
H-62-T-10	23.8	40	22.65
H-62-T-11	288.1	40	22.36
H-62-T-12	8.5	40	23.61
H-62-T-13	220.3	50	20.66
H-62-T-14	54.4	50	21.43
H-63-T-1	76.3	40	24.44
H-63-T-2	48.9	40	23.47
H-63-T-3	14.1	40	24.46
H-63-T-4	186.2	40	21.65
H-63-T-5	138.9	63	23.58
H-63-T-6	61.4	63	23.81
H-63-T-7	94.8	40	24.5
H-63-T-8	173.4	40	23.37

Tubería	Long (m)	DN (mm)	Presión (mca)
H-63-T-9	198	75	20.14
H-63-T-10	5	40	24.83
H-63-T-11	3.5	40	24.79
H-63-T-12	14	40	24.7
H-63-T-13	38.8	50	23.51
H-63-T-14	20.9	63	23.19
H-64-T-1	112.4	40	24.44
H-64-T-2	81.1	40	25.58
H-64-T-3	110.4	40	22.21
H-64-T-4	2.9	40	26.43
H-64-T-5	95.1	50	24.52
H-64-T-6	36.1	50	24.18
H-64-T-7	51.1	50	22.84
H-64-T-8	45.3	40	27.06
H-64-T-9	61.7	40	26.75
H-64-T-10	29.8	40	25.94
H-64-T-11	5.1	40	26.17
H-64-T-12	81.7	40	25.24
H-64-T-13	46.7	40	26.64
H-64-T-14	8.7	40	23.51
H-65-T-1	251.8	40	24.35
H-65-T-2	238.7	50	21.26

Tubería	Long (m)	DN (mm)	Presión (mca)
H-65-T-3	242.9	75	23.24
H-65-T-4	9.1	50	22.26
H-65-T-5	4.2	40	24.82
H-65-T-6	247.5	50	21.7
H-65-T-7	33.4	40	23.29
H-65-T-8	64.8	40	23.34
H-65-T-9	264.7	63	23.72
H-65-T-10	65.2	50	24.01
H-65-T-11	2.3	40	22.92
H-66-T-1	49.4	40	26.19
H-66-T-2	30	63	24.51
H-66-T-3	5.6	40	25.88
H-66-T-4	268.5	50	22.38
H-66-T-5	36.3	63	23.03
H-66-T-6	13.5	40	26.28
H-66-T-7	65.8	40	24.18
H-66-T-8	307.3	50	21.42
H-66-T-9	46.7	40	22.13
H-66-T-10	7.9	40	23.4
H-66-T-11	5	40	22.65
H-66-T-12	120.6	50	23.01
H-67-T-1	73.8	40	25.6

Tubería	Long (m)	DN (mm)	Presión (mca)
H-67-T-2	52.1	40	23.62
H-67-T-3	5	63	23.47
H-67-T-4	82.4	40	24.57
H-67-T-5	7.6	40	25.11
H-67-T-6	50.2	50	23.7
H-67-T-7	12.5	63	23.27
H-67-T-8	193.5	40	22.27
H-67-T-9	108.7	50	23.25
H-67-T-10	85.6	50	22.31
H-67-T-11	70.2	50	21.6
H-67-T-12	141.2	63	21.59
H-67-T-13	79.9	40	22.84
H-67-T-14	149.4	50	21.54
H-68-T-1	416	40	22.16
H-68-T-2	196	50	22.57
H-68-T-3	293.4	50	23.24
H-68-T-4	300.4	50	22.35
H-68-T-5	93.4	75	21.41
H-68-T-6	125.4	110	23.81
H-68-T-7	5	75	22.44
H-68-T-8	226.7	50	22.15
H-68-T-9	339	50	21.77

Tubería	Long (m)	DN (mm)	Presión (mca)
H-68-T-10	185.5	63	21.88

Tubería	Long (m)	DN (mm)	Presión (mca)
H-68-T-11	9	50	23.41

Tubería	Long (m)	DN (mm)	Presión (mca)
H-68-T-12	103.2	50	23.8

1.2.4 Resultados de las tuberías secundarias de la alternativa con modificación de ubicación de hidrantes

Tubería	Nodo ini	Nodo fin	Long (m)	DN (mm)	Presión (mca)
P00'	UGD_43	J250	16	500	35.61
P01_A'	J250	J147	89.5	355	54.29
P01_A_H2'	J147	H2'	4	160	35.38
P01_B'	J147	J148	103.1	355	53.69
P01_B_H3'	J148	H3'	80.5	140	35.08
P01_C'	J148	J149	150.7	315	52.19
P01_C_H4'	J149	H4'	5	160	35.52
P01_D'	J149	J150	110.3	315	51.78
P01_D_H6'	J150	H6'	78.9	140	35.88
P01_E'	J150	J151	123.3	315	51.36
P01_E_H5'	J151	H5'	5	140	35.77
P01_F'	J151	J152	246.5	315	50.57
P01_F_H32'	J152	H32'	51.8	140	36.4
P01_G'	J152	J153	388.5	315	49.4
P0101_A'	J149	J161	233.1	250	50.91
P0101_B'	J161	J172	110.8	225	50.3
P0101_B_H26'	J172	H26'	5	125	31.91
P0101_C'	J172	J174	58.1	225	50.02
P0101_D'	J174	J175	22.1	160	49.68
P0101_E'	J176	J175	124.3	160	49.68

Tubería	Nodo ini	Nodo fin	Long (m)	DN (mm)	Presión (mca)
P0101_F'	J176	J177	157	140	47.61
P0101_F_H18'	J177	H18'	5	110	30.21
P0101_G'	J177	J7771	225.7	125	46.94
P0101_G_H19'	J7771	H19'	5	110	29.63
P0101_H'	J7771	J179	378.9	125	46.55
P0101_H_H20'	J179	H20'	5	110	29.03
P0101_I_H21'	J179	H21'	102.1	110	29.83
P010101_A'	J174	J191	30.3	125	49.81
P010101_A_H17'	J191	H17'	5	110	29.89
P010101_B'	J191	J193	236.9	125	49.49
P010101_B_H66'	J193	H66'	6	110	28.78
P010101_C_H65'	J193	H65'	66.5	110	28.22
P010102_A'	J161	J162	150	140	49.84
P010102_A_H27'	J162	H27'	5	110	33.02
P010102_B'	J162	J163	155.9	125	48.74
P010102_B_H28'	J163	H28'	4	110	32.72
P010102_C'	J163	J164	123.1	125	48.27
P010102_D'	J164	J166	55.1	125	48.16
P010102_D_H29'	J164	H29'	30	110	32.75
P010102_D_H30'	J166	H30'	30	110	33.04

Tubería	Nodo ini	Nodo fin	Long (m)	DN (mm)	Presión (mca)
P010102_D_H31'	J166	H31'	202.8	110	34
P010103_A'	J175	J196	403.8	160	49.14
P010103_A_H67'	J196	H67'	5	140	29.03
P010103_B_H68'	J196	H68'	237.7	140	26.78
P010104_A'	J176	J181	86.4	140	48.24
P010104_A_H22'	J181	H22'	5	110	29.83
P010104_B'	J181	J182	131.6	125	47.64
P010104_B_H23'	J182	H23'	3.5	110	30.17
P010104_C'	J182	J183	73.7	125	47.43
P010104_C_H25'	J183	H25'	91.9	110	30.56
P010104_D_H24'	J183	H24'	29	110	30.46
P0102_A'	J153	J223	142.4	250	49.12
P0102_A_H33'	J223	H33'	5	110	36.51
P0102_B'	J223	J225	173	250	48.83
P0102_B_H34'	J225	H34'	5	110	35.41
P0102_C'	J225	J227	248.6	200	47.79
P0102_C_H35'	J227	H35'	4	110	34.72
P0102_D'	J227	J243	148.9	160	47.51
P0102_E'	J243	J247	287.7	160	47.32
P0102_E_H38'	J247	H38'	4	110	37.21
P0102_F_H39'	J247	H39'	95.9	140	37.41
P010201_A'	J243	J244	42.4	160	47.49
P010201_A_H36'	J244	H36'	5	110	36.85
P010201_B_H37'	J244	H37'	137	125	36.03
P010202_A'	J227	J229	74.9	200	47.67

Tubería	Nodo ini	Nodo fin	Long (m)	DN (mm)	Presión (mca)
P010202_B'	J229	J234	10	200	47.66
P010202_B_H42'	J234	H42'	5	110	34.93
P010202_C'	J234	J236	149.2	200	47.56
P010202_C_H43'	J236	H43'	5	110	34.29
P010202_D'	J236	J238	237.7	200	47.46
P010202_D_H46'	J238	H46'	416.5	140	35.76
P010202_E'	J238	J9418	14.3	160	47.45
P010202_E_H45'	J9418	H45'	5.7	110	32.76
P010202_F_H44'	J9418	H44'	184.6	110	31.16
P01020201_A'	J229	J230	242.2	160	47.57
P01020201_A_H41'	J230	H41'	5	110	37.28
P01020201_B_H40'	J230	H40'	112.7	125	37.62
P0103_A'	J153	J200	106.9	315	49.29
P0103_A_H57'	J200	H57'	5	125	36.34
P0103_B'	J200	J202	271.7	315	49.04
P0103_B_H56'	J202	H56'	5.3	125	37.05
P0103_C'	J202	J205	176.1	225	48.33
P0103_C_H55'	J205	H55'	5	125	37.38
P0103_D'	J205	J207	160.1	225	47.78
P0103_D_H54'	J207	H54'	5.1	125	37.39
P0103_E'	J207	J209	259	200	46.51
P0103_F'	J209	J210	169.6	200	46.43
P0103_F_H50'	J210	H50'	75.7	125	37.09
P0103_G'	J210	J212	64.1	200	46.41
P0103_G_H49'	J212	H49'	20	110	36

Tubería	Nodo ini	Nodo fin	Long (m)	DN (mm)	Presión (mca)
P0103_H'	J212	J214	132.7	200	46.4
P0103_H_H48'	J214	H48'	3.5	140	36.35
P0103_I_H47'	J214	H47'	193.2	200	34.21
P010301_A'	J209	J217	101	160	45.71
P010301_A_H51'	J217	H51'	5	140	35.73
P010301_B'	J217	J219	128.4	160	44.94
P010301_B_H52'	J219	H52'	5	160	34.48
P010301_C_H53'	J219	H53'	229.9	160	32.44
P02_A'	J250	J109	115.2	140	53.28
P02_A_H1'	J109	H1'	5	200	33.09
P02_B'	J109	J7737	190.1	125	51.78
P02_B_H64'	J7737	H64'	5.8	125	29.88
P02_C'	J7737	J7739	187.4	125	50.83
P02_C_H61'	J7739	H61'	114.4	125	29.09
P02_D'	J7739	J7740	68.5	125	50.64
P02_D_H62'	J7740	H62'	18.3	125	26.32
P02_F_H63'	J7740	H63'	63	125	28.18
P04_A'	J250	J124	357.4	200	52.35
P04_B'	J124	J125	407	160	51.62
P04_B_H15'	J125	H15'	5	110	30.92

Tubería	Nodo ini	Nodo fin	Long (m)	DN (mm)	Presión (mca)
P04_C_H16'	J125	H16'	166.1	110	31.87
P0401_A'	J124	J138	94.9	125	51.33
P0401_A_H11'	J138	H11'	7.3	140	32.76
P0401_B'	J138	J140	134.1	125	50.47
P0401_B_H10'	J140	H10'	111.4	110	33.89
P0401_C'	J140	J141	60.9	125	50.23
P0401_C_H9'	J141	H9'	5	110	32.85
P0401_D'	J141	J143	177.6	125	49.99
P0401_D_H7'	J143	H7'	4.5	110	34.38
P0401_D_H8'	J143	H8'	4	110	34.89
P0403_A'	J124	J133	30.5	125	52.25
P0403_A_H12'	J133	H12'	5	110	33.09
P0403_B'	J133	J135	178.8	125	51.92
P0403_B_H13'	J135	H13'	5	110	33.41
P0403_C_H14'	J135	H14'	159.3	125	34.91
P0404_A'	J124	J128	16.3	125	52.25
P0404_A_H58'	J7746	H58'	2.5	110	31.72
P0404_A_H59'	J128	H59'	146.9	110	32.15
P0404_B'	J128	J7746	78.06	125	51.95
P0404_C_H60'	J7746	H60'	120	110	29.85

1.3 Sector 44

1.3.1 Revisión y mejora de proyecto original

Después de verificar que el diseño original no cumple con la presión mínima de 25mca en hidrantes. Se ha decidido realizar un ajuste mínimo por el método de la pendiente hidráulica con cabecera conocida y con la variación de la selección del diámetro, el cual se muestra a continuación.

En los cálculos se puede observar el cálculo del diámetro teórico en función de un factor de fricción estimado, del caudal de diseño para 5 turnos y la pendiente de diseño. Además, se observa el cálculo de los diámetros D1 (diámetros inferiores al teórico), y D2 (diámetros superiores al teórico), el cálculo de Reynolds, el factor de fricción, las perdidas por fricción y la altura piezométrica, y finalmente el cálculo de la presión P1 (presión en función del resultado de la solución del D1) y P2 (presión en función del resultado de la solución del D2). Finalmente, al obtener las presiones calculadas para cada solución de diámetros, se selecciona la solución del diámetro que permite mantener la presión mínima de 25mca en hidrante. Esto se realiza para todos los hidrantes después de conocer la solución de la serie critica que es el nudo critico de la red.

Serie critica	P00";P02_A";P02_B";P02_C";P02_D";P04_A";P04_B";P04_C";P04_D";P04_D_2";P04_E";P04_F";P04_G";P04_H";P04_I";P04_J";P04_J_H65"
Jcritica	0.82
Longtotal	3469.8
Pmin	25
Hcab	53.59
Visc	1.10E-06
Rug	0.01

																						52.1959	52.8571981
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**ΣL_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						0															53.59	53.59		
P00"	UGD_44	J252	9	0	203.962	9	3176.67	0.016	583.14	0.76	474.6	474.6	1.15	1.15	497438.00	497438.00	0.013	0.013	0.02	0.02	53.57	53.57	53.57	53.57
P02_A"	J252	J285	136.9	0	163.818	145.9	195.96	0.016	534.19	0.73	474.6	474.6	0.93	0.93	399531.77	399531.77	0.014	0.014	0.18	0.18	53.40	53.40	53.40	53.40
P02_B"	J285	J287	110.8	0	160.624	256.7	111.38	0.016	530.00	0.73	474.6	474.6	0.91	0.91	391742.00	391742.00	0.014	0.014	0.14	0.14	53.26	53.26	53.26	53.26
P02_C"	J287	J295	39.9	0	148.708	296.6	96.39	0.016	513.91	0.72	474.6	474.6	0.84	0.84	362680.36	362680.36	0.014	0.014	0.04	0.04	53.22	53.22	53.22	53.22
P02_D"	J295	J297	7.2	0	146.624	303.8	94.11	0.016	511.02	0.71	474.6	474.6	0.83	0.83	357597.74	357597.74	0.014	0.014	0.01	0.01	53.21	53.21	53.21	53.21
P04_A"	J297	J298	234	0	49.17	537.8	53.16	0.016	330.09	0.57	299.2	379.8	0.70	0.43	190219.95	149852.05	0.016	0.017	0.31	0.10	52.90	53.11	52.90	53.11
P04_B"	J298	J300	109.7	0	46.836	647.5	44.15	0.016	323.73	0.57	299.2	379.8	0.67	0.41	181190.59	142738.88	0.016	0.017	0.13	0.04	52.76	53.07	52.76	53.07
P04_C"	J300	J302	379.1	0	44.54	1026.6	27.85	0.016	317.29	0.56	299.2	379.8	0.63	0.39	172308.24	135741.51	0.016	0.017	0.42	0.13	52.34	52.94	52.34	52.94
P04_D"	J302	J322	168.3	0	38.986	1194.9	23.93	0.016	300.83	0.55	299.2	340.8	0.55	0.43	150821.94	132411.75	0.017	0.017	0.15	0.08	52.20	52.86	52.20	52.86
P04_D_2"	J322	J304	5.6	0	33.176	1200.5	23.82	0.016	282.02	0.53	237.4	340.8	0.75	0.36	161756.13	112678.71	0.017	0.018	0.01	0.00	52.18	52.86	52.18	52.86
P04_E"	J304	J305	672.4	0	33.176	1872.9	15.27	0.016	282.02	0.53	237.4	340.8	0.75	0.36	161756.13	112678.71	0.017	0.018	1.34	0.23	50.84	52.62	50.84	52.62
P04_F"	J305	J307	434.6	0	28.558	2307.5	12.39	0.016	265.61	0.52	237.4	340.8	0.65	0.31	139240.16	96994.17	0.017	0.018	0.66	0.12	50.18	52.51	50.18	52.51
P04_G"	J307	J309	216.6	0	23.898	2524.1	11.33	0.016	247.34	0.50	237.4	299.2	0.54	0.34	116519.41	92452.23	0.018	0.018	0.24	0.08	49.95	52.43	49.95	52.43
P04_H"	J309	J310	163	0	16.514	2687.1	10.64	0.016	213.35	0.46	190	299.2	0.58	0.23	100604.20	63886.36	0.018	0.020	0.27	0.03	49.68	52.40	49.68	52.40
P04_I"	J310	J312	156.9	0	10.214	2844	10.05	0.016	176.05	0.42	152	237.4	0.56	0.23	77780.32	49800.37	0.019	0.021	0.32	0.04	49.36	52.36	49.36	52.36
P04_J"	J312	J314	157.5	0	7.86	3001.5	9.53	0.016	158.53	0.40	152	213.6	0.43	0.22	59854.44	42593.05	0.020	0.022	0.20	0.04	49.16	52.32	49.16	52.32
P04_J_H65"	J314	H65"	468.3	25.76	4.942	3469.8	0.82	0.016	131.68	0.36	117.8	117.8	0.45	0.45	48559.58	48559.58	0.021	0.021	0.88	0.88	48.27	51.44	22.51	25.68

Solución escogida (diametro superior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P00"	UGD_44	J252	9	474.6	500	€ 1,058.58
P02_A"	J252	J285	136.9	474.6	500	€ 16,102.18
P02_B"	J285	J287	110.8	474.6	500	€ 13,032.30
P02_C"	J287	J295	39.9	474.6	500	€ 4,693.04
P02_D"	J295	J297	7.2	474.6	500	€ 846.86
P04_A"	J297	J298	234	379.8	400	€ 16,003.26
P04_B"	J298	J300	109.7	379.8	400	€ 7,502.38
P04_C"	J300	J302	379.1	379.8	400	€ 25,926.65
P04_D"	J302	J322	168.3	340.8	355	€ 9,870.80
P04_D_2"	J322	J304	5.6	340.8	355	€ 328.44
P04_E"	J304	J305	672.4	340.8	355	€ 39,436.26
P04_F"	J305	J307	434.6	340.8	355	€ 25,489.29
P04_G"	J307	J309	216.6	299.2	315	€ 10,344.82
P04_H"	J309	J310	163	299.2	315	€ 7,784.88
P04_I"	J310	J312	156.9	237.4	250	€ 5,162.01
P04_J"	J312	J314	157.5	213.6	225	€ 3,992.63
P04_J_H65"	J314	H65"	468.3	117.8	125	€ 4,748.56
						€ 192,322.93

CONJUNTO DE RAMALES POR HIDRANTES

HIDRANTE 1

Serie	P00'';P02_A'';P02_A_H1'
Jcritica	63.87
Longtotal	67.6
Pmin	25
Hcab	53.3972198
Visc	1.10E-06
Rug	0.01

J285

38.5325 38.5324861

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						145.9															53.39722	53.3972		
P02_A_H1''	J285	H1''	67.6	14.76	3.194	213.5	63.87	0.016	46.22922529	1.90288174	104.4	104.4	0.373116	0.37312	35412.11	35412.11	0.0228	0.0228	0.10473	0.1047	53.29249	53.2925	38.5325	38.5324861

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P02_A_H1''	J285	H1''	67.6	104.4	110	€ 607.72
						€ 607.72

HIDRANTE 2

Serie	P00';P01_A'';P01_B'';P01_C_H2''
Jcritica	242.85
Longtotal	2.3
Pmin	25
Hcab	53.3208791
Visc	1.10E-06
Rug	0.01

J252

39.3992 39.399162

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						57															53.32088	53.3209		
P01_C_H2''	J262	H2''	2.3	13.92	2.114	59.3	242.85	0.016	30.00705502	2.98929209	104.4	104.4	0.246953	0.24695	23438.07	23438.07	0.02507	0.02507	0.00172	0.0017	53.31916	53.3192	39.3992	39.399162

Solución escogida (INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P01_C_H2''	J262	H2''	2.3	104.4	110	€ 20.68
						€ 20.68

HIDRANTE 3

Serie	P00'';P01_A'';P0101_A'';P0101_A_H3''
Jcritica	71.35
Longtotal	3.8
Pmin	25
Hcab	52.053829
Visc	1.10E-06
Rug	0.01

J254

39.5305 39.530512

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						199.9															52.05383	52.0538		
P0101_A_H3''	J254	H3''	3.8	12.52	2.31	203.7	71.35	0.016	39.72054802	1.86419627	104.4	104.4	0.269849	0.26985	25611.14	25611.14	0.02455	0.02455	0.00332	0.0033	52.05051	52.0505	39.5305	39.530512

Solución escogida (diametroinferior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0101_A_H3''	J254	H3''	3.8	104.4	110	€ 34.16
						€ 34.16

HIDRANTE 4

Serie	P00";P01_A";P0101_A";P0101_B";P0101_B_H4"
Jcritica	43.42
Longtotal	3.6
Pmin	25
Hcab	51.5824315 J258
Visc	1.10E-06
Rug	0.01

38.3789 38.3788742

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						304.6															51.58243	51.5824		
P0101_B_H4"	J258	H4"	3.6	13.2	2.478	308.2	43.42	0.016	45.1178385	1.54993987	104.4	104.4	0.289475	0.28947	27473.77	27473.77	0.02415	0.02415	0.00356	0.0036	51.57887	51.5789	38.3789	38.3788742

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0101_B_H4"	J258	H4"	3.6	104.4	110	€ 32.36
						€ 32.36

HIDRANTE 5

Serie	P00";P01_A";P0101_A";P0101_B";P0101_C"
Jcritica	33.63
Longtotal	280.2
Pmin	25
Hcab	53.5002409 J253
Visc	1.10E-06
Rug	0.01

51.5824 51.5824315

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						24.4															53.50024	53.5002		
P0101_A"	J253	J254	175.5	0	8.112	199.9	142.57	0.016	76.30505734	1.77390932	104.4	104.4	0.947626	0.94763	89938.34	89938.34	0.0188	0.0188	1.44641	1.4464	52.05383	52.0538	52.0538	52.053829
P0101_B"	J254	J258	104.7	0	5.802	304.6	93.57	0.016	66.73186093	1.65890445	104.4	104.4	0.677777	0.67778	64327.20	64327.20	0.02008	0.02008	0.4714	0.4714	51.58243	51.5824	51.5824	51.5824315
P0101_C"	J258	H5"	134	13.75	3.324	438.6	33.63	0.016	53.40311035	1.48401411	104.4	104.4	0.388302	0.3883	36853.43	36853.43	0.02259	0.02259	0.22286	0.2229	51.35957	51.3596	37.6096	37.6095692

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0101_A"	J253	J254	175.5	104.4	110	1577.745
P0101_B"	J254	J258	104.7	104.4	110	941.253
P0101_C"	J258	H5"	134	104.4	110	1204.66
						€ 3,723.66

HIDRANTE 6

Serie	P00";P01_A";P01_B";P01_C";P01_C_H6"
Jcritica	65.88
Longtotal	9.9
Pmin	25
Hcab	52.6326146 J264
Visc	1.10E-06
Rug	0.01

38.7328 38.7328321

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						198.7															52.63261	52.6326		
P01_C_H6"	J264	H6"	9.9	13.89	2.478	208.6	65.88	0.016	41.50856806	1.83120058	104.4	104.4	0.289475	0.28947	27473.77	27473.77	0.02415	0.02415	0.00978	0.0098	52.62283	52.6228	38.7328	38.7328321

Solución escogida (diametro inferior)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P01_C_H6"	J264	H6"	9.9	104.4	110	89.001
						€ 89.00

HIDRANTE 7

Serie	P00";P01_A";P01_B";P01_C";P0102_H7"
Jcritica	27.85
Longtotal	252.4
Pmin	25
Hcab	52.6326146 J264
Visc	1.10E-06
Rug	0.01

37.1433 37.1432842

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						198.7															52.63261	52.6326		
P0102_H7"	J264	H7"	252.4	15.07	3.322	451.1	27.85	0.016	55.44299119	1.37599369	104.4	104.4	0.388069	0.38807	36831.26	36831.26	0.0226	0.0226	0.41933	0.4193	52.21328	52.2133	37.1433	37.1432842

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0102_H7"	J264	H7"	252.4	104.4	110	2269.076
					€	2,269.08

HIDRANTE 8

Serie	P00";P01_A";P01_B";P01_C";P01_D";P01_D_H8"
Jcritica	31.33
Longtotal	5.1
Pmin	25
Hcab	51.9731559 J283
Visc	1.10E-06
Rug	0.01

37.676 37.6760444

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						399.7															51.97316	51.9732		
P01_D_H8"	J283	H8"	5.1	14.29	3.01	404.8	31.33	0.016	52.05680103	1.41423526	104.4	104.4	0.351622	0.35162	33372.09	33372.09	0.0231	0.0231	0.00711	0.0071	51.96604	51.966	37.676	37.6760444

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P01_D_H8"	J283	H8"	5.1	104.4	110	45.849
					€	45.85

HIDRANTE 9

Serie	P00";P01_A";P01_B";P01_C";P01_D";P01_E";P0104_A";P0104_A_H9"
Jcritica	17.30
Longtotal	3.6
Pmin	25
Hcab	51.1206072 J269
Visc	1.10E-06
Rug	0.01

36.3066 36.3066177

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						650.3															51.12061	51.1206		
P0104_A_H9"	J269	H9"	3.6	14.81	2.644	653.9	17.30	0.016	55.66188463	1.08656511	104.4	104.4	0.308866	0.30887	29314.22	29314.22	0.02379	0.02379	0.00399	0.004	51.11662	51.1166	36.3066	36.3066177

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0104_A_H9"	J269	H9"	3.6	104.4	110	32.364
					€	32.36

HIDRANTE 10

Serie	P00'';P01_A'';P01_B'';P01_C'';P01_D'';P01_E'';P0104_A'';P0104_B'';P0104_B_H10''
Jcritica	5.08
Longtotal	4.9
Pmin	25
Hcab	49.8151843 J271
Visc	1.10E-06
Rug	0.01

30.8909 30.8909462

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1156.4															49.81518	49.8152		
P0104_B_H10''	J271	H10''	4.9	18.92	2.298	1161.3	5.08	0.016	67.24773488	0.64700081	104.4	104.4	0.268447	0.26845	25478.10	25478.10	0.02458	0.02458	0.00424	0.0042	49.81095	49.8109	30.8909	30.8909462

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0104_B_H10''	J271	H10''	4.9	104.4	110	44.051
					€	44.05

HIDRANTE 12

Serie	P00'';P02_A'';P02_B'';P02_C'';P02_D'';P04_A'';P04_B'';P04_B_H12''
Jcritica	17.44
Longtotal	4
Pmin	25
Hcab	53.0690808 J300
Visc	1.10E-06
Rug	0.01

36.3556 36.3556264

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						647.5															53.06908	53.0691		
P04_B_H12''	J300	H12''	4	16.71	2.296	651.5	17.44	0.016	52.5232079	1.05969166	104.4	104.4	0.268214	0.26821	25455.92	25455.92	0.02459	0.02459	0.00345	0.0035	53.06563	53.0656	36.3556	36.3556264

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P04_B_H12''	J300	H12''	4	104.4	110	35.96
					€	35.96

HIDRANTE 13

Serie	P00'';P02_A'';P02_B'';P02_C'';P02_D'';P04_A'';P04_A_H13''
Jcritica	23.19
Longtotal	23.3
Pmin	25
Hcab	53.1113553 J298
Visc	1.10E-06
Rug	0.01

37.9906 37.9906422

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						537.8															53.11136	53.1114		
P04_A_H13''	J298	H13''	23.3	15.1	2.334	561.1	23.19	0.016	49.93811335	1.19164449	104.4	104.4	0.272653	0.27265	25877.23	25877.23	0.02449	0.02449	0.02071	0.0207	53.09064	53.0906	37.9906	37.9906422

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P04_A_H13''	J298	H13''	23.3	104.4	110	209.467
					€	209.47

HIDRANTE 14

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P0203_A";P0203_A_H14"
Jcritica	21.97
Longtotal	3.8
Pmin	25
Hcab	52.731871 J325
Visc	1.10E-06
Rug	0.01

38.2694 38.2694099

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						600.3															52.73187	52.7319		
P0203_A_H14"	J325	H14"	3.8	14.46	1.95	604.1	21.97	0.016	46.97831383	1.12499316	104.4	104.4	0.227795	0.22779	21619.79	21619.79	0.02557	0.02557	0.00246	0.0025	52.72941	52.7294	38.2694	38.2694099

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0203_A_H14"	J325	H14"	3.8	104.4	110	34.162
						€ 34.16

HIDRANTE 15

Serie	P00";P02_A";P02_B";P0202_A";P02_C";P02_C_H15"
Jcritica	47.31
Longtotal	3.7
Pmin	25
Hcab	53.2173542 J295
Visc	1.10E-06
Rug	0.01

39.2047 39.2046606

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						296.6															53.21735	53.2174		
P02_C_H15"	J295	H15"	3.7	14.01	2.084	300.3	47.31	0.016	41.3824076	1.54944557	104.4	104.4	0.243448	0.24345	23105.46	23105.46	0.02516	0.02516	0.00269	0.0027	53.21466	53.2147	39.2047	39.2046606

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P02_C_H15"	J295	H15"	3.7	104.4	110	33.263
						€ 33.26

HIDRANTE 16

Serie	P00";P02_A";P02_B";P0202_A";P0202_A_H16"
Jcritica	28.65
Longtotal	4.8
Pmin	25
Hcab	49.7968577 J288
Visc	1.10E-06
Rug	0.01

38.4703 38.4703137

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						465.6															49.79686	49.7969		
P0202_A_H16"	J288	H16"	4.8	11.32	2.972	470.4	28.65	0.016	52.72826722	1.36104325	104.4	104.4	0.347183	0.34718	32950.78	32950.78	0.02317	0.02317	0.00654	0.0065	49.79031	49.7903	38.4703	38.4703137

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0202_A_H16"	J288	H16"	4.8	104.4	110	43.152
						€ 43.15

HIDRANTE 17

Serie	P00";P02_A";P02_B";P0202_A";P0202_B";P0202_C";P0202_B_H17"
Jcritica	22.99
Longtotal	4.2
Pmin	25
Hcab	48.7944876 J290
Visc	1.10E-06
Rug	0.01

38.1421 38.1420501

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						567.5															48.79449	48.7945		
P0202_B_H17"	J290	H17"	4.2	10.65	1.832	571.7	22.99	0.016	45.40496421	1.13143319	104.4	104.4	0.21401	0.21401	20311.52	20311.52	0.02596	0.02596	0.00244	0.0024	48.79205	48.7921	38.1421	38.1420501

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0202_B_H17"	J290	H17"	4.2	104.4	110	37.758
						€ 37.76

HIDRANTE 18

Serie	P00";P02_A";P02_B";P0202_A";P0202_B";P0202_C";P0202_C_H18"
Jcritica	15.84
Longtotal	3.7
Pmin	25
Hcab	47.827056 J292
Visc	1.10E-06
Rug	0.01

36.3972 36.3971809

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						716.4															47.82706	47.8271		
P0202_C_H18"	J292	H18"	3.7	11.42	4.334	720.1	15.84	0.016	69.03155457	1.15798709	104.4	104.4	0.506288	0.50629	48051.38	48051.38	0.02133	0.02133	0.00988	0.0099	47.81718	47.8172	36.3972	36.3971809

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0202_C_H18"	J292	H18"	3.7	104.4	110	33.263
						€ 33.26

HIDRANTE 19

Serie	P00";P02_A";P02_B";P0202_A";P0202_B";P0202_C";P0202_D"
Jcritica	15.94
Longtotal	208.9
Pmin	25
Hcab	53.2601985 J287
Visc	1.10E-06
Rug	0.01

48.7945 48.7944876

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						256.7															53.2602	53.2602		
P0202_A"	J287	J288	208.9	0	11.916	465.6	60.70	0.016	103.3216726	1.42120837	104.4	104.4	1.392001	1.392	132113.57	132113.57	0.01753	0.01753	3.46334	3.4633	49.79686	49.7969	49.7969	49.7968577
P0202_B"	J288	J290	101.9	0	8.944	567.5	49.80	0.016	92.11957939	1.3419552	104.4	104.4	1.044819	1.04482	99162.79	99162.79	0.01846	0.01846	1.00237	1.0024	48.79449	48.7945	48.7945	48.7944876
P0202_C"	J290	J292	148.9	0	7.112	716.4	39.45	0.016	84.04965387	1.28182875	104.4	104.4	0.830808	0.83081	78851.27	78851.27	0.01928	0.01928	0.96743	0.9674	47.82706	47.8271	47.8271	47.827056
P0202_D"	J292	H19"	274.7	12.46	2.778	991.1	15.94	0.016	57.70748225	1.06213105	104.4	104.4	0.32452	0.32452	30799.89	30799.89	0.02353	0.02353	0.33227	0.3323	47.49479	47.4948	35.0348	35.0347862

Solución escogida (diametro SUPERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0202_A"	J287	J288	208.9	104.4	110	1878.011
P0202_B"	J288	J290	101.9	104.4	110	916.081
P0202_C"	J290	J292	148.9	104.4	110	1338.611
P0202_D"	J292	H19"	274.7	104.4	110	2469.553
						€ 6,602.26

HIDRANTE 20

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P02_G";P02_G_H20"
Jcritica	31.05
Longtotal	2.5
Pmin	25
Hcab	52.0002719 J820
Visc	1.10E-06
Rug	0.01

42.7271 42.7271235

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						568.5															52.00027	52.0003		
P02_G_H20"	J820	H20"	2.5	9.27	2.842	571	31.05	0.016	50.96617195	1.39306109	104.4	104.4	0.331996	0.332	31509.46	31509.46	0.0234	0.0234	0.00315	0.0031	51.99712	51.9971	42.7271	42.7271235

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P02_G_H20"	J820	H20"	2.5	104.4	110	€	22.48
						€	22.48

HIDRANTE 21

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P02_G";P02_H";P02_H_H21"
Jcritica	17.60
Longtotal	3
Pmin	25
Hcab	50.6052499 J841
Visc	1.10E-06
Rug	0.01

41.8228 41.8227578

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						952.9															50.60525	50.6052		
P02_H_H21"	J841	H21"	3	8.78	2.246	955.9	17.60	0.016	51.96397103	1.05904693	104.4	104.4	0.262373	0.26237	24901.57	24901.57	0.02472	0.02472	0.00249	0.0025	50.60276	50.6028	41.8228	41.8227578

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P02_H_H21"	J841	H21"	3	104.4	110	€	26.97
						€	26.97

HIDRANTE 22

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P02_G";P02_H";P02_I";P0204_I_H22"
Jcritica	13.32
Longtotal	255.6
Pmin	25
Hcab	50.5819248 J822
Visc	1.10E-06
Rug	0.01

40.4688 40.4688369

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						960.5															50.58192	50.5819		
P0204_I_H22"	J822	H22"	255.6	9.38	4.512	1216.1	13.32	0.016	72.62337287	1.08924702	104.4	104.4	0.527082	0.52708	50024.88	50024.88	0.02115	0.02115	0.73309	0.7331	49.84884	49.8488	40.4688	40.4688369

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0204_I_H22"	J822	H22"	255.6	104.4	110	€	2,297.84
						€	2,297.84

HIDRANTE 23

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P02_G";P02_H";P02_I";P02_J";P02_J_H23"
Jcritica	15.03
Longtotal	88.5
Pmin	25
Hcab	50.2172577 J824
Visc	1.10E-06
Rug	0.01

41.615 41.6150066

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1020.2															50.21726	50.2173		
P02_J_H23"	J824	H23"	88.5	8.55	1.85	1108.7	15.03	0.016	49.62573068	0.95646266	104.4	104.4	0.216113	0.21611	20511.09	20511.09	0.02589	0.02589	0.05225	0.0523	50.16501	50.165	41.615	41.6150066

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P02_J_H23"	J824	H23"	88.5	104.4	110	€	795.62
						€	795.62

HIDRANTE 24

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P02_G";P02_H";P02_I";P02_J";P0206_A";P0206_A_H24"
Jcritica	12.48
Longtotal	5.5
Pmin	25
Hcab	49.1008195 J825
Visc	1.10E-06
Rug	0.01

40.558 40.5579621

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1241															49.10082	49.1008		
P0206_A_H24"	J825	H24"	5.5	8.54	1.72	1246.5	12.48	0.016	50.02551699	0.87509539	104.4	104.4	0.200927	0.20093	19069.77	19069.77	0.02636	0.02636	0.00286	0.0029	49.09796	49.098	40.558	40.5579621

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0206_A_H24"	J825	H24"	5.5	104.4	110	€	49.45
						€	49.45

HIDRANTE 25

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P02_G";P02_H";P02_I";P02_J";P0206_A";P0206_B";P0206_B_H25"
Jcritica	10.45
Longtotal	39.3
Pmin	25
Hcab	48.4878369 J827
Visc	1.10E-06
Rug	0.01

39.1317 39.131729

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1316.5															48.48784	48.4878		
P0206_B_H25"	J827	H25"	39.3	9.32	2.378	1355.8	10.45	0.016	59.00806857	0.86955923	104.4	104.4	0.277793	0.27779	26365.06	26365.06	0.02439	0.02439	0.03611	0.0361	48.45173	48.4517	39.1317	39.131729

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0206_B_H25"	J827	H25"	39.3	104.4	110	€	353.31
						€	353.31

HIDRANTE 26

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P02_G";P02_H";P02_I";P02_J";P0206_A";P0206_B";P0206_C";P0206_C_H26"
Jcritica	8.21
Longtotal	127.5
Pmin	25
Hcab	47.9077572 J829
Visc	1.10E-06
Rug	0.01

37.5434 37.5433824

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1413.9															47.90776	47.9078		
P0206_C_H26"	J829	H26"	127.5	10.25	2.346	1541.4	8.21	0.016	61.5873	0.78750949	104.4	104.4	0.274055	0.27405	26010.27	26010.27	0.02447	0.02447	0.11437	0.1144	47.79338	47.7934	37.5434	37.5433824

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0206_C_H26"	J829	H26"	127.5	104.4	110	€	1,146.23
						€	1,146.23

HIDRANTE 27

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P02_G";P02_H";P02_I";P02_J";P0206_A";P0206_B";P0206_C";P0206_D";P0206_D_H27"
Jcritica	7.51
Longtotal	4.8
Pmin	25
Hcab	47.0322784 J831
Visc	1.10E-06
Rug	0.01

36.5603 36.5602748

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1534.5															47.03228	47.0323		
P0206_D_H27"	J831	H27"	4.8	10.47	1.518	1539.3	7.51	0.016	52.67601605	0.69655602	104.4	104.4	0.177329	0.17733	16830.18	16830.18	0.02719	0.02719	0.002	0.002	47.03027	47.0303	36.5603	36.5602748

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0206_D_H27"	J831	H27"	4.8	104.4	110	€	43.15
						€	43.15

HIDRANTE 28

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P02_G";P02_H";P02_I";P02_J";P0206_A";P0206_B";P0206_C";P0206_D";P0206_E";P0206_F";P0206_F_28"
Jcritica	6.21
Longtotal	4.1
Pmin	25
Hcab	46.1939637 J835
Visc	1.10E-06
Rug	0.01

35.4711 35.471069

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1683.6															46.19396	46.194		
P0206_F_H28"	J835	H28"	4.1	10.72	2.048	1687.7	6.21	0.016	61.6903255	0.685182	104.4	104.4	0.239243	0.23924	22706.33	22706.33	0.02527	0.02527	0.00289	0.0029	46.19107	46.1911	35.4711	35.471069

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0206_F_H28"	J835	H28"	4.1	104.4	110	€	36.86
						€	36.86

HIDRANTE 29

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P02_G";P02_H";P02_I";P02_J";P0206_A";P0206_B";P0206_C";P0206_D";P0206_E";P0206_E_H29"
Jcritica	6.95
Longtotal	206.8
Pmin	25
Hcab	46.6351329
Visc	1.10E-06
Rug	0.01

J833

37.4312 37.4311826

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1607.2															46.63513	46.6351		
P0206_E_H29"	J833	H29"	206.8	9.03	2.262	1814	6.95	0.016	62.75715602	0.7312674	104.4	104.4	0.264242	0.26424	25078.96	25078.96	0.02468	0.02468	0.17395	0.174	46.46118	46.4612	37.4312	37.4311826

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0206_E_H29"	J833	H29"	206.8	104.4	110	€	1,859.13
						€	1,859.13

HIDRANTE 30

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P02_G";P02_H";P02_I";P02_J";P0206_A";P0206_B";P0206_C";P0206_D";P0206_E";P0206_F";P0206_G";P0206_H_H30"
Jcritica	7.68
Longtotal	175.3
Pmin	25
Hcab	52.7714374
Visc	1.10E-06
Rug	0.01

J806

48.2988 52.0002719

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						393.2															52.77144	52.7714		
P02_G"	J806	J820	175.3	0	28.336	568.5	48.85	0.016	169.0709553	1.26214906	132.4	190	2.058129	0.9994	247723.95	172624.48	0.01565	0.01642	4.47266	0.7712	48.29878	52.0003	48.2988	52.0002719
P02_H"	J820	J841	384.4	0	25.494	952.9	29.14	0.016	162.0722949	1.23574977	132.4	190	1.851706	0.89917	222878.12	155310.86	0.01591	0.01673	8.07272	1.395	40.22605	50.6052	40.2261	50.6052499
P02_I"	J841	J822	7.6	0	23.248	960.5	28.91	0.016	156.2024451	1.21316552	132.4	190	1.688573	0.81995	203242.74	141628.10	0.01615	0.01702	0.13472	0.0233	40.09133	50.5819	40.0913	50.5819248
P02_J"	J822	J824	59.7	0	18.736	1020.2	27.22	0.016	143.2861917	1.16192559	117.8	152	1.719081	1.03252	184097.98	142675.93	0.01649	0.01709	1.25877	0.3647	38.83256	50.2173	38.8326	50.2172577
P0206_A"	J824	J825	220.8	0	16.886	1241	22.38	0.016	137.4498604	1.13801581	117.8	152	1.549339	0.93057	165920.07	128588.06	0.01678	0.01741	3.84771	1.1164	34.98485	49.1008	34.9848	49.1008195
P0206_B"	J825	J827	75.5	0	15.166	1316.5	21.09	0.016	131.6685369	1.11382549	104.4	132.4	1.771659	1.10155	168146.56	132586.86	0.01682	0.01738	1.94612	0.613	33.03872	48.4878	33.0387	48.4878369
P0206_C"	J827	J829	97.4	0	12.788	1413.9	19.64	0.016	122.9857064	1.0764738	104.4	132.4	1.493866	0.92883	141781.50	111797.50	0.01731	0.01793	1.83712	0.5801	31.2016	47.9078	31.2016	47.9077572
P0206_D"	J829	J831	120.6	0	10.442	1534.5	18.10	0.016	113.4088808	1.03371229	104.4	117.8	1.219812	0.95808	115771.22	102602.00	0.01794	0.01828	1.57178	0.8755	29.62982	47.0323	29.6298	47.0322784
P0206_E"	J831	J833	72.7	0	8.924	1607.2	17.28	0.016	106.5019142	1.00173962	104.4	117.8	1.042482	0.8188	98941.05	87686.29	0.01847	0.01883	0.71224	0.3971	28.91759	46.6351	28.9176	46.6351329
P0206_F"	J833	J835	76.4	0	6.662	1683.6	16.50	0.016	94.74917571	0.94485217	104.4	104.4	0.77824	0.77824	73862.09	73862.09	0.01953	0.01953	0.44117	0.4412	28.47642	46.194	28.4764	46.1939637
P0206_G"	J835	J837	430.9	0	4.614	2114.5	13.13	0.016	81.80213245	0.87792711	104.4	104.4	0.538997	0.539	51155.76	51155.76	0.02105	0.02105	1.2863	1.2863	27.19012	44.9077	27.1901	44.9076643
P0206_H_H30"	J837	H30"	414.4	8.34	2.398	2528.9	7.68	0.016	62.96123824	0.77021643	104.4	104.4	0.280129	0.28013	26586.80	26586.80	0.02434	0.02434	0.38641	0.3864	26.8037	44.5213	18.4637	36.1812505

Solución escogida (diametro SUPERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P02_G"	J806	J820	175.3	190	200	€	3,847.84
P02_H"	J820	J841	384.4	190	200	€	8,437.58
P02_I"	J841	J822	7.6	190	200	€	166.82
P02_J"	J822	J824	59.7	152	160	€	782.67
P0206_A"	J824	J825	220.8	152	160	€	2,894.69
P0206_B"	J825	J827	75.5	132.4	140	€	924.88
P0206_C"	J827	J829	97.4	132.4	140	€	1,193.15
P0206_D"	J829	J831	120.6	117.8	125	€	1,222.88
P0206_E"	J831	J833	72.7	117.8	125	€	737.18
P0206_F"	J833	J835	76.4	104.4	110	€	686.84
P0206_G"	J835	J837	430.9	104.4	110	€	3,873.79
P0206_H_H30"	J837	H30"	414.4	104.4	110	€	3,725.46
						€	28,493.76

HIDRANTE 31

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P02_G";P02_H";P02_I";P02_J";P0206_A";P0206_B";P0206_C";P0206_D";P0206_E";P0206_F";P0206_G";P0206_G_H31"
Jcritica	5.06
Longtotal	4.7
Pmin	25
Hcab	44.9076643
Visc	1.10E-06
Rug	0.01

J837

35.7139 35.7138516

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2114.5															44.90766	44.9077		
P0206_G_H31"	J837	H31"	4.7	9.19	2.216	2119.2	5.06	0.016	66.327023	0.64135556	104.4	104.4	0.258868	0.25887	24568.96	24568.96	0.0248	0.0248	0.00381	0.0038	44.90385	44.9039	35.7139	35.7138516

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0206_G_H31"	J837	H31"	4.7	104.4	110	€	42.25
						€	42.25

HIDRANTE 32

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P0205_A";P0205_B";P0205_B_H32"
Jcritica	26.77
Longtotal	4.5
Pmin	25
Hcab	50.5263618 J808
Visc	1.10E-06
Rug	0.01

40.4991 40.4990686

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						574.7															50.52636	50.5264		
P0205_B_H32"	J808	H32"	4.5	10.02	3.276	579.2	26.77	0.016	55.5711685	1.35068773	104.4	104.4	0.382695	0.3827	36321.25	36321.25	0.02267	0.02267	0.00729	0.0073	50.51907	50.5191	40.4991	40.4990686

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0205_B_H32"	J808	H32"	4.5	104.4	110	€	40.46
						€	40.46

HIDRANTE 33

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P0205_A";P0205_B";P0205_C";P0205_C_H33"
Jcritica	19.66
Longtotal	6
Pmin	25
Hcab	48.9051986 J810
Visc	1.10E-06
Rug	0.01

38.8477 38.8476517

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						698.7															48.9052	48.9052		
P0205_C_H33"	J810	H33"	6	10.05	2.84	704.7	19.66	0.016	55.82823305	1.16016749	104.4	104.4	0.331763	0.33176	31487.29	31487.29	0.02341	0.02341	0.00755	0.0075	48.89765	48.8977	38.8477	38.8476517

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0205_C_H33"	J810	H33"	6	104.4	110	€	53.94
						€	53.94

HIDRANTE 34

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P0205_A";P0205_B";P0205_C";P0205_D";P0205_D_H34"
Jcritica	13.37
Longtotal	100.3
Pmin	25
Hcab	48.0029052 J812
Visc	1.10E-06
Rug	0.01

37.226 37.2260464

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						821.3															48.00291	48.0029		
P0205_D_H34"	J812	H34"	100.3	10.68	2.446	921.6	13.37	0.016	56.80632525	0.96510192	104.4	104.4	0.285736	0.28574	27118.98	27118.98	0.02423	0.02423	0.09686	0.0969	47.90605	47.906	37.226	37.2260464

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0205_D_H34"	J812	H34"	100.3	104.4	110	€	901.70
						€	901.70

HIDRANTE 35

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P0205_A";P0205_B";P0205_C";P0205_D";P0205_E"P0205_F_H35"
Jcritica	16.85
Longtotal	170.5
Pmin	25
Hcab	53.0497604
Visc	1.10E-06
Rug	0.01

J324

51.4159 52.7714374

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						368.6															53.04976	53.0498		
P02_F"	J324	J806	24.6	0	47.462	393.2	71.34	0.016	177.6064277	1.91574983	132.4	190	3.447309	1.67397	414930.62	289141.13	0.01452	0.01505	1.63388	0.2783	51.41588	52.7714	51.4159	52.7714374
P0205_A"	J806	J807	170.5	0	19.126	563.7	49.76	0.016	123.4724102	1.59732916	104.4	132.4	2.234258	1.38918	212051.37	167206.67	0.01621	0.01669	6.73442	2.1136	44.68145	50.6578	44.6815	50.6578133
P0205_B"	J807	J808	11	0	13.736	574.7	48.81	0.016	108.159427	1.49500156	104.4	117.8	1.60461	1.26032	152292.04	134968.50	0.0171	0.01739	0.23648	0.1315	44.44498	50.5264	44.445	50.5263618
P0205_C"	J808	J810	124	0	10.46	698.7	40.15	0.016	96.99133541	1.4157153	104.4	104.4	1.221914	1.22191	115970.79	115970.79	0.01794	0.01794	1.62116	1.6212	42.82382	48.9052	42.8238	48.9051986
P0205_D"	J810	J812	122.6	0	7.62	821.3	34.15	0.016	85.44806917	1.32880295	104.4	104.4	0.890152	0.89015	84483.50	84483.50	0.01903	0.01903	0.90229	0.9023	41.92152	48.0029	41.9215	48.0029052
P0205_E"	J812	J814	56	0	5.174	877.3	31.97	0.016	73.18984625	1.22980109	104.4	104.4	0.604415	0.60442	57364.52	57364.52	0.02055	0.02055	0.20525	0.2053	41.71627	47.7977	31.2663	37.3476538
P0205_F_H35"	J814	H35"	167.1	10.45	2.05	1044.4	16.85	0.016	50.53843736	1.02192815	104.4	104.4	0.239477	0.23948	22728.50	22728.50	0.02526	0.02526	0.11818	0.1182	41.59809	47.6795	41.5981	47.679477

Solución escogida (diametro SUPERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P02_F"	J324	J806	24.6	190	200	€	539.97
P0205_A"	J806	J807	170.5	132.4	140	€	2,088.63
P0205_B"	J807	J808	11	117.8	125	€	111.54
P0205_C"	J808	J810	124	104.4	110	€	1,114.76
P0205_D"	J810	J812	122.6	104.4	110	€	1,102.17
P0205_E"	J812	J814	56	104.4	110	€	503.44
P0205_F_H35"	J814	H35"	167.1	104.4	110	€	1,502.23
						€	6,962.74

HIDRANTE 36

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P0205_A";P0205_B";P0205_C";P0205_D";P0205_E"P0205_E_H36"
Jcritica	12.67
Longtotal	168.8
Pmin	25
Hcab	47.7976538
Visc	1.10E-06
Rug	0.01

J814

38.0062 38.0062222

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						877.3															47.79765	47.7977		
P0205_E_H36"	J814	H36"	168.8	9.54	3.124	1046.1	12.67	0.016	63.32190313	0.99200355	104.4	104.4	0.364939	0.36494	34636.02	34636.02	0.02291	0.02291	0.25143	0.2514	47.54622	47.5462	38.0062	38.0062222

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0205_E_H36"	J814	H36"	168.8	104.4	110	€	1,517.51
						€	1,517.51

HIDRANTE 37

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P0205_A";P020502_A";P020502_B_H37"
Jcritica	15.71
Longtotal	354
Pmin	25
Hcab	50.6578133
Visc	1.10E-06
Rug	0.01

J807

49.2615 49.2615253

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						563.7															50.65781	50.6578		
P020502_A"	J807	J817	354	0	5.39	917.7	27.96	0.016	75.44714241	1.20562791	104.4	104.4	0.629648	0.62965	59759.33	59759.33	0.02038	0.02038	1.39629	1.3963	49.26153	49.2615	49.2615	49.2615253
P020502_B_H37"	J817	H37"	150.2	8.88	2.71	1067.9	15.71	0.016	57.30532839	1.0507258	104.4	104.4	0.316576	0.31658	30045.97	30045.97	0.02366	0.02366	0.17388	0.1739	49.08765	49.0876	40.2076	40.2076489

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P020502_A"	J807	J817	354	104.4	110	€	3,182.46
P020502_B_H37"	J817	H37"	150.2	104.4	110	€	1,350.30
						€	4,532.76

HIDRANTE 38

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P02_F";P0205_A";P020502_A";P020502_A_H38"
Jcritica	16.39
Longtotal	4.8
Pmin	25
Hcab	49.2615253 J817
Visc	1.10E-06
Rug	0.01

40.1161 40.1160771

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						917.7															49.26153	49.2615		
P020502_A_H38"	J817	H38"	4.8	9.14	2.68	922.5	16.39	0.016	56.56871533	1.0663316	104.4	104.4	0.313072	0.31307	29713.36	29713.36	0.02372	0.02372	0.00545	0.0054	49.25608	49.2561	40.1161	40.1160771

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P020502_A_H38"	J817	H38"	4.8	104.4	110	€	43.15
						€	43.15

HIDRANTE 39

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P0203_A";P0203_B";P0203_C";P0203_D";P0203_E";P020302_A";P02030202_A";P02030202_B";P02030202_C";P02030202_D_H39"
Jcritica	8.24
Longtotal	6.2
Pmin	25
Hcab	50.8164531 J342
Visc	1.10E-06
Rug	0.01

50.7714 50.7714492

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1515.9															50.81645	50.8165		
P02030202_A"	J342	J790	6.2	0	7.562	1522.1	16.96	0.016	98.30067491	0.99640017	104.4	104.4	0.883376	0.88338	83840.45	83840.45	0.01905	0.01905	0.045	0.045	50.77145	50.7714	50.7714	50.7714492
P02030202_B"	J790	J792	188.7	0	4.654	1710.8	15.09	0.016	80.95289454	0.90421505	104.4	104.4	0.54367	0.54367	51599.24	51599.24	0.02101	0.02101	0.57207	0.5721	50.19938	50.1994	50.1994	50.1993822
P02030202_C"	J792	J794	141.9	0	2.806	1852.7	13.93	0.016	66.12061693	0.81719178	104.4	104.4	0.327791	0.32779	31110.33	31110.33	0.02347	0.02347	0.17472	0.1747	50.02467	50.0247	50.0247	50.0246669
P02030202_D_H39"	J794	H39"	4.5	10.52	2.806	1857.2	8.24	0.016	66.12061693	0.81719178	104.4	104.4	0.327791	0.32779	31110.33	31110.33	0.02347	0.02347	0.00554	0.0055	50.01913	50.0191	39.4991	39.4991263

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P02030202_A"	J342	J790	6.2	104.4	110	€	55.74
P02030202_B"	J790	J792	188.7	104.4	110	€	1,696.41
P02030202_C"	J792	J794	141.9	104.4	110	€	1,275.68
P02030202_D_H39"	J794	H39"	4.5	104.4	110	€	40.46
						€	3,068.29

HIDRANTE 40

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P0203_A";P0203_B";P0203_C";P0203_D";P0203_E";P020302_A";P02030202_A";P02030202_B";P02030202_B_H40"
Jcritica	7.93
Longtotal	3.4
Pmin	25
Hcab	50.1993822 J792
Visc	1.10E-06
Rug	0.01

38.5874 38.5873787

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1710.8															50.19938	50.1994		
P02030202_B_H40"	J792	H40"	3.4	11.61	1.848	1714.2	7.93	0.016	56.37692515	0.74030267	104.4	104.4	0.215879	0.21588	20488.91	20488.91	0.0259	0.0259	0.002	0.002	50.19738	50.1974	38.5874	38.5873787

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P02030202_B_H40"	J792	H40"	3.4	104.4	110	€	30.57
						€	30.57

HIDRANTE 41

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P0203_A";P0203_B";P0203_C";P0203_D";P0203_E";P020302_A";P020302_B";P020302_B_H41"
Jcritica	7.65
Longtotal	15.5
Pmin	25
Hcab	50.1145505 J343
Visc	1.10E-06
Rug	0.01

37.765 37.7650056

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1655.7															50.11455	50.1146		
P020302_B_H41"	J343	H41"	15.5	12.33	2.844	1671.2	7.65	0.016	67.46657651	0.79554063	104.4	104.4	0.33223	0.33223	31531.64	31531.64	0.0234	0.0234	0.01954	0.0195	50.09501	50.095	37.765	37.7650056

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P020302_B_H41"	J343	H41"	15.5	104.4	110	€	139.35
						€	139.35

HIDRANTE 42

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P0203_A";P0203_B";P0203_C";P0203_D";P0203_E";P020302_A";P02030202_A";P02030202_A_H42"
Jcritica	9.12
Longtotal	5
Pmin	25
Hcab	50.7714492 J790
Visc	1.10E-06
Rug	0.01

38.9249 38.9248907

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1522.1															50.77145	50.7714		
P02030202_A_H42"	J790	H42"	5	11.84	2.908	1527.1	9.12	0.016	65.71435364	0.85740111	104.4	104.4	0.339706	0.33971	32241.21	32241.21	0.02328	0.02328	0.00656	0.0066	50.76489	50.7649	38.9249	38.9248907

Solución escogida (diametro inferior)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P02030202_A_H42"	J790	H42"	5	104.4	110	€	44.95
						€	44.95

HIDRANTE 43

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P0203_A";P0203_B";P0203_C";P0203_D";P0203_C_H43"
Jcritica	8.22
Longtotal	2.8
Pmin	25
Hcab	51.3474885 J234
Visc	1.10E-06
Rug	0.01

35.4957 35.4957303

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1274.2															51.34749	51.3475		
P0203_C_H43"	J337	H43"	2.8	15.85	1.916	1277	8.22	0.016	56.78420418	0.75657247	104.4	104.4	0.223823	0.22382	21242.83	21242.83	0.02567	0.02567	0.00176	0.0018	51.34573	51.3457	35.4957	35.4957303

Solución escogida (diametro inferior)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0203_C_H43"	J337	H43"	2.8	104.4	110	€	25.17
						€	25.17

HIDRANTE 44

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P0203_A";P0203_B";P0203_C";P0203_B_H44"
Jcritica	11.88
Longtotal	3.3
Pmin	25
Hcab	51.8871526 J332
Visc	1.10E-06
Rug	0.01

37.3725 37.372515

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1039.2															51.88715	51.8872		
P0203_B_H44"	J332	H44"	3.3	14.5	5.754	1042.5	11.88	0.016	81.89494614	1.09235996	104.4	104.4	0.67217	0.67217	63795.02	63795.02	0.02011	0.02011	0.01464	0.0146	51.87252	51.8725	37.3725	37.372515

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0203_B_H44"	J332	H44"	3.3	104.4	110	€	29.67
						€	29.67

HIDRANTE 45

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P0203_A";P0203_B";P0203_C";P0203_D";P0203_E";P020302_A";P020302_B";P020302_C";P020302_C_H45"
Jcritica	6.53
Longtotal	87.4
Pmin	25
Hcab	49.9847459 J345
Visc	1.10E-06
Rug	0.01

36.4573 36.4572846

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1680.1															49.98475	49.9847		
P020302_C_H45"	J345	H45"	87.4	13.45	2.33	1767.5	6.53	0.016	64.3073909	0.71737173	104.4	104.4	0.272186	0.27219	25832.88	25832.88	0.0245	0.0245	0.07746	0.0775	49.90728	49.9073	36.4573	36.4572846

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P020302_C_H45"	J345	H45"	87.4	104.4	110	€	785.73
						€	785.73

HIDRANTE 46

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P0203_A";P0203_B";P0203_C";P0203_D";P0203_E";P020302_A";P020302_B";P020302_C";P020302_D";P020302_D_H46";P020302_D_H46_2"
Jcritica	5.95
Longtotal	145.2
Pmin	25
Hcab	49.0971535 J347
Visc	1.10E-06
Rug	0.01

48.9733 48.9732983

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1842.4															49.09715	49.0972		
P020302_D_H46"	J347	J537	145.2	0	2.28	1987.6	12.12	0.016	64.94855992	0.68818613	104.4	104.4	0.266345	0.26634	25278.53	25278.53	0.02463	0.02463	0.12386	0.1239	48.9733	48.9733	48.9733	48.9732983
P020302_D_H46_2"	J537	H46"	3	12.26	2.28	1990.6	5.95	0.016	64.94855992	0.68818613	104.4	104.4	0.266345	0.26634	25278.53	25278.53	0.02463	0.02463	0.00256	0.0026	48.97074	48.9707	36.7107	36.7107393

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P020302_D_H46"	J347	J537	145.2	104.4	110	€	1,305.35
P020302_D_H46_2"	J537	H46"	3	104.4	110	€	26.97
						€	1,332.32

HIDRANTE 47

Serie	P00'';P02_A'';P02_B'';P02_C'';P02_D'';P02_E'';P0203_A'';P0203_B'';P0203_C'';P0203_D'';P0203_E'';P020302_A'';P020302_B'';P020302_C'';P020302_D'';P020302_E'';P020302_E_H47''
Jcritica	5.28
Longtotal	80.5
Pmin	25
Hcab	48.5971762 J349
Visc	1.10E-06
Rug	0.01

36.1647 36.1646697

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2041.9															48.59718	48.5972		
P020302_E_H47''	J349	H47''	80.5	12.39	1.736	2122.4	5.28	0.016	59.6395474	0.62142849	104.4	104.4	0.202796	0.2028	19247.16	19247.16	0.0263	0.0263	0.04251	0.0425	48.55467	48.5547	36.1647	36.1646697

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P020302_E_H47''	J349	H47''	80.5	104.4	110	€	723.70
						€	723.70

HIDRANTE 48

Serie	P00'';P02_A'';P02_B'';P02_C'';P02_D'';P02_E'';P0203_A'';P0203_B'';P0203_C'';P0203_D'';P0203_E'';P020302_A'';P020302_B'';P020302_C'';P020302_D'';P020302_E'';P020302_F_H48''
Jcritica	4.79
Longtotal	236.6
Pmin	25
Hcab	51.3298117 J339
Visc	1.10E-06
Rug	0.01

48.376 50.8164531

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1279.3															51.32981	51.3298		
P020302_A''	J339	J342	236.6	0	19.2	1515.9	17.37	0.016	159.0199489	0.96673653	132.4	190	1.394554	0.67718	167853.61	116967.46	0.01668	0.01764	2.95383	0.5134	48.37598	50.8165	48.376	50.8164531
P020302_B''	J342	J343	139.8	0	11.638	1655.7	15.90	0.016	130.1614743	0.87462836	104.4	132.4	1.359526	0.8453	129031.36	101743.76	0.0176	0.01825	2.22002	0.7019	46.15596	50.1146	46.156	50.1145505
P020302_C''	J343	J345	24.4	0	8.794	1680.1	15.67	0.016	116.3605332	0.82696128	104.4	117.8	1.027296	0.80687	97499.73	86408.93	0.01852	0.01889	0.23277	0.1298	45.92319	49.9847	45.9232	49.9847459
P020302_D''	J345	J347	162.3	0	6.464	1842.4	14.29	0.016	102.8801662	0.7775855	104.4	104.4	0.75511	0.75511	71666.84	71666.84	0.01965	0.01965	0.88759	0.8876	45.0356	49.0972	45.0356	49.0971535
P020302_E''	J347	J349	199.5	0	4.184	2041.9	12.89	0.016	86.45055553	0.71279758	104.4	104.4	0.488766	0.48877	46388.32	46388.32	0.02149	0.02149	0.49998	0.5	44.53562	48.5972	44.5356	48.5971762
P020302_F_H48''	J349	H48''	359.6	14.82	2.448	2401.5	4.79	0.016	69.76790521	0.64033931	104.4	104.4	0.28597	0.28597	27141.16	27141.16	0.02422	0.02422	0.34776	0.3478	44.18786	48.2494	29.3679	33.4294119

Solución escogida (diametro SUPERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P020302_A''	J339	J342	236.6	190	200	€	5,193.37
P020302_B''	J342	J343	139.8	132.4	140	€	1,712.55
P020302_C''	J343	J345	24.4	117.8	125	€	247.42
P020302_D''	J345	J347	162.3	104.4	110	€	1,459.08
P020302_E''	J347	J349	199.5	104.4	110	€	1,793.51
P020302_F_H48''	J349	H48''	359.6	104.4	110	€	3,232.80
						€	13,638.72

HIDRANTE 49

Serie	P00'';P02_A'';P02_B'';P02_C'';P02_D'';P02_E'';P0203_A'';P0203_B'';P0203_C'';P0203_D'';P0203_E'';P0203_F'';P0203_G'';P0203_G_H49''
Jcritica	7.60
Longtotal	30.3
Pmin	25
Hcab	50.6276203 J795
Visc	1.10E-06
Rug	0.01

35.9256 35.9255617

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1410.8															50.62762	50.6276		
P0203_G_H49''	J795	H49''	30.3	14.68	2.084	1441.1	7.60	0.016	59.65985691	0.74549274	104.4	104.4	0.243448	0.24345	23105.46	23105.46	0.02516	0.02516	0.02206	0.0221	50.60556	50.6056	35.9256	35.9255617

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0203_G_H49''	J795	H49''	30.3	104.4	110	€	272.40
						€	272.40

HIDRANTE 50

Serie	P00";P01_A";P01_B";P01_C";P01_D";P01_E";P01_F";P01_G";P01_G_H50"
Jcritica	12.23
Longtotal	3.4
Pmin	25
Hcab	50.0325416 J279
Visc	1.10E-06
Rug	0.01

33.6791 33.6790952

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						706.6															50.03254	50.0325		
P01_G_H50"	J279	H50"	3.4	16.35	2.514	710	12.23	0.016	58.46778587	0.93635837	104.4	104.4	0.29368	0.29368	27872.90	27872.90	0.02407	0.02407	0.00345	0.0034	50.0291	50.0291	33.6791	33.6790952

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P01_G_H50"	J279	H50"	3.4	104.4	110	€ 30.57
						€ 30.57

HIDRANTE 51

Serie	P00";P01_A";P01_B";P01_C";P01_D";P01_E";P01_F";P01_G";P0103_H51"
Jcritica	9.02
Longtotal	87.4
Pmin	25
Hcab	50.4309394 J273
Visc	1.10E-06
Rug	0.01

50.0325 50.0325416

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						619.2															50.43094	50.4309		
P01_G"	J273	J279	87.4	0	5.842	706.6	35.99	0.016	87.06947668	0.98115993	104.4	104.4	0.68245	0.68245	64770.68	64770.68	0.02005	0.02005	0.3984	0.3984	50.03254	50.0325	50.0325	50.0325416
P0103_H51"	J279	H51"	306.1	16.3	3.328	1012.7	9.02	0.016	69.52078065	0.87672654	104.4	104.4	0.38877	0.38877	36897.78	36897.78	0.02259	0.02259	0.51018	0.5102	49.52236	49.5224	33.2224	33.2223613

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P01_G"	J273	J279	87.4	104.4	110	€ 785.73
P0103_H51"	J279	H51"	306.1	104.4	110	€ 2,751.84
						€ 785.73

HIDRANTE 52

Serie	P00";P01_A";P01_B";P01_C";P01_D";P01_E";P01_F";P0106_A";P0106_B";P0106_C_H52"
Jcritica	6.87
Longtotal	15.4
Pmin	25
Hcab	53.5727411 J252
Visc	1.10E-06
Rug	0.01

53.1922 53.5002409

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						9															53.57274	53.5727		
P01_A"	J252	J253	15.4	0	40.144	24.4	1171.01	0.016	198.722515	1.29430495	152	213.6	2.212298	1.12028	305699.33	217538.85	0.01506	0.01572	0.38053	0.0725	53.19221	53.5002	53.1922	53.5002409
P01_B"	J253	J262	32.6	0	32.032	57	501.28	0.016	181.5651278	1.23716976	132.4	190	2.326581	1.12976	280035.77	195140.71	0.01536	0.01607	1.0431	0.1794	52.14911	53.3209	52.1491	53.3208791
P01_C"	J262	J264	141.7	0	29.918	198.7	143.80	0.016	176.673674	1.220391	132.4	190	2.173035	1.0552	261554.39	182262.11	0.01552	0.01626	3.99659	0.6883	48.15252	52.6326	48.1525	52.6326146
P01_D"	J264	J283	201	0	24.118	399.7	71.49	0.016	162.082204	1.16890911	132.4	190	1.751763	0.85064	210848.61	146928.19	0.01605	0.0169	3.81176	0.6595	44.34076	51.9732	44.3408	51.9731559
P01_E"	J283	J267	8.9	0	21.108	408.6	69.93	0.016	153.6659522	1.13815629	132.4	190	1.533138	0.74447	184534.06	128591.10	0.01641	0.01733	0.13215	0.0229	44.20861	51.9502	44.2086	51.9502306
P01_F"	J267	J273	210.6	0	14.212	619.2	46.14	0.016	131.1779673	1.05158292	96.8	132.4	1.931144	1.03226	169940.65	124246.64	0.01685	0.01759	6.96692	1.5193	37.24169	50.4309	37.2417	50.4309394
P0106_A"	J273	J274	35.8	0	8.37	655	43.62	0.016	106.1424237	0.9459269	79.2	117.8	1.698968	0.76797	122325.70	82242.75	0.01795	0.01907	1.19394	0.1742	36.04774	50.2567	36.0477	50.2567462
P0106_B"	J274	J276	322.2	0	5.772	977.2	29.24	0.016	91.480672	0.87816829	104.4	104.4	0.674272	0.67427	63994.59	63994.59	0.0201	0.0201	1.4372	1.4372	34.61054	48.8195	34.6105	48.8195414
P0106_C_H52"	J276	H52"	280	19.93	3.222	1257.2	6.87	0.016	72.45177532	0.78151549	104.4	104.4	0.376387	0.37639	35722.55	35722.55	0.02275	0.02275	0.44059	0.4406	34.16995	48.379	14.2399	28.4489534

Solución escogida (diametro SUPERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P01_A"	J252	J253	15.4	213.6	225	€ 390.39
P01_B"	J253	J262	32.6	190	200	€ 715.57
P01_C"	J262	J264	141.7	190	200	€ 3,110.32
P01_D"	J264	J283	201	190	200	€ 4,411.95
P01_E"	J283	J267	8.9	190	200	€ 195.36
P01_F"	J267	J273	210.6	132.4	140	€ 2,579.85
P0106_A"	J273	J274	35.8	117.8	125	€ 363.01
P0106_B"	J274	J276	322.2	104.4	110	€ 2,896.58
P0106_C_H52"	J276	H52"	280	104.4	110	€ 2,517.20
						€ 17,180.22

HIDRANTE 53

Serie	P00";P01_A";P01_B";P01_C";P01_D";P01_E";P01_F";P0106_A";P0106_B";P0106_B_H53"
Jcritica	9.01
Longtotal	5.1
Pmin	25
Hcab	48.8195414 J276
Visc	1.10E-06
Rug	0.01

33.8442 33.8442402

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						977.2															48.81954	48.8195		
P0106_B_H53"	J276	H53"	5.1	14.97	2.55	982.3	9.01	0.016	62.50704836	0.83098334	104.4	104.4	0.297885	0.29789	28272.04	28272.04	0.02399	0.02399	0.0053	0.0053	48.81424	48.8142	33.8442	33.8442402

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0106_B_H53"	J276	H53"	5.1	104.4	110	€	45.85
						€	45.85

HIDRANTE 54

Serie	P00";P01_A";P01_B";P01_C";P01_D";P01_E";P01_F";P0106_A";P0106_A_H54"
Jcritica	9.40
Longtotal	169
Pmin	25
Hcab	50.2567462 J274
Visc	1.10E-06
Rug	0.01

32.5652 32.565188

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						655															50.25675	50.2567		
P0106_A_H54"	J274	H54"	169	17.51	2.598	824	9.40	0.016	62.44037156	0.84843448	104.4	104.4	0.303493	0.30349	28804.22	28804.22	0.02389	0.02389	0.18156	0.1816	50.07519	50.0752	32.5652	32.565188

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0106_A_H54"	J274	H54"	169	104.4	110	€	1,519.31
						€	1,519.31

HIDRANTE 55

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P0203_A";P0203_B";P020301";P020301_H55"
Jcritica	6.14
Longtotal	140.4
Pmin	25
Hcab	51.5451003 J328
Visc	1.10E-06
Rug	0.01

32.055 32.0549525

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1029.6															51.5451	51.5451		
P020301_H55"	J328	H55"	140.4	19.36	2.39	1170	6.14	0.016	65.75942536	0.70370721	104.4	104.4	0.279195	0.27919	26498.11	26498.11	0.02436	0.02436	0.13015	0.1301	51.41495	51.415	32.055	32.0549525

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P020301_H55"	J328	H55"	140.4	104.4	110	€	798.88
						€	798.88

HIDRANTE 56

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P0203_A";P0203_B";P020301";P020301_H56"
Jcritica	6.67
Longtotal	154.4
Pmin	25
Hcab	52.381035 J327
Visc	1.10E-06
Rug	0.01

51.5451 51.5451003

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						875.2															52.38104	52.381		
P020301''	J327	J328	154.4	0	6.428	1029.6	26.59	0.016	96.08085058	0.88656852	104.4	104.4	0.750905	0.7509	71267.71	71267.71	0.01967	0.01967	0.83593	0.8359	51.5451	51.5451	51.5451	51.5451003
P020301_H56''	J328	H56''	63.3	20.09	4.038	1092.9	6.67	0.016	79.77613977	0.80784938	104.4	104.4	0.47171	0.47171	44769.60	44769.60	0.02165	0.02165	0.14889	0.1489	51.39621	51.3962	31.3062	31.3062088

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P020301''	J327	J328	154.4	104.4	110	€	878.54
P020301_H56''	J328	H56''	63.3	104.4	110	€	360.18
						€	1,238.71

HIDRANTE 57

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P0203_A";P0203_B";P0203_C";P0203_D";P0203_E";P0203_F";P020303_A";P020303_B";P020303_B_H57"
Jcritica	3.86
Longtotal	2.5
Pmin	25
Hcab	50.7273529 J801
Visc	1.10E-06
Rug	0.01

30.7344 30.7343675

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1484.3															50.72735	50.7274		
P020303_B_H57''	J801	H57''	2.5	19.99	2.758	1486.8	3.86	0.016	76.41773222	0.60133446	104.4	104.4	0.322184	0.32218	30578.15	30578.15	0.02356	0.02356	0.00299	0.003	50.72437	50.7244	30.7344	30.7343675

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P020303_B_H57''	J801	H57''	2.5	104.4	110	€	14.23
						€	14.23

HIDRANTE 58

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P0203_A";P0203_B";P0203_C";P0203_D";P0203_E";P0203_F";P020303_A";P020303_A_H58"
Jcritica	5.55
Longtotal	2.5
Pmin	25
Hcab	51.0562175 J799
Visc	1.10E-06
Rug	0.01

32.6547 32.6547218

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1376.5															51.05622	51.0562		
P020303_A_H58''	J799	H58''	2.5	18.4	1.864	1379	5.55	0.016	60.74864671	0.64310637	104.4	104.4	0.217748	0.21775	20666.31	20666.31	0.02585	0.02585	0.0015	0.0015	51.05472	51.0547	32.6547	32.6547218

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P020303_A_H58''	J799	H58''	2.5	104.4	110	€	14.23
						€	14.23

HIDRANTE 59

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P0203_A";P0203_B";P0203_C";P0203_D";P0203_E";P0203_F";P020303_A";P020303_B";P020303_B_H59";
Jcritica	3.71
Longtotal	64.8
Pmin	25
Hcab	53.2098201 J297
Visc	1.10E-06
Rug	0.01

52.2771 53.0497604

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						303.8															53.20982	53.2098		
P02_E"	J297	J324	64.8	0	97.454	368.6	76.53	0.016	320.5649743	1.20747362	237.4	340.8	2.20165	1.06834	475156.19	330992.02	0.01383	0.01447	0.93267	0.1601	52.27715	53.0498	52.2771	53.0497604
P0203_A"	J324	J325	231.7	0	49.992	600.3	46.99	0.016	245.4462524	1.05656889	213.6	299.2	1.395109	0.71103	270904.80	193399.95	0.01515	0.01593	1.63036	0.3179	50.64679	52.7319	50.6468	52.731871
P0203_B"	J325	J327	274.9	0	48.042	875.2	32.23	0.016	241.5709084	1.04819464	213.6	299.2	1.340691	0.68329	260337.82	185856.14	0.01525	0.01605	1.79814	0.3508	48.84865	52.381	48.8486	52.381035
P0203_C"	J327	J332	164	0	41.614	1039.2	27.15	0.016	228.0825112	1.01851073	190	237.4	1.467717	0.94013	253514.79	202897.26	0.01537	0.01587	1.45707	0.4939	47.39157	51.8872	47.3916	51.8871526
P0203_D"	J332	J337	235	0	35.86	1274.2	22.14	0.016	214.9019296	0.98864363	190	237.4	1.264775	0.81014	218461.10	174842.50	0.01576	0.0163	1.58938	0.5397	45.80219	51.3475	45.8022	51.3474885
P0203_E"	J337	J339	5.1	0	33.944	1279.3	22.05	0.016	210.233252	0.97784568	152	213.6	1.870622	0.94726	258485.90	183941.28	0.01545	0.01619	0.09247	0.0177	45.70972	51.3298	45.7097	51.3298117
P0203_F"	J339	J340	5.9	0	14.744	1285.2	21.95	0.016	150.6060193	0.82763868	117.8	152	1.352804	0.81253	144873.00	112276.58	0.01717	0.01786	0.08023	0.0233	45.62949	51.3065	45.6295	51.3064863
P020303_A"	J340	J799	91.3	0	8.322	1376.5	20.49	0.016	119.8084047	0.73818167	104.4	132.4	0.972158	0.60445	92266.63	72754.05	0.01871	0.01949	0.78811	0.2503	44.84139	51.0562	44.8414	51.0562175
P020303_B"	J799	J801	107.8	0	6.458	1484.3	19.01	0.016	108.2518724	0.70167714	104.4	117.8	0.75441	0.59254	71600.32	63455.63	0.01965	0.02008	0.58856	0.3289	44.25283	50.7274	44.2528	50.7273529
P020303_B_H59"	J801	H59"	359.8	21.37	3.7	1844.1	3.71	0.016	86.63171071	0.62770858	104.4	104.4	0.432226	0.43223	41022.17	41022.17	0.02207	0.02207	0.72415	0.7241	43.52869	50.0032	22.1587	28.633207

Solución escogida (diametro SUPERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P02_E"	J297	J324	64.8	340.8	355	€ 3,800.52
P0203_A"	J324	J325	231.7	299.2	315	€ 11,065.99
P0203_B"	J325	J327	274.9	299.2	315	€ 13,129.22
P0203_C"	J327	J332	164	237.4	250	€ 5,395.60
P0203_D"	J332	J337	235	237.4	250	€ 7,731.50
P0203_E"	J337	J339	5.1	213.6	225	€ 129.29
P0203_F"	J339	J340	5.9	152	160	€ 77.35
P020303_A"	J340	J799	91.3	132.4	140	€ 1,118.43
P020303_B"	J799	J801	107.8	117.8	125	€ 1,093.09
P020303_B_H59"	J801	H59"	359.8	104.4	110	€ 2,047.26
						€ 45,588.25

HIDRANTE 60

Serie	P00";P02_A";P02_B";P02_C";P02_D";P04_A";P04_B";P04_C";P04_D";P04_D_H60"
Jcritica	6.69
Longtotal	3.4
Pmin	25
Hcab	52.8571981 J322
Visc	1.10E-06
Rug	0.01

33.0019 33.0018521

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1194.9															52.8572	52.8572		
P04_D_H60"	J322	H60"	3.4	19.84	5.81	1198.3	6.69	0.016	92.22046014	0.86982459	104.4	104.4	0.678712	0.67871	64415.90	64415.90	0.02007	0.02007	0.01535	0.0153	52.84185	52.8419	33.0019	33.0018521

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P04_D_H60"	J322	H60"	3.4	104.4	110	€ 19.35
						€ 19.35

HIDRANTE 61

Serie	P00";P01_A";P01_B";P01_C";P01_D";P01_E";P0104_A";P0104_B";P0104_C_H61"
Jcritica	6.71
Longtotal	241.7
Pmin	25
Hcab	51.9502306 J267
Visc	1.10E-06
Rug	0.01

51.1206 50.4648819

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						408.6															51.95023	51.9502		
P0104_A"	J267	J269	241.7	0	6.896	650.3	41.44	0.016	98.70925428	0.90113868	117.8	104.4	0.632728	0.80558	67759.38	76456.46	0.01982	0.0194	0.82962	1.4853	51.12061	50.4649	51.1206	50.4648819
P0104_B"	J269	J271	506.1	0	4.252	1156.4	23.31	0.016	81.34975928	0.81807068	104.4	104.4	0.496709	0.49671	47142.24	47142.24	0.02141	0.02141	1.30542	1.3054	49.81518	49.1595	49.8152	49.1594589
P0104_C_H61"	J271	H61"	130	18.32	1.954	1286.4	6.71	0.016	59.60583737	0.70025641	104.4	104.4	0.228262	0.22826	21664.14	21664.14	0.02555	0.02555	0.0845	0.0845	49.73069	49.075	31.4107	30.7549608

Solución escogida (diametro INFERIOR)						
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**
P0104_A"	J267	J269	241.7	117.8	125	€ 2,450.84
P0104_B"	J269	J271	506.1	104.4	110	€ 2,879.71
P0104_C_H61"	J271	H61"	130	104.4	110	€ 739.70
						€ 6,070.25

HIDRANTE 62

Serie	P00";P02_A";P02_B";P02_C";P02_D";P04_A";P04_B";P04_C";P04_D";P04_D_2";P04_E";P04_E_H62"
Jcritica	2.85
Longtotal	4.4
Pmin	25
Hcab	52.6209204 J305
Visc	1.10E-06
Rug	0.01

																							30.3278	30.3277654
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1872.9															52.62092	52.6209		
P04_E_H62"	J305	H62"	4.4	22.28	4.618	1877.3	2.85	0.016	99.8190265	0.590116	104.4	104.4	0.539465	0.53946	51200.11	51200.11	0.02104	0.02104	0.01316	0.0132	52.60777	52.6078	30.3278	30.3277654

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P04_E_H62"	J305	H62"	4.4	104.4	110	€	25.04
						€	25.04

HIDRANTE 63

Serie	P00";P02_A";P02_B";P02_C";P02_D";P04_A";P04_B";P04_C";P04_D";P04_D_2";P04_E";P04_F";P04_F_H63"
Jcritica	1.79
Longtotal	6.2
Pmin	25
Hcab	52.5052804 J307
Visc	1.10E-06
Rug	0.01

																							29.1164	29.1247332
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2307.5															52.50528	52.5053		
P04_F_H63"	J307	H63"	6.2	23.37	4.66	2313.7	1.79	0.016	109.9418463	0.49087395	104.4	117.8	0.544371	0.42757	51665.76	45788.67	0.021	0.02151	0.01884	0.0105	52.48644	52.4947	29.1164	29.1247332

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P04_F_H63"	J307	H63"	6.2	104.4	110	€	35.28
						€	35.28

HIDRANTE 64

Serie	P00";P02_A";P02_B";P02_C";P02_D";P04_A";P04_B";P04_C";P04_D";P04_D_2";P04_E";P04_F";P04_G";P04_H";P04_H_H64"
Jcritica	1.04
Longtotal	251.8
Pmin	25
Hcab	52.3966866 J310
Visc	1.10E-06
Rug	0.01

																							27.6278	27.8307428
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2687.1															52.39669	52.3967		
P04_H_H64"	J310	H64"	251.8	24.35	6.3	2938.9	1.04	0.016	138.3107288	0.41931358	132.4	152	0.457588	0.34719	55076.96	47974.93	0.02064	0.02122	0.41891	0.2159	51.97777	52.1807	27.6278	27.8307428

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P04_H_H64"	J310	H64"	251.8	132.4	140	€	3,084.55
						€	3,084.55

HIDRANTE 66

Serie	P00";P02_A";P02_B";P02_C";P02_D";P04_A";P04_B";P04_C";P04_D";P04_D_2";P04_E";P04_F";P04_G";P04_H";P04_I";P04_J";P04_J_H66"
Jcritica	1.58
Longtotal	71.8
Pmin	25
Hcab	52.3198566
Visc	1.10E-06
Rug	0.01

J314

29.7651 29.7651016

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						3001.5															52.31986	52.3199		
P04_J_H66"	J314	H66"	71.8	22.46	2.918	3073.3	1.58	0.016	93.42834548	0.42563574	104.4	104.4	0.340874	0.34087	32352.08	32352.08	0.02326	0.02326	0.09475	0.0948	52.2251	52.2251	29.7651	29.7651016

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P04_J_H66"	J314	H66"	71.8	104.4	110	€	408.54
						€	408.54

HIDRANTE 67

Serie	P00";P02_A";P02_B";P02_C";P02_D";P04_A";P04_B";P04_C";P04_D";P04_D_2";P04_E";P04_F";P04_G";P0402_A";P0402_B";P0402_B_H67"
Jcritica	1.45
Longtotal	76.9
Pmin	25
Hcab	52.4270437
Visc	1.10E-06
Rug	0.01

J309

52.1285 52.3394755

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2524.1															52.42704	52.427		
P0402_A"	J309	J317	76.9	0	7.384	2601	10.54	0.016	137.7207699	0.49568174	117.8	152	0.677503	0.40693	72554.41	56229.67	0.01955	0.02051	0.29851	0.0876	52.12854	52.3395	52.1285	52.3394755
P0402_B"	J317	J319	392.5	0	4.974	2993.5	9.16	0.016	117.5885619	0.45802137	104.4	135.2	0.581052	0.34647	55147.10	42584.01	0.02072	0.02181	1.34042	0.3874	50.78812	51.9521	50.7881	51.9521172
P0402_B_H67"	J319	H67"	228.1	22.74	3.046	3221.6	1.45	0.016	96.64396205	0.41523176	104.4	104.4	0.355827	0.35583	33771.23	33771.23	0.02304	0.02304	0.32485	0.3248	50.46327	51.6273	27.7233	28.8872704

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0402_A"	J309	J317	76.9	117.8	125	€	779.77
P0402_B"	J317	J319	392.5	104.4	110	€	2,233.33
P0402_B_H67"	J319	H67"	228.1	104.4	110	€	1,297.89
						€	4,310.98

HIDRANTE 68

Serie	P00";P02_A";P02_B";P02_C";P02_D";P02_E";P0203_A";P0203_B";P0203_C";P0203_D";P0203_E";P0203_F";P0203_G";P0203_H_H68";P0203_D_H68_2"
Jcritica	5.47
Longtotal	125.6
Pmin	25
Hcab	51.3064863
Visc	1.10E-06
Rug	0.01

J340

50.6276 50.6276203

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1285.2															51.30649	51.3065		
P0203_G"	J340	J795	125.6	0	6.422	1410.8	18.65	0.016	99.92969515	0.81882538	104.4	104.4	0.750204	0.7502	71201.19	71201.19	0.01967	0.01967	0.67887	0.6789	50.62762	50.6276	50.6276	50.6276203
P0203_H_H68"	J795	J1245	549.9	0	4.338	1960.7	13.42	0.016	85.41659621	0.75703358	104.4	104.4	0.506756	0.50676	48095.73	48095.73	0.02132	0.02132	1.47007	1.4701	49.15755	49.1575	49.1575	49.1575465
P0203_D_H68_2"	J1245	H68"	5.2	15.55	4.338	1965.9	5.47	0.016	85.41659621	0.75703358	104.4	104.4	0.506756	0.50676	48095.73	48095.73	0.02132	0.02132	0.0139	0.0139	49.14365	49.1436	33.5936	33.5936451

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0203_G"	J340	J795	125.6	104.4	110	€	714.66
P0203_H_H68"	J795	J1245	549.9	104.4	110	€	3,128.93
P0203_D_H68_2"	J1245	H68"	5.2	104.4	110	€	29.59
						€	3,873.18

HIDRANTE 69

Serie	P00";P02_A";P02_B";P02_C";P02_D";P04_A";P04_B";P04_C";P04_D";P04_D_2";P04_E";P04_F";P04_G";P0402_A";P0402_B";P0402_B_H69"
Jcritica	1.49
Longtotal	4.6
Pmin	25
Hcab	50.7881182
Visc	1.10E-06
Rug	0.01

J319

29.4752 29.4751978

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2993.5															50.78812	50.7881		
P0402_B_H69"	J319	H69"	4.6	21.31	1.928	2998.1	1.49	0.016	80.06471615	0.3829436	104.4	104.4	0.225225	0.22522	21375.88	21375.88	0.02564	0.02564	0.00292	0.0029	50.7852	50.7852	29.4752	29.4751978

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0402_B_H69"	J319	H69"	4.6	104.4	110	€	26.17
						€	26.17

HIDRANTE 70

Serie	P00";P02_A";P02_B";P02_C";P02_D";P04_A";P04_B";P04_C";P04_D";P04_D_2";P04_E";P04_F";P04_G";P0402_A";P0402_A_H70"
Jcritica	1.04
Longtotal	99.4
Pmin	25
Hcab	52.1285368
Visc	1.10E-06
Rug	0.01

J317

27.705 27.7050289

Tuberia	Nudo Ini	Nudo Fin	Long (m)	z(fin)	Qinst	∑L_i(acum)	jdispon	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2601															52.12854	52.1285		
P0402_A_H70"	J317	H70"	99.4	24.33	2.41	2700.4	1.04	0.016	94.17908731	0.34595388	104.4	104.4	0.281531	0.28153	26719.85	26719.85	0.02431	0.02431	0.09351	0.0935	52.03503	52.035	27.705	27.7050289

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P0402_A_H70"	J317	H70"	99.4	104.4	110	€	565.59
						€	565.59

HIDRANTE 71

Serie	P00";P02_A";P02_B";P02_C";P02_D";P04_A";P04_B";P04_C";P04_D";P04_D_2";P04_E";P04_F";P04_G";P04_H";P04_I";P04_I_H71"
Jcritica	0.54
Longtotal	104.1
Pmin	25
Hcab	52.3591068
Visc	1.10E-06
Rug	0.01

J312

																							26.4852	26.5263149
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						2844															52.35911	52.3591		
P04_I_H71"	J312	H71"	104.1	25.78	2.354	2948.1	0.54	0.016	106.4625761	0.26443725	104.4	117.8	0.274989	0.21599	26098.97	23130.16	0.02445	0.02513	0.09395	0.0528	52.26516	52.3063	26.4852	26.5263149

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P04_I_H71"	J312	H71"	104.1	104.4	110	€	592.33
						€	592.33

HIDRANTE 11

Serie	P00";P02_A";P02_B";P02_C";P02_D";P04_A";P04_B";P04_C";P04_C_H11"
Jcritica	8.58
Longtotal	6.1
Pmin	25
Hcab	52.9356739
Visc	1.10E-06
Rug	0.01

J302

																							33.8429	33.842927
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**z(fin)**	**Qinst**	**∑L_i(acum)**	**jdispon**	fest	Dteor (mm)	Vteor(m/s)	D1	D2	V1	V2	Re1	Re2	f1	f2	hf1	hf2	H1	H2	P1	P2
						1026.6															52.93567	52.9357		
P04_C_H11"	J302	H11"	6.1	19.07	5.224	1032.7	8.58	0.016	84.08179914	0.94082597	104.4	104.4	0.610256	0.61026	57918.87	57918.87	0.02051	0.02051	0.02275	0.0227	52.91293	52.9129	33.8429	33.842927

Solución escogida (diametro INFERIOR)							
Tuberia	**Nudo Ini**	**Nudo Fin**	**Long (m)**	**Dint**	**DN**	**Coste**	
P04_C_H11"	J302	H11"	6.1	104.4	110	€	34.71
						€	34.71

1.3.1.1 Cálculo de la garantía suministro del modelo original.

GS global	Rug	0.01	Hcab	53.59	
94.800%	Visc	1.10E-06			25.001
					0.001

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	∑pi·Qi	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P00''	UGD_44	J252	474.6	500	9	0	169.9286582	1.6258	280.32	197.15	0.19	1.11	480820.54	0.0135	0.016	0.016	53.574	53.574
P01_A''	J252	J253	190	200	15.4	0	33.44552443	1.6258	45.46	44.41	0.22	1.57	270532.20	0.0152	0.154	0.170	53.420	53.420
P01_B''	J253	J262	190	200	32.6	0	26.6871024	1.6258	36.74	36.54	0.23	1.29	222610.65	0.0157	0.228	0.399	53.191	53.191
P01_C''	J262	J264	190	200	141.7	0	24.92584695	1.6258	35.32	34.59	0.23	1.22	210715.27	0.0159	0.897	1.296	52.294	52.294
P01_C_H2''	J262	H2''	132.4	140	2.3	13.92	1.761255447	1.6258	1.41	3.69	0.35	0.27	32292.13	0.0232	0.001	0.400	53.190	39.270
P01_C_H6''	J264	H6''	132.4	140	9.9	13.89	2.064517974	1.6258	2.52	4.65	0.38	0.34	40630.98	0.0220	0.010	1.305	52.285	38.395
P01_D''	J264	J283	152	160	201	0	20.09364185	1.6258	30.26	29.04	0.24	1.60	221112.98	0.0158	2.735	4.030	49.560	49.560
P01_D_H8''	J283	H8''	132.4	140	5.1	14.29	2.507747821	1.6258	3.08	5.36	0.36	0.39	46852.54	0.0214	0.006	4.037	49.553	35.263
P01_E''	J283	J267	152	160	8.9	0	17.58589402	1.6258	27.18	26.06	0.25	1.44	198461.54	0.0161	0.099	4.130	49.460	49.460
P01_F''	J267	J273	132.4	140	210.6	0	11.84056878	1.6258	20.62	19.22	0.27	1.40	168060.19	0.0167	2.635	6.765	46.825	46.825
P01_G''	J273	J279	132.4	140	87.4	0	4.867196934	1.6258	8.28	9.55	0.33	0.69	83449.85	0.0190	0.307	7.071	46.519	46.519
P01_G_H50''	J279	H50''	117.8	125	3.4	16.35	2.094510971	1.6258	3.15	4.98	0.40	0.46	48947.20	0.0212	0.007	7.078	46.512	30.162
P0101_A''	J253	J254	104.4	110	175.5	0	6.758422035	1.6258	8.72	11.56	0.29	1.35	128172.34	0.0176	2.753	2.924	50.666	50.666
P0101_A_H3''	J254	H3''	104.4	110	3.8	12.52	1.924550654	1.6258	1.85	4.13	0.36	0.48	45837.57	0.0215	0.009	2.933	50.657	38.137
P0101_B''	J254	J258	104.4	110	104.7	0	4.833871382	1.6258	6.88	9.10	0.31	1.06	100862.73	0.0184	1.062	3.986	49.604	49.604
P0101_B_H4''	J258	H4''	104.4	110	3.6	13.2	2.064517974	1.6258	2.93	4.85	0.39	0.57	53717.10	0.0208	0.012	3.997	49.593	36.393
P0101_C''	J258	H5''	104.4	110	134	13.75	2.769353408	1.6258	3.95	6.00	0.36	0.70	66537.49	0.0199	0.641	4.627	48.963	35.213
P0102_H7''	J264	H7''	132.4	140	252.4	15.07	2.76768713	1.6258	3.66	5.88	0.35	0.43	51372.07	0.0209	0.371	1.666	51.924	36.854
P0103_H51''	J279	H51''	132.4	140	306.1	16.3	2.772685963	1.6258	5.29	6.51	0.39	0.47	56927.18	0.0205	0.540	7.612	45.978	29.678
P0104_A''	J267	J269	104.4	110	241.7	0	5.745325241	1.6258	5.45	9.54	0.28	1.11	105759.23	0.0182	2.672	6.802	46.788	46.788
P0104_A_H9''	J269	H9''	104.4	110	3.6	14.81	2.202819016	1.6258	2.18	4.60	0.35	0.54	51036.86	0.0211	0.011	6.813	46.777	31.967
P0104_B''	J269	J271	104.4	110	506.1	0	3.542506225	1.6258	3.26	6.48	0.30	0.76	71845.47	0.0196	2.780	9.582	44.008	44.008
P0104_B_H10''	J271	H10''	104.4	110	4.9	18.92	1.914552988	1.6258	1.83	4.11	0.36	0.48	45617.81	0.0216	0.012	9.594	43.996	25.076
P0104_C_H61''	J271	H61''	104.4	110	130	18.32	1.627953237	1.6258	1.43	3.57	0.37	0.42	39632.72	0.0222	0.246	9.828	43.762	25.442
P0106_A''	J273	J274	132.4	140	35.8	0	6.973371849	1.6258	12.18	12.65	0.30	0.92	110568.96	0.0180	0.209	6.974	46.616	46.616
P0106_A_H54''	J274	H54''	117.8	125	169	17.51	2.164494631	1.6258	3.23	5.09	0.39	0.47	49995.77	0.0211	0.336	7.310	46.280	28.770
P0106_B''	J274	J276	132.4	140	322.2	0	4.808877218	1.6258	8.95	9.67	0.34	0.70	84554.11	0.0189	1.158	8.132	45.458	45.458
P0106_B_H53''	J276	H53''	117.8	125	5.1	14.97	2.124503968	1.6258	2.67	4.78	0.38	0.44	47000.57	0.0214	0.009	8.141	45.449	30.479
P0106_C_H52''	J276	H52''	132.4	140	280	19.93	2.684373249	1.6258	6.27	6.76	0.42	0.49	59063.54	0.0203	0.528	8.659	44.931	25.001
P02_A''	J252	J285	379.8	400	136.9	0	136.4831338	1.6258	234.86	161.40	0.20	1.42	491881.83	0.0135	0.505	0.521	53.069	53.069
P02_A_H1''	J285	H1''	132.4	140	67.6	14.76	2.661045363	1.6258	4.93	6.27	0.39	0.46	54820.00	0.0207	0.112	0.632	52.958	38.198
P02_B''	J285	J287	379.8	400	110.8	0	133.8220884	1.6258	229.93	158.47	0.20	1.40	482970.86	0.0136	0.395	0.916	52.674	52.674
P02_C''	J287	J295	379.8	400	39.9	0	123.8944063	1.6258	213.29	147.64	0.20	1.30	449945.94	0.0137	0.125	1.041	52.549	52.549
P02_C_H15''	J295	H15''	104.4	110	3.7	14.01	1.736261282	1.6258	1.48	3.71	0.36	0.43	41182.07	0.0220	0.007	1.048	52.542	38.532
P02_D''	J295	J297	379.8	400	7.2	0	122.158145	1.6258	211.81	145.82	0.20	1.29	444402.88	0.0138	0.022	1.063	52.527	52.527
P02_E''	J297	J324	337.4	355	64.8	0	81.19270969	1.6258	120.57	99.04	0.20	1.11	339784.20	0.0144	0.173	1.236	52.354	52.354
P02_F''	J324	J806	237.4	250	24.6	0	39.54243425	1.6258	70.41	53.18	0.22	1.20	259309.17	0.0152	0.116	1.352	52.238	52.238
P02_G''	J806	J820	190	200	175.3	0	23.60782135	1.6258	29.57	32.45	0.23	1.14	197676.05	0.0160	0.987	2.339	51.251	51.251
P02_G_H20''	J820	H20''	132.4	140	2.5	9.27	2.367780501	1.6258	3.30	5.32	0.37	0.39	46506.84	0.0214	0.003	2.342	51.248	41.978
P02_H''	J820	J841	152	160	384.4	0	21.24004085	1.6258	26.27	29.57	0.23	1.63	225200.31	0.0158	5.409	7.748	45.842	45.842
P02_H_H21''	J841	H21''	117.8	125	3	8.78	1.87122977	1.6258	1.54	3.89	0.35	0.36	38203.56	0.0224	0.004	7.752	45.838	37.058
P02_I''	J841	J822	152	160	7.6	0	19.36881108	1.6258	17.80	26.23	0.23	1.45	199729.66	0.0161	0.086	7.834	45.756	45.756
P02_J''	J822	J824	152	160	59.7	0	15.60968876	1.6258	18.04	22.51	0.24	1.24	171451.16	0.0165	0.510	8.344	45.246	45.246
P02_J_H23''	J824	H23''	104.4	110	88.5	8.55	1.5413068	1.6258	1.07	3.22	0.35	0.38	35708.19	0.0228	0.139	8.483	45.107	36.557
P0202_A''	J287	J288	117.8	125	208.9	0	9.927682073	1.6258	16.64	16.56	0.28	1.52	162704.40	0.0168	3.512	4.428	49.162	49.162
P0202_A_H16''	J288	H16''	117.8	125	4.8	11.32	2.476088547	1.6258	3.05	5.32	0.36	0.49	52242.80	0.0209	0.010	0.010	53.580	42.260
P0202_B''	J288	J290	104.4	110	101.9	0	7.451593526	1.6258	13.58	13.44	0.30	1.57	149047.23	0.0172	2.106	2.106	51.484	51.484
P0202_B_H17''	J290	H17''	104.4	110	4.2	10.65	1.526310302	1.6258	1.24	3.34	0.36	0.39	37010.69	0.0226	0.007	0.007	53.583	42.933

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	∑pi·Qi	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P0202_C''	J290	J292	104.4	110	148.9	0	5.925283224	1.6258	12.34	11.64	0.33	1.36	129014.80	0.0176	2.364	2.364	51.226	51.226
P0202_C_H18''	J292	H18''	104.4	110	3.7	11.42	3.610823607	1.6258	8.66	8.39	0.39	0.98	93075.35	0.0187	0.032	0.032	53.558	42.138
P0202_D''	J292	H19''	104.4	110	274.7	12.46	2.314459617	1.6258	3.68	5.43	0.39	0.63	60244.91	0.0203	1.099	1.099	52.491	40.031
P0203_A''	J324	J325	237.4	250	231.7	0	41.65027544	1.6258	70.41	55.29	0.22	1.25	269586.36	0.0151	1.173	2.409	51.181	51.181
P0203_A_H14''	J325	H14''	104.4	110	3.8	14.46	1.624620682	1.6258	1.42	3.56	0.37	0.42	39456.71	0.0223	0.007	0.007	53.583	39.123
P0203_B''	J325	J327	237.4	250	274.9	0	40.02565476	1.6258	68.99	53.53	0.22	1.21	260993.26	0.0152	1.312	1.312	52.278	52.278
P0203_B_H44''	J332	H44''	152	160	3.3	14.5	4.793880719	1.6258	22.90	12.57	0.44	0.69	95750.16	0.0184	0.010	0.010	53.580	39.080
P0203_C''	J327	J332	213.6	225	164	0	34.67023848	1.6258	59.95	47.26	0.23	1.32	256090.07	0.0153	1.041	1.041	52.549	52.549
P0203_C_H43''	J337	H43''	104.4	110	2.8	15.85	1.596293962	1.6258	1.58	3.64	0.38	0.43	40369.19	0.0221	0.005	0.005	53.585	37.735
P0203_D''	J332	J337	190	200	235	0	29.87635777	1.6258	37.05	39.77	0.22	1.40	242294.64	0.0155	1.921	1.921	51.669	51.669
P0203_D_H68_2''	J1245	H68''	104.4	110	5.2	15.55	3.614156162	1.6258	7.12	7.95	0.37	0.93	88183.65	0.0189	0.041	0.041	53.549	37.999
P0203_E''	J337	J339	190	200	5.1	0	28.2800638	1.6258	35.47	37.96	0.22	1.34	231268.87	0.0156	0.038	0.038	53.552	53.552
P0203_F''	J339	J340	190	200	5.9	0	12.28379863	1.6258	17.40	19.06	0.26	0.67	116144.74	0.0177	0.013	0.013	53.577	53.577
P0203_G''	J340	J795	190	200	125.6	0	5.350417445	1.6258	8.93	10.21	0.32	0.36	62197.95	0.0200	0.087	0.087	53.503	53.503
P0203_G_H49''	J795	H49''	104.4	110	30.3	14.68	1.736261282	1.6258	1.81	3.92	0.38	0.46	43491.22	0.0218	0.068	0.068	53.522	38.842
P0203_H_H68''	J795	J1245	104.4	110	549.9	0	3.614156162	1.6258	7.12	7.95	0.37	0.93	88183.65	0.0189	4.373	4.373	49.217	49.217
P020301''	J327	J328	104.4	110	154.4	0	5.355416278	1.6258	9.04	10.24	0.32	1.20	113574.22	0.0180	1.943	1.943	51.647	51.647
P020301_H55''	J328	H55''	104.4	110	140.4	19.36	1.991201758	1.6258	3.11	4.86	0.41	0.57	53855.23	0.0208	0.460	0.460	53.130	33.770
P020301_H56''	J328	H56''	104.4	110	63.3	20.09	3.364214519	1.6258	5.93	7.32	0.36	0.86	81203.47	0.0192	0.434	0.434	53.156	33.066
P020302_A''	J339	J342	152	160	236.6	0	15.99626517	1.6258	18.07	22.91	0.24	1.26	174441.04	0.0165	2.085	2.085	51.505	51.505
P020302_B''	J342	J343	117.8	125	139.8	0	9.696069483	1.6258	17.75	16.55	0.28	1.52	162581.39	0.0168	2.347	2.347	51.243	51.243
P020302_B_H41''	J343	H41''	117.8	125	15.5	12.33	2.369446779	1.6258	3.18	5.27	0.37	0.48	51766.46	0.0210	0.033	0.033	53.557	41.227
P020302_C''	J343	J345	117.8	125	24.4	0	7.326622705	1.6258	14.57	13.53	0.31	1.24	132975.13	0.0174	0.284	0.284	53.306	53.306
P020302_C_H45''	J345	H45''	117.8	125	87.4	13.45	1.94121343	1.6258	1.69	4.05	0.35	0.37	39824.81	0.0222	0.116	0.116	53.474	40.024
P020302_D''	J345	J347	117.8	125	162.3	0	5.385409275	1.6258	6.71	9.60	0.30	0.88	94284.24	0.0186	1.011	1.011	52.579	52.579
P020302_D_H46''	J347	J537	117.8	125	145.2	0	1.899556489	1.6258	2.48	4.46	0.39	0.41	43802.19	0.0217	0.228	0.228	53.362	53.362
P020302_D_H46_2''	J537	H46''	117.8	125	3	12.26	1.899556489	1.6258	2.48	4.46	0.39	0.41	43802.19	0.0217	0.005	0.005	53.585	41.325
P020302_E''	J347	J349	104.4	110	199.5	0	3.485852786	1.6258	4.23	6.83	0.33	0.80	75719.17	0.0194	1.205	1.205	52.385	52.385
P020302_E_H47''	J349	H47''	104.4	110	80.5	12.39	1.446328976	1.6258	1.33	3.32	0.38	0.39	36848.99	0.0226	0.134	0.134	53.456	41.066
P020302_F_H48''	J349	H48''	104.4	110	359.6	14.82	2.03952381	1.6258	2.90	4.81	0.39	0.56	53289.37	0.0209	1.155	1.155	52.435	37.615
P02030202_A''	J342	J790	104.4	110	6.2	0	6.300195689	1.6258	6.50	10.44	0.28	1.22	115798.23	0.0179	0.081	0.081	53.509	53.509
P02030202_A_H42''	J790	H42''	104.4	110	5	11.84	2.422767663	1.6258	3.09	5.28	0.36	0.62	58548.10	0.0205	0.019	0.019	53.571	41.731
P02030202_B''	J790	J792	104.4	110	188.7	0	3.877428027	1.6258	3.41	6.88	0.30	0.80	76262.82	0.0194	1.154	1.154	52.436	52.436
P02030202_B_H40''	J792	H40''	104.4	110	3.4	11.61	1.539640523	1.6258	1.21	3.33	0.36	0.39	36897.56	0.0226	0.006	0.006	53.584	41.974
P02030202_C''	J792	J794	104.4	110	141.9	0	2.337787504	1.6258	2.20	4.75	0.34	0.55	52639.95	0.0209	0.446	0.446	53.144	53.144
P02030202_D_H39''	J794	H39''	104.4	110	4.5	10.52	2.337787504	1.6258	2.20	4.75	0.34	0.55	52639.95	0.0209	0.014	0.014	53.576	43.056
P020303_A''	J340	J799	190	200	91.3	0	6.933381186	1.6258	8.46	11.66	0.28	0.41	71053.12	0.0195	0.081	0.081	53.509	53.509
P020303_A_H58''	J799	H58''	104.4	110	2.5	18.4	1.552970744	1.6258	1.21	3.34	0.36	0.39	37022.58	0.0226	0.004	0.004	53.586	35.186
P020303_B''	J799	J801	190	200	107.8	0	5.380410442	1.6258	7.26	9.76	0.30	0.34	59458.43	0.0202	0.069	0.069	53.521	53.521
P020303_B_H57''	J801	H57''	152	160	2.5	19.99	2.297796841	1.6258	2.09	4.65	0.34	0.26	35390.94	0.0227	0.001	0.001	53.589	33.599
P020303_B_H59''	J801	H59''	190	200	359.8	21.37	3.082613601	1.6258	5.17	6.78	0.37	0.24	41295.12	0.0219	0.121	0.121	53.469	32.099
P0204_I_H22''	J822	H22''	152	160	255.6	9.38	3.759122316	1.6258	8.47	8.49	0.38	0.47	64656.22	0.0199	0.374	8.208	45.382	36.002
P0205_A''	J806	J807	152	160	170.5	0	15.9346129	1.6258	20.36	23.27	0.24	1.28	177207.64	0.0164	1.546	2.898	50.692	50.692
P0205_B''	J807	J808	117.8	125	11	0	11.44399471	1.6258	14.20	17.57	0.26	1.61	172639.39	0.0167	0.206	0.206	53.384	53.384
P0205_B_H32''	J808	H32''	132.4	140	4.5	10.02	2.729362745	1.6258	4.09	6.02	0.37	0.44	52593.68	0.0208	0.007	0.007	53.583	43.563
P0205_C''	J808	J810	132.4	140	124	0	8.714631964	1.6258	10.11	13.88	0.27	1.01	121380.78	0.0177	0.857	0.857	52.733	52.733
P0205_C_H33''	J810	H33''	132.4	140	6	10.05	2.366114223	1.6258	2.45	4.91	0.35	0.36	42936.92	0.0218	0.006	0.006	53.584	43.534

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	∑pi·Qi	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P0205_D''	J810	J812	132.4	140	122.6	0	6.34851774	1.6258	7.66	10.85	0.28	0.79	94837.98	0.0185	0.542	0.542	53.048	53.048
P0205_D_H34''	J812	H34''	117.8	125	100.3	10.68	2.037857532	1.6258	2.42	4.57	0.37	0.42	44863.62	0.0216	0.165	0.165	53.425	42.745
P0205_E''	J812	J814	132.4	140	56	0	4.310660209	1.6258	5.24	8.03	0.31	0.58	70226.87	0.0196	0.144	0.144	53.446	53.446
P0205_E_H36''	J814	H36''	132.4	140	168.8	9.54	2.602725646	1.6258	3.20	5.51	0.35	0.40	48178.50	0.0212	0.221	0.221	53.369	43.829
P0205_F_H35''	J814	H35''	104.4	110	167.1	10.45	1.707934563	1.6258	2.04	4.03	0.39	0.47	44694.54	0.0217	0.392	0.392	53.198	42.748
P020502_A''	J807	J817	117.8	125	354	0	4.490618192	1.6258	6.16	8.53	0.32	0.78	83784.41	0.0190	1.781	1.781	51.809	51.809
P020502_A_H38''	J817	H38''	117.8	125	4.8	9.14	2.232812014	1.6258	3.63	5.33	0.40	0.49	52361.30	0.0209	0.010	0.010	53.580	44.440
P020502_B_H37''	J817	H37''	117.8	125	150.2	8.88	2.257806178	1.6258	2.54	4.85	0.36	0.44	47629.57	0.0213	0.274	0.274	53.316	44.436
P0206_A''	J824	J825	132.4	140	220.8	0	14.06838196	1.6258	15.43	20.46	0.24	1.49	178827.10	0.0165	3.095	11.439	42.151	42.151
P0206_A_H24''	J825	H24''	104.4	110	5.5	8.54	1.432998755	1.6258	1.32	3.30	0.38	0.39	36599.26	0.0226	0.009	0.009	53.581	45.041
P0206_B''	J825	J827	132.4	140	75.5	0	12.63538321	1.6258	14.11	18.74	0.25	1.36	163857.52	0.0167	0.902	0.902	52.688	52.688
P0206_B_H25''	J827	H25''	117.8	125	39.3	9.32	1.981204093	1.6258	2.65	4.63	0.39	0.42	45455.14	0.0215	0.066	0.066	53.524	44.204
P0206_C''	J827	J829	117.8	125	97.4	0	10.65417912	1.6258	11.47	16.16	0.25	1.48	158779.81	0.0169	1.566	1.566	52.024	52.024
P0206_C_H26''	J829	H26''	117.8	125	127.5	10.25	1.954543651	1.6258	2.19	4.36	0.37	0.40	42838.54	0.0218	0.193	0.193	53.397	43.147
P0206_D''	J829	J831	117.8	125	120.6	0	8.699635465	1.6258	9.28	13.65	0.26	1.25	134138.78	0.0174	1.425	1.425	52.165	52.165
P0206_D_H27''	J831	H27''	104.4	110	4.8	10.47	1.264704715	1.6258	1.01	2.90	0.38	0.34	32166.97	0.0233	0.006	0.006	53.584	43.114
P0206_E''	J831	J833	117.8	125	72.7	0	7.43493075	1.6258	8.26	12.11	0.27	1.11	118977.72	0.0178	0.691	0.691	52.899	52.899
P0206_E_H29''	J833	H29''	117.8	125	206.8	9.03	1.884559991	1.6258	1.85	4.09	0.36	0.38	40234.75	0.0221	0.279	0.279	53.311	44.281
P0206_F''	J833	J835	104.4	110	76.4	0	5.550370759	1.6258	6.42	9.67	0.29	1.13	107194.12	0.0182	0.866	0.866	52.724	52.724
P0206_F_H28''	J835	H28''	104.4	110	4.1	10.72	1.706268285	1.6258	1.81	3.89	0.38	0.45	43136.71	0.0218	0.009	0.009	53.581	42.861
P0206_G''	J835	J837	104.4	110	430.9	0	3.844102474	1.6258	4.61	7.33	0.32	0.86	81323.46	0.0192	2.960	2.960	50.630	50.630
P0206_G_H31''	J837	H31''	104.4	110	4.7	9.19	1.846235605	1.6258	2.63	4.48	0.40	0.52	49680.85	0.0212	0.013	0.013	53.577	44.387
P0206_H_H30''	J837	H30''	104.4	110	414.4	8.34	1.997866869	1.6258	1.98	4.29	0.36	0.50	47540.62	0.0214	1.085	1.085	52.505	44.165
P04_A''	J297	J298	337.4	355	234	0	40.96543534	1.6258	91.24	56.49	0.23	0.63	193810.88	0.0159	0.224	1.287	52.303	52.303
P04_A_H13''	J298	H13''	117.8	125	23.3	15.1	1.944545985	1.6258	2.57	4.55	0.39	0.42	44737.07	0.0216	0.038	0.038	53.552	38.452
P04_B''	J298	J300	337.4	355	109.7	0	39.02088936	1.6258	88.66	54.33	0.23	0.61	186382.96	0.0160	0.098	0.098	53.492	53.492
P04_B_H12''	J300	H12''	117.8	125	4	16.71	1.91288671	1.6258	2.15	4.30	0.37	0.39	42214.32	0.0219	0.006	0.006	53.584	36.874
P04_C''	J300	J302	337.4	355	379.1	0	37.10800265	1.6258	86.51	52.23	0.23	0.58	179180.19	0.0161	0.315	0.315	53.275	53.275
P04_C_H11''	J302	H11''	152	160	6.1	19.07	4.352317149	1.6258	13.28	10.28	0.39	0.57	78251.40	0.0192	0.013	0.013	53.577	34.507
P04_D''	J302	J322	337.4	355	168.3	0	32.48074969	1.6258	73.24	46.39	0.24	0.52	159159.99	0.0165	0.113	0.113	53.477	53.477
P04_D_2''	J322	J304	237.4	250	5.6	0	27.6402132	1.6258	62.75	40.52	0.24	0.92	197554.79	0.0159	0.016	0.016	53.574	53.574
P04_D_H60''	J322	H60''	152	160	3.4	19.84	4.840536492	1.6258	10.49	10.11	0.35	0.56	76963.95	0.0192	0.007	0.007	53.583	33.743
P04_E''	J304	J305	337.4	355	672.4	0	27.6402132	1.6258	62.70	40.51	0.24	0.45	138986.24	0.0169	0.353	0.353	53.237	53.237
P04_E_H62''	J305	H62''	152	160	4.4	22.28	3.84743503	1.6258	8.97	8.72	0.38	0.48	66380.10	0.0198	0.007	0.007	53.583	31.303
P04_F''	J305	J307	237.4	250	434.6	0	23.79277817	1.6258	53.73	35.71	0.25	0.81	174108.79	0.0163	0.990	0.990	52.600	52.600
P04_F_H63''	J307	H63''	152	160	6.2	23.37	3.88242686	1.6258	9.52	8.90	0.38	0.49	67768.26	0.0197	0.010	0.010	53.580	30.210
P04_G''	J307	J309	237.4	250	216.6	0	19.91035131	1.6258	44.21	30.72	0.26	0.69	149779.57	0.0168	0.376	0.376	53.214	53.214
P04_H''	J309	J310	237.4	250	163	0	13.75845433	1.6258	36.96	23.64	0.29	0.53	115274.42	0.0176	0.176	0.176	53.414	53.414
P04_H_H64''	J310	H64''	152	160	251.8	24.35	5.24877451	1.6258	17.66	12.08	0.38	0.67	91999.74	0.0186	0.694	0.694	52.896	28.546
P04_I''	J310	J312	213.6	225	156.9	0	8.509679816	1.6258	19.30	15.65	0.31	0.44	84818.22	0.0188	0.134	0.134	53.456	53.456
P04_I_H71''	J312	H71''	117.8	125	104.1	25.78	1.961208761	1.6258	1.81	4.15	0.35	0.38	40738.56	0.0221	0.144	0.144	53.446	27.666
P04_J''	J312	J314	213.6	225	157.5	0	6.548471055	1.6258	17.49	13.35	0.34	0.37	72335.21	0.0194	0.101	0.101	53.489	53.489
P04_J_H65''	J314	H65''	190	200	468.3	25.76	4.117372004	1.6258	14.32	10.27	0.42	0.36	62558.97	0.0200	0.329	0.329	53.261	27.501
P04_J_H66''	J314	H66''	132.4	140	71.8	22.46	2.431099051	1.6258	3.18	5.33	0.37	0.39	46589.92	0.0214	0.089	0.089	53.501	31.041
P0402_A''	J309	J317	117.8	125	76.9	0	6.151896981	1.6258	7.24	10.53	0.29	0.97	103438.77	0.0183	0.567	0.567	53.023	53.023
P0402_A_H70''	J317	H70''	117.8	125	99.4	24.33	2.007864535	1.6258	1.95	4.28	0.36	0.39	42057.08	0.0219	0.145	0.145	53.445	29.115
P0402_B''	J317	J319	117.8	125	392.5	0	4.144032446	1.6258	5.29	7.88	0.32	0.72	77456.75	0.0193	1.714	1.714	51.876	51.876
P0402_B_H67''	J319	H67''	117.8	125	228.1	22.74	2.537740819	1.6258	3.84	5.72	0.38	0.53	56252.08	0.0206	0.561	0.561	53.029	30.289
P0402_B_H69''	J319	H69''	104.4	110	4.6	21.31	1.606291628	1.6258	1.45	3.56	0.37	0.42	39482.58	0.0223	0.009	0.009	53.581	32.271

1.3.1.2 Cálculo de la garantía suministro del ajuste del modelo original.

GS
89.520%

Rug	0.01
Visc	1.10E-06

Hcab	53.59

25.000
0.000

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Qinst	∑pi·Qi	nº hidr.	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P00''	UGD_44	J252	474.6	500	9	0	1019.81	169.9286582	281		1.2547	280.32	190.94	0.19	1.08	465667.33	0.0136	0.015	0.015	53.575	53.575
P01_A''	J252	J253	213.6	225	15.4	0	200.72	33.44552443	11		1.2547	45.46	41.91	0.21	1.17	227082.85	0.0156	0.078	0.094	53.496	53.496
P01_B''	J253	J262	190	200	32.6	0	160.16	26.6871024	270		1.2547	36.74	34.29	0.21	1.21	208907.88	0.0159	0.203	0.297	53.293	53.293
P01_C''	J262	J264	190	200	141.7	0	149.59	24.92584695	82		1.2547	35.32	32.38	0.22	1.14	197278.58	0.0160	0.795	1.092	52.498	52.498
P01_C_H2''	J262	H2''	104.4	110	2.3	13.92	10.57	1.761255447	67		1.2547	1.41	3.25	0.31	0.38	36062.22	0.0227	0.004	0.301	53.289	39.369
P01_C_H6''	J264	H6''	104.4	110	9.9	13.89	12.39	2.064517974	41		1.2547	2.52	4.06	0.33	0.47	44991.10	0.0216	0.023	1.116	52.474	38.584
P01_D''	J264	J283	190	200	201	0	120.59	20.09364185	12		1.2547	30.26	27.00	0.22	0.95	164455.04	0.0166	0.809	1.902	51.688	51.688
P01_D_H8''	J283	H8''	104.4	110	5.1	14.29	15.05	2.507747821	41		1.2547	3.08	4.71	0.31	0.55	52201.95	0.0210	0.016	1.917	51.673	37.383
P01_E''	J283	J267	190	200	8.9	0	105.54	17.58589402	15		1.2547	27.18	24.13	0.23	0.85	146983.01	0.0169	0.029	1.931	51.659	51.659
P01_F''	J267	J273	132.4	140	210.6	0	71.06	11.84056878	14		1.2547	20.62	17.54	0.25	1.27	153327.01	0.0169	2.228	4.159	49.431	49.431
P01_G''	J273	J279	104.4	110	87.4	0	29.21	4.867196934	27		1.2547	8.28	8.48	0.29	0.99	93991.61	0.0186	0.780	4.940	48.650	48.650
P01_G_H50''	J279	H50''	104.4	110	3.4	16.35	12.57	2.094510971	15		1.2547	3.15	4.32	0.34	0.50	47923.61	0.0213	0.009	4.949	48.641	32.291
P0101_A''	J253	J254	104.4	110	175.5	0	40.56	6.758422035	12		1.2547	8.72	10.46	0.26	1.22	116019.49	0.0179	2.296	2.390	51.200	51.200
P0101_A_H3''	J254	H3''	104.4	110	3.8	12.52	11.55	1.924550654	14		1.2547	1.85	3.63	0.31	0.42	40245.20	0.0222	0.007	2.397	51.193	38.673
P0101_B''	J254	J258	104.4	110	104.7	0	29.01	4.833871382	188		1.2547	6.88	8.12	0.28	0.95	90073.03	0.0188	0.865	3.255	50.335	50.335
P0101_B_H4''	J258	H4''	104.4	110	3.6	13.2	12.39	2.064517974	103		1.2547	2.93	4.21	0.34	0.49	46680.38	0.0215	0.009	3.264	50.326	37.126
P0101_C''	J258	H5''	104.4	110	134	13.75	16.62	2.769353408	11		1.2547	3.95	5.26	0.32	0.61	58358.13	0.0205	0.507	3.762	49.828	36.078
P0102_H7''	J264	H7''	104.4	110	252.4	15.07	16.61	2.76768713	92		1.2547	3.66	5.17	0.31	0.60	57283.15	0.0206	0.923	2.015	51.575	36.505
P0103_H51''	J279	H51''	104.4	110	306.1	16.3	16.64	2.772685963	80		1.2547	5.29	5.66	0.34	0.66	62732.69	0.0202	1.317	6.257	47.333	31.033
P0104_A''	J267	J269	117.8	125	241.7	0	34.48	5.745325241	13		1.2547	5.45	8.67	0.25	0.80	85220.28	0.0189	1.254	3.185	50.405	50.405
P0104_A_H9''	J269	H9''	104.4	110	3.6	14.81	13.22	2.202819016	67		1.2547	2.18	4.06	0.31	0.47	44961.93	0.0216	0.009	3.193	50.397	35.587
P0104_B''	J269	J271	104.4	110	506.1	0	21.26	3.542506225	52		1.2547	3.26	5.81	0.27	0.68	64411.16	0.0201	2.284	5.469	48.121	48.121
P0104_B_H10''	J271	H10''	104.4	110	4.9	18.92	11.49	1.914552988	14		1.2547	1.83	3.61	0.31	0.42	40050.31	0.0222	0.009	5.478	48.112	29.192
P0104_C_H61''	J271	H61''	104.4	110	130	18.32	9.77	1.627953237	38		1.2547	1.43	3.13	0.32	0.37	34706.07	0.0229	0.194	5.663	47.927	29.607
P0106_A''	J273	J274	117.8	125	35.8	0	41.85	6.973371849	15		1.2547	12.18	11.35	0.27	1.04	111546.52	0.0180	0.302	4.462	49.128	49.128
P0106_A_H54''	J274	H54''	104.4	110	169	17.51	12.99	2.164494631	23		1.2547	3.23	4.42	0.34	0.52	49013.81	0.0212	0.467	4.929	48.661	31.151
P0106_B''	J274	J276	104.4	110	322.2	0	28.86	4.808877218	14		1.2547	8.95	8.56	0.30	1.00	94924.79	0.0186	2.928	7.390	46.200	46.200
P0106_B_H53''	J276	H53''	104.4	110	5.1	14.97	12.75	2.124503968	9		1.2547	2.67	4.18	0.33	0.49	46304.40	0.0215	0.013	7.403	46.187	31.217
P0106_C_H52''	J276	H52''	104.4	110	280	19.93	16.11	2.684373249	85		1.2547	6.27	5.83	0.36	0.68	64600.09	0.0201	1.270	8.660	44.930	25.000
P02_A''	J252	J285	474.6	500	136.9	0	819.09	136.4831338	13		1.2547	234.86	155.71	0.19	0.88	379759.73	0.0140	0.160	0.175	53.415	53.415
P02_A_H1''	J285	H1''	104.4	110	67.6	14.76	15.97	2.661045363	72		1.2547	4.93	5.45	0.34	0.64	60387.83	0.0203	0.272	0.447	53.143	38.383
P02_B''	J285	J287	474.6	500	110.8	0	803.12	133.8220884	63		1.2547	229.93	152.85	0.19	0.86	372775.03	0.0141	0.125	0.300	53.290	53.290
P02_C''	J287	J295	474.6	500	39.9	0	743.54	123.8944063	11		1.2547	213.29	142.22	0.19	0.80	346852.55	0.0143	0.039	0.340	53.250	53.250
P02_C_H15''	J295	H15''	104.4	110	3.7	14.01	10.42	1.736261282	52		1.2547	1.48	3.26	0.31	0.38	36175.86	0.0227	0.006	0.346	53.244	39.234
P02_D''	J295	J297	474.6	500	7.2	0	733.12	122.158145	13		1.2547	211.81	140.42	0.19	0.79	342462.65	0.0143	0.007	0.347	53.243	53.243
P02_E''	J297	J324	340.8	355	64.8	0	487.27	81.19270969	14		1.2547	120.57	94.97	0.19	1.04	322554.45	0.0145	0.153	0.499	53.091	53.091
P02_F''	J324	J806	190	200	24.6	0	237.31	39.54243425	25		1.2547	70.41	50.07	0.21	1.77	305030.34	0.0149	0.307	0.807	52.783	52.783
P02_G''	J806	J820	190	200	175.3	0	141.68	23.60782135	11		1.2547	29.57	30.43	0.21	1.07	185382.88	0.0162	0.878	1.685	51.905	51.905
P02_G_H20''	J820	H20''	104.4	110	2.5	9.27	14.21	2.367780501	14		1.2547	3.30	4.65	0.33	0.54	51509.39	0.0210	0.008	1.692	51.898	42.628
P02_H''	J820	J841	190	200	384.4	0	127.47	21.24004085	9		1.2547	26.27	27.67	0.22	0.98	168572.67	0.0165	1.619	3.304	50.286	50.286
P02_H_H21''	J841	H21''	104.4	110	3	8.78	11.23	1.87122977	39		1.2547	1.54	3.43	0.31	0.40	38003.04	0.0224	0.005	3.309	50.281	41.501
P02_I''	J841	J822	190	200	7.6	0	116.24	19.36881108	12		1.2547	17.80	24.66	0.21	0.87	150245.22	0.0168	0.026	3.330	50.260	50.260
P02_J''	J822	J824	152	160	59.7	0	93.68	15.60968876	15		1.2547	18.04	20.94	0.22	1.15	159448.71	0.0168	0.447	3.777	49.813	49.813
P02_J_H23''	J824	H23''	104.4	110	88.5	8.55	9.25	1.5413068	281		1.2547	1.07	2.84	0.31	0.33	31458.07	0.0234	0.111	3.888	49.702	41.152
P0202_A''	J287	J288	104.4	110	208.9	0	59.58	9.927682073			1.2547	16.64	15.05	0.25	1.76	166806.45	0.0168	5.306	5.607	47.983	47.983
P0202_A_H16''	J288	H16''	104.4	110	4.8	11.32	14.86	2.476088547			1.2547	3.05	4.67	0.31	0.55	51759.07	0.0210	0.015	0.015	53.575	42.255
P0202_B''	J288	J290	104.4	110	101.9	0	44.72	7.451593526			1.2547	13.58	12.08	0.27	1.41	133883.70	0.0175	1.731	1.731	51.859	51.859
P0202_B_H17''	J290	H17''	104.4	110	4.2	10.65	9.16	1.526310302			1.2547	1.24	2.92	0.32	0.34	32425.31	0.0233	0.006	0.006	53.584	42.934

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Qinst	∑pi·Qi	nº hidr.	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P0202_C''	J290	J292	104.4	110	148.9	0	35.56	5.925283224			1.2547	12.34	10.33	0.29	1.21	114561.18	0.0180	1.904	1.904	51.686	51.686
P0202_C_H18''	J292	H18''	104.4	110	3.7	11.42	21.67	3.610823607			1.2547	8.66	7.30	0.34	0.85	80967.99	0.0192	0.025	0.025	53.565	42.145
P0202_D''	J292	H19''	104.4	110	274.7	12.46	13.89	2.314459617			1.2547	3.68	4.72	0.34	0.55	52350.68	0.0209	0.855	0.855	52.735	40.275
P0203_A''	J324	J325	299.2	250	231.7	0	249.96	41.65027544			1.2547	70.41	52.18	0.21	0.74	201856.85	0.0158	0.344	0.843	52.747	52.747
P0203_A_H14''	J325	H14''	104.4	110	3.8	14.46	9.75	1.624620682			1.2547	1.42	3.12	0.32	0.36	34561.80	0.0229	0.006	0.006	53.584	39.124
P0203_B''	J325	J327	299.2	250	274.9	0	240.21	40.02565476			1.2547	68.99	50.45	0.21	0.72	195160.36	0.0159	0.383	0.383	53.207	53.207
P0203_B_H44''	J332	H44''	104.4	110	3.3	14.5	28.77	4.793880719			1.2547	22.90	10.80	0.38	1.26	119717.48	0.0178	0.046	0.046	53.544	39.044
P0203_C''	J327	J332	237.4	250	164	0	208.07	34.67023848			1.2547	59.95	44.38	0.21	1.00	216406.92	0.0157	0.556	0.556	53.034	53.034
P0203_C_H43''	J337	H43''	104.4	110	2.8	15.85	9.58	1.596293962			1.2547	1.58	3.17	0.33	0.37	35194.31	0.0228	0.004	0.004	53.586	37.736
P0203_D''	J332	J337	237.4	250	235	0	179.3	29.87635777			1.2547	37.05	37.51	0.21	0.85	182903.96	0.0162	0.586	0.586	53.004	53.004
P0203_D_H68_2''	J1245	H68''	104.4	110	5.2	15.55	21.69	3.614156162			1.2547	7.12	6.96	0.32	0.81	77201.31	0.0194	0.033	0.033	53.557	38.007
P0203_E''	J337	J339	213.6	225	5.1	0	169.72	28.2800638			1.2547	35.47	35.75	0.21	1.00	193740.31	0.0160	0.019	0.019	53.571	53.571
P0203_F''	J339	J340	152	160	5.9	0	73.72	12.28379863			1.2547	17.40	17.52	0.24	0.97	133393.80	0.0173	0.032	0.032	53.558	53.558
P0203_G''	J340	J795	104.4	110	125.6	0	32.11	5.350417445			1.2547	8.93	9.10	0.28	1.06	100897.96	0.0184	1.275	1.275	52.315	52.315
P0203_G_H49''	J795	H49''	104.4	110	30.3	14.68	10.42	1.736261282			1.2547	1.81	3.42	0.33	0.40	37957.93	0.0224	0.053	0.053	53.537	38.857
P0203_H_H68''	J795	J1245	104.4	110	549.9	0	21.69	3.614156162			1.2547	7.12	6.96	0.32	0.81	77201.31	0.0194	3.439	3.439	50.151	50.151
P020301''	J327	J328	104.4	110	154.4	0	32.14	5.355416278			1.2547	9.04	9.13	0.28	1.07	101202.89	0.0184	1.576	1.576	52.014	52.014
P020301_H55''	J328	H55''	104.4	110	140.4	19.36	11.95	1.991201758			1.2547	3.11	4.20	0.35	0.49	46601.43	0.0215	0.355	0.355	53.235	33.875
P020301_H56''	J328	H56''	104.4	110	63.3	20.09	20.19	3.364214519			1.2547	5.93	6.42	0.32	0.75	71181.89	0.0197	0.342	0.342	53.248	33.158
P020302_A''	J339	J342	190	200	236.6	0	96	15.99626517			1.2547	18.07	21.33	0.22	0.75	129942.45	0.0173	0.621	0.621	52.969	52.969
P020302_B''	J342	J343	132.4	140	139.8	0	58.19	9.696069483			1.2547	17.75	14.98	0.26	1.09	130983.50	0.0174	1.110	1.110	52.480	52.480
P020302_B_H41''	J343	H41''	104.4	110	15.5	12.33	14.22	2.369446779			1.2547	3.18	4.61	0.32	0.54	51074.39	0.0211	0.046	0.046	53.544	41.214
P020302_C''	J343	J345	117.8	125	24.4	0	43.97	7.326622705			1.2547	14.57	12.12	0.28	1.11	119054.79	0.0178	0.232	0.232	53.358	53.358
P020302_C_H45''	J345	H45''	104.4	110	87.4	13.45	11.65	1.94121343			1.2547	1.69	3.57	0.31	0.42	39591.93	0.0222	0.165	0.165	53.425	39.975
P020302_D''	J345	J347	104.4	110	162.3	0	32.32	5.385409275			1.2547	6.71	8.63	0.27	1.01	95731.25	0.0186	1.498	1.498	52.092	52.092
P020302_D_H46''	J347	J537	104.4	110	145.2	0	11.4	1.899556489			1.2547	2.48	3.87	0.34	0.45	42949.98	0.0218	0.317	0.317	53.273	53.273
P020302_D_H46_2''	J537	H46''	104.4	110	3	12.26	11.4	1.899556489			1.2547	2.48	3.87	0.34	0.45	42949.98	0.0218	0.007	0.007	53.583	41.323
P020302_E''	J347	J349	104.4	110	199.5	0	20.92	3.485852786			1.2547	4.23	6.07	0.29	0.71	67257.27	0.0199	0.973	0.973	52.617	52.617
P020302_E_H47''	J349	H47''	104.4	110	80.5	12.39	8.68	1.446328976			1.2547	1.33	2.90	0.33	0.34	32098.10	0.0233	0.105	0.105	53.485	41.095
P020302_F_H48''	J349	H48''	104.4	110	359.6	14.82	12.24	2.03952381			1.2547	2.90	4.17	0.34	0.49	46287.02	0.0215	0.898	0.898	52.692	37.872
P02030202_A''	J342	J790	104.4	110	6.2	0	37.81	6.300195689			1.2547	6.50	9.50	0.25	1.11	105310.24	0.0183	0.068	0.068	53.522	53.522
P02030202_A_H42''	J790	H42''	104.4	110	5	11.84	14.54	2.422767663			1.2547	3.09	4.63	0.32	0.54	51315.28	0.0210	0.015	0.015	53.575	41.735
P02030202_B''	J790	J792	104.4	110	188.7	0	23.27	3.877428027			1.2547	3.41	6.19	0.27	0.72	68667.81	0.0198	0.956	0.956	52.634	52.634
P02030202_B_H40''	J792	H40''	104.4	110	3.4	11.61	9.24	1.539640523			1.2547	1.21	2.92	0.32	0.34	32371.74	0.0233	0.004	0.004	53.586	41.976
P02030202_C''	J792	J794	104.4	110	141.9	0	14.03	2.337787504			1.2547	2.20	4.20	0.30	0.49	46540.67	0.0215	0.358	0.358	53.232	53.232
P02030202_D_H39''	J794	H39''	104.4	110	4.5	10.52	14.03	2.337787504			1.2547	2.20	4.20	0.30	0.49	46540.67	0.0215	0.011	0.011	53.579	43.059
P020303_A''	J340	J799	132.4	140	91.3	0	41.61	6.933381186			1.2547	8.46	10.58	0.25	0.77	92525.83	0.0186	0.386	0.386	53.204	53.204
P020303_A_H58''	J799	H58''	104.4	110	2.5	18.4	9.32	1.552970744			1.2547	1.21	2.93	0.31	0.34	32501.96	0.0232	0.003	0.003	53.587	35.187
P020303_B''	J799	J801	117.8	125	107.8	0	32.29	5.380410442			1.2547	7.26	8.76	0.27	0.80	86077.89	0.0189	0.570	0.570	53.020	53.020
P020303_B_H57''	J801	H57''	104.4	110	2.5	19.99	13.79	2.297796841			1.2547	2.09	4.11	0.30	0.48	45580.58	0.0216	0.006	0.006	53.584	33.594
P020303_B_H59''	J801	H59''	104.4	110	359.8	21.37	18.5	3.082613601			1.2547	5.17	5.93	0.32	0.69	65800.57	0.0200	1.687	1.687	51.903	30.533
P0204_I_H22''	J822	H22''	104.4	110	255.6	9.38	22.56	3.759122316			1.2547	8.47	7.41	0.33	0.87	82161.45	0.0191	1.789	5.119	48.471	39.091
P0205_A''	J806	J807	132.4	140	170.5	0	95.63	15.9346129			1.2547	20.36	21.60	0.23	1.57	188801.45	0.0163	2.640	3.447	50.143	50.143
P0205_B''	J807	J808	117.8	125	11	0	68.68	11.44399471			1.2547	14.20	16.17	0.24	1.48	158899.96	0.0169	0.177	0.177	53.413	53.413
P0205_B_H32''	J808	H32''	104.4	110	4.5	10.02	16.38	2.729362745			1.2547	4.09	5.27	0.32	0.62	58381.77	0.0205	0.017	0.017	53.573	43.553
P0205_C''	J808	J810	104.4	110	124	0	52.3	8.714631964			1.2547	10.11	12.70	0.24	1.48	140852.21	0.0173	2.311	2.311	51.279	51.279
P0205_C_H33''	J810	H33''	104.4	110	6	10.05	14.2	2.366114223			1.2547	2.45	4.33	0.30	0.51	48011.22	0.0213	0.016	0.016	53.574	43.524

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Qinst	∑pi·Qi	nº hidr.	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P0205_D''	J810	J812	104.4	110	122.6	0	38.1	6.34851774			1.2547	7.66	9.82	0.26	1.15	108886.23	0.0181	1.429	1.429	52.161	52.161
P0205_D_H34''	J812	H34''	104.4	110	100.3	10.68	12.23	2.037857532			1.2547	2.42	3.99	0.33	0.47	44224.27	0.0217	0.231	0.231	53.359	42.679
P0205_E''	J812	J814	104.4	110	56	0	25.87	4.310660209			1.2547	5.24	7.18	0.28	0.84	79641.57	0.0192	0.370	0.370	53.220	53.220
P0205_E_H36''	J814	H36''	104.4	110	168.8	9.54	15.62	2.602725646			1.2547	3.20	4.85	0.31	0.57	53740.06	0.0208	0.550	0.550	53.040	43.500
P0205_F_H35''	J814	H35''	104.4	110	167.1	10.45	10.25	1.707934563			1.2547	2.04	3.50	0.34	0.41	38814.89	0.0223	0.305	0.305	53.285	42.835
P020502_A''	J807	J817	104.4	110	354	0	26.95	4.490618192			1.2547	6.16	7.61	0.28	0.89	84323.58	0.0190	2.596	2.596	50.994	50.994
P020502_A_H38''	J817	H38''	104.4	110	4.8	9.14	13.4	2.232812014			1.2547	3.63	4.62	0.34	0.54	51246.59	0.0210	0.014	0.014	53.576	44.436
P020502_B_H37''	J817	H37''	104.4	110	150.2	8.88	13.55	2.257806178			1.2547	2.54	4.26	0.31	0.50	47189.48	0.0214	0.388	0.388	53.202	44.322
P0206_A''	J824	J825	152	160	220.8	0	84.43	14.06838196			1.2547	15.43	19.00	0.23	1.05	144666.12	0.0170	1.383	5.160	48.430	48.430
P0206_A_H24''	J825	H24''	104.4	110	5.5	8.54	8.6	1.432998755			1.2547	1.32	2.87	0.33	0.34	31871.65	0.0233	0.007	0.007	53.583	45.043
P0206_B''	J825	J827	132.4	140	75.5	0	75.83	12.63538321			1.2547	14.11	17.35	0.23	1.26	151669.73	0.0170	0.783	0.783	52.807	52.807
P0206_B_H25''	J827	H25''	104.4	110	39.3	9.32	11.89	1.981204093			1.2547	2.65	4.02	0.34	0.47	44595.99	0.0217	0.092	0.092	53.498	44.178
P0206_C''	J827	J829	132.4	140	97.4	0	63.94	10.65417912			1.2547	11.47	14.90	0.23	1.08	130285.14	0.0174	0.766	0.766	52.824	52.824
P0206_C_H26''	J829	H26''	104.4	110	127.5	10.25	11.73	1.954543651			1.2547	2.19	3.81	0.32	0.45	42250.00	0.0219	0.270	0.270	53.320	43.070
P0206_D''	J829	J831	117.8	125	120.6	0	52.21	8.699635465			1.2547	9.28	12.52	0.24	1.15	123032.30	0.0177	1.218	1.218	52.372	52.372
P0206_D_H27''	J831	H27''	104.4	110	4.8	10.47	7.59	1.264704715			1.2547	1.01	2.53	0.33	0.30	28025.17	0.0240	0.005	0.005	53.585	43.115
P0206_E''	J831	J833	117.8	125	72.7	0	44.62	7.43493075			1.2547	8.26	11.04	0.25	1.01	108495.35	0.0181	0.584	0.584	53.006	53.006
P0206_E_H29''	J833	H29''	104.4	110	206.8	9.03	11.31	1.884559991			1.2547	1.85	3.59	0.32	0.42	39805.52	0.0222	0.394	0.394	53.196	44.166
P0206_F''	J833	J835	104.4	110	76.4	0	33.31	5.550370759			1.2547	6.42	8.73	0.26	1.02	96772.50	0.0185	0.719	0.719	52.871	52.871
P0206_F_H28''	J835	H28''	104.4	110	4.1	10.72	10.24	1.706268285			1.2547	1.81	3.39	0.33	0.40	37608.43	0.0225	0.007	0.007	53.583	42.863
P0206_G''	J835	J837	104.4	110	430.9	0	23.07	3.844102474			1.2547	4.61	6.54	0.28	0.76	72488.96	0.0196	2.405	2.405	51.185	51.185
P0206_G_H31''	J837	H31''	104.4	110	4.7	9.19	11.08	1.846235605			1.2547	2.63	3.88	0.35	0.45	43013.02	0.0218	0.010	0.010	53.580	44.390
P0206_H_H30''	J837	H30''	104.4	110	414.4	8.34	11.99	1.997866869			1.2547	1.98	3.77	0.31	0.44	41745.07	0.0220	0.860	0.860	52.730	44.390
P04_A''	J297	J298	379.8	400	234	0	245.85	40.96543534			1.2547	91.24	52.95	0.22	0.47	161371.46	0.0164	0.113	0.459	53.131	53.131
P04_A_H13''	J298	H13''	104.4	110	23.3	15.1	11.67	1.944545985			1.2547	2.57	3.96	0.34	0.46	43877.92	0.0217	0.053	0.053	53.537	38.437
P04_B''	J298	J300	379.8	400	109.7	0	234.18	39.02088936			1.2547	88.66	50.83	0.22	0.45	154926.27	0.0165	0.049	0.049	53.541	53.541
P04_B_H12''	J300	H12''	104.4	110	4	16.71	11.48	1.91288671			1.2547	2.15	3.75	0.33	0.44	41601.01	0.0220	0.008	0.008	53.582	36.872
P04_C''	J300	J302	379.8	400	379.1	0	222.7	37.10800265			1.2547	86.51	48.78	0.22	0.43	148657.45	0.0167	0.157	0.157	53.433	53.433
P04_C_H11''	J302	H11''	104.4	110	6.1	19.07	26.12	4.352317149			1.2547	13.28	8.92	0.34	1.04	98938.29	0.0185	0.060	0.060	53.530	34.460
P04_D''	J302	J322	340.8	355	168.3	0	194.93	32.48074969			1.2547	73.24	43.22	0.22	0.47	146785.74	0.0167	0.095	0.095	53.495	53.495
P04_D_2''	J322	J304	340.8	355	5.6	0	165.88	27.6402132			1.2547	62.75	37.58	0.23	0.41	127632.06	0.0172	0.002	0.002	53.588	53.588
P04_D_H60''	J322	H60''	104.4	110	3.4	19.84	29.05	4.840536492			1.2547	10.49	8.90	0.31	1.04	98727.27	0.0185	0.033	0.033	53.557	33.717
P04_E''	J304	J305	340.8	355	672.4	0	165.88	27.6402132			1.2547	62.70	37.58	0.23	0.41	127619.49	0.0172	0.293	0.293	53.297	53.297
P04_E_H62''	J305	H62''	104.4	110	4.4	22.28	23.09	3.84743503			1.2547	8.97	7.61	0.33	0.89	84321.91	0.0190	0.032	0.032	53.558	31.278
P04_F''	J305	J307	340.8	355	434.6	0	142.79	23.79277817			1.2547	53.73	32.99	0.23	0.36	112044.94	0.0176	0.150	0.150	53.440	53.440
P04_F_H63''	J307	H63''	104.4	110	6.2	23.37	23.3	3.88242686			1.2547	9.52	7.75	0.33	0.91	85970.21	0.0190	0.047	0.047	53.543	30.173
P04_G''	J307	J309	299.2	250	216.6	0	119.49	19.91035131			1.2547	44.21	28.25	0.24	0.40	109297.33	0.0177	0.106	0.106	53.484	53.484
P04_H''	J309	J310	299.2	250	163	0	82.57	13.75845433			1.2547	36.96	21.39	0.26	0.30	82736.13	0.0188	0.048	0.048	53.542	53.542
P04_H_H64''	J310	H64''	132.4	140	251.8	24.35	31.5	5.24877451			1.2547	17.66	10.52	0.33	0.76	91984.53	0.0186	1.053	1.053	52.537	28.187
P04_I''	J310	J312	237.4	250	156.9	0	51.07	8.509679816			1.2547	19.30	14.02	0.27	0.32	68365.94	0.0196	0.066	0.066	53.524	53.524
P04_I_H71''	J312	H71''	104.4	110	104.1	25.78	11.77	1.961208761			1.2547	1.81	3.65	0.31	0.43	40438.21	0.0221	0.204	0.204	53.386	27.606
P04_J''	J312	J314	213.6	225	157.5	0	39.3	6.548471055			1.2547	17.49	11.80	0.30	0.33	63923.98	0.0199	0.081	0.081	53.509	53.509
P04_J_H65''	J314	H65''	117.8	125	468.3	25.76	24.71	4.117372004			1.2547	14.32	8.86	0.36	0.81	87104.44	0.0189	2.528	2.528	51.062	25.302
P04_J_H66''	J314	H66''	104.4	110	71.8	22.46	14.59	2.431099051			1.2547	3.18	4.67	0.32	0.55	51750.94	0.0210	0.219	0.219	53.371	30.911
P0402_A''	J309	J317	117.8	125	76.9	0	36.92	6.151896981			1.2547	7.24	9.53	0.26	0.87	93625.66	0.0186	0.473	0.473	53.117	53.117
P0402_A_H70''	J317	H70''	104.4	110	99.4	24.33	12.05	2.007864535			1.2547	1.95	3.76	0.31	0.44	41704.45	0.0220	0.206	0.206	53.384	29.054
P0402_B''	J317	J319	104.4	110	392.5	0	24.87	4.144032446			1.2547	5.29	7.03	0.28	0.82	77936.37	0.0193	2.497	2.497	51.093	51.093
P0402_B_H67''	J319	H67''	104.4	110	228.1	22.74	15.23	2.537740819			1.2547	3.84	5.00	0.33	0.58	55406.36	0.0207	0.786	0.786	52.804	30.064
P0402_B_H69''	J319	H69''	104.4	110	4.6	21.31	9.64	1.606291628			1.2547	1.45	3.11	0.32	0.36	34535.38	0.0229	0.007	0.007	53.583	32.273

1.3.1.3 Resultados del ajuste mínimo del proyecto original

En este subcapítulo se pueden observar los resultados obtenidos del diseño realizado en el ajuste mínimo del proyecto original. En la tabla adjunta se identifican las columnas por cada tubería, en el cual se observa el diámetro seleccionado, la velocidad y la presión en el nudo final, en función del caudal de diseño para 5 turnos. La última columna es el coste del tramo de tubería, siendo el producto del precio unitario del diámetro seleccionado y la longitud de la tubería.

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P00''	UGD_44	J252	9	203.96	474.6	500	1.15	53.57	€ 1,058.58
P01_A''	J252	J253	15.4	40.14	213.6	225	1.12	53.50	€ 390.39
P01_B''	J253	J262	32.6	32.03	190	200	1.13	53.32	€ 715.57
P01_C''	J262	J264	141.7	29.92	190	200	1.06	52.63	€ 3,110.32
P01_C_H2''	J262	H2''	2.3	2.11	104.4	110	0.25	39.40	€ 20.68
P01_C_H6''	J264	H6''	9.9	2.48	104.4	110	0.29	38.73	€ 89.00
P01_D''	J264	J283	201	24.12	190	200	0.85	51.97	€ 4,411.95
P01_D_H8''	J283	H8''	5.1	3.01	104.4	110	0.35	37.68	€ 45.85
P01_E''	J283	J267	8.9	21.11	190	200	0.74	51.95	€ 195.36
P01_F''	J267	J273	210.6	14.21	132.4	140	1.03	50.43	€ 2,579.85
P01_G''	J273	J279	87.4	5.84	104.4	110	0.68	50.03	€ 785.73
P01_G_H50''	J279	H50''	3.4	2.51	104.4	110	0.29	33.68	€ 30.57
P0101_A''	J253	J254	175.5	8.11	104.4	110	0.95	52.05	€ 1,577.75
P0101_A_H3''	J254	H3''	3.8	2.31	104.4	110	0.27	39.53	€ 34.16
P0101_B''	J254	J258	104.7	5.80	104.4	110	0.68	51.58	€ 941.25
P0101_B_H4''	J258	H4''	3.6	2.48	104.4	110	0.29	38.38	€ 32.36
P0101_C''	J258	H5''	134	3.32	104.4	110	0.39	37.61	€ 1,204.66
P0102_H7''	J264	H7''	252.4	3.32	104.4	110	0.39	37.14	€ 2,269.08
P0103_H51''	J279	H51''	306.1	3.33	104.4	110	0.39	33.22	€ 2,751.84
P0104_A''	J267	J269	241.7	6.90	117.8	125	0.63	51.12	€ 2,450.84
P0104_A_H9''	J269	H9''	3.6	2.64	104.4	110	0.31	36.31	€ 32.36
P0104_B''	J269	J271	506.1	4.25	104.4	110	0.50	49.82	€ 4,549.84
P0104_B_H10''	J271	H10''	4.9	2.30	104.4	110	0.27	30.89	€ 44.05
P0104_C_H61''	J271	H61''	130	1.95	104.4	110	0.23	31.41	€ 1,168.70
P0106_A''	J273	J274	35.8	8.37	117.8	125	0.77	50.26	€ 363.01
P0106_A_H54''	J274	H54''	169	2.60	104.4	110	0.30	32.57	€ 1,519.31
P0106_B''	J274	J276	322.2	5.77	104.4	110	0.67	48.82	€ 2,896.58
P0106_B_H53''	J276	H53''	5.1	2.55	104.4	110	0.30	33.84	€ 45.85
P0106_C_H52''	J276	H52''	280	3.22	104.4	110	0.38	28.45	€ 2,517.20
P02_A''	J252	J285	136.9	163.82	474.6	500	0.93	53.40	€ 16,102.18
P02_A_H1''	J285	H1''	67.6	3.19	104.4	110	0.37	38.53	€ 607.72
P02_B''	J285	J287	110.8	160.62	474.6	500	0.91	53.26	€ 13,032.30
P02_C''	J287	J295	39.9	148.71	474.6	500	0.84	53.22	€ 4,693.04
P02_C_H15''	J295	H15''	3.7	2.08	104.4	110	0.24	39.20	€ 33.26
P02_D''	J295	J297	7.2	146.62	474.6	500	0.83	53.21	€ 846.86
P02_E''	J297	J324	64.8	97.45	340.8	355	1.07	53.05	€ 3,800.52
P02_F''	J324	J806	24.6	47.46	190	200	1.67	52.77	€ 539.97
P02_G''	J806	J820	175.3	28.34	190	200	1.00	52.00	€ 3,847.84
P02_G_H20''	J820	H20''	2.5	2.84	104.4	110	0.33	42.73	€ 22.48
P02_H''	J820	J841	384.4	25.49	190	200	0.90	50.61	€ 8,437.58
P02_H_H21''	J841	H21''	3	2.25	104.4	110	0.26	41.82	€ 26.97
P02_I''	J841	J822	7.6	23.25	190	200	0.82	50.58	€ 166.82
P02_J''	J822	J824	59.7	18.74	152	160	1.03	50.22	€ 782.67
P02_J_H23''	J824	H23''	88.5	1.85	104.4	110	0.22	41.62	€ 795.62
P0202_A''	J287	J288	208.9	11.92	104.4	110	1.39	49.80	€ 1,878.01
P0202_A_H16''	J288	H16''	4.8	2.97	104.4	110	0.35	38.47	€ 43.15

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P0202_B''	J288	J290	101.9	8.94	104.4	110	1.04	48.79	€ 916.08
P0202_B_H17''	J290	H17''	4.2	1.83	104.4	110	0.21	38.14	€ 37.76
P0202_C''	J290	J292	148.9	7.11	104.4	110	0.83	47.83	€ 1,338.61
P0202_C_H18''	J292	H18''	3.7	4.33	104.4	110	0.51	36.40	€ 33.26
P0202_D''	J292	H19''	274.7	2.78	104.4	110	0.32	35.03	€ 2,469.55
P0203_A''	J324	J325	231.7	49.99	299.2	315	0.71	52.73	€ 11,065.99
P0203_A_H14''	J325	H14''	3.8	1.95	104.4	110	0.23	38.27	€ 34.16
P0203_B''	J325	J327	274.9	48.04	299.2	315	0.68	52.38	€ 13,129.22
P0203_B_H44''	J332	H44''	3.3	5.75	104.4	110	0.67	37.37	€ 29.67
P0203_C''	J327	J332	164	41.61	237.4	250	0.94	51.89	€ 5,395.60
P0203_C_H43''	J337	H43''	2.8	1.92	104.4	110	0.22	35.50	€ 25.17
P0203_D''	J332	J337	235	35.86	237.4	250	0.81	51.35	€ 7,731.50
P0203_D_H68_2''	J1245	H68''	5.2	4.34	104.4	110	0.51	33.59	€ 46.75
P0203_E''	J337	J339	5.1	33.94	213.6	225	0.95	51.33	€ 129.29
P0203_F''	J339	J340	5.9	14.74	152	160	0.81	51.31	€ 77.35
P0203_G''	J340	J795	125.6	6.42	104.4	110	0.75	50.63	€ 1,129.14
P0203_G_H49''	J795	H49''	30.3	2.08	104.4	110	0.24	35.93	€ 272.40
P0203_H_H68''	J795	J1245	549.9	4.34	104.4	110	0.51	49.16	€ 4,943.60
P020301''	J327	J328	154.4	6.43	104.4	110	0.75	51.55	€ 1,388.06
P020301_H55''	J328	H55''	140.4	2.39	104.4	110	0.28	32.05	€ 1,262.20
P020301_H56''	J328	H56''	63.3	4.04	104.4	110	0.47	31.31	€ 569.07
P020302_A''	J339	J342	236.6	19.20	190	200	0.68	50.82	€ 5,193.37
P020302_B''	J342	J343	139.8	11.64	132.4	140	0.85	50.11	€ 1,712.55
P020302_B_H41''	J343	H41''	15.5	2.84	104.4	110	0.33	37.77	€ 139.35
P020302_C''	J343	J345	24.4	8.79	117.8	125	0.81	49.98	€ 247.42
P020302_C_H45''	J345	H45''	87.4	2.33	104.4	110	0.27	36.46	€ 785.73
P020302_D''	J345	J347	162.3	6.46	104.4	110	0.76	49.10	€ 1,459.08
P020302_D_H46''	J347	J537	145.2	2.28	104.4	110	0.27	48.97	€ 1,305.35
P020302_D_H46_2''	J537	H46''	3	2.28	104.4	110	0.27	36.71	€ 26.97
P020302_E''	J347	J349	199.5	4.18	104.4	110	0.49	48.60	€ 1,793.51
P020302_E_H47''	J349	H47''	80.5	1.74	104.4	110	0.20	36.16	€ 723.70
P020302_F_H48''	J349	H48''	359.6	2.45	104.4	110	0.29	33.43	€ 3,232.80
P02030202_A''	J342	J790	6.2	7.56	104.4	110	0.88	50.77	€ 55.74
P02030202_A_H42''	J790	H42''	5	2.91	104.4	110	0.34	38.92	€ 44.95
P02030202_B''	J790	J792	188.7	4.65	104.4	110	0.54	50.20	€ 1,696.41
P02030202_B_H40''	J792	H40''	3.4	1.85	104.4	110	0.22	38.59	€ 30.57
P02030202_C''	J792	J794	141.9	2.81	104.4	110	0.33	50.02	€ 1,275.68
P02030202_D_H39''	J794	H39''	4.5	2.81	104.4	110	0.33	39.50	€ 40.46
P020303_A''	J340	J799	91.3	8.32	132.4	140	0.60	51.06	€ 1,118.43
P020303_A_H58''	J799	H58''	2.5	1.86	104.4	110	0.22	32.65	€ 22.48
P020303_B''	J799	J801	107.8	6.46	117.8	125	0.59	50.73	€ 1,093.09
P020303_B_H57''	J801	H57''	2.5	2.76	104.4	110	0.32	30.73	€ 22.48
P020303_B_H59''	J801	H59''	359.8	3.70	104.4	110	0.43	28.63	€ 3,234.60
P0204_I_H22''	J822	H22''	255.6	4.51	104.4	110	0.53	40.47	€ 2,297.84
P0205_A''	J806	J807	170.5	19.13	132.4	140	1.39	50.66	€ 2,088.63
P0205_B''	J807	J808	11	13.74	117.8	125	1.26	50.53	€ 111.54
P0205_B_H32''	J808	H32''	4.5	3.28	104.4	110	0.38	40.50	€ 40.46
P0205_C''	J808	J810	124	10.46	104.4	110	1.22	48.91	€ 1,114.76
P0205_C_H33''	J810	H33''	6	2.84	104.4	110	0.33	38.85	€ 53.94

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P0205_D''	J810	J812	122.6	7.62	104.4	110	0.89	48.00	€ 1,102.17
P0205_D_H34''	J812	H34''	100.3	2.45	104.4	110	0.29	37.23	€ 901.70
P0205_E''	J812	J814	56	5.17	104.4	110	0.60	37.35	€ 503.44
P0205_E_H36''	J814	H36''	168.8	3.12	104.4	110	0.36	38.01	€ 1,517.51
P0205_F_H35''	J814	H35''	167.1	2.05	104.4	110	0.24	47.68	€ 1,502.23
P020502_A''	J807	J817	354	5.39	104.4	110	0.63	49.26	€ 3,182.46
P020502_A_H38''	J817	H38''	4.8	2.68	104.4	110	0.31	40.12	€ 43.15
P020502_B_H37''	J817	H37''	150.2	2.71	104.4	110	0.32	40.21	€ 1,350.30
P0206_A''	J824	J825	220.8	16.89	152	160	0.93	49.10	€ 2,894.69
P0206_A_H24''	J825	H24''	5.5	1.72	104.4	110	0.20	40.56	€ 49.45
P0206_B''	J825	J827	75.5	15.17	132.4	140	1.10	48.49	€ 924.88
P0206_B_H25''	J827	H25''	39.3	2.38	104.4	110	0.28	39.13	€ 353.31
P0206_C''	J827	J829	97.4	12.79	132.4	140	0.93	47.91	€ 1,193.15
P0206_C_H26''	J829	H26''	127.5	2.35	104.4	110	0.27	37.54	€ 1,146.23
P0206_D''	J829	J831	120.6	10.44	117.8	125	0.96	47.03	€ 1,222.88
P0206_D_H27''	J831	H27''	4.8	1.52	104.4	110	0.18	36.56	€ 43.15
P0206_E''	J831	J833	72.7	8.92	117.8	125	0.82	46.64	€ 737.18
P0206_E_H29''	J833	H29''	206.8	2.26	104.4	110	0.26	37.43	€ 1,859.13
P0206_F''	J833	J835	76.4	6.66	104.4	110	0.78	46.19	€ 686.84
P0206_F_H28''	J835	H28''	4.1	2.05	104.4	110	0.24	35.47	€ 36.86
P0206_G''	J835	J837	430.9	4.61	104.4	110	0.54	44.91	€ 3,873.79
P0206_G_H31''	J837	H31''	4.7	2.22	104.4	110	0.26	35.71	€ 42.25
P0206_H_H30''	J837	H30''	414.4	2.40	104.4	110	0.28	36.18	€ 3,725.46
P04_A''	J297	J298	234	49.17	379.8	400	0.43	53.11	€ 16,003.26
P04_A_H13''	J298	H13''	23.3	2.33	104.4	110	0.27	37.99	€ 209.47
P04_B''	J298	J300	109.7	46.84	379.8	400	0.41	53.07	€ 7,502.38
P04_B_H12''	J300	H12''	4	2.30	104.4	110	0.27	36.36	€ 35.96
P04_C''	J300	J302	379.1	44.54	379.8	400	0.39	52.94	€ 25,926.65
P04_C_H11''	J302	H11''	6.1	5.22	104.4	110	0.61	33.84	€ 54.84
P04_D''	J302	J322	168.3	38.99	340.8	355	0.43	52.86	€ 9,870.80
P04_D_2''	J322	J304	5.6	33.18	340.8	355	0.36	52.86	€ 328.44
P04_D_H60''	J322	H60''	3.4	5.81	104.4	110	0.68	33.00	€ 30.57
P04_E''	J304	J305	672.4	33.18	340.8	355	0.36	52.62	€ 39,436.26
P04_E_H62''	J305	H62''	4.4	4.62	104.4	110	0.54	30.33	€ 39.56
P04_F''	J305	J307	434.6	28.56	340.8	355	0.31	52.51	€ 25,489.29
P04_F_H63''	J307	H63''	6.2	4.66	104.4	110	0.54	29.12	€ 55.74
P04_G''	J307	J309	216.6	23.90	299.2	315	0.34	52.43	€ 10,344.82
P04_H''	J309	J310	163	16.51	299.2	315	0.23	52.40	€ 7,784.88
P04_H_H64''	J310	H64''	251.8	6.30	132.4	140	0.46	27.63	€ 3,084.55
P04_I''	J310	J312	156.9	10.21	237.4	250	0.23	52.36	€ 5,162.01
P04_I_H71''	J312	H71''	104.1	2.35	104.4	110	0.27	26.49	€ 935.86
P04_J''	J312	J314	157.5	7.86	213.6	225	0.22	52.32	€ 3,992.63
P04_J_H65''	J314	H65''	468.3	4.94	117.8	125	0.45	25.68	€ 4,748.56
P04_J_H66''	J314	H66''	71.8	2.92	104.4	110	0.34	29.77	€ 645.48
P0402_A''	J309	J317	76.9	7.38	117.8	125	0.68	52.13	€ 779.77
P0402_A_H70''	J317	H70''	99.4	2.41	104.4	110	0.28	27.71	€ 893.61
P0402_B''	J317	J319	392.5	4.97	104.4	110	0.58	50.79	€ 3,528.58
P0402_B_H67''	J319	H67''	228.1	3.05	104.4	110	0.36	27.72	€ 2,050.62
P0402_B_H69''	J319	H69''	4.6	1.93	104.4	110	0.23	29.48	€ 41.35

1.3.2 Análisis de alternativas sin modificación del trazado

1.3.2.1 Diseño a la demanda con garantía suministro del 99%

1.3.2.1.1 Calculo del caudal de diseño por el método de Clement

A continuación se puede observar el cálculo del caudal de diseño para una GS del 99%, a partir de la sumatoria de caudales demandados en las parcelas y la probabilidad de apertura de la toma.

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks
P00''	UGD_44	J252	474.6	500	9	0	1019.81	169.93	99%	2.3263	280.32	208.88	0.20
P01_A''	J252	J253	190	200	15.4	0	200.72	33.45	99%	2.3263	45.46	49.13	0.24
P01_B''	J253	J262	190	200	32.6	0	160.16	26.69	99%	2.3263	36.74	40.79	0.25
P01_C''	J262	J264	190	200	141.7	0	149.59	24.93	99%	2.3263	35.32	38.75	0.26
P01_C_H2''	J262	H2''	132.4	140	2.3	13.92	10.57	1.76	99%	2.3263	1.41	4.53	0.43
P01_C_H6''	J264	H6''	132.4	140	9.9	13.89	12.39	2.06	99%	2.3263	2.52	5.76	0.46
P01_D''	J264	J283	152	160	201	0	120.59	20.09	99%	2.3263	30.26	32.89	0.27
P01_D_H8''	J283	H8''	132.4	140	5.1	14.29	15.05	2.51	99%	2.3263	3.08	6.59	0.44
P01_E''	J283	J267	152	160	8.9	0	105.54	17.59	99%	2.3263	27.18	29.71	0.28
P01_F''	J267	J273	132.4	140	210.6	0	71.06	11.84	99%	2.3263	20.62	22.41	0.32
P01_G''	J273	J279	132.4	140	87.4	0	29.21	4.87	99%	2.3263	8.28	11.56	0.40
P01_G_H50''	J279	H50''	117.8	125	3.4	16.35	12.57	2.09	99%	2.3263	3.15	6.23	0.50
P0101_A''	J253	J254	104.4	110	175.5	0	40.56	6.76	99%	2.3263	8.72	13.63	0.34
P0101_A_H3''	J254	H3''	104.4	110	3.8	12.52	11.55	1.92	99%	2.3263	1.85	5.09	0.44
P0101_B''	J254	J258	104.4	110	104.7	0	29.01	4.83	99%	2.3263	6.88	10.93	0.38
P0101_B_H4''	J258	H4''	104.4	110	3.6	13.2	12.39	2.06	99%	2.3263	2.93	6.04	0.49
P0101_C''	J258	H5''	104.4	110	134	13.75	16.62	2.77	99%	2.3263	3.95	7.39	0.44
P0102_H7''	J264	H7''	132.4	140	252.4	15.07	16.61	2.77	99%	2.3263	3.66	7.22	0.43
P0103_H51''	J279	H51''	132.4	140	306.1	16.3	16.64	2.77	99%	2.3263	5.29	8.12	0.49
P0104_A''	J267	J269	104.4	110	241.7	0	34.48	5.75	99%	2.3263	5.45	11.17	0.32
P0104_A_H9''	J269	H9''	104.4	110	3.6	14.81	13.22	2.20	99%	2.3263	2.18	5.64	0.43
P0104_B''	J269	J271	104.4	110	506.1	0	21.26	3.54	99%	2.3263	3.26	7.75	0.36
P0104_B_H10''	J271	H10''	104.4	110	4.9	18.92	11.49	1.91	99%	2.3263	1.83	5.06	0.44
P0104_C_H61''	J271	H61''	104.4	110	130	18.32	9.77	1.63	99%	2.3263	1.43	4.41	0.45
P0106_A''	J273	J274	132.4	140	35.8	0	41.85	6.97	99%	2.3263	12.18	15.09	0.36
P0106_A_H54''	J274	H54''	117.8	125	169	17.51	12.99	2.16	99%	2.3263	3.23	6.35	0.49
P0106_B''	J274	J276	132.4	140	322.2	0	28.86	4.81	99%	2.3263	8.95	11.77	0.41
P0106_B_H53''	J276	H53''	117.8	125	5.1	14.97	12.75	2.12	99%	2.3263	2.67	5.93	0.47
P0106_C_H52''	J276	H52''	132.4	140	280	19.93	16.11	2.68	99%	2.3263	6.27	8.51	0.53
P02_A''	J252	J285	379.8	400	136.9	0	819.09	136.48	99%	2.3263	234.86	172.13	0.21
P02_A_H1''	J285	H1''	132.4	140	67.6	14.76	15.97	2.66	99%	2.3263	4.93	7.83	0.49
P02_B''	J285	J287	379.8	400	110.8	0	803.12	133.82	99%	2.3263	229.93	169.10	0.21
P02_C''	J287	J295	379.8	400	39.9	0	743.54	123.89	99%	2.3263	213.29	157.87	0.21
P02_C_H15''	J295	H15''	104.4	110	3.7	14.01	10.42	1.74	99%	2.3263	1.48	4.57	0.44
P02_D''	J295	J297	379.8	400	7.2	0	733.12	122.16	99%	2.3263	211.81	156.02	0.21
P02_E''	J297	J324	337.4	355	64.8	0	487.27	81.19	99%	2.3263	120.57	106.74	0.22
P02_F''	J324	J806	237.4	250	24.6	0	237.31	39.54	99%	2.3263	70.41	59.06	0.25
P02_G''	J806	J820	190	200	175.3	0	141.68	23.61	99%	2.3263	29.57	36.26	0.26
P02_G_H20''	J820	H20''	132.4	140	2.5	9.27	14.21	2.37	99%	2.3263	3.30	6.59	0.46
P02_H''	J820	J841	152	160	384.4	0	127.47	21.24	99%	2.3263	26.27	33.16	0.26
P02_H_H21''	J841	H21''	117.8	125	3	8.78	11.23	1.87	99%	2.3263	1.54	4.76	0.42
P02_I''	J841	J822	152	160	7.6	0	116.24	19.37	99%	2.3263	17.80	29.18	0.25
P02_J''	J822	J824	152	160	59.7	0	93.68	15.61	99%	2.3263	18.04	25.49	0.27
P02_J_H23''	J824	H23''	104.4	110	88.5	8.55	9.25	1.54	99%	2.3263	1.07	3.94	0.43
P0202_A''	J287	J288	117.8	125	208.9	0	59.58	9.93	99%	2.3263	16.64	19.42	0.33
P0202_A_H16''	J288	H16''	117.8	125	4.8	11.32	14.86	2.48	99%	2.3263	3.05	6.54	0.44
P0202_B''	J288	J290	104.4	110	101.9	0	44.72	7.45	99%	2.3263	13.58	16.03	0.36
P0202_B_H17''	J290	H17''	104.4	110	4.2	10.65	9.16	1.53	99%	2.3263	1.24	4.12	0.45

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks
P0202_C''	J290	J292	104.4	110	148.9	0	35.56	5.93	99%	2.3263	12.34	14.10	0.40
P0202_C_H18''	J292	H18''	104.4	110	3.7	11.42	21.67	3.61	99%	2.3263	8.66	10.46	0.48
P0202_D''	J292	H19''	104.4	110	274.7	12.46	13.89	2.31	99%	2.3263	3.68	6.78	0.49
P0203_A''	J324	J325	237.4	250	231.7	0	249.96	41.65	99%	2.3263	70.41	61.17	0.24
P0203_A_H14''	J325	H14''	104.4	110	3.8	14.46	9.75	1.62	99%	2.3263	1.42	4.39	0.45
P0203_B''	J325	J327	237.4	250	274.9	0	240.21	40.03	99%	2.3263	68.99	59.35	0.25
P0203_B_H44''	J332	H44''	152	160	3.3	14.5	28.77	4.79	99%	2.3263	22.90	15.93	0.55
P0203_C''	J327	J332	213.6	225	164	0	208.07	34.67	99%	2.3263	59.95	52.68	0.25
P0203_C_H43''	J337	H43''	104.4	110	2.8	15.85	9.58	1.60	99%	2.3263	1.58	4.52	0.47
P0203_D''	J332	J337	190	200	235	0	179.3	29.88	99%	2.3263	37.05	44.04	0.25
P0203_D_H68_2''	J1245	H68''	104.4	110	5.2	15.55	21.69	3.61	99%	2.3263	7.12	9.82	0.45
P0203_E''	J337	J339	190	200	5.1	0	169.72	28.28	99%	2.3263	35.47	42.13	0.25
P0203_F''	J339	J340	190	200	5.9	0	73.72	12.28	99%	2.3263	17.40	21.99	0.30
P0203_G''	J340	J795	190	200	125.6	0	32.11	5.35	99%	2.3263	8.93	12.30	0.38
P0203_G_H49''	J795	H49''	104.4	110	30.3	14.68	10.42	1.74	99%	2.3263	1.81	4.86	0.47
P0203_H_H68''	J795	J1245	104.4	110	549.9	0	21.69	3.61	99%	2.3263	7.12	9.82	0.45
P020301''	J327	J328	104.4	110	154.4	0	32.14	5.36	99%	2.3263	9.04	12.35	0.38
P020301_H55''	J328	H55''	104.4	110	140.4	19.36	11.95	1.99	99%	2.3263	3.11	6.09	0.51
P020301_H56''	J328	H56''	104.4	110	63.3	20.09	20.19	3.36	99%	2.3263	5.93	9.03	0.45
P020302_A''	J339	J342	152	160	236.6	0	96	16.00	99%	2.3263	18.07	25.89	0.27
P020302_B''	J342	J343	117.8	125	139.8	0	58.19	9.70	99%	2.3263	17.75	19.50	0.34
P020302_B_H41''	J343	H41''	117.8	125	15.5	12.33	14.22	2.37	99%	2.3263	3.18	6.52	0.46
P020302_C''	J343	J345	117.8	125	24.4	0	43.97	7.33	99%	2.3263	14.57	16.21	0.37
P020302_C_H45''	J345	H45''	117.8	125	87.4	13.45	11.65	1.94	99%	2.3263	1.69	4.96	0.43
P020302_D''	J345	J347	117.8	125	162.3	0	32.32	5.39	99%	2.3263	6.71	11.41	0.35
P020302_D_H46''	J347	J537	117.8	125	145.2	0	11.4	1.90	99%	2.3263	2.48	5.56	0.49
P020302_D_H46_2''	J537	H46''	117.8	125	3	12.26	11.4	1.90	99%	2.3263	2.48	5.56	0.49
P020302_E''	J347	J349	104.4	110	199.5	0	20.92	3.49	99%	2.3263	4.23	8.27	0.40
P020302_E_H47''	J349	H47''	104.4	110	80.5	12.39	8.68	1.45	99%	2.3263	1.33	4.13	0.48
P020302_F_H48''	J349	H48''	104.4	110	359.6	14.82	12.24	2.04	99%	2.3263	2.90	6.00	0.49
P02030202_A''	J342	J790	104.4	110	6.2	0	37.81	6.30	99%	2.3263	6.50	12.23	0.32
P02030202_A_H42''	J790	H42''	104.4	110	5	11.84	14.54	2.42	99%	2.3263	3.09	6.51	0.45
P02030202_B''	J790	J792	104.4	110	188.7	0	23.27	3.88	99%	2.3263	3.41	8.17	0.35
P02030202_B_H40''	J792	H40''	104.4	110	3.4	11.61	9.24	1.54	99%	2.3263	1.21	4.10	0.44
P02030202_C''	J792	J794	104.4	110	141.9	0	14.03	2.34	99%	2.3263	2.20	5.79	0.41
P02030202_D_H39''	J794	H39''	104.4	110	4.5	10.52	14.03	2.34	99%	2.3263	2.20	5.79	0.41
P020303_A''	J340	J799	190	200	91.3	0	41.61	6.93	99%	2.3263	8.46	13.70	0.33
P020303_A_H58''	J799	H58''	104.4	110	2.5	18.4	9.32	1.55	99%	2.3263	1.21	4.11	0.44
P020303_B''	J799	J801	190	200	107.8	0	32.29	5.38	99%	2.3263	7.26	11.65	0.36
P020303_B_H57''	J801	H57''	152	160	2.5	19.99	13.79	2.30	99%	2.3263	2.09	5.66	0.41
P020303_B_H59''	J801	H59''	190	200	359.8	21.37	18.5	3.08	99%	2.3263	5.17	8.37	0.45
P0204_I_H22''	J822	H22''	152	160	255.6	9.38	22.56	3.76	99%	2.3263	8.47	10.53	0.47
P0205_A''	J806	J807	152	160	170.5	0	95.63	15.93	99%	2.3263	20.36	26.43	0.28
P0205_B''	J807	J808	117.8	125	11	0	68.68	11.44	99%	2.3263	14.20	20.21	0.29
P0205_B_H32''	J808	H32''	132.4	140	4.5	10.02	16.38	2.73	99%	2.3263	4.09	7.43	0.45
P0205_C''	J808	J810	132.4	140	124	0	52.3	8.71	99%	2.3263	10.11	16.11	0.31
P0205_C_H33''	J810	H33''	132.4	140	6	10.05	14.2	2.37	99%	2.3263	2.45	6.01	0.42
P0205_D''	J810	J812	132.4	140	122.6	0	38.1	6.35	99%	2.3263	7.66	12.79	0.34

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks
P0205_D_H34''	J812	H34''	117.8	125	100.3	10.68	12.23	2.04	99%	2.3263	2.42	5.66	0.46
P0205_E''	J812	J814	132.4	140	56	0	25.87	4.31	99%	2.3263	5.24	9.64	0.37
P0205_E_H36''	J814	H36''	132.4	140	168.8	9.54	15.62	2.60	99%	2.3263	3.20	6.76	0.43
P0205_F_H35''	J814	H35''	104.4	110	167.1	10.45	10.25	1.71	99%	2.3263	2.04	5.03	0.49
P020502_A''	J807	J817	117.8	125	354	0	26.95	4.49	99%	2.3263	6.16	10.27	0.38
P020502_A_H38''	J817	H38''	117.8	125	4.8	9.14	13.4	2.23	99%	2.3263	3.63	6.66	0.50
P020502_B_H37''	J817	H37''	117.8	125	150.2	8.88	13.55	2.26	99%	2.3263	2.54	5.96	0.44
P0206_A''	J824	J825	132.4	140	220.8	0	84.43	14.07	99%	2.3263	15.43	23.21	0.27
P0206_A_H24''	J825	H24''	104.4	110	5.5	8.54	8.6	1.43	99%	2.3263	1.32	4.11	0.48
P0206_B''	J825	J827	132.4	140	75.5	0	75.83	12.64	99%	2.3263	14.11	21.37	0.28
P0206_B_H25''	J827	H25''	117.8	125	39.3	9.32	11.89	1.98	99%	2.3263	2.65	5.77	0.48
P0206_C''	J827	J829	117.8	125	97.4	0	63.94	10.65	99%	2.3263	11.47	18.53	0.29
P0206_C_H26''	J829	H26''	117.8	125	127.5	10.25	11.73	1.95	99%	2.3263	2.19	5.40	0.46
P0206_D''	J829	J831	117.8	125	120.6	0	52.21	8.70	99%	2.3263	9.28	15.79	0.30
P0206_D_H27''	J831	H27''	104.4	110	4.8	10.47	7.59	1.26	99%	2.3263	1.01	3.61	0.48
P0206_E''	J831	J833	117.8	125	72.7	0	44.62	7.43	99%	2.3263	8.26	14.12	0.32
P0206_E_H29''	J833	H29''	117.8	125	206.8	9.03	11.31	1.88	99%	2.3263	1.85	5.05	0.45
P0206_F''	J833	J835	104.4	110	76.4	0	33.31	5.55	99%	2.3263	6.42	11.44	0.34
P0206_F_H28''	J835	H28''	104.4	110	4.1	10.72	10.24	1.71	99%	2.3263	1.81	4.83	0.47
P0206_G''	J835	J837	104.4	110	430.9	0	23.07	3.84	99%	2.3263	4.61	8.84	0.38
P0206_G_H31''	J837	H31''	104.4	110	4.7	9.19	11.08	1.85	99%	2.3263	2.63	5.62	0.51
P0206_H_H30''	J837	H30''	104.4	110	414.4	8.34	11.99	2.00	99%	2.3263	1.98	5.27	0.44
P04_A''	J297	J298	337.4	355	234	0	245.85	40.97	99%	2.3263	91.24	63.19	0.26
P04_A_H13''	J298	H13''	117.8	125	23.3	15.1	11.67	1.94	99%	2.3263	2.57	5.68	0.49
P04_B''	J298	J300	337.4	355	109.7	0	234.18	39.02	99%	2.3263	88.66	60.93	0.26
P04_B_H12''	J300	H12''	117.8	125	4	16.71	11.48	1.91	99%	2.3263	2.15	5.32	0.46
P04_C''	J300	J302	337.4	355	379.1	0	222.7	37.11	99%	2.3263	86.51	58.75	0.26
P04_C_H11''	J302	H11''	152	160	6.1	19.07	26.12	4.35	99%	2.3263	13.28	12.83	0.49
P04_D''	J302	J322	337.4	355	168.3	0	194.93	32.48	99%	2.3263	73.24	52.39	0.27
P04_D_2''	J322	J304	237.4	250	5.6	0	165.88	27.64	99%	2.3263	62.75	46.07	0.28
P04_D_H60''	J322	H60''	152	160	3.4	19.84	29.05	4.84	99%	2.3263	10.49	12.38	0.43
P04_E''	J304	J305	337.4	355	672.4	0	165.88	27.64	99%	2.3263	62.70	46.06	0.28
P04_E_H62''	J305	H62''	152	160	4.4	22.28	23.09	3.85	99%	2.3263	8.97	10.82	0.47
P04_F''	J305	J307	237.4	250	434.6	0	142.79	23.79	99%	2.3263	53.73	40.84	0.29
P04_F_H63''	J307	H63''	152	160	6.2	23.37	23.3	3.88	99%	2.3263	9.52	11.06	0.47
P04_G''	J307	J309	237.4	250	216.6	0	119.49	19.91	99%	2.3263	44.21	35.38	0.30
P04_H''	J309	J310	237.4	250	163	0	82.57	13.76	99%	2.3263	36.96	27.90	0.34
P04_H_H64''	J310	H64''	152	160	251.8	24.35	31.5	5.25	99%	2.3263	17.66	15.03	0.48
P04_I''	J310	J312	213.6	225	156.9	0	51.07	8.51	99%	2.3263	19.30	18.73	0.37
P04_I_H71''	J312	H71''	117.8	125	104.1	25.78	11.77	1.96	99%	2.3263	1.81	5.09	0.43
P04_J''	J312	J314	213.6	225	157.5	0	39.3	6.55	99%	2.3263	17.49	16.28	0.41
P04_J_H65''	J314	H65''	190	200	468.3	25.76	24.71	4.12	99%	2.3263	14.32	12.92	0.52
P04_J_H66''	J314	H66''	132.4	140	71.8	22.46	14.59	2.43	99%	2.3263	3.18	6.58	0.45
P0402_A''	J309	J317	117.8	125	76.9	0	36.92	6.15	99%	2.3263	7.24	12.41	0.34
P0402_A_H70''	J317	H70''	117.8	125	99.4	24.33	12.05	2.01	99%	2.3263	1.95	5.26	0.44
P0402_B''	J317	J319	117.8	125	392.5	0	24.87	4.14	99%	2.3263	5.29	9.49	0.38
P0402_B_H67''	J319	H67''	117.8	125	228.1	22.74	15.23	2.54	99%	2.3263	3.84	7.10	0.47
P0402_B_H69''	J319	H69''	104.4	110	4.6	21.31	9.64	1.61	99%	2.3263	1.45	4.40	0.46

1.3.2.1.2 Resultado del diseño por pendiente hidráulica con cabecera conocida Qdis 99%

En este subcapítulo se pueden observar los resultados obtenidos del diseño realizado por el método de la pendiente hidráulica con cabecera conocida, se realiza de la misma manera en que se muestra en el capítulo 1.3.1. En la tabla adjunta se identifican las columnas por cada tubería, en el cual se observa el diámetro seleccionado, la velocidad y la presión en el nudo final, en función del caudal de diseño para una GS del 99%, obtenido por el método de Clement. La última columna es el coste del tramo de tubería, siendo el producto del precio unitario del diámetro seleccionado y la longitud de la tubería.

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P00''	UGD_44	J252	9	208.88	474.6	500	1.12	53.57	€ 1,058.58
P01_A''	J252	J253	15.4	49.13	237.4	250	1.11	53.51	€ 506.66
P01_B''	J253	J262	32.6	40.79	213.6	225	1.14	53.35	€ 826.41
P01_C''	J262	J264	141.7	38.75	213.6	225	1.08	52.73	€ 3,592.10
P01_C_H2''	J262	H2''	2.3	4.53	104.4	110	0.53	39.43	€ 20.68
P01_C_H6''	J264	H6''	9.9	5.76	104.4	110	0.67	38.79	€ 89.00
P01_D''	J264	J283	201	32.89	190	200	1.16	51.57	€ 4,411.95
P01_D_H8''	J283	H8''	5.1	6.59	104.4	110	0.77	37.25	€ 45.85
P01_E''	J283	J267	8.9	29.71	190	200	1.05	51.52	€ 195.36
P01_F''	J267	J273	210.6	22.41	190	200	0.79	50.92	€ 4,622.67
P01_G''	J273	J279	87.4	11.56	104.4	110	1.35	49.55	€ 785.73
P01_G_H50''	J279	H50''	3.4	6.23	104.4	110	0.73	33.18	€ 30.57
P0101_A''	J253	J254	175.5	13.63	104.4	110	1.59	49.79	€ 1,577.75
P0101_A_H3''	J254	H3''	3.8	5.09	104.4	110	0.59	37.26	€ 34.16
P0101_B''	J254	J258	104.7	10.93	104.4	110	1.28	48.31	€ 941.25
P0101_B_H4''	J258	H4''	3.6	6.04	104.4	110	0.71	35.09	€ 32.36
P0101_C''	J258	H5''	134	7.39	104.4	110	0.86	33.62	€ 1,204.66
P0102_H7''	J264	H7''	252.4	7.22	104.4	110	0.84	35.97	€ 2,269.08
P0103_H51''	J279	H51''	306.1	8.12	104.4	110	0.95	30.72	€ 2,751.84
P0104_A''	J267	J269	241.7	11.17	117.8	125	1.03	49.54	€ 2,450.84
P0104_A_H9''	J269	H9''	3.6	5.64	104.4	110	0.66	34.71	€ 32.36
P0104_B''	J269	J271	506.1	7.75	104.4	110	0.90	45.70	€ 4,549.84
P0104_B_H10''	J271	H10''	4.9	5.06	104.4	110	0.59	26.77	€ 44.05
P0104_C_H61''	J271	H61''	130	4.41	104.4	110	0.52	27.02	€ 1,168.70
P0106_A''	J273	J274	35.8	15.09	152	160	0.83	50.77	€ 469.34
P0106_A_H54''	J274	H54''	169	6.35	104.4	110	0.74	32.37	€ 1,519.31
P0106_B''	J274	J276	322.2	11.77	132.4	140	0.85	49.12	€ 3,946.95
P0106_B_H53''	J276	H53''	5.1	5.93	104.4	110	0.69	34.13	€ 45.85
P0106_C_H52''	J276	H52''	280	8.51	117.8	125	0.78	27.79	€ 2,839.20
P02_A''	J252	J285	136.9	172.13	474.6	500	0.91	53.40	€ 16,102.18
P02_A_H1''	J285	H1''	67.6	7.83	104.4	110	0.91	38.12	€ 607.72
P02_B''	J285	J287	110.8	169.1	474.6	500	0.90	53.27	€ 13,032.30
P02_C''	J287	J295	39.9	157.87	474.6	500	0.84	53.23	€ 4,693.04
P02_C_H15''	J295	H15''	3.7	4.57	104.4	110	0.53	39.20	€ 33.26
P02_D''	J295	J297	7.2	156.02	474.6	500	0.83	53.22	€ 846.86
P02_E''	J297	J324	64.8	106.74	340.8	355	1.17	53.03	€ 3,800.52
P02_F''	J324	J806	24.6	59.06	213.6	225	1.65	52.79	€ 623.61
P02_G''	J806	J820	175.3	36.26	190	200	1.28	51.58	€ 3,847.84
P02_G_H20''	J820	H20''	2.5	6.59	104.4	110	0.77	42.30	€ 22.48
P02_H''	J820	J841	384.4	33.16	190	200	1.17	49.33	€ 8,437.58
P02_H_H21''	J841	H21''	3	4.76	104.4	110	0.56	40.54	€ 26.97
P02_I''	J841	J822	7.6	29.18	190	200	1.03	49.30	€ 166.82
P02_J''	J822	J824	59.7	25.49	190	200	0.90	49.08	€ 1,310.42
P02_J_H23''	J824	H23''	88.5	3.94	104.4	110	0.46	40.33	€ 795.62
P0202_A''	J287	J288	208.9	19.42	132.4	140	1.41	50.61	€ 2,559.03
P0202_A_H16''	J288	H16''	4.8	6.54	104.4	110	0.76	39.26	€ 43.15
P0202_B''	J288	J290	101.9	16.03	117.8	125	1.47	48.99	€ 1,033.27
P0202_B_H17''	J290	H17''	4.2	4.12	104.4	110	0.48	38.33	€ 37.76

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P0202_C''	J290	J292	148.9	14.1	117.8	125	1.29	47.13	€ 1,509.85
P0202_C_H18''	J292	H18''	3.7	10.46	104.4	110	1.22	35.66	€ 33.26
P0202_D''	J292	H19''	274.7	6.78	104.4	110	0.79	33.03	€ 2,469.55
P0203_A''	J324	J325	231.7	61.17	299.2	315	0.87	52.57	€ 11,065.99
P0203_A_H14''	J325	H14''	3.8	4.39	104.4	110	0.51	38.10	€ 34.16
P0203_B''	J325	J327	274.9	59.35	299.2	315	0.84	52.05	€ 13,129.22
P0203_B_H44''	J332	H44''	3.3	15.93	104.4	110	1.86	37.21	€ 29.67
P0203_C''	J327	J332	164	52.68	299.2	315	0.75	51.81	€ 7,832.64
P0203_C_H43''	J337	H43''	2.8	4.52	104.4	110	0.53	35.16	€ 25.17
P0203_D''	J332	J337	235	44.04	237.4	250	0.99	51.02	€ 7,731.50
P0203_D_H68_2''	J1245	H68''	5.2	9.82	104.4	110	1.15	26.76	€ 46.75
P0203_E''	J337	J339	5.1	42.13	237.4	250	0.95	51.01	€ 167.79
P0203_F''	J339	J340	5.9	21.99	190	200	0.78	50.99	€ 129.51
P0203_G''	J340	J795	125.6	12.3	104.4	110	1.44	48.78	€ 1,129.14
P0203_G_H49''	J795	H49''	30.3	4.86	104.4	110	0.57	34.00	€ 272.40
P0203_H_H68''	J795	J1245	549.9	9.82	104.4	110	1.15	42.37	€ 4,943.60
P020301''	J327	J328	154.4	12.35	104.4	110	1.44	49.32	€ 1,388.06
P020301_H55''	J328	H55''	140.4	6.09	104.4	110	0.71	29.27	€ 1,262.20
P020301_H56''	J328	H56''	63.3	9.03	104.4	110	1.05	28.60	€ 569.07
P020302_A''	J339	J342	236.6	25.89	190	200	0.91	50.12	€ 5,193.37
P020302_B''	J342	J343	139.8	19.5	190	200	0.69	49.81	€ 3,068.61
P020302_B_H41''	J343	H41''	15.5	6.52	104.4	110	0.76	37.40	€ 139.35
P020302_C''	J343	J345	24.4	16.21	152	160	0.89	49.70	€ 319.88
P020302_C_H45''	J345	H45''	87.4	4.96	104.4	110	0.58	35.95	€ 785.73
P020302_D''	J345	J347	162.3	11.41	132.4	140	0.83	48.91	€ 1,988.18
P020302_D_H46''	J347	J537	145.2	5.56	104.4	110	0.65	48.31	€ 1,305.35
P020302_D_H46_2''	J537	H46''	3	5.56	104.4	110	0.65	36.03	€ 26.97
P020302_E''	J347	J349	199.5	8.27	117.8	125	0.76	47.96	€ 2,022.93
P020302_E_H47''	J349	H47''	80.5	4.13	104.4	110	0.48	35.37	€ 723.70
P020302_F_H48''	J349	H48''	359.6	6	104.4	110	0.70	31.42	€ 3,232.80
P02030202_A''	J342	J790	6.2	12.23	104.4	110	1.43	50.02	€ 55.74
P02030202_A_H42''	J790	H42''	5	6.51	104.4	110	0.76	38.15	€ 44.95
P02030202_B''	J790	J792	188.7	8.17	104.4	110	0.95	48.44	€ 1,696.41
P02030202_B_H40''	J792	H40''	3.4	4.1	104.4	110	0.48	36.82	€ 30.57
P02030202_C''	J792	J794	141.9	5.79	104.4	110	0.68	47.80	€ 1,275.68
P02030202_D_H39''	J794	H39''	4.5	5.79	104.4	110	0.68	37.26	€ 40.46
P020303_A''	J340	J799	91.3	13.7	152	160	0.76	50.67	€ 1,196.94
P020303_A_H58''	J799	H58''	2.5	4.11	104.4	110	0.48	32.27	€ 22.48
P020303_B''	J799	J801	107.8	11.65	152	160	0.64	50.40	€ 1,413.26
P020303_B_H57''	J801	H57''	2.5	5.66	104.4	110	0.66	30.40	€ 22.48
P020303_B_H59''	J801	H59''	359.8	8.37	132.4	140	0.61	28.03	€ 4,407.55
P0204_I_H22''	J822	H22''	255.6	10.53	104.4	110	1.23	36.53	€ 2,297.84
P0205_A''	J806	J807	170.5	26.43	152	160	1.46	50.84	€ 2,235.26
P0205_B''	J807	J808	11	20.21	132.4	140	1.47	50.69	€ 134.75
P0205_B_H32''	J808	H32''	4.5	7.43	104.4	110	0.87	40.64	€ 40.46
P0205_C''	J808	J810	124	16.11	117.8	125	1.48	48.71	€ 1,257.36
P0205_C_H33''	J810	H33''	6	6.01	104.4	110	0.70	38.63	€ 53.94

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P0205_D''	J810	J812	122.6	12.79	117.8	125	1.17	47.42	€ 1,243.16
P0205_D_H34''	J812	H34''	100.3	5.66	104.4	110	0.66	36.31	€ 901.70
P0205_E''	J812	J814	56	9.64	104.4	110	1.13	36.34	€ 503.44
P0205_E_H36''	J814	H36''	168.8	6.76	104.4	110	0.79	36.25	€ 1,517.51
P0205_F_H35''	J814	H35''	167.1	5.03	104.4	110	0.59	46.21	€ 1,502.23
P020502_A''	J807	J817	354	10.27	104.4	110	1.20	46.37	€ 3,182.46
P020502_A_H38''	J817	H38''	4.8	6.66	104.4	110	0.78	37.20	€ 43.15
P020502_B_H37''	J817	H37''	150.2	5.96	104.4	110	0.70	36.78	€ 1,350.30
P0206_A''	J824	J825	220.8	23.21	190	200	0.82	48.40	€ 4,846.56
P0206_A_H24''	J825	H24''	5.5	4.11	104.4	110	0.48	39.85	€ 49.45
P0206_B''	J825	J827	75.5	21.37	152	160	1.18	47.82	€ 989.81
P0206_B_H25''	J827	H25''	39.3	5.77	104.4	110	0.67	38.32	€ 353.31
P0206_C''	J827	J829	97.4	18.53	152	160	1.02	47.23	€ 1,276.91
P0206_C_H26''	J829	H26''	127.5	5.4	104.4	110	0.63	36.48	€ 1,146.23
P0206_D''	J829	J831	120.6	15.79	152	160	0.87	46.69	€ 1,581.07
P0206_D_H27''	J831	H27''	4.8	3.61	104.4	110	0.42	36.21	€ 43.15
P0206_E''	J831	J833	72.7	14.12	132.4	140	1.03	46.18	€ 890.58
P0206_E_H29''	J833	H29''	206.8	5.05	104.4	110	0.59	36.42	€ 1,859.13
P0206_F''	J833	J835	76.4	11.44	117.8	125	1.05	45.52	€ 774.70
P0206_F_H28''	J835	H28''	4.1	4.83	104.4	110	0.56	34.79	€ 36.86
P0206_G''	J835	J837	430.9	8.84	117.8	125	0.81	43.21	€ 4,369.33
P0206_G_H31''	J837	H31''	4.7	5.62	104.4	110	0.66	34.00	€ 42.25
P0206_H_H30''	J837	H30''	414.4	5.27	104.4	110	0.62	33.29	€ 3,725.46
P04_A''	J297	J298	234	63.19	379.8	400	0.50	53.09	€ 16,003.26
P04_A_H13''	J298	H13''	23.3	5.68	104.4	110	0.66	37.89	€ 209.47
P04_B''	J298	J300	109.7	60.93	379.8	400	0.48	53.04	€ 7,502.38
P04_B_H12''	J300	H12''	4	5.32	104.4	110	0.62	36.31	€ 35.96
P04_C''	J300	J302	379.1	58.75	379.8	400	0.46	52.86	€ 25,926.65
P04_C_H11''	J302	H11''	6.1	12.83	104.4	110	1.50	33.67	€ 54.84
P04_D''	J302	J322	168.3	52.39	340.8	355	0.51	52.75	€ 9,870.80
P04_D_2''	J322	J304	5.6	46.07	340.8	355	0.45	52.75	€ 328.44
P04_D_H60''	J322	H60''	3.4	12.38	104.4	110	1.45	32.85	€ 30.57
P04_E''	J304	J305	672.4	46.06	340.8	355	0.45	52.41	€ 39,436.26
P04_E_H62''	J305	H62''	4.4	10.82	117.8	125	0.99	30.09	€ 44.62
P04_F''	J305	J307	434.6	40.84	340.8	355	0.39	52.23	€ 25,489.29
P04_F_H63''	J307	H63''	6.2	11.06	132.4	140	0.80	28.83	€ 75.95
P04_G''	J307	J309	216.6	35.38	299.2	315	0.50	52.07	€ 10,344.82
P04_H''	J309	J310	163	27.9	299.2	315	0.40	52.00	€ 7,784.88
P04_H_H64''	J310	H64''	251.8	15.03	132.4	140	1.09	25.64	€ 3,084.55
P04_I''	J310	J312	156.9	18.73	237.4	250	0.42	51.88	€ 5,162.01
P04_I_H71''	J312	H71''	104.1	5.09	132.4	140	0.37	25.99	€ 1,275.23
P04_J''	J312	J314	157.5	16.28	213.6	225	0.45	51.74	€ 3,992.63
P04_J_H65''	J314	H65''	468.3	12.92	190	200	0.46	25.48	€ 10,279.19
P04_J_H66''	J314	H66''	71.8	6.58	117.8	125	0.60	29.05	€ 728.05
P0402_A''	J309	J317	76.9	12.41	132.4	140	0.90	51.64	€ 942.03
P0402_A_H70''	J317	H70''	99.4	5.26	117.8	125	0.48	27.10	€ 1,007.92
P0402_B''	J317	J319	392.5	9.49	132.4	140	0.69	50.28	€ 4,808.13
P0402_B_H67''	J319	H67''	228.1	7.1	117.8	125	0.65	26.71	€ 2,312.93
P0402_B_H69''	J319	H69''	4.6	4.4	104.4	110	0.51	28.95	€ 41.35

1.3.2.2 Diseño a la demanda con garantía suministro del 95%

1.3.2.2.1 Calculo del caudal de diseño por el método de Clement

A continuación se puede observar el cálculo del caudal de diseño para una GS del 95%, a partir de la sumatoria de caudales demandados en las parcelas y la probabilidad de apertura de la toma.

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks
P00''	UGD_44	J252	474.6	500	9	0	1019.81	169.93	95%	1.6449	280.32	197.47	0.19
P01_A''	J252	J253	190	200	15.4	0	200.72	33.45	95%	1.6449	45.46	44.54	0.22
P01_B''	J253	J262	190	200	32.6	0	160.16	26.69	95%	1.6449	36.74	36.66	0.23
P01_C''	J262	J264	190	200	141.7	0	149.59	24.93	95%	1.6449	35.32	34.70	0.23
P01_C_H2''	J262	H2''	132.4	140	2.3	13.92	10.57	1.76	95%	1.6449	1.41	3.72	0.35
P01_C_H6''	J264	H6''	132.4	140	9.9	13.89	12.39	2.06	95%	1.6449	2.52	4.68	0.38
P01_D''	J264	J283	152	160	201	0	120.59	20.09	95%	1.6449	30.26	29.14	0.24
P01_D_H8''	J283	H8''	132.4	140	5.1	14.29	15.05	2.51	95%	1.6449	3.08	5.39	0.36
P01_E''	J283	J267	152	160	8.9	0	105.54	17.59	95%	1.6449	27.18	26.16	0.25
P01_F''	J267	J273	132.4	140	210.6	0	71.06	11.84	95%	1.6449	20.62	19.31	0.27
P01_G''	J273	J279	132.4	140	87.4	0	29.21	4.87	95%	1.6449	8.28	9.60	0.33
P01_G_H50''	J279	H50''	117.8	125	3.4	16.35	12.57	2.09	95%	1.6449	3.15	5.02	0.40
P0101_A''	J253	J254	104.4	110	175.5	0	40.56	6.76	95%	1.6449	8.72	11.62	0.29
P0101_A_H3''	J254	H3''	104.4	110	3.8	12.52	11.55	1.92	95%	1.6449	1.85	4.16	0.36
P0101_B''	J254	J258	104.4	110	104.7	0	29.01	4.83	95%	1.6449	6.88	9.15	0.32
P0101_B_H4''	J258	H4''	104.4	110	3.6	13.2	12.39	2.06	95%	1.6449	2.93	4.88	0.39
P0101_C''	J258	H5''	104.4	110	134	13.75	16.62	2.77	95%	1.6449	3.95	6.04	0.36
P0102_H7''	J264	H7''	132.4	140	252.4	15.07	16.61	2.77	95%	1.6449	3.66	5.91	0.36
P0103_H51''	J279	H51''	132.4	140	306.1	16.3	16.64	2.77	95%	1.6449	5.29	6.56	0.39
P0104_A''	J267	J269	104.4	110	241.7	0	34.48	5.75	95%	1.6449	5.45	9.58	0.28
P0104_A_H9''	J269	H9''	104.4	110	3.6	14.81	13.22	2.20	95%	1.6449	2.18	4.63	0.35
P0104_B''	J269	J271	104.4	110	506.1	0	21.26	3.54	95%	1.6449	3.26	6.51	0.31
P0104_B_H10''	J271	H10''	104.4	110	4.9	18.92	11.49	1.91	95%	1.6449	1.83	4.14	0.36
P0104_C_H61''	J271	H61''	104.4	110	130	18.32	9.77	1.63	95%	1.6449	1.43	3.60	0.37
P0106_A''	J273	J274	132.4	140	35.8	0	41.85	6.97	95%	1.6449	12.18	12.71	0.30
P0106_A_H54''	J274	H54''	117.8	125	169	17.51	12.99	2.16	95%	1.6449	3.23	5.12	0.39
P0106_B''	J274	J276	132.4	140	322.2	0	28.86	4.81	95%	1.6449	8.95	9.73	0.34
P0106_B_H53''	J276	H53''	117.8	125	5.1	14.97	12.75	2.12	95%	1.6449	2.67	4.81	0.38
P0106_C_H52''	J276	H52''	132.4	140	280	19.93	16.11	2.68	95%	1.6449	6.27	6.80	0.42
P02_A''	J252	J285	379.8	400	136.9	0	819.09	136.48	95%	1.6449	234.86	161.69	0.20
P02_A_H1''	J285	H1''	132.4	140	67.6	14.76	15.97	2.66	95%	1.6449	4.93	6.31	0.40
P02_B''	J285	J287	379.8	400	110.8	0	803.12	133.82	95%	1.6449	229.93	158.76	0.20
P02_C''	J287	J295	379.8	400	39.9	0	743.54	123.89	95%	1.6449	213.29	147.92	0.20
P02_C_H15''	J295	H15''	104.4	110	3.7	14.01	10.42	1.74	95%	1.6449	1.48	3.74	0.36
P02_D''	J295	J297	379.8	400	7.2	0	733.12	122.16	95%	1.6449	211.81	146.10	0.20
P02_E''	J297	J324	337.4	355	64.8	0	487.27	81.19	95%	1.6449	120.57	99.25	0.20
P02_F''	J324	J806	237.4	250	24.6	0	237.31	39.54	95%	1.6449	70.41	53.34	0.22
P02_G''	J806	J820	190	200	175.3	0	141.68	23.61	95%	1.6449	29.57	32.55	0.23
P02_G_H20''	J820	H20''	132.4	140	2.5	9.27	14.21	2.37	95%	1.6449	3.30	5.35	0.38
P02_H''	J820	J841	152	160	384.4	0	127.47	21.24	95%	1.6449	26.27	29.67	0.23
P02_H_H21''	J841	H21''	117.8	125	3	8.78	11.23	1.87	95%	1.6449	1.54	3.91	0.35
P02_I''	J841	J822	152	160	7.6	0	116.24	19.37	95%	1.6449	17.80	26.31	0.23
P02_J''	J822	J824	152	160	59.7	0	93.68	15.61	95%	1.6449	18.04	22.60	0.24
P02_J_H23''	J824	H23''	104.4	110	88.5	8.55	9.25	1.54	95%	1.6449	1.07	3.24	0.35
P0202_A''	J287	J288	117.8	125	208.9	0	59.58	9.93	95%	1.6449	16.64	16.64	0.28
P0202_A_H16''	J288	H16''	117.8	125	4.8	11.32	14.86	2.48	95%	1.6449	3.05	5.35	0.36
P0202_B''	J288	J290	104.4	110	101.9	0	44.72	7.45	95%	1.6449	13.58	13.51	0.30
P0202_B_H17''	J290	H17''	104.4	110	4.2	10.65	9.16	1.53	95%	1.6449	1.24	3.36	0.37

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks
P0202_C''	J290	J292	104.4	110	148.9	0	35.56	5.93	95%	1.6449	12.34	11.70	0.33
P0202_C_H18''	J292	H18''	104.4	110	3.7	11.42	21.67	3.61	95%	1.6449	8.66	8.45	0.39
P0202_D''	J292	H19''	104.4	110	274.7	12.46	13.89	2.31	95%	1.6449	3.68	5.47	0.39
P0203_A''	J324	J325	237.4	250	231.7	0	249.96	41.65	95%	1.6449	70.41	55.45	0.22
P0203_A_H14''	J325	H14''	104.4	110	3.8	14.46	9.75	1.62	95%	1.6449	1.42	3.58	0.37
P0203_B''	J325	J327	237.4	250	274.9	0	240.21	40.03	95%	1.6449	68.99	53.69	0.22
P0203_B_H44''	J332	H44''	152	160	3.3	14.5	28.77	4.79	95%	1.6449	22.90	12.67	0.44
P0203_C''	J327	J332	213.6	225	164	0	208.07	34.67	95%	1.6449	59.95	47.41	0.23
P0203_C_H43''	J337	H43''	104.4	110	2.8	15.85	9.58	1.60	95%	1.6449	1.58	3.67	0.38
P0203_D''	J332	J337	190	200	235	0	179.3	29.88	95%	1.6449	37.05	39.89	0.22
P0203_D_H68_2''	J1245	H68''	104.4	110	5.2	15.55	21.69	3.61	95%	1.6449	7.12	8.00	0.37
P0203_E''	J337	J339	190	200	5.1	0	169.72	28.28	95%	1.6449	35.47	38.08	0.22
P0203_F''	J339	J340	190	200	5.9	0	73.72	12.28	95%	1.6449	17.40	19.14	0.26
P0203_G''	J340	J795	190	200	125.6	0	32.11	5.35	95%	1.6449	8.93	10.27	0.32
P0203_G_H49''	J795	H49''	104.4	110	30.3	14.68	10.42	1.74	95%	1.6449	1.81	3.95	0.38
P0203_H_H68''	J795	J1245	104.4	110	549.9	0	21.69	3.61	95%	1.6449	7.12	8.00	0.37
P020301''	J327	J328	104.4	110	154.4	0	32.14	5.36	95%	1.6449	9.04	10.30	0.32
P020301_H55''	J328	H55''	104.4	110	140.4	19.36	11.95	1.99	95%	1.6449	3.11	4.89	0.41
P020301_H56''	J328	H56''	104.4	110	63.3	20.09	20.19	3.36	95%	1.6449	5.93	7.37	0.37
P020302_A''	J339	J342	152	160	236.6	0	96	16.00	95%	1.6449	18.07	22.99	0.24
P020302_B''	J342	J343	117.8	125	139.8	0	58.19	9.70	95%	1.6449	17.75	16.63	0.29
P020302_B_H41''	J343	H41''	117.8	125	15.5	12.33	14.22	2.37	95%	1.6449	3.18	5.30	0.37
P020302_C''	J343	J345	117.8	125	24.4	0	43.97	7.33	95%	1.6449	14.57	13.61	0.31
P020302_C_H45''	J345	H45''	117.8	125	87.4	13.45	11.65	1.94	95%	1.6449	1.69	4.08	0.35
P020302_D''	J345	J347	117.8	125	162.3	0	32.32	5.39	95%	1.6449	6.71	9.64	0.30
P020302_D_H46''	J347	J537	117.8	125	145.2	0	11.4	1.90	95%	1.6449	2.48	4.49	0.39
P020302_D_H46_2''	J537	H46''	117.8	125	3	12.26	11.4	1.90	95%	1.6449	2.48	4.49	0.39
P020302_E''	J347	J349	104.4	110	199.5	0	20.92	3.49	95%	1.6449	4.23	6.87	0.33
P020302_E_H47''	J349	H47''	104.4	110	80.5	12.39	8.68	1.45	95%	1.6449	1.33	3.35	0.39
P020302_F_H48''	J349	H48''	104.4	110	359.6	14.82	12.24	2.04	95%	1.6449	2.90	4.84	0.40
P02030202_A''	J342	J790	104.4	110	6.2	0	37.81	6.30	95%	1.6449	6.50	10.49	0.28
P02030202_A_H42''	J790	H42''	104.4	110	5	11.84	14.54	2.42	95%	1.6449	3.09	5.31	0.37
P02030202_B''	J790	J792	104.4	110	188.7	0	23.27	3.88	95%	1.6449	3.41	6.91	0.30
P02030202_B_H40''	J792	H40''	104.4	110	3.4	11.61	9.24	1.54	95%	1.6449	1.21	3.35	0.36
P02030202_C''	J792	J794	104.4	110	141.9	0	14.03	2.34	95%	1.6449	2.20	4.78	0.34
P02030202_D_H39''	J794	H39''	104.4	110	4.5	10.52	14.03	2.34	95%	1.6449	2.20	4.78	0.34
P020303_A''	J340	J799	190	200	91.3	0	41.61	6.93	95%	1.6449	8.46	11.72	0.28
P020303_A_H58''	J799	H58''	104.4	110	2.5	18.4	9.32	1.55	95%	1.6449	1.21	3.36	0.36
P020303_B''	J799	J801	190	200	107.8	0	32.29	5.38	95%	1.6449	7.26	9.81	0.30
P020303_B_H57''	J801	H57''	152	160	2.5	19.99	13.79	2.30	95%	1.6449	2.09	4.68	0.34
P020303_B_H59''	J801	H59''	190	200	359.8	21.37	18.5	3.08	95%	1.6449	5.17	6.82	0.37
P0204_I_H22''	J822	H22''	152	160	255.6	9.38	22.56	3.76	95%	1.6449	8.47	8.55	0.38
P0205_A''	J806	J807	152	160	170.5	0	95.63	15.93	95%	1.6449	20.36	23.36	0.24
P0205_B''	J807	J808	117.8	125	11	0	68.68	11.44	95%	1.6449	14.20	17.64	0.26
P0205_B_H32''	J808	H32''	132.4	140	4.5	10.02	16.38	2.73	95%	1.6449	4.09	6.05	0.37
P0205_C''	J808	J810	132.4	140	124	0	52.3	8.71	95%	1.6449	10.11	13.94	0.27
P0205_C_H33''	J810	H33''	132.4	140	6	10.05	14.2	2.37	95%	1.6449	2.45	4.94	0.35
P0205_D''	J810	J812	132.4	140	122.6	0	38.1	6.35	95%	1.6449	7.66	10.90	0.29

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Qinst	∑pi·Qi	GS	U	∑pi·(1-pi)·Qi^2	Q diseño	ks
P0205_D_H34''	J812	H34''	117.8	125	100.3	10.68	12.23	2.04	95%	1.6449	2.42	4.60	0.38
P0205_E''	J812	J814	132.4	140	56	0	25.87	4.31	95%	1.6449	5.24	8.08	0.31
P0205_E_H36''	J814	H36''	132.4	140	168.8	9.54	15.62	2.60	95%	1.6449	3.20	5.55	0.35
P0205_F_H35''	J814	H35''	104.4	110	167.1	10.45	10.25	1.71	95%	1.6449	2.04	4.06	0.40
P020502_A''	J807	J817	117.8	125	354	0	26.95	4.49	95%	1.6449	6.16	8.57	0.32
P020502_A_H38''	J817	H38''	117.8	125	4.8	9.14	13.4	2.23	95%	1.6449	3.63	5.37	0.40
P020502_B_H37''	J817	H37''	117.8	125	150.2	8.88	13.55	2.26	95%	1.6449	2.54	4.88	0.36
P0206_A''	J824	J825	132.4	140	220.8	0	84.43	14.07	95%	1.6449	15.43	20.53	0.24
P0206_A_H24''	J825	H24''	104.4	110	5.5	8.54	8.6	1.43	95%	1.6449	1.32	3.32	0.39
P0206_B''	J825	J827	132.4	140	75.5	0	75.83	12.64	95%	1.6449	14.11	18.81	0.25
P0206_B_H25''	J827	H25''	117.8	125	39.3	9.32	11.89	1.98	95%	1.6449	2.65	4.66	0.39
P0206_C''	J827	J829	117.8	125	97.4	0	63.94	10.65	95%	1.6449	11.47	16.22	0.25
P0206_C_H26''	J829	H26''	117.8	125	127.5	10.25	11.73	1.95	95%	1.6449	2.19	4.39	0.37
P0206_D''	J829	J831	117.8	125	120.6	0	52.21	8.70	95%	1.6449	9.28	13.71	0.26
P0206_D_H27''	J831	H27''	104.4	110	4.8	10.47	7.59	1.26	95%	1.6449	1.01	2.92	0.38
P0206_E''	J831	J833	117.8	125	72.7	0	44.62	7.43	95%	1.6449	8.26	12.16	0.27
P0206_E_H29''	J833	H29''	117.8	125	206.8	9.03	11.31	1.88	95%	1.6449	1.85	4.12	0.36
P0206_F''	J833	J835	104.4	110	76.4	0	33.31	5.55	95%	1.6449	6.42	9.72	0.29
P0206_F_H28''	J835	H28''	104.4	110	4.1	10.72	10.24	1.71	95%	1.6449	1.81	3.92	0.38
P0206_G''	J835	J837	104.4	110	430.9	0	23.07	3.84	95%	1.6449	4.61	7.38	0.32
P0206_G_H31''	J837	H31''	104.4	110	4.7	9.19	11.08	1.85	95%	1.6449	2.63	4.51	0.41
P0206_H_H30''	J837	H30''	104.4	110	414.4	8.34	11.99	2.00	95%	1.6449	1.98	4.31	0.36
P04_A''	J297	J298	337.4	355	234	0	245.85	40.97	95%	1.6449	91.24	56.68	0.23
P04_A_H13''	J298	H13''	117.8	125	23.3	15.1	11.67	1.94	95%	1.6449	2.57	4.58	0.39
P04_B''	J298	J300	337.4	355	109.7	0	234.18	39.02	95%	1.6449	88.66	54.51	0.23
P04_B_H12''	J300	H12''	117.8	125	4	16.71	11.48	1.91	95%	1.6449	2.15	4.32	0.38
P04_C''	J300	J302	337.4	355	379.1	0	222.7	37.11	95%	1.6449	86.51	52.41	0.24
P04_C_H11''	J302	H11''	152	160	6.1	19.07	26.12	4.35	95%	1.6449	13.28	10.35	0.40
P04_D''	J302	J322	337.4	355	168.3	0	194.93	32.48	95%	1.6449	73.24	46.56	0.24
P04_D_2''	J322	J304	237.4	250	5.6	0	165.88	27.64	95%	1.6449	62.75	40.67	0.25
P04_D_H60''	J322	H60''	152	160	3.4	19.84	29.05	4.84	95%	1.6449	10.49	10.17	0.35
P04_E''	J304	J305	337.4	355	672.4	0	165.88	27.64	95%	1.6449	62.70	40.66	0.25
P04_E_H62''	J305	H62''	152	160	4.4	22.28	23.09	3.85	95%	1.6449	8.97	8.77	0.38
P04_F''	J305	J307	237.4	250	434.6	0	142.79	23.79	95%	1.6449	53.73	35.85	0.25
P04_F_H63''	J307	H63''	152	160	6.2	23.37	23.3	3.88	95%	1.6449	9.52	8.96	0.38
P04_G''	J307	J309	237.4	250	216.6	0	119.49	19.91	95%	1.6449	44.21	30.85	0.26
P04_H''	J309	J310	237.4	250	163	0	82.57	13.76	95%	1.6449	36.96	23.76	0.29
P04_H_H64''	J310	H64''	152	160	251.8	24.35	31.5	5.25	95%	1.6449	17.66	12.16	0.39
P04_I''	J310	J312	213.6	225	156.9	0	51.07	8.51	95%	1.6449	19.30	15.74	0.31
P04_I_H71''	J312	H71''	117.8	125	104.1	25.78	11.77	1.96	95%	1.6449	1.81	4.17	0.35
P04_J''	J312	J314	213.6	225	157.5	0	39.3	6.55	95%	1.6449	17.49	13.43	0.34
P04_J_H65''	J314	H65''	190	200	468.3	25.76	24.71	4.12	95%	1.6449	14.32	10.34	0.42
P04_J_H66''	J314	H66''	132.4	140	71.8	22.46	14.59	2.43	95%	1.6449	3.18	5.36	0.37
P0402_A''	J309	J317	117.8	125	76.9	0	36.92	6.15	95%	1.6449	7.24	10.58	0.29
P0402_A_H70''	J317	H70''	117.8	125	99.4	24.33	12.05	2.01	95%	1.6449	1.95	4.31	0.36
P0402_B''	J317	J319	117.8	125	392.5	0	24.87	4.14	95%	1.6449	5.29	7.93	0.32
P0402_B_H67''	J319	H67''	117.8	125	228.1	22.74	15.23	2.54	95%	1.6449	3.84	5.76	0.38
P0402_B_H69''	J319	H69''	104.4	110	4.6	21.31	9.64	1.61	95%	1.6449	1.45	3.58	0.37

1.3.2.2.2 Resultado del diseño por pendiente hidráulica con cabecera conocida Qdis 95%

En este subcapítulo se pueden observar los resultados obtenidos del diseño realizado por el método de la pendiente hidráulica con cabecera conocida, se realiza de la misma manera en que se muestra en el capítulo 1.3.1. En la tabla adjunta se identifican las columnas por cada tubería, en el cual se observa el diámetro seleccionado, la velocidad y la presión en el nudo final, en función del caudal de diseño para una GS del 95%, obtenido por el método de Clement. La última columna es el coste del tramo de tubería, siendo el producto del precio unitario del diámetro seleccionado y la longitud de la tubería.

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P00''	UGD_44	J252	9	197.47	474.6	500	1.12	53.57	€ 1,058.58
P01_A''	J252	J253	15.4	44.54	213.6	250	1.24	53.49	€ 390.39
P01_B''	J253	J262	32.6	36.66	213.6	225	1.02	53.36	€ 826.41
P01_C''	J262	J264	141.7	34.7	190	225	1.22	52.45	€ 3,110.32
P01_C_H2''	J262	H2''	2.3	3.72	104.4	110	0.43	39.43	€ 20.68
P01_C_H6''	J264	H6''	9.9	4.68	104.4	110	0.55	38.53	€ 89.00
P01_D''	J264	J283	201	29.14	190	200	1.03	51.52	€ 4,411.95
P01_D_H8''	J283	H8''	5.1	5.39	104.4	110	0.63	37.21	€ 45.85
P01_E''	J283	J267	8.9	26.16	190	200	0.92	51.49	€ 195.36
P01_F''	J267	J273	210.6	19.31	152	200	1.06	50.13	€ 2,760.97
P01_G''	J273	J279	87.4	9.6	104.4	110	1.12	49.15	€ 785.73
P01_G_H50''	J279	H50''	3.4	5.02	104.4	110	0.59	32.79	€ 30.57
P0101_A''	J253	J254	175.5	11.62	104.4	110	1.36	50.71	€ 1,577.75
P0101_A_H3''	J254	H3''	3.8	4.16	104.4	110	0.49	38.18	€ 34.16
P0101_B''	J254	J258	104.7	9.15	104.4	110	1.07	49.64	€ 941.25
P0101_B_H4''	J258	H4''	3.6	4.88	104.4	110	0.57	36.42	€ 32.36
P0101_C''	J258	H5''	134	6.04	104.4	110	0.71	35.24	€ 1,204.66
P0102_H7''	J264	H7''	252.4	5.91	104.4	110	0.69	36.21	€ 2,269.08
P0103_H51''	J279	H51''	306.1	6.56	104.4	110	0.77	31.14	€ 2,751.84
P0104_A''	J267	J269	241.7	9.58	117.8	125	0.88	49.99	€ 2,450.84
P0104_A_H9''	J269	H9''	3.6	4.63	104.4	110	0.54	35.17	€ 32.36
P0104_B''	J269	J271	506.1	6.51	104.4	110	0.76	47.18	€ 4,549.84
P0104_B_H10''	J271	H10''	4.9	4.14	104.4	110	0.48	28.25	€ 44.05
P0104_C_H61''	J271	H61''	130	3.6	104.4	110	0.42	28.61	€ 1,168.70
P0106_A''	J273	J274	35.8	12.71	132.4	160	0.92	49.92	€ 438.55
P0106_A_H54''	J274	H54''	169	5.12	104.4	110	0.60	31.80	€ 1,519.31
P0106_B''	J274	J276	322.2	9.73	117.8	140	0.89	47.86	€ 3,267.11
P0106_B_H53''	J276	H53''	5.1	4.81	104.4	110	0.56	32.88	€ 45.85
P0106_C_H52''	J276	H52''	280	6.8	104.4	125	0.79	26.25	€ 2,517.20
P02_A''	J252	J285	136.9	161.69	474.6	500	0.91	53.40	€ 16,102.18
P02_A_H1''	J285	H1''	67.6	6.31	104.4	110	0.74	38.29	€ 607.72
P02_B''	J285	J287	110.8	158.76	474.6	500	0.90	53.27	€ 13,032.30
P02_C''	J287	J295	39.9	147.92	474.6	500	0.84	53.23	€ 4,693.04
P02_C_H15''	J295	H15''	3.7	3.74	104.4	110	0.44	39.21	€ 33.26
P02_D''	J295	J297	7.2	146.1	474.6	500	0.83	53.22	€ 846.86
P02_E''	J297	J324	64.8	99.25	340.8	355	1.09	53.05	€ 3,800.52
P02_F''	J324	J806	24.6	53.34	190	225	1.88	52.71	€ 539.97
P02_G''	J806	J820	175.3	32.55	190	200	1.15	51.71	€ 3,847.84
P02_G_H20''	J820	H20''	2.5	5.35	104.4	110	0.63	42.43	€ 22.48
P02_H''	J820	J841	384.4	29.67	190	200	1.05	49.88	€ 8,437.58
P02_H_H21''	J841	H21''	3	3.91	104.4	110	0.46	41.09	€ 26.97
P02_I''	J841	J822	7.6	26.31	190	200	0.93	49.85	€ 166.82
P02_J''	J822	J824	59.7	22.6	190	200	0.80	49.67	€ 1,310.42
P02_J_H23''	J824	H23''	88.5	3.24	104.4	110	0.38	40.98	€ 795.62
P0202_A''	J287	J288	208.9	16.64	132.4	140	1.21	51.26	€ 2,559.03
P0202_A_H16''	J288	H16''	4.8	5.35	104.4	110	0.62	39.92	€ 43.15
P0202_B''	J288	J290	101.9	13.51	117.8	125	1.24	50.08	€ 1,033.27
P0202_B_H17''	J290	H17''	4.2	3.36	104.4	110	0.39	39.42	€ 37.76

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P0202_C''	J290	J292	148.9	11.7	104.4	125	1.37	47.69	€ 1,338.61
P0202_C_H18''	J292	H18''	3.7	8.45	104.4	110	0.99	36.24	€ 33.26
P0202_D''	J292	H19''	274.7	5.47	104.4	110	0.64	34.12	€ 2,469.55
P0203_A''	J324	J325	231.7	55.45	299.2	315	0.79	52.67	€ 11,065.99
P0203_A_H14''	J325	H14''	3.8	3.58	104.4	110	0.42	38.20	€ 34.16
P0203_B''	J325	J327	274.9	53.69	299.2	315	0.76	52.24	€ 13,129.22
P0203_B_H44''	J332	H44''	3.3	12.67	104.4	110	1.48	37.47	€ 29.67
P0203_C''	J327	J332	164	47.41	299.2	315	0.67	52.04	€ 7,832.64
P0203_C_H43''	J337	H43''	2.8	3.67	104.4	110	0.43	35.52	€ 25.17
P0203_D''	J332	J337	235	39.89	237.4	250	0.90	51.38	€ 7,731.50
P0203_D_H68_2''	J1245	H68''	5.2	8	104.4	110	0.94	29.75	€ 46.75
P0203_E''	J337	J339	5.1	38.08	237.4	250	0.86	51.37	€ 167.79
P0203_F''	J339	J340	5.9	19.14	190	200	0.68	51.35	€ 129.51
P0203_G''	J340	J795	125.6	10.27	104.4	110	1.20	49.77	€ 1,129.14
P0203_G_H49''	J795	H49''	30.3	3.95	104.4	110	0.46	35.02	€ 272.40
P0203_H_H68''	J795	J1245	549.9	8	104.4	110	0.94	45.34	€ 4,943.60
P020301''	J327	J328	154.4	10.3	104.4	110	1.20	50.28	€ 1,388.06
P020301_H55''	J328	H55''	140.4	4.89	104.4	110	0.57	30.45	€ 1,262.20
P020301_H56''	J328	H56''	63.3	7.37	104.4	110	0.86	29.75	€ 569.07
P020302_A''	J339	J342	236.6	22.99	190	200	0.81	50.66	€ 5,193.37
P020302_B''	J342	J343	139.8	16.63	152	200	0.92	49.97	€ 1,832.78
P020302_B_H41''	J343	H41''	15.5	5.3	104.4	110	0.62	37.58	€ 139.35
P020302_C''	J343	J345	24.4	13.61	152	160	0.75	49.88	€ 319.88
P020302_C_H45''	J345	H45''	87.4	4.08	104.4	110	0.48	36.23	€ 785.73
P020302_D''	J345	J347	162.3	9.64	132.4	140	0.70	49.30	€ 1,988.18
P020302_D_H46''	J347	J537	145.2	4.49	104.4	110	0.52	48.89	€ 1,305.35
P020302_D_H46_2''	J537	H46''	3	4.49	104.4	110	0.52	36.62	€ 26.97
P020302_E''	J347	J349	199.5	6.87	117.8	125	0.63	48.62	€ 2,022.93
P020302_E_H47''	J349	H47''	80.5	3.35	104.4	110	0.39	36.10	€ 723.70
P020302_F_H48''	J349	H48''	359.6	4.84	104.4	110	0.57	32.64	€ 3,232.80
P02030202_A''	J342	J790	6.2	10.49	104.4	110	1.23	50.57	€ 55.74
P02030202_A_H42''	J790	H42''	5	5.31	104.4	110	0.62	38.71	€ 44.95
P02030202_B''	J790	J792	188.7	6.91	104.4	110	0.81	49.41	€ 1,696.41
P02030202_B_H40''	J792	H40''	3.4	3.35	104.4	110	0.39	37.79	€ 30.57
P02030202_C''	J792	J794	141.9	4.78	104.4	110	0.56	48.96	€ 1,275.68
P02030202_D_H39''	J794	H39''	4.5	4.78	104.4	110	0.56	38.42	€ 40.46
P020303_A''	J340	J799	91.3	11.72	152	160	0.65	51.12	€ 1,196.94
P020303_A_H58''	J799	H58''	2.5	3.36	104.4	110	0.39	32.71	€ 22.48
P020303_B''	J799	J801	107.8	9.81	132.4	140	0.71	50.72	€ 1,320.55
P020303_B_H57''	J801	H57''	2.5	4.68	104.4	110	0.55	30.72	€ 22.48
P020303_B_H59''	J801	H59''	359.8	6.82	117.8	125	0.63	28.14	€ 3,648.37
P0204_I_H22''	J822	H22''	255.6	8.55	104.4	110	1.00	38.15	€ 2,297.84
P0205_A''	J806	J807	170.5	23.36	152	160	1.29	51.15	€ 2,235.26
P0205_B''	J807	J808	11	17.64	132.4	140	1.28	51.03	€ 134.75
P0205_B_H32''	J808	H32''	4.5	6.05	104.4	110	0.71	40.99	€ 40.46
P0205_C''	J808	J810	124	13.94	117.8	125	1.28	49.51	€ 1,257.36
P0205_C_H33''	J810	H33''	6	4.94	104.4	110	0.58	39.44	€ 53.94

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P0205_D''	J810	J812	122.6	10.9	104.4	125	1.27	47.78	€ 1,102.17
P0205_D_H34''	J812	H34''	100.3	4.6	104.4	110	0.54	36.80	€ 901.70
P0205_E''	J812	J814	56	8.08	104.4	110	0.94	36.87	€ 503.44
P0205_E_H36''	J814	H36''	168.8	5.55	104.4	110	0.65	37.08	€ 1,517.51
P0205_F_H35''	J814	H35''	167.1	4.06	104.4	110	0.47	46.93	€ 1,502.23
P020502_A''	J807	J817	354	8.57	104.4	110	1.00	47.93	€ 3,182.46
P020502_A_H38''	J817	H38''	4.8	5.37	104.4	110	0.63	38.77	€ 43.15
P020502_B_H37''	J817	H37''	150.2	4.88	104.4	110	0.57	38.55	€ 1,350.30
P0206_A''	J824	J825	220.8	20.53	152	200	1.13	48.08	€ 2,894.69
P0206_A_H24''	J825	H24''	5.5	3.32	104.4	110	0.39	39.53	€ 49.45
P0206_B''	J825	J827	75.5	18.81	152	160	1.04	47.61	€ 989.81
P0206_B_H25''	J827	H25''	39.3	4.66	104.4	110	0.54	38.17	€ 353.31
P0206_C''	J827	J829	97.4	16.22	152	160	0.89	47.16	€ 1,276.91
P0206_C_H26''	J829	H26''	127.5	4.39	104.4	110	0.51	36.56	€ 1,146.23
P0206_D''	J829	J831	120.6	13.71	132.4	160	1.00	46.34	€ 1,477.35
P0206_D_H27''	J831	H27''	4.8	2.92	104.4	110	0.34	35.86	€ 43.15
P0206_E''	J831	J833	72.7	12.16	132.4	140	0.88	45.95	€ 890.58
P0206_E_H29''	J833	H29''	206.8	4.12	104.4	110	0.48	36.41	€ 1,859.13
P0206_F''	J833	J835	76.4	9.72	117.8	125	0.89	45.46	€ 774.70
P0206_F_H28''	J835	H28''	4.1	3.92	104.4	110	0.46	34.73	€ 36.86
P0206_G''	J835	J837	430.9	7.38	104.4	125	0.86	42.47	€ 3,873.79
P0206_G_H31''	J837	H31''	4.7	4.51	104.4	110	0.53	33.27	€ 42.25
P0206_H_H30''	J837	H30''	414.4	4.31	104.4	110	0.50	33.03	€ 3,725.46
P04_A''	J297	J298	234	56.68	379.8	400	0.50	53.09	€ 16,003.26
P04_A_H13''	J298	H13''	23.3	4.58	104.4	110	0.54	37.92	€ 209.47
P04_B''	J298	J300	109.7	54.51	379.8	400	0.48	53.04	€ 7,502.38
P04_B_H12''	J300	H12''	4	4.32	104.4	110	0.51	36.31	€ 35.96
P04_C''	J300	J302	379.1	52.41	379.8	400	0.46	52.86	€ 25,926.65
P04_C_H11''	J302	H11''	6.1	10.35	104.4	110	1.21	33.71	€ 54.84
P04_D''	J302	J322	168.3	46.56	340.8	355	0.51	52.75	€ 9,870.80
P04_D_2''	J322	J304	5.6	40.67	340.8	355	0.45	52.75	€ 328.44
P04_D_H60''	J322	H60''	3.4	10.17	104.4	110	1.19	32.87	€ 30.57
P04_E''	J304	J305	672.4	40.66	340.8	355	0.45	52.41	€ 39,436.26
P04_E_H62''	J305	H62''	4.4	8.77	104.4	110	1.02	30.09	€ 39.56
P04_F''	J305	J307	434.6	35.85	340.8	355	0.39	52.23	€ 25,489.29
P04_F_H63''	J307	H63''	6.2	8.96	117.8	125	0.82	28.83	€ 62.87
P04_G''	J307	J309	216.6	30.85	299.2	315	0.44	52.11	€ 10,344.82
P04_H''	J309	J310	163	23.76	299.2	315	0.34	52.05	€ 7,784.88
P04_H_H64''	J310	H64''	251.8	12.16	132.4	140	0.88	26.33	€ 3,084.55
P04_I''	J310	J312	156.9	15.74	237.4	250	0.36	51.97	€ 5,162.01
P04_I_H71''	J312	H71''	104.1	4.17	117.8	125	0.38	26.04	€ 1,055.57
P04_J''	J312	J314	157.5	13.43	213.6	225	0.37	51.87	€ 3,992.63
P04_J_H65''	J314	H65''	468.3	10.34	152	200	0.57	25.13	€ 6,139.41
P04_J_H66''	J314	H66''	71.8	5.36	104.4	110	0.63	29.13	€ 645.48
P0402_A''	J309	J317	76.9	10.58	132.4	140	0.77	51.78	€ 942.03
P0402_A_H70''	J317	H70''	99.4	4.31	104.4	110	0.50	27.19	€ 893.61
P0402_B''	J317	J319	392.5	7.93	117.8	125	0.73	50.05	€ 3,979.95
P0402_B_H67''	J319	H67''	228.1	5.76	104.4	110	0.67	26.30	€ 2,050.62
P0402_B_H69''	J319	H69''	4.6	3.58	104.4	110	0.42	28.73	€ 41.35

*1.3.2.*3 *Resultado del diseño por pendiente hidráulica con cabecera conocida Qdiseño 4 turnos.*

En este subcapítulo se pueden observar los resultados obtenidos del diseño realizado por el método de la pendiente hidráulica con cabecera conocida, se realiza de la misma manera en que se muestra en el capítulo 1.3.1. En la tabla adjunta se identifican las columnas por cada tubería, en el cual se observa el diámetro seleccionado, la velocidad y la presión en el nudo final, en función del caudal de diseño para 4 turnos. La última columna es el coste del tramo de tubería, siendo el producto del precio unitario del diámetro seleccionado y la longitud de la tubería.

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion /mca)	Coste
P00''	UGD_44	J252	9	254.95	474.6	500	1.44	53.56	€ 1,058.58
P01_A''	J252	J253	15.4	50.18	237.4	250	1.133650924	53.49867343	€ 506.66
P01_B''	J253	J262	32.6	40.04	213.6	225	1.117382051	53.34592503	€ 826.41
P01_C''	J262	J264	141.7	37.4	213.6	225	1.043638742	52.75984094	€ 3,592.10
P01_C_H2''	J262	H2''	2.3	2.64	104.4	110	0.308691106	39.42337875	€ 20.68
P01_C_H6''	J264	H6''	9.9	3.1	104.4	110	0.361843217	38.85531602	€ 89.00
P01_D''	J264	J283	201	30.15	190	200	1.063296099	51.7698385	€ 4,411.95
P01_D_H8''	J283	H8''	5.1	3.76	104.4	110	0.439527072	37.46926305	€ 45.85
P01_E''	J283	J267	8.9	26.39	190	200	0.930593501	51.73545643	€ 195.36
P01_F''	J267	J273	210.6	17.77	152	160	0.979012314	50.56773023	€ 2,760.97
P01_G''	J273	J279	87.4	7.3	104.4	110	0.853062178	49.97211278	€ 785.73
P01_G_H50''	J279	H50''	3.4	3.14	104.4	110	0.36710002	33.61699502	€ 30.57
P0101_A''	J253	J254	175.5	10.14	104.4	110	1.18453276	51.33030869	€ 1,577.75
P0101_A_H3''	J254	H3''	3.8	2.89	104.4	110	0.337311474	38.80538637	€ 34.16
P0101_B''	J254	J258	104.7	7.25	104.4	110	0.847221286	50.62559398	€ 941.25
P0101_B_H4''	J258	H4''	3.6	3.1	104.4	110	0.361843217	37.42031219	€ 32.36
P0101_C''	J258	H5''	134	4.16	104.4	110	0.485378069	36.54391542	€ 1,204.66
P0102_H7''	J264	H7''	252.4	4.15	104.4	110	0.485086024	37.06576828	€ 2,269.08
P0103_H51''	J279	H51''	306.1	4.16	104.4	110	0.485962158	32.91282101	€ 2,751.84
P0104_A''	J267	J269	241.7	8.62	117.8	125	0.790909521	50.49523226	€ 2,450.84
P0104_A_H9''	J269	H9''	3.6	3.31	104.4	110	0.386082916	35.67930563	€ 32.36
P0104_B''	J269	J271	506.1	5.32	104.4	110	0.620886748	48.54859507	€ 4,549.84
P0104_B_H10''	J271	H10''	4.9	2.87	104.4	110	0.335559206	29.6223062	€ 44.05
P0104_C_H61''	J271	H61''	130	2.44	104.4	110	0.285327541	30.10337249	€ 1,168.70
P0106_A''	J273	J274	35.8	10.46	117.8	125	0.959964137	50.30691945	€ 363.01
P0106_A_H54''	J274	H54''	169	3.25	104.4	110	0.379365891	32.52724186	€ 1,519.31
P0106_B''	J274	J276	322.2	7.22	104.4	110	0.842840618	48.15846444	€ 2,896.58
P0106_B_H53''	J276	H53''	5.1	3.19	104.4	110	0.372356822	33.18059147	€ 45.85
P0106_C_H52''	J276	H52''	280	4.03	104.4	110	0.470483796	27.57291437	€ 2,517.20
P02_A''	J252	J285	136.9	204.77	474.6	500	1.157514082	53.29950889	€ 16,102.18
P02_A_H1''	J285	H1''	67.6	3.99	104.4	110	0.466395172	38.3836865	€ 607.72
P02_B''	J285	J287	110.8	200.78	474.6	500	1.134945744	53.09309122	€ 13,032.30
P02_C''	J287	J295	39.9	185.89	474.6	500	1.050749027	53.02857992	€ 4,693.04
P02_C_H15''	J295	H15''	3.7	2.61	104.4	110	0.304310438	39.01458601	€ 33.26
P02_D''	J295	J297	7.2	183.28	474.6	500	1.036023787	53.01723673	€ 846.86
P02_E''	J297	J324	64.8	121.82	379.8	400	1.075251062	52.87485708	€ 4,431.67
P02_F''	J324	J806	24.6	59.33	213.6	225	1.655631459	52.63771539	€ 623.61
P02_G''	J806	J820	175.3	35.42	190	200	1.249256085	51.4785948	€ 3,847.84
P02_G_H20''	J820	H20''	2.5	3.55	104.4	110	0.414995328	42.20391487	€ 22.48
P02_H''	J820	J841	384.4	31.87	190	200	1.123960144	49.38346201	€ 8,437.58
P02_H_H21''	J841	H21''	3	2.81	104.4	110	0.327966048	40.59976474	€ 26.97
P02_I''	J841	J822	7.6	29.06	190	200	1.024940199	49.34845522	€ 166.82
P02_J''	J822	J824	59.7	23.42	190	200	0.826018563	49.16276148	€ 1,310.42
P02_J_H23''	J824	H23''	88.5	2.31	104.4	110	0.270141224	40.53536202	€ 795.62
P0202_A''	J287	J288	208.9	14.9	117.8	125	1.366658621	50.19905606	€ 2,118.25
P0202_A_H16''	J288	H16''	4.8	3.72	104.4	110	0.433978225	38.86932552	€ 43.15
P0202_B''	J288	J290	101.9	11.18	104.4	110	1.3060233	48.69511117	€ 916.08
P0202_B_H17''	J290	H17''	4.2	2.29	104.4	110	0.267512823	38.04150081	€ 37.76

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion /mca)	Coste
P0202_C''	J290	J292	148.9	8.89	104.4	110	1.038510477	47.24641188	€ 1,338.61
P0202_C_H18''	J292	H18''	3.7	5.42	104.4	110	0.632860575	35.81168397	€ 33.26
P0202_D''	J292	H19''	274.7	3.47	104.4	110	0.405649902	34.29261109	€ 2,469.55
P0203_A''	J324	J325	231.7	62.49	299.2	315	0.888786532	52.39746111	€ 11,065.99
P0203_A_H14''	J325	H14''	3.8	2.44	104.4	110	0.284743452	37.93381399	€ 34.16
P0203_B''	J325	J327	274.9	60.05	299.2	315	0.85411831	51.87072828	€ 13,129.22
P0203_B_H44''	J332	H44''	3.3	7.19	104.4	110	0.840212217	37.10697876	€ 29.67
P0203_C''	J327	J332	164	52.02	299.2	315	0.739837629	51.62885966	€ 7,832.64
P0203_C_H43''	J337	H43''	2.8	2.4	104.4	110	0.279778694	34.96573396	€ 25.17
P0203_D''	J332	J337	235	44.83	237.4	250	1.012672433	50.81833909	€ 7,731.50
P0203_D_H68_2''	J1245	H68''	5.2	5.42	104.4	110	0.633444664	32.01157268	€ 46.75
P0203_E''	J337	J339	5.1	42.43	237.4	250	0.958565339	50.80242673	€ 167.79
P0203_F''	J339	J340	5.9	18.43	190	200	0.650022294	50.79053887	€ 129.51
P0203_G''	J340	J795	125.6	8.03	104.4	110	0.937755102	49.77482095	€ 1,129.14
P0203_G_H49''	J795	H49''	30.3	2.61	104.4	110	0.304310438	35.06211406	€ 272.40
P0203_H_H68''	J795	J1245	549.9	5.42	104.4	110	0.633444664	47.58230569	€ 4,943.60
P020301''	J327	J328	154.4	8.04	104.4	110	0.938631235	50.61999475	€ 1,388.06
P020301_H55''	J328	H55''	140.4	2.99	104.4	110	0.348993256	31.06680848	€ 1,262.20
P020301_H56''	J328	H56''	63.3	5.05	104.4	110	0.589637979	30.30806064	€ 569.07
P020302_A''	J339	J342	236.6	24	190	200	0.846475044	50.0330551	€ 5,193.37
P020302_B''	J342	J343	139.8	14.55	152	160	0.801698939	49.49363289	€ 1,832.78
P020302_B_H41''	J343	H41''	15.5	3.56	104.4	110	0.415287373	37.13458098	€ 139.35
P020302_C''	J343	J345	24.4	10.99	132.4	140	0.798418558	49.38314395	€ 298.90
P020302_C_H45''	J345	H45''	87.4	2.91	104.4	110	0.340231919	35.81818675	€ 785.73
P020302_D''	J345	J347	162.3	8.08	117.8	125	0.741362985	48.64211103	€ 1,645.72
P020302_D_H46''	J347	J537	145.2	2.85	104.4	110	0.332930805	48.45833461	€ 1,305.35
P020302_D_H46_2''	J537	H46''	3	2.85	104.4	110	0.332930805	36.19453758	€ 26.97
P020302_E''	J347	J349	199.5	5.23	104.4	110	0.610957232	47.89664475	€ 1,793.51
P020302_E_H47''	J349	H47''	80.5	2.17	104.4	110	0.253494683	35.4437126	€ 723.70
P020302_F_H48''	J349	H48''	359.6	3.06	104.4	110	0.357462549	32.56033807	€ 3,232.80
P02030202_A''	J342	J790	6.2	9.45	104.4	110	1.104220504	49.96562835	€ 55.74
P02030202_A_H42''	J790	H42''	5	3.64	104.4	110	0.424632799	38.11587793	€ 44.95
P02030202_B''	J790	J792	188.7	5.82	104.4	110	0.679587705	49.11194718	€ 1,696.41
P02030202_B_H40''	J792	H40''	3.4	2.31	104.4	110	0.269849179	37.49897931	€ 30.57
P02030202_C''	J792	J794	141.9	3.51	104.4	110	0.409738526	48.85227432	€ 1,275.68
P02030202_D_H39''	J794	H39''	4.5	3.51	104.4	110	0.409738526	38.32403945	€ 40.46
P020303_A''	J340	J799	91.3	10.4	132.4	140	0.755565071	50.41634576	€ 1,118.43
P020303_A_H58''	J799	H58''	2.5	2.33	104.4	110	0.272185536	32.01413005	€ 22.48
P020303_B''	J799	J801	107.8	8.07	132.4	140	0.586330117	50.13658742	€ 1,320.55
P020303_B_H57''	J801	H57''	2.5	3.45	104.4	110	0.402729457	30.14215082	€ 22.48
P020303_B_H59''	J801	H59''	359.8	4.63	104.4	110	0.540282447	27.68794505	€ 3,234.60
P0204_I_H22''	J822	H22''	255.6	5.64	104.4	110	0.658852541	38.87475922	€ 2,297.84
P0205_A''	J806	J807	170.5	23.91	152	160	1.317519668	51.01305869	€ 2,235.26
P0205_B''	J807	J808	11	17.17	132.4	140	1.247109087	50.90108586	€ 134.75
P0205_B_H32''	J808	H32''	4.5	4.1	104.4	110	0.478368999	40.87023297	€ 40.46
P0205_C''	J808	J810	124	13.08	117.8	125	1.199668444	49.54662607	€ 1,257.36
P0205_C_H33''	J810	H33''	6	3.55	104.4	110	0.414703284	39.48540831	€ 53.94

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion /mca)	Coste
P0205_D''	J810	J812	122.6	9.53	104.4	110	1.112689797	48.19468514	€ 1,102.17
P0205_D_H34''	J812	H34''	100.3	3.06	104.4	110	0.357170504	37.37088512	€ 901.70
P0205_E''	J812	J814	56	6.47	104.4	110	0.755519292	37.43813136	€ 503.44
P0205_E_H36''	J814	H36''	168.8	3.91	104.4	110	0.456173612	37.97411867	€ 1,517.51
P0205_F_H35''	J814	H35''	167.1	2.56	104.4	110	0.29934568	47.71293047	€ 1,502.23
P020502_A''	J807	J817	354	6.74	104.4	110	0.787060106	48.92693594	€ 3,182.46
P020502_A_H38''	J817	H38''	4.8	3.35	104.4	110	0.391339719	39.77884145	€ 43.15
P020502_B_H37''	J817	H37''	150.2	3.39	104.4	110	0.395720387	39.78858164	€ 1,350.30
P0206_A''	J824	J825	220.8	21.11	152	160	1.163214322	47.48693039	€ 2,894.69
P0206_A_H24''	J825	H24''	5.5	2.15	104.4	110	0.251158327	38.94270028	€ 49.45
P0206_B''	J825	J827	75.5	18.96	152	160	1.044729859	47.01578009	€ 989.81
P0206_B_H25''	J827	H25''	39.3	2.97	104.4	110	0.347240989	37.64218516	€ 353.31
P0206_C''	J827	J829	97.4	15.99	152	160	0.880918201	46.56995477	€ 1,276.91
P0206_C_H26''	J829	H26''	127.5	2.93	104.4	110	0.342568276	36.15020651	€ 1,146.23
P0206_D''	J829	J831	120.6	13.05	132.4	140	0.948042595	45.82452668	€ 1,477.35
P0206_D_H27''	J831	H27''	4.8	1.9	104.4	110	0.221661826	35.35156362	€ 43.15
P0206_E''	J831	J833	72.7	11.16	117.8	125	1.023502982	45.22959033	€ 737.18
P0206_E_H29''	J833	H29''	206.8	2.83	104.4	110	0.330302404	35.94149916	€ 1,859.13
P0206_F''	J833	J835	76.4	8.33	104.4	110	0.97280045	44.56931293	€ 686.84
P0206_F_H28''	J835	H28''	4.1	2.56	104.4	110	0.299053636	33.84502158	€ 36.86
P0206_G''	J835	J837	430.9	5.77	104.4	110	0.673746814	42.64993398	€ 3,873.79
P0206_G_H31''	J837	H31''	4.7	2.77	104.4	110	0.323585379	33.45427795	€ 42.25
P0206_H_H30''	J837	H30''	414.4	3	104.4	110	0.350161435	33.73634121	€ 3,725.46
P04_A''	J297	J298	234	61.46	379.8	400	0.542513337	52.86970198	€ 16,003.26
P04_A_H13''	J298	H13''	23.3	2.92	104.4	110	0.340816009	37.73896214	€ 209.47
P04_B''	J298	J300	109.7	58.55	379.8	400	0.516761331	52.806379	€ 7,502.38
P04_B_H12''	J300	H12''	4	2.87	104.4	110	0.335267162	36.09125314	€ 35.96
P04_C''	J300	J302	379.1	55.68	379.8	400	0.491428595	52.60661011	€ 25,926.65
P04_C_H11''	J302	H11''	6.1	6.53	104.4	110	0.762820407	33.50263389	€ 54.84
P04_D''	J302	J322	168.3	48.73	340.8	355	0.53423168	52.48908848	€ 9,870.80
P04_D_2''	J322	J304	5.6	41.47	340.8	355	0.454616278	52.48616887	€ 328.44
P04_D_H60''	J322	H60''	3.4	7.26	104.4	110	0.848389464	32.62614674	€ 30.57
P04_E''	J304	J305	672.4	41.47	340.8	355	0.454616278	52.13560662	€ 39,436.26
P04_E_H62''	J305	H62''	4.4	5.77	104.4	110	0.674330903	29.83597693	€ 39.56
P04_F''	J305	J307	434.6	35.7	340.8	355	0.391335051	51.96276541	€ 25,489.29
P04_F_H63''	J307	H63''	6.2	5.83	104.4	110	0.680463839	28.56465148	€ 55.74
P04_G''	J307	J309	216.6	29.87	299.2	315	0.42487239	51.84583617	€ 10,344.82
P04_H''	J309	J310	163	20.64	299.2	315	0.293595391	51.80057265	€ 7,784.88
P04_H_H64''	J310	H64''	251.8	7.88	132.4	140	0.571985094	26.82556409	€ 3,084.55
P04_I''	J310	J312	156.9	12.77	237.4	250	0.288439382	51.74461227	€ 5,162.01
P04_I_H71''	J312	H71''	104.1	2.94	104.4	110	0.343736454	25.82517853	€ 935.86
P04_J''	J312	J314	157.5	9.83	213.6	225	0.274182783	51.68621768	€ 3,992.63
P04_J_H65''	J314	H65''	468.3	6.18	132.4	140	0.448690529	25.17401314	€ 5,736.68
P04_J_H66''	J314	H66''	71.8	3.65	104.4	110	0.426093022	29.08534301	€ 645.48
P0402_A''	J309	J317	76.9	9.23	132.4	140	0.670402846	51.5918332	€ 942.03
P0402_A_H70''	J317	H70''	99.4	3.01	104.4	110	0.351913702	27.12302448	€ 893.61
P0402_B''	J317	J319	392.5	6.22	104.4	110	0.726314836	49.59048659	€ 3,528.58
P0402_B_H67''	J319	H67''	228.1	3.81	104.4	110	0.444783874	26.36736346	€ 2,050.62
P0402_B_H69''	J319	H69''	4.6	2.41	104.4	110	0.281530962	28.27615927	€ 41.35

1.3.2.3.1 Cálculo de la garantía suministro del diseño con caudal para 4 turnos.

A continuación, se observa el cálculo de la garantía suministro para el diseño de la red de 4 turnos:

								GS global				Rug	0.01		Hcab	53.59		
								94.719%				Visc	1.10E-06					25.002
																		0.002
Tuberia	**Nudo Ini**	**Nudo Fin**	**Diam (mm)**	**DN**	**Long (m)**	**z(fin)**	**Qinst**	**∑pi·Qi**	**U**	**∑pi·(1-pi)·Qi^2**	**Q diseño**	**ks**	**V (m/s)**	**Re**	**f**	**hf**	**∑hf**	**H(fin)**	**P(fin)**
P00''	UGD_44	J252	474.6	500	9	0	1019.81	169.928658	1.6182	280.32	197.02	0.19	1.11	480511.60	0.0135	0.016	0.016	53.574	53.574
P01_A''	J252	J253	237.4	250	15.4	0	200.72	33.4455244	1.6182	45.46	44.36	0.22	1.00	216268.20	0.0157	0.052	0.068	53.522	53.522
P01_B''	J253	J262	213.6	225	32.6	0	160.16	26.6871024	1.6182	36.74	36.50	0.23	1.02	197766.60	0.0160	0.129	0.197	53.393	53.393
P01_C''	J262	J264	213.6	225	141.7	0	149.59	24.9258469	1.6182	35.32	34.54	0.23	0.96	187190.32	0.0161	0.507	0.704	52.886	52.886
P01_C_H2''	J262	H2''	104.4	110	2.3	13.92	10.57	1.76125545	1.6182	1.41	3.68	0.35	0.43	40853.15	0.0221	0.005	0.202	53.388	39.468
P01_C_H6''	J264	H6''	104.4	110	9.9	13.89	12.39	2.06451797	1.6182	2.52	4.64	0.37	0.54	51394.91	0.0210	0.030	0.734	52.856	38.966
P01_D''	J264	J283	190	200	201	0	120.59	20.0936418	1.6182	30.26	28.99	0.24	1.02	176636.86	0.0164	0.922	1.626	51.964	51.964
P01_D_H8''	J283	H8''	104.4	110	5.1	14.29	15.05	2.50774782	1.6182	3.08	5.35	0.36	0.62	59271.23	0.0204	0.020	1.646	51.944	37.654
P01_E''	J283	J267	190	200	8.9	0	105.54	17.585894	1.6182	27.18	26.02	0.25	0.92	158528.94	0.0167	0.034	1.660	51.930	51.930
P01_F''	J267	J273	152	160	210.6	0	71.06	11.8405688	1.6182	20.62	19.19	0.27	1.06	146127.63	0.0170	1.344	3.004	50.586	50.586
P01_G''	J273	J279	104.4	110	87.4	0	29.21	4.86719693	1.6182	8.28	9.52	0.33	1.11	105589.66	0.0182	0.964	3.967	49.623	49.623
P01_G_H50''	J279	H50''	104.4	110	3.4	16.35	12.57	2.09451097	1.6182	3.15	4.97	0.40	0.58	55080.74	0.0207	0.012	3.979	49.611	33.261
P0101_A''	J253	J254	104.4	110	175.5	0	40.56	6.75842204	1.6182	8.72	11.54	0.28	1.35	127924.58	0.0176	2.743	2.812	50.778	50.778
P0101_A_H3''	J254	H3''	104.4	110	3.8	12.52	11.55	1.92455065	1.6182	1.85	4.12	0.36	0.48	45723.55	0.0216	0.009	2.821	50.769	38.249
P0101_B''	J254	J258	104.4	110	104.7	0	29.01	4.83387138	1.6182	6.88	9.08	0.31	1.06	100642.75	0.0184	1.058	3.870	49.720	49.720
P0101_B_H4''	J258	H4''	104.4	110	3.6	13.2	12.39	2.06451797	1.6182	2.93	4.83	0.39	0.56	53573.64	0.0208	0.012	3.881	49.709	36.509
P0101_C''	J258	H5''	104.4	110	134	13.75	16.62	2.76935341	1.6182	3.95	5.99	0.36	0.70	66370.74	0.0199	0.638	4.508	49.082	35.332
P0102_H7''	J264	H7''	104.4	110	252.4	15.07	16.61	2.76768713	1.6182	3.66	5.86	0.35	0.68	64989.64	0.0200	1.158	1.862	51.728	36.658
P0103_H51''	J279	H51''	104.4	110	306.1	16.3	16.64	2.77268596	1.6182	5.29	6.49	0.39	0.76	72002.09	0.0196	1.688	5.655	47.935	31.635
P0104_A''	J267	J269	117.8	125	241.7	0	34.48	5.74532524	1.6182	5.45	9.52	0.28	0.87	93555.42	0.0186	1.484	3.144	50.446	50.446
P0104_A_H9''	J269	H9''	104.4	110	3.6	14.81	13.22	2.20281902	1.6182	2.18	4.59	0.35	0.54	50913.01	0.0211	0.011	3.155	50.435	35.625
P0104_B''	J269	J271	104.4	110	506.1	0	21.26	3.54250622	1.6182	3.26	6.47	0.30	0.76	71693.90	0.0196	2.770	5.914	47.676	47.676
P0104_B_H10''	J271	H10''	104.4	110	4.9	18.92	11.49	1.91455299	1.6182	1.83	4.10	0.36	0.48	45504.30	0.0216	0.012	5.926	47.664	28.744
P0104_C_H61''	J271	H61''	104.4	110	130	18.32	9.77	1.62795324	1.6182	1.43	3.57	0.36	0.42	39532.28	0.0222	0.245	6.159	47.431	29.111
P0106_A''	J273	J274	117.8	125	35.8	0	41.85	6.97337185	1.6182	12.18	12.62	0.30	1.16	124013.29	0.0177	0.367	3.370	50.220	50.220
P0106_A_H54''	J274	H54''	104.4	110	169	17.51	12.99	2.16449463	1.6182	3.23	5.07	0.39	0.59	56262.00	0.0206	0.598	3.968	49.622	32.112
P0106_B''	J274	J276	104.4	110	322.2	0	28.86	4.80887722	1.6182	8.95	9.65	0.33	1.13	106980.56	0.0182	3.638	7.008	46.582	46.582
P0106_B_H53''	J276	H53''	104.4	110	5.1	14.97	12.75	2.12450397	1.6182	2.67	4.77	0.37	0.56	52896.03	0.0209	0.016	7.024	46.566	31.596
P0106_C_H52''	J276	H52''	104.4	110	280	19.93	16.11	2.68437325	1.6182	6.27	6.74	0.42	0.79	74694.25	0.0195	1.650	8.658	44.932	25.002
P02_A''	J252	J285	474.6	500	136.9	0	819.09	136.483134	1.6182	234.86	161.28	0.20	0.91	393347.06	0.0140	0.171	0.187	53.403	53.403
P02_A_H1''	J285	H1''	104.4	110	67.6	14.76	15.97	2.66104536	1.6182	4.93	6.25	0.39	0.73	69336.45	0.0198	0.348	0.535	53.055	38.295
P02_B''	J285	J287	474.6	500	110.8	0	803.12	133.822088	1.6182	229.93	158.36	0.20	0.90	386219.01	0.0140	0.134	0.320	53.270	53.270
P02_C''	J287	J295	474.6	500	39.9	0	743.54	123.894406	1.6182	213.29	147.53	0.20	0.83	359801.04	0.0142	0.042	0.362	53.228	53.228
P02_C_H15''	J295	H15''	104.4	110	3.7	14.01	10.42	1.73626128	1.6182	1.48	3.71	0.36	0.43	41080.01	0.0221	0.007	0.370	53.220	39.210
P02_D''	J295	J297	474.6	500	7.2	0	733.12	122.158145	1.6182	211.81	145.71	0.20	0.82	355366.13	0.0142	0.007	0.370	53.220	53.220
P02_E''	J297	J324	379.8	400	64.8	0	487.27	81.1927097	1.6182	120.57	98.96	0.20	0.87	301598.29	0.0147	0.097	0.467	53.123	53.123
P02_F''	J324	J806	213.6	225	24.6	0	237.31	39.5424343	1.6182	70.41	53.12	0.22	1.48	287858.22	0.0150	0.194	0.661	52.929	52.929
P02_G''	J806	J820	190	200	175.3	0	141.68	23.6078214	1.6182	29.57	32.41	0.23	1.14	197425.42	0.0160	0.985	1.646	51.944	51.944
P02_G_H20''	J820	H20''	104.4	110	2.5	9.27	14.21	2.3677805	1.6182	3.30	5.31	0.37	0.62	58827.63	0.0204	0.010	1.656	51.934	42.664
P02_H''	J820	J841	190	200	384.4	0	127.47	21.2400408	1.6182	26.27	29.53	0.23	1.04	179924.01	0.0163	1.824	3.470	50.120	50.120
P02_H_H21''	J841	H21''	104.4	110	3	8.78	11.23	1.87122977	1.6182	1.54	3.88	0.35	0.45	43003.02	0.0218	0.007	3.476	50.114	41.334
P02_I''	J841	J822	190	200	7.6	0	116.24	19.3688111	1.6182	17.80	26.20	0.23	0.92	159589.26	0.0167	0.029	3.499	50.091	50.091
P02_J''	J822	J824	190	200	59.7	0	93.68	15.6096888	1.6182	18.04	22.48	0.24	0.79	136965.17	0.0171	0.172	3.671	49.919	49.919
P02_J_H23''	J824	H23''	104.4	110	88.5	8.55	9.25	1.5413068	1.6182	1.07	3.21	0.35	0.38	35621.54	0.0228	0.139	3.810	49.780	41.230
P0202_A''	J287	J288	117.8	125	208.9	0	59.58	9.92768207	1.6182	16.64	16.53	0.28	1.52	162401.19	0.0168	3.500	3.821	49.769	49.769
P0202_A_H16''	J288	H16''	104.4	110	4.8	11.32	14.86	2.47608855	1.6182	3.05	5.30	0.36	0.62	58801.72	0.0204	0.018	0.018	53.572	42.252
P0202_B''	J288	J290	104.4	110	101.9	0	44.72	7.45159353	1.6182	13.58	13.42	0.30	1.57	148738.09	0.0172	2.098	2.098	51.492	51.492
P0202_B_H17''	J290	H17''	104.4	110	4.2	10.65	9.16	1.5263103	1.6182	1.24	3.33	0.36	0.39	36917.21	0.0226	0.007	0.007	53.583	42.933

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Qinst	∑pi·Qi	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P0202_C''	J290	J292	104.4	110	148.9	0	35.56	5.92528322	1.6182	12.34	11.61	0.33	1.36	128720.13	0.0176	2.354	2.354	51.236	51.236
P0202_C_H18''	J292	H18''	104.4	110	3.7	11.42	21.67	3.61082361	1.6182	8.66	8.37	0.39	0.98	92828.51	0.0187	0.032	0.032	53.558	42.138
P0202_D''	J292	H19''	104.4	110	274.7	12.46	13.89	2.31445962	1.6182	3.68	5.42	0.39	0.63	60083.97	0.0204	1.094	1.094	52.496	40.036
P0203_A''	J324	J325	299.2	250	231.7	0	249.96	41.6502754	1.6182	70.41	55.23	0.22	0.79	213657.49	0.0156	0.381	0.848	52.742	52.742
P0203_A_H14''	J325	H14''	104.4	110	3.8	14.46	9.75	1.62462068	1.6182	1.42	3.55	0.36	0.41	39356.91	0.0223	0.007	0.007	53.583	39.123
P0203_B''	J325	J327	299.2	250	274.9	0	240.21	40.0256548	1.6182	68.99	53.47	0.22	0.76	206841.78	0.0157	0.426	0.426	53.164	53.164
P0203_B_H44''	J332	H44''	104.4	110	3.3	14.5	28.77	4.79388072	1.6182	22.90	12.54	0.44	1.46	139004.95	0.0174	0.060	0.060	53.530	39.030
P0203_C''	J327	J332	299.2	250	164	0	208.07	34.6702385	1.6182	59.95	47.20	0.23	0.67	182597.04	0.0161	0.203	0.203	53.387	53.387
P0203_C_H43''	J337	H43''	104.4	110	2.8	15.85	9.58	1.59629396	1.6182	1.58	3.63	0.38	0.42	40263.69	0.0222	0.005	0.005	53.585	37.735
P0203_D''	J332	J337	237.4	250	235	0	179.3	29.8763578	1.6182	37.05	39.73	0.22	0.90	193692.83	0.0160	0.650	0.650	52.940	52.940
P0203_D_H68_2''	J1245	H68''	104.4	110	5.2	15.55	21.69	3.61415616	1.6182	7.12	7.93	0.37	0.93	87959.75	0.0189	0.041	0.041	53.549	37.999
P0203_E''	J337	J339	237.4	250	5.1	0	169.72	28.2800638	1.6182	35.47	37.92	0.22	0.86	184873.34	0.0161	0.013	0.013	53.577	53.577
P0203_F''	J339	J340	190	200	5.9	0	73.72	12.2837986	1.6182	17.40	19.03	0.26	0.67	115952.49	0.0177	0.013	0.013	53.577	53.577
P0203_G''	J340	J795	104.4	110	125.6	0	32.11	5.35041744	1.6182	8.93	10.19	0.32	1.19	112944.78	0.0180	1.565	1.565	52.025	52.025
P0203_G_H49''	J795	H49''	104.4	110	30.3	14.68	10.42	1.73626128	1.6182	1.81	3.91	0.38	0.46	43378.42	0.0218	0.067	0.067	53.523	38.843
P0203_H_H68''	J795	J1245	104.4	110	549.9	0	21.69	3.61415616	1.6182	7.12	7.93	0.37	0.93	87959.75	0.0189	4.353	4.353	49.237	49.237
P020301''	J327	J328	104.4	110	154.4	0	32.14	5.35541628	1.6182	9.04	10.22	0.32	1.19	113322.00	0.0180	1.936	1.936	51.654	51.654
P020301_H55''	J328	H55''	104.4	110	140.4	19.36	11.95	1.99120176	1.6182	3.11	4.84	0.41	0.57	53707.34	0.0208	0.457	0.457	53.133	33.773
P020301_H56''	J328	H56''	104.4	110	63.3	20.09	20.19	3.36421452	1.6182	5.93	7.31	0.36	0.85	80999.16	0.0192	0.432	0.432	53.158	33.068
P020302_A''	J339	J342	190	200	236.6	0	96	15.9962652	1.6182	18.07	22.88	0.24	0.81	139356.90	0.0171	0.705	0.705	52.885	52.885
P020302_B''	J342	J343	152	160	139.8	0	58.19	9.69606948	1.6182	17.75	16.51	0.28	0.91	125757.82	0.0175	0.679	0.679	52.911	52.911
P020302_B_H41''	J343	H41''	104.4	110	15.5	12.33	14.22	2.36944678	1.6182	3.18	5.25	0.37	0.61	58261.24	0.0205	0.058	0.058	53.532	41.202
P020302_C''	J343	J345	132.4	140	24.4	0	43.97	7.3266227	1.6182	14.57	13.50	0.31	0.98	118059.21	0.0178	0.160	0.160	53.430	53.430
P020302_C_H45''	J345	H45''	104.4	110	87.4	13.45	11.65	1.94121343	1.6182	1.69	4.04	0.35	0.47	44827.46	0.0216	0.206	0.206	53.384	39.934
P020302_D''	J345	J347	117.8	125	162.3	0	32.32	5.38540927	1.6182	6.71	9.58	0.30	0.88	94091.73	0.0186	1.007	1.007	52.583	52.583
P020302_D_H46''	J347	J537	104.4	110	145.2	0	11.4	1.89955649	1.6182	2.48	4.45	0.39	0.52	49292.32	0.0212	0.406	0.406	53.184	53.184
P020302_D_H46_2''	J537	H46''	104.4	110	3	12.26	11.4	1.89955649	1.6182	2.48	4.45	0.39	0.52	49292.32	0.0212	0.008	0.008	53.582	41.322
P020302_E''	J347	J349	104.4	110	199.5	0	20.92	3.48585279	1.6182	4.23	6.81	0.33	0.80	75546.65	0.0194	1.200	1.200	52.390	52.390
P020302_E_H47''	J349	H47''	104.4	110	80.5	12.39	8.68	1.44632898	1.6182	1.33	3.31	0.38	0.39	36752.13	0.0226	0.133	0.133	53.457	41.067
P020302_F_H48''	J349	H48''	104.4	110	359.6	14.82	12.24	2.03952381	1.6182	2.90	4.79	0.39	0.56	53146.61	0.0209	1.149	1.149	52.441	37.621
P02030202_A''	J342	J790	104.4	110	6.2	0	37.81	6.30019569	1.6182	6.50	10.43	0.28	1.22	115584.40	0.0179	0.081	0.081	53.509	53.509
P02030202_A_H42''	J790	H42''	104.4	110	5	11.84	14.54	2.42276766	1.6182	3.09	5.27	0.36	0.62	58400.64	0.0205	0.019	0.019	53.571	41.731
P02030202_B''	J790	J792	104.4	110	188.7	0	23.27	3.87742803	1.6182	3.41	6.86	0.29	0.80	76107.98	0.0194	1.150	1.150	52.440	52.440
P02030202_B_H40''	J792	H40''	104.4	110	3.4	11.61	9.24	1.53964052	1.6182	1.21	3.32	0.36	0.39	36805.29	0.0226	0.006	0.006	53.584	41.974
P02030202_C''	J792	J794	104.4	110	141.9	0	14.03	2.3377875	1.6182	2.20	4.74	0.34	0.55	52515.60	0.0209	0.444	0.444	53.146	53.146
P02030202_D_H39''	J794	H39''	104.4	110	4.5	10.52	14.03	2.3377875	1.6182	2.20	4.74	0.34	0.55	52515.60	0.0209	0.014	0.014	53.576	43.056
P020303_A''	J340	J799	132.4	140	91.3	0	41.61	6.93338119	1.6182	8.46	11.64	0.28	0.85	101772.01	0.0183	0.459	0.459	53.131	53.131
P020303_A_H58''	J799	H58''	104.4	110	2.5	18.4	9.32	1.55297074	1.6182	1.21	3.33	0.36	0.39	36930.42	0.0226	0.004	0.004	53.586	35.186
P020303_B''	J799	J801	132.4	140	107.8	0	32.29	5.38041044	1.6182	7.26	9.74	0.30	0.71	85147.37	0.0189	0.392	0.392	53.198	53.198
P020303_B_H57''	J801	H57''	104.4	110	2.5	19.99	13.79	2.29779684	1.6182	2.09	4.64	0.34	0.54	51405.80	0.0210	0.008	0.008	53.582	33.592
P020303_B_H59''	J801	H59''	104.4	110	359.8	21.37	18.5	3.0826136	1.6182	5.17	6.76	0.37	0.79	74963.26	0.0195	2.134	2.134	51.456	30.086
P0204_I_H22''	J822	H22''	104.4	110	255.6	9.38	22.56	3.75912232	1.6182	8.47	8.47	0.38	0.99	93891.37	0.0186	2.277	5.776	47.814	38.434
P0205_A''	J806	J807	152	160	170.5	0	95.63	15.9346129	1.6182	20.36	23.24	0.24	1.28	176947.67	0.0165	1.542	2.203	51.387	51.387
P0205_B''	J807	J808	132.4	140	11	0	68.68	11.4439947	1.6182	14.20	17.54	0.26	1.27	153352.89	0.0169	0.116	0.116	53.474	53.474
P0205_B_H32''	J808	H32''	104.4	110	4.5	10.02	16.38	2.72936275	1.6182	4.09	6.00	0.37	0.70	66529.69	0.0199	0.022	0.022	53.568	43.548
P0205_C''	J808	J810	117.8	125	124	0	52.3	8.71463196	1.6182	10.11	13.86	0.27	1.27	136188.19	0.0174	1.506	1.506	52.084	52.084
P0205_C_H33''	J810	H33''	104.4	110	6	10.05	14.2	2.36611422	1.6182	2.45	4.90	0.35	0.57	54321.24	0.0208	0.020	0.020	53.570	43.520

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Qinst	∑pi·Qi	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P0205_D''	J810	J812	104.4	110	122.6	0	38.1	6.34851774	1.6182	7.66	10.83	0.28	1.26	120041.29	0.0178	1.707	1.707	51.883	51.883
P0205_D_H34''	J812	H34''	104.4	110	100.3	10.68	12.23	2.03785753	1.6182	2.42	4.55	0.37	0.53	50491.55	0.0211	0.292	0.292	53.298	42.618
P0205_E''	J812	J814	104.4	110	56	0	25.87	4.31066021	1.6182	5.24	8.02	0.31	0.94	88869.61	0.0188	0.452	0.452	53.138	53.138
P0205_E_H36''	J814	H36''	104.4	110	168.8	9.54	15.62	2.60272565	1.6182	3.20	5.50	0.35	0.64	60949.89	0.0203	0.690	0.690	52.900	43.360
P0205_F_H35''	J814	H35''	104.4	110	167.1	10.45	10.25	1.70793456	1.6182	2.04	4.02	0.39	0.47	44574.67	0.0217	0.390	0.390	53.200	42.750
P020502_A''	J807	J817	104.4	110	354	0	26.95	4.49061819	1.6182	6.16	8.51	0.32	0.99	94330.10	0.0186	3.181	3.181	50.409	50.409
P020502_A_H38''	J817	H38''	104.4	110	4.8	9.14	13.4	2.23281201	1.6182	3.63	5.31	0.40	0.62	58922.26	0.0204	0.018	0.018	53.572	44.432
P020502_B_H37''	J817	H37''	104.4	110	150.2	8.88	13.55	2.25780618	1.6182	2.54	4.84	0.36	0.56	53609.34	0.0208	0.488	0.488	53.102	44.222
P0206_A''	J824	J825	152	160	220.8	0	84.43	14.068382	1.6182	15.43	20.43	0.24	1.13	155541.48	0.0168	1.578	5.249	48.341	48.341
P0206_A_H24''	J825	H24''	104.4	110	5.5	8.54	8.6	1.43299876	1.6182	1.32	3.29	0.38	0.38	36502.88	0.0226	0.009	0.009	53.581	45.041
P0206_B''	J825	J827	152	160	75.5	0	75.83	12.6353832	1.6182	14.11	18.71	0.25	1.03	142512.09	0.0171	0.460	0.460	53.130	53.130
P0206_B_H25''	J827	H25''	104.4	110	39.3	9.32	11.89	1.98120409	1.6182	2.65	4.61	0.39	0.54	51152.96	0.0210	0.117	0.117	53.473	44.153
P0206_C''	J827	J829	152	160	97.4	0	63.94	10.6541791	1.6182	11.47	16.13	0.25	0.89	122859.26	0.0176	0.453	0.453	53.137	53.137
P0206_C_H26''	J829	H26''	104.4	110	127.5	10.25	11.73	1.95454365	1.6182	2.19	4.35	0.37	0.51	48212.88	0.0213	0.342	0.342	53.248	42.998
P0206_D''	J829	J831	132.4	140	120.6	0	52.21	8.69963547	1.6182	9.28	13.63	0.26	0.99	119145.58	0.0177	0.806	0.806	52.784	52.784
P0206_D_H27''	J831	H27''	104.4	110	4.8	10.47	7.59	1.26470472	1.6182	1.01	2.89	0.38	0.34	32082.53	0.0233	0.006	0.006	53.584	43.114
P0206_E''	J831	J833	117.8	125	72.7	0	44.62	7.43493075	1.6182	8.26	12.09	0.27	1.11	118764.01	0.0178	0.688	0.688	52.902	52.902
P0206_E_H29''	J833	H29''	104.4	110	206.8	9.03	11.31	1.88455999	1.6182	1.85	4.08	0.36	0.48	45284.94	0.0216	0.496	0.496	53.094	44.064
P0206_F''	J833	J835	104.4	110	76.4	0	33.31	5.55037076	1.6182	6.42	9.65	0.29	1.13	106981.66	0.0182	0.863	0.863	52.727	52.727
P0206_F_H28''	J835	H28''	104.4	110	4.1	10.72	10.24	1.70626829	1.6182	1.81	3.88	0.38	0.45	43024.01	0.0218	0.009	0.009	53.581	42.861
P0206_G''	J835	J837	104.4	110	430.9	0	23.07	3.84410247	1.6182	4.61	7.32	0.32	0.85	81143.35	0.0192	2.948	2.948	50.642	50.642
P0206_G_H31''	J837	H31''	104.4	110	4.7	9.19	11.08	1.84623561	1.6182	2.63	4.47	0.40	0.52	49544.91	0.0212	0.013	0.013	53.577	44.387
P0206_H_H30''	J837	H30''	104.4	110	414.4	8.34	11.99	1.99786687	1.6182	1.98	4.28	0.36	0.50	47422.47	0.0214	1.080	1.080	52.510	44.170
P04_A''	J297	J298	379.8	400	234	0	245.85	40.9654353	1.6182	91.24	56.42	0.23	0.50	171954.04	0.0162	0.126	0.496	53.094	53.094
P04_A_H13''	J298	H13''	104.4	110	23.3	15.1	11.67	1.94454599	1.6182	2.57	4.54	0.39	0.53	50344.60	0.0211	0.068	0.068	53.522	38.422
P04_B''	J298	J300	379.8	400	109.7	0	234.18	39.0208894	1.6182	88.66	54.26	0.23	0.48	165358.48	0.0163	0.055	0.055	53.535	53.535
P04_B_H12''	J300	H12''	104.4	110	4	16.71	11.48	1.91288671	1.6182	2.15	4.29	0.37	0.50	47509.66	0.0214	0.010	0.010	53.580	36.870
P04_C''	J300	J302	379.8	400	379.1	0	222.7	37.1080026	1.6182	86.51	52.16	0.23	0.46	158962.46	0.0165	0.178	0.178	53.412	53.412
P04_C_H11''	J302	H11''	104.4	110	6.1	19.07	26.12	4.35231715	1.6182	13.28	10.25	0.39	1.20	113623.61	0.0180	0.077	0.077	53.513	34.443
P04_D''	J302	J322	340.8	355	168.3	0	194.93	32.4807497	1.6182	73.24	46.33	0.24	0.51	157352.22	0.0165	0.107	0.107	53.483	53.483
P04_D_2''	J322	J304	340.8	355	5.6	0	165.88	27.6402132	1.6182	62.75	40.46	0.24	0.44	137412.38	0.0169	0.003	0.003	53.587	53.587
P04_D_H60''	J322	H60''	104.4	110	3.4	19.84	29.05	4.84053649	1.6182	10.49	10.08	0.35	1.18	111783.08	0.0181	0.042	0.042	53.548	33.708
P04_E''	J304	J305	340.8	355	672.4	0	165.88	27.6402132	1.6182	62.70	40.45	0.24	0.44	137396.17	0.0169	0.335	0.335	53.255	53.255
P04_E_H62''	J305	H62''	104.4	110	4.4	22.28	23.09	3.84743503	1.6182	8.97	8.69	0.38	1.02	96394.12	0.0186	0.041	0.041	53.549	31.269
P04_F''	J305	J307	340.8	355	434.6	0	142.79	23.7927782	1.6182	53.73	35.65	0.25	0.39	121095.18	0.0174	0.172	0.172	53.418	53.418
P04_F_H63''	J307	H63''	104.4	110	6.2	23.37	23.3	3.88242686	1.6182	9.52	8.88	0.38	1.04	98407.59	0.0185	0.060	0.060	53.530	30.160
P04_G''	J307	J309	299.2	250	216.6	0	119.49	19.9103513	1.6182	44.21	30.67	0.26	0.44	118647.88	0.0175	0.123	0.123	53.467	53.467
P04_H''	J309	J310	299.2	250	163	0	82.57	13.7584543	1.6182	36.96	23.60	0.29	0.34	91286.45	0.0184	0.058	0.058	53.532	53.532
P04_H_H64''	J310	H64''	132.4	140	251.8	24.35	31.5	5.24877451	1.6182	17.66	12.05	0.38	0.88	105341.07	0.0181	1.346	1.346	52.244	27.894
P04_I''	J310	J312	237.4	250	156.9	0	51.07	8.50967982	1.6182	19.30	15.62	0.31	0.35	76152.90	0.0191	0.080	0.080	53.510	53.510
P04_I_H71''	J312	H71''	104.4	110	104.1	25.78	11.77	1.96120876	1.6182	1.81	4.14	0.35	0.48	45854.72	0.0215	0.256	0.256	53.334	27.554
P04_J''	J312	J314	213.6	225	157.5	0	39.3	6.54847106	1.6182	17.49	13.32	0.34	0.37	72163.73	0.0194	0.101	0.101	53.489	53.489
P04_J_H65''	J314	H65''	132.4	140	468.3	25.76	24.71	4.117372	1.6182	14.32	10.24	0.41	0.74	89524.69	0.0187	1.866	1.866	51.724	25.964
P04_J_H66''	J314	H66''	104.4	110	71.8	22.46	14.59	2.43109905	1.6182	3.18	5.32	0.36	0.62	58935.77	0.0204	0.276	0.276	53.314	30.854
P0402_A''	J309	J317	132.4	140	76.9	0	36.92	6.15189698	1.6182	7.24	10.51	0.28	0.76	91854.38	0.0186	0.321	0.321	53.269	53.269
P0402_A_H70''	J317	H70''	104.4	110	99.4	24.33	12.05	2.00786453	1.6182	1.95	4.27	0.35	0.50	47337.97	0.0214	0.258	0.258	53.332	29.002
P0402_B''	J317	J319	104.4	110	392.5	0	24.87	4.14403245	1.6182	5.29	7.87	0.32	0.92	87205.61	0.0189	3.059	3.059	50.531	50.531
P0402_B_H67''	J319	H67''	104.4	110	228.1	22.74	15.23	2.53774082	1.6182	3.84	5.71	0.37	0.67	63307.74	0.0201	0.998	0.998	52.592	29.852
P0402_B_H69''	J319	H69''	104.4	110	4.6	21.31	9.64	1.60629163	1.6182	1.45	3.55	0.37	0.41	39381.72	0.0223	0.009	0.009	53.581	32.271

1.3.2.4 Resultado del diseño por pendiente hidráulica con cabecera conocida Qdiseño 6 turnos.

En este subcapítulo se pueden observar los resultados obtenidos del diseño realizado por el método de la pendiente hidráulica con cabecera conocida, se realiza de la misma manera en que se muestra en el capítulo 1.3.1. En la tabla adjunta se identifican las columnas por cada tubería, en el cual se observa el diámetro seleccionado, la velocidad y la presión en el nudo final, en función del caudal de diseño para 6 turnos. La última columna es el coste del tramo de tubería, siendo el producto del precio unitario del diámetro seleccionado y la longitud de la tubería.

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P00''	UGD_44	J252	9	169.97	474.6	500	0.96	53.58	€ 1,058.58
P01_A''	J252	J253	15.4	33.45	190	200	1.18	53.49	€ 338.03
P01_B''	J253	J262	32.6	26.69	190	200	0.94	53.36	€ 715.57
P01_C''	J262	J264	141.7	24.93	190	200	0.88	52.86	€ 3,110.32
P01_C_H2''	J262	H2''	2.3	1.76	104.4	110	0.21	39.44	€ 20.68
P01_C_H6''	J264	H6''	9.9	2.07	104.4	110	0.24	38.97	€ 89.00
P01_D''	J264	J283	201	20.1	152	160	1.11	51.47	€ 2,635.11
P01_D_H8''	J283	H8''	5.1	2.51	104.4	110	0.29	37.17	€ 45.85
P01_E''	J283	J267	8.9	17.59	152	160	0.97	51.42	€ 116.68
P01_F''	J267	J273	210.6	11.84	132.4	140	0.86	50.33	€ 2,579.85
P01_G''	J273	J279	87.4	4.87	104.4	110	0.57	50.04	€ 785.73
P01_G_H50''	J279	H50''	3.4	2.1	104.4	110	0.24	33.69	€ 30.57
P0101_A''	J253	J254	175.5	6.76	104.4	110	0.79	52.45	€ 1,577.75
P0101_A_H3''	J254	H3''	3.8	1.93	104.4	110	0.22	39.92	€ 34.16
P0101_B''	J254	J258	104.7	4.84	104.4	110	0.56	52.11	€ 941.25
P0101_B_H4''	J258	H4''	3.6	2.07	104.4	110	0.24	38.90	€ 32.36
P0101_C''	J258	H5''	134	2.77	104.4	110	0.32	38.19	€ 1,204.66
P0102_H7''	J264	H7''	252.4	2.77	104.4	110	0.32	37.49	€ 2,269.08
P0103_H51''	J279	H51''	306.1	2.77	104.4	110	0.32	33.37	€ 2,751.84
P0104_A''	J267	J269	241.7	5.75	117.8	125	0.53	50.82	€ 2,450.84
P0104_A_H9''	J269	H9''	3.6	2.2	104.4	110	0.26	36.01	€ 32.36
P0104_B''	J269	J271	506.1	3.54	104.4	110	0.41	49.88	€ 4,549.84
P0104_B_H10''	J271	H10''	4.9	1.92	104.4	110	0.22	30.96	€ 44.05
P0104_C_H61''	J271	H61''	130	1.63	104.4	110	0.19	31.50	€ 1,168.70
P0106_A''	J273	J274	35.8	6.98	104.4	110	0.81	50.10	€ 321.84
P0106_A_H54''	J274	H54''	169	2.17	104.4	110	0.25	32.46	€ 1,519.31
P0106_B''	J274	J276	322.2	4.81	104.4	110	0.56	49.07	€ 2,896.58
P0106_B_H53''	J276	H53''	5.1	2.13	104.4	110	0.25	34.09	€ 45.85
P0106_C_H52''	J276	H52''	280	2.69	104.4	110	0.31	28.82	€ 2,517.20
P02_A''	J252	J285	136.9	136.52	474.6	500	0.77	53.45	€ 16,102.18
P02_A_H1''	J285	H1''	67.6	2.66	104.4	110	0.31	38.62	€ 607.72
P02_B''	J285	J287	110.8	133.85	474.6	500	0.76	53.35	€ 13,032.30
P02_C''	J287	J295	39.9	123.92	474.6	500	0.70	53.32	€ 4,693.04
P02_C_H15''	J295	H15''	3.7	1.74	104.4	110	0.20	39.31	€ 33.26
P02_D''	J295	J297	7.2	122.19	474.6	500	0.69	53.32	€ 846.86
P02_E''	J297	J324	64.8	81.21	299.2	315	1.16	53.10	€ 3,094.85
P02_F''	J324	J806	24.6	39.55	190	200	1.39	52.90	€ 539.97
P02_G''	J806	J820	175.3	23.61	190	200	0.83	52.35	€ 3,847.84
P02_G_H20''	J820	H20''	2.5	2.37	104.4	110	0.28	43.08	€ 22.48
P02_H''	J820	J841	384.4	21.25	152	160	1.17	49.40	€ 5,039.48
P02_H_H21''	J841	H21''	3	1.87	104.4	110	0.22	40.62	€ 26.97
P02_I''	J841	J822	7.6	19.37	152	160	1.07	49.35	€ 99.64
P02_J''	J822	J824	59.7	15.61	152	160	0.86	49.09	€ 782.67
P02_J_H23''	J824	H23''	88.5	1.54	104.4	110	0.18	40.50	€ 795.62
P0202_A''	J287	J288	208.9	9.93	104.4	110	1.16	50.87	€ 1,878.01
P0202_A_H16''	J288	H16''	4.8	2.48	104.4	110	0.29	39.54	€ 43.15
P0202_B''	J288	J290	101.9	7.45	104.4	110	0.87	50.15	€ 916.08
P0202_B_H17''	J290	H17''	4.2	1.53	104.4	110	0.18	39.50	€ 37.76

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P0202_C''	J290	J292	148.9	5.93	104.4	110	0.69	49.45	€ 1,338.61
P0202_C_H18''	J292	H18''	3.7	3.61	104.4	110	0.42	38.02	€ 33.26
P0202_D''	J292	H19''	274.7	2.32	104.4	110	0.27	36.75	€ 2,469.55
P0203_A''	J324	J325	231.7	41.66	237.4	250	0.94	52.40	€ 7,622.93
P0203_A_H14''	J325	H14''	3.8	1.63	104.4	110	0.19	37.94	€ 34.16
P0203_B''	J325	J327	274.9	40.04	237.4	250	0.90	51.63	€ 9,044.21
P0203_B_H44''	J332	H44''	3.3	4.8	104.4	110	0.56	36.53	€ 29.67
P0203_C''	J327	J332	164	34.68	213.6	225	0.97	51.04	€ 4,157.40
P0203_C_H43''	J337	H43''	2.8	1.6	104.4	110	0.19	34.54	€ 25.17
P0203_D''	J332	J337	235	29.88	213.6	225	0.83	50.39	€ 5,957.25
P0203_D_H68_2''	J1245	H68''	5.2	3.62	104.4	110	0.42	33.25	€ 46.75
P0203_E''	J337	J339	5.1	28.29	213.6	225	0.79	50.38	€ 129.29
P0203_F''	J339	J340	5.9	12.29	152	160	0.68	50.36	€ 77.35
P0203_G''	J340	J795	125.6	5.35	104.4	110	0.63	49.88	€ 1,129.14
P0203_G_H49''	J795	H49''	30.3	1.74	104.4	110	0.20	35.18	€ 272.40
P0203_H_H68''	J795	J1245	549.9	3.62	104.4	110	0.42	48.81	€ 4,943.60
P020301''	J327	J328	154.4	5.36	104.4	110	0.63	51.03	€ 1,388.06
P020301_H55''	J328	H55''	140.4	1.99	104.4	110	0.23	31.57	€ 1,262.20
P020301_H56''	J328	H56''	63.3	3.37	104.4	110	0.39	30.83	€ 569.07
P020302_A''	J339	J342	236.6	16	152	160	0.88	49.30	€ 3,101.83
P020302_B''	J342	J343	139.8	9.7	132.4	140	0.70	48.79	€ 1,712.55
P020302_B_H41''	J343	H41''	15.5	2.37	104.4	110	0.28	36.45	€ 139.35
P020302_C''	J343	J345	24.4	7.33	117.8	125	0.67	48.70	€ 247.42
P020302_C_H45''	J345	H45''	87.4	1.94	104.4	110	0.23	35.19	€ 785.73
P020302_D''	J345	J347	162.3	5.39	104.4	110	0.63	48.06	€ 1,459.08
P020302_D_H46''	J347	J537	145.2	1.9	104.4	110	0.22	47.97	€ 1,305.35
P020302_D_H46_2''	J537	H46''	3	1.9	104.4	110	0.22	35.71	€ 26.97
P020302_E''	J347	J349	199.5	3.49	104.4	110	0.41	47.70	€ 1,793.51
P020302_E_H47''	J349	H47''	80.5	1.45	104.4	110	0.17	35.28	€ 723.70
P020302_F_H48''	J349	H48''	359.6	2.04	104.4	110	0.24	32.63	€ 3,232.80
P02030202_A''	J342	J790	6.2	6.3	104.4	110	0.74	49.26	€ 55.74
P02030202_A_H42''	J790	H42''	5	2.42	104.4	110	0.28	37.42	€ 44.95
P02030202_B''	J790	J792	188.7	3.88	104.4	110	0.45	48.85	€ 1,696.41
P02030202_B_H40''	J792	H40''	3.4	1.54	104.4	110	0.18	37.24	€ 30.57
P02030202_C''	J792	J794	141.9	2.34	104.4	110	0.27	48.72	€ 1,275.68
P02030202_D_H39''	J794	H39''	4.5	2.34	104.4	110	0.27	38.20	€ 40.46
P020303_A''	J340	J799	91.3	6.94	117.8	125	0.64	50.05	€ 925.78
P020303_A_H58''	J799	H58''	2.5	1.55	104.4	110	0.18	31.65	€ 22.48
P020303_B''	J799	J801	107.8	5.38	104.4	110	0.63	49.62	€ 969.12
P020303_B_H57''	J801	H57''	2.5	2.3	104.4	110	0.27	29.63	€ 22.48
P020303_B_H59''	J801	H59''	359.8	3.08	104.4	110	0.36	27.73	€ 3,234.60
P0204_I_H22''	J822	H22''	255.6	3.76	104.4	110	0.44	39.44	€ 2,297.84
P0205_A''	J806	J807	170.5	15.94	117.8	125	1.46	50.23	€ 1,728.87
P0205_B''	J807	J808	11	11.45	104.4	110	1.34	50.06	€ 98.89
P0205_B_H32''	J808	H32''	4.5	2.73	104.4	110	0.32	40.04	€ 40.46
P0205_C''	J808	J810	124	8.72	104.4	110	1.02	48.90	€ 1,114.76
P0205_C_H33''	J810	H33''	6	2.37	104.4	110	0.28	38.84	€ 53.94

Tuberia	Nudo Ini	Nudo Fin	Long (m)	Q diseño (l/s)	Dint (mm)	DN (mm)	Velocidad (m/s)	Presion (mca)	Coste
P0205_D''	J810	J812	122.6	6.35	104.4	110	0.74	48.25	€ 1,102.17
P0205_D_H34''	J812	H34''	100.3	2.04	104.4	110	0.24	37.50	€ 901.70
P0205_E''	J812	J814	56	4.31	104.4	110	0.50	37.65	€ 503.44
P0205_E_H36''	J814	H36''	168.8	2.6	104.4	110	0.30	38.38	€ 1,517.51
P0205_F_H35''	J814	H35''	167.1	1.71	104.4	110	0.20	48.01	€ 1,502.23
P020502_A''	J807	J817	354	4.49	104.4	110	0.52	49.22	€ 3,182.46
P020502_A_H38''	J817	H38''	4.8	2.23	104.4	110	0.26	40.08	€ 43.15
P020502_B_H37''	J817	H37''	150.2	2.26	104.4	110	0.26	40.22	€ 1,350.30
P0206_A''	J824	J825	220.8	14.07	132.4	140	1.02	47.52	€ 2,704.80
P0206_A_H24''	J825	H24''	5.5	1.43	104.4	110	0.17	38.98	€ 49.45
P0206_B''	J825	J827	75.5	12.64	132.4	140	0.92	47.08	€ 924.88
P0206_B_H25''	J827	H25''	39.3	1.98	104.4	110	0.23	37.74	€ 353.31
P0206_C''	J827	J829	97.4	10.66	117.8	125	0.98	46.35	€ 987.64
P0206_C_H26''	J829	H26''	127.5	1.96	104.4	110	0.23	36.01	€ 1,146.23
P0206_D''	J829	J831	120.6	8.7	117.8	125	0.80	45.72	€ 1,222.88
P0206_D_H27''	J831	H27''	4.8	1.27	104.4	110	0.15	35.25	€ 43.15
P0206_E''	J831	J833	72.7	7.44	104.4	110	0.87	45.21	€ 653.57
P0206_E_H29''	J833	H29''	206.8	1.89	104.4	110	0.22	36.05	€ 1,859.13
P0206_F''	J833	J835	76.4	5.55	104.4	110	0.65	44.89	€ 686.84
P0206_F_H28''	J835	H28''	4.1	1.71	104.4	110	0.20	34.17	€ 36.86
P0206_G''	J835	J837	430.9	3.85	104.4	110	0.45	43.96	€ 3,873.79
P0206_G_H31''	J837	H31''	4.7	1.85	104.4	110	0.22	34.77	€ 42.25
P0206_H_H30''	J837	H30''	414.4	2	104.4	110	0.23	35.34	€ 3,725.46
P04_A''	J297	J298	234	40.98	379.8	400	0.36	53.25	€ 16,003.26
P04_A_H13''	J298	H13''	23.3	1.95	104.4	110	0.23	38.13	€ 209.47
P04_B''	J298	J300	109.7	39.03	379.8	400	0.34	53.22	€ 7,502.38
P04_B_H12''	J300	H12''	4	1.91	104.4	110	0.22	36.50	€ 35.96
P04_C''	J300	J302	379.1	37.12	379.8	400	0.33	53.12	€ 25,926.65
P04_C_H11''	J302	H11''	6.1	4.35	104.4	110	0.51	34.03	€ 54.84
P04_D''	J302	J322	168.3	32.49	340.8	355	0.36	53.06	€ 9,870.80
P04_D_2''	J322	J304	5.6	27.65	340.8	355	0.30	53.06	€ 328.44
P04_D_H60''	J322	H60''	3.4	4.84	104.4	110	0.57	33.21	€ 30.57
P04_E''	J304	J305	672.4	27.65	340.8	355	0.30	52.89	€ 39,436.26
P04_E_H62''	J305	H62''	4.4	3.85	104.4	110	0.45	30.60	€ 39.56
P04_F''	J305	J307	434.6	23.8	340.8	355	0.26	52.81	€ 25,489.29
P04_F_H63''	J307	H63''	6.2	3.88	104.4	110	0.45	29.43	€ 55.74
P04_G''	J307	J309	216.6	19.92	299.2	315	0.28	52.75	€ 10,344.82
P04_H''	J309	J310	163	13.76	299.2	315	0.20	52.73	€ 7,784.88
P04_H_H64''	J310	H64''	251.8	5.25	132.4	140	0.38	28.08	€ 3,084.55
P04_I''	J310	J312	156.9	8.51	237.4	250	0.19	52.70	€ 5,162.01
P04_I_H71''	J312	H71''	104.1	1.96	104.4	110	0.23	26.86	€ 935.86
P04_J''	J312	J314	157.5	6.55	213.6	225	0.18	52.68	€ 3,992.63
P04_J_H65''	J314	H65''	468.3	4.12	117.8	125	0.38	26.28	€ 4,748.56
P04_J_H66''	J314	H66''	71.8	2.43	104.4	110	0.28	30.15	€ 645.48
P0402_A''	J309	J317	76.9	6.15	104.4	110	0.72	52.37	€ 691.33
P0402_A_H70''	J317	H70''	99.4	2.01	104.4	110	0.23	27.97	€ 893.61
P0402_B''	J317	J319	392.5	4.15	104.4	110	0.48	51.40	€ 3,528.58
P0402_B_H67''	J319	H67''	228.1	2.54	104.4	110	0.30	28.43	€ 2,050.62
P0402_B_H69''	J319	H69''	4.6	1.61	104.4	110	0.19	30.09	€ 41.35

1.3.2.4.1 Cálculo de la garantía suministro del diseño con caudal para 6 turnos.

A continuación, se observa el cálculo de la garantía suministro para el diseño de la red de 6 turnos:

									GS global				Rug	0.01			Hcab	53.59		
									81.150%				Visc	1.10E-06						25.002
																				0.002
Tuberia	**Nudo Ini**	**Nudo Fin**	**Diam (mm)**	**DN**	**Long (m)**	**z(fin)**	**Qinst**	**∑pi·Qi**	**U**	**∑pi·(1-pi)·Qi^2**	**Q diseño**	**ks**	**V (m/s)**	**Re**	**f**	**hf**	**∑hf**	**H(fin)**	**P(fin)**
P00''	UGD_44	J252	474.6	500	9	0	1019.81	169.928658	0.8834	280.32	184.72	0.18	1.04	450508.76	0.0137	0.014	0.014	53.576	53.576
P01_A''	J252	J253	190	200	15.4	0	200.72	33.4455244	0.8834	45.46	39.40	0.20	1.39	240040.25	0.0155	0.124	0.138	53.452	53.452
P01_B''	J253	J262	190	200	32.6	0	160.16	26.6871024	0.8834	36.74	32.04	0.20	1.13	195200.25	0.0161	0.179	0.318	53.272	53.272
P01_C''	J262	J264	190	200	141.7	0	149.59	24.9258469	0.8834	35.32	30.18	0.20	1.06	183837.13	0.0162	0.699	1.017	52.573	52.573
P01_C_H2''	J262	H2''	104.4	110	2.3	13.92	10.57	1.76125545	0.8834	1.41	2.81	0.27	0.33	31169.85	0.0235	0.003	0.320	53.270	39.350
P01_C_H6''	J264	H6''	104.4	110	9.9	13.89	12.39	2.06451797	0.8834	2.52	3.47	0.28	0.41	38451.70	0.0224	0.018	1.035	52.555	38.665
P01_D''	J264	J283	152	160	201	0	120.59	20.0936418	0.8834	30.26	24.95	0.21	1.38	190019.10	0.0163	2.071	3.088	50.502	50.502
P01_D_H8''	J283	H8''	104.4	110	5.1	14.29	15.05	2.50774782	0.8834	3.08	4.06	0.27	0.47	44983.00	0.0216	0.012	3.100	50.490	36.200
P01_E''	J283	J267	152	160	8.9	0	105.54	17.585894	0.8834	27.18	22.19	0.21	1.22	168990.77	0.0166	0.074	3.162	50.428	50.428
P01_F''	J267	J273	132.4	140	210.6	0	71.06	11.8405688	0.8834	20.62	15.85	0.22	1.15	138588.62	0.0172	1.853	5.015	48.575	48.575
P01_G''	J273	J279	104.4	110	87.4	0	29.21	4.86719693	0.8834	8.28	7.41	0.25	0.87	82148.00	0.0191	0.611	5.627	47.963	47.963
P01_G_H50''	J279	H50''	104.4	110	3.4	16.35	12.57	2.09451097	0.8834	3.15	3.66	0.29	0.43	40614.93	0.0221	0.007	5.634	47.956	31.606
P0101_A''	J253	J254	104.4	110	175.5	0	40.56	6.75842204	0.8834	8.72	9.37	0.23	1.09	103862.32	0.0183	1.878	2.016	51.574	51.574
P0101_A_H3''	J254	H3''	104.4	110	3.8	12.52	11.55	1.92455065	0.8834	1.85	3.13	0.27	0.37	34650.86	0.0229	0.006	2.022	51.568	39.048
P0101_B''	J254	J258	104.4	110	104.7	0	29.01	4.83387138	0.8834	6.88	7.15	0.25	0.84	79279.52	0.0193	0.687	2.703	50.887	50.887
P0101_B_H4''	J258	H4''	104.4	110	3.6	13.2	12.39	2.06451797	0.8834	2.93	3.58	0.29	0.42	39641.16	0.0222	0.007	2.710	50.880	37.680
P0101_C''	J258	H5''	104.4	110	134	13.75	16.62	2.76935341	0.8834	3.95	4.53	0.27	0.53	50175.88	0.0211	0.386	3.089	50.501	36.751
P0102_H7''	J264	H7''	104.4	110	252.4	15.07	16.61	2.76768713	0.8834	3.66	4.46	0.27	0.52	49413.49	0.0212	0.708	1.725	51.865	36.795
P0103_H51''	J279	H51''	104.4	110	306.1	16.3	16.64	2.77268596	0.8834	5.29	4.80	0.29	0.56	53267.03	0.0209	0.982	6.609	46.981	30.681
P0104_A''	J267	J269	117.8	125	241.7	0	34.48	5.74532524	0.8834	5.45	7.81	0.23	0.72	76708.65	0.0193	1.037	4.199	49.391	49.391
P0104_A_H9''	J269	H9''	104.4	110	3.6	14.81	13.22	2.20281902	0.8834	2.18	3.51	0.27	0.41	38884.85	0.0223	0.007	4.206	49.384	34.574
P0104_B''	J269	J271	104.4	110	506.1	0	21.26	3.54250622	0.8834	3.26	5.14	0.24	0.60	56974.21	0.0206	1.832	6.032	47.558	47.558
P0104_B_H10''	J271	H10''	104.4	110	4.9	18.92	11.49	1.91455299	0.8834	1.83	3.11	0.27	0.36	34480.83	0.0229	0.007	6.039	47.551	28.631
P0104_C_H61''	J271	H61''	104.4	110	130	18.32	9.77	1.62795324	0.8834	1.43	2.69	0.27	0.31	29777.67	0.0237	0.148	6.180	47.410	29.090
P0106_A''	J273	J274	104.4	110	35.8	0	41.85	6.97337185	0.8834	12.18	10.06	0.24	1.17	111499.04	0.0181	0.436	5.451	48.139	48.139
P0106_A_H54''	J274	H54''	104.4	110	169	17.51	12.99	2.16449463	0.8834	3.23	3.75	0.29	0.44	41612.14	0.0220	0.349	5.800	47.790	30.280
P0106_B''	J274	J276	104.4	110	322.2	0	28.86	4.80887722	0.8834	8.95	7.45	0.26	0.87	82613.75	0.0191	2.277	7.728	45.862	45.862
P0106_B_H53''	J276	H53''	104.4	110	5.1	14.97	12.75	2.12450397	0.8834	2.67	3.57	0.28	0.42	39573.20	0.0222	0.010	7.738	45.852	30.882
P0106_C_H52''	J276	H52''	104.4	110	280	19.93	16.11	2.68437325	0.8834	6.27	4.90	0.30	0.57	54292.20	0.0208	0.930	8.658	44.932	25.002
P02_A''	J252	J285	474.6	500	136.9	0	819.09	136.483134	0.8834	234.86	150.02	0.18	0.85	365884.71	0.0141	0.149	0.164	53.426	53.426
P02_A_H1''	J285	H1''	104.4	110	67.6	14.76	15.97	2.66104536	0.8834	4.93	4.62	0.29	0.54	51249.73	0.0210	0.202	0.366	53.224	38.464
P02_B''	J285	J287	474.6	500	110.8	0	803.12	133.822088	0.8834	229.93	147.22	0.18	0.83	359046.40	0.0142	0.117	0.281	53.309	53.309
P02_C''	J287	J295	474.6	500	39.9	0	743.54	123.894406	0.8834	213.29	136.80	0.18	0.77	333629.90	0.0144	0.037	0.317	53.273	53.273
P02_C_H15''	J295	H15''	104.4	110	3.7	14.01	10.42	1.73626128	0.8834	1.48	2.81	0.27	0.33	31167.88	0.0235	0.005	0.322	53.268	39.258
P02_D''	J295	J297	474.6	500	7.2	0	733.12	122.158145	0.8834	211.81	135.02	0.18	0.76	329285.97	0.0144	0.006	0.324	53.266	53.266
P02_E''	J297	J324	299.2	250	64.8	0	487.27	81.1927097	0.8834	120.57	90.89	0.19	1.29	351631.85	0.0144	0.265	0.589	53.001	53.001
P02_F''	J324	J806	190	200	24.6	0	237.31	39.5424343	0.8834	70.41	46.96	0.20	1.66	286053.98	0.0151	0.273	0.862	52.728	52.728
P02_G''	J806	J820	190	200	175.3	0	141.68	23.6078214	0.8834	29.57	28.41	0.20	1.00	173085.37	0.0164	0.775	1.637	51.953	51.953
P02_G_H20''	J820	H20''	104.4	110	2.5	9.27	14.21	2.3677805	0.8834	3.30	3.97	0.28	0.46	44036.20	0.0217	0.006	1.643	51.947	42.677
P02_H''	J820	J841	152	160	384.4	0	127.47	21.2400408	0.8834	26.27	25.77	0.20	1.42	196226.24	0.0162	4.201	5.838	47.752	47.752
P02_H_H21''	J841	H21''	104.4	110	3	8.78	11.23	1.87122977	0.8834	1.54	2.97	0.26	0.35	32897.19	0.0232	0.004	5.842	47.748	38.968
P02_I''	J841	J822	152	160	7.6	0	116.24	19.3688111	0.8834	17.80	23.10	0.20	1.27	175879.16	0.0165	0.068	5.906	47.684	47.684
P02_J''	J822	J824	152	160	59.7	0	93.68	15.6096888	0.8834	18.04	19.36	0.21	1.07	147442.00	0.0170	0.387	6.293	47.297	47.297
P02_J_H23''	J824	H23''	104.4	110	88.5	8.55	9.25	1.5413068	0.8834	1.07	2.45	0.27	0.29	27206.45	0.0242	0.086	6.379	47.211	38.661
P0202_A''	J287	J288	104.4	110	208.9	0	59.58	9.92768207	0.8834	16.64	13.53	0.23	1.58	150019.04	0.0171	4.369	4.650	48.940	48.940
P0202_A_H16''	J288	H16''	104.4	110	4.8	11.32	14.86	2.47608855	0.8834	3.05	4.02	0.27	0.47	44567.30	0.0217	0.011	0.011	53.579	42.259
P0202_B''	J288	J290	104.4	110	101.9	0	44.72	7.45159353	0.8834	13.58	10.71	0.24	1.25	118714.80	0.0179	1.390	1.390	52.200	52.200
P0202_B_H17''	J290	H17''	104.4	110	4.2	10.65	9.16	1.5263103	0.8834	1.24	2.51	0.27	0.29	27838.31	0.0241	0.004	0.004	53.586	42.936

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Qinst	∑pi·Qi	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P0202_C''	J290	J292	104.4	110	148.9	0	35.56	5.92528322	0.8834	12.34	9.03	0.25	1.05	100102.45	0.0184	1.490	1.490	52.100	52.100
P0202_C_H18''	J292	H18''	104.4	110	3.7	11.42	21.67	3.61082361	0.8834	8.66	6.21	0.29	0.73	68856.35	0.0198	0.019	0.019	53.571	42.151
P0202_D''	J292	H19''	104.4	110	274.7	12.46	13.89	2.31445962	0.8834	3.68	4.01	0.29	0.47	44453.65	0.0217	0.638	0.638	52.952	40.492
P0203_A''	J324	J325	237.4	250	231.7	0	249.96	41.6502754	0.8834	70.41	49.06	0.20	1.11	239216.78	0.0154	0.943	1.532	52.058	52.058
P0203_A_H14''	J325	H14''	104.4	110	3.8	14.46	9.75	1.62462068	0.8834	1.42	2.68	0.27	0.31	29665.15	0.0237	0.004	0.004	53.586	39.126
P0203_B''	J325	J327	237.4	250	274.9	0	240.21	40.0256548	0.8834	68.99	47.36	0.20	1.07	230930.48	0.0155	1.049	1.049	52.541	52.541
P0203_B_H44''	J332	H44''	104.4	110	3.3	14.5	28.77	4.79388072	0.8834	22.90	9.02	0.31	1.05	100021.62	0.0184	0.033	0.033	53.557	39.057
P0203_C''	J327	J332	213.6	225	164	0	208.07	34.6702385	0.8834	59.95	41.51	0.20	1.16	224943.76	0.0156	0.821	0.821	52.769	52.769
P0203_C_H43''	J337	H43''	104.4	110	2.8	15.85	9.58	1.59629396	0.8834	1.58	2.71	0.28	0.32	30017.59	0.0237	0.003	0.003	53.587	37.737
P0203_D''	J332	J337	213.6	225	235	0	179.3	29.8763578	0.8834	37.05	35.25	0.20	0.98	191038.83	0.0161	0.873	0.873	52.717	52.717
P0203_D_H68_2''	J1245	H68''	104.4	110	5.2	15.55	21.69	3.61415616	0.8834	7.12	5.97	0.28	0.70	66215.08	0.0200	0.025	0.025	53.565	38.015
P0203_E''	J337	J339	213.6	225	5.1	0	169.72	28.2800638	0.8834	35.47	33.54	0.20	0.94	181759.69	0.0162	0.017	0.017	53.573	53.573
P0203_F''	J339	J340	152	160	5.9	0	73.72	12.2837986	0.8834	17.40	15.97	0.22	0.88	121602.50	0.0176	0.027	0.027	53.563	53.563
P0203_G''	J340	J795	104.4	110	125.6	0	32.11	5.35041744	0.8834	8.93	7.99	0.25	0.93	88596.08	0.0189	1.007	1.007	52.583	52.583
P0203_G_H49''	J795	H49''	104.4	110	30.3	14.68	10.42	1.73626128	0.8834	1.81	2.92	0.28	0.34	32422.67	0.0233	0.040	0.040	53.550	38.870
P0203_H_H68''	J795	J1245	104.4	110	549.9	0	21.69	3.61415616	0.8834	7.12	5.97	0.28	0.70	66215.08	0.0200	2.608	2.608	50.982	50.982
P020301''	J327	J328	104.4	110	154.4	0	32.14	5.35541628	0.8834	9.04	8.01	0.25	0.94	88827.18	0.0188	1.244	1.244	52.346	52.346
P020301_H55''	J328	H55''	104.4	110	140.4	19.36	11.95	1.99120176	0.8834	3.11	3.55	0.30	0.41	39345.06	0.0223	0.262	0.262	53.328	33.968
P020301_H56''	J328	H56''	104.4	110	63.3	20.09	20.19	3.36421452	0.8834	5.93	5.52	0.27	0.64	61156.76	0.0203	0.260	0.260	53.330	33.240
P020302_A''	J339	J342	152	160	236.6	0	96	15.9962652	0.8834	18.07	19.75	0.21	1.09	150410.84	0.0169	1.591	1.591	51.999	51.999
P020302_B''	J342	J343	132.4	140	139.8	0	58.19	9.69606948	0.8834	17.75	13.42	0.23	0.97	117308.94	0.0178	0.909	0.909	52.681	52.681
P020302_B_H41''	J343	H41''	104.4	110	15.5	12.33	14.22	2.36944678	0.8834	3.18	3.94	0.28	0.46	43735.37	0.0218	0.035	0.035	53.555	41.225
P020302_C''	J343	J345	117.8	125	24.4	0	43.97	7.3266227	0.8834	14.57	10.70	0.24	0.98	105129.52	0.0182	0.185	0.185	53.405	53.405
P020302_C_H45''	J345	H45''	104.4	110	87.4	13.45	11.65	1.94121343	0.8834	1.69	3.09	0.27	0.36	34245.53	0.0230	0.128	0.128	53.462	40.012
P020302_D''	J345	J347	104.4	110	162.3	0	32.32	5.38540927	0.8834	6.71	7.67	0.24	0.90	85072.88	0.0190	1.210	1.210	52.380	52.380
P020302_D_H46''	J347	J537	104.4	110	145.2	0	11.4	1.89955649	0.8834	2.48	3.29	0.29	0.38	36473.36	0.0226	0.237	0.237	53.353	53.353
P020302_D_H46_2''	J537	H46''	104.4	110	3	12.26	11.4	1.89955649	0.8834	2.48	3.29	0.29	0.38	36473.36	0.0226	0.005	0.005	53.585	41.325
P020302_E''	J347	J349	104.4	110	199.5	0	20.92	3.48585279	0.8834	4.23	5.30	0.25	0.62	58792.37	0.0204	0.764	0.764	52.826	52.826
P020302_E_H47''	J349	H47''	104.4	110	80.5	12.39	8.68	1.44632898	0.8834	1.33	2.47	0.28	0.29	27345.54	0.0242	0.079	0.079	53.511	41.121
P020302_F_H48''	J349	H48''	104.4	110	359.6	14.82	12.24	2.03952381	0.8834	2.90	3.54	0.29	0.41	39282.20	0.0223	0.670	0.670	52.920	38.100
P02030202_A''	J342	J790	104.4	110	6.2	0	37.81	6.30019569	0.8834	6.50	8.55	0.23	1.00	94818.53	0.0186	0.056	0.056	53.534	53.534
P02030202_A_H42''	J790	H42''	104.4	110	5	11.84	14.54	2.42276766	0.8834	3.09	3.98	0.27	0.46	44079.91	0.0217	0.011	0.011	53.579	41.739
P02030202_B''	J790	J792	104.4	110	188.7	0	23.27	3.87742803	0.8834	3.41	5.51	0.24	0.64	61070.10	0.0203	0.774	0.774	52.816	52.816
P02030202_B_H40''	J792	H40''	104.4	110	3.4	11.61	9.24	1.53964052	0.8834	1.21	2.51	0.27	0.29	27844.32	0.0241	0.003	0.003	53.587	41.977
P02030202_C''	J792	J794	104.4	110	141.9	0	14.03	2.3377875	0.8834	2.20	3.65	0.26	0.43	40439.23	0.0221	0.278	0.278	53.312	53.312
P02030202_D_H39''	J794	H39''	104.4	110	4.5	10.52	14.03	2.3377875	0.8834	2.20	3.65	0.26	0.43	40439.23	0.0221	0.009	0.009	53.581	43.061
P020303_A''	J340	J799	117.8	125	91.3	0	41.61	6.93338119	0.8834	8.46	9.50	0.23	0.87	93381.19	0.0186	0.559	0.559	53.031	53.031
P020303_A_H58''	J799	H58''	104.4	110	2.5	18.4	9.32	1.55297074	0.8834	1.21	2.52	0.27	0.29	27979.74	0.0241	0.003	0.003	53.587	35.187
P020303_B''	J799	J801	104.4	110	107.8	0	32.29	5.38041044	0.8834	7.26	7.76	0.24	0.91	86038.69	0.0190	0.820	0.820	52.770	52.770
P020303_B_H57''	J801	H57''	104.4	110	2.5	19.99	13.79	2.29779684	0.8834	2.09	3.57	0.26	0.42	39632.02	0.0222	0.005	0.005	53.585	33.595
P020303_B_H59''	J801	H59''	104.4	110	359.8	21.37	18.5	3.0826136	0.8834	5.17	5.09	0.28	0.59	56443.89	0.0206	1.281	1.281	52.309	30.939
P0204_I_H22''	J822	H22''	104.4	110	255.6	9.38	22.56	3.75912232	0.8834	8.47	6.33	0.28	0.74	70183.17	0.0197	1.346	7.252	46.338	36.958
P0205_A''	J806	J807	117.8	125	170.5	0	95.63	15.9346129	0.8834	20.36	19.92	0.21	1.83	195741.73	0.0163	4.024	4.885	48.705	48.705
P0205_B''	J807	J808	104.4	110	11	0	68.68	11.4439947	0.8834	14.20	14.77	0.22	1.73	163786.77	0.0169	0.270	0.270	53.320	53.320
P0205_B_H32''	J808	H32''	104.4	110	4.5	10.02	16.38	2.72936275	0.8834	4.09	4.52	0.28	0.53	50061.33	0.0211	0.013	0.013	53.577	43.557
P0205_C''	J808	J810	104.4	110	124	0	52.3	8.71463196	0.8834	10.11	11.52	0.22	1.35	127764.78	0.0176	1.934	1.934	51.656	51.656
P0205_C_H33''	J810	H33''	104.4	110	6	10.05	14.2	2.36611422	0.8834	2.45	3.75	0.26	0.44	41567.60	0.0220	0.012	0.012	53.578	43.528

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	Qinst	∑pi·Qi	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P0205_D''	J810	J812	104.4	110	122.6	0	38.1	6.34851774	0.8834	7.66	8.79	0.23	1.03	97494.99	0.0185	1.169	1.169	52.421	52.421
P0205_D_H34''	J812	H34''	104.4	110	100.3	10.68	12.23	2.03785753	0.8834	2.42	3.41	0.28	0.40	37824.31	0.0225	0.175	0.175	53.415	42.735
P0205_E''	J812	J814	104.4	110	56	0	25.87	4.31066021	0.8834	5.24	6.33	0.24	0.74	70218.15	0.0197	0.295	0.295	53.295	53.295
P0205_E_H36''	J814	H36''	104.4	110	168.8	9.54	15.62	2.60272565	0.8834	3.20	4.18	0.27	0.49	46377.59	0.0215	0.423	0.423	53.167	43.627
P0205_F_H35''	J814	H35''	104.4	110	167.1	10.45	10.25	1.70793456	0.8834	2.04	2.97	0.29	0.35	32933.15	0.0232	0.228	0.228	53.362	42.912
P020502_A''	J807	J817	104.4	110	354	0	26.95	4.49061819	0.8834	6.16	6.68	0.25	0.78	74105.19	0.0195	2.056	2.056	51.534	51.534
P020502_A_H38''	J817	H38''	104.4	110	4.8	9.14	13.4	2.23281201	0.8834	3.63	3.92	0.29	0.46	43408.40	0.0218	0.011	0.011	53.579	44.439
P020502_B_H37''	J817	H37''	104.4	110	150.2	8.88	13.55	2.25780618	0.8834	2.54	3.66	0.27	0.43	40633.70	0.0221	0.297	0.297	53.293	44.413
P0206_A''	J824	J825	132.4	140	220.8	0	84.43	14.068382	0.8834	15.43	17.54	0.21	1.27	153332.29	0.0169	2.337	8.630	44.960	44.960
P0206_A_H24''	J825	H24''	104.4	110	5.5	8.54	8.6	1.43299876	0.8834	1.32	2.45	0.28	0.29	27142.36	0.0242	0.005	0.005	53.585	45.045
P0206_B''	J825	J827	132.4	140	75.5	0	75.83	12.6353832	0.8834	14.11	15.95	0.21	1.16	139477.62	0.0172	0.672	0.672	52.918	52.918
P0206_B_H25''	J827	H25''	104.4	110	39.3	9.32	11.89	1.98120409	0.8834	2.65	3.42	0.29	0.40	37900.19	0.0225	0.069	0.069	53.521	44.201
P0206_C''	J827	J829	117.8	125	97.4	0	63.94	10.6541791	0.8834	11.47	13.65	0.21	1.25	134080.88	0.0174	1.150	1.150	52.440	52.440
P0206_C_H26''	J829	H26''	104.4	110	127.5	10.25	11.73	1.95454365	0.8834	2.19	3.26	0.28	0.38	36160.87	0.0227	0.205	0.205	53.385	43.135
P0206_D''	J829	J831	117.8	125	120.6	0	52.21	8.69963547	0.8834	9.28	11.39	0.22	1.05	111921.89	0.0180	1.025	1.025	52.565	52.565
P0206_D_H27''	J831	H27''	104.4	110	4.8	10.47	7.59	1.26470472	0.8834	1.01	2.15	0.28	0.25	23881.89	0.0250	0.004	0.004	53.586	43.116
P0206_E''	J831	J833	104.4	110	72.7	0	44.62	7.43493075	0.8834	8.26	9.97	0.22	1.17	110589.01	0.0181	0.872	0.872	52.718	52.718
P0206_E_H29''	J833	H29''	104.4	110	206.8	9.03	11.31	1.88455999	0.8834	1.85	3.09	0.27	0.36	34210.08	0.0230	0.301	0.301	53.289	44.259
P0206_F''	J833	J835	104.4	110	76.4	0	33.31	5.55037076	0.8834	6.42	7.79	0.23	0.91	86347.18	0.0189	0.585	0.585	53.005	53.005
P0206_F_H28''	J835	H28''	104.4	110	4.1	10.72	10.24	1.70626829	0.8834	1.81	2.89	0.28	0.34	32078.20	0.0233	0.005	0.005	53.585	42.865
P0206_G''	J835	J837	104.4	110	430.9	0	23.07	3.84410247	0.8834	4.61	5.74	0.25	0.67	63651.34	0.0201	1.904	1.904	51.686	51.686
P0206_G_H31''	J837	H31''	104.4	110	4.7	9.19	11.08	1.84623561	0.8834	2.63	3.28	0.30	0.38	36342.83	0.0227	0.008	0.008	53.582	44.392
P0206_H_H30''	J837	H30''	104.4	110	414.4	8.34	11.99	1.99786687	0.8834	1.98	3.24	0.27	0.38	35947.45	0.0227	0.659	0.659	52.931	44.591
P04_A''	J297	J298	379.8	400	234	0	245.85	40.9654353	0.8834	91.24	49.40	0.20	0.44	150564.82	0.0166	0.099	0.423	53.167	53.167
P04_A_H13''	J298	H13''	104.4	110	23.3	15.1	11.67	1.94454599	0.8834	2.57	3.36	0.29	0.39	37274.33	0.0225	0.040	0.040	53.550	38.450
P04_B''	J298	J300	379.8	400	109.7	0	234.18	39.0208894	0.8834	88.66	47.34	0.20	0.42	144273.17	0.0168	0.043	0.043	53.547	53.547
P04_B_H12''	J300	H12''	104.4	110	4	16.71	11.48	1.91288671	0.8834	2.15	3.21	0.28	0.37	35567.25	0.0228	0.006	0.006	53.584	36.874
P04_C''	J300	J302	379.8	400	379.1	0	222.7	37.1080026	0.8834	86.51	45.33	0.20	0.40	138134.26	0.0169	0.138	0.138	53.452	53.452
P04_C_H11''	J302	H11''	104.4	110	6.1	19.07	26.12	4.35231715	0.8834	13.28	7.57	0.29	0.88	83942.03	0.0190	0.044	0.044	53.546	34.476
P04_D''	J302	J322	340.8	355	168.3	0	194.93	32.4807497	0.8834	73.24	40.04	0.21	0.44	135995.53	0.0170	0.082	0.082	53.508	53.508
P04_D_2''	J322	J304	340.8	355	5.6	0	165.88	27.6402132	0.8834	62.75	34.64	0.21	0.38	117644.67	0.0175	0.002	0.002	53.588	53.588
P04_D_H60''	J322	H60''	104.4	110	3.4	19.84	29.05	4.84053649	0.8834	10.49	7.70	0.27	0.90	85395.02	0.0190	0.026	0.026	53.564	33.724
P04_E''	J304	J305	340.8	355	672.4	0	165.88	27.6402132	0.8834	62.70	34.64	0.21	0.38	117635.82	0.0175	0.253	0.253	53.337	53.337
P04_E_H62''	J305	H62''	104.4	110	4.4	22.28	23.09	3.84743503	0.8834	8.97	6.49	0.28	0.76	71994.10	0.0196	0.024	0.024	53.566	31.286
P04_F''	J305	J307	340.8	355	434.6	0	142.79	23.7927782	0.8834	53.73	30.27	0.21	0.33	102803.07	0.0179	0.128	0.128	53.462	53.462
P04_F_H63''	J307	H63''	104.4	110	6.2	23.37	23.3	3.88242686	0.8834	9.52	6.61	0.28	0.77	73269.49	0.0196	0.035	0.035	53.555	30.185
P04_G''	J307	J309	299.2	250	216.6	0	119.49	19.9103513	0.8834	44.21	25.78	0.22	0.37	99748.80	0.0181	0.090	0.090	53.500	53.500
P04_H''	J309	J310	299.2	250	163	0	82.57	13.7584543	0.8834	36.96	19.13	0.23	0.27	74004.78	0.0192	0.039	0.039	53.551	53.551
P04_H_H64''	J310	H64''	132.4	140	251.8	24.35	31.5	5.24877451	0.8834	17.66	8.96	0.28	0.65	78345.19	0.0192	0.789	0.789	52.801	28.451
P04_I''	J310	J312	237.4	250	156.9	0	51.07	8.50967982	0.8834	19.30	12.39	0.24	0.28	60414.11	0.0201	0.053	0.053	53.537	53.537
P04_I_H71''	J312	H71''	104.4	110	104.1	25.78	11.77	1.96120876	0.8834	1.81	3.15	0.27	0.37	34907.02	0.0229	0.157	0.157	53.433	27.653
P04_J''	J312	J314	213.6	225	157.5	0	39.3	6.54847106	0.8834	17.49	10.24	0.26	0.29	55509.77	0.0205	0.063	0.063	53.527	53.527
P04_J_H65''	J314	H65''	117.8	125	468.3	25.76	24.71	4.117372	0.8834	14.32	7.46	0.30	0.68	73302.43	0.0195	1.852	1.852	51.738	25.978
P04_J_H66''	J314	H66''	104.4	110	71.8	22.46	14.59	2.43109905	0.8834	3.18	4.01	0.27	0.47	44413.99	0.0217	0.166	0.166	53.424	30.964
P0402_A''	J309	J317	104.4	110	76.9	0	36.92	6.15189698	0.8834	7.24	8.53	0.23	1.00	94566.17	0.0186	0.694	0.694	52.896	52.896
P0402_A_H70''	J317	H70''	104.4	110	99.4	24.33	12.05	2.00786453	0.8834	1.95	3.24	0.27	0.38	35951.65	0.0227	0.158	0.158	53.432	29.102
P0402_B''	J317	J319	104.4	110	392.5	0	24.87	4.14403245	0.8834	5.29	6.18	0.25	0.72	68470.87	0.0198	1.977	1.977	51.613	51.613
P0402_B_H67''	J319	H67''	104.4	110	228.1	22.74	15.23	2.53774082	0.8834	3.84	4.27	0.28	0.50	47337.68	0.0214	0.593	0.593	52.997	30.257
P0402_B_H69''	J319	H69''	104.4	110	4.6	21.31	9.64	1.60629163	0.8834	1.45	2.67	0.28	0.31	29586.43	0.0237	0.005	0.005	53.585	32.275

1.3.3 Calculo de la garantía suministro de la alternativa con modificación de ubicación del cabezal

A continuación, se observa el cálculo de la garantía suministro para el diseño de la red con la modificación de ubicación del cabezal:

							GS global					Rug				Hcab		
							87.4%					Visc	1.10E-06					25.009
																		0.009
Tuberia	**Nudo Ini**	**Nudo Fin**	**Diam (mm)**	**DN**	**Long (m)**	**z(fin)**	**∑pi·Qi**	**U**	**∑pi·(1-pi)·Qi^2**	**Q diseño**	**ks**	**V (m/s)**	**Re**	**f**	**hf**	**∑hf**	**H(fin)**	**P(fin)**
P01_A''	J252	J253	213.6	225	15.4	0	33.44552443	1.1455	45.46	41.17	0.21	1.15	223094.34	0.0157	0.076	0.091	53.499	53.499
P01_B''	J253	J262	213.6	225	32.6	0	26.6871024	1.1455	36.74	33.63	0.21	0.94	182240.87	0.0162	0.111	0.202	53.388	53.388
P01_C''	J262	J264	213.6	225	141.7	0	24.92584695	1.1455	35.32	31.73	0.21	0.89	171966.08	0.0164	0.434	0.636	52.954	52.954
P01_C_H2''	J262	H2''	132.4	140	2.3	13.92	1.761255447	1.1455	1.41	3.12	0.30	0.23	27301.39	0.0241	0.001	0.203	53.387	39.467
P01_C_H6''	J264	H6''	132.4	140	9.9	13.89	2.064517974	1.1455	2.52	3.88	0.31	0.28	33960.10	0.0229	0.007	0.643	52.947	39.057
P01_D''	J264	J283	190	200	201	0	20.09364185	1.1455	30.26	26.39	0.22	0.93	160797.08	0.0166	0.777	1.414	52.176	52.176
P01_D_H8''	J283	H8''	132.4	140	5.1	14.29	2.507747821	1.1455	3.08	4.52	0.30	0.33	39488.43	0.0222	0.005	1.418	52.172	37.882
P01_E''	J283	J267	152	160	8.9	0	17.58589402	1.1455	27.18	23.56	0.22	1.30	179395.01	0.0164	0.083	1.496	52.094	52.094
P01_F''	J267	J273	132.4	140	210.6	0	11.84056878	1.1455	20.62	17.04	0.24	1.24	148993.14	0.0170	2.115	3.611	49.979	49.979
P01_G''	J273	J279	104.4	110	87.4	0	4.867196934	1.1455	8.28	8.16	0.28	0.95	90508.96	0.0188	0.729	4.340	49.250	49.250
P01_G_H50''	J279	H50''	104.4	110	3.4	16.35	2.094510971	1.1455	3.15	4.13	0.33	0.48	45774.47	0.0215	0.008	4.348	49.242	32.892
P0101_A''	J253	J254	104.4	110	175.5	0	6.758422035	1.1455	8.72	10.14	0.25	1.18	112444.63	0.0180	2.169	2.260	51.330	51.330
P0101_A_H3''	J254	H3''	104.4	110	3.8	12.52	1.924550654	1.1455	1.85	3.48	0.30	0.41	38600.17	0.0224	0.007	2.267	51.323	38.803
P0101_B''	J254	J258	104.4	110	104.7	0	4.833871382	1.1455	6.88	7.84	0.27	0.92	86899.17	0.0189	0.811	3.071	50.519	50.519
P0101_B_H4''	J258	H4''	104.4	110	3.6	13.2	2.064517974	1.1455	2.93	4.02	0.32	0.47	44610.47	0.0217	0.008	3.079	50.511	37.311
P0101_C''	J258	H5''	104.4	110	134	13.75	2.769353408	1.1455	3.95	5.05	0.30	0.59	55952.11	0.0207	0.470	3.541	50.049	36.299
P0102_H7''	J264	H7''	132.4	140	252.4	15.07	2.76768713	1.1455	3.66	4.96	0.30	0.36	43344.18	0.0217	0.274	0.910	52.680	37.610
P0103_H51''	J279	H51''	104.4	110	306.1	16.3	2.772685963	1.1455	5.29	5.41	0.32	0.63	59949.28	0.0204	1.214	5.554	48.036	31.736
P0104_A''	J267	J269	104.4	110	241.7	0	5.745325241	1.1455	5.45	8.42	0.24	0.98	93334.39	0.0187	2.130	3.626	49.964	49.964
P0104_A_H9''	J269	H9''	104.4	110	3.6	14.81	2.202819016	1.1455	2.18	3.89	0.29	0.45	43174.94	0.0218	0.008	3.634	49.956	35.146
P0104_B''	J269	J271	104.4	110	506.1	0	3.542506225	1.1455	3.26	5.61	0.26	0.66	62224.30	0.0202	2.147	5.773	47.817	47.817
P0104_B_H10''	J271	H10''	104.4	110	4.9	18.92	1.914552988	1.1455	1.83	3.46	0.30	0.40	38412.59	0.0224	0.009	5.782	47.808	28.888
P0104_C_H61''	J271	H61''	104.4	110	130	18.32	1.627953237	1.1455	1.43	3.00	0.31	0.35	33256.86	0.0231	0.180	5.953	47.637	29.317
P0106_A''	J273	J274	117.8	125	35.8	0	6.973371849	1.1455	12.18	10.97	0.26	1.01	107803.01	0.0181	0.284	3.895	49.695	49.695
P0106_A_H54''	J274	H54''	104.4	110	169	17.51	2.164494631	1.1455	3.23	4.22	0.33	0.49	46837.32	0.0214	0.431	4.326	49.264	31.754
P0106_B''	J274	J276	117.8	125	322.2	0	4.808877218	1.1455	8.95	8.24	0.29	0.76	80918.58	0.0191	1.522	5.418	48.172	48.172
P0106_B_H53''	J276	H53''	104.4	110	5.1	14.97	2.124503968	1.1455	2.67	4.00	0.31	0.47	44325.07	0.0217	0.012	5.429	48.161	33.191
P0106_C_H52''	J276	H52''	104.4	110	280	19.93	2.684373249	1.1455	6.27	5.55	0.34	0.65	61569.02	0.0203	1.165	6.583	47.007	27.077
P02_A''	J252	J285	379.8	400	136.9	0	136.4831338	1.1455	174.86	151.63	0.19	1.34	462114.13	0.0137	0.450	0.465	53.125	53.125
P02_A_H1''	J285	H1''	132.4	140	67.6	14.76	2.661045363	1.1455	4.93	5.20	0.33	0.38	45498.17	0.0215	0.080	0.545	53.045	38.285
P02_B''	J285	J287	379.8	400	110.8	0	133.8220884	1.1455	19.93	138.94	0.17	1.23	423424.92	0.0139	0.310	0.775	52.815	52.815
P02_C''	J287	J295	132.4	140	39.9	0	123.8944063	1.1455	3.29	125.97	0.17	9.15	1101301.62	0.0130	16.731	17.506	36.084	36.084
P02_C_H15''	J295	H15''	104.4	110	3.7	14.01	1.736261282	1.1455	19.93	6.85	0.66	0.80	75945.35	0.0194	0.022	17.529	36.061	25.551
P02_D''	J295	J297	474.6	500	7.2	0	122.158145	1.1455	120.57	134.74	0.18	0.76	328605.61	0.0144	0.006	17.513	36.077	36.077
P02_E''	J297	J324	337.4	355	64.8	0	81.19270969	1.1455	120.57	93.77	0.19	1.05	321692.71	0.0145	0.157	17.669	35.921	35.921
P02_F''	J324	J806	190	200	24.6	0	39.54243425	1.1455	70.41	49.15	0.21	1.73	299450.28	0.0150	0.297	17.966	35.624	35.624
P02_G''	J806	J820	190	200	175.3	0	23.60782135	1.1455	29.57	29.84	0.21	1.05	181766.76	0.0163	0.847	18.813	34.777	34.777
P02_G_H20''	J820	H20''	132.4	140	2.5	9.27	2.367780501	1.1455	3.30	4.45	0.31	0.32	38883.38	0.0223	0.002	18.816	34.774	25.504
P02_H''	J820	J841	152	160	384.4	0	21.24004085	1.1455	26.27	27.11	0.21	1.49	206455.12	0.0160	4.611	23.425	30.165	30.165
P02_H_H21''	J841	H21''	117.8	125	3	8.78	1.87122977	1.1455	1.54	3.29	0.29	0.30	32349.51	0.0232	0.003	23.427	30.163	26.383
P02_I''	J841	J822	152	160	7.6	0	19.36881108	1.1455	17.80	24.20	0.21	1.33	184299.24	0.0163	0.074	23.499	30.091	30.091
P02_J''	J822	J824	152	160	59.7	0	15.60968876	1.1455	18.04	20.47	0.22	1.13	155918.09	0.0168	0.429	23.927	29.663	29.663
P02_J_H23''	J824	H23''	104.4	110	88.5	8.55	1.5413068	1.1455	1.07	2.72	0.29	0.32	30207.87	0.0236	0.103	24.031	29.559	25.009
P0202_A''	J287	J288	104.4	110	208.9	0	9.927682073	1.1455	16.64	14.60	0.25	1.71	161870.06	0.0169	5.022	5.797	47.793	47.793
P0202_A_H16''	J288	H16''	117.8	125	4.8	11.32	2.476088547	1.1455	3.05	4.48	0.30	0.41	43997.16	0.0217	0.008	0.008	53.582	42.262
P0202_B''	J288	J290	104.4	110	101.9	0	7.451593526	1.1455	13.58	11.67	0.26	1.36	129423.23	0.0176	1.627	1.627	51.963	51.963
P0202_B_H17''	J290	H17''	104.4	110	4.2	10.65	1.526310302	1.1455	1.24	2.80	0.31	0.33	31076.49	0.0235	0.005	0.005	53.585	42.935

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	∑pi·Qi	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P0202_C''	J290	J292	104.4	110	148.9	0	5.925283224	1.1455	12.34	9.95	0.28	1.16	110309.55	0.0181	1.777	1.777	51.813	51.813
P0202_C_H18''	J292	H18''	104.4	110	3.7	11.42	3.610823607	1.1455	8.66	6.98	0.32	0.82	77406.52	0.0194	0.023	0.023	53.567	42.147
P0202_D''	J292	H19''	104.4	110	274.7	12.46	2.314459617	1.1455	3.68	4.51	0.32	0.53	50028.53	0.0211	0.788	0.788	52.802	40.342
P0203_A''	J324	J325	337.4	355	231.7	0	41.65027544	1.1455	70.41	51.26	0.21	0.57	175860.58	0.0162	0.186	17.855	35.735	35.735
P0203_A_H14''	J325	H14''	104.4	110	3.8	14.46	1.624620682	1.1455	1.42	2.99	0.31	0.35	33121.92	0.0231	0.005	0.005	53.585	39.125
P0203_B''	J325	J327	337.4	355	274.9	0	40.02565476	1.1455	68.99	49.54	0.21	0.55	169954.00	0.0163	0.208	0.208	53.382	53.382
P0203_B_H44''	J332	H44''	152	160	3.3	14.5	4.793880719	1.1455	22.90	10.28	0.36	0.57	78249.07	0.0192	0.007	0.007	53.583	39.083
P0203_C''	J327	J332	190	200	164	0	34.67023848	1.1455	59.95	43.54	0.21	1.54	265245.70	0.0153	1.583	1.583	52.007	52.007
P0203_C_H43''	J337	H43''	104.4	110	2.8	15.85	1.596293962	1.1455	1.58	3.04	0.32	0.35	33672.08	0.0231	0.004	0.004	53.586	37.736
P0203_D''	J332	J337	190	200	235	0	29.87635777	1.1455	37.05	36.85	0.21	1.30	224485.80	0.0157	1.671	1.671	51.919	51.919
P0203_D_H68_2''	J1245	H68''	104.4	110	5.2	15.55	3.614156162	1.1455	7.12	6.67	0.31	0.78	73970.77	0.0195	0.030	0.030	53.560	38.010
P0203_E''	J337	J339	152	160	5.1	0	28.2800638	1.1455	35.47	35.10	0.21	1.93	267305.46	0.0154	0.098	0.098	53.492	53.492
P0203_F''	J339	J340	152	160	5.9	0	12.28379863	1.1455	17.40	17.06	0.23	0.94	129926.53	0.0174	0.030	0.030	53.560	53.560
P0203_G''	J340	J795	152	160	125.6	0	5.350417445	1.1455	8.93	8.77	0.27	0.48	66816.38	0.0198	0.195	0.195	53.395	53.395
P0203_G_H49''	J795	H49''	104.4	110	30.3	14.68	1.736261282	1.1455	1.81	3.28	0.31	0.38	36330.27	0.0227	0.049	0.049	53.541	38.861
P0203_H_H68''	J795	J1245	104.4	110	549.9	0	3.614156162	1.1455	7.12	6.67	0.31	0.78	73970.77	0.0195	3.184	3.184	50.406	50.406
P020301''	J327	J328	104.4	110	154.4	0	5.355416278	1.1455	9.04	8.80	0.27	1.03	97563.77	0.0185	1.475	1.475	52.115	52.115
P020301_H55''	J328	H55''	104.4	110	140.4	19.36	1.991201758	1.1455	3.11	4.01	0.34	0.47	44467.67	0.0217	0.326	0.326	53.264	33.904
P020301_H56''	J328	H56''	104.4	110	63.3	20.09	3.364214519	1.1455	5.93	6.15	0.30	0.72	68233.97	0.0198	0.317	0.317	53.273	33.183
P020302_A''	J339	J342	152	160	236.6	0	15.99626517	1.1455	18.07	20.87	0.22	1.15	158894.36	0.0168	1.758	1.758	51.832	51.832
P020302_B''	J342	J343	117.8	125	139.8	0	9.696069483	1.1455	17.75	14.52	0.25	1.33	142698.04	0.0172	1.849	1.849	51.741	51.741
P020302_B_H41''	J343	H41''	117.8	125	15.5	12.33	2.369446779	1.1455	3.18	4.41	0.31	0.40	43351.99	0.0218	0.024	0.024	53.566	41.236
P020302_C''	J343	J345	104.4	110	24.4	0	7.326622705	1.1455	14.57	11.70	0.27	1.37	129715.42	0.0176	0.391	0.391	53.199	53.199
P020302_C_H45''	J345	H45''	104.4	110	87.4	13.45	1.94121343	1.1455	1.69	3.43	0.29	0.40	38019.80	0.0224	0.154	0.154	53.436	39.986
P020302_D''	J345	J347	104.4	110	162.3	0	5.385409275	1.1455	6.71	8.35	0.26	0.98	92597.12	0.0187	1.410	1.410	52.180	52.180
P020302_D_H46''	J347	J537	104.4	110	145.2	0	1.899556489	1.1455	2.48	3.70	0.32	0.43	41045.51	0.0221	0.293	0.293	53.297	53.297
P020302_D_H46_2''	J537	H46''	104.4	110	3	12.26	1.899556489	1.1455	2.48	3.70	0.32	0.43	41045.51	0.0221	0.006	0.006	53.584	41.324
P020302_E''	J347	J349	104.4	110	199.5	0	3.485852786	1.1455	4.23	5.84	0.28	0.68	64768.14	0.0200	0.909	0.909	52.681	52.681
P020302_E_H47''	J349	H47''	104.4	110	80.5	12.39	1.446328976	1.1455	1.33	2.77	0.32	0.32	30700.60	0.0235	0.097	0.097	53.493	41.103
P020302_F_H48''	J349	H48''	104.4	110	359.6	14.82	2.03952381	1.1455	2.90	3.99	0.33	0.47	44227.23	0.0217	0.828	0.828	52.762	37.942
P02030202_A''	J342	J790	104.4	110	6.2	0	6.300195689	1.1455	6.50	9.22	0.24	1.08	102225.12	0.0184	0.064	0.064	53.526	53.526
P02030202_A_H42''	J790	H42''	104.4	110	5	11.84	2.422767663	1.1455	3.09	4.44	0.31	0.52	49187.70	0.0212	0.014	0.014	53.576	41.736
P02030202_B''	J790	J792	104.4	110	188.7	0	3.877428027	1.1455	3.41	5.99	0.26	0.70	66433.67	0.0199	0.900	0.900	52.690	52.690
P02030202_B_H40''	J792	H40''	104.4	110	3.4	11.61	1.539640523	1.1455	1.21	2.80	0.30	0.33	31040.44	0.0235	0.004	0.004	53.586	41.976
P02030202_C''	J792	J794	104.4	110	141.9	0	2.337787504	1.1455	2.20	4.04	0.29	0.47	44746.52	0.0217	0.333	0.333	53.257	53.257
P02030202_D_H39''	J794	H39''	104.4	110	4.5	10.52	2.337787504	1.1455	2.20	4.04	0.29	0.47	44746.52	0.0217	0.011	0.011	53.579	43.059
P020303_A''	J340	J799	132.4	140	91.3	0	6.933381186	1.1455	8.46	10.27	0.25	0.75	89749.39	0.0187	0.365	0.365	53.225	53.225
P020303_A_H58''	J799	H58''	104.4	110	2.5	18.4	1.552970744	1.1455	1.21	2.81	0.30	0.33	31172.19	0.0235	0.003	0.003	53.587	35.187
P020303_B''	J799	J801	132.4	140	107.8	0	5.380410442	1.1455	7.26	8.47	0.26	0.61	74015.09	0.0194	0.305	0.305	53.285	53.285
P020303_B_H57''	J801	H57''	152	160	2.5	19.99	2.297796841	1.1455	2.09	3.95	0.29	0.22	30105.24	0.0236	0.001	0.001	53.589	33.599
P020303_B_H59''	J801	H59''	132.4	140	359.8	21.37	3.082613601	1.1455	5.17	5.69	0.31	0.41	49715.54	0.0211	0.498	0.498	53.092	31.722
P0204_I_H22''	J822	H22''	152	160	255.6	9.38	3.759122316	1.1455	8.47	7.09	0.31	0.39	54012.71	0.0207	0.271	23.770	29.820	26.440
P0205_A''	J806	J807	190	200	170.5	0	15.9346129	1.1455	20.36	21.10	0.22	0.74	128564.01	0.0173	0.439	18.405	35.185	35.185
P0205_B''	J807	J808	104.4	110	11	0	11.44399471	1.1455	14.20	15.76	0.23	1.84	174734.87	0.0167	0.304	0.304	53.286	53.286
P0205_B_H32''	J808	H32''	104.4	110	4.5	10.02	2.729362745	1.1455	4.09	5.05	0.31	0.59	55935.12	0.0207	0.016	0.016	53.574	43.554
P0205_C''	J808	J810	104.4	110	124	0	8.714631964	1.1455	10.11	12.36	0.24	1.44	137003.81	0.0174	2.197	2.197	51.393	51.393
P0205_C_H33''	J810	H33''	104.4	110	6	10.05	2.366114223	1.1455	2.45	4.16	0.29	0.49	46116.45	0.0215	0.015	0.015	53.575	43.525

Tuberia	Nudo Ini	Nudo Fin	Diam (mm)	DN	Long (m)	z(fin)	∑pi·Qi	U	∑pi·(1-pi)·Qi^2	Q diseño	ks	V (m/s)	Re	f	hf	∑hf	H(fin)	P(fin)
P0205_D''	J810	J812	104.4	110	122.6	0	6.34851774	1.1455	7.66	9.52	0.25	1.11	105536.60	0.0182	1.350	1.350	52.240	52.240
P0205_D_H34''	J812	H34''	104.4	110	100.3	10.68	2.037857532	1.1455	2.42	3.82	0.31	0.45	42342.34	0.0219	0.214	0.214	53.376	42.696
P0205_E''	J812	J814	104.4	110	56	0	4.310660209	1.1455	5.24	6.93	0.27	0.81	76870.58	0.0194	0.348	0.348	53.242	53.242
P0205_E_H36''	J814	H36''	104.4	110	168.8	9.54	2.602725646	1.1455	3.20	4.65	0.30	0.54	51575.10	0.0210	0.511	0.511	53.079	43.539
P0205_F_H35''	J814	H35''	104.4	110	167.1	10.45	1.707934563	1.1455	2.04	3.34	0.33	0.39	37085.34	0.0226	0.281	0.281	53.309	42.859
P020502_A''	J807	J817	213.6	225	354	0	4.490618192	1.1455	6.16	7.33	0.27	0.20	39745.72	0.0220	0.078	0.078	53.512	53.512
P020502_A_H38''	J817	H38''	104.4	110	4.8	9.14	2.232812014	1.1455	3.63	4.41	0.33	0.52	48941.74	0.0212	0.013	0.013	53.577	44.437
P020502_B_H37''	J817	H37''	152	160	150.2	8.88	2.257806178	1.1455	2.54	4.08	0.30	0.22	31087.66	0.0234	0.060	0.060	53.530	44.650
P0206_A''	J824	J825	152	160	220.8	0	14.06838196	1.1455	15.43	18.57	0.22	1.02	141400.47	0.0171	1.327	25.254	28.336	28.336
P0206_A_H24''	J825	H24''	104.4	110	5.5	8.54	1.432998755	1.1455	1.32	2.75	0.32	0.32	30480.98	0.0236	0.007	0.007	53.583	45.043
P0206_B''	J825	J827	152	160	75.5	0	12.63538321	1.1455	14.11	16.94	0.22	0.93	128989.48	0.0174	0.384	0.384	53.206	53.206
P0206_B_H25''	J827	H25''	117.8	125	39.3	9.32	1.981204093	1.1455	2.65	3.84	0.32	0.35	37778.15	0.0224	0.047	0.047	53.543	44.223
P0206_C''	J827	J829	132.4	140	97.4	0	10.65417912	1.1455	11.47	14.53	0.23	1.06	127053.61	0.0175	0.732	0.732	52.858	52.858
P0206_C_H26''	J829	H26''	117.8	125	127.5	10.25	1.954543651	1.1455	2.19	3.65	0.31	0.33	35857.12	0.0227	0.140	0.140	53.450	43.200
P0206_D''	J829	J831	117.8	125	120.6	0	8.699635465	1.1455	9.28	12.19	0.23	1.12	119765.25	0.0178	1.159	1.159	52.431	52.431
P0206_D_H27''	J831	H27''	104.4	110	4.8	10.47	1.264704715	1.1455	1.01	2.42	0.32	0.28	26806.82	0.0243	0.005	0.005	53.585	43.115
P0206_E''	J831	J833	104.4	110	72.7	0	7.43493075	1.1455	8.26	10.73	0.24	1.25	118941.76	0.0179	0.995	0.995	52.595	52.595
P0206_E_H29''	J833	H29''	117.8	125	206.8	9.03	1.884559991	1.1455	1.85	3.44	0.30	0.32	33819.36	0.0230	0.205	0.205	53.385	44.355
P0206_F''	J833	J835	104.4	110	76.4	0	5.550370759	1.1455	6.42	8.45	0.25	0.99	93706.90	0.0187	0.678	0.678	52.912	52.912
P0206_F_H28''	J835	H28''	104.4	110	4.1	10.72	1.706268285	1.1455	1.81	3.25	0.32	0.38	35982.25	0.0227	0.007	0.007	53.583	42.863
P0206_G''	J835	J837	104.4	110	430.9	0	3.844102474	1.1455	4.61	6.30	0.27	0.74	69890.23	0.0197	2.252	2.252	51.338	51.338
P0206_G_H31''	J837	H31''	104.4	110	4.7	9.19	1.846235605	1.1455	2.63	3.70	0.33	0.43	41051.63	0.0221	0.009	0.009	53.581	44.391
P0206_H_H30''	J837	H30''	104.4	110	414.4	8.34	1.997866869	1.1455	1.98	3.61	0.30	0.42	40040.26	0.0222	0.799	0.799	52.791	44.451
P04_A''	J297	J298	379.8	400	234	0	40.96543534	1.1455	91.24	51.91	0.21	0.46	158193.74	0.0165	0.109	17.621	35.969	35.969
P04_A_H13''	J298	H13''	117.8	125	23.3	15.1	1.944545985	1.1455	2.57	3.78	0.32	0.35	37165.79	0.0225	0.027	0.027	53.563	38.463
P04_B''	J298	J300	379.8	400	109.7	0	39.02088936	1.1455	88.66	49.81	0.21	0.44	151793.69	0.0166	0.047	0.047	53.543	53.543
P04_B_H12''	J300	H12''	117.8	125	4	16.71	1.91288671	1.1455	2.15	3.59	0.31	0.33	35296.38	0.0228	0.004	0.004	53.586	36.876
P04_C''	J300	J302	337.4	355	379.1	0	37.10800265	1.1455	86.51	47.76	0.21	0.53	163855.53	0.0164	0.268	0.268	53.322	53.322
P04_C_H11''	J302	H11''	152	160	6.1	19.07	4.352317149	1.1455	13.28	8.53	0.33	0.47	64926.22	0.0199	0.009	0.009	53.581	34.511
P04_D''	J302	J322	337.4	355	168.3	0	32.48074969	1.1455	73.24	42.28	0.22	0.47	145060.04	0.0168	0.095	0.095	53.495	53.495
P04_D_2''	J322	J304	337.4	355	5.6	0	27.6402132	1.1455	62.75	36.71	0.22	0.41	125951.80	0.0172	0.002	0.002	53.588	53.588
P04_D_H60''	J322	H60''	152	160	3.4	19.84	4.840536492	1.1455	10.49	8.55	0.29	0.47	65117.35	0.0199	0.005	0.005	53.585	33.745
P04_E''	J304	J305	337.4	355	672.4	0	27.6402132	1.1455	62.70	36.71	0.22	0.41	125940.21	0.0172	0.295	0.295	53.295	53.295
P04_E_H62''	J305	H62''	152	160	4.4	22.28	3.84743503	1.1455	8.97	7.28	0.32	0.40	55426.01	0.0206	0.005	0.005	53.585	31.305
P04_F''	J305	J307	337.4	355	434.6	0	23.79277817	1.1455	53.73	32.19	0.23	0.36	110429.03	0.0177	0.151	0.151	53.439	53.439
P04_F_H63''	J307	H63''	152	160	6.2	23.37	3.88242686	1.1455	9.52	7.42	0.32	0.41	56482.82	0.0205	0.007	0.007	53.583	30.213
P04_G''	J307	J309	237.4	250	216.6	0	19.91035131	1.1455	44.21	27.53	0.23	0.62	134210.93	0.0171	0.308	0.308	53.282	53.282
P04_H''	J309	J310	237.4	250	163	0	13.75845433	1.1455	36.96	20.72	0.25	0.47	101038.16	0.0181	0.139	0.139	53.451	53.451
P04_H_H64''	J310	H64''	152	160	251.8	24.35	5.24877451	1.1455	17.66	10.06	0.32	0.55	76629.84	0.0192	0.500	0.500	53.090	28.740
P04_I''	J310	J312	237.4	250	156.9	0	8.509679816	1.1455	19.30	13.54	0.27	0.31	66027.68	0.0197	0.062	0.062	53.528	53.528
P04_I_H71''	J312	H71''	152	160	104.1	25.78	1.961208761	1.1455	1.81	3.50	0.30	0.19	26657.54	0.0242	0.031	0.031	53.559	27.779
P04_J''	J312	J314	237.4	250	157.5	0	6.548471055	1.1455	17.49	11.34	0.29	0.26	55289.25	0.0205	0.045	0.045	53.545	53.545
P04_J_H65''	J314	H65''	190	200	468.3	25.76	4.117372004	1.1455	14.32	8.45	0.34	0.30	51488.47	0.0208	0.233	0.233	53.357	27.597
P04_J_H66''	J314	H66''	132.4	140	71.8	22.46	2.431099051	1.1455	3.18	4.47	0.31	0.32	39105.44	0.0222	0.065	0.065	53.525	31.065
P0402_A''	J309	J317	117.8	125	76.9	0	6.151896981	1.1455	7.24	9.23	0.25	0.85	90739.06	0.0187	0.447	0.447	53.143	53.143
P0402_A_H70''	J317	H70''	117.8	125	99.4	24.33	2.007864535	1.1455	1.95	3.61	0.30	0.33	35461.28	0.0228	0.107	0.107	53.483	29.153
P0402_B''	J317	J319	117.8	125	392.5	0	4.144032446	1.1455	5.29	6.78	0.27	0.62	66604.19	0.0199	1.306	1.306	52.284	52.284
P0402_B_H67''	J319	H67''	117.8	125	228.1	22.74	2.537740819	1.1455	3.84	4.78	0.31	0.44	47001.04	0.0214	0.407	0.407	53.183	30.443
P0402_B_H69''	J319	H69''	104.4	110	4.6	21.31	1.606291628	1.1455	1.45	2.98	0.31	0.35	33080.12	0.0231	0.006	0.006	53.584	32.274

1.3.4 Resultados de las tuberías secundarias de la alternativa con modificación de ubicación de hidrantes

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
P01_A''	J252	J253	15.4	213.6	225	53.07
P01_B''	J253	J262	32.6	213.6	225	52.98
P01_C''	J262	J264	141.7	213.6	225	52.58
P01_C_H2''	J262	H2''	2.3	132.4	140	39.06
P01_C_H6''	J264	H6''	9.9	132.4	140	38.69
P01_D''	J264	J283	201	190	200	51.75
P01_D_H8''	J283	H8''	5.1	132.4	140	37.46
P01_E''	J283	J267	8.9	152	160	51.66
P01_F''	J267	J273	210.6	132.4	140	49.46
P01_G''	J273	J279	87.4	104.4	110	48.91
P01_G_H50''	J279	H50''	3.4	104.4	110	32.56
P0101_A''	J253	J254	175.5	104.4	110	51.38
P0101_A_H3''	J254	H3''	3.8	104.4	110	38.86
P0101_B''	J254	J258	104.7	104.4	110	50.74
P0101_B_H4''	J258	H4''	3.6	104.4	110	37.53
P0101_C''	J258	H5''	134	104.4	110	36.77
P0102_H7''	J264	H7''	146.4	132.4	140	38.47
P0103_H51''	J279	H51''	306.1	104.4	110	31.9
P0104_A''	J267	J269	241.7	104.4	110	50.11
P0104_A_H9''	J269	H9''	3.6	104.4	110	35.8
P0104_B''	J269	J271	506.1	104.4	110	48.71
P0104_B_H10''	J271	H10''	4.9	104.4	110	29.78
P0104_C_H61''	J271	H61''	53.4	104.4	110	30.76
P0106_A''	J273	J274	35.8	117.8	125	49.2
P0106_A_H54''	J274	H54''	169	104.4	110	31.43
P0106_B''	J274	J276	322.2	117.8	125	48
P0106_B_H53''	J276	H53''	5.1	104.4	110	33.03
P0106_C_H52''	J276	H52''	280	104.4	110	27.24
P02_A''	J285	J252	136.9	379.8	400	53.14
P02_A_H1''	J285	H1''	67.6	132.4	140	38.53
P02_B''	UGD44	J285	110.8	379.8	400	53.17
P02_C''	J287	J295-UGD44	39.9	132.4	140	53.21
P02_C_H15''	J295-UGD44	H15''	3.7	104.4	110	39.19
P02_D''	J295-UGD44	J297	7.2	474.6	500	53.2
P02_E''	J297	J324	64.8	337.4	355	53.04
P02_F''	J324	J806	24.6	190	200	52.79
P02_G''	J806	J820	175.3	190	200	51.9
P02_G_H20''	J820	H20''	2.5	132.4	140	42.63
P02_H''	J820	J841	384.4	152	160	46.76
P02_H_H21''	J841	H21''	3	117.8	125	37.98
P02_I''	J841	J822	7.6	152	160	46.68
P02_J''	J822	J824	59.7	152	160	46.23
P02_J_H23''	J824	H23''	88.5	104.4	110	37.64
P0202_A''	J287	J288	208.9	104.4	110	49.5
P0202_A_H16''	J288	H16''	4.8	117.8	125	38.18
P0202_B''	J288	J290	101.9	104.4	110	48.48

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
P0202_B_H17''	J290	H17''	4.2	104.4	110	37.83
P0202_C''	J290	J292	148.9	104.4	110	47.53
P0202_C_H18''	J292	H18''	3.7	104.4	110	36.1
P0202_D''	J292	H19''	274.7	104.4	110	34.7
P0203_A''	J324	J325	231.7	337.4	355	52.86
P0203_A_H14''	J325	H14''	3.8	104.4	110	38.39
P0203_B''	J325	J327	274.9	337.4	355	52.65
P0203_B_H44''	J332	H44''	3.3	152	160	36.64
P0203_C''	J327	J332	164	190	200	51.14
P0203_C_H43''	J337	H43''	2.8	104.4	110	33.45
P0203_D''	J332	J337	235	190	200	49.3
P0203_D_H68_2"	J1245	H68''	5.2	104.4	110	32.04
P0203_E''	J337	J339	5.1	152	160	49.19
P0203_F''	J339	J340	5.9	152	160	49.16
P0203_G''	J340	J795	125.6	152	160	49.05
P0203_G_H49''	J795	H49''	30.3	104.4	110	34.35
P0203_H_H68''	J795	J1245	549.9	104.4	110	47.61
P020301''	J327	J328	154.4	104.4	110	51.75
P020301_H55''	J328	H55''	140.4	104.4	110	32.18
P020301_H56''	J328	H56''	63.3	104.4	110	31.49
P020302_A''	J339	J342	236.6	152	160	47.81
P020302_B''	J342	J343	139.8	117.8	125	46.71
P020302_B_H41''	J343	H41''	15.5	117.8	125	34.38
P020302_C''	J343	J345	24.4	104.4	110	46.49
P020302_C_H45''	J345	H45''	87.4	104.4	110	32.97

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
P020302_D''	J345	J347	162.3	104.4	110	45.62
P020302_D_H46''	J347	J537	145.2	104.4	110	45.51
P020302_D_H46_2''	J537	H46''	3	104.4	110	33.24
P020302_E''	J347	J349	199.5	104.4	110	45.12
P020302_E_H47''	J349	H47''	80.5	104.4	110	32.69
P020302_F_H48''	J349	H48''	359.6	104.4	110	29.97
P02030202_A''	J342	J790	6.2	104.4	110	47.77
P02030202_A_H42''	J790	H42''	5	104.4	110	35.92
P02030202_B''	J790	J792	188.7	104.4	110	47.17
P02030202_B_H40''	J792	H40''	3.4	104.4	110	35.56
P02030202_C''	J792	J794	141.9	104.4	110	47
P02030202_D_H39''	J794	H39''	4.5	104.4	110	36.48
P020303_A''	J340	J799	91.3	132.4	140	48.65
P020303_A_H58''	J799	H58''	2.5	104.4	110	30.25
P020303_B''	J799	J801	107.8	132.4	140	48.2
P020303_B_H57''	J801	H57''	2.5	152	160	28.21
P020303_B_H59''	J801	H59''	359.8	132.4	140	26.27
P0204_I_H22''	J822	H22''	255.6	152	160	37.12
P0205_A''	J806	J807	170.5	190	200	52.47
P0205_B''	J807	J808	11	104.4	110	52.23
P0205_B_H32''	J808	H32''	4.5	104.4	110	42.2
P0205_C''	J808	J810	124	104.4	110	50.5
P0205_C_H33''	J810	H33''	6	104.4	110	40.44
P0205_D''	J810	J812	122.6	104.4	110	49.61
P0205_D_H34''	J812	H34''	100.3	104.4	110	38.83

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
P0205_E''	J812	J814	56	104.4	110	49.37
P0205_E_H36''	J814	H36''	168.8	104.4	110	39.56
P0205_F_H35''	J814	H35''	167.1	104.4	110	38.78
P020502_A''	J807	J817	354	213.6	225	52.43
P020502_A_H38''	J817	H38''	4.8	104.4	110	43.29
P020502_B_H37''	J817	H37''	150.2	152	160	43.52
P0206_A''	J824	J825	220.8	152	160	44.83
P0206_A_H24''	J825	H24''	5.5	104.4	110	36.29
P0206_B''	J825	J827	75.5	152	160	44.44
P0206_B_H25''	J827	H25''	39.3	117.8	125	35.1
P0206_C''	J827	J829	97.4	132.4	140	43.74
P0206_C_H26''	J829	H26''	127.5	117.8	125	33.43
P0206_D''	J829	J831	120.6	117.8	125	42.63
P0206_D_H27''	J831	H27''	4.8	104.4	110	32.16
P0206_E''	J831	J833	72.7	104.4	110	41.71
P0206_E_H29''	J833	H29''	206.8	117.8	125	32.59
P0206_F''	J833	J835	76.4	104.4	110	41.11
P0206_F_H28''	J835	H28''	4.1	104.4	110	30.38
P0206_G''	J835	J837	430.9	104.4	110	39.05
P0206_G_H31''	J837	H31''	4.7	104.4	110	29.85
P0206_H_H30''	J837	H30''	414.4	104.4	110	30.33
P04_A''	J297	J298	234	379.8	400	53.07
P04_A_H13''	J298	H13''	23.3	117.8	125	37.96
P04_B''	J298	J300	109.7	379.8	400	53.01

Tubería	Nodo ini	Nodo fin	Long (m)	Dint (mm)	DN (mm)	Presión (mca)
P04_B_H12''	J300	H12''	4	117.8	125	36.3
P04_C''	J300	J302	379.1	337.4	355	52.68
P04_C_H11''	J302	H11''	6.1	152	160	33.6
P04_D''	J302	J322	168.3	337.4	355	52.56
P04_D_2''	J322	J304	5.6	337.4	355	52.55
P04_D_H60''	J322	H60''	3.4	152	160	32.71
P04_E''	J304	J305	672.4	337.4	355	52.17
P04_E_H62''	J305	H62''	4.4	152	160	29.89
P04_F''	J305	J307	434.6	337.4	355	51.96
P04_F_H63''	J307	H63''	6.2	152	160	28.58
P04_G''	J307	J309	216.6	237.4	250	51.53
P04_H''	J309	J310	163	237.4	250	51.3
P04_H_H64''	J310	H64''	251.8	152	160	26.29
P04_I''	J310	J312	156.9	237.4	250	51.21
P04_I_H71''	J312	H71''	104.1	152	160	25.38
P04_J''	J312	J314	157.5	237.4	250	51.17
P04_J_H65''	J314	H65''	468.3	190	200	25.26
P04_J_H66''	J314	H66''	71.8	132.4	140	28.64
P0402_A''	J309	J317	76.9	117.8	125	51.07
P0402_A_H70''	J317	H70''	99.4	117.8	125	26.69
P0402_B''	J317	J319	392.5	117.8	125	49.41
P0402_B_H67''	J319	H67''	228.1	117.8	125	26.11
P0402_B_H69''	J319	H69''	4.6	104.4	110	28.1

CAPÍTULO II: SUPERFICIE REGABLE POR PARCELA

En este capítulo se puede observar la superficie regable para cada parcela. Con la superficie se puede calcular la demanda en cada parcela, multiplicándola por el caudal instantáneo por unidad de superficie, mencionado en el capítulo 2.4.1 del trabajo final del máster.

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Hidrante - NºParcela	Superf (has)
H-01-P-1	0.17
H-01-P-2	0.58
H-01-P-3	0.58
H-01-P-4	0.77
H-01-P-5	0.33
H-01-P-6	0.08
H-01-P-7	0.27
H-01-P-8	0.4
H-01-P-9	0.1
H-01-P-10	0.06
H-01-P-11	0.29
H-01-P-12	0.35
H-01-P-13	0.15
H-01-P-14	0.04
H-02-P-1	0.23
H-02-P-2	0.29
H-02-P-3	0.17
H-02-P-4	0.21
H-02-P-5	0.54

Hidrante - NºParcela	Superf (has)
H-02-P-6	0.44
H-02-P-7	0.38
H-02-P-8	0.71
H-02-P-9	0.27
H-02-P-10	0.31
H-02-P-11	0.17
H-03-P-1	0.27
H-03-P-2	0.31
H-03-P-3	0.5
H-03-P-4	0.46
H-03-P-5	0.06
H-03-P-6	0.15
H-03-P-7	0.48
H-03-P-8	0.1
H-03-P-9	0.27
H-03-P-10	0.17
H-03-P-11	0.15
H-03-P-12	0.31
H-03-P-13	0.23

Hidrante - NºParcela	Superf (has)
H-03-P-14	0.13
H-04-P-1	0.15
H-04-P-2	0.23
H-04-P-3	0.1
H-04-P-4	0.08
H-04-P-5	0.17
H-04-P-6	0.08
H-04-P-7	0.25
H-04-P-8	0.29
H-04-P-9	0.1
H-04-P-10	0.1
H-04-P-11	0.15
H-04-P-12	0.17
H-04-P-13	0.08
H-05-P-1	0.15
H-05-P-2	0.33
H-05-P-3	0.25
H-05-P-4	0.23
H-05-P-5	0.21

Hidrante - NºParcela	Superf (has)
H-05-P-6	0.42
H-05-P-7	0.15
H-05-P-8	0.23
H-05-P-9	0.31
H-05-P-10	0.4
H-05-P-11	0.33
H-06-P-1	0.17
H-06-P-2	0.1
H-06-P-3	0.29
H-06-P-4	0.15
H-06-P-5	0.4
H-06-P-6	0.17
H-06-P-7	0.35
H-06-P-8	0.1
H-06-P-9	0.15
H-06-P-10	0.67
H-06-P-11	0.04
H-06-P-12	0.17
H-07-P-1	0.13

Hidrante - NºParcela	Superf (has)
H-07-P-2	0.23
H-07-P-3	0.42
H-07-P-4	0.25
H-07-P-5	0.33
H-07-P-6	0.17
H-07-P-7	0.9
H-07-P-8	0.38
H-07-P-9	0.65
H-08-P-1	0.27
H-08-P-2	0.02
H-08-P-3	0.75
H-08-P-4	0.67
H-08-P-5	0.56
H-08-P-6	0.35
H-08-P-7	0.06
H-08-P-8	0.08
H-08-P-9	0.23
H-08-P-10	0.13
H-08-P-11	0.21
H-08-P-12	0.4
H-08-P-13	0.15
H-09-P-1	0.33
H-09-P-2	0.19
H-09-P-3	0.25

Hidrante - NºParcela	Superf (has)
H-09-P-4	0.23
H-09-P-5	0.17
H-09-P-6	0.38
H-09-P-7	0.19
H-09-P-8	0.17
H-09-P-9	0.23
H-09-P-10	0.35
H-09-P-11	0.15
H-09-P-12	0.25
H-09-P-13	0.08
H-10-P-1	0.35
H-10-P-2	0.54
H-10-P-3	0.31
H-10-P-4	0.44
H-10-P-5	0.52
H-10-P-6	0.15
H-10-P-7	0.27
H-10-P-8	0.38
H-10-P-9	0.46
H-10-P-10	0.33
H-10-P-11	0.06
H-11-P-1	0.17
H-11-P-2	0.08
H-11-P-3	0.1

Hidrante - NºParcela	Superf (has)
H-11-P-4	0.1
H-11-P-5	0.77
H-11-P-6	0.23
H-11-P-7	0.1
H-11-P-8	0.19
H-11-P-9	0.17
H-11-P-10	0.23
H-11-P-11	0.23
H-11-P-12	0.29
H-11-P-13	0.19
H-11-P-14	0.04
H-12-P-1	0.71
H-12-P-2	0.52
H-12-P-3	0.17
H-12-P-4	0.33
H-12-P-5	0.21
H-12-P-6	0.44
H-12-P-7	0.13
H-12-P-8	0.1
H-12-P-9	0.33
H-13-P-1	0.17
H-13-P-2	0.25
H-13-P-3	0.23
H-13-P-4	0.25

Hidrante - NºParcela	Superf (has)
H-13-P-5	0.13
H-13-P-6	0.08
H-13-P-7	0.17
H-13-P-8	0.1
H-13-P-9	0.19
H-13-P-10	0.1
H-13-P-11	0.33
H-13-P-12	0.25
H-13-P-13	0.08
H-13-P-14	0.17
H-13-P-15	0.21
H-14-P-1	0.52
H-14-P-2	0.13
H-14-P-3	0.19
H-14-P-4	0.1
H-14-P-5	0.1
H-14-P-6	0.17
H-14-P-7	0.21
H-14-P-8	0.23
H-14-P-9	0.23
H-14-P-10	0.08
H-14-P-11	0.33
H-14-P-12	0.13
H-14-P-13	0.06

Hidrante - NºParcela	Superf (has)
H-14-P-14	0.08
H-15-P-1	0.23
H-15-P-2	0.96
H-15-P-3	1.04
H-15-P-4	0.25
H-15-P-5	0.15
H-15-P-6	0.13
H-15-P-7	0.06
H-15-P-8	0.21
H-15-P-9	0.33
H-15-P-10	0.4
H-15-P-11	0.13
H-15-P-12	0.38
H-15-P-13	0.13
H-15-P-14	0.13
H-15-P-15	0.21
H-16-P-1	0.25
H-16-P-2	0.08
H-16-P-3	0.13
H-16-P-4	0.1
H-16-P-5	0.1
H-16-P-6	0.25
H-16-P-7	0.19
H-16-P-8	0.15

Hidrante - NºParcela	Superf (has)
H-16-P-9	0.13
H-16-P-10	0.08
H-16-P-11	0.1
H-16-P-12	0.08
H-16-P-13	0.13
H-16-P-14	0.1
H-17-P-1	0.23
H-17-P-2	0.15
H-17-P-3	0.21
H-17-P-4	0.31
H-17-P-5	1.5
H-17-P-6	0.25
H-17-P-7	0.25
H-17-P-8	0.33
H-17-P-9	0.21
H-17-P-10	0.04
H-17-P-11	0.19
H-17-P-12	0.33
H-17-P-13	0.15
H-17-P-14	0.19
H-17-P-15	0.23
H-18-P-1	0.48
H-18-P-2	0.73
H-18-P-3	0.23

Hidrante - NºParcela	Superf (has)
H-18-P-4	0.27
H-18-P-5	0.06
H-18-P-6	0.19
H-18-P-7	0.35
H-18-P-8	0.1
H-18-P-9	0.15
H-18-P-10	0.04
H-18-P-11	0.08
H-18-P-12	0.02
H-19-P-1	0.35
H-19-P-2	0.42
H-19-P-3	0.29
H-19-P-4	0.31
H-19-P-5	0.21
H-19-P-6	0.31
H-19-P-7	0.29
H-19-P-8	0.54
H-19-P-9	0.29
H-19-P-10	0.33
H-19-P-11	0.23
H-19-P-12	1.15
H-19-P-13	0.27
H-19-P-14	0.54
H-19-P-15	0.23

Hidrante - NºParcela	Superf (has)
H-20-P-1	1.23
H-20-P-2	0.29
H-20-P-3	0.94
H-20-P-4	1.52
H-20-P-5	2.02
H-20-P-6	0.25
H-20-P-7	0.58
H-20-P-8	1.15
H-20-P-9	0.31
H-20-P-10	0.17
H-20-P-11	0.25
H-20-P-12	0.58
H-21-P-1	0.17
H-21-P-2	0.27
H-21-P-3	1.52
H-21-P-4	0.67
H-21-P-5	0.33
H-21-P-6	0.44
H-21-P-7	0.1
H-21-P-8	0.56
H-21-P-9	0.15
H-21-P-10	0.19
H-21-P-11	0.17
H-21-P-12	0.13

Hidrante - NºParcela	Superf (has)
H-21-P-13	0.08
H-21-P-14	0.1
H-22-P-1	0.1
H-22-P-2	1.48

Hidrante - NºParcela	Superf (has)
H-22-P-3	0.92
H-22-P-4	0.21
H-22-P-5	0.25
H-22-P-6	0.35

Hidrante - NºParcela	Superf (has)
H-22-P-7	0.69
H-22-P-8	0.19
H-22-P-9	0.54
H-22-P-10	0.38

Hidrante - NºParcela	Superf (has)
H-22-P-11	0.27

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Hidrante - NºParcela	Superf. (has)
H-1-P-1	0.08
H-1-P-2	2.33
H-1-P-3	2.71
H-1-P-4	0.85
H-1-P-5	0.1
H-1-P-6	0.21
H-1-P-7	0.25
H-1-P-8	0.27
H-1-P-9	0.25
H-1-P-10	0.08
H-1-P-11	0.33
H-1-P-12	1
H-2-P-1	0.17
H-2-P-2	0.21
H-2-P-3	0.21
H-2-P-4	0.29

Hidrante - NºParcela	Superf. (has)
H-2-P-5	1.21
H-2-P-6	0.21
H-2-P-7	0.65
H-2-P-8	0.27
H-2-P-9	0.08
H-2-P-10	0.06
H-2-P-11	0.5
H-2-P-12	0.75
H-2-P-13	0.08
H-2-P-14	0.08
H-3-P-1	0.06
H-3-P-2	0.29
H-3-P-3	0.17
H-3-P-4	0.19
H-3-P-5	0.42
H-3-P-6	0.1

Hidrante - NºParcela	Superf. (has)
H-3-P-7	0.21
H-3-P-8	0.21
H-3-P-9	0.27
H-3-P-10	0.15
H-3-P-11	1.04
H-3-P-12	0.25
H-3-P-13	0.42
H-4-P-1	0.21
H-4-P-2	0.4
H-4-P-3	0.31
H-4-P-4	0.29
H-4-P-5	0.25
H-4-P-6	0.08
H-4-P-7	0.31
H-4-P-8	0.31
H-4-P-9	0.21

Hidrante - NºParcela	Superf. (has)
H-4-P-10	0.42
H-4-P-11	0.25
H-4-P-12	0.56
H-4-P-13	0.75
H-4-P-14	0.42
H-5-P-1	0.25
H-5-P-2	0.35
H-5-P-3	0.5
H-5-P-4	0.19
H-5-P-5	0.19
H-5-P-6	0.21
H-5-P-7	0.19
H-5-P-8	0.21
H-5-P-9	0.56
H-5-P-10	0.21
H-5-P-11	0.23

Hidrante - NºParcela	Superf. (has)
H-5-P-12	0.04
H-5-P-13	0.15
H-5-P-14	0.27
H-5-P-15	0.1
H-6-P-1	0.13
H-6-P-2	0.63
H-6-P-3	0.58
H-6-P-4	0.5
H-6-P-5	0.27
H-6-P-6	0.25
H-6-P-7	0.17
H-6-P-8	0.1
H-6-P-9	0.1
H-6-P-10	0.13
H-6-P-11	0.23
H-6-P-12	0.15
H-6-P-13	0.42
H-7-P-1	0.19
H-7-P-2	0.29
H-7-P-3	0.23
H-7-P-4	0.13
H-7-P-5	0.13
H-7-P-6	0.1
H-7-P-7	0.46

Hidrante - NºParcela	Superf. (has)
H-7-P-8	0.25
H-7-P-9	0.5
H-7-P-10	0.23
H-7-P-11	0.25
H-7-P-12	0.25
H-8-P-1	0.1
H-8-P-2	0.1
H-8-P-3	0.1
H-8-P-4	0.06
H-8-P-5	0.25
H-8-P-6	0.17
H-8-P-7	0.44
H-8-P-8	0.15
H-8-P-9	0.15
H-8-P-10	0.08
H-8-P-11	0.15
H-9-P-1	0.13
H-9-P-2	0.06
H-9-P-3	0.15
H-9-P-4	0.83
H-9-P-5	0.15
H-9-P-6	0.21
H-9-P-7	0.52
H-9-P-8	0.25

Hidrante - NºParcela	Superf. (has)
H-9-P-9	0.17
H-9-P-10	0.25
H-9-P-11	0.25
H-9-P-12	0.19
H-9-P-13	0.21
H-9-P-14	0.29
H-10-P-1	0.1
H-10-P-2	0.48
H-10-P-3	0.29
H-10-P-4	0.1
H-10-P-5	0.13
H-10-P-6	0.15
H-10-P-7	0.31
H-10-P-8	0.21
H-10-P-9	0.38
H-10-P-10	0.44
H-10-P-11	0.21
H-10-P-12	0.25
H-11-P-1	0.19
H-11-P-2	0.27
H-11-P-3	0.25
H-11-P-4	0.5
H-11-P-5	0.29
H-11-P-6	0.81

Hidrante - NºParcela	Superf. (has)
H-11-P-7	0.31
H-11-P-8	0.23
H-11-P-9	0.25
H-11-P-10	0.08
H-11-P-11	0.13
H-11-P-12	0.21
H-11-P-13	0.19
H-12-P-1	0.5
H-12-P-2	0.06
H-12-P-3	0.17
H-12-P-4	0.19
H-12-P-5	0.21
H-12-P-6	0.13
H-12-P-7	0.08
H-12-P-8	0.1
H-12-P-9	0.1
H-12-P-10	0.25
H-12-P-11	0.08
H-13-P-1	0.4
H-13-P-2	0.38
H-13-P-3	0.23
H-13-P-4	0.08
H-13-P-5	0.29
H-13-P-6	0.31

Hidrante - NºParcela	Superf. (has)
H-13-P-7	0.1
H-13-P-8	0.06
H-13-P-9	0.04
H-13-P-10	0.1
H-13-P-11	0.33
H-13-P-12	0.21
H-14-P-1	0.21
H-14-P-2	0.77
H-14-P-3	0.08
H-14-P-4	0.1
H-14-P-5	0.46
H-14-P-6	0.29
H-14-P-7	0.04
H-14-P-8	0.21
H-14-P-9	0.21
H-14-P-10	0.13
H-14-P-11	0.23
H-14-P-12	0.21
H-14-P-13	0.25
H-15-P-1	0.38
H-15-P-2	0.31
H-15-P-3	0.21
H-15-P-4	0.13
H-15-P-5	0.13

Hidrante - NºParcela	Superf. (has)
H-15-P-6	0.23
H-15-P-7	0.27
H-15-P-8	0.19
H-15-P-9	0.13
H-15-P-10	0.15
H-15-P-11	0.42
H-15-P-12	0.13
H-15-P-13	0.17
H-15-P-14	0.48
H-16-P-1	0.1
H-16-P-2	0.71
H-16-P-3	1.04
H-16-P-4	0.5
H-16-P-5	0.4
H-16-P-6	0.02
H-16-P-7	0.23
H-16-P-8	0.29
H-16-P-9	0.08
H-16-P-10	0.23
H-16-P-11	0.1
H-16-P-12	0.08
H-16-P-13	0.21
H-16-P-14	0.15
H-17-P-1	0.15

Hidrante - NºParcela	Superf. (has)
H-17-P-2	0.5
H-17-P-3	0.71
H-17-P-4	0.33
H-17-P-5	0.17
H-17-P-6	0.46
H-17-P-7	0.67
H-17-P-8	0.73
H-17-P-9	0.69
H-17-P-10	0.9
H-17-P-11	1
H-17-P-12	0.04
H-17-P-13	0.52
H-17-P-14	0.35
H-18-P-1	0.27
H-18-P-2	0.06
H-18-P-3	0.13
H-18-P-4	1.67
H-18-P-5	0.6
H-18-P-6	0.56
H-18-P-7	0.06
H-18-P-8	0.17
H-18-P-9	0.13
H-18-P-10	0.1
H-18-P-11	0.56

Hidrante - NºParcela	Superf. (has)
H-18-P-12	0.23
H-18-P-13	0.25
H-19-P-1	0.29
H-19-P-2	0.42
H-19-P-3	0.38
H-19-P-4	0.13
H-19-P-5	0.21
H-19-P-6	0.21
H-19-P-7	0.42
H-19-P-8	0.17
H-19-P-9	0.42
H-19-P-10	0.29
H-19-P-11	0.73
H-19-P-12	0.25
H-20-P-1	0.15
H-20-P-2	0.15
H-20-P-3	0.31
H-20-P-4	0.35
H-20-P-5	0.35
H-20-P-6	0.17
H-20-P-7	0.33
H-20-P-8	0.31
H-20-P-9	0.5
H-20-P-10	0.54

Hidrante - NºParcela	Superf. (has)
H-21-P-1	0.08
H-21-P-2	0.1
H-21-P-3	0.08
H-21-P-4	0.15
H-21-P-5	0.19
H-21-P-6	0.17
H-21-P-7	0.17
H-21-P-8	0.23
H-21-P-9	0.4
H-21-P-10	0.35
H-21-P-11	0.5
H-22-P-1	0.33
H-22-P-2	0.21
H-22-P-3	0.23
H-22-P-4	0.35
H-22-P-5	0.27
H-22-P-6	0.19
H-22-P-7	0.13
H-22-P-8	0.23
H-22-P-9	0.27
H-22-P-10	0.19
H-22-P-11	0.13
H-22-P-12	0.1
H-23-P-1	0.33

Hidrante - NºParcela	Superf. (has)
H-23-P-2	0.08
H-23-P-3	0.21
H-23-P-4	0.08
H-23-P-5	0.13
H-23-P-6	0.08
H-23-P-7	0.25
H-23-P-8	0.33
H-23-P-9	0.27
H-23-P-10	0.17
H-23-P-11	0.08
H-23-P-12	0.08
H-23-P-13	0.08
H-23-P-14	0.17
H-24-P-1	0.13
H-24-P-2	1.04
H-24-P-3	0.13
H-24-P-4	0.31
H-24-P-5	0.15
H-24-P-6	0.25
H-24-P-7	0.13
H-24-P-8	0.21
H-24-P-9	0.15
H-24-P-10	0.21
H-24-P-11	0.25

Hidrante - NºParcela	Superf. (has)
H-24-P-12	0.13
H-24-P-13	0.29
H-25-P-1	0.42
H-25-P-2	0.15
H-25-P-3	0.17
H-25-P-4	0.15
H-25-P-5	0.25
H-25-P-6	0.25
H-25-P-7	0.1
H-25-P-8	0.13
H-25-P-9	0.17
H-25-P-10	0.13
H-25-P-11	0.1
H-25-P-12	0.19
H-25-P-13	0.15
H-25-P-14	0.13
H-26-P-1	0.25
H-26-P-2	0.19
H-26-P-3	0.17
H-26-P-4	0.15
H-26-P-5	0.42
H-26-P-6	0.08
H-26-P-7	0.19
H-26-P-8	0.65

Hidrante - NºParcela	Superf. (has)
H-26-P-9	0.29
H-26-P-10	0.13
H-26-P-11	0.13
H-26-P-12	0.1
H-26-P-13	0.19
H-27-P-1	0.23
H-27-P-2	0.23
H-27-P-3	0.23
H-27-P-4	0.5
H-27-P-5	0.19
H-27-P-6	0.25
H-27-P-7	0.13
H-27-P-8	0.33
H-27-P-9	0.79
H-27-P-10	0.69
H-27-P-11	0.25
H-27-P-12	0.44
H-27-P-13	0.52
H-27-P-14	0.19
H-28-P-1	0.52
H-28-P-2	0.15
H-28-P-3	0.6
H-28-P-4	0.15
H-28-P-5	0.15

Hidrante - NºParcela	Superf. (has)
H-28-P-6	0.06
H-28-P-7	0.1
H-28-P-8	0.1
H-28-P-9	0.23
H-28-P-10	0.25
H-28-P-11	0.42
H-28-P-12	0.44
H-28-P-13	0.42
H-28-P-14	0.25
H-29-P-1	0.35
H-29-P-2	0.08
H-29-P-3	0.13
H-29-P-4	0.33
H-29-P-5	0.33
H-29-P-6	0.13
H-29-P-7	0.17
H-29-P-8	0.06
H-29-P-9	0.02
H-29-P-10	0.08
H-29-P-11	0.1
H-29-P-12	0.15
H-29-P-13	0.38
H-29-P-14	0.21
H-29-P-15	0.33

Hidrante - NºParcela	Superf. (has)
H-30-P-1	0.4
H-30-P-2	0.04
H-30-P-3	0.1
H-30-P-4	0.04
H-30-P-5	0.19
H-30-P-6	0.13
H-30-P-7	0.13
H-30-P-8	0.29
H-30-P-9	0.17
H-30-P-10	0.17
H-30-P-11	0.19
H-30-P-12	0.42
H-30-P-13	0.15
H-30-P-14	0.31
H-30-P-15	0.1
H-31-P-1	0.25
H-31-P-2	0.19
H-31-P-3	0.54
H-31-P-4	0.15
H-31-P-5	0.29
H-31-P-6	0.29
H-31-P-7	0.15
H-31-P-8	0.75
H-31-P-9	0.15

Hidrante - NºParcela	Superf. (has)
H-31-P-10	0.19
H-31-P-11	0.29
H-31-P-12	0.31
H-32-P-1	0.19
H-32-P-2	0.56
H-32-P-3	0.15
H-32-P-4	0.25
H-32-P-5	0.1
H-32-P-6	0.4
H-32-P-7	0.19
H-32-P-8	0.17
H-32-P-9	0.31
H-32-P-10	0.21
H-32-P-11	0.25
H-32-P-12	0.5
H-32-P-13	0.17
H-32-P-14	0.02
H-32-P-15	0.15
H-33-P-1	0.17
H-33-P-2	0.58
H-33-P-3	0.23
H-33-P-4	0.25
H-33-P-5	0.27
H-33-P-6	0.21

Hidrante - NºParcela	Superf. (has)
H-33-P-7	0.17
H-33-P-8	0.67
H-33-P-9	0.25
H-33-P-10	0.17
H-33-P-11	0.23
H-33-P-12	0.17
H-33-P-13	0.29
H-34-P-1	0.25
H-34-P-2	0.19
H-34-P-3	0.19
H-34-P-4	0.44
H-34-P-5	0.31
H-34-P-6	0.38
H-34-P-7	0.31
H-34-P-8	0.13
H-34-P-9	0.15
H-34-P-10	0.21
H-34-P-11	0.15
H-34-P-12	0.21
H-34-P-13	0.02
H-35-P-1	0.25
H-35-P-2	0.17
H-35-P-3	0.21
H-35-P-4	0.19

Hidrante - NºParcela	Superf. (has)
H-35-P-5	0.15
H-35-P-6	0.25
H-35-P-7	0.13
H-35-P-8	0.35
H-35-P-9	0.38
H-35-P-10	0.06
H-35-P-11	0.25
H-36-P-1	0.15
H-36-P-2	0.1
H-36-P-3	0.21
H-36-P-4	0.19
H-36-P-5	0.17
H-36-P-6	0.19
H-36-P-7	0.19
H-36-P-8	0.21
H-36-P-9	0.1
H-36-P-10	0.21
H-36-P-11	0.17
H-36-P-12	0.13
H-37-P-1	0.17
H-37-P-2	0.17
H-37-P-3	0.17
H-37-P-4	0.17
H-37-P-5	0.75

Hidrante - NºParcela	Superf. (has)
H-37-P-6	0.17
H-37-P-7	0.23
H-37-P-8	0.17
H-37-P-9	0.35
H-37-P-10	0.27
H-37-P-11	0.31
H-37-P-12	0.25
H-37-P-13	0.17
H-38-P-1	0.42
H-38-P-2	0.31
H-38-P-3	0.19
H-38-P-4	0.21
H-38-P-5	0.17
H-38-P-6	0.4
H-38-P-7	0.19
H-38-P-8	0.17
H-38-P-9	0.08
H-38-P-10	0.17
H-38-P-11	0.21
H-38-P-12	0.06
H-39-P-1	0.1
H-39-P-2	0.13
H-39-P-3	0.58
H-39-P-4	0.69

Hidrante - NºParcela	Superf. (has)
H-39-P-5	0.5
H-39-P-6	0.5
H-39-P-7	0.25
H-39-P-8	0.88
H-39-P-9	0.19
H-40-P-1	0.17
H-40-P-2	0.17
H-40-P-3	0.25
H-40-P-4	0.17
H-40-P-5	0.54
H-40-P-6	0.48
H-40-P-7	0.1
H-40-P-8	0.29
H-40-P-9	0.23
H-40-P-10	0.25
H-40-P-11	0.15
H-40-P-12	0.23
H-41-P-1	0.27
H-41-P-2	0.19
H-41-P-3	0.35
H-41-P-4	0.23
H-41-P-5	0.25
H-41-P-6	0.23
H-41-P-7	0.54

Hidrante - NºParcela	Superf. (has)
H-41-P-8	0.19
H-41-P-9	0.17
H-41-P-10	0.21
H-42-P-1	0.1
H-42-P-2	0.21
H-42-P-3	0.21
H-42-P-4	0.08
H-42-P-5	0.25
H-42-P-6	0.1
H-42-P-7	0.27
H-42-P-8	0.1
H-42-P-9	0.19
H-42-P-10	0.06
H-42-P-11	0.38
H-43-P-1	0.48
H-43-P-2	0.25
H-43-P-3	0.13
H-43-P-4	0.27
H-43-P-5	0.17
H-43-P-6	0.1
H-43-P-7	0.1
H-43-P-8	0.23
H-43-P-9	0.23
H-43-P-10	0.29

Hidrante - NºParcela	Superf. (has)
H-43-P-11	0.38
H-44-P-1	0.15
H-44-P-2	0.1
H-44-P-3	0.13
H-44-P-4	0.04
H-44-P-5	0.31
H-44-P-6	0.31
H-44-P-7	0.31
H-44-P-8	0.08
H-44-P-9	0.33
H-44-P-10	0.54
H-44-P-11	0.04
H-44-P-12	0.08
H-44-P-13	0.04
H-45-P-1	0.13
H-45-P-2	0.13
H-45-P-3	0.23
H-45-P-4	0.4
H-45-P-5	0.15
H-45-P-6	0.15
H-45-P-7	0.08
H-45-P-8	0.23
H-45-P-9	0.13
H-45-P-10	0.04

Hidrante - NºParcela	Superf. (has)
H-45-P-11	0.04
H-45-P-12	0.69
H-46-P-1	0.13
H-46-P-2	0.31
H-46-P-3	0.1
H-46-P-4	0.19
H-46-P-5	0.19
H-46-P-6	0.31
H-46-P-7	0.21
H-46-P-8	0.19
H-46-P-9	0.46
H-46-P-10	0.48
H-46-P-11	0.35
H-46-P-12	0.1
H-46-P-13	0.31
H-46-P-14	0.42
H-46-P-15	0.17
H-47-P-1	2.42
H-47-P-2	7.65
H-47-P-3	0.52
H-48-P-1	0.96
H-48-P-2	0.17
H-48-P-3	0.31
H-48-P-4	0.27

Hidrante - NºParcela	Superf. (has)
H-48-P-5	0.17
H-48-P-6	0.25
H-48-P-7	0.17
H-48-P-8	0.25
H-48-P-9	0.27
H-48-P-10	0.23
H-48-P-11	0.5
H-48-P-12	0.35
H-48-P-13	0.48
H-49-P-1	0.04
H-49-P-2	0.02
H-49-P-3	0.21
H-49-P-4	0.19
H-49-P-5	0.23
H-49-P-6	0.25
H-49-P-7	0.19
H-49-P-8	0.42
H-49-P-9	0.23
H-49-P-10	0.17
H-50-P-1	0.17
H-50-P-2	0.56
H-50-P-3	0.77
H-50-P-4	0.19
H-50-P-5	0.15

Hidrante - NºParcela	Superf. (has)
H-50-P-6	0.17
H-50-P-7	0.19
H-50-P-8	0.33
H-50-P-9	0.13
H-50-P-10	0.17
H-50-P-11	0.17
H-51-P-1	0.06
H-51-P-2	0.31
H-51-P-3	0.27
H-51-P-4	0.71
H-51-P-5	0.21
H-51-P-6	0.13
H-51-P-7	0.35
H-51-P-8	0.48
H-51-P-9	0.42
H-51-P-10	0.42
H-51-P-11	0.27
H-51-P-12	0.13
H-51-P-13	0.13
H-51-P-14	0.13
H-52-P-1	0.52
H-52-P-2	0.25
H-52-P-3	0.31
H-52-P-4	0.4

Hidrante - NºParcela	Superf. (has)
H-52-P-5	0.27
H-52-P-6	0.25
H-52-P-7	0.15
H-52-P-8	0.31
H-52-P-9	0.19
H-52-P-10	0.08
H-52-P-11	2.35
H-52-P-12	0.35
H-52-P-13	0.21
H-52-P-14	0.25
H-53-P-1	2.35
H-53-P-2	0.56
H-53-P-3	0.31
H-53-P-4	0.38
H-53-P-5	0.08
H-53-P-6	0.13
H-53-P-7	0.19
H-53-P-8	1.63
H-53-P-9	0.38
H-53-P-10	0.25
H-53-P-11	0.27
H-54-P-1	0.92
H-54-P-2	0.25
H-54-P-3	0.25

Hidrante - NºParcela	Superf. (has)
H-54-P-4	0.15
H-54-P-5	0.35
H-54-P-6	0.19
H-54-P-7	0.54
H-54-P-8	0.1
H-54-P-9	0.19
H-54-P-10	0.44
H-54-P-11	0.27
H-54-P-12	0.33
H-55-P-1	0.19
H-55-P-2	0.19
H-55-P-3	0.19
H-55-P-4	0.27
H-55-P-5	0.67
H-55-P-6	0.54
H-55-P-7	0.13
H-55-P-8	0.27
H-55-P-9	0.15
H-55-P-10	0.15
H-55-P-11	0.25
H-55-P-12	0.42
H-55-P-13	0.27
H-55-P-14	0.27
H-55-P-15	0.13

Hidrante - NºParcela	Superf. (has)
H-56-P-1	0.21
H-56-P-2	0.13
H-56-P-3	0.27
H-56-P-4	0.63
H-56-P-5	0.25
H-56-P-6	0.33
H-56-P-7	0.44
H-56-P-8	0.5
H-56-P-9	0.73
H-56-P-10	0.23
H-56-P-11	0.33
H-56-P-12	0.33
H-56-P-13	0.19
H-56-P-14	0.1
H-57-P-1	0.4
H-57-P-2	0.15
H-57-P-3	0.27
H-57-P-4	0.6
H-57-P-5	0.15
H-57-P-6	0.75
H-57-P-7	0.25
H-57-P-8	0.42
H-57-P-9	0.25
H-57-P-10	0.31

Hidrante - NºParcela	Superf. (has)
H-57-P-11	0.42
H-57-P-12	0.27
H-58-P-1	0.18
H-58-P-2	0.16
H-58-P-3	0.2
H-58-P-4	0.2
H-58-P-5	0.21
H-58-P-6	0.21
H-58-P-7	0.35
H-58-P-8	0.51
H-58-P-9	0.3
H-58-P-10	0.3
H-58-P-11	0.31
H-58-P-12	0.33
H-58-P-13	0.53
H-59-P-1	0.41
H-59-P-2	0.68
H-59-P-3	0.1
H-59-P-4	0.16
H-59-P-5	0.17
H-59-P-6	0.36
H-59-P-7	0.42
H-59-P-8	0.09
H-59-P-9	0.13

Hidrante - NºParcela	Superf. (has)
H-59-P-10	0.16
H-59-P-11	0.16
H-59-P-12	0.18
H-59-P-13	0.2
H-59-P-14	0.26
H-60-P-1	0.05
H-60-P-2	0.07
H-60-P-3	0.19
H-60-P-4	1.12
H-60-P-5	0.14
H-60-P-6	0.14
H-60-P-7	0.15
H-60-P-8	0.15
H-60-P-9	0.21
H-60-P-10	0.27
H-60-P-11	0.31
H-60-P-12	0.49
H-61-P-1	0.13
H-61-P-2	0.17
H-61-P-3	0.21
H-61-P-4	0.23
H-61-P-5	0.34
H-61-P-6	0.42
H-61-P-7	0.11

Hidrante - NºParcela	Superf. (has)
H-61-P-8	0.13
H-61-P-9	0.15
H-61-P-10	0.17
H-61-P-11	0.23
H-61-P-12	0.23
H-61-P-13	0.25
H-61-P-14	0.26
H-62-P-1	0.02
H-62-P-2	0.25
H-62-P-3	0.26
H-62-P-4	0.27
H-62-P-5	0.34
H-62-P-6	0.09
H-62-P-7	0.21
H-62-P-8	0.3
H-62-P-9	0.08
H-62-P-10	0.24
H-62-P-11	0.09
H-62-P-12	0.1
H-62-P-13	0.23
H-62-P-14	0.3
H-63-P-1	0.11
H-63-P-2	0.17
H-63-P-3	0.18

Hidrante - NºParcela	Superf. (has)
H-63-P-4	0.18
H-63-P-5	0.35
H-63-P-6	0.6
H-63-P-7	0.1
H-63-P-8	0.11
H-63-P-9	1.06
H-63-P-10	0.12
H-63-P-11	0.17
H-63-P-12	0.18
H-63-P-13	0.28
H-63-P-14	0.42
H-64-P-1	0.11
H-64-P-2	0.19
H-64-P-3	0.23
H-64-P-4	0.24
H-64-P-5	0.33
H-64-P-6	0.36
H-64-P-7	0.38
H-64-P-8	0.1
H-64-P-9	0.1
H-64-P-10	0.12
H-64-P-11	0.12
H-64-P-12	0.15
H-64-P-13	0.17

Hidrante - NºParcela	Superf. (has)
H-64-P-14	0.3
H-65-P-1	0.04
H-65-P-2	0.23
H-65-P-3	0.39
H-65-P-4	0.52
H-65-P-5	0.12
H-65-P-6	0.15
H-65-P-7	0.15
H-65-P-8	0.23
H-65-P-9	0.26
H-65-P-10	0.26
H-65-P-11	0.27
H-66-P-1	0.08
H-66-P-2	0.39
H-66-P-3	0.19
H-66-P-4	0.22
H-66-P-5	0.39
H-66-P-6	0.09
H-66-P-7	0.14
H-66-P-8	0.24
H-66-P-9	0.25
H-66-P-10	0.25
H-66-P-11	0.3
H-66-P-12	0.3

Hidrante - NºParcela	Superf. (has)
H-67-P-1	0.12
H-67-P-2	0.2
H-67-P-3	0.42
H-67-P-4	0.2
H-67-P-5	0.23
H-67-P-6	0.31
H-67-P-7	0.45

Hidrante - NºParcela	Superf. (has)
H-67-P-8	0.17
H-67-P-9	0.28
H-67-P-10	0.35
H-67-P-11	0.38
H-67-P-12	0.6
H-67-P-13	0.17
H-67-P-14	0.29

Hidrante - NºParcela	Superf. (has)
H-68-P-1	0.08
H-68-P-2	0.15
H-68-P-3	0.11
H-68-P-4	0.18
H-68-P-5	0.48
H-68-P-6	0.49
H-68-P-7	1.24

Hidrante - NºParcela	Superf. (has)
H-68-P-8	0.16
H-68-P-9	0.18
H-68-P-10	0.33
H-68-P-11	0.37
H-68-P-12	0.22

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Hidrante - NºParcela	Superf. (has)
H-1-P-1	0.83
H-1-P-2	0.27
H-1-P-3	0.33
H-1-P-4	0.17
H-1-P-5	0.5
H-1-P-6	0.33
H-1-P-7	0.08
H-1-P-8	0.08
H-1-P-9	0.04
H-1-P-10	0.13
H-1-P-11	0.92

Hidrante - NºParcela	Superf. (has)
H-1-P-12	0.33
H-2-P-1	0.17
H-2-P-2	0.33
H-2-P-3	0.31
H-2-P-4	0.08
H-2-P-5	0.25
H-2-P-6	0.25
H-2-P-7	0.31
H-2-P-8	0.23
H-2-P-9	0.17
H-2-P-10	0.17

Hidrante - NºParcela	Superf. (has)
H-2-P-11	0.06
H-2-P-12	0.08
H-2-P-13	0.25
H-3-P-1	0.08
H-3-P-2	0.17
H-3-P-3	0.19
H-3-P-4	0.17
H-3-P-5	0.42
H-3-P-6	0.08
H-3-P-7	0.08
H-3-P-8	0.42

Hidrante - NºParcela	Superf. (has)
H-3-P-9	0.31
H-3-P-10	0.08
H-3-P-11	0.25
H-3-P-12	0.33
H-3-P-13	0.33
H-4-P-1	0.33
H-4-P-2	0.08
H-4-P-3	0.17
H-4-P-4	0.17
H-4-P-5	0.23
H-4-P-6	0.17

Hidrante - NºParcela	Superf. (has)
H-4-P-7	0.25
H-4-P-8	0.31
H-4-P-9	0.17
H-4-P-10	0.17
H-4-P-11	0.17
H-4-P-12	0.92
H-5-P-1	0.67
H-5-P-2	0.58
H-5-P-3	0.5
H-5-P-4	0.25
H-5-P-5	0.25
H-5-P-6	0.25
H-5-P-7	0.56
H-5-P-8	0.17
H-5-P-9	0.25
H-5-P-10	0.17
H-5-P-11	0.29
H-5-P-12	0.25
H-6-P-1	0.46
H-6-P-2	0.67
H-6-P-3	0.17
H-6-P-4	0.25
H-6-P-5	0.08
H-6-P-6	0.25

Hidrante - NºParcela	Superf. (has)
H-6-P-7	0.17
H-6-P-8	0.08
H-6-P-9	0.08
H-6-P-10	0.08
H-6-P-11	0.08
H-6-P-12	0.42
H-6-P-13	0.33
H-7-P-1	0.17
H-7-P-2	0.17
H-7-P-3	0.17
H-7-P-4	0.17
H-7-P-5	0.44
H-7-P-6	0.25
H-7-P-7	0.42
H-7-P-8	0.17
H-7-P-9	0.5
H-7-P-10	0.25
H-7-P-11	0.75
H-7-P-12	0.42
H-7-P-13	0.17
H-7-P-14	0.17
H-8-P-1	0.48
H-8-P-2	0.15
H-8-P-3	0.5

Hidrante - NºParcela	Superf. (has)
H-8-P-4	0.25
H-8-P-5	0.17
H-8-P-6	0.17
H-8-P-7	0.58
H-8-P-8	0.08
H-8-P-9	0.08
H-8-P-10	0.25
H-8-P-11	0.5
H-8-P-12	0.17
H-8-P-13	0.17
H-8-P-14	0.25
H-9-P-1	0.25
H-9-P-2	0.17
H-9-P-3	0.17
H-9-P-4	0.5
H-9-P-5	0.25
H-9-P-6	0.38
H-9-P-7	0.17
H-9-P-8	0.25
H-9-P-9	0.33
H-9-P-10	0.25
H-9-P-11	0.08
H-9-P-12	0.38
H-9-P-13	0.08

Hidrante - NºParcela	Superf. (has)
H-9-P-14	0.08
H-10-P-1	0.5
H-10-P-2	0.25
H-10-P-3	0.33
H-10-P-4	0.17
H-10-P-5	0.17
H-10-P-6	0.1
H-10-P-7	0.17
H-10-P-8	0.13
H-10-P-9	0.35
H-10-P-10	0.23
H-10-P-11	0.33
H-10-P-12	0.08
H-10-P-13	0.08
H-11-P-1	0.17
H-11-P-2	0.42
H-11-P-3	0.33
H-11-P-4	1.17
H-11-P-5	0.25
H-11-P-6	0.42
H-11-P-7	1.75
H-11-P-8	0.19
H-11-P-9	0.65
H-11-P-10	0.58

Hidrante - NºParcela	Superf. (has)
H-11-P-11	0.29
H-11-P-12	0.25
H-11-P-13	0.21
H-11-P-14	0.33
H-12-P-1	0.08
H-12-P-2	0.33
H-12-P-3	0.33
H-12-P-4	0.08
H-12-P-5	0.25
H-12-P-6	0.08
H-12-P-7	0.67
H-12-P-8	0.25
H-12-P-9	0.25
H-12-P-10	0.23
H-12-P-11	0.17
H-12-P-12	0.17
H-13-P-6	0.15
H-13-P-1	0.17
H-13-P-2	0.04
H-13-P-3	0.38
H-13-P-4	0.08
H-13-P-5	0.08
H-13-P-7	0.42
H-13-P-8	0.27

Hidrante - NºParcela	Superf. (has)
H-13-P-9	0.52
H-13-P-10	0.67
H-13-P-11	0.17
H-14-P-1	0.17
H-14-P-2	0.13
H-14-P-3	0.06
H-14-P-4	0.17
H-14-P-5	0.33
H-14-P-6	0.42
H-14-P-7	0.08
H-14-P-8	0.25
H-14-P-9	0.27
H-14-P-10	0.33
H-14-P-11	0.17
H-14-P-12	0.08
H-15-P-1	0.5
H-15-P-2	0.17
H-15-P-3	0.17
H-15-P-4	0.08
H-15-P-5	0.15
H-15-P-6	0.25
H-15-P-7	0.1
H-15-P-8	0.33
H-15-P-9	0.13

Hidrante - NºParcela	Superf. (has)
H-15-P-10	0.21
H-15-P-11	0.08
H-15-P-12	0.17
H-15-P-13	0.04
H-15-P-14	0.25
H-16-P-1	0.42
H-16-P-2	0.63
H-16-P-3	0.42
H-16-P-4	0.17
H-16-P-5	0.42
H-16-P-6	0.17
H-16-P-7	0.17
H-16-P-8	0.38
H-16-P-9	0.33
H-16-P-10	0.25
H-16-P-11	0.25
H-16-P-12	0.17
H-17-P-1	0.33
H-17-P-2	0.08
H-17-P-3	0.17
H-17-P-4	0.25
H-17-P-5	0.25
H-17-P-6	0.31
H-17-P-7	0.08

Hidrante - NºParcela	Superf. (has)
H-17-P-8	0.25
H-17-P-9	0.25
H-17-P-10	0.25
H-17-P-11	0.08
H-18-P-1	0.5
H-18-P-2	1
H-18-P-3	0.58
H-18-P-4	0.9
H-18-P-5	0.1
H-18-P-6	0.42
H-18-P-7	0.08
H-18-P-8	1.08
H-18-P-9	0.33
H-18-P-10	0.25
H-18-P-11	0.08
H-18-P-12	0.13
H-19-P-1	0.33
H-19-P-2	0.58
H-19-P-3	0.58
H-19-P-4	0.42
H-19-P-5	0.17
H-19-P-6	0.25
H-19-P-7	0.17
H-19-P-8	0.17

Hidrante - NºParcela	Superf. (has)
H-19-P-9	0.08
H-19-P-10	0.75
H-20-P-1	0.17
H-20-P-2	0.5
H-20-P-3	0.25
H-20-P-4	0.17
H-20-P-5	0.17
H-20-P-6	0.17
H-20-P-7	0.17
H-20-P-8	0.25
H-20-P-9	0.83
H-20-P-10	0.25
H-20-P-11	0.25
H-20-P-12	0.42
H-21-P-1	0.17
H-21-P-2	0.25
H-21-P-3	0.25
H-21-P-4	0.19
H-21-P-5	0.17
H-21-P-6	0.5
H-21-P-7	0.21
H-21-P-8	0.25
H-21-P-9	0.17
H-21-P-10	0.17

Hidrante - NºParcela	Superf. (has)
H-21-P-11	0.08
H-21-P-12	0.17
H-21-P-13	0.08
H-21-P-14	0.19
H-22-P-1	0.48
H-22-P-2	0.4
H-22-P-3	0.33
H-22-P-4	0.29
H-22-P-5	0.48
H-22-P-6	1.42
H-22-P-7	0.33
H-22-P-8	0.31
H-22-P-9	0.65
H-22-P-10	0.5
H-22-P-11	0.08
H-22-P-12	0.42
H-23-P-1	0.27
H-23-P-2	0.17
H-23-P-3	0.08
H-23-P-4	0.08
H-23-P-5	0.1
H-23-P-6	0.08
H-23-P-7	0.15
H-23-P-8	0.19

Hidrante - NºParcela	Superf. (has)
H-23-P-9	0.33
H-23-P-10	0.17
H-23-P-11	0.33
H-23-P-12	0.08
H-23-P-13	0.15
H-23-P-14	0.15
H-24-P-1	0.52
H-24-P-2	0.04
H-24-P-3	0.17
H-24-P-4	0.17
H-24-P-5	0.19
H-24-P-6	0.17
H-24-P-7	0.25
H-24-P-8	0.21
H-24-P-9	0.21
H-24-P-10	0.25
H-25-P-1	0.33
H-25-P-2	0.42
H-25-P-3	0.38
H-25-P-4	0.08
H-25-P-5	0.29
H-25-P-6	0.25
H-25-P-7	0.73
H-25-P-8	0.17

Hidrante - NºParcela	Superf. (has)
H-25-P-9	0.25
H-25-P-10	0.1
H-26-P-1	0.42
H-26-P-2	0.08
H-26-P-3	0.33
H-26-P-4	0.17
H-26-P-5	0.35
H-26-P-6	0.17
H-26-P-7	0.58
H-26-P-8	0.25
H-26-P-9	0.19
H-26-P-10	0.17
H-26-P-11	0.25
H-27-P-1	0.08
H-27-P-2	0.08
H-27-P-3	0.08
H-27-P-4	0.33
H-27-P-5	0.17
H-27-P-6	0.25
H-27-P-7	0.08
H-27-P-8	0.33
H-27-P-9	0.25
H-27-P-10	0.25
H-28-P-1	0.33

Hidrante - NºParcela	Superf. (has)
H-28-P-2	0.17
H-28-P-3	0.25
H-28-P-4	0.08
H-28-P-5	0.17
H-28-P-6	0.42
H-28-P-7	0.5
H-28-P-8	0.33
H-28-P-9	0.17
H-28-P-10	0.17
H-29-P-1	0.21
H-29-P-2	0.1
H-29-P-3	0.17
H-29-P-4	0.42
H-29-P-5	0.25
H-29-P-6	0.21
H-29-P-7	0.33
H-29-P-8	0.25
H-29-P-9	0.17
H-29-P-10	0.42
H-29-P-11	0.33
H-30-P-1	0.17
H-30-P-2	0.27
H-30-P-3	0.08
H-30-P-4	0.21

Hidrante - NºParcela	Superf. (has)
H-30-P-5	0.25
H-30-P-6	0.17
H-30-P-7	0.35
H-30-P-8	0.6
H-30-P-9	0.25
H-30-P-10	0.08
H-30-P-11	0.17
H-30-P-12	0.08
H-30-P-13	0.08
H-30-P-14	0.25
H-31-P-1	0.15
H-31-P-2	0.25
H-31-P-3	0.92
H-31-P-4	0.25
H-31-P-5	0.17
H-31-P-6	0.15
H-31-P-7	0.15
H-31-P-8	0.08
H-31-P-9	0.17
H-31-P-10	0.17
H-31-P-11	0.08
H-31-P-12	0.27
H-32-P-1	0.52
H-32-P-2	0.35

Hidrante - NºParcela	Superf. (has)
H-32-P-3	0.33
H-32-P-4	0.33
H-32-P-5	0.75
H-32-P-6	0.25
H-32-P-7	0.67
H-32-P-8	0.25
H-32-P-9	0.08
H-32-P-10	0.04
H-32-P-11	0.25
H-32-P-12	0.17
H-32-P-13	0.13
H-33-P-1	0.25
H-33-P-2	0.25
H-33-P-3	0.31
H-33-P-4	0.33
H-33-P-5	0.25
H-33-P-6	0.06
H-33-P-7	0.25
H-33-P-8	0.33
H-33-P-9	0.08
H-33-P-10	0.33
H-33-P-11	0.29
H-33-P-12	0.42
H-33-P-13	0.42

Hidrante - NºParcela	Superf. (has)
H-34-P-1	0.33
H-34-P-2	0.08
H-34-P-3	0.17
H-34-P-4	0.17
H-34-P-5	0.17
H-34-P-6	0.23
H-34-P-7	0.5
H-34-P-8	0.33
H-34-P-9	0.25
H-34-P-10	0.6
H-34-P-11	0.25
H-35-P-1	0.25
H-35-P-2	0.08
H-35-P-3	0.17
H-35-P-4	0.17
H-35-P-5	0.17
H-35-P-6	0.29
H-35-P-7	0.08
H-35-P-8	0.06
H-35-P-9	0.56
H-35-P-10	0.17
H-35-P-11	0.58
H-36-P-1	0.25
H-36-P-2	0.17

Hidrante - NºParcela	Superf. (has)
H-36-P-3	0.42
H-36-P-4	0.17
H-36-P-5	0.17
H-36-P-6	0.5
H-36-P-7	0.33
H-36-P-8	0.17
H-36-P-9	0.27
H-36-P-10	0.17
H-36-P-11	0.17
H-36-P-12	0.08
H-36-P-13	0.67
H-36-P-14	0.42
H-37-P-1	0.17
H-37-P-2	0.17
H-37-P-3	0.35
H-37-P-4	0.31
H-37-P-5	0.5
H-37-P-6	0.42
H-37-P-7	0.33
H-37-P-8	0.33
H-37-P-9	0.33
H-37-P-10	0.33
H-37-P-11	0.08
H-37-P-12	0.08

Hidrante - NºParcela	Superf. (has)
H-38-P-1	0.08
H-38-P-2	0.17
H-38-P-3	0.25
H-38-P-4	0.25
H-38-P-5	0.08
H-38-P-6	0.17
H-38-P-7	0.83
H-38-P-8	0.21
H-38-P-9	0.17
H-38-P-10	0.67
H-38-P-11	0.5
H-39-P-1	0.33
H-39-P-2	0.17
H-39-P-3	0.25
H-39-P-4	0.25
H-39-P-5	0.13
H-39-P-6	0.25
H-39-P-7	0.25
H-39-P-8	0.33
H-39-P-9	0.17
H-39-P-10	0.33
H-39-P-11	0.25
H-39-P-12	0.42
H-39-P-13	0.33

Hidrante - NºParcela	Superf. (has)
H-39-P-14	0.08
H-40-P-1	0.17
H-40-P-2	0.17
H-40-P-3	0.17
H-40-P-4	0.17
H-40-P-5	0.08
H-40-P-6	0.17
H-40-P-7	0.42
H-40-P-8	0.17
H-40-P-9	0.08
H-40-P-10	0.25
H-40-P-11	0.33
H-40-P-12	0.17
H-41-P-1	0.42
H-41-P-2	0.25
H-41-P-3	0.25
H-41-P-4	0.67
H-41-P-5	0.17
H-41-P-6	0.25
H-41-P-7	0.17
H-41-P-8	0.5
H-41-P-10	0.17
H-41-P-11	0.25
H-41-P-12	0.5

Hidrante - NºParcela	Superf. (has)
H-42-P-1	0.29
H-42-P-2	0.08
H-42-P-3	0.08
H-42-P-4	0.17
H-42-P-5	0.33
H-42-P-6	0.17
H-42-P-7	0.17
H-42-P-8	0.33
H-42-P-9	0.83
H-42-P-10	0.25
H-42-P-11	0.33
H-42-P-12	0.17
H-42-P-13	0.17
H-42-P-14	0.29
H-43-P-1	0.04
H-43-P-2	0.21
H-43-P-3	0.25
H-43-P-4	0.33
H-43-P-5	0.25
H-43-P-6	0.17
H-43-P-7	0.08
H-43-P-8	0.42
H-43-P-9	0.42
H-43-P-10	0.25

Hidrante - NºParcela	Superf. (has)
H-44-P-1	0.25
H-44-P-2	0.33
H-44-P-3	0.33
H-44-P-4	0.17
H-44-P-5	0.5
H-44-P-6	2
H-44-P-7	0.25
H-44-P-8	0.08
H-44-P-9	2.33
H-44-P-10	0.33
H-44-P-11	0.17
H-44-P-12	0.5
H-45-P-1	0.25
H-45-P-2	0.08
H-45-P-3	0.33
H-45-P-4	0.17
H-45-P-5	0.17
H-45-P-6	0.1
H-45-P-7	0.17
H-45-P-8	0.21
H-45-P-9	0.25
H-45-P-10	0.08
H-45-P-11	0.17
H-45-P-12	0.5

Hidrante - NºParcela	Superf. (has)
H-45-P-13	0.25
H-45-P-14	0.21
H-46-P-1	0.38
H-46-P-2	0.17
H-46-P-3	0.02
H-46-P-4	0.25
H-46-P-5	0.75
H-46-P-6	0.19
H-46-P-7	0.42
H-46-P-8	0.17
H-46-P-9	0.15
H-46-P-10	0.23
H-46-P-11	0.17
H-47-P-1	0.25
H-47-P-2	0.04
H-47-P-3	0.42
H-47-P-4	0.15
H-47-P-5	0.27
H-47-P-6	0.08
H-47-P-7	0.08
H-47-P-8	0.15
H-47-P-9	0.42
H-47-P-10	0.25
H-47-P-11	0.08

Hidrante - NºParcela	Superf. (has)
H-48-P-1	0.17
H-48-P-2	0.06
H-48-P-3	0.17
H-48-P-4	0.08
H-48-P-5	0.25
H-48-P-6	0.17
H-48-P-7	0.5
H-48-P-8	0.17
H-48-P-9	0.67
H-48-P-10	0.23
H-48-P-11	0.63
H-49-P-1	0.13
H-49-P-2	0.33
H-49-P-3	0.23
H-49-P-4	0.17
H-49-P-5	0.25
H-49-P-6	0.08
H-49-P-7	0.17
H-49-P-8	0.58
H-49-P-9	0.17
H-49-P-10	0.35
H-49-P-11	0.17
H-50-P-1	0.08
H-50-P-2	0.13

Hidrante - NºParcela	Superf. (has)
H-50-P-3	0.04
H-50-P-4	0.02
H-50-P-5	0.1
H-50-P-6	0.58
H-50-P-7	0.75
H-50-P-8	0.1
H-50-P-9	0.44
H-50-P-10	0.25
H-50-P-11	0.42
H-50-P-12	0.25
H-51-P-1	0.15
H-51-P-2	1.02
H-51-P-3	0.5
H-51-P-4	0.17
H-51-P-5	0.08
H-51-P-6	0.5
H-51-P-7	0.38
H-51-P-8	0.13
H-51-P-9	0.71
H-51-P-10	0.29
H-51-P-11	0.27
H-52-P-1	1.17
H-52-P-2	0.79
H-52-P-3	0.19

Hidrante - NºParcela	Superf. (has)
H-52-P-4	0.25
H-52-P-5	0.27
H-52-P-6	0.79
H-52-P-7	0.08
H-52-P-8	0.19
H-52-P-9	0.08
H-52-P-10	0.17
H-52-P-11	0.08
H-53-P-1	0.33
H-53-P-2	0.58
H-53-P-3	0.29
H-53-P-4	0.58
H-53-P-5	0.23
H-53-P-6	0.08
H-53-P-7	0.04
H-53-P-8	0.08
H-53-P-9	0.1
H-53-P-10	0.23
H-53-P-11	0.35
H-53-P-12	0.29
H-54-P-1	0.08
H-54-P-2	0.17
H-54-P-3	0.08
H-54-P-4	0.42

Hidrante - NºParcela	Superf. (has)
H-54-P-5	0.38
H-54-P-6	0.48
H-54-P-7	0.81
H-54-P-8	0.44
H-54-P-9	0.08
H-54-P-10	0.06
H-54-P-11	0.04
H-54-P-12	0.13
H-54-P-13	0.1
H-55-P-1	0.79
H-55-P-2	0.63
H-55-P-3	0.5
H-55-P-4	0.12
H-55-P-5	0.08
H-55-P-6	0.11
H-55-P-7	0.1
H-55-P-8	0.06
H-55-P-9	0.1
H-55-P-10	0.23
H-55-P-11	0.13
H-55-P-12	0.17
H-56-P-1	0.34
H-56-P-2	0.24
H-56-P-3	0.3

Hidrante - NºParcela	Superf. (has)
H-56-P-4	1.07
H-56-P-5	0.18
H-56-P-6	0.21
H-56-P-7	0.42
H-56-P-8	0.11
H-56-P-9	0.11
H-56-P-10	0.11
H-56-P-11	0.13
H-56-P-12	0.65
H-56-P-13	0.55
H-56-P-14	0.47
H-56-P-15	0.2
H-57-P-1	0.44
H-57-P-2	0.21
H-57-P-3	0.31
H-57-P-4	0.15
H-57-P-5	0.16
H-57-P-6	0.16
H-57-P-7	0.17
H-57-P-8	0.27
H-57-P-9	0.29
H-57-P-10	0.38
H-57-P-11	0.35
H-57-P-12	0.12

Hidrante - NºParcela	Superf. (has)
H-57-P-13	0.09
H-57-P-14	0.16
H-57-P-15	0.21
H-58-P-1	0.24
H-58-P-2	0.21
H-58-P-3	0.09
H-58-P-4	0.08
H-58-P-5	0.2
H-58-P-6	0.05
H-58-P-7	0.1
H-58-P-8	0.08
H-58-P-9	0.08
H-58-P-10	0.1
H-58-P-11	0.13
H-58-P-12	0.12
H-58-P-13	0.52
H-58-P-14	0.21
H-58-P-15	0.13
H-59-P-1	4.66
H-60-P-1	0.09
H-60-P-2	1.27
H-60-P-3	0.45
H-60-P-4	0.65
H-60-P-5	0.4

Hidrante - NºParcela	Superf. (has)
H-60-P-6	0.52
H-60-P-7	0.39
H-60-P-8	0.45
H-60-P-9	0.33
H-60-P-10	0.38
H-60-P-11	0.44
H-60-P-12	0.73
H-60-P-13	0.75
H-60-P-14	0.49
H-61-P-1	0.17
H-61-P-2	0.13
H-61-P-3	0.08
H-61-P-4	0.19
H-61-P-5	0.08
H-61-P-6	0.24
H-61-P-7	0.34
H-61-P-8	0.1
H-61-P-9	0.33
H-61-P-10	0.17
H-61-P-11	0.46
H-61-P-12	0.16
H-62-P-1	0.49
H-62-P-2	0.38
H-62-P-3	0.2

Hidrante - NºParcela	Superf. (has)
H-62-P-4	0.18
H-62-P-5	0.16
H-62-P-6	0.15
H-62-P-7	0.49
H-62-P-8	0.66
H-62-P-9	0.51
H-62-P-10	0.45
H-62-P-11	0.31
H-62-P-12	0.33
H-62-P-13	1.5
H-63-P-1	0.3
H-63-P-2	0.76
H-63-P-3	0.45
H-63-P-4	0.87
H-63-P-5	0.47
H-63-P-6	0.07
H-63-P-7	0.53
H-63-P-8	0.58
H-63-P-9	1.33
H-63-P-10	0.23
H-63-P-11	0.22
H-63-P-12	0.03
H-63-P-13	0.02
H-64-P-1	1.61

Hidrante - NºParcela	Superf. (has)
H-64-P-2	0.48
H-64-P-3	0.17
H-64-P-4	0.33
H-64-P-5	0.44
H-64-P-6	0.4
H-64-P-7	1.24
H-64-P-8	0.23
H-64-P-9	0.17
H-64-P-10	0.46
H-64-P-11	0.26
H-64-P-12	0.24
H-64-P-13	1.65
H-64-P-14	0.25
H-65-P-1	1.28
H-65-P-2	3.65
H-65-P-3	0.24
H-65-P-4	0.43
H-65-P-5	0.18
H-65-P-6	0.17
H-65-P-7	0.16
H-65-P-8	0.18
H-65-P-9	0.72
H-65-P-10	0.19
H-65-P-11	0.05

Hidrante - NºParcela	Superf. (has)
H-65-P-12	0.79
H-66-P-1	0.74
H-66-P-2	0.37
H-66-P-3	0.27
H-66-P-4	0.3
H-66-P-5	0.27
H-66-P-6	0.26
H-66-P-7	0.15
H-66-P-8	0.57
H-66-P-9	0.21
H-66-P-10	0.1
H-66-P-11	0.13
H-66-P-12	0.13
H-66-P-13	0.17
H-67-P-1	0.14
H-67-P-2	0.23
H-67-P-3	0.18
H-67-P-4	0.93
H-67-P-5	0.22
H-67-P-6	0.11
H-67-P-7	0.12
H-67-P-8	0.23
H-67-P-9	0.16
H-67-P-10	0.12

Hidrante - NºParcela	Superf. (has)
H-67-P-11	0.22
H-67-P-12	0.2
H-67-P-13	0.65
H-67-P-14	0.32
H-68-P-1	0.7
H-68-P-2	0.83
H-68-P-3	0.51
H-68-P-4	0.67
H-68-P-5	0.65
H-68-P-6	0.35
H-68-P-7	0.33
H-68-P-8	0.63
H-68-P-9	0.36

Hidrante - NºParcela	Superf. (has)
H-68-P-10	0.44
H-69-P-1	0.32
H-69-P-2	0.33
H-69-P-3	0.35
H-69-P-4	0.18
H-69-P-5	0.25
H-69-P-6	0.21
H-69-P-7	0.2
H-69-P-8	0.06
H-69-P-9	0.04
H-69-P-10	0.13
H-69-P-11	0.35
H-70-P-1	0.31

Hidrante - NºParcela	Superf. (has)
H-70-P-2	0.28
H-70-P-3	0.18
H-70-P-4	0.17
H-70-P-5	0.32
H-70-P-6	0.37
H-70-P-7	0.41
H-70-P-8	0.35
H-70-P-9	0.2
H-70-P-10	0.23
H-70-P-11	0.17
H-70-P-12	0.05
H-71-P-1	0.2
H-71-P-2	0.22

Hidrante - NºParcela	Superf. (has)
H-71-P-3	0.3
H-71-P-4	0.06
H-71-P-5	0.1
H-71-P-6	0.32
H-71-P-7	0.21
H-71-P-8	0.22
H-71-P-9	0.22
H-71-P-10	0.22
H-71-P-11	0.17
H-71-P-12	0.52
H-71-P-13	0.2

CAPÍTULO III: ASIGNACIÓN DE TURNOS PARA EL RIEGO

En este capítulo se identifica por sector la asignación de los turnos creando combinaciones en las que puedan ser equilibradas las demandas totales y que sea similar al 20% de la demanda total. Esto quiere decir que dentro de cada hidrante hay diferentes turnos para el riego de las parcelas.

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Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
1	H1	P4 - 3.06, P10 - 0.25	3.31
2	H1	P3 - 2.32, P7 - 1.08	3.4
3	H1	P2 - 2.32, P1 - 0.66, P6 - 0.33	3.31
4	H1	P8 - 1.57, P11 - 1.16, P13 - 0.58	3.31
5	H1	P12 - 1.41, P5 - 1.32, P9 - 0.41, P14 - 0.17	3.31
1	H2	P8 - 2.81	2.81
2	H2	P5 - 2.15, P4 - 0.83	2.98
3	H2	P6 - 1.74, P1 - 0.91	2.65
4	H2	P7 - 1.49, P9 - 1.08, P11 - 0.66	3.23
5	H2	P10 - 1.24, P2 - 1.16, P3 - 0.66	3.06
1	H3	P3 - 1.99, P6 - 0.58, P5 - 0.25	2.82
2	H3	P7 - 1.90, P10 - 0.66, P8 - 0.41	2.97
3	H3	P4 - 1.82, P13 - 0.91	2.73
4	H3	P2 - 1.24, P9 - 1.08, P11 - 0.58	2.9
5	H3	P12 - 1.24, P1 - 1.08, P14 - 0.50	2.82
1	H4	P8 - 1.16, P9 - 0.41	1.57
2	H4	P7 - 0.99, P3 - 0.41	1.4
3	H4	P2 - 0.91, P10 - 0.41, P13 - 0.33	1.65
4	H4	P5 - 0.66, P11 - 0.58, P4 - 0.33	1.57
5	H4	P12 - 0.66, P1 - 0.58, P6 - 0.33	1.57
1	H5	P6 - 1.65, P1 - 0.58, P7 - 0.58	2.81
2	H5	P10 - 1.57, P5 - 0.83	2.4
3	H5	P2 - 1.32, P8 - 0.91	2.23
4	H5	P11 - 1.32, P4 - 0.91	2.23
5	H5	P9 - 1.24, P3 - 0.99	2.23

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
1	H6	P10 - 2.65	2.65
2	H6	P5 - 1.57, P8 - 0.41	1.98
3	H6	P7 - 1.41, P9 - 0.58	1.99
4	H6	P3 - 1.16, P12 - 0.66, P2 - 0.41	2.23
5	H6	P1 - 0.66, P6 - 0.66, P4 - 0.58, P11 - 0.17	2.07
1	H7	P7 - 3.56	3.56
2	H7	P9 - 2.56	2.56
3	H7	P3 - 1.65, P6 - 0.66, P1 - 0.50	2.81
4	H7	P8 - 1.49, P2 - 0.91	2.4
5	H7	P5 - 1.32, P4 - 0.99	2.31
1	H8	P3 - 2.98, P7 - 0.25	3.23
2	H8	P4 - 2.65, P8 - 0.33, P2 - 0.08	3.06
3	H8	P5 - 2.23, P11 - 0.83	3.06
4	H8	P12 - 1.57, P9 - 0.91, P13 - 0.58	3.06
5	H8	P6 - 1.41, P1 - 1.08, P10 - 0.50	2.99
1	H9	P6 - 1.49, P8 - 0.66	2.15
2	H9	P10 - 1.41, P2 - 0.74	2.15
3	H9	P1 - 1.32, P7 - 0.74, P13 - 0.33	2.39
4	H9	P3 - 0.99, P4 - 0.91, P5 - 0.66	2.56
5	H9	P12 - 0.99, P9 - 0.91, P11 - 0.58	2.48
1	H10	P2 - 2.15, P6 - 0.58, P11 - 0.25	2.98
2	H10	P5 - 2.07, P7 - 1.08	3.15
3	H10	P9 - 1.82, P3 - 1.24	3.06
4	H10	P4 - 1.74, P10 - 1.32	3.06
5	H10	P8 - 1.49, P1 - 1.41	2.9
1	H11	P5 - 3.06	3.06
2	H11	P12 - 1.16, P9 - 0.66, P2 - 0.33	2.15
3	H11	P10 - 0.91, P8 - 0.74, P4 - 0.41	2.06
4	H11	P11 - 0.91, P13 - 0.74, P7 - 0.41	2.06
5	H11	P6 - 0.91, P1 - 0.66, P3 - 0.41, P14 - 0.17	2.15
1	H12	P1 - 2.81	2.81
2	H12	P2 - 2.07	2.07
3	H12	P6 - 1.74, P7 - 0.50	2.24
4	H12	P4 - 1.32, P5 - 0.83	2.15
5	H12	P9 - 1.32, P3 - 0.66, P8 - 0.41	2.39

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
1	H13	P11 - 1.32, P7 - 0.66, P13 - 0.33	2.31
2	H13	P4 - 0.99, P9 - 0.74, P10 - 0.41	2.14
3	H13	P2 - 0.99, P1 - 0.66, P5 - 0.50	2.15
4	H13	P12 - 0.99, P14 - 0.66, P8 - 0.41	2.06
5	H13	P3 - 0.91, P15 - 0.83, P6 - 0.33	2.07
1	H14	P1 - 2.07	2.07
2	H14	P11 - 1.32, P12 - 0.50, P14 - 0.33	2.15
3	H14	P9 - 0.91, P6 - 0.66, P10 - 0.33	1.9
4	H14	P8 - 0.91, P2 - 0.50, P4 - 0.41, P13 - 0.25	2.07
5	H14	P7 - 0.83, P3 - 0.74, P5 - 0.41	1.98
1	H15	P3 - 4.14	4.14
2	H15	P2 - 3.80	3.8
3	H15	P10 - 1.57, P8 - 0.83, P5 - 0.58, P14 - 0.50	3.48
4	H15	P12 - 1.49, P1 - 0.91, P6 - 0.50, P13 - 0.50, P7 - 0.25	3.65
5	H15	P9 - 1.32, P4 - 0.99, P15 - 0.83, P11 - 0.50	3.64

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
1	H16	P1 - 0.99, P11 - 0.41, P2 - 0.33	1.73
2	H16	P6 - 0.99, P4 - 0.41	1.4
3	H16	P7 - 0.74, P5 - 0.41, P10 - 0.33	1.48
4	H16	P8 - 0.58, P13 - 0.50, P12 - 0.33	1.41
5	H16	P3 - 0.50, P9 - 0.50, P14 - 0.41	1.41
1	H17	P5 - 5.96	5.96
2	H17	P8 - 1.32, P15 - 0.91, P2 - 0.58, P13 - 0.58	3.39
3	H17	P12 - 1.32, P3 - 0.83, P14 - 0.74	2.89
4	H17	P4 - 1.24, P1 - 0.91, P11 - 0.74	2.89
5	H17	P6 - 0.99, P7 - 0.99, P9 - 0.83, P10 - 0.17	2.98
1	H18	P2 - 2.89	2.89
2	H18	P1 - 1.90, P12 - 0.08	1.98
3	H18	P7 - 1.41, P8 - 0.41, P10 - 0.17	1.99
4	H18	P4 - 1.08, P9 - 0.58, P5 - 0.25	1.91
5	H18	P3 - 0.91, P6 - 0.74, P11 - 0.33	1.98
1	H19	P12 - 4.55	4.55

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
2	H19	P8 - 2.15, P6 - 1.24, P11 - 0.91	4.3
3	H19	P14 - 2.15, P7 - 1.16, P13 - 1.08	4.39
4	H19	P2 - 1.65, P4 - 1.24, P9 - 1.16, P5 - 0.83	4.88
5	H19	P1 - 1.41, P10 - 1.32, P3 - 1.16, P15 - 0.91	4.8
1	H20	P5 - 8.02	8.02
2	H20	P4 - 6.04, P2 - 1.16	7.2
3	H20	P1 - 4.88, P9 - 1.24, P6 - 0.99	7.11
4	H20	P8 - 4.55, P12 - 2.32, P10 - 0.66	7.53
5	H20	P3 - 3.72, P7 - 2.32, P11 - 0.99	7.03

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
1	H21	P3 - 6.04	6.04
2	H21	P4 - 2.65, P12 - 0.50	3.15
3	H21	P8 - 2.23, P1 - 0.66, P7 - 0.41	3.3
4	H21	P6 - 1.74, P10 - 0.74, P9 - 0.58, P14 - 0.41	3.47
5	H21	P5 - 1.32, P2 - 1.08, P11 - 0.66, P13 - 0.33	3.39
1	H22	P2 - 5.87	5.87
2	H22	P3 - 3.64, P1 - 0.41	4.05
3	H22	P7 - 2.73, P5 - 0.99	3.72
4	H22	P9 - 2.15, P11 - 1.08, P8 - 0.74	3.97
5	H22	P10 - 1.49, P6 - 1.41, P4 - 0.83	3.73

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Turno	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
1	H1	H-1-P-2 - 9.26	9.26
2	H1	H-1-P-3 - 5.38	5.38
3	H1	H-1-P-12 - 3.97, H-1-P-5 - 0.41	4.38
4	H1	H-1-P-4 - 3.39, H-1-P-9 - 0.99	4.38

Turno	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
5	H1	H-1-P-11 - 1.32, H-1-P-8 - 1.08, H-1-P-7 - 0.99, H-1-P-6 - 0.83, H-1-P-10 - 0.33	4.55
1	H2	H-2-P-5 - 4.80	4.8
2	H2	H-2-P-12 - 2.98, H-2-P-9 - 0.33, H-2-P-14 - 0.33	3.64

Turno	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
3	H2	H-2-P-7 - 2.56, H-2-P-2 - 0.83, H-2-P-10 - 0.25	3.64
4	H2	H-2-P-11 - 1.99, H-2-P-3 - 0.83, H-2-P-1 - 0.66	3.48
5	H2	H-2-P-4 - 1.16, H-2-P-8 - 1.08, H-2-P-6 - 0.83, H-2-P-13 - 0.33	3.4
1	H3	H-3-P-11 - 4.14	4.14
2	H3	H-3-P-5 - 1.65, H-3-P-8 - 0.83, H-3-P-1 - 0.25	2.73
3	H3	H-3-P-13 - 1.65, H-3-P-4 - 0.74, H-3-P-6 - 0.41	2.8
4	H3	H-3-P-2 - 1.16, H-3-P-7 - 0.83, H-3-P-3 - 0.66	2.65
5	H3	H-3-P-9 - 1.08, H-3-P-12 - 0.99, H-3-P-10 - 0.58	2.65
1	H4	H-4-P-13 - 2.98, H-4-P-1 - 0.83	3.81
2	H4	H-4-P-12 - 2.23, H-4-P-4 - 1.16, H-4-P-6 - 0.33	3.72
3	H4	H-4-P-10 - 1.65, H-4-P-8 - 1.24, H-4-P-5 - 0.99	3.88
4	H4	H-4-P-14 - 1.65, H-4-P-3 - 1.24, H-4-P-9 - 0.83	3.72
5	H4	H-4-P-2 - 1.57, H-4-P-7 - 1.24, H-4-P-11 - 0.99	3.8
1	H5	H-5-P-9 - 2.23, H-5-P-4 - 0.74	2.97
2	H5	H-5-P-3 - 1.99, H-5-P-5 - 0.74, H-5-P-12 - 0.17	2.9
3	H5	H-5-P-2 - 1.41, H-5-P-8 - 0.83, H-5-P-13 - 0.58	2.82
4	H5	H-5-P-14 - 1.08, H-5-P-10 - 0.83, H-5-P-7 - 0.74, H-5-P-15 - 0.41	3.06
5	H5	H-5-P-1 - 0.99, H-5-P-11 - 0.91, H-5-P-6 - 0.83	2.73
1	H6	H-6-P-2 - 2.48, H-6-P-1 - 0.50	2.98
2	H6	H-6-P-3 - 2.32, H-6-P-10 - 0.50	2.82
3	H6	H-6-P-4 - 1.99, H-6-P-7 - 0.66, H-6-P-9 - 0.41	3.06
4	H6	H-6-P-13 - 1.65, H-6-P-11 - 0.91, H-6-P-8 - 0.41	2.97
5	H6	H-6-P-5 - 1.08, H-6-P-6 - 0.99, H-6-P-12 - 0.58	2.65
1	H7	H-7-P-9 - 1.99, H-7-P-6 - 0.41	2.4
2	H7	H-7-P-7 - 1.82, H-7-P-1 - 0.74	2.56
3	H7	H-7-P-2 - 1.16, H-7-P-10 - 0.91	2.07
4	H7	H-7-P-8 - 0.99, H-7-P-12 - 0.99, H-7-P-5 - 0.50	2.48

Turno	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
5	H7	H-7-P-11 - 0.99, H-7-P-3 - 0.91, H-7-P-4 - 0.50	2.4
1	H8	H-8-P-7 - 1.74	1.74
2	H8	H-8-P-5 - 0.99, H-8-P-3 - 0.41	1.4
3	H8	H-8-P-6 - 0.66, H-8-P-2 - 0.41, H-8-P-4 - 0.25	1.32
4	H8	H-8-P-8 - 0.58, H-8-P-11 - 0.58	1.16
5	H8	H-8-P-9 - 0.58, H-8-P-1 - 0.41, H-8-P-10 - 0.33	1.32
1	H9	H-9-P-4 - 3.31	3.31
2	H9	H-9-P-7 - 2.07, H-9-P-3 - 0.58	2.65
3	H9	H-9-P-14 - 1.16, H-9-P-6 - 0.83, H-9-P-5 - 0.58, H-9-P-2 - 0.25	2.82
4	H9	H-9-P-10 - 0.99, H-9-P-8 - 0.99, H-9-P-9 - 0.66	2.64
5	H9	H-9-P-11 - 0.99, H-9-P-13 - 0.83, H-9-P-12 - 0.74, H-9-P-1 - 0.50	3.06
1	H10	H-10-P-2 - 1.90, H-10-P-5 - 0.50	2.4
2	H10	H-10-P-10 - 1.74, H-10-P-6 - 0.58	2.32
3	H10	H-10-P-9 - 1.49, H-10-P-8 - 0.83	2.32
4	H10	H-10-P-7 - 1.24, H-10-P-11 - 0.83, H-10-P-1 - 0.41	2.48
5	H10	H-10-P-3 - 1.16, H-10-P-12 - 0.99, H-10-P-4 - 0.41	2.56
1	H11	H-11-P-6 - 3.23	3.23
2	H11	H-11-P-4 - 1.99, H-11-P-12 - 0.83	2.82
3	H11	H-11-P-7 - 1.24, H-11-P-8 - 0.91, H-11-P-13 - 0.74	2.89
4	H11	H-11-P-5 - 1.16, H-11-P-9 - 0.99, H-11-P-11 - 0.50, H-11-P-10 - 0.33	2.98
5	H11	H-11-P-2 - 1.08, H-11-P-3 - 0.99, H-11-P-1 - 0.74	2.81
1	H12	H-12-P-1 - 1.99	1.99
2	H12	H-12-P-10 - 0.99, H-12-P-7 - 0.33	1.32
3	H12	H-12-P-5 - 0.83, H-12-P-8 - 0.41	1.24
4	H12	H-12-P-4 - 0.74, H-12-P-9 - 0.41, H-12-P-11 - 0.33	1.48
5	H12	H-12-P-3 - 0.66, H-12-P-6 - 0.50, H-12-P-2 - 0.25	1.41
1	H13	H-13-P-1 - 1.57, H-13-P-4 - 0.33	1.9

Turno	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
2	H13	H-13-P-2 - 1.49, H-13-P-10 - 0.41, H-13-P-9 - 0.17	2.07
3	H13	H-13-P-11 - 1.32, H-13-P-7 - 0.41, H-13-P-8 - 0.25	1.98
4	H13	H-13-P-6 - 1.24, H-13-P-12 - 0.83	2.07
5	H13	H-13-P-5 - 1.16, H-13-P-3 - 0.91	2.07
1	H14	H-14-P-2 - 3.06	3.06
2	H14	H-14-P-5 - 1.82, H-14-P-4 - 0.41, H-14-P-7 - 0.17	2.4
3	H14	H-14-P-6 - 1.16, H-14-P-12 - 0.83, H-14-P-3 - 0.33	2.32
4	H14	H-14-P-13 - 0.99, H-14-P-1 - 0.83, H-14-P-10 - 0.50	2.32
5	H14	H-14-P-11 - 0.91, H-14-P-9 - 0.83, H-14-P-8 - 0.83	2.57
1	H15	H-15-P-14 - 1.90, H-15-P-10 - 0.58	2.48
2	H15	H-15-P-11 - 1.65, H-15-P-13 - 0.66, H-15-P-5 - 0.50	2.81
3	H15	H-15-P-1 - 1.49, H-15-P-8 - 0.74, H-15-P-9 - 0.50	2.73
4	H15	H-15-P-2 - 1.24, H-15-P-3 - 0.83, H-15-P-12 - 0.50	2.57
5	H15	H-15-P-7 - 1.08, H-15-P-6 - 0.91, H-15-P-4 - 0.50	2.49

Turno	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
1	H16	H-16-P-3 - 4.14	4.14
2	H16	H-16-P-2 - 2.81, H-16-P-9 - 0.33	3.14
3	H16	H-16-P-4 - 1.99, H-16-P-13 - 0.83, H-16-P-12 - 0.33	3.15
4	H16	H-16-P-5 - 1.57, H-16-P-10 - 0.91, H-16-P-1 - 0.41, H-16-P-6 - 0.08	2.97
5	H16	H-16-P-8 - 1.16, H-16-P-7 - 0.91, H-16-P-14 - 0.58, H-16-P-11 - 0.41	3.06
1	H17	H-17-P-11 - 3.97, H-17-P-14 - 1.41, H-17-P-1 - 0.58	5.96
2	H17	H-17-P-10 - 3.56, H-17-P-6 - 1.82, H-17-P-12 - 0.17	5.55
3	H17	H-17-P-8 - 2.89, H-17-P-2 - 1.99, H-17-P-4 - 1.32	6.2
4	H17	H-17-P-3 - 2.81, H-17-P-13 - 2.07, H-17-P-5 - 0.66	5.54
5	H17	H-17-P-9 - 2.73, H-17-P-7 - 2.65	5.38
1	H18	H-18-P-4 - 6.62	6.62
2	H18	H-18-P-5 - 2.40, H-18-P-3 - 0.50, H-18-P-7 - 0.25	3.15
3	H18	H-18-P-6 - 2.23, H-18-P-8 - 0.66, H-18-P-2 - 0.25	3.14

Turno	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
4	H18	H-18-P-11 - 2.23, H-18-P-9 - 0.50, H-18-P-10 - 0.41	3.14
5	H18	H-18-P-1 - 1.08, H-18-P-13 - 0.99, H-18-P-12 - 0.91	2.98
1	H19	H-19-P-11 - 2.89	2.89
2	H19	H-19-P-7 - 1.65, H-19-P-1 - 1.16	2.81
3	H19	H-19-P-9 - 1.65, H-19-P-12 - 0.99, H-19-P-8 - 0.66	3.3
4	H19	H-19-P-2 - 1.65, H-19-P-6 - 0.83, H-19-P-5 - 0.83	3.31
5	H19	H-19-P-3 - 1.49, H-19-P-10 - 1.16, H-19-P-4 - 0.50	3.15
1	H20	H-20-P-10 - 2.15	2.15
2	H20	H-20-P-9 - 1.99, H-20-P-1 - 0.58	2.57
3	H20	H-20-P-4 - 1.41, H-20-P-8 - 1.24	2.65
4	H20	H-20-P-5 - 1.41, H-20-P-6 - 0.66, H-20-P-2 - 0.58	2.65
5	H20	H-20-P-7 - 1.32, H-20-P-3 - 1.24	2.56
1	H21	H-21-P-11 - 1.99	1.99
2	H21	H-21-P-9 - 1.57, H-21-P-1 - 0.33	1.9
3	H21	H-21-P-10 - 1.41, H-21-P-2 - 0.41	1.82
4	H21	H-21-P-8 - 0.91, H-21-P-7 - 0.66, H-21-P-3 - 0.33	1.9
5	H21	H-21-P-5 - 0.74, H-21-P-6 - 0.66, H-21-P-4 - 0.58	1.98
1	H22	H-22-P-4 - 1.41, H-22-P-7 - 0.50	1.91
2	H22	H-22-P-1 - 1.32, H-22-P-10 - 0.74	2.06
3	H22	H-22-P-5 - 1.08, H-22-P-2 - 0.83	1.91
4	H22	H-22-P-9 - 1.08, H-22-P-6 - 0.74, H-22-P-11 - 0.50	2.32
5	H22	H-22-P-8 - 0.91, H-22-P-3 - 0.91, H-22-P-12 - 0.41	2.23
1	H23	H-23-P-1 - 1.32, H-23-P-6 - 0.33, H-23-P-2 - 0.33	1.98
2	H23	H-23-P-8 - 1.32, H-23-P-4 - 0.33	1.65
3	H23	H-23-P-9 - 1.08, H-23-P-5 - 0.50, H-23-P-12 - 0.33	1.91
4	H23	H-23-P-7 - 0.99, H-23-P-14 - 0.66, H-23-P-13 - 0.33	1.98
5	H23	H-23-P-3 - 0.83, H-23-P-10 - 0.66, H-23-P-11 - 0.33	1.82
1	H24	H-24-P-2 - 4.14	4.14
2	H24	H-24-P-4 - 1.24, H-24-P-5 - 0.58, H-24-P-3 - 0.50	2.32

Turno	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
3	H24	H-24-P-13 - 1.16, H-24-P-9 - 0.58, H-24-P-7 - 0.50	2.24
4	H24	H-24-P-11 - 0.99, H-24-P-8 - 0.83, H-24-P-12 - 0.50	2.32
5	H24	H-24-P-6 - 0.99, H-24-P-10 - 0.83, H-24-P-1 - 0.50	2.32
1	H25	H-25-P-1 - 1.65, H-25-P-7 - 0.41	2.06
2	H25	H-25-P-5 - 0.99, H-25-P-4 - 0.58, H-25-P-14 - 0.50	2.07
3	H25	H-25-P-6 - 0.99, H-25-P-13 - 0.58, H-25-P-11 - 0.41	1.98
4	H25	H-25-P-12 - 0.74, H-25-P-2 - 0.58, H-25-P-8 - 0.50	1.82
5	H25	H-25-P-9 - 0.66, H-25-P-3 - 0.66, H-25-P-10 - 0.50	1.82
1	H26	H-26-P-8 - 2.56	2.56
2	H26	H-26-P-5 - 1.65, H-26-P-11 - 0.50	2.15
3	H26	H-26-P-9 - 1.16, H-26-P-3 - 0.66, H-26-P-12 - 0.41	2.23
4	H26	H-26-P-1 - 0.99, H-26-P-13 - 0.74, H-26-P-10 - 0.50	2.23
5	H26	H-26-P-2 - 0.74, H-26-P-7 - 0.74, H-26-P-4 - 0.58, H-26-P-6 - 0.33	2.39
1	H27	H-27-P-9 - 3.14, H-27-P-14 - 0.74	3.88
2	H27	H-27-P-10 - 2.73, H-27-P-3 - 0.91, H-27-P-7 - 0.50	4.14
3	H27	H-27-P-13 - 2.07, H-27-P-11 - 0.99, H-27-P-2 - 0.91	3.97
4	H27	H-27-P-4 - 1.99, H-27-P-6 - 0.99, H-27-P-1 - 0.91	3.89
5	H27	H-27-P-12 - 1.74, H-27-P-8 - 1.32, H-27-P-5 - 0.74	3.8
1	H28	H-28-P-3 - 2.40, H-28-P-4 - 0.58	2.98
2	H28	H-28-P-1 - 2.07, H-28-P-2 - 0.58, H-28-P-8 - 0.41	3.06
3	H28	H-28-P-12 - 1.74, H-28-P-9 - 0.91, H-28-P-6 - 0.25	2.9
4	H28	H-28-P-11 - 1.65, H-28-P-10 - 0.99, H-28-P-5 - 0.58	3.22
5	H28	H-28-P-13 - 1.65, H-28-P-14 - 0.99, H-28-P-7 - 0.41	3.05
1	H29	H-29-P-13 - 1.49, H-29-P-3 - 0.50, H-29-P-8 - 0.25	2.24
2	H29	H-29-P-1 - 1.41, H-29-P-6 - 0.50, H-29-P-10 - 0.33	2.24
3	H29	H-29-P-5 - 1.32, H-29-P-14 - 0.83, H-29-P-9 - 0.08	2.23
4	H29	H-29-P-4 - 1.32, H-29-P-7 - 0.66, H-29-P-2 - 0.33	2.31
5	H29	H-29-P-15 - 1.32, H-29-P-12 - 0.58, H-29-P-11 - 0.41	2.31

Turno	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
1	H30	H-30-P-12 - 1.65, H-30-P-6 - 0.50	2.15
2	H30	H-30-P-1 - 1.57, H-30-P-7 - 0.50, H-30-P-2 - 0.17	2.24
3	H30	H-30-P-14 - 1.24, H-30-P-9 - 0.66, H-30-P-15 - 0.41	2.31
4	H30	H-30-P-8 - 1.16, H-30-P-10 - 0.66, H-30-P-3 - 0.41	2.23
5	H30	H-30-P-5 - 0.74, H-30-P-11 - 0.74, H-30-P-13 - 0.58, H-30-P-4 - 0.17	2.23
1	H31	H-31-P-8 - 2.98	2.98
2	H31	H-31-P-3 - 2.15, H-31-P-7 - 0.58	2.73
3	H31	H-31-P-12 - 1.24, H-31-P-2 - 0.74, H-31-P-10 - 0.74	2.72
4	H31	H-31-P-5 - 1.16, H-31-P-6 - 1.16, H-31-P-9 - 0.58	2.9
5	H31	H-31-P-11 - 1.16, H-31-P-1 - 0.99, H-31-P-4 - 0.58	2.73
1	H32	H-32-P-2 - 2.23, H-32-P-3 - 0.58	2.81
2	H32	H-32-P-12 - 1.99, H-32-P-8 - 0.66, H-32-P-5 - 0.41	3.06
3	H32	H-32-P-6 - 1.57, H-32-P-1 - 0.74, H-32-P-15 - 0.58	2.89
4	H32	H-32-P-9 - 1.24, H-32-P-10 - 0.83, H-32-P-13 - 0.66	2.73
5	H32	H-32-P-11 - 0.99, H-32-P-4 - 0.99, H-32-P-7 - 0.74, H-32-P-14 - 0.08	2.8
1	H33	H-33-P-8 - 2.65, H-33-P-7 - 0.66	3.31
2	H33	H-33-P-2 - 2.32, H-33-P-12 - 0.66	2.98
3	H33	H-33-P-13 - 1.16, H-33-P-3 - 0.91, H-33-P-1 - 0.66	2.73
4	H33	H-33-P-5 - 1.08, H-33-P-11 - 0.91, H-33-P-10 - 0.66	2.65
5	H33	H-33-P-9 - 0.99, H-33-P-4 - 0.99, H-33-P-6 - 0.83	2.81
1	H34	H-34-P-4 - 1.74, H-34-P-11 - 0.58	2.32
2	H34	H-34-P-6 - 1.49, H-34-P-3 - 0.74	2.23
3	H34	H-34-P-5 - 1.24, H-34-P-12 - 0.83, H-34-P-13 - 0.08	2.15
4	H34	H-34-P-7 - 1.24, H-34-P-2 - 0.74, H-34-P-8 - 0.50	2.48
5	H34	H-34-P-1 - 0.99, H-34-P-10 - 0.83, H-34-P-9 - 0.58	2.4
1	H35	H-35-P-9 - 1.49, H-35-P-7 - 0.50	1.99
2	H35	H-35-P-8 - 1.41, H-35-P-5 - 0.58	1.99

Turno	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
3	H35	H-35-P-1 - 0.99, H-35-P-3 - 0.83	1.82
4	H35	H-35-P-6 - 0.99, H-35-P-4 - 0.74	1.73
5	H35	H-35-P-11 - 0.99, H-35-P-2 - 0.66, H-35-P-10 - 0.25	1.9
1	H36	H-36-P-3 - 0.83, H-36-P-11 - 0.66	1.49
2	H36	H-36-P-8 - 0.83, H-36-P-1 - 0.58	1.41
3	H36	H-36-P-10 - 0.83, H-36-P-12 - 0.50, H-36-P-9 - 0.41	1.74
4	H36	H-36-P-7 - 0.74, H-36-P-6 - 0.74	1.48
5	H36	H-36-P-4 - 0.74, H-36-P-5 - 0.66, H-36-P-2 - 0.41	1.81
1	H37	H-37-P-5 - 2.98	2.98
2	H37	H-37-P-9 - 1.41, H-37-P-3 - 0.66, H-37-P-13 - 0.66	2.73
3	H37	H-37-P-11 - 1.24, H-37-P-8 - 0.66, H-37-P-1 - 0.66	2.56
4	H37	H-37-P-10 - 1.08, H-37-P-2 - 0.66, H-37-P-4 - 0.66	2.4
5	H37	H-37-P-12 - 0.99, H-37-P-7 - 0.91, H-37-P-6 - 0.66	2.56
1	H38	H-38-P-1 - 1.65, H-38-P-12 - 0.25	1.9
2	H38	H-38-P-6 - 1.57, H-38-P-9 - 0.33	1.9
3	H38	H-38-P-2 - 1.24, H-38-P-8 - 0.66	1.9
4	H38	H-38-P-4 - 0.83, H-38-P-7 - 0.74, H-38-P-10 - 0.66	2.23
5	H38	H-38-P-11 - 0.83, H-38-P-3 - 0.74, H-38-P-5 - 0.66	2.23
1	H39	H-39-P-8 - 3.47	3.47
2	H39	H-39-P-4 - 2.73, H-39-P-1 - 0.41	3.14
3	H39	H-39-P-3 - 2.32, H-39-P-2 - 0.50	2.82
4	H39	H-39-P-6 - 1.99, H-39-P-7 - 0.99	2.98
5	H39	H-39-P-5 - 1.99, H-39-P-9 - 0.74	2.73
1	H40	H-40-P-5 - 2.15	2.15
2	H40	H-40-P-6 - 1.90, H-40-P-4 - 0.66	2.56
3	H40	H-40-P-8 - 1.16, H-40-P-2 - 0.66, H-40-P-1 - 0.66	2.48
4	H40	H-40-P-3 - 0.99, H-40-P-9 - 0.91, H-40-P-11 - 0.58	2.48
5	H40	H-40-P-10 - 0.99, H-40-P-12 - 0.91, H-40-P-7 - 0.41	2.31
1	H41	H-41-P-7 - 2.15	2.15

Turno	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
2	H41	H-41-P-3 - 1.41, H-41-P-2 - 0.74	2.15
3	H41	H-41-P-1 - 1.08, H-41-P-8 - 0.74	1.82
4	H41	H-41-P-5 - 0.99, H-41-P-10 - 0.83, H-41-P-9 - 0.66	2.48
5	H41	H-41-P-6 - 0.91, H-41-P-4 - 0.91	1.82
1	H42	H-42-P-11 - 1.49	1.49
2	H42	H-42-P-7 - 1.08, H-42-P-1 - 0.41	1.49
3	H42	H-42-P-5 - 0.99, H-42-P-6 - 0.41, H-42-P-10 - 0.25	1.65
4	H42	H-42-P-3 - 0.83, H-42-P-9 - 0.74	1.57
5	H42	H-42-P-2 - 0.83, H-42-P-8 - 0.41, H-42-P-4 - 0.33	1.57
1	H43	H-43-P-1 - 1.90, H-43-P-7 - 0.41	2.31
2	H43	H-43-P-11 - 1.49, H-43-P-3 - 0.50	1.99
3	H43	H-43-P-10 - 1.16, H-43-P-5 - 0.66, H-43-P-6 - 0.41	2.23
4	H43	H-43-P-4 - 1.08, H-43-P-9 - 0.91	1.99
5	H43	H-43-P-2 - 0.99, H-43-P-8 - 0.91	1.9

Turno	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
1	H44	H-44-P-10 - 2.15	2.15
2	H44	H-44-P-9 - 1.32, H-44-P-8 - 0.33, H-44-P-11 - 0.17	1.82
3	H44	H-44-P-7 - 1.24, H-44-P-1 - 0.58, H-44-P-13 - 0.17	1.99
4	H44	H-44-P-5 - 1.24, H-44-P-3 - 0.50, H-44-P-4 - 0.17	1.91
5	H44	H-44-P-6 - 1.24, H-44-P-2 - 0.41, H-44-P-12 - 0.33	1.98
1	H45	H-45-P-12 - 2.73	2.73
2	H45	H-45-P-4 - 1.57, H-45-P-10 - 0.17	1.74
3	H45	H-45-P-8 - 0.91, H-45-P-1 - 0.50, H-45-P-7 - 0.33	1.74
4	H45	H-45-P-3 - 0.91, H-45-P-9 - 0.50, H-45-P-11 - 0.17	1.58
5	H45	H-45-P-5 - 0.58, H-45-P-6 - 0.58, H-45-P-2 - 0.50	1.66
1	H46	H-46-P-10 - 1.90, H-46-P-4 - 0.74, H-46-P-12 - 0.41	3.05
2	H46	H-46-P-9 - 1.82, H-46-P-8 - 0.74, H-46-P-1 - 0.50	3.06
3	H46	H-46-P-14 - 1.65, H-46-P-7 - 0.83, H-46-P-5 - 0.74	3.22
4	H46	H-46-P-11 - 1.41, H-46-P-6 - 1.24, H-46-P-3 - 0.41	3.06

Turno	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
5	H46	H-46-P-2 - 1.24, H-46-P-13 - 1.24, H-46-P-15 - 0.66	3.14
1	H47	H-47-P-3	2.07
2	H47	H-47-P-1	9.59
3	H47	H-47-P-2	10.11
1	H48	H-48-P-1 - 3.80	3.8
2	H48	H-48-P-11 - 1.99, H-48-P-8 - 0.99, H-48-P-7 - 0.66	3.64
3	H48	H-48-P-13 - 1.90, H-48-P-6 - 0.99, H-48-P-2 - 0.66	3.55
4	H48	H-48-P-12 - 1.41, H-48-P-4 - 1.08, H-48-P-5 - 0.66	3.15
5	H48	H-48-P-3 - 1.24, H-48-P-9 - 1.08, H-48-P-10 - 0.91	3.23
1	H49	H-49-P-8 - 1.65	1.65
2	H49	H-49-P-6 - 0.99, H-49-P-1 - 0.17, H-49-P-2 - 0.08	1.24
3	H49	H-49-P-5 - 0.91, H-49-P-7 - 0.74	1.65
4	H49	H-49-P-9 - 0.91, H-49-P-10 - 0.66	1.57
5	H49	H-49-P-3 - 0.83, H-49-P-4 - 0.74	1.57
1	H50	H-50-P-3 - 3.06	3.06
2	H50	H-50-P-2 - 2.23	2.23
3	H50	H-50-P-8 - 1.32, H-50-P-10 - 0.66, H-50-P-9 - 0.50	2.48
4	H50	H-50-P-7 - 0.74, H-50-P-1 - 0.66, H-50-P-11 - 0.66	2.06
5	H50	H-50-P-4 - 0.74, H-50-P-6 - 0.66, H-50-P-5 - 0.58	1.98
1	H51	H-51-P-4 - 2.81, H-51-P-1 - 0.25	3.06
2	H51	H-51-P-8 - 1.90, H-51-P-5 - 0.83, H-51-P-12 - 0.50	3.23
3	H51	H-51-P-9 - 1.65, H-51-P-3 - 1.08, H-51-P-13 - 0.50	3.23
4	H51	H-51-P-10 - 1.65, H-51-P-11 - 1.08, H-51-P-14 - 0.50	3.23
5	H51	H-51-P-7 - 1.41, H-51-P-2 - 1.24, H-51-P-6 - 0.50	3.15
1	H52	H-52-P-11 - 9.35	9.35
2	H52	H-52-P-1 - 2.07, H-52-P-2 - 0.99, H-52-P-7 - 0.58	3.64
3	H52	H-52-P-4 - 1.57, H-52-P-6 - 0.99, H-52-P-9 - 0.74, H-52-P-10 - 0.33	3.63
4	H52	H-52-P-12 - 1.41, H-52-P-5 - 1.08, H-52-P-13 - 0.83	3.32
5	H52	H-52-P-3 - 1.24, H-52-P-8 - 1.24, H-52-P-14 - 0.99	3.47
1	H53	H-53-P-1 - 9.35	9.35
2	H53	H-53-P-8 - 6.45	6.45

Turno	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
3	H53	H-53-P-2 - 2.23, H-53-P-10 - 0.99, H-53-P-5 - 0.33	3.55
4	H53	H-53-P-4 - 1.49, H-53-P-3 - 1.24, H-53-P-6 - 0.50	3.23
5	H53	H-53-P-9 - 1.49, H-53-P-11 - 1.08, H-53-P-7 - 0.74	3.31
1	H54	H-54-P-1 - 3.64	3.64
2	H54	H-54-P-7 - 2.15, H-54-P-9 - 0.74	2.89
3	H54	H-54-P-10 - 1.74, H-54-P-2 - 0.99, H-54-P-8 - 0.41	3.14
4	H54	H-54-P-5 - 1.41, H-54-P-3 - 0.99, H-54-P-6 - 0.74	3.14
5	H54	H-54-P-12 - 1.32, H-54-P-11 - 1.08, H-54-P-4 - 0.58	2.98
1	H55	H-55-P-5 - 2.65, H-55-P-10 - 0.58	3.23
2	H55	H-55-P-6 - 2.15, H-55-P-3 - 0.74, H-55-P-7 - 0.50	3.39
3	H55	H-55-P-12 - 1.65, H-55-P-11 - 0.99, H-55-P-9 - 0.58	3.22
4	H55	H-55-P-8 - 1.08, H-55-P-13 - 1.08, H-55-P-1 - 0.74, H-55-P-15 - 0.50	3.4
5	H55	H-55-P-4 - 1.08, H-55-P-14 - 1.08, H-55-P-2 - 0.74	2.9
1	H56	H-56-P-9 - 2.89, H-56-P-1 - 0.83	3.72
2	H56	H-56-P-4 - 2.48, H-56-P-5 - 0.99, H-56-P-14 - 0.41	3.88
3	H56	H-56-P-8 - 1.99, H-56-P-3 - 1.08, H-56-P-2 - 0.50	3.57
4	H56	H-56-P-7 - 1.74, H-56-P-12 - 1.32, H-56-P-13 - 0.74	3.8
5	H56	H-56-P-6 - 1.32, H-56-P-11 - 1.32, H-56-P-10 - 0.91	3.55
1	H57	H-57-P-6 - 2.98	2.98
2	H57	H-57-P-4 - 2.40, H-57-P-9 - 0.99	3.39
3	H57	H-57-P-8 - 1.65, H-57-P-3 - 1.08, H-57-P-7 - 0.99	3.72
4	H57	H-57-P-11 - 1.65, H-57-P-12 - 1.08, H-57-P-5 - 0.58	3.31
5	H57	H-57-P-1 - 1.57, H-57-P-10 - 1.24, H-57-P-2 - 0.58	3.39
1	H58	H-58-P-13 - 2.09, H-58-P-4 - 0.81	2.9
2	H58	H-58-P-8 - 2.03, H-58-P-5 - 0.83	2.86
3	H58	H-58-P-7 - 1.38, H-58-P-6 - 0.83, H-58-P-3 - 0.77	2.98
4	H58	H-58-P-12 - 1.31, H-58-P-9 - 1.18, H-58-P-2 - 0.63	3.12
5	H58	H-58-P-11 - 1.25, H-58-P-10 - 1.18, H-58-P-1 - 0.71	3.14

Turno	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
1	H59	H-59-P-2 - 2.68	2.68
2	H59	H-59-P-7 - 1.67, H-59-P-4 - 0.65, H-59-P-3 - 0.42	2.74
3	H59	H-59-P-1 - 1.64, H-59-P-5 - 0.67, H-59-P-9 - 0.53	2.84
4	H59	H-59-P-6 - 1.44, H-59-P-12 - 0.72, H-59-P-10 - 0.62	2.78
5	H59	H-59-P-14 - 1.02, H-59-P-13 - 0.79, H-59-P-11 - 0.64, H-59-P-8 - 0.37	2.82
1	H60	H-60-P-4 - 4.44	4.44
2	H60	H-60-P-12 - 1.93, H-60-P-1 - 0.21	2.14
3	H60	H-60-P-11 - 1.22, H-60-P-7 - 0.60, H-60-P-2 - 0.27	2.09
4	H60	H-60-P-10 - 1.06, H-60-P-8 - 0.61, H-60-P-5 - 0.54	2.21
5	H60	H-60-P-9 - 0.83, H-60-P-3 - 0.76, H-60-P-6 - 0.57	2.16
1	H61	H-61-P-6 - 1.66, H-61-P-10 - 0.66	2.32
2	H61	H-61-P-5 - 1.35, H-61-P-2 - 0.68, H-61-P-7 - 0.42	2.45
3	H61	H-61-P-14 - 1.04, H-61-P-3 - 0.83, H-61-P-1 - 0.51	2.38
4	H61	H-61-P-13 - 1.00, H-61-P-11 - 0.92, H-61-P-8 - 0.50	2.42
5	H61	H-61-P-4 - 0.93, H-61-P-12 - 0.93, H-61-P-9 - 0.59	2.45
1	H62	H-62-P-5 - 1.34, H-62-P-6 - 0.38, H-62-P-12 - 0.38	2.1
2	H62	H-62-P-14 - 1.21, H-62-P-7 - 0.83, H-62-P-1 - 0.08	2.12
3	H62	H-62-P-8 - 1.18, H-62-P-13 - 0.93	2.11
4	H62	H-62-P-4 - 1.07, H-62-P-10 - 0.96, H-62-P-9 - 0.32	2.35
5	H62	H-62-P-3 - 1.03, H-62-P-2 - 0.99, H-62-P-11 - 0.37	2.39
1	H63	H-63-P-9 - 4.20	4.2
2	H63	H-63-P-6 - 2.39, H-63-P-1 - 0.45	2.84
3	H63	H-63-P-14 - 1.65, H-63-P-12 - 0.70, H-63-P-10 - 0.48	2.83
4	H63	H-63-P-5 - 1.37, H-63-P-3 - 0.72, H-63-P-2 - 0.68, H-63-P-8 - 0.42	3.19
5	H63	H-63-P-13 - 1.11, H-63-P-4 - 0.72, H-63-P-11 - 0.68, H-63-P-7 - 0.42	2.93
1	H64	H-64-P-7 - 1.51, H-64-P-11 - 0.47, H-64-P-9 - 0.39	2.37
2	H64	H-64-P-6 - 1.45, H-64-P-12 - 0.59	2.04

Turno	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
3	H64	H-64-P-5 - 1.32, H-64-P-13 - 0.68, H-64-P-8 - 0.38	2.38
4	H64	H-64-P-14 - 1.18, H-64-P-2 - 0.76, H-64-P-1 - 0.42	2.36
5	H64	H-64-P-4 - 0.94, H-64-P-3 - 0.89, H-64-P-10 - 0.46	2.29
1	H65	H-65-P-4 - 2.05	2.05
2	H65	H-65-P-3 - 1.56, H-65-P-6 - 0.59	2.15
3	H65	H-65-P-11 - 1.09, H-65-P-7 - 0.61, H-65-P-5 - 0.49	2.19
4	H65	H-65-P-10 - 1.04, H-65-P-2 - 0.92	1.96
5	H65	H-65-P-9 - 1.02, H-65-P-8 - 0.92, H-65-P-1 - 0.14	2.08
1	H66	H-66-P-5 - 1.57, H-66-P-7 - 0.54	2.11
2	H66	H-66-P-2 - 1.53, H-66-P-3 - 0.76	2.29
3	H66	H-66-P-11 - 1.19, H-66-P-8 - 0.94	2.13
4	H66	H-66-P-12 - 1.19, H-66-P-4 - 0.87, H-66-P-1 - 0.33	2.39
5	H66	H-66-P-10 - 1.00, H-66-P-9 - 0.98, H-66-P-6 - 0.34	2.32
1	H67	H-67-P-12 - 2.37, H-67-P-2 - 0.80	3.17
2	H67	H-67-P-7 - 1.77, H-67-P-5 - 0.91, H-67-P-13 - 0.66	3.34
3	H67	H-67-P-3 - 1.67, H-67-P-9 - 1.12, H-67-P-1 - 0.48	3.27
4	H67	H-67-P-11 - 1.50, H-67-P-14 - 1.17, H-67-P-8 - 0.67	3.34
5	H67	H-67-P-10 - 1.37, H-67-P-6 - 1.25, H-67-P-4 - 0.80	3.42
1	H68	H-68-P-7 - 4.92	4.92
2	H68	H-68-P-6 - 1.93, H-68-P-8 - 0.64, H-68-P-1 - 0.31	2.88
3	H68	H-68-P-5 - 1.92, H-68-P-4 - 0.72	2.64
4	H68	H-68-P-11 - 1.47, H-68-P-9 - 0.72, H-68-P-3 - 0.45	2.64
5	H68	H-68-P-10 - 1.30, H-68-P-12 - 0.88, H-68-P-2 - 0.59	2.77

3.3 Sector 44

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
1	H1	P11 - 3.64	3.64
2	H1	P1 - 3.31	3.31
3	H1	P5 - 1.99, P4 - 0.66, P7 - 0.33	2.98
4	H1	P6 - 1.32, P12 - 1.32, P8 - 0.33	2.97
5	H1	P3 - 1.32, P2 - 1.08, P10 - 0.50, P9 - 0.17	3.07
1	H2	P2 - 1.32, P1 - 0.66	1.98
2	H2	P3 - 1.24, P9 - 0.66, P12 - 0.33	2.23
3	H2	P7 - 1.24, P10 - 0.66, P4 - 0.33	2.23
4	H2	P6 - 0.99, P13 - 0.99	1.98
5	H2	P5 - 0.99, P8 - 0.91, P11 - 0.25	2.15
1	H3	P5 - 1.65, P4 - 0.66	2.31
2	H3	P8 - 1.65, P10 - 0.33, P7 - 0.33	2.31
3	H3	P12 - 1.32, P3 - 0.74, P6 - 0.33	2.39
4	H3	P13 - 1.32, P2 - 0.66, P1 - 0.33	2.31
5	H3	P9 - 1.24, P11 - 0.99	2.23
1	H4	P12 - 3.64	3.64
2	H4	P1 - 1.32, P10 - 0.66	1.98
3	H4	P8 - 1.24, P9 - 0.66, P2 - 0.33	2.23
4	H4	P7 - 0.99, P3 - 0.66, P6 - 0.66	2.31
5	H4	P5 - 0.91, P4 - 0.66, P11 - 0.66	2.23
1	H5	P1 - 2.65, P8 - 0.66	3.31
2	H5	P2 - 2.32, P12 - 0.99	3.31
3	H5	P7 - 2.23, P5 - 0.99	3.22
4	H5	P3 - 1.99, P4 - 0.99, P10 - 0.66	3.64
5	H5	P11 - 1.16, P6 - 0.99, P9 - 0.99	3.14
1	H6	P2 - 2.65	2.65
2	H6	P1 - 1.82, P9 - 0.33, P5 - 0.33	2.48
3	H6	P12 - 1.65, P7 - 0.66, P8 - 0.33	2.64
4	H6	P13 - 1.32, P3 - 0.66, P10 - 0.33	2.31
5	H6	P4 - 0.99, P6 - 0.99, P11 - 0.33	2.31
1	H7	P11 - 2.98, P14 - 0.66	3.64
2	H7	P9 - 1.99, P4 - 0.66, P13 - 0.66	3.31
3	H7	P5 - 1.74, P8 - 0.66, P1 - 0.66	3.06

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
4	H7	P7 - 1.65, P6 - 0.99, P2 - 0.66	3.3
5	H7	P12 - 1.65, P10 - 0.99, P3 - 0.66	3.3
1	H8	P7 - 2.32, P6 - 0.66	2.98
2	H8	P3 - 1.99, P12 - 0.66, P9 - 0.33	2.98
3	H8	P11 - 1.99, P13 - 0.66, P8 - 0.33	2.98
4	H8	P1 - 1.90, P14 - 0.99	2.89
5	H8	P10 - 0.99, P4 - 0.99, P5 - 0.66, P2 - 0.58	3.22
1	H9	P4 - 1.99, P3 - 0.66	2.65
2	H9	P6 - 1.49, P1 - 0.99, P14 - 0.33	2.81
3	H9	P12 - 1.49, P2 - 0.66, P11 - 0.33	2.48
4	H9	P9 - 1.32, P10 - 0.99, P13 - 0.33	2.64
5	H9	P8 - 0.99, P5 - 0.99, P7 - 0.66	2.64
1	H10	P1 - 1.99, P13 - 0.33	2.32
2	H10	P9 - 1.41, P7 - 0.66	2.07
3	H10	P3 - 1.32, P4 - 0.66, P6 - 0.41	2.39
4	H10	P11 - 1.32, P5 - 0.66, P12 - 0.33	2.31
5	H10	P2 - 0.99, P10 - 0.91, P8 - 0.50	2.4
1	H11	P7 - 6.95	6.95
2	H11	P4 - 4.63, P8 - 0.74	5.37
3	H11	P9 - 2.56, P14 - 1.32, P5 - 0.99	4.87
4	H11	P10 - 2.32, P3 - 1.32, P12 - 0.99, P1 - 0.66	5.29
5	H11	P6 - 1.65, P2 - 1.65, P11 - 1.16, P13 - 0.83	5.29
1	H12	P7 - 2.65	2.65
2	H12	P3 - 1.32, P11 - 0.66, P1 - 0.33	2.31
3	H12	P2 - 1.32, P12 - 0.66, P6 - 0.33	2.31
4	H12	P5 - 0.99, P9 - 0.99	1.98
5	H12	P8 - 0.99, P10 - 0.91, P4 - 0.33	2.23
1	H13	P10 - 2.65	2.65
2	H13	P9 - 2.07, P4 - 0.33	2.4
3	H13	P7 - 1.65, P6 - 0.58	2.23
4	H13	P3 - 1.49, P11 - 0.66	2.15
5	H13	P8 - 1.08, P1 - 0.66, P5 - 0.33, P2 - 0.17	2.24
1	H14	P6 - 1.65, P7 - 0.33	1.98
2	H14	P5 - 1.32, P11 - 0.66	1.98
3	H14	P10 - 1.32, P2 - 0.50	1.82

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
4	H14	P9 - 1.08, P1 - 0.66, P3 - 0.25	1.99
5	H14	P8 - 0.99, P4 - 0.66, P12 - 0.33	1.98
1	H15	P1 - 1.99	1.99
2	H15	P8 - 1.32, P5 - 0.58, P11 - 0.33	2.23
3	H15	P6 - 0.99, P12 - 0.66, P7 - 0.41	2.06
4	H15	P14 - 0.99, P3 - 0.66, P4 - 0.33, P13 - 0.17	2.15
5	H15	P10 - 0.83, P2 - 0.66, P9 - 0.50	1.99
1	H16	P2 - 2.48, P4 - 0.66	3.14
2	H16	P1 - 1.65, P10 - 0.99, P12 - 0.66	3.3
3	H16	P3 - 1.65, P11 - 0.99	2.64
4	H16	P5 - 1.65, P6 - 0.66, P7 - 0.66	2.97
5	H16	P8 - 1.49, P9 - 1.32	2.81
1	H17	P1 - 1.32, P2 - 0.33	1.65
2	H17	P6 - 1.24, P7 - 0.33, P11 - 0.33	1.9
3	H17	P5 - 0.99, P9 - 0.99	1.98
4	H17	P4 - 0.99, P10 - 0.99	1.98
5	H17	P8 - 0.99, P3 - 0.66	1.65
1	H18	P8 - 4.30	4.3
2	H18	P2 - 3.97, P11 - 0.33	4.3
3	H18	P4 - 3.56, P10 - 0.99	4.55
4	H18	P3 - 2.32, P9 - 1.32, P12 - 0.50	4.14
5	H18	P1 - 1.99, P6 - 1.65, P5 - 0.41, P7 - 0.33	4.38
1	H19	P10 - 2.98	2.98
2	H19	P3 - 2.32, P9 - 0.33	2.65
3	H19	P2 - 2.32	2.32
4	H19	P4 - 1.65, P7 - 0.66, P8 - 0.66	2.97
5	H19	P1 - 1.32, P6 - 0.99, P5 - 0.66	2.97
1	H20	P9 - 3.31	3.31
2	H20	P2 - 1.99, P6 - 0.66	2.65
3	H20	P12 - 1.65, P1 - 0.66, P7 - 0.66	2.97
4	H20	P3 - 0.99, P11 - 0.99, P4 - 0.66	2.64
5	H20	P10 - 0.99, P8 - 0.99, P5 - 0.66	2.64
1	H21	P6 - 1.99, P11 - 0.33	2.32
2	H21	P3 - 0.99, P14 - 0.74, P13 - 0.33	2.06
3	H21	P2 - 0.99, P1 - 0.66, P12 - 0.66	2.31

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
4	H21	P8 - 0.99, P9 - 0.66, P5 - 0.66	2.31
5	H21	P7 - 0.83, P4 - 0.74, P10 - 0.66	2.23
1	H22	P6 - 5.62	5.62
2	H22	P9 - 2.56, P3 - 1.32	3.88
3	H22	P10 - 1.99, P7 - 1.32, P8 - 1.24	4.55
4	H22	P5 - 1.90, P12 - 1.65, P11 - 0.33	3.88
5	H22	P1 - 1.90, P2 - 1.57, P4 - 1.16	4.63
1	H23	P9 - 1.32, P5 - 0.41	1.73
2	H23	P11 - 1.32, P3 - 0.33, P6 - 0.33	1.98
3	H23	P1 - 1.08, P13 - 0.58	1.66
4	H23	P8 - 0.74, P7 - 0.58, P14 - 0.58	1.9
5	H23	P10 - 0.66, P2 - 0.66, P12 - 0.33, P4 - 0.33	1.98
1	H24	P1 - 2.07	2.07
2	H24	P7 - 0.99, P6 - 0.66	1.65
3	H24	P10 - 0.99, P4 - 0.66	1.65
4	H24	P9 - 0.83, P5 - 0.74	1.57
5	H24	P8 - 0.83, P3 - 0.66, P2 - 0.17	1.66
1	H25	P7 - 2.89	2.89
2	H25	P2 - 1.65, P10 - 0.41, P4 - 0.33	2.39
3	H25	P3 - 1.49, P8 - 0.66	2.15
4	H25	P1 - 1.32, P9 - 0.99	2.31
5	H25	P5 - 1.16, P6 - 0.99	2.15
1	H26	P7 - 2.32	2.32
2	H26	P1 - 1.65, P10 - 0.66	2.31
3	H26	P5 - 1.41, P4 - 0.66	2.07
4	H26	P3 - 1.32, P9 - 0.74, P2 - 0.33	2.39
5	H26	P8 - 0.99, P11 - 0.99, P6 - 0.66	2.64
1	H27	P4 - 1.32, P2 - 0.33	1.65
2	H27	P8 - 1.32, P3 - 0.33	1.65
3	H27	P6 - 0.99, P5 - 0.66	1.65
4	H27	P9 - 0.99, P7 - 0.33	1.32
5	H27	P10 - 0.99, P1 - 0.33	1.32
1	H28	P7 - 1.99	1.99
2	H28	P6 - 1.65, P10 - 0.66	2.31
3	H28	P1 - 1.32, P2 - 0.66	1.98
4	H28	P8 - 1.32, P9 - 0.66	1.98
5	H28	P3 - 0.99, P5 - 0.66, P4 - 0.33	1.98
1	H29	P4 - 1.65, P3 - 0.66	2.31
2	H29	P10 - 1.65, P9 - 0.66	2.31

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
3	H29	P7 - 1.32, P1 - 0.83	2.15
4	H29	P11 - 1.32, P6 - 0.83	2.15
5	H29	P5 - 0.99, P8 - 0.99, P2 - 0.41	2.39
1	H30	P8 - 2.40	2.4
2	H30	P7 - 1.41, P11 - 0.66, P13 - 0.33	2.4
3	H30	P2 - 1.08, P1 - 0.66, P6 - 0.66	2.4
4	H30	P5 - 0.99, P14 - 0.99, P12 - 0.33	2.31
5	H30	P9 - 0.99, P4 - 0.83, P3 - 0.33, P10 - 0.33	2.48
1	H31	P3 - 3.64	3.64
2	H31	P12 - 1.08, P6 - 0.58	1.66
3	H31	P4 - 0.99, P5 - 0.66, P8 - 0.33	1.98
4	H31	P2 - 0.99, P1 - 0.58, P11 - 0.33	1.9
5	H31	P9 - 0.66, P10 - 0.66, P7 - 0.58	1.9
1	H32	P5 - 2.98, P9 - 0.33	3.31
2	H32	P7 - 2.65, P13 - 0.50	3.15
3	H32	P1 - 2.07, P8 - 0.99, P10 - 0.17	3.23
4	H32	P2 - 1.41, P6 - 0.99, P11 - 0.99	3.39
5	H32	P3 - 1.32, P4 - 1.32, P12 - 0.66	3.3
1	H33	P12 - 1.65, P5 - 0.99	2.64
2	H33	P13 - 1.65, P7 - 0.99	2.64
3	H33	P10 - 1.32, P3 - 1.24, P6 - 0.25	2.81
4	H33	P4 - 1.32, P11 - 1.16, P9 - 0.33	2.81
5	H33	P8 - 1.32, P2 - 0.99, P1 - 0.99	3.3
1	H34	P10 - 2.40	2.4
2	H34	P7 - 1.99, P2 - 0.33	2.32
3	H34	P8 - 1.32, P6 - 0.91	2.23
4	H34	P1 - 1.32, P3 - 0.66, P4 - 0.66	2.64
5	H34	P9 - 0.99, P11 - 0.99, P5 - 0.66	2.64
1	H35	P11 - 2.32	2.32
2	H35	P9 - 2.23	2.23
3	H35	P6 - 1.16, P5 - 0.66	1.82
4	H35	P1 - 0.99, P10 - 0.66, P2 - 0.33	1.98
5	H35	P3 - 0.66, P4 - 0.66, P7 - 0.33, P8 - 0.25	1.9
1	H36	P13 - 2.65, P4 - 0.66	3.31
2	H36	P6 - 1.99, P5 - 0.66, P12 - 0.33	2.98

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
3	H36	P3 - 1.65, P1 - 0.99, P2 - 0.66	3.3
4	H36	P14 - 1.65, P8 - 0.66, P10 - 0.66	2.97
5	H36	P7 - 1.32, P9 - 1.08, P11 - 0.66	3.06
1	H37	P5 - 1.99, P2 - 0.66	2.65
2	H37	P6 - 1.65, P1 - 0.66, P11 - 0.33, P12 - 0.33	2.97
3	H37	P3 - 1.41, P4 - 1.24	2.65
4	H37	P7 - 1.32, P9 - 1.32	2.64
5	H37	P8 - 1.32, P10 - 1.32	2.64
1	H38	P7 - 3.31	3.31
2	H38	P10 - 2.65	2.65
3	H38	P11 - 1.99, P1 - 0.33	2.32
4	H38	P4 - 0.99, P8 - 0.83, P6 - 0.66	2.48
5	H38	P3 - 0.99, P9 - 0.66, P2 - 0.66, P5 - 0.33	2.64
1	H39	P12 - 1.65, P7 - 0.99	2.64
2	H39	P8 - 1.32, P3 - 0.99, P2 - 0.66	2.97
3	H39	P10 - 1.32, P4 - 0.99, P9 - 0.66	2.97
4	H39	P1 - 1.32, P11 - 0.99, P5 - 0.50	2.81
5	H39	P13 - 1.32, P6 - 0.99, P14 - 0.33	2.64
1	H40	P7 - 1.65, P5 - 0.33	1.98
2	H40	P11 - 1.32, P3 - 0.66	1.98
3	H40	P10 - 0.99, P2 - 0.66	1.65
4	H40	P4 - 0.66, P1 - 0.66, P12 - 0.66	1.98
5	H40	P6 - 0.66, P8 - 0.66, P9 - 0.33	1.65
1	H41	P4 - 2.65	2.65
2	H41	P8 - 1.99, P9 - 0.66	2.65
3	H41	P11 - 1.99, P7 - 0.66	2.65
4	H41	P1 - 1.65, P10 - 0.99, P5 - 0.66	3.3
5	H41	P6 - 0.99, P3 - 0.99, P2 - 0.99	2.97
1	H42	P9 - 3.31	3.31
2	H42	P8 - 1.32, P10 - 0.99, P6 - 0.66	2.97
3	H42	P5 - 1.32, P7 - 0.66, P12 - 0.66, P2 - 0.33	2.97
4	H42	P11 - 1.32, P4 - 0.66, P13 - 0.66	2.64
5	H42	P1 - 1.16, P14 - 1.16, P3 - 0.33	2.65
1	H43	P8 - 1.65, P7 - 0.33	1.98
2	H43	P9 - 1.65, P1 - 0.17	1.82

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
3	H43	P4 - 1.32, P6 - 0.66	1.98
4	H43	P3 - 0.99, P10 - 0.99	1.98
5	H43	P5 - 0.99, P2 - 0.83	1.82
1	H44	P9 - 9.26	9.26
2	H44	P6 - 7.94	7.94
3	H44	P5 - 1.99, P3 - 1.32, P4 - 0.66	3.97
4	H44	P12 - 1.99, P7 - 0.99, P11 - 0.66	3.64
5	H44	P2 - 1.32, P10 - 1.32, P1 - 0.99, P8 - 0.33	3.96
1	H45	P12 - 1.99, P10 - 0.33	2.32
2	H45	P3 - 1.32, P7 - 0.66, P2 - 0.33	2.31
3	H45	P9 - 0.99, P8 - 0.83, P5 - 0.66	2.48
4	H45	P1 - 0.99, P14 - 0.83, P6 - 0.41	2.23
5	H45	P13 - 0.99, P11 - 0.66, P4 - 0.66	2.31
1	H46	P5 - 2.98	2.98
2	H46	P7 - 1.65, P11 - 0.66	2.31
3	H46	P1 - 1.49, P2 - 0.66	2.15
4	H46	P4 - 0.99, P8 - 0.66, P9 - 0.58	2.23
5	H46	P10 - 0.91, P6 - 0.74, P3 - 0.08	1.73

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
1	H47	P3 - 1.65	1.65
2	H47	P9 - 1.65	1.65
3	H47	P5 - 1.08, P7 - 0.33, P6 - 0.33	1.74
4	H47	P1 - 0.99, P4 - 0.58, P11 - 0.33	1.9
5	H47	P10 - 0.99, P8 - 0.58, P2 - 0.17	1.74
1	H48	P9 - 2.65	2.65
2	H48	P11 - 2.48	2.48
3	H48	P7 - 1.99, P4 - 0.33	2.32
4	H48	P5 - 0.99, P1 - 0.66, P3 - 0.66	2.31
5	H48	P10 - 0.91, P8 - 0.66, P6 - 0.66, P2 - 0.25	2.48
1	H49	P8 - 2.32	2.32
2	H49	P10 - 1.41, P11 - 0.66	2.07
3	H49	P2 - 1.32, P7 - 0.66	1.98
4	H49	P5 - 0.99, P9 - 0.66, P6 - 0.33	1.98
5	H49	P3 - 0.91, P4 - 0.66, P1 - 0.50	2.07
1	H50	P7 - 2.98	2.98
2	H50	P6 - 2.32, P4 - 0.08	2.4
3	H50	P9 - 1.74, P5 - 0.41, P1 - 0.33	2.48

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
4	H50	P11 - 1.65, P2 - 0.50, P3 - 0.17	2.32
5	H50	P10 - 0.99, P12 - 0.99, P8 - 0.41	2.39
1	H51	P2 - 4.05	4.05
2	H51	P9 - 2.81, P5 - 0.33	3.14
3	H51	P6 - 1.99, P11 - 1.08	3.07
4	H51	P3 - 1.99, P4 - 0.66, P1 - 0.58	3.23
5	H51	P7 - 1.49, P10 - 1.16, P8 - 0.50	3.15
1	H52	P1 - 4.63	4.63
2	H52	P2 - 3.14	3.14
3	H52	P6 - 3.14	3.14
4	H52	P5 - 1.08, P8 - 0.74, P9 - 0.33, P7 - 0.33	2.48
5	H52	P4 - 0.99, P3 - 0.74, P10 - 0.66, P11 - 0.33	2.72
1	H53	P2 - 2.32, P6 - 0.33	2.65
2	H53	P4 - 2.32, P8 - 0.33	2.65
3	H53	P11 - 1.41, P10 - 0.91, P7 - 0.17	2.49
4	H53	P1 - 1.32, P5 - 0.91, P9 - 0.41	2.64
5	H53	P3 - 1.16, P12 - 1.16	2.32
1	H54	P7 - 3.23	3.23

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
2	H54	P6 - 1.90, P9 - 0.33, P11 - 0.17	2.4
3	H54	P8 - 1.74, P13 - 0.41, P3 - 0.33	2.48
4	H54	P4 - 1.65, P12 - 0.50, P1 - 0.33	2.48
5	H54	P5 - 1.49, P2 - 0.66, P10 - 0.25	2.4
1	H55	P1 - 3.12	3.12
2	H55	P2 - 2.49	2.49
3	H55	P3 - 2.00	2
4	H55	P10 - 0.93, P4 - 0.49, P9 - 0.40, P5 - 0.30	2.12
5	H55	P12 - 0.66, P11 - 0.53, P6 - 0.42, P7 - 0.38, P8 - 0.23	2.22
1	H56	P4 - 4.27	4.27
2	H56	P12 - 2.59, P6 - 0.82, P10 - 0.43	3.84
3	H56	P13 - 2.17, P2 - 0.95, P11 - 0.52, P8 - 0.43	4.07
4	H56	P14 - 1.89, P3 - 1.18, P5 - 0.70, P9 - 0.43	4.2
5	H56	P7 - 1.65, P1 - 1.36, P15 - 0.80	3.81
1	H57	P1 - 1.73, P14 - 0.65, P13 - 0.34	2.72
2	H57	P10 - 1.53, P7 - 0.68, P5 - 0.64	2.85

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
3	H57	P11 - 1.40, P2 - 0.82, P4 - 0.60	2.82
4	H57	P3 - 1.22, P15 - 0.84, P6 - 0.65	2.71
5	H57	P9 - 1.14, P8 - 1.08, P12 - 0.47	2.69
1	H58	P13 - 2.04	2.04
2	H58	P1 - 0.95, P10 - 0.41, P9 - 0.32, P4 - 0.31	1.99
3	H58	P2 - 0.85, P12 - 0.50, P3 - 0.36	1.71
4	H58	P14 - 0.85, P11 - 0.50, P8 - 0.33, P6 - 0.21	1.89
5	H58	P5 - 0.78, P15 - 0.53, P7 - 0.38	1.69
1	H59	P1 - 6.1	6.1
1	H60	P2 - 5.04, P1 - 0.34	5.38
2	H60	P13 - 2.98, P11 - 1.75, P9 - 1.30	6.03
3	H60	P12 - 2.88, P8 - 1.79, P10 - 1.51	6.18
4	H60	P4 - 2.57, P3 - 1.80, P7 - 1.53	5.9
5	H60	P6 - 2.06, P14 - 1.93, P5 - 1.57	5.56
1	H61	P11 - 1.83, P5 - 0.32	2.15
2	H61	P7 - 1.34, P2 - 0.51	1.85
3	H61	P9 - 1.30, P12 - 0.65	1.95
4	H61	P6 - 0.96, P1 - 0.69, P3 - 0.34	1.99
5	H61	P4 - 0.75, P10 - 0.69, P8 - 0.39	1.83
1	H62	P13 - 5.95	5.95
2	H62	P8 - 2.62, P11 - 1.24, P6 - 0.59	4.45
3	H62	P9 - 2.01, P12 - 1.31, P3 - 0.80	4.12
4	H62	P7 - 1.95, P2 - 1.52, P4 - 0.72	4.19
5	H62	P1 - 1.94, P10 - 1.80, P5 - 0.64	4.38
1	H63	P9 - 5.29	5.29
2	H63	P4 - 3.44, P10 - 0.93, P13 - 0.06	4.43
3	H63	P2 - 3.02, P1 - 1.21, P12 - 0.14	4.37
4	H63	P8 - 2.31, P3 - 1.79, P6 - 0.28	4.38
5	H63	P7 - 2.11, P5 - 1.86, P11 - 0.86	4.83
1	H64	P13 - 6.55	6.55
2	H64	P1 - 6.40	6.4
3	H64	P7 - 4.94, P8 - 0.93	5.87
4	H64	P2 - 1.90, P6 - 1.60, P4 - 1.32, P12 - 0.94, P3 - 0.67	6.43

Turnos	Hidrante	Combinación por turno (Parcela-demanda)	Suma Demanda (l/s)
5	H64	P10 - 1.81, P5 - 1.73, P11 - 1.02, P14 - 1.01, P9 - 0.68	6.25
1	H65	P2 - 7.25	7.25
2	H65	P1 - 5.10	5.1
3	H65	P12 - 3.16, P5 - 0.70, P11 - 0.20	4.06
4	H65	P9 - 2.87, P8 - 0.73, P7 - 0.63	4.23
5	H65	P4 - 1.71, P3 - 0.96, P10 - 0.74, P6 - 0.66	4.07
1	H66	P1 - 2.93	2.93
2	H66	P8 - 2.25, P7 - 0.59	2.84
3	H66	P2 - 1.49, P9 - 0.83, P11 - 0.50	2.82
4	H66	P4 - 1.20, P6 - 1.05, P12 - 0.54, P10 - 0.40	3.19
5	H66	P3 - 1.07, P5 - 1.06, P13 - 0.68	2.81
1	H67	P4 - 3.71	3.71
2	H67	P13 - 2.56, P6 - 0.46	3.02
3	H67	P14 - 1.28, P12 - 0.78, P1 - 0.54	2.6
4	H67	P2 - 0.92, P11 - 0.88, P3 - 0.71, P10 - 0.47	2.98
5	H67	P8 - 0.91, P5 - 0.89, P9 - 0.63, P7 - 0.49	2.92
1	H68	P2 - 3.30, P7 - 1.32	4.62
2	H68	P1 - 2.79, P6 - 1.38	4.17
3	H68	P4 - 2.64, P9 - 1.42	4.06
4	H68	P5 - 2.57, P10 - 1.76	4.33
5	H68	P8 - 2.50, P3 - 2.01	4.51
1	H69	P11 - 1.40, P8 - 0.24, P9 - 0.17	1.81
2	H69	P3 - 1.39, P10 - 0.53	1.92
3	H69	P2 - 1.32, P4 - 0.72	2.04
4	H69	P1 - 1.26, P7 - 0.77	2.03
5	H69	P5 - 1.01, P6 - 0.83	1.84
1	H70	P7 - 1.65, P11 - 0.68	2.33
2	H70	P6 - 1.49, P3 - 0.71	2.2
3	H70	P8 - 1.37, P9 - 0.78, P4 - 0.66	2.81
4	H70	P5 - 1.26, P10 - 0.92, P12 - 0.18	2.36
5	H70	P1 - 1.24, P2 - 1.11	2.35
1	H71	P12 - 2.06, P4 - 0.25	2.31
2	H71	P6 - 1.28, P13 - 0.79	2.07
3	H71	P3 - 1.20, P7 - 0.85, P5 - 0.39	2.44
4	H71	P9 - 0.89, P8 - 0.87, P11 - 0.67	2.43
5	H71	P2 - 0.87, P10 - 0.87, P1 - 0.78	2.52