

CUADRO DE CÁLCULO ALCANTARILLADO SANITARIO - ANA GILMA

Elaborado por: BIVIANA PISCO GARZÓN
ANDRÉS ALBERTO CAICEDO TOLEDO
CRISTIAN CAMILO CALDERÓN LÓPEZ

| | | |
|-------------------------|-------|-------------|
| Area tributaria total | 3.8 | Ha |
| Poblacion | 1.445 | habitantes |
| Habitantes /Ha | 380.3 | Hab/Ha |
| Dotación | 140 | L/hab - día |
| Coefficiente de retorno | 0.85 | |

| | | |
|----------------------|---------|------------|
| Q medio residual | 1.99 | L/s |
| Q residual | 0.524 | (L/seg-Ha) |
| Q infiltración | 0.30 | L/s-Ha |
| Q conexiones erradas | 0.20 | L/s-Ha |
| Periodo de Diseño | 25 años | |

| INICIO 1 | TRAMO | | AREA TRIBUTARIA (Ha) | | | Q medio residual | Población servida | F | Q residual Max. h | Q infiltración | Q conexiones erradas | Qdiseño total | Qdiseño total | L | Φtub | Φtub interior | Material tubería |
|----------|-------|-----|----------------------|--------|--------|------------------|-------------------|-----|-------------------|----------------|----------------------|---------------|---------------|--------|--------|---------------|------------------|
| | DE | A | Afluente | Propia | TOTAL | (L/s) | (habitantes) | | (L/s) | (L/s) | (L/s) | (L/s) | (L/s) | (m) | (pulg) | (m) | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) |
| 1 | P13 | P12 | 0.00 | 0.336 | 0.336 | 0.160 | 116 | 3.8 | 0.61 | 0.034 | 0.067 | 0.710 | 1.5 | 65.50 | 8 | 0.182 | PVC |
| | P12 | P18 | 3.73 | 0.100 | 3.831 | 1.824 | 1,324 | 3.8 | 6.93 | 0.383 | 0.766 | 8.079 | 8.1 | 35.80 | 8 | 0.182 | PVC |
| 1 | P19 | P18 | 0.00 | 0.350 | 0.350 | 0.167 | 121 | 3.8 | 0.63 | 0.035 | 0.070 | 0.739 | 1.5 | 84.50 | 8 | 0.182 | PVC |
| 1 | P17 | P18 | 1.08 | 0.373 | 1.453 | 0.692 | 502 | 3.8 | 2.63 | 0.145 | 0.291 | 3.064 | 3.1 | 99.93 | 8 | 0.182 | PVC |
| | P18 | P24 | 5.63 | 0.100 | 5.734 | 2.730 | 1,982 | 3.8 | 10.37 | 0.573 | 1.147 | 12.093 | 12.1 | 36.30 | 10 | 0.227 | PVC |
| 1 | P23 | P24 | 1.07 | 0.429 | 1.501 | 0.715 | 519 | 3.8 | 2.72 | 0.150 | 0.300 | 3.166 | 3.2 | 98.55 | 8 | 0.182 | PVC |
| | P24 | P25 | 7.24 | 0.376 | 7.612 | 3.623 | 2,631 | 3.8 | 13.77 | 0.761 | 1.522 | 16.053 | 16.1 | 100.30 | 12 | 0.284 | PVC |
| | P25 | P31 | 7.61 | 0.100 | 7.712 | 3.671 | 2,665 | 3.8 | 13.95 | 0.771 | 1.542 | 16.264 | 16.3 | 36.90 | 12 | 0.284 | PVC |
| 1 | P29 | P30 | 1.23 | 0.429 | 1.664 | 0.792 | 575 | 3.8 | 3.01 | 0.166 | 0.333 | 3.509 | 3.5 | 98.05 | 8 | 0.182 | PVC |
| | P30 | P31 | 1.66 | 0.436 | 2.100 | 1.000 | 726 | 3.8 | 3.80 | 0.210 | 0.420 | 4.428 | 4.4 | 99.68 | 8 | 0.182 | PVC |
| 1 | P36 | P37 | 0.00 | 0.297 | 0.297 | 0.141 | 102 | 3.8 | 0.54 | 0.030 | 0.059 | 0.625 | 1.5 | 95.30 | 8 | 0.182 | PVC |
| | P37 | P35 | 0.30 | 0.100 | 0.397 | 0.189 | 137 | 3.8 | 0.72 | 0.040 | 0.079 | 0.836 | 1.5 | 35.83 | 8 | 0.182 | PVC |
| 1 | P33 | P34 | 0.34 | 0.480 | 0.822 | 0.391 | 284 | 3.8 | 1.49 | 0.082 | 0.164 | 1.734 | 1.7 | 96.20 | 8 | 0.182 | PVC |
| | P34 | P35 | 0.82 | 0.376 | 1.198 | 0.570 | 414 | 3.8 | 2.17 | 0.120 | 0.240 | 2.527 | 2.5 | 99.00 | 8 | 0.182 | PVC |
| | P35 | P31 | 1.59 | 0.100 | 1.695 | 0.807 | 586 | 3.8 | 3.07 | 0.169 | 0.339 | 3.574 | 3.6 | 41.70 | 8 | 0.182 | PVC |
| | P31 | PZA | 11.51 | 0.100 | 11.606 | 5.525 | 4,011 | 3.8 | 20.92 | 1.161 | 2.321 | 24.405 | 24.4 | 36.97 | 12 | 0.284 | PVC |
| | PZA | PZB | 11.61 | 0.100 | 11.706 | 5.572 | 4,046 | 3.8 | 21.07 | 1.171 | 2.341 | 24.579 | 24.6 | 106.07 | 12 | 0.284 | PVC |
| | PZB | PZC | 11.71 | 0.100 | 11.806 | 5.620 | 4,080 | 3.8 | 21.21 | 1.181 | 2.361 | 24.753 | 24.8 | 100.00 | 12 | 0.284 | PVC |
| | PZC | PZD | 11.81 | 0.100 | 11.906 | 5.668 | 4,115 | 3.8 | 21.36 | 1.191 | 2.381 | 24.927 | 24.9 | 86.52 | 12 | 0.284 | PVC |
| | PZD | PZE | 11.91 | 0.100 | 12.006 | 5.715 | 4,150 | 3.8 | 21.50 | 1.201 | 2.401 | 25.100 | 25.1 | 116.53 | 12 | 0.284 | PVC |
| | PZE | PZF | 12.01 | 0.100 | 12.106 | 5.763 | 4,184 | 3.8 | 21.64 | 1.211 | 2.421 | 25.273 | 25.3 | 99.54 | 12 | 0.284 | PVC |
| | PZF | PZG | 12.11 | 0.100 | 12.206 | 5.811 | 4,219 | 3.7 | 21.78 | 1.221 | 2.441 | 25.446 | 25.4 | 99.54 | 12 | 0.284 | PVC |
| | PZG | PF | 12.21 | 0.100 | 12.306 | 5.858 | 4,253 | 3.7 | 21.93 | 1.231 | 2.461 | 25.619 | 25.6 | 24.95 | 12 | 0.284 | PVC |

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| INICIO 1 | TRAMO | | n | P terreno | S tubería | Sección plena | | Q/Qo | Vr | d | H | d/D | H/D | R | c | V ² /2g | E |
|----------|-------|-----|------|-----------|-----------|---------------|---------|--------|-------|------|------------|-------|-------|----------------------|------|--------------------|-------|
| | DE | A | | (%) | (%) | Q (L/s) | V (m/s) | | (m/s) | (m) | (m) | | (m) | (Kg/m ²) | (m) | (m) | |
| (1) | (2) | (3) | (19) | (20) | (19) | (20) | (21) | (22) | (23) | (24) | (25) | (26) | (27) | (28) | (29) | (30) | (31) |
| 1 | P13 | P12 | 0.01 | -0.31 | 0.55 | 24.61 | 0.95 | 0.0609 | 0.44 | 0.03 | 0.02077563 | 0.165 | 0.114 | 0.018 | 0.10 | 0.010 | 0.040 |
| | P12 | P18 | 0.01 | -1.68 | 0.25 | 16.60 | 0.64 | 0.4868 | 0.54 | 0.10 | 0.0832724 | 0.562 | 0.458 | 0.049 | 0.12 | 0.015 | 0.117 |
| 1 | P19 | P18 | 0.01 | -0.95 | 0.55 | 24.61 | 0.95 | 0.0609 | 0.44 | 0.03 | 0.02077563 | 0.165 | 0.114 | 0.018 | 0.10 | 0.010 | 0.040 |
| 1 | P17 | P18 | 0.01 | -0.80 | 0.35 | 19.64 | 0.75 | 0.1561 | 0.46 | 0.05 | 0.03749602 | 0.287 | 0.206 | 0.030 | 0.10 | 0.011 | 0.063 |
| | P18 | P24 | 0.01 | -1.10 | 0.35 | 35.39 | 0.87 | 0.3417 | 0.67 | 0.10 | 0.07941549 | 0.456 | 0.350 | 0.053 | 0.19 | 0.023 | 0.126 |
| | P24 | P25 | 0.01 | 1.20 | 0.33 | 62.46 | 0.99 | 0.2570 | 0.70 | 0.11 | 0.08140587 | 0.385 | 0.287 | 0.059 | 0.20 | 0.025 | 0.134 |
| | P25 | P31 | 0.01 | 0.54 | 0.33 | 62.46 | 0.99 | 0.2604 | 0.70 | 0.11 | 0.08213506 | 0.388 | 0.289 | 0.060 | 0.20 | 0.025 | 0.135 |
| | P30 | P31 | 0.01 | 1.61 | 0.45 | 22.26 | 0.86 | 0.1989 | 0.56 | 0.06 | 0.04392611 | 0.331 | 0.241 | 0.034 | 0.15 | 0.016 | 0.076 |
| 1 | P36 | P37 | 0.01 | 2.31 | 1.20 | 36.36 | 1.40 | 0.0413 | 0.58 | 0.02 | 0.01636493 | 0.131 | 0.090 | 0.015 | 0.18 | 0.017 | 0.041 |
| | P37 | P35 | 0.01 | 0.00 | 1.20 | 36.36 | 1.40 | 0.0413 | 0.58 | 0.02 | 0.01636493 | 0.131 | 0.090 | 0.015 | 0.18 | 0.017 | 0.041 |
| | P34 | P35 | 0.01 | 1.82 | 0.45 | 22.26 | 0.86 | 0.1135 | 0.47 | 0.04 | 0.03059566 | 0.238 | 0.168 | 0.026 | 0.12 | 0.011 | 0.055 |
| | P35 | P31 | 0.01 | 0.00 | 0.45 | 22.26 | 0.86 | 0.1605 | 0.53 | 0.05 | 0.03818268 | 0.292 | 0.210 | 0.030 | 0.14 | 0.014 | 0.067 |
| | P31 | PZA | 0.01 | -6.22 | 0.25 | 54.36 | 0.86 | 0.4489 | 0.71 | 0.15 | 0.12185288 | 0.535 | 0.429 | 0.074 | 0.19 | 0.026 | 0.178 |
| | PZA | PZB | 0.01 | 1.40 | 0.25 | 54.36 | 0.86 | 0.4521 | 0.72 | 0.15 | 0.12253175 | 0.538 | 0.431 | 0.074 | 0.19 | 0.026 | 0.179 |
| | PZB | PZC | 0.01 | 0.88 | 0.25 | 54.36 | 0.86 | 0.4553 | 0.72 | 0.15 | 0.12321042 | 0.540 | 0.434 | 0.074 | 0.19 | 0.026 | 0.180 |
| | PZC | PZD | 0.01 | -0.57 | 0.25 | 54.36 | 0.86 | 0.4585 | 0.72 | 0.15 | 0.12388894 | 0.542 | 0.436 | 0.075 | 0.19 | 0.026 | 0.180 |
| | PZD | PZE | 0.01 | -1.29 | 0.25 | 54.36 | 0.86 | 0.4617 | 0.72 | 0.15 | 0.12456733 | 0.544 | 0.439 | 0.075 | 0.19 | 0.026 | 0.181 |
| | PZE | PZF | 0.01 | 1.40 | 0.25 | 54.36 | 0.86 | 0.4649 | 0.72 | 0.16 | 0.12524565 | 0.546 | 0.441 | 0.075 | 0.19 | 0.027 | 0.182 |
| | PZF | PZG | 0.01 | -3.08 | 0.25 | 54.36 | 0.86 | 0.4681 | 0.72 | 0.16 | 0.12592391 | 0.549 | 0.443 | 0.075 | 0.19 | 0.027 | 0.182 |
| | PZG | PF | 0.01 | 0.16 | 0.25 | 54.36 | 0.86 | 0.4713 | 0.72 | 0.16 | 0.12660216 | 0.551 | 0.446 | 0.075 | 0.19 | 0.027 | 0.183 |

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| INICIO 1 | TRAMO | | H (m) | NF | Reg. Flujo | COTA RASANTE ORIGINAL | | COTA RASANTE NECESARIA | | COTA CLAVE | | COTA BATEA | | PROFUNDIDAD A CLAVE | | PROFUNDIDAD A BATEA | |
|----------|-------|-----|----------|-------|--------------|-----------------------|--------|------------------------|--------|------------|--------|------------|--------|---------------------|-------|---------------------|-------|
| | DE | A | | | | INICIAL | FINAL | INICIAL | FINAL | INICIAL | FINAL | INICIAL | FINAL | INICIAL | FINAL | INICIAL | FINAL |
| (1) | (2) | (3) | (32) | (33) | (34) | (45) | (46) | (45) | (46) | (47) | (48) | (49) | (50) | (55) | (56) | (57) | (58) |
| 1 | P11 | P12 | 0.076 | 0.608 | Subcrítico | 311.00 | 311.00 | 311.00 | 311.00 | 309.80 | 309.55 | 309.62 | 309.36 | 1.20 | 1.45 | 1.38 | 1.64 |
| 1 | P13 | P12 | 0.021 | 0.967 | Subcrítico | 310.80 | 311.00 | 310.80 | 311.00 | 309.60 | 309.24 | 309.42 | 309.06 | 1.20 | 1.76 | 1.38 | 1.94 |
| | P12 | P18 | 0.083 | 0.601 | Subcrítico | 311.00 | 311.60 | 311.00 | 311.60 | 309.22 | 309.13 | 309.04 | 308.95 | 1.78 | 2.47 | 1.96 | 2.65 |
| 1 | P19 | P18 | 0.021 | 0.967 | Subcrítico | 310.80 | 311.60 | 310.80 | 311.60 | 309.60 | 309.14 | 309.42 | 308.95 | 1.20 | 2.46 | 1.38 | 2.65 |
| 1 | P17 | P18 | 0.037 | 0.758 | Subcrítico | 310.80 | 311.60 | 310.80 | 311.60 | 309.60 | 309.25 | 309.42 | 309.07 | 1.20 | 2.35 | 1.38 | 2.53 |
| | P18 | P24 | 0.079 | 0.760 | Subcrítico | 311.60 | 312.00 | 311.60 | 312.00 | 309.11 | 308.98 | 308.88 | 308.76 | 2.49 | 3.02 | 2.72 | 3.24 |
| | P24 | P25 | 0.081 | 0.779 | Subcrítico | 312.00 | 310.80 | 312.00 | 310.80 | 308.96 | 308.63 | 308.68 | 308.35 | 3.04 | 2.17 | 3.32 | 2.45 |
| | P25 | P31 | 0.082 | 0.778 | Subcrítico | 310.80 | 310.60 | 310.80 | 310.60 | 308.61 | 308.49 | 308.33 | 308.21 | 2.19 | 2.11 | 2.47 | 2.39 |
| | P30 | P31 | 0.044 | 0.853 | Subcrítico | 312.20 | 310.60 | 312.20 | 310.60 | 309.94 | 309.49 | 309.76 | 309.31 | 2.26 | 1.11 | 2.44 | 1.29 |
| 1 | P36 | P37 | 0.016 | 1.435 | Supercrítico | 312.80 | 310.60 | 312.80 | 311.40 | 311.60 | 310.46 | 311.42 | 310.27 | 1.20 | 0.94 | 1.38 | 1.13 |
| | P37 | P35 | 0.016 | 1.435 | Supercrítico | 310.60 | 310.60 | 311.40 | 311.10 | 310.44 | 310.01 | 310.25 | 309.82 | 0.96 | 1.09 | 1.15 | 1.28 |
| | P34 | P35 | 0.031 | 0.866 | Subcrítico | 312.40 | 310.60 | 312.40 | 311.10 | 310.12 | 309.68 | 309.94 | 309.50 | 2.28 | 1.42 | 2.46 | 1.60 |
| | P35 | P31 | 0.038 | 0.859 | Subcrítico | 310.60 | 310.60 | 311.10 | 310.60 | 309.66 | 309.47 | 309.48 | 309.29 | 1.44 | 1.13 | 1.62 | 1.31 |
| | P31 | PZA | 0.122 | 0.653 | Subcrítico | 310.60 | 312.90 | 310.60 | 312.90 | 308.47 | 308.38 | 308.19 | 308.09 | 2.13 | 4.52 | 2.41 | 4.81 |
| | PZA | PZB | 0.123 | 0.652 | Subcrítico | 312.90 | 311.41 | 312.90 | 311.41 | 308.36 | 308.09 | 308.07 | 307.81 | 4.54 | 3.32 | 4.83 | 3.60 |
| | PZB | PZC | 0.123 | 0.652 | Subcrítico | 311.41 | 310.53 | 311.41 | 310.53 | 308.07 | 307.82 | 307.79 | 307.54 | 3.34 | 2.71 | 3.62 | 2.99 |
| | PZC | PZD | 0.124 | 0.652 | Subcrítico | 310.53 | 311.02 | 310.53 | 311.02 | 307.80 | 307.59 | 307.52 | 307.30 | 2.73 | 3.43 | 3.01 | 3.72 |
| | PZD | PZE | 0.125 | 0.651 | Subcrítico | 311.02 | 312.52 | 311.02 | 312.52 | 307.57 | 307.28 | 307.28 | 306.99 | 3.45 | 5.24 | 3.74 | 5.53 |
| | PZE | PZF | 0.125 | 0.651 | Subcrítico | 312.52 | 311.13 | 312.52 | 311.13 | 307.26 | 307.01 | 306.97 | 306.72 | 5.26 | 4.12 | 5.55 | 4.41 |
| | PZF | PZG | 0.126 | 0.650 | Subcrítico | 311.13 | 314.20 | 311.13 | 314.20 | 306.99 | 306.74 | 306.70 | 306.45 | 4.14 | 7.46 | 4.43 | 7.75 |
| | PZG | PF | 0.127 | 0.650 | Subcrítico | 314.20 | 314.16 | 314.20 | 314.16 | 306.72 | 306.66 | 306.43 | 306.37 | 7.48 | 7.50 | 7.77 | 7.79 |