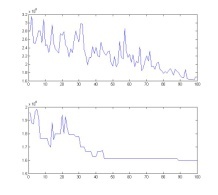
|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| start node | end node | D1 mm | L 1 m | D2 mm | L2 m |  | node\_id | Q | head | min head |  |
| 1 | 2 | 400 | 760.0 | 450.0 | 0.0 |  | 1 | 165 | 79.38 | 75 | 4.38 |
| 1 | 4 | 300 | 387.4 | 350.0 | 132.6 |  | 2 | 220 | 90.35 | 74 | 16.35 |
| 2 | 5 | 500 | 610.0 | 550.0 | 0.0 |  | 3 | 145 | 73.05 | 73 | 0.05 |
| 2 | 6 | 250 | 533.6 | 300.0 | 146.4 |  | 4 | 165 | 72.28 | 72 | 0.28 |
| 3 | 5 | 200 | 128.0 | 250.0 | 552.0 |  | 6 | 140 | 73.06 | 73 | 0.06 |
| 5 | 7 | 350 | 506.8 | 400.0 | 383.2 |  | 7 | 175 | 78.42 | 67 | 11.42 |
| 7 | 13 | 300 | 680.0 | 350.0 | 0.0 |  | 8 | 180 | 72.05 | 72 | 0.05 |
| 5 | 10 | 400 | 741.8 | 450.0 | 8.2 |  | 9 | 140 | 77.36 | 70 | 7.36 |
| 11 | 10 | 250 | 102.1 | 300.0 | 247.9 |  | 10 | 160 | 79.58 | 69 | 10.58 |
| 10 | 12 | 300 | 620.0 | 350.0 | 0.0 |  | 11 | 170 | 71.07 | 71 | 0.07 |
| 8 | 9 | 300 | 97.4 | 350.0 | 382.6 |  | 12 | 160 | 70.07 | 70 | 0.07 |
| 9 | 14 | 400 | 770.0 | 450.0 | 0.0 |  | 13 | 190 | 64.08 | 64 | 0.08 |
| 14 | 15 | 250 | 411.2 | 300.0 | 88.8 |  | 14 | 200 | 87.86 | 73 | 14.86 |
| 14 | 16 | 500 | 450.0 | 550.0 | 0.0 |  | 15 | 150 | 73.05 | 73 | 0.05 |
| 16 | 18 | 400 | 540.0 | 450.0 | 0.0 |  | 17 | 165 | 67.06 | 67 | 0.06 |
| 18 | 17 | 250 | 5.1 | 300.0 | 844.9 |  | 18 | 140 | 80.99 | 70 | 10.99 |
| 18 | 20 | 250 | 75.0 | 300.0 | 675.0 |  | 19 | 185 | 70.06 | 70 | 0.06 |
| 16 | 19 | 250 | 414.2 | 300.0 | 285.8 |  | 20 | 165 | 67.06 | 67 | 0.06 |





|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Link | From | To | Length  (m) | Node | Demand (l/s) | Min. Head  (m) |
| 1 | 1 | 2 | 760 | 1 | 165 | 75 |
| 2 | 1 | 4 | 520 | 2 | 220 | 74 |
| 3 | 1 | 6 | 890 | 3 | 145 | 73 |
| 4 | 2 | 3 | 1120 | 4 | 165 | 72 |
| 5 | 2 | 5 | 610 | 5 | … | 102 |
| 6 | 2 | 6 | 680 | 6 | 140 | 73 |
| 7 | 3 | 5 | 680 | 7 | 175 | 67 |
| 8 | 3 | 7 | 870 | 8 | 180 | 72 |
| 9 | 4 | 8 | 860 | 9 | 140 | 70 |
| 10 | 4 | 9 | 980 | 10 | 160 | 69 |
| 11 | 5 | 7 | 890 | 11 | 170 | 71 |
| 12 | 5 | 10 | 750 | 12 | 160 | 70 |
| 13 | 6 | 9 | 620 | 13 | 190 | 64 |
| 14 | 6 | 10 | 800 | 14 | 200 | 73 |
| 15 | 7 | 12 | 730 | 15 | 150 | 73 |
| 16 | 7 | 13 | 680 | 16 | … | 96 |
| 17 | 8 | 9 | 480 | 17 | 165 | 67 |
| 18 | 8 | 15 | 860 | 18 | 140 | 70 |
| 19 | 9 | 11 | 800 | 19 | 185 | 70 |
| 20 | 9 | 14 | 770 | 20 | 165 | 67 |
| 21 | 10 | 11 | 350 |  |  |  |
| 22 | 10 | 12 | 620 |  |  |  |
| 23 | 11 | 12 | 670 |  |  |  |
| 24 | 11 | 16 | 790 |  |  |  |
| 25 | 11 | 18 | 1150 |  |  |  |
| 26 | 12 | 13 | 750 |  |  |  |
| 27 | 12 | 17 | 550 |  |  |  |
| 28 | 13 | 17 | 700 |  |  |  |
| 29 | 14 | 15 | 500 |  |  |  |
| 30 | 14 | 16 | 450 |  |  |  |
| 31 | 14 | 19 | 750 |  |  |  |
| 32 | 15 | 19 | 720 |  |  |  |
| 33 | 16 | 18 | 540 |  |  |  |
| 34 | 16 | 19 | 700 |  |  |  |
| 35 | 17 | 18 | 850 |  |  |  |
| 36 | 18 | 20 | 750 |  |  |  |
| 37 | 19 | 20 | 970 |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Link | D1 (mm) | L 1  (m) | D2 (mm) | L2  (m) | Node | Pressure  (m) |
| 1 | 400 | 760 | 450 | … | 1 | 79.38 |
| 2 | 300 | 387.4 | 350 | 132.6 | 2 | 90.35 |
| 5 | 500 | 610 | 550 | … | 3 | 73.05 |
| 6 | 250 | 533.6 | 300 | 146.4 | 4 | 72.28 |
| 7 | 200 | 128 | 250 | 552 |  |  |
| 11 | 350 | 506.8 | 400 | 383.2 | 6 | 73.06 |
| 16 | 300 | 680 | 350 | … | 7 | 78.42 |
| 12 | 400 | 741.8 | 450 | 8.2 | 8 | 72.05 |
| 21 | 250 | 102.1 | 300 | 247.9 | 9 | 77.36 |
| 22 | 300 | 620 | 350 | … | 10 | 79.58 |
| 17 | 300 | 97.4 | 350 | 382.6 | 11 | 71.07 |
| 20 | 400 | 770 | 450 | … | 12 | 70.07 |
| 29 | 250 | 411.2 | 300 | 88.8 | 13 | 64.08 |
| 30 | 500 | 450 | 550 | … | 14 | 87.86 |
| 33 | 400 | 540 | 450 | … |  |  |
| 34 | 250 | 5.1 | 300 | 844.9 | 15 | 73.05 |
| 35 | 250 | 75 | 300 | 675 | 17 | 67.06 |
| 36 | 250 | 414.2 | 300 | 285.8 | 18 | 80.99 |
| Cost ($) | 559595505 | | | |  |  |
|  |  | | | |  |  |
|  |  | | | |  |  |