# HILLSIDE GROVES SUBDIVISION

IRRIGATION DEMAND CALCULATION

DESIGN REPORT

FOR

Easton & Associates
10165 NW 19th St.
Miami, FL 33172
Phone: (305) 593-2222

PREPARED BY:


## Connelly & Wicker, Inc.

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DATE: 7/10/2023
CWI Project No.: 21-04-0008

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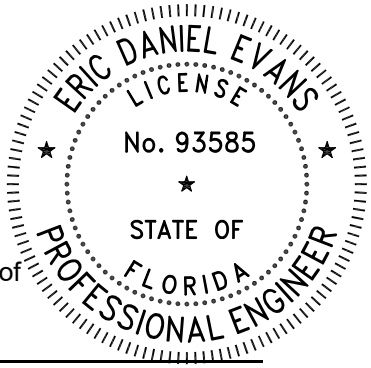


Prepared under the direction of

Eric D Evans

Digitally signed by Eric D Evans
DN: cn=Eric D Evans, c=US, o=CONNELLY AND WICKER INC., email=eevans@cwieng.com
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Eric D. Evans, P.E.
PE # 93585

## PROJECT SUMMARY

### THE PROJECT

The proposed development is located within the Town of Howey in the Hills, Florida. The project is located west of South Palm Avenue and north of Revels Road. The development will contain 728 single family lots.

### IRRIGATION WATER SUPPLY

In the future the site will be supplied by reclaimed water for irrigation demands in a future connection on Number 2 Road. However, at this time this system is not available, but onsite irrigation wells are available to supply irrigation water in the interim. The analysis provided here is for the first phase and geographically convenient lots in future phases that could also be served by the existing onsite well adjacent to lot 51. Future Phase 2 is addressed in this analysis which includes Lots 308-385).

Future development can also be supplied by a well located within a future phase adjacent to lot 42. The future lots served will include phase 2 lots 246-307 and phase 3 lots 308-385.

The results of this analysis require the well pump to provide 2,600 GPM at 129 feet of head pressure.

### WATER MAIN DESIGN

The analysis provided shows a steady state analysis of a minimum 40 PSI with 5 GPM to each lot. Additionally, each open space and the amenity is conservatively designed for 10 GPM of demand.

### DESIGN ANALYSIS

The modeling for this system was accomplished using Bentley OpenFlows WaterCAD CONNECT Edition Update 3.

# Connelly & Wicker, Inc.

**HILLSIDE GROVES SUBDIVISION**

Designed By: EE
Date: 7/10/2023
Project No: 23-04-0041

**Demand Summary Table**

| **Calculate Average Daily Flow** | | | | |
|---|---|---|---|---|
| Junction. No. J- | Description | DU Units | Demand / Unit | Total Demand |
| 1 | Single Family Lot | 0 | 5 | 0 |
| 2 | Single Family Lot | 0 | 5 | 0 |
| 3 | Single Family Lot | 0 | 5 | 0 |
| 4 | Single Family Lot | 4 | 5 | 20 |
| 5 | Single Family Lot | 45 | 5 | 225 |
| 6 | Single Family Lot | 16 | 5 | 80 |
| 7 | Landscape Service | 1 | 10 | 10 |
| 8 | Single Family Lot | 18 | 5 | 90 |
| 9 | Single Family Lot | 20 | 5 | 100 |
| 10 | Single Family Lot | 0 | 5 | 0 |
| 11.1 | Single Family Lot | 4 | 5 | 20 |
| 11.2 | Landscape Service | 1 | 10 | 10 |
| 12 | Single Family Lot | 0 | 5 | 0 |
| 13 | Single Family Lot | 46 | 5 | 230 |
| 14 | Single Family Lot | 3 | 5 | 15 |
| 15 | Single Family Lot | 5 | 5 | 25 |
| 16 | Single Family Lot | 6 | 5 | 30 |
| 17 | Single Family Lot | 0 | 5 | 0 |
| 18 | Single Family Lot | 6 | 5 | 30 |
| 19 | Single Family Lot | 19 | 5 | 95 |
| 20 | Single Family Lot | 4 | 5 | 20 |
| 21 | Single Family Lot | 0 | 5 | 0 |
| 22 | Single Family Lot | 6 | 5 | 30 |
| 23 | Single Family Lot | 0 | 5 | 0 |
| 24 | Single Family Lot | 4 | 5 | 20 |
| 25 | Single Family Lot | 0 | 5 | 0 |
| 26 | Single Family Lot | 0 | 5 | 0 |
| 27 | Single Family Lot | 17 | 5 | 85 |
| 28 | Amenity Center | 1 | 10 | 10 |
| 29 | Single Family Lot | 0 | 5 | 0 |
| 30 | Landscape Service | 1 | 10 | 10 |
| 31 | Single Family Lot | 0 | 5 | 0 |
| 32 | Single Family Lot | 12 | 5 | 60 |
| 33 | Single Family Lot | 7 | 5 | 35 |
| 34 | Single Family Lot | 4 | 5 | 20 |
| 35 | Single Family Lot | 5 | 5 | 25 |
| 36 | Single Family Lot | 19 | 5 | 95 |
| 37 | Single Family Lot | 0 | 5 | 0 |
| 38 | Single Family Lot | 13 | 5 | 65 |
| 39 | Single Family Lot | 5 | 5 | 25 |
| 40 | Single Family Lot | 6 | 5 | 30 |

# Connelly & Wicker, Inc.

**HILLSIDE GROVES SUBDIVISION**

Designed By: EE
Date: 7/10/2023
Project No: 23-04-0041

**Demand Summary Table**

| **Calculate Average Daily Flow** | | | | |
|---|---|---|---|---|
| Junction. No. J- | Description | DU Units | Flow / Unit GPD | Avg Daily GPD |
| | | | | |
| 41 | | 6 | 5 | 30 |
| 42 | | 3 | 5 | 15 |
| 43 | | 8 | 5 | 40 |
| 44 | | 21 | 5 | 105 |
| 45 | | 18 | 5 | 90 |
| 46 | | 13 | 5 | 65 |
| 47 | | 3 | 5 | 15 |
| 48 | | 50 | 5 | 250 |
| 49 | | 5 | 5 | 25 |
| 50 | | 6 | 5 | 30 |
| 51 | | 6 | 5 | 30 |
| 52 | | 6 | 5 | 30 |
| 53 | | 54 | 5 | 270 |
| 54 | | 19 | 5 | 95 |
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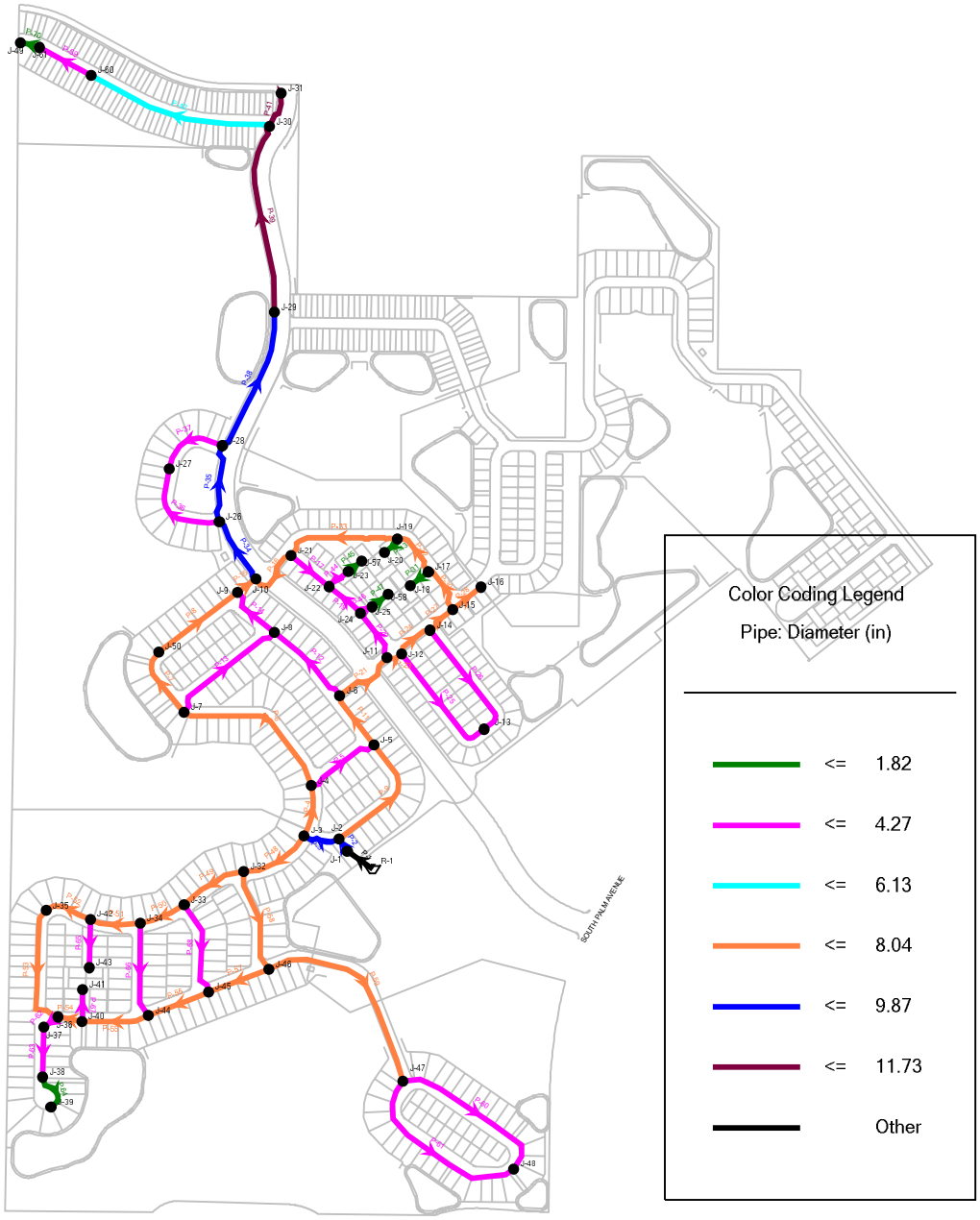
| | | | | |
| | **Total** | **516** | | **2600** |

# Scenario: Base



# FlexTable: Pipe Table

| Label | Diameter (in) | Material | Hazen-Williams C | Flow (gpm) | Velocity (ft/s) | Headloss (Friction) (ft) | Headloss (Minor) (ft) | Headloss (ft) |
|---|---|---|---|---|---|---|---|---|
| P-1 | 999.00 | PVC | 130.0 | 2,600.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| P-2 | 9.87 | PVC | 130.0 | 2,600.00 | 10.90 | 2.71 | 3.45 | 6.17 |
| P-3 | 9.87 | PVC | 130.0 | 1,673.91 | 7.02 | 3.01 | 2.30 | 5.31 |
| P-4 | 8.04 | PVC | 130.0 | 708.91 | 4.48 | 2.30 | 0.70 | 3.00 |
| P-5 | 4.24 | PVC | 130.0 | 89.66 | 2.04 | 1.70 | 0.26 | 1.96 |
| P-6 | 8.04 | PVC | 130.0 | 599.25 | 3.79 | 5.40 | 0.52 | 5.92 |
| P-7 | 8.04 | PVC | 130.0 | 506.53 | 3.20 | 1.76 | 0.17 | 1.93 |
| P-8 | 8.04 | PVC | 130.0 | 476.53 | 3.01 | 2.09 | 0.10 | 2.20 |
| P-9 | 8.04 | PVC | 130.0 | 926.09 | 5.85 | 9.49 | 0.78 | 10.27 |
| P-11 | 8.04 | PVC | 130.0 | 790.75 | 5.00 | 3.34 | 0.59 | 3.94 |
| P-12 | 4.24 | PVC | 130.0 | 99.90 | 2.27 | 2.45 | 0.15 | 2.60 |
| P-13 | 4.24 | PVC | 130.0 | -82.72 | 1.88 | 2.35 | 0.23 | 2.58 |
| P-14 | 4.24 | PVC | 130.0 | -92.63 | 2.10 | 1.35 | 0.20 | 1.55 |
| P-15 | 8.04 | PVC | 130.0 | 469.16 | 2.96 | 0.47 | 0.28 | 0.75 |
| P-16 | 8.04 | PVC | 130.0 | -25.84 | 0.16 | 0.01 | 0.00 | 0.01 |
| P-17 | 4.24 | PVC | 130.0 | 11.36 | 0.26 | 0.02 | 0.00 | 0.03 |
| P-19 | 4.24 | PVC | 130.0 | -48.64 | 1.11 | 0.29 | 0.03 | 0.31 |
| P-20 | 4.24 | PVC | 130.0 | -98.64 | 2.24 | 1.38 | 0.16 | 1.54 |
| P-21 | 8.04 | PVC | 130.0 | -610.84 | 3.86 | 2.20 | 0.87 | 3.07 |
| P-23 | 8.04 | PVC | 130.0 | 482.20 | 3.05 | 0.36 | 0.14 | 0.50 |
| P-24 | 8.04 | PVC | 130.0 | 362.62 | 2.29 | 0.50 | 0.16 | 0.66 |
| P-25 | 4.24 | PVC | 130.0 | 119.58 | 2.72 | 4.67 | 0.24 | 4.91 |
| P-26 | 4.24 | PVC | 130.0 | -110.42 | 2.51 | 4.04 | 0.20 | 4.25 |
| P-27 | 8.04 | PVC | 130.0 | 237.20 | 1.50 | 0.19 | 0.05 | 0.24 |
| P-28 | 8.04 | PVC | 130.0 | 30.00 | 0.19 | 0.00 | 0.00 | 0.01 |
| P-30 | 8.04 | PVC | 130.0 | 182.20 | 1.15 | 0.18 | 0.08 | 0.25 |
| P-31 | 1.81 | HDPE | 130.0 | 30.00 | 3.74 | 4.14 | 0.36 | 4.50 |
| P-32 | 8.04 | PVC | 130.0 | 152.20 | 0.96 | 0.13 | 0.02 | 0.15 |
| P-33 | 8.04 | PVC | 130.0 | 37.20 | 0.24 | 0.02 | 0.00 | 0.02 |
| P-34 | 9.87 | PVC | 130.0 | 495.00 | 2.08 | 0.58 | 0.13 | 0.71 |
| P-35 | 9.87 | PVC | 130.0 | 441.18 | 1.85 | 0.54 | 0.10 | 0.64 |
| P-36 | 4.24 | PVC | 130.0 | 53.82 | 1.22 | 0.82 | 0.05 | 0.88 |
| P-37 | 4.24 | PVC | 130.0 | -31.18 | 0.71 | 0.22 | 0.02 | 0.24 |
| P-38 | 9.87 | PVC | 130.0 | 400.00 | 1.68 | 0.83 | 0.07 | 0.91 |
| P-39 | 11.73 | PVC | 130.0 | 400.00 | 1.19 | 0.47 | 0.06 | 0.52 |
| P-41 | 11.73 | PVC | 130.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| P-42 | 6.13 | PVC | 130.0 | 390.00 | 4.24 | 10.37 | 0.55 | 10.92 |
| P-43 | 1.81 | HDPE | 130.0 | 20.00 | 2.49 | 1.70 | 0.16 | 1.86 |
| P-44 | 4.24 | PVC | 130.0 | 30.00 | 0.68 | 0.07 | 0.01 | 0.09 |
| P-45 | 1.81 | HDPE | 130.0 | 30.00 | 3.74 | 3.05 | 0.08 | 3.13 |
| P-46 | 4.24 | PVC | 130.0 | 30.00 | 0.68 | 0.04 | 0.01 | 0.06 |
| P-47 | 1.81 | HDPE | 130.0 | 30.00 | 3.74 | 3.59 | 0.08 | 3.67 |
| P-48 | 8.04 | PVC | 130.0 | 965.00 | 6.10 | 5.74 | 1.19 | 6.93 |
| P-49 | 8.04 | PVC | 130.0 | 433.76 | 2.74 | 1.24 | 0.18 | 1.42 |
| P-50 | 8.04 | PVC | 130.0 | 328.66 | 2.08 | 0.51 | 0.10 | 0.61 |
| P-51 | 8.04 | PVC | 130.0 | 251.14 | 1.59 | 0.33 | 0.06 | 0.39 |
| P-52 | 8.04 | PVC | 130.0 | 196.14 | 1.24 | 0.20 | 0.04 | 0.23 |
| P-53 | 8.04 | PVC | 130.0 | 171.14 | 1.08 | 0.40 | 0.04 | 0.43 |

# FlexTable: Pipe Table

| Label | Diameter (in) | Material | Hazen-Williams C | Flow (gpm) | Velocity (ft/s) | Headloss (Friction) (ft) | Headloss (Minor) (ft) | Headloss (ft) |
|---|---|---|---|---|---|---|---|---|
| P-54 | 8.04 | PVC | 130.0 | -13.86 | 0.09 | 0.00 | 0.00 | 0.00 |
| P-55 | 8.04 | PVC | 130.0 | -73.86 | 0.47 | 0.05 | 0.01 | 0.05 |
| P-56 | 8.04 | PVC | 130.0 | -121.34 | 0.77 | 0.11 | 0.02 | 0.12 |
| P-57 | 8.04 | PVC | 130.0 | -141.24 | 0.89 | 0.14 | 0.02 | 0.16 |
| P-58 | 8.04 | PVC | 130.0 | -471.24 | 2.98 | 2.16 | 0.60 | 2.76 |
| P-59 | 8.04 | PVC | 130.0 | 265.00 | 1.67 | 1.50 | 0.16 | 1.66 |
| P-60 | 4.24 | PVC | 130.0 | 128.76 | 2.93 | 6.99 | 0.38 | 7.37 |
| P-61 | 4.24 | PVC | 130.0 | -121.24 | 2.75 | 6.94 | 0.43 | 7.37 |
| P-62 | 4.24 | PVC | 130.0 | 90.00 | 2.05 | 0.38 | 0.11 | 0.49 |
| P-63 | 4.24 | PVC | 130.0 | 90.00 | 2.05 | 1.10 | 0.10 | 1.20 |
| P-64 | 1.81 | HDPE | 130.0 | 25.00 | 3.12 | 5.21 | 0.24 | 5.45 |
| P-65 | 4.24 | PVC | 130.0 | 40.00 | 0.91 | 0.24 | 0.03 | 0.26 |
| P-66 | 4.24 | PVC | 130.0 | 57.52 | 1.31 | 0.91 | 0.10 | 1.01 |
| P-67 | 4.24 | PVC | 130.0 | -30.00 | 0.68 | 0.09 | 0.01 | 0.11 |
| P-68 | 4.24 | PVC | 130.0 | 70.10 | 1.59 | 1.33 | 0.16 | 1.50 |
| P-69 | 4.24 | PVC | 130.0 | 120.00 | 2.73 | 2.19 | 0.12 | 2.31 |
| P-70 | 1.81 | HDPE | 130.0 | 25.00 | 3.12 | 2.52 | 0.16 | 2.68 |

# FlexTable: Pipe Table

| Label | Diameter (in) | Material | Hazen-Williams C | Flow (gpm) | Velocity (ft/s) | Headloss (Friction) (ft) | Headloss (Minor) (ft) | Headloss (ft) |
|---|---|---|---|---|---|---|---|---|
| P-1 | 999.00 | PVC | 130.0 | 2,600.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| P-2 | 9.87 | PVC | 130.0 | 2,600.00 | 10.90 | 2.71 | 3.45 | 6.17 |
| P-3 | 9.87 | PVC | 130.0 | 1,673.91 | 7.02 | 3.01 | 2.30 | 5.31 |
| P-4 | 8.04 | PVC | 130.0 | 708.91 | 4.48 | 2.30 | 0.70 | 3.00 |
| P-5 | 4.24 | PVC | 130.0 | 89.66 | 2.04 | 1.70 | 0.26 | 1.96 |
| P-6 | 8.04 | PVC | 130.0 | 599.25 | 3.79 | 5.40 | 0.52 | 5.92 |
| P-7 | 8.04 | PVC | 130.0 | 506.53 | 3.20 | 1.76 | 0.17 | 1.93 |
| P-8 | 8.04 | PVC | 130.0 | 476.53 | 3.01 | 2.09 | 0.10 | 2.20 |
| P-9 | 8.04 | PVC | 130.0 | 926.09 | 5.85 | 9.49 | 0.78 | 10.27 |
| P-11 | 8.04 | PVC | 130.0 | 790.75 | 5.00 | 3.34 | 0.59 | 3.94 |
| P-12 | 4.24 | PVC | 130.0 | 99.90 | 2.27 | 2.45 | 0.15 | 2.60 |
| P-13 | 4.24 | PVC | 130.0 | -82.72 | 1.88 | 2.35 | 0.23 | 2.58 |
| P-14 | 4.24 | PVC | 130.0 | -92.63 | 2.10 | 1.35 | 0.20 | 1.55 |
| P-15 | 8.04 | PVC | 130.0 | 469.16 | 2.96 | 0.47 | 0.28 | 0.75 |
| P-16 | 8.04 | PVC | 130.0 | -25.84 | 0.16 | 0.01 | 0.00 | 0.01 |
| P-17 | 4.24 | PVC | 130.0 | 11.36 | 0.26 | 0.02 | 0.00 | 0.03 |
| P-19 | 4.24 | PVC | 130.0 | -48.64 | 1.11 | 0.29 | 0.03 | 0.31 |
| P-20 | 4.24 | PVC | 130.0 | -98.64 | 2.24 | 1.38 | 0.16 | 1.54 |
| P-21 | 8.04 | PVC | 130.0 | -610.84 | 3.86 | 2.20 | 0.87 | 3.07 |
| P-23 | 8.04 | PVC | 130.0 | 482.20 | 3.05 | 0.36 | 0.14 | 0.50 |
| P-24 | 8.04 | PVC | 130.0 | 362.62 | 2.29 | 0.50 | 0.16 | 0.66 |
| P-25 | 4.24 | PVC | 130.0 | 119.58 | 2.72 | 4.67 | 0.24 | 4.91 |
| P-26 | 4.24 | PVC | 130.0 | -110.42 | 2.51 | 4.04 | 0.20 | 4.25 |
| P-27 | 8.04 | PVC | 130.0 | 237.20 | 1.50 | 0.19 | 0.05 | 0.24 |
| P-28 | 8.04 | PVC | 130.0 | 30.00 | 0.19 | 0.00 | 0.00 | 0.01 |
| P-30 | 8.04 | PVC | 130.0 | 182.20 | 1.15 | 0.18 | 0.08 | 0.25 |
| P-31 | 1.81 | HDPE | 130.0 | 30.00 | 3.74 | 4.14 | 0.36 | 4.50 |
| P-32 | 8.04 | PVC | 130.0 | 152.20 | 0.96 | 0.13 | 0.02 | 0.15 |
| P-33 | 8.04 | PVC | 130.0 | 37.20 | 0.24 | 0.02 | 0.00 | 0.02 |
| P-34 | 9.87 | PVC | 130.0 | 495.00 | 2.08 | 0.58 | 0.13 | 0.71 |
| P-35 | 9.87 | PVC | 130.0 | 441.18 | 1.85 | 0.54 | 0.10 | 0.64 |
| P-36 | 4.24 | PVC | 130.0 | 53.82 | 1.22 | 0.82 | 0.05 | 0.88 |
| P-37 | 4.24 | PVC | 130.0 | -31.18 | 0.71 | 0.22 | 0.02 | 0.24 |
| P-38 | 9.87 | PVC | 130.0 | 400.00 | 1.68 | 0.83 | 0.07 | 0.91 |
| P-39 | 11.73 | PVC | 130.0 | 400.00 | 1.19 | 0.47 | 0.06 | 0.52 |
| P-41 | 11.73 | PVC | 130.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| P-42 | 6.13 | PVC | 130.0 | 390.00 | 4.24 | 10.37 | 0.55 | 10.92 |
| P-43 | 1.81 | HDPE | 130.0 | 20.00 | 2.49 | 1.70 | 0.16 | 1.86 |
| P-44 | 4.24 | PVC | 130.0 | 30.00 | 0.68 | 0.07 | 0.01 | 0.09 |
| P-45 | 1.81 | HDPE | 130.0 | 30.00 | 3.74 | 3.05 | 0.08 | 3.13 |
| P-46 | 4.24 | PVC | 130.0 | 30.00 | 0.68 | 0.04 | 0.01 | 0.06 |
| P-47 | 1.81 | HDPE | 130.0 | 30.00 | 3.74 | 3.59 | 0.08 | 3.67 |
| P-48 | 8.04 | PVC | 130.0 | 965.00 | 6.10 | 5.74 | 1.19 | 6.93 |
| P-49 | 8.04 | PVC | 130.0 | 433.76 | 2.74 | 1.24 | 0.18 | 1.42 |
| P-50 | 8.04 | PVC | 130.0 | 328.66 | 2.08 | 0.51 | 0.10 | 0.61 |
| P-51 | 8.04 | PVC | 130.0 | 251.14 | 1.59 | 0.33 | 0.06 | 0.39 |
| P-52 | 8.04 | PVC | 130.0 | 196.14 | 1.24 | 0.20 | 0.04 | 0.23 |
| P-53 | 8.04 | PVC | 130.0 | 171.14 | 1.08 | 0.40 | 0.04 | 0.43 |

# FlexTable: Pipe Table

| Label | Diameter (in) | Material | Hazen-Williams C | Flow (gpm) | Velocity (ft/s) | Headloss (Friction) (ft) | Headloss (Minor) (ft) | Headloss (ft) |
|---|---|---|---|---|---|---|---|---|
| P-54 | 8.04 | PVC | 130.0 | -13.86 | 0.09 | 0.00 | 0.00 | 0.00 |
| P-55 | 8.04 | PVC | 130.0 | -73.86 | 0.47 | 0.05 | 0.01 | 0.05 |
| P-56 | 8.04 | PVC | 130.0 | -121.34 | 0.77 | 0.11 | 0.02 | 0.12 |
| P-57 | 8.04 | PVC | 130.0 | -141.24 | 0.89 | 0.14 | 0.02 | 0.16 |
| P-58 | 8.04 | PVC | 130.0 | -471.24 | 2.98 | 2.16 | 0.60 | 2.76 |
| P-59 | 8.04 | PVC | 130.0 | 265.00 | 1.67 | 1.50 | 0.16 | 1.66 |
| P-60 | 4.24 | PVC | 130.0 | 128.76 | 2.93 | 6.99 | 0.38 | 7.37 |
| P-61 | 4.24 | PVC | 130.0 | -121.24 | 2.75 | 6.94 | 0.43 | 7.37 |
| P-62 | 4.24 | PVC | 130.0 | 90.00 | 2.05 | 0.38 | 0.11 | 0.49 |
| P-63 | 4.24 | PVC | 130.0 | 90.00 | 2.05 | 1.10 | 0.10 | 1.20 |
| P-64 | 1.81 | HDPE | 130.0 | 25.00 | 3.12 | 5.21 | 0.24 | 5.45 |
| P-65 | 4.24 | PVC | 130.0 | 40.00 | 0.91 | 0.24 | 0.03 | 0.26 |
| P-66 | 4.24 | PVC | 130.0 | 57.52 | 1.31 | 0.91 | 0.10 | 1.01 |
| P-67 | 4.24 | PVC | 130.0 | -30.00 | 0.68 | 0.09 | 0.01 | 0.11 |
| P-68 | 4.24 | PVC | 130.0 | 70.10 | 1.59 | 1.33 | 0.16 | 1.50 |
| P-69 | 4.24 | PVC | 130.0 | 120.00 | 2.73 | 2.19 | 0.12 | 2.31 |
| P-70 | 1.81 | HDPE | 130.0 | 25.00 | 3.12 | 2.52 | 0.16 | 2.68 |

## FlexTable: Reservoir Table

| Label | Elevation (ft) | Flow (Out net) (gpm) |
|---|---|---|
| R-1 | 224.00 | 2,600.00 |

Ground Elevation at well is ~95.6
Well pump to increase head to 224.0
by providing an additional ~129 feet
of head pressure.