

Hydraulic Analysis – Coffee Factory

Project Objective

To evaluate whether the existing pump can adequately supply the irrigation system with sufficient pressure and flow when operating multiple zones at a time, and to document the methodology used for emitter coefficient calculations and gate valve modeling in EPANET.

System Setup

- Water Source: Pond with submersible pump
- Pump Design Point: ~1,350 LPM (22.5 LPS) at 68 m head
- Operation Mode: 4 zones running simultaneously in sequential time slots
- Total Zones: 33 (controlled via modeled gate valves)

Emitter Coefficient Calculation

In EPANET, the emitter coefficient (Ke) is used to model flow through devices such as sprinklers, where flow is proportional to the square root of pressure. The formula is:

$$Q = K_e \times \sqrt{P}$$

Where:

- Q is the flow in LPM per sprinkler
- Ke is the emitter coefficient in LPM/ $\sqrt{m}$
- P is the pressure in meters at the emitter location

From the HASS calculations, each sprinkler was determined to have a K-factor of 8.52 LPM/ $\sqrt{\text{bar}}$. Since 1 bar $\approx$ 10.197 m, the equivalent Ke in LPM/ $\sqrt{m}$ is:

$$K_e = 8.52 \div \sqrt{10.197} \approx 2.67 \text{ LPM}/\sqrt{m} \text{ per sprinkler}$$

Therefore, for a junction with N sprinklers connected:

$$K_{e_total} = 2.67 \times N$$

This value was entered into the 'Emitter Coeff' field in EPANET for each node. Base Demand for those nodes was set to zero to ensure that all demand was pressure-dependent.

Gate Valve Modeling with Short Pipes

Originally, gate valves were modeled in EPANET using General Purpose Valves (GPVs). However, GPVs require head loss curves, and for this irrigation model, the primary purpose of the valves was to control which zones were active at any given time.

To simplify control, each GPV was replaced with a short pipe segment representing the gate valve location. These short pipes were given IDs such as 'GV-1', 'GV-2', etc., and assigned a negligible length (e.g., 0.01 m) to avoid introducing additional head loss.

Control rules were then created in EPANET to set the status of these short pipes to 'OPEN' or 'CLOSED' depending on the zone operation schedule. This allowed simulation of multiple zones operating in sequence without requiring complex valve head loss curves.

Control Rules

Control rules in EPANET were used to ensure that only four zones operated at a time. For example, the first slot operated zones 31, 32, 11, and 12. The control syntax was:

```
RULE 1
IF SYSTEM TIME = 0:00
THEN LINK GV-31 STATUS IS OPEN
THEN LINK GV-32 STATUS IS OPEN
THEN LINK GV-11 STATUS IS OPEN
THEN LINK GV-12 STATUS IS OPEN
ELSE LINK ALL OTHER GV STATUS IS CLOSED
```

Similar rules were created for subsequent time slots to rotate through all zones.

Key Findings

1. Pump Performance

- Under the simulated operating conditions, the pump consistently delivered the design flow or higher.
- Head at low flows was above 68 m due to low friction losses and pump curve characteristics.

2. Zone Pressures

- For active zones, header pressures were generally **well above 50 m (5 bar)**.

- This ensures that even the most remote sprinklers receive ≥ 30 m (3 bar) — meeting operational requirements.
- Non-active zones showed 0 m pressure (valves closed), as expected.

3. Minimum Pressure Check

- Across all time steps and active zones, **no active node dropped below 50 m** header pressure.
- Adequate margin exists above the minimum design threshold.

4. System Behavior

- When fewer zones operate, pressures are higher due to reduced friction losses.
- Pressure values above pump's nominal head are due to pump operating near shutoff and the elevation difference from the pond water surface.

- Pump consistently delivered design flow or higher under simulated conditions.
- Header pressures in active zones were generally well above 50 m (5 bar).
- No active node dropped below 50 m header pressure across all time steps.
- Pressures above pump nominal head occurred due to low friction losses and elevation gain from pond surface.

Conclusion

The current pump is sufficient for the proposed operation of four zones at a time. No additional pump is required for the tested conditions. The system has a healthy safety margin.

```

*****
*                               E P A N E T                               *
*                               Hydraulic and Water Quality                *
*                               Analysis for Pipe Networks                  *
*                               Version 2.2                                *
*****

```

Input File: Hydraulic Analysis Coffe Factory.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	POND	2	13	6
3	2	3	16.3	150
4	3	z4	20.1	150
5	z4	5	131.5	150
6	5	6	116.2	150
7	6	7	6	150
8	7	8	170.7	150
10	9	10	79.8	150
11	10	11	53.4	150
12	11	z15	19	150
13	z15	z19	25.8	150
14	z19	z16	26.6	150
15	z16	z17	52.5	150
16	z17	z18	52.5	150
18	17	18	32.4	100
19	18	z26	26.4	100
20	z26	z27	80.5	100
21	z27	z28	59.7	100
22	z28	z29	30.1	100
23	z29	23	21.7	80
24	23	z31	117	50
GV-30	23	Zone-30	1	50
26	10	z13	79.7	80
27	z13	z14	57.7	65
28	z32	36	35.6	100
29	36	37	7.1	50
GV-25	37	Zone-25	1	50
31	36	z23	52.4	100
32	z23	34	9.2	150
33	34	40	54.5	65
GV-24	40	Zone-24	1	65
35	34	33	43	150
36	33	z22	5.4	150
37	z22	z12	77	150
38	z12	z11	63.5	150
39	z11	z10	59.2	150

40

z10

z9

90

150



Page 2

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
41	z9	8	38.9	150
42	2	42	14.2	150
43	42	43	7.6	150
44	43	z1	56.5	100
45	z1	z2	66.8	80
46	z2	z3	4.7	80
47	42	47	115.6	100
48	z7	z6	28.5	80
49	z6	z5	7.9	80
50	z5	48	53.9	80
51	48	47	23.5	100
52	48	z33	38	50
53	8	z8	28.2	150
54	z8	9	23.5	150
55	z18	z20	9.1	150
56	z20	z21	121.7	150
57	z21	17	47.2	100
GV-7	Zone-7	z7	1	80
GV-6	z6	Zone-6	1	80
GV-5	z5	Zone-5	1	65
GV-3	z3	Zone-3	1	50
GV-2	z2	Zone-2	1	65
GV-1	z1	Zone-1	1	65
GV-4	z4	Zone-4	1	50
GV-8	z8	Zone-8	1	80
GV-13	z13	Zone-13	1	80
GV-14	z14	Zone-14	1	80
GV-9	z9	Zone-9	1	80
GV-10	z10	Zone-10	1	80
GV-11	z11	Zone-11	1	80
GV-12	z12	Zone-12	1	80
GV-22	z22	Zone-22	1	80
GV-23	z23	Zone-23	1	65
GV-32	z32	Zone-32	1	80
GV-15	z15	Zone-15	1	80
GV-19	z19	Zone-19	1	80
GV-16	z16	Zone-16	1	80
GV-17	z17	Zone-17	1	80
GV-18	z18	Zone-18	1	80
GV-20	z20	Zone-20	1	80
GV-21	z21	Zone-21	1	80
GV-26	z26	Zone-26	1	80
GV-27	z27	Zone-27	1	80
GV-28	z28	Zone-28	1	80

GV-29	z29	Zone-29	1	80
GV-31	z31	Zone-31	1	50
GV-33	z33	Zone-33	1	50



Page 3

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
PUMP	POND	2	#N/A	#N/A Pump

Energy Usage:

Pump	Usage Factor	Avg. Effic.	Kw-hr /m3	Avg. Kw	Peak Kw	Cost /day
PUMP	100.00	75.00	0.28	17.95	19.61	0.00
Demand Charge:						0.00
Total Cost:						0.00

Node Results at 0:00 Hrs:

Node ID	Demand LPM	Head m	Pressure m	Quality
2	0.00	179.16	75.38	0.00
3	0.00	179.01	74.62	0.00
z4	0.00	178.82	74.80	0.00
5	0.00	177.58	72.61	0.00
6	0.00	176.48	66.26	0.00
7	0.00	176.42	65.99	0.00
8	0.00	174.81	67.02	0.00
9	0.00	174.79	66.90	0.00
10	0.00	174.75	69.36	0.00
11	0.00	174.72	68.84	0.00
z15	0.00	174.71	69.83	0.00
z19	0.00	174.70	70.30	0.00
z16	0.00	174.69	70.79	0.00
z17	0.00	174.66	71.83	0.00
z18	0.00	174.64	72.03	0.00
17	0.00	174.41	71.96	0.00
18	0.00	174.29	72.31	0.00
z26	0.00	174.20	71.76	0.00
z27	0.00	173.92	71.02	0.00
z28	0.00	173.71	70.25	0.00
z29	0.00	173.60	69.04	0.00
23	0.00	173.38	69.39	0.00
z31	0.00	161.39	57.81	0.00
Zone-30	0.00	103.99	0.00	0.00
z13	0.00	174.75	68.77	0.00

z14	0.00	174.75	69.61	0.00
z9	0.00	174.57	66.84	0.00
z10	0.00	174.01	66.88	0.00
z11	0.00	173.64	66.38	0.00
z12	0.00	173.41	64.01	0.00



Page 4

Node Results at 0:00 Hrs: (continued)

Node ID	Demand LPM	Head m	Pressure m	Quality
z22	0.00	173.26	67.69	0.00
33	0.00	173.25	68.79	0.00
34	0.00	173.16	66.43	0.00
z23	0.00	173.15	65.90	0.00
36	0.00	172.41	65.08	0.00
37	0.00	172.41	66.62	0.00
Zone-25	0.00	105.79	0.00	0.00
z32	0.00	171.91	63.90	0.00
40	0.00	173.16	68.56	0.00
Zone-24	0.00	104.60	0.00	0.00
42	0.00	179.16	75.38	0.00
43	0.00	179.16	77.23	0.00
z1	0.00	179.16	76.23	0.00
z2	0.00	179.16	75.91	0.00
z3	0.00	179.16	76.11	0.00
47	0.00	179.16	73.46	0.00
48	0.00	179.16	74.22	0.00
z5	0.00	179.16	75.76	0.00
z6	0.00	179.16	75.98	0.00
z7	0.00	179.16	76.53	0.00
z33	0.00	179.16	73.78	0.00
z8	0.00	174.80	67.04	0.00
z20	0.00	174.63	72.13	0.00
z21	0.00	174.57	71.73	0.00
Zone-7	0.00	102.63	0.00	0.00
Zone-6	0.00	103.18	0.00	0.00
Zone-5	0.00	103.40	0.00	0.00
Zone-3	0.00	103.06	0.00	0.00
Zone-2	0.00	103.25	0.00	0.00
Zone-1	0.00	102.93	0.00	0.00
Zone-4	0.00	104.02	0.00	0.00
Zone-8	0.00	107.76	0.00	0.00
Zone-13	0.00	105.98	0.00	0.00
Zone-14	0.00	105.14	0.00	0.00
Zone-9	0.00	107.73	0.00	0.00
Zone-10	0.00	107.13	0.00	0.00
Zone-11	217.53	173.63	66.37	0.00
Zone-12	192.25	173.40	64.01	0.00
Zone-22	0.00	105.57	0.00	0.00
Zone-23	0.00	107.25	0.00	0.00

Zone-32	469.39	171.87	63.86	0.00
Zone-15	0.00	104.88	0.00	0.00
Zone-19	0.00	104.40	0.00	0.00
Zone-16	0.00	103.90	0.00	0.00
Zone-17	0.00	102.83	0.00	0.00
Zone-18	0.00	102.61	0.00	0.00
Zone-20	0.00	102.50	0.00	0.00



Page 5

Node Results at 0:00 Hrs: (continued)

Node ID	Demand LPM	Head m	Pressure m	Quality
Zone-21	0.00	102.84	0.00	0.00
Zone-26	0.00	102.44	0.00	0.00
Zone-27	0.00	102.90	0.00	0.00
Zone-28	0.00	103.46	0.00	0.00
Zone-29	0.00	104.56	0.00	0.00
Zone-31	221.92	161.28	57.09	0.00
Zone-33	0.00	105.38	0.00	0.00
POND	-1101.20	103.80	0.00	0.00 Reservoir

Link Results at 0:00 Hrs:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
1	-8.12	4.78	5797.06	Open
3	1101.18	1.04	9.44	Open
4	1101.18	1.04	9.44	Open
5	1101.17	1.04	9.44	Open
6	1101.17	1.04	9.44	Open
7	1101.17	1.04	9.44	Open
8	1101.17	1.04	9.44	Open
10	221.98	0.21	0.49	Open
11	221.97	0.21	0.49	Open
12	221.97	0.21	0.49	Open
13	221.97	0.21	0.49	Open
14	221.96	0.21	0.49	Open
15	221.96	0.21	0.49	Open
16	221.95	0.21	0.49	Open
18	221.94	0.47	3.50	Open
19	221.94	0.47	3.50	Open
20	221.94	0.47	3.50	Open
21	221.93	0.47	3.50	Open
22	221.93	0.47	3.50	Open
23	221.93	0.74	10.39	Open
24	221.92	1.88	102.50	Open
GV-30	0.00	0.00	0.00	Closed
26	0.01	0.00	0.00	Open
27	0.00	0.00	0.00	Open

28	-469.39	1.00	14.03	Open
29	0.00	0.00	0.00	Open
GV-25	0.00	0.00	0.00	Closed
31	-469.40	1.00	14.03	Open
32	-469.40	0.44	1.95	Open
33	0.00	0.00	0.00	Open
GV-24	0.00	0.00	0.00	Closed
35	-469.40	0.44	1.95	Open
36	-469.40	0.44	1.95	Open



Page 6

Link Results at 0:00 Hrs: (continued)

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
37	-469.41	0.44	1.95	Open
38	-661.66	0.62	3.68	Open
39	-879.18	0.83	6.22	Open
40	-879.19	0.83	6.22	Open
41	-879.19	0.83	6.22	Open
42	0.03	0.00	0.00	Open
43	0.01	0.00	0.00	Open
44	0.01	0.00	0.00	Open
45	0.01	0.00	0.00	Open
46	0.00	0.00	0.00	Open
47	0.02	0.00	0.00	Open
48	0.00	0.00	0.00	Open
49	-0.01	0.00	0.00	Open
50	-0.01	0.00	0.00	Open
51	-0.02	0.00	0.00	Open
52	0.00	0.00	0.00	Open
53	221.98	0.21	0.49	Open
54	221.98	0.21	0.49	Open
55	221.95	0.21	0.49	Open
56	221.95	0.21	0.49	Open
57	221.94	0.47	3.50	Open
GV-7	0.00	0.00	0.00	Closed
GV-6	0.00	0.00	0.00	Closed
GV-5	0.00	0.00	0.00	Closed
GV-3	0.00	0.00	0.00	Closed
GV-2	0.00	0.00	0.00	Closed
GV-1	0.00	0.00	0.00	Closed
GV-4	0.00	0.00	0.00	Closed
GV-8	0.00	0.00	0.00	Closed
GV-13	0.00	0.00	0.00	Closed
GV-14	0.00	0.00	0.00	Closed
GV-9	0.00	0.00	0.00	Closed
GV-10	0.00	0.00	0.00	Closed
GV-11	217.53	0.72	10.01	Open
GV-12	192.25	0.64	7.96	Open
GV-22	0.00	0.00	0.00	Closed

GV-23	0.00	0.00	0.00	Closed
GV-32	469.39	1.56	41.60	Open
GV-15	0.00	0.00	0.00	Closed
GV-19	0.00	0.00	0.00	Closed
GV-16	0.00	0.00	0.00	Closed
GV-17	0.00	0.00	0.00	Closed
GV-18	0.00	0.00	0.00	Closed
GV-20	0.00	0.00	0.00	Closed
GV-21	0.00	0.00	0.00	Closed
GV-26	0.00	0.00	0.00	Closed
GV-27	0.00	0.00	0.00	Closed



Page 7

Link Results at 0:00 Hrs: (continued)

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
GV-28	0.00	0.00	0.00	Closed
GV-29	0.00	0.00	0.00	Closed
GV-31	221.92	1.88	102.51	Open
GV-33	0.00	0.00	0.00	Closed
PUMP	1109.32	0.00	-75.36	Open Pump

Node Results at 1:00 Hrs:

Node ID	Demand LPM	Head m	Pressure m	Quality
2	0.00	182.24	78.45	0.00
3	0.00	182.23	77.84	0.00
z4	0.00	182.22	78.20	0.00
5	0.00	182.18	77.21	0.00
6	0.00	182.14	71.92	0.00
7	0.00	182.14	71.70	0.00
8	0.00	182.08	74.29	0.00
9	0.00	182.07	74.18	0.00
10	0.00	182.07	76.69	0.00
11	0.00	182.07	76.19	0.00
z15	0.00	182.07	77.19	0.00
z19	0.00	182.07	77.67	0.00
z16	0.00	182.07	78.17	0.00
z17	0.00	182.07	79.24	0.00
z18	0.00	182.07	79.46	0.00
17	0.00	182.07	79.62	0.00
18	0.00	182.07	80.09	0.00
z26	0.00	182.07	79.63	0.00
z27	0.00	182.07	79.17	0.00
z28	0.00	182.07	78.61	0.00
z29	0.00	182.07	77.51	0.00
23	0.00	182.07	78.08	0.00
z31	0.00	182.07	78.49	0.00

Zone-30	0.00	103.99	0.00	0.00
z13	0.00	182.07	76.09	0.00
z14	0.00	182.07	76.93	0.00
z9	0.00	182.08	74.35	0.00
z10	0.00	182.08	74.94	0.00
z11	0.00	182.08	74.82	0.00
z12	0.00	182.08	72.69	0.00
z22	0.00	182.08	76.51	0.00
33	0.00	182.08	77.63	0.00
34	0.00	182.08	75.35	0.00
z23	0.00	182.08	74.83	0.00
36	0.00	182.08	74.75	0.00
37	0.00	182.08	76.29	0.00



Page 8

Node Results at 1:00 Hrs: (continued)

Node ID	Demand LPM	Head m	Pressure m	Quality
Zone-25	0.00	105.79	0.00	0.00
z32	0.00	182.08	74.07	0.00
40	0.00	182.08	77.48	0.00
Zone-24	0.00	104.60	0.00	0.00
42	0.00	182.16	78.38	0.00
43	0.00	182.16	80.24	0.00
z1	0.00	182.16	79.23	0.00
z2	0.00	182.16	78.91	0.00
z3	0.00	182.16	79.11	0.00
47	0.00	176.06	70.36	0.00
48	0.00	175.18	70.24	0.00
z5	0.00	169.17	65.76	0.00
z6	0.00	168.64	65.46	0.00
z7	0.00	168.18	65.55	0.00
z33	0.00	175.18	69.80	0.00
z8	0.00	182.07	74.31	0.00
z20	0.00	182.07	79.56	0.00
z21	0.00	182.07	79.23	0.00
Zone-7	280.99	168.17	65.53	0.00
Zone-6	323.99	168.62	65.44	0.00
Zone-5	194.83	169.14	65.74	0.00
Zone-3	0.00	103.06	0.00	0.00
Zone-2	0.00	103.25	0.00	0.00
Zone-1	0.00	102.93	0.00	0.00
Zone-4	0.00	104.02	0.00	0.00
Zone-8	184.13	182.06	74.31	0.00
Zone-13	0.00	105.98	0.00	0.00
Zone-14	0.00	105.14	0.00	0.00
Zone-9	0.00	107.73	0.00	0.00
Zone-10	0.00	107.13	0.00	0.00
Zone-11	0.00	107.26	0.00	0.00
Zone-12	0.00	109.39	0.00	0.00

Zone-22	0.00	105.57	0.00	0.00
Zone-23	0.00	107.25	0.00	0.00
Zone-32	0.00	108.01	0.00	0.00
Zone-15	0.00	104.88	0.00	0.00
Zone-19	0.00	104.40	0.00	0.00
Zone-16	0.00	103.90	0.00	0.00
Zone-17	0.00	102.83	0.00	0.00
Zone-18	0.00	102.61	0.00	0.00
Zone-20	0.00	102.50	0.00	0.00
Zone-21	0.00	102.84	0.00	0.00
Zone-26	0.00	102.44	0.00	0.00
Zone-27	0.00	102.90	0.00	0.00
Zone-28	0.00	103.46	0.00	0.00
Zone-29	0.00	104.56	0.00	0.00
Zone-31	0.00	104.19	0.00	0.00



Page 9

Node Results at 1:00 Hrs: (continued)

Node ID	Demand LPM	Head m	Pressure m	Quality
Zone-33	0.00	105.38	0.00	0.00
POND	-984.06	103.80	0.00	0.00 Reservoir

Link Results at 1:00 Hrs:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
1	-7.59	4.47	6033.59	Open
3	184.23	0.17	0.34	Open
4	184.23	0.17	0.34	Open
5	184.23	0.17	0.34	Open
6	184.23	0.17	0.34	Open
7	184.23	0.17	0.34	Open
8	184.23	0.17	0.34	Open
10	0.07	0.00	0.00	Open
11	0.06	0.00	0.00	Open
12	0.06	0.00	0.00	Open
13	0.05	0.00	0.00	Open
14	0.05	0.00	0.00	Open
15	0.04	0.00	0.00	Open
16	0.04	0.00	0.00	Open
18	0.03	0.00	0.00	Open
19	0.03	0.00	0.00	Open
20	0.02	0.00	0.00	Open
21	0.02	0.00	0.00	Open
22	0.01	0.00	0.00	Open
23	0.01	0.00	0.00	Open
24	0.00	0.00	0.00	Open
GV-30	0.00	0.00	0.00	Closed

26	0.01	0.00	0.00	Open
27	0.00	0.00	0.00	Open
28	0.00	0.00	0.00	Open
29	0.00	0.00	0.00	Open
GV-25	0.00	0.00	0.00	Closed
31	-0.01	0.00	0.00	Open
32	-0.01	0.00	0.00	Open
33	0.00	0.00	0.00	Open
GV-24	0.00	0.00	0.00	Closed
35	-0.02	0.00	0.00	Open
36	-0.02	0.00	0.00	Open
37	-0.02	0.00	0.00	Open
38	-0.03	0.00	0.00	Open
39	-0.03	0.00	0.00	Open
40	-0.03	0.00	0.00	Open
41	-0.04	0.00	0.00	Open
42	799.82	0.75	5.22	Open



Page 10

Link Results at 1:00 Hrs: (continued)

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
43	0.01	0.00	0.00	Open
44	0.01	0.00	0.00	Open
45	0.01	0.00	0.00	Open
46	0.00	0.00	0.00	Open
47	799.81	1.70	52.75	Open
48	-280.99	0.93	16.08	Open
49	-604.97	2.01	66.54	Open
50	-799.81	2.65	111.59	Open
51	-799.81	1.70	37.64	Open
52	0.00	0.00	0.00	Open
53	184.19	0.17	0.34	Open
54	0.07	0.00	0.00	Open
55	0.04	0.00	0.00	Open
56	0.03	0.00	0.00	Open
57	0.03	0.00	0.00	Open
GV-7	-280.99	0.93	16.07	Open
GV-6	323.99	1.07	20.93	Open
GV-5	194.83	0.98	22.45	Open
GV-3	0.00	0.00	0.00	Closed
GV-2	0.00	0.00	0.00	Closed
GV-1	0.00	0.00	0.00	Closed
GV-4	0.00	0.00	0.00	Closed
GV-8	184.13	0.61	7.35	Open
GV-13	0.00	0.00	0.00	Closed
GV-14	0.00	0.00	0.00	Closed
GV-9	0.00	0.00	0.00	Closed
GV-10	0.00	0.00	0.00	Closed
GV-11	0.00	0.00	0.00	Closed

GV-12	0.00	0.00	0.00	Closed
GV-22	0.00	0.00	0.00	Closed
GV-23	0.00	0.00	0.00	Closed
GV-32	0.00	0.00	0.00	Closed
GV-15	0.00	0.00	0.00	Closed
GV-19	0.00	0.00	0.00	Closed
GV-16	0.00	0.00	0.00	Closed
GV-17	0.00	0.00	0.00	Closed
GV-18	0.00	0.00	0.00	Closed
GV-20	0.00	0.00	0.00	Closed
GV-21	0.00	0.00	0.00	Closed
GV-26	0.00	0.00	0.00	Closed
GV-27	0.00	0.00	0.00	Closed
GV-28	0.00	0.00	0.00	Closed
GV-29	0.00	0.00	0.00	Closed
GV-31	0.00	0.00	0.00	Closed
GV-33	0.00	0.00	0.00	Closed
PUMP	991.64	0.00	-78.44	Open Pump



Page 11

Node Results at 2:00 Hrs:

Node ID	Demand LPM	Head m	Pressure m	Quality
2	0.00	178.07	74.29	0.00
3	0.00	177.91	73.52	0.00
z4	0.00	177.71	73.69	0.00
5	0.00	176.38	71.42	0.00
6	0.00	175.21	64.99	0.00
7	0.00	175.15	64.71	0.00
8	0.00	173.43	65.64	0.00
9	0.00	172.91	65.02	0.00
10	0.00	172.11	66.72	0.00
11	0.00	171.57	65.69	0.00
z15	0.00	171.38	66.50	0.00
z19	0.00	171.22	66.82	0.00
z16	0.00	171.06	67.17	0.00
z17	0.00	170.92	68.09	0.00
z18	0.00	170.88	68.27	0.00
17	0.00	170.88	68.43	0.00
18	0.00	170.88	68.89	0.00
z26	0.00	170.88	68.43	0.00
z27	0.00	170.88	67.98	0.00
z28	0.00	170.88	67.41	0.00
z29	0.00	170.88	66.31	0.00
23	0.00	170.88	66.89	0.00
z31	0.00	170.88	67.30	0.00
Zone-30	0.00	103.99	0.00	0.00
z13	0.00	172.11	66.13	0.00
z14	0.00	172.11	66.97	0.00

z9	0.00	173.43	65.70	0.00
z10	0.00	173.43	66.30	0.00
z11	0.00	173.43	66.17	0.00
z12	0.00	173.43	64.04	0.00
z22	0.00	173.43	67.86	0.00
33	0.00	173.43	68.98	0.00
34	0.00	173.43	66.70	0.00
z23	0.00	173.43	66.18	0.00
36	0.00	173.43	66.10	0.00
37	0.00	173.43	67.64	0.00
Zone-25	0.00	105.79	0.00	0.00
z32	0.00	173.43	65.42	0.00
40	0.00	173.43	68.83	0.00
Zone-24	0.00	104.60	0.00	0.00
42	0.00	178.07	74.29	0.00
43	0.00	178.07	76.15	0.00
z1	0.00	178.07	75.15	0.00
z2	0.00	178.07	74.82	0.00
z3	0.00	178.07	75.02	0.00
47	0.00	178.07	72.37	0.00
48	0.00	178.07	73.13	0.00



Page 12

Node Results at 2:00 Hrs: (continued)

Node ID	Demand LPM	Head m	Pressure m	Quality
z5	0.00	178.07	74.67	0.00
z6	0.00	178.07	74.90	0.00
z7	0.00	178.07	75.44	0.00
z33	0.00	178.07	72.70	0.00
z8	0.00	173.15	65.39	0.00
z20	0.00	170.88	68.37	0.00
z21	0.00	170.88	68.03	0.00
Zone-7	0.00	102.63	0.00	0.00
Zone-6	0.00	103.18	0.00	0.00
Zone-5	0.00	103.40	0.00	0.00
Zone-3	0.00	103.06	0.00	0.00
Zone-2	0.00	103.25	0.00	0.00
Zone-1	0.00	102.93	0.00	0.00
Zone-4	0.00	104.02	0.00	0.00
Zone-8	0.00	107.76	0.00	0.00
Zone-13	0.00	105.98	0.00	0.00
Zone-14	0.00	105.14	0.00	0.00
Zone-9	0.00	107.73	0.00	0.00
Zone-10	0.00	107.13	0.00	0.00
Zone-11	0.00	107.26	0.00	0.00
Zone-12	0.00	109.39	0.00	0.00
Zone-22	0.00	105.57	0.00	0.00
Zone-23	0.00	107.25	0.00	0.00
Zone-32	0.00	108.01	0.00	0.00

Zone-15	283.01	171.36	66.48	0.00
Zone-19	0.00	104.40	0.00	0.00
Zone-16	284.43	171.05	67.15	0.00
Zone-17	286.37	170.90	68.07	0.00
Zone-18	286.76	170.86	68.25	0.00
Zone-20	0.00	102.50	0.00	0.00
Zone-21	0.00	102.84	0.00	0.00
Zone-26	0.00	102.44	0.00	0.00
Zone-27	0.00	102.90	0.00	0.00
Zone-28	0.00	103.46	0.00	0.00
Zone-29	0.00	104.56	0.00	0.00
Zone-31	0.00	104.19	0.00	0.00
Zone-33	0.00	105.38	0.00	0.00
POND	-1140.68	103.80	0.00	0.00 Reservoir



Page 13

Link Results at 2:00 Hrs:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
1	-7.37	4.34	5713.42	Open
3	1140.65	1.08	10.08	Open
4	1140.65	1.08	10.08	Open
5	1140.65	1.08	10.08	Open
6	1140.65	1.08	10.08	Open
7	1140.65	1.08	10.08	Open
8	1140.65	1.08	10.08	Open
10	1140.61	1.08	10.08	Open
11	1140.61	1.08	10.08	Open
12	1140.61	1.08	10.08	Open
13	857.59	0.81	5.94	Open
14	857.59	0.81	5.94	Open
15	573.16	0.54	2.82	Open
16	286.79	0.27	0.78	Open
18	0.02	0.00	0.00	Open
19	0.02	0.00	0.00	Open
20	0.02	0.00	0.00	Open
21	0.01	0.00	0.00	Open
22	0.01	0.00	0.00	Open
23	0.01	0.00	0.00	Open
24	0.00	0.00	0.00	Open
GV-30	0.00	0.00	0.00	Closed
26	0.01	0.00	0.00	Open
27	0.00	0.00	0.00	Open
28	0.00	0.00	0.00	Open
29	0.00	0.00	0.00	Open
GV-25	0.00	0.00	0.00	Closed
31	-0.01	0.00	0.00	Open
32	-0.01	0.00	0.00	Open
33	0.00	0.00	0.00	Open

GV-24	0.00	0.00	0.00	Closed
35	-0.01	0.00	0.00	Open
36	-0.01	0.00	0.00	Open
37	-0.02	0.00	0.00	Open
38	-0.02	0.00	0.00	Open
39	-0.03	0.00	0.00	Open
40	-0.03	0.00	0.00	Open
41	-0.03	0.00	0.00	Open
42	0.03	0.00	0.00	Open
43	0.01	0.00	0.00	Open
44	0.01	0.00	0.00	Open
45	0.01	0.00	0.00	Open
46	0.00	0.00	0.00	Open
47	0.02	0.00	0.00	Open
48	0.00	0.00	0.00	Open
49	-0.01	0.00	0.00	Open
50	-0.01	0.00	0.00	Open



Page 14

Link Results at 2:00 Hrs: (continued)

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
51	-0.02	0.00	0.00	Open
52	0.00	0.00	0.00	Open
53	1140.62	1.08	10.08	Open
54	1140.61	1.08	10.08	Open
55	0.03	0.00	0.00	Open
56	0.03	0.00	0.00	Open
57	0.02	0.00	0.00	Open
GV-7	0.00	0.00	0.00	Closed
GV-6	0.00	0.00	0.00	Closed
GV-5	0.00	0.00	0.00	Closed
GV-3	0.00	0.00	0.00	Closed
GV-2	0.00	0.00	0.00	Closed
GV-1	0.00	0.00	0.00	Closed
GV-4	0.00	0.00	0.00	Closed
GV-8	0.00	0.00	0.00	Closed
GV-13	0.00	0.00	0.00	Closed
GV-14	0.00	0.00	0.00	Closed
GV-9	0.00	0.00	0.00	Closed
GV-10	0.00	0.00	0.00	Closed
GV-11	0.00	0.00	0.00	Closed
GV-12	0.00	0.00	0.00	Closed
GV-22	0.00	0.00	0.00	Closed
GV-23	0.00	0.00	0.00	Closed
GV-32	0.00	0.00	0.00	Closed
GV-15	283.01	0.94	16.30	Open
GV-19	0.00	0.00	0.00	Closed
GV-16	284.43	0.94	16.45	Open
GV-17	286.37	0.95	16.65	Open

GV-18	286.76	0.95	16.69	Open
GV-20	0.00	0.00	0.00	Closed
GV-21	0.00	0.00	0.00	Closed
GV-26	0.00	0.00	0.00	Closed
GV-27	0.00	0.00	0.00	Closed
GV-28	0.00	0.00	0.00	Closed
GV-29	0.00	0.00	0.00	Closed
GV-31	0.00	0.00	0.00	Closed
GV-33	0.00	0.00	0.00	Closed
PUMP	1148.05	0.00	-74.27	Open Pump



Page 15

Node Results at 3:00 Hrs:

Node ID	Demand LPM	Head m	Pressure m	Quality
2	0.00	174.04	70.26	0.00
3	0.00	173.84	69.45	0.00
z4	0.00	173.59	69.57	0.00
5	0.00	171.96	67.00	0.00
6	0.00	170.53	60.31	0.00
7	0.00	170.45	60.02	0.00
8	0.00	168.34	60.55	0.00
9	0.00	168.30	60.41	0.00
10	0.00	168.23	62.84	0.00
11	0.00	168.18	62.30	0.00
z15	0.00	168.17	63.29	0.00
z19	0.00	168.14	63.74	0.00
z16	0.00	168.12	64.22	0.00
z17	0.00	168.08	65.25	0.00
z18	0.00	168.03	65.43	0.00
17	0.00	167.63	65.18	0.00
18	0.00	167.43	65.45	0.00
z26	0.00	167.27	64.83	0.00
z27	0.00	167.27	64.37	0.00
z28	0.00	167.27	63.81	0.00
z29	0.00	167.27	62.70	0.00
23	0.00	167.27	63.28	0.00
z31	0.00	167.27	63.69	0.00
Zone-30	0.00	103.99	0.00	0.00
z13	0.00	168.23	62.25	0.00
z14	0.00	168.23	63.09	0.00
z9	0.00	168.05	60.32	0.00
z10	0.00	167.37	60.24	0.00
z11	0.00	166.93	59.67	0.00
z12	0.00	166.45	57.06	0.00
z22	0.00	165.87	60.30	0.00
33	0.00	165.83	61.38	0.00
34	0.00	165.51	58.78	0.00
z23	0.00	165.48	58.23	0.00

36	0.00	165.35	58.02	0.00
37	0.00	164.83	59.04	0.00
Zone-25	184.53	164.76	58.97	0.00
z32	0.00	165.35	57.34	0.00
40	0.00	161.26	56.66	0.00
Zone-24	381.60	161.18	56.58	0.00
42	0.00	174.04	70.26	0.00
43	0.00	174.04	72.12	0.00
z1	0.00	174.04	71.11	0.00
z2	0.00	174.04	70.79	0.00
z3	0.00	174.04	70.99	0.00
47	0.00	174.04	68.34	0.00
48	0.00	174.04	69.10	0.00



Page 16

Node Results at 3:00 Hrs: (continued)

Node ID	Demand LPM	Head m	Pressure m	Quality
z5	0.00	174.04	70.64	0.00
z6	0.00	174.04	70.86	0.00
z7	0.00	174.04	71.41	0.00
z33	0.00	174.04	68.66	0.00
z8	0.00	168.32	60.56	0.00
z20	0.00	168.02	65.52	0.00
z21	0.00	167.92	65.08	0.00
Zone-7	0.00	102.63	0.00	0.00
Zone-6	0.00	103.18	0.00	0.00
Zone-5	0.00	103.40	0.00	0.00
Zone-3	0.00	103.06	0.00	0.00
Zone-2	0.00	103.25	0.00	0.00
Zone-1	0.00	102.93	0.00	0.00
Zone-4	0.00	104.02	0.00	0.00
Zone-8	0.00	107.76	0.00	0.00
Zone-13	0.00	105.98	0.00	0.00
Zone-14	0.00	105.14	0.00	0.00
Zone-9	0.00	107.73	0.00	0.00
Zone-10	0.00	107.13	0.00	0.00
Zone-11	0.00	107.26	0.00	0.00
Zone-12	0.00	109.39	0.00	0.00
Zone-22	0.00	105.57	0.00	0.00
Zone-23	407.19	165.39	58.14	0.00
Zone-32	0.00	108.01	0.00	0.00
Zone-15	0.00	104.88	0.00	0.00
Zone-19	0.00	104.40	0.00	0.00
Zone-16	0.00	103.90	0.00	0.00
Zone-17	0.00	102.83	0.00	0.00
Zone-18	0.00	102.61	0.00	0.00
Zone-20	0.00	102.50	0.00	0.00
Zone-21	0.00	102.84	0.00	0.00
Zone-26	300.92	167.25	64.81	0.00

Zone-27	0.00	102.90	0.00	0.00
Zone-28	0.00	103.46	0.00	0.00
Zone-29	0.00	104.56	0.00	0.00
Zone-31	0.00	104.19	0.00	0.00
Zone-33	0.00	105.38	0.00	0.00
POND	-1274.35	103.80	0.00	0.00 Reservoir



Page 17

Link Results at 3:00 Hrs:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
1	-7.15	4.21	5403.23	Open
3	1274.32	1.20	12.37	Open
4	1274.32	1.20	12.37	Open
5	1274.32	1.20	12.37	Open
6	1274.32	1.20	12.37	Open
7	1274.32	1.20	12.37	Open
8	1274.32	1.20	12.37	Open
10	300.97	0.28	0.85	Open
11	300.96	0.28	0.85	Open
12	300.96	0.28	0.85	Open
13	300.96	0.28	0.85	Open
14	300.96	0.28	0.85	Open
15	300.95	0.28	0.85	Open
16	300.95	0.28	0.85	Open
18	300.94	0.64	6.16	Open
19	300.94	0.64	6.16	Open
20	0.02	0.00	0.00	Open
21	0.01	0.00	0.00	Open
22	0.01	0.00	0.00	Open
23	0.01	0.00	0.00	Open
24	0.00	0.00	0.00	Open
GV-30	0.00	0.00	0.00	Closed
26	0.01	0.00	0.00	Open
27	0.00	0.00	0.00	Open
28	0.00	0.00	0.00	Open
29	184.53	1.57	72.84	Open
GV-25	184.53	1.57	72.83	Open
31	-184.54	0.39	2.49	Open
32	-591.73	0.56	2.99	Open
33	381.60	1.92	77.93	Open
GV-24	381.60	1.92	77.93	Open
35	-973.33	0.92	7.51	Open
36	-973.33	0.92	7.51	Open
37	-973.33	0.92	7.51	Open
38	-973.33	0.92	7.51	Open
39	-973.34	0.92	7.51	Open
40	-973.34	0.92	7.51	Open
41	-973.34	0.92	7.51	Open

42	0.03	0.00	0.00	Open
43	0.01	0.00	0.00	Open
44	0.01	0.00	0.00	Open
45	0.01	0.00	0.00	Open
46	0.00	0.00	0.00	Open
47	0.02	0.00	0.00	Open
48	0.00	0.00	0.00	Open
49	-0.01	0.00	0.00	Open
50	-0.01	0.00	0.00	Open



Page 18

Link Results at 3:00 Hrs: (continued)

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
51	-0.02	0.00	0.00	Open
52	0.00	0.00	0.00	Open
53	300.97	0.28	0.85	Open
54	300.97	0.28	0.85	Open
55	300.95	0.28	0.85	Open
56	300.94	0.28	0.85	Open
57	300.94	0.64	6.16	Open
GV-7	0.00	0.00	0.00	Closed
GV-6	0.00	0.00	0.00	Closed
GV-5	0.00	0.00	0.00	Closed
GV-3	0.00	0.00	0.00	Closed
GV-2	0.00	0.00	0.00	Closed
GV-1	0.00	0.00	0.00	Closed
GV-4	0.00	0.00	0.00	Closed
GV-8	0.00	0.00	0.00	Closed
GV-13	0.00	0.00	0.00	Closed
GV-14	0.00	0.00	0.00	Closed
GV-9	0.00	0.00	0.00	Closed
GV-10	0.00	0.00	0.00	Closed
GV-11	0.00	0.00	0.00	Closed
GV-12	0.00	0.00	0.00	Closed
GV-22	0.00	0.00	0.00	Closed
GV-23	407.19	2.05	87.88	Open
GV-32	0.00	0.00	0.00	Closed
GV-15	0.00	0.00	0.00	Closed
GV-19	0.00	0.00	0.00	Closed
GV-16	0.00	0.00	0.00	Closed
GV-17	0.00	0.00	0.00	Closed
GV-18	0.00	0.00	0.00	Closed
GV-20	0.00	0.00	0.00	Closed
GV-21	0.00	0.00	0.00	Closed
GV-26	300.92	1.00	18.25	Open
GV-27	0.00	0.00	0.00	Closed
GV-28	0.00	0.00	0.00	Closed
GV-29	0.00	0.00	0.00	Closed
GV-31	0.00	0.00	0.00	Closed

GV-33	0.00	0.00	0.00	Closed
PUMP	1281.50	0.00	-70.24	Open Pump



Page 19

Node Results at 4:00 Hrs:

Node ID	Demand LPM	Head m	Pressure m	Quality
2	0.00	179.73	75.94	0.00
3	0.00	179.73	75.34	0.00
z4	0.00	179.73	75.70	0.00
5	0.00	179.73	74.76	0.00
6	0.00	179.73	69.51	0.00
7	0.00	179.73	69.29	0.00
8	0.00	179.73	71.94	0.00
9	0.00	179.73	71.84	0.00
10	0.00	179.73	74.34	0.00
11	0.00	179.73	73.85	0.00
z15	0.00	179.73	74.85	0.00
z19	0.00	179.73	75.33	0.00
z16	0.00	179.73	75.83	0.00
z17	0.00	179.73	76.90	0.00
z18	0.00	179.73	77.12	0.00
17	0.00	179.73	77.28	0.00
18	0.00	179.73	77.74	0.00
z26	0.00	179.73	77.29	0.00
z27	0.00	179.73	76.83	0.00
z28	0.00	179.73	76.26	0.00
z29	0.00	179.73	75.16	0.00
23	0.00	179.73	75.74	0.00
z31	0.00	179.73	76.15	0.00
Zone-30	0.00	103.99	0.00	0.00
z13	0.00	179.73	73.75	0.00
z14	0.00	179.73	74.59	0.00
z9	0.00	179.73	72.00	0.00
z10	0.00	179.73	72.59	0.00
z11	0.00	179.73	72.47	0.00
z12	0.00	179.73	70.33	0.00
z22	0.00	179.73	74.15	0.00
33	0.00	179.73	75.27	0.00
34	0.00	179.73	73.00	0.00
z23	0.00	179.73	72.48	0.00
36	0.00	179.73	72.40	0.00
37	0.00	179.73	73.94	0.00
Zone-25	0.00	105.79	0.00	0.00
z32	0.00	179.73	71.71	0.00
40	0.00	179.73	75.13	0.00
Zone-24	0.00	104.60	0.00	0.00
42	0.00	179.60	75.81	0.00
43	0.00	179.57	77.64	0.00

z1	0.00	177.97	75.04	0.00
z2	0.00	175.59	72.34	0.00
z3	0.00	175.56	72.50	0.00
47	0.00	177.94	72.24	0.00
48	0.00	177.70	72.76	0.00



Page 20

Node Results at 4:00 Hrs: (continued)

Node ID	Demand LPM	Head m	Pressure m	Quality
z5	0.00	177.70	74.30	0.00
z6	0.00	177.70	74.53	0.00
z7	0.00	177.70	75.07	0.00
z33	0.00	166.36	60.99	0.00
z8	0.00	179.73	71.97	0.00
z20	0.00	179.73	77.22	0.00
z21	0.00	179.73	76.89	0.00
Zone-7	0.00	102.63	0.00	0.00
Zone-6	0.00	103.18	0.00	0.00
Zone-5	0.00	103.40	0.00	0.00
Zone-3	181.79	175.49	72.43	0.00
Zone-2	249.73	175.55	72.30	0.00
Zone-1	254.36	177.93	75.00	0.00
Zone-4	0.00	104.02	0.00	0.00
Zone-8	0.00	107.76	0.00	0.00
Zone-13	0.00	105.98	0.00	0.00
Zone-14	0.00	105.14	0.00	0.00
Zone-9	0.00	107.73	0.00	0.00
Zone-10	0.00	107.13	0.00	0.00
Zone-11	0.00	107.26	0.00	0.00
Zone-12	0.00	109.39	0.00	0.00
Zone-22	0.00	105.57	0.00	0.00
Zone-23	0.00	107.25	0.00	0.00
Zone-32	0.00	108.01	0.00	0.00
Zone-15	0.00	104.88	0.00	0.00
Zone-19	0.00	104.40	0.00	0.00
Zone-16	0.00	103.90	0.00	0.00
Zone-17	0.00	102.83	0.00	0.00
Zone-18	0.00	102.61	0.00	0.00
Zone-20	0.00	102.50	0.00	0.00
Zone-21	0.00	102.84	0.00	0.00
Zone-26	0.00	102.44	0.00	0.00
Zone-27	0.00	102.90	0.00	0.00
Zone-28	0.00	103.46	0.00	0.00
Zone-29	0.00	104.56	0.00	0.00
Zone-31	0.00	104.19	0.00	0.00
Zone-33	395.20	166.07	60.69	0.00
POND	-1081.19	103.80	0.00	0.00 Reservoir



Page 21

Link Results at 4:00 Hrs:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
1	-7.45	4.39	5840.53	Open
3	0.11	0.00	0.00	Open
4	0.11	0.00	0.00	Open
5	0.10	0.00	0.00	Open
6	0.10	0.00	0.00	Open
7	0.10	0.00	0.00	Open
8	0.10	0.00	0.00	Open
10	0.06	0.00	0.00	Open
11	0.06	0.00	0.00	Open
12	0.06	0.00	0.00	Open
13	0.05	0.00	0.00	Open
14	0.05	0.00	0.00	Open
15	0.04	0.00	0.00	Open
16	0.04	0.00	0.00	Open
18	0.03	0.00	0.00	Open
19	0.03	0.00	0.00	Open
20	0.02	0.00	0.00	Open
21	0.02	0.00	0.00	Open
22	0.01	0.00	0.00	Open
23	0.01	0.00	0.00	Open
24	0.00	0.00	0.00	Open
GV-30	0.00	0.00	0.00	Closed
26	0.01	0.00	0.00	Open
27	0.00	0.00	0.00	Open
28	0.00	0.00	0.00	Open
29	0.00	0.00	0.00	Open
GV-25	0.00	0.00	0.00	Closed
31	-0.01	0.00	0.00	Open
32	-0.01	0.00	0.00	Open
33	0.00	0.00	0.00	Open
GV-24	0.00	0.00	0.00	Closed
35	-0.02	0.00	0.00	Open
36	-0.02	0.00	0.00	Open
37	-0.02	0.00	0.00	Open
38	-0.02	0.00	0.00	Open
39	-0.03	0.00	0.00	Open
40	-0.03	0.00	0.00	Open
41	-0.04	0.00	0.00	Open
42	1081.09	1.02	9.12	Open
43	685.88	0.65	3.93	Open
44	685.88	1.46	28.31	Open
45	431.52	1.43	35.59	Open
46	181.79	0.60	7.18	Open
47	395.21	0.84	14.30	Open
48	0.00	0.00	0.00	Open
49	-0.01	0.00	0.00	Open

50	-0.01	0.00	0.00	Open
----	-------	------	------	------



Page 22

Link Results at 4:00 Hrs: (continued)

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
51	-395.21	0.84	10.20	Open
52	395.20	3.35	298.45	Open
53	0.07	0.00	0.00	Open
54	0.06	0.00	0.00	Open
55	0.03	0.00	0.00	Open
56	0.03	0.00	0.00	Open
57	0.03	0.00	0.00	Open
GV-7	0.00	0.00	0.00	Closed
GV-6	0.00	0.00	0.00	Closed
GV-5	0.00	0.00	0.00	Closed
GV-3	181.79	1.54	70.84	Open
GV-2	249.73	1.25	35.53	Open
GV-1	254.36	1.28	36.76	Open
GV-4	0.00	0.00	0.00	Closed
GV-8	0.00	0.00	0.00	Closed
GV-13	0.00	0.00	0.00	Closed
GV-14	0.00	0.00	0.00	Closed
GV-9	0.00	0.00	0.00	Closed
GV-10	0.00	0.00	0.00	Closed
GV-11	0.00	0.00	0.00	Closed
GV-12	0.00	0.00	0.00	Closed
GV-22	0.00	0.00	0.00	Closed
GV-23	0.00	0.00	0.00	Closed
GV-32	0.00	0.00	0.00	Closed
GV-15	0.00	0.00	0.00	Closed
GV-19	0.00	0.00	0.00	Closed
GV-16	0.00	0.00	0.00	Closed
GV-17	0.00	0.00	0.00	Closed
GV-18	0.00	0.00	0.00	Closed
GV-20	0.00	0.00	0.00	Closed
GV-21	0.00	0.00	0.00	Closed
GV-26	0.00	0.00	0.00	Closed
GV-27	0.00	0.00	0.00	Closed
GV-28	0.00	0.00	0.00	Closed
GV-29	0.00	0.00	0.00	Closed
GV-31	0.00	0.00	0.00	Closed
GV-33	395.20	3.35	298.46	Open
PUMP	1088.65	0.00	-75.93	Open Pump



Page 23

Node Results at 5:00 Hrs:

Node ID	Demand LPM	Head m	Pressure m	Quality

2	0.00	179.73	75.94	0.00
3	0.00	179.73	75.34	0.00
z4	0.00	179.73	75.70	0.00
5	0.00	179.73	74.76	0.00
6	0.00	179.73	69.51	0.00
7	0.00	179.73	69.29	0.00
8	0.00	179.73	71.94	0.00
9	0.00	179.73	71.84	0.00
10	0.00	179.73	74.34	0.00
11	0.00	179.73	73.85	0.00
z15	0.00	179.73	74.85	0.00
z19	0.00	179.73	75.33	0.00
z16	0.00	179.73	75.83	0.00
z17	0.00	179.73	76.90	0.00
z18	0.00	179.73	77.12	0.00
17	0.00	179.73	77.28	0.00
18	0.00	179.73	77.74	0.00
z26	0.00	179.73	77.29	0.00
z27	0.00	179.73	76.83	0.00
z28	0.00	179.73	76.26	0.00
z29	0.00	179.73	75.16	0.00
23	0.00	179.73	75.74	0.00
z31	0.00	179.73	76.15	0.00
Zone-30	0.00	103.99	0.00	0.00
z13	0.00	179.73	73.75	0.00
z14	0.00	179.73	74.59	0.00
z9	0.00	179.73	72.00	0.00
z10	0.00	179.73	72.59	0.00
z11	0.00	179.73	72.47	0.00
z12	0.00	179.73	70.33	0.00
z22	0.00	179.73	74.15	0.00
33	0.00	179.73	75.27	0.00
34	0.00	179.73	73.00	0.00
z23	0.00	179.73	72.48	0.00
36	0.00	179.73	72.40	0.00
37	0.00	179.73	73.94	0.00
Zone-25	0.00	105.79	0.00	0.00
z32	0.00	179.73	71.71	0.00
40	0.00	179.73	75.13	0.00
Zone-24	0.00	104.60	0.00	0.00
42	0.00	179.60	75.81	0.00
43	0.00	179.57	77.64	0.00
z1	0.00	177.97	75.04	0.00
z2	0.00	175.59	72.34	0.00
z3	0.00	175.56	72.50	0.00
47	0.00	177.94	72.24	0.00
48	0.00	177.70	72.76	0.00



Node Results at 5:00 Hrs: (continued)

Node ID	Demand LPM	Head m	Pressure m	Quality
z5	0.00	177.70	74.30	0.00
z6	0.00	177.70	74.53	0.00
z7	0.00	177.70	75.07	0.00
z33	0.00	166.36	60.99	0.00
z8	0.00	179.73	71.97	0.00
z20	0.00	179.73	77.22	0.00
z21	0.00	179.73	76.89	0.00
Zone-7	0.00	102.63	0.00	0.00
Zone-6	0.00	103.18	0.00	0.00
Zone-5	0.00	103.40	0.00	0.00
Zone-3	181.79	175.49	72.43	0.00
Zone-2	249.73	175.55	72.30	0.00
Zone-1	254.36	177.93	75.00	0.00
Zone-4	0.00	104.02	0.00	0.00
Zone-8	0.00	107.76	0.00	0.00
Zone-13	0.00	105.98	0.00	0.00
Zone-14	0.00	105.14	0.00	0.00
Zone-9	0.00	107.73	0.00	0.00
Zone-10	0.00	107.13	0.00	0.00
Zone-11	0.00	107.26	0.00	0.00
Zone-12	0.00	109.39	0.00	0.00
Zone-22	0.00	105.57	0.00	0.00
Zone-23	0.00	107.25	0.00	0.00
Zone-32	0.00	108.01	0.00	0.00
Zone-15	0.00	104.88	0.00	0.00
Zone-19	0.00	104.40	0.00	0.00
Zone-16	0.00	103.90	0.00	0.00
Zone-17	0.00	102.83	0.00	0.00
Zone-18	0.00	102.61	0.00	0.00
Zone-20	0.00	102.50	0.00	0.00
Zone-21	0.00	102.84	0.00	0.00
Zone-26	0.00	102.44	0.00	0.00
Zone-27	0.00	102.90	0.00	0.00
Zone-28	0.00	103.46	0.00	0.00
Zone-29	0.00	104.56	0.00	0.00
Zone-31	0.00	104.19	0.00	0.00
Zone-33	395.20	166.07	60.69	0.00
POND	-1081.19	103.80	0.00	0.00 Reservoir



Page 25

Link Results at 5:00 Hrs:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
1	-7.45	4.39	5840.53	Open

3	0.11	0.00	0.00	Open
4	0.11	0.00	0.00	Open
5	0.10	0.00	0.00	Open
6	0.10	0.00	0.00	Open
7	0.10	0.00	0.00	Open
8	0.10	0.00	0.00	Open
10	0.06	0.00	0.00	Open
11	0.06	0.00	0.00	Open
12	0.06	0.00	0.00	Open
13	0.05	0.00	0.00	Open
14	0.05	0.00	0.00	Open
15	0.04	0.00	0.00	Open
16	0.04	0.00	0.00	Open
18	0.03	0.00	0.00	Open
19	0.03	0.00	0.00	Open
20	0.02	0.00	0.00	Open
21	0.02	0.00	0.00	Open
22	0.01	0.00	0.00	Open
23	0.01	0.00	0.00	Open
24	0.00	0.00	0.00	Open
GV-30	0.00	0.00	0.00	Closed
26	0.01	0.00	0.00	Open
27	0.00	0.00	0.00	Open
28	0.00	0.00	0.00	Open
29	0.00	0.00	0.00	Open
GV-25	0.00	0.00	0.00	Closed
31	-0.01	0.00	0.00	Open
32	-0.01	0.00	0.00	Open
33	0.00	0.00	0.00	Open
GV-24	0.00	0.00	0.00	Closed
35	-0.02	0.00	0.00	Open
36	-0.02	0.00	0.00	Open
37	-0.02	0.00	0.00	Open
38	-0.02	0.00	0.00	Open
39	-0.03	0.00	0.00	Open
40	-0.03	0.00	0.00	Open
41	-0.04	0.00	0.00	Open
42	1081.09	1.02	9.13	Open
43	685.88	0.65	3.93	Open
44	685.88	1.46	28.31	Open
45	431.52	1.43	35.59	Open
46	181.79	0.60	7.18	Open
47	395.21	0.84	14.30	Open
48	0.00	0.00	0.00	Open
49	-0.01	0.00	0.00	Open
50	-0.01	0.00	0.00	Open



Page 26

Link Results at 5:00 Hrs: (continued)

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
------------	-------------	-----------------	-----------------------	--------

51	-395.21	0.84	10.20	Open
52	395.20	3.35	298.45	Open
53	0.07	0.00	0.00	Open
54	0.06	0.00	0.00	Open
55	0.03	0.00	0.00	Open
56	0.03	0.00	0.00	Open
57	0.03	0.00	0.00	Open
GV-7	0.00	0.00	0.00	Closed
GV-6	0.00	0.00	0.00	Closed
GV-5	0.00	0.00	0.00	Closed
GV-3	181.79	1.54	70.84	Open
GV-2	249.73	1.25	35.53	Open
GV-1	254.36	1.28	36.76	Open
GV-4	0.00	0.00	0.00	Closed
GV-8	0.00	0.00	0.00	Closed
GV-13	0.00	0.00	0.00	Closed
GV-14	0.00	0.00	0.00	Closed
GV-9	0.00	0.00	0.00	Closed
GV-10	0.00	0.00	0.00	Closed
GV-11	0.00	0.00	0.00	Closed
GV-12	0.00	0.00	0.00	Closed
GV-22	0.00	0.00	0.00	Closed
GV-23	0.00	0.00	0.00	Closed
GV-32	0.00	0.00	0.00	Closed
GV-15	0.00	0.00	0.00	Closed
GV-19	0.00	0.00	0.00	Closed
GV-16	0.00	0.00	0.00	Closed
GV-17	0.00	0.00	0.00	Closed
GV-18	0.00	0.00	0.00	Closed
GV-20	0.00	0.00	0.00	Closed
GV-21	0.00	0.00	0.00	Closed
GV-26	0.00	0.00	0.00	Closed
GV-27	0.00	0.00	0.00	Closed
GV-28	0.00	0.00	0.00	Closed
GV-29	0.00	0.00	0.00	Closed
GV-31	0.00	0.00	0.00	Closed
GV-33	395.20	3.35	298.46	Open
PUMP	1088.65	0.00	-75.93	Open Pump



Page 27

Node Results at 6:00 Hrs:

Node ID	Demand LPM	Head m	Pressure m	Quality
2	0.00	179.73	75.94	0.00
3	0.00	179.73	75.34	0.00
z4	0.00	179.73	75.70	0.00
5	0.00	179.73	74.76	0.00
6	0.00	179.73	69.51	0.00

7	0.00	179.73	69.29	0.00
8	0.00	179.73	71.94	0.00
9	0.00	179.73	71.84	0.00
10	0.00	179.73	74.34	0.00
11	0.00	179.73	73.85	0.00
z15	0.00	179.73	74.85	0.00
z19	0.00	179.73	75.33	0.00
z16	0.00	179.73	75.83	0.00
z17	0.00	179.73	76.90	0.00
z18	0.00	179.73	77.12	0.00
17	0.00	179.73	77.28	0.00
18	0.00	179.73	77.74	0.00
z26	0.00	179.73	77.29	0.00
z27	0.00	179.73	76.83	0.00
z28	0.00	179.73	76.26	0.00
z29	0.00	179.73	75.16	0.00
23	0.00	179.73	75.74	0.00
z31	0.00	179.73	76.15	0.00
Zone-30	0.00	103.99	0.00	0.00
z13	0.00	179.73	73.75	0.00
z14	0.00	179.73	74.59	0.00
z9	0.00	179.73	72.00	0.00
z10	0.00	179.73	72.59	0.00
z11	0.00	179.73	72.47	0.00
z12	0.00	179.73	70.33	0.00
z22	0.00	179.73	74.15	0.00
33	0.00	179.73	75.27	0.00
34	0.00	179.73	73.00	0.00
z23	0.00	179.73	72.48	0.00
36	0.00	179.73	72.40	0.00
37	0.00	179.73	73.94	0.00
Zone-25	0.00	105.79	0.00	0.00
z32	0.00	179.73	71.71	0.00
40	0.00	179.73	75.13	0.00
Zone-24	0.00	104.60	0.00	0.00
42	0.00	179.60	75.81	0.00
43	0.00	179.57	77.64	0.00
z1	0.00	177.97	75.04	0.00
z2	0.00	175.59	72.34	0.00
z3	0.00	175.56	72.50	0.00
47	0.00	177.94	72.24	0.00
48	0.00	177.70	72.76	0.00



Page 28

Node Results at 6:00 Hrs: (continued)

Node ID	Demand LPM	Head m	Pressure m	Quality
z5	0.00	177.70	74.30	0.00
z6	0.00	177.70	74.53	0.00
z7	0.00	177.70	75.07	0.00

z33	0.00	166.36	60.99	0.00
z8	0.00	179.73	71.97	0.00
z20	0.00	179.73	77.22	0.00
z21	0.00	179.73	76.89	0.00
Zone-7	0.00	102.63	0.00	0.00
Zone-6	0.00	103.18	0.00	0.00
Zone-5	0.00	103.40	0.00	0.00
Zone-3	181.79	175.49	72.43	0.00
Zone-2	249.73	175.55	72.30	0.00
Zone-1	254.36	177.93	75.00	0.00
Zone-4	0.00	104.02	0.00	0.00
Zone-8	0.00	107.76	0.00	0.00
Zone-13	0.00	105.98	0.00	0.00
Zone-14	0.00	105.14	0.00	0.00
Zone-9	0.00	107.73	0.00	0.00
Zone-10	0.00	107.13	0.00	0.00
Zone-11	0.00	107.26	0.00	0.00
Zone-12	0.00	109.39	0.00	0.00
Zone-22	0.00	105.57	0.00	0.00
Zone-23	0.00	107.25	0.00	0.00
Zone-32	0.00	108.01	0.00	0.00
Zone-15	0.00	104.88	0.00	0.00
Zone-19	0.00	104.40	0.00	0.00
Zone-16	0.00	103.90	0.00	0.00
Zone-17	0.00	102.83	0.00	0.00
Zone-18	0.00	102.61	0.00	0.00
Zone-20	0.00	102.50	0.00	0.00
Zone-21	0.00	102.84	0.00	0.00
Zone-26	0.00	102.44	0.00	0.00
Zone-27	0.00	102.90	0.00	0.00
Zone-28	0.00	103.46	0.00	0.00
Zone-29	0.00	104.56	0.00	0.00
Zone-31	0.00	104.19	0.00	0.00
Zone-33	395.20	166.07	60.69	0.00
POND	-1081.19	103.80	0.00	0.00 Reservoir



Page 29

Link Results at 6:00 Hrs:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
1	-7.45	4.39	5840.53	Open
3	0.11	0.00	0.00	Open
4	0.11	0.00	0.00	Open
5	0.10	0.00	0.00	Open
6	0.10	0.00	0.00	Open
7	0.10	0.00	0.00	Open
8	0.10	0.00	0.00	Open
10	0.06	0.00	0.00	Open
11	0.06	0.00	0.00	Open

12	0.06	0.00	0.00	Open
13	0.05	0.00	0.00	Open
14	0.05	0.00	0.00	Open
15	0.04	0.00	0.00	Open
16	0.04	0.00	0.00	Open
18	0.03	0.00	0.00	Open
19	0.03	0.00	0.00	Open
20	0.02	0.00	0.00	Open
21	0.02	0.00	0.00	Open
22	0.01	0.00	0.00	Open
23	0.01	0.00	0.00	Open
24	0.00	0.00	0.00	Open
GV-30	0.00	0.00	0.00	Closed
26	0.01	0.00	0.00	Open
27	0.00	0.00	0.00	Open
28	0.00	0.00	0.00	Open
29	0.00	0.00	0.00	Open
GV-25	0.00	0.00	0.00	Closed
31	-0.01	0.00	0.00	Open
32	-0.01	0.00	0.00	Open
33	0.00	0.00	0.00	Open
GV-24	0.00	0.00	0.00	Closed
35	-0.02	0.00	0.00	Open
36	-0.02	0.00	0.00	Open
37	-0.02	0.00	0.00	Open
38	-0.02	0.00	0.00	Open
39	-0.03	0.00	0.00	Open
40	-0.03	0.00	0.00	Open
41	-0.04	0.00	0.00	Open
42	1081.09	1.02	9.13	Open
43	685.88	0.65	3.93	Open
44	685.88	1.46	28.31	Open
45	431.52	1.43	35.59	Open
46	181.79	0.60	7.18	Open
47	395.21	0.84	14.30	Open
48	0.00	0.00	0.00	Open
49	-0.01	0.00	0.00	Open
50	-0.01	0.00	0.00	Open



Page 30

Link Results at 6:00 Hrs: (continued)

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
51	-395.21	0.84	10.20	Open
52	395.20	3.35	298.45	Open
53	0.07	0.00	0.00	Open
54	0.06	0.00	0.00	Open
55	0.03	0.00	0.00	Open
56	0.03	0.00	0.00	Open
57	0.03	0.00	0.00	Open

GV-7	0.00	0.00	0.00	Closed
GV-6	0.00	0.00	0.00	Closed
GV-5	0.00	0.00	0.00	Closed
GV-3	181.79	1.54	70.84	Open
GV-2	249.73	1.25	35.53	Open
GV-1	254.36	1.28	36.76	Open
GV-4	0.00	0.00	0.00	Closed
GV-8	0.00	0.00	0.00	Closed
GV-13	0.00	0.00	0.00	Closed
GV-14	0.00	0.00	0.00	Closed
GV-9	0.00	0.00	0.00	Closed
GV-10	0.00	0.00	0.00	Closed
GV-11	0.00	0.00	0.00	Closed
GV-12	0.00	0.00	0.00	Closed
GV-22	0.00	0.00	0.00	Closed
GV-23	0.00	0.00	0.00	Closed
GV-32	0.00	0.00	0.00	Closed
GV-15	0.00	0.00	0.00	Closed
GV-19	0.00	0.00	0.00	Closed
GV-16	0.00	0.00	0.00	Closed
GV-17	0.00	0.00	0.00	Closed
GV-18	0.00	0.00	0.00	Closed
GV-20	0.00	0.00	0.00	Closed
GV-21	0.00	0.00	0.00	Closed
GV-26	0.00	0.00	0.00	Closed
GV-27	0.00	0.00	0.00	Closed
GV-28	0.00	0.00	0.00	Closed
GV-29	0.00	0.00	0.00	Closed
GV-31	0.00	0.00	0.00	Closed
GV-33	395.20	3.35	298.46	Open
PUMP	1088.65	0.00	-75.93	Open Pump



Page 31

Node Results at 7:00 Hrs:

Node ID	Demand LPM	Head m	Pressure m	Quality
2	0.00	179.73	75.94	0.00
3	0.00	179.73	75.34	0.00
z4	0.00	179.73	75.70	0.00
5	0.00	179.73	74.76	0.00
6	0.00	179.73	69.51	0.00
7	0.00	179.73	69.29	0.00
8	0.00	179.73	71.94	0.00
9	0.00	179.73	71.84	0.00
10	0.00	179.73	74.34	0.00
11	0.00	179.73	73.85	0.00
z15	0.00	179.73	74.85	0.00
z19	0.00	179.73	75.33	0.00
z16	0.00	179.73	75.83	0.00

z17	0.00	179.73	76.90	0.00
z18	0.00	179.73	77.12	0.00
17	0.00	179.73	77.28	0.00
18	0.00	179.73	77.74	0.00
z26	0.00	179.73	77.29	0.00
z27	0.00	179.73	76.83	0.00
z28	0.00	179.73	76.26	0.00
z29	0.00	179.73	75.16	0.00
23	0.00	179.73	75.74	0.00
z31	0.00	179.73	76.15	0.00
Zone-30	0.00	103.99	0.00	0.00
z13	0.00	179.73	73.75	0.00
z14	0.00	179.73	74.59	0.00
z9	0.00	179.73	72.00	0.00
z10	0.00	179.73	72.59	0.00
z11	0.00	179.73	72.47	0.00
z12	0.00	179.73	70.33	0.00
z22	0.00	179.73	74.15	0.00
33	0.00	179.73	75.27	0.00
34	0.00	179.73	73.00	0.00
z23	0.00	179.73	72.48	0.00
36	0.00	179.73	72.40	0.00
37	0.00	179.73	73.94	0.00
Zone-25	0.00	105.79	0.00	0.00
z32	0.00	179.73	71.71	0.00
40	0.00	179.73	75.13	0.00
Zone-24	0.00	104.60	0.00	0.00
42	0.00	179.60	75.81	0.00
43	0.00	179.57	77.64	0.00
z1	0.00	177.97	75.04	0.00
z2	0.00	175.59	72.34	0.00
z3	0.00	175.56	72.50	0.00
47	0.00	177.94	72.24	0.00
48	0.00	177.70	72.76	0.00



Page 32

Node Results at 7:00 Hrs: (continued)

Node ID	Demand LPM	Head m	Pressure m	Quality
z5	0.00	177.70	74.30	0.00
z6	0.00	177.70	74.53	0.00
z7	0.00	177.70	75.07	0.00
z33	0.00	166.36	60.99	0.00
z8	0.00	179.73	71.97	0.00
z20	0.00	179.73	77.22	0.00
z21	0.00	179.73	76.89	0.00
Zone-7	0.00	102.63	0.00	0.00
Zone-6	0.00	103.18	0.00	0.00
Zone-5	0.00	103.40	0.00	0.00
Zone-3	181.79	175.49	72.43	0.00

Zone-2	249.73	175.55	72.30	0.00
Zone-1	254.36	177.93	75.00	0.00
Zone-4	0.00	104.02	0.00	0.00
Zone-8	0.00	107.76	0.00	0.00
Zone-13	0.00	105.98	0.00	0.00
Zone-14	0.00	105.14	0.00	0.00
Zone-9	0.00	107.73	0.00	0.00
Zone-10	0.00	107.13	0.00	0.00
Zone-11	0.00	107.26	0.00	0.00
Zone-12	0.00	109.39	0.00	0.00
Zone-22	0.00	105.57	0.00	0.00
Zone-23	0.00	107.25	0.00	0.00
Zone-32	0.00	108.01	0.00	0.00
Zone-15	0.00	104.88	0.00	0.00
Zone-19	0.00	104.40	0.00	0.00
Zone-16	0.00	103.90	0.00	0.00
Zone-17	0.00	102.83	0.00	0.00
Zone-18	0.00	102.61	0.00	0.00
Zone-20	0.00	102.50	0.00	0.00
Zone-21	0.00	102.84	0.00	0.00
Zone-26	0.00	102.44	0.00	0.00
Zone-27	0.00	102.90	0.00	0.00
Zone-28	0.00	103.46	0.00	0.00
Zone-29	0.00	104.56	0.00	0.00
Zone-31	0.00	104.19	0.00	0.00
Zone-33	395.20	166.07	60.69	0.00
POND	-1081.19	103.80	0.00	0.00 Reservoir



Page 33

Link Results at 7:00 Hrs:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
1	-7.45	4.39	5840.53	Open
3	0.11	0.00	0.00	Open
4	0.11	0.00	0.00	Open
5	0.10	0.00	0.00	Open
6	0.10	0.00	0.00	Open
7	0.10	0.00	0.00	Open
8	0.10	0.00	0.00	Open
10	0.06	0.00	0.00	Open
11	0.06	0.00	0.00	Open
12	0.06	0.00	0.00	Open
13	0.05	0.00	0.00	Open
14	0.05	0.00	0.00	Open
15	0.04	0.00	0.00	Open
16	0.04	0.00	0.00	Open
18	0.03	0.00	0.00	Open
19	0.03	0.00	0.00	Open
20	0.02	0.00	0.00	Open

21	0.02	0.00	0.00	Open
22	0.01	0.00	0.00	Open
23	0.01	0.00	0.00	Open
24	0.00	0.00	0.00	Open
GV-30	0.00	0.00	0.00	Closed
26	0.01	0.00	0.00	Open
27	0.00	0.00	0.00	Open
28	0.00	0.00	0.00	Open
29	0.00	0.00	0.00	Open
GV-25	0.00	0.00	0.00	Closed
31	-0.01	0.00	0.00	Open
32	-0.01	0.00	0.00	Open
33	0.00	0.00	0.00	Open
GV-24	0.00	0.00	0.00	Closed
35	-0.02	0.00	0.00	Open
36	-0.02	0.00	0.00	Open
37	-0.02	0.00	0.00	Open
38	-0.02	0.00	0.00	Open
39	-0.03	0.00	0.00	Open
40	-0.03	0.00	0.00	Open
41	-0.04	0.00	0.00	Open
42	1081.09	1.02	9.12	Open
43	685.88	0.65	3.93	Open
44	685.88	1.46	28.31	Open
45	431.52	1.43	35.59	Open
46	181.79	0.60	7.18	Open
47	395.21	0.84	14.30	Open
48	0.00	0.00	0.00	Open
49	-0.01	0.00	0.00	Open
50	-0.01	0.00	0.00	Open



Page 34

Link Results at 7:00 Hrs: (continued)

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
51	-395.21	0.84	10.20	Open
52	395.20	3.35	298.45	Open
53	0.07	0.00	0.00	Open
54	0.06	0.00	0.00	Open
55	0.03	0.00	0.00	Open
56	0.03	0.00	0.00	Open
57	0.03	0.00	0.00	Open
GV-7	0.00	0.00	0.00	Closed
GV-6	0.00	0.00	0.00	Closed
GV-5	0.00	0.00	0.00	Closed
GV-3	181.79	1.54	70.84	Open
GV-2	249.73	1.25	35.53	Open
GV-1	254.36	1.28	36.76	Open
GV-4	0.00	0.00	0.00	Closed
GV-8	0.00	0.00	0.00	Closed

GV-13	0.00	0.00	0.00	Closed
GV-14	0.00	0.00	0.00	Closed
GV-9	0.00	0.00	0.00	Closed
GV-10	0.00	0.00	0.00	Closed
GV-11	0.00	0.00	0.00	Closed
GV-12	0.00	0.00	0.00	Closed
GV-22	0.00	0.00	0.00	Closed
GV-23	0.00	0.00	0.00	Closed
GV-32	0.00	0.00	0.00	Closed
GV-15	0.00	0.00	0.00	Closed
GV-19	0.00	0.00	0.00	Closed
GV-16	0.00	0.00	0.00	Closed
GV-17	0.00	0.00	0.00	Closed
GV-18	0.00	0.00	0.00	Closed
GV-20	0.00	0.00	0.00	Closed
GV-21	0.00	0.00	0.00	Closed
GV-26	0.00	0.00	0.00	Closed
GV-27	0.00	0.00	0.00	Closed
GV-28	0.00	0.00	0.00	Closed
GV-29	0.00	0.00	0.00	Closed
GV-31	0.00	0.00	0.00	Closed
GV-33	395.20	3.35	298.46	Open
PUMP	1088.65	0.00	-75.93	Open Pump



Page 35

Node Results at 8:00 Hrs:

Node ID	Demand LPM	Head m	Pressure m	Quality
2	0.00	179.73	75.94	0.00
3	0.00	179.73	75.34	0.00
z4	0.00	179.73	75.70	0.00
5	0.00	179.73	74.76	0.00
6	0.00	179.73	69.51	0.00
7	0.00	179.73	69.29	0.00
8	0.00	179.73	71.94	0.00
9	0.00	179.73	71.84	0.00
10	0.00	179.73	74.34	0.00
11	0.00	179.73	73.85	0.00
z15	0.00	179.73	74.85	0.00
z19	0.00	179.73	75.33	0.00
z16	0.00	179.73	75.83	0.00
z17	0.00	179.73	76.90	0.00
z18	0.00	179.73	77.12	0.00
17	0.00	179.73	77.28	0.00
18	0.00	179.73	77.74	0.00
z26	0.00	179.73	77.29	0.00
z27	0.00	179.73	76.83	0.00
z28	0.00	179.73	76.26	0.00
z29	0.00	179.73	75.16	0.00

23	0.00	179.73	75.74	0.00
z31	0.00	179.73	76.15	0.00
Zone-30	0.00	103.99	0.00	0.00
z13	0.00	179.73	73.75	0.00
z14	0.00	179.73	74.59	0.00
z9	0.00	179.73	72.00	0.00
z10	0.00	179.73	72.59	0.00
z11	0.00	179.73	72.47	0.00
z12	0.00	179.73	70.33	0.00
z22	0.00	179.73	74.15	0.00
33	0.00	179.73	75.27	0.00
34	0.00	179.73	73.00	0.00
z23	0.00	179.73	72.48	0.00
36	0.00	179.73	72.40	0.00
37	0.00	179.73	73.94	0.00
Zone-25	0.00	105.79	0.00	0.00
z32	0.00	179.73	71.71	0.00
40	0.00	179.73	75.13	0.00
Zone-24	0.00	104.60	0.00	0.00
42	0.00	179.60	75.81	0.00
43	0.00	179.57	77.64	0.00
z1	0.00	177.97	75.04	0.00
z2	0.00	175.59	72.34	0.00
z3	0.00	175.56	72.50	0.00
47	0.00	177.94	72.24	0.00
48	0.00	177.70	72.76	0.00



Page 36

Node Results at 8:00 Hrs: (continued)

Node ID	Demand LPM	Head m	Pressure m	Quality
z5	0.00	177.70	74.30	0.00
z6	0.00	177.70	74.53	0.00
z7	0.00	177.70	75.07	0.00
z33	0.00	166.36	60.99	0.00
z8	0.00	179.73	71.97	0.00
z20	0.00	179.73	77.22	0.00
z21	0.00	179.73	76.89	0.00
Zone-7	0.00	102.63	0.00	0.00
Zone-6	0.00	103.18	0.00	0.00
Zone-5	0.00	103.40	0.00	0.00
Zone-3	181.79	175.49	72.43	0.00
Zone-2	249.73	175.55	72.30	0.00
Zone-1	254.36	177.93	75.00	0.00
Zone-4	0.00	104.02	0.00	0.00
Zone-8	0.00	107.76	0.00	0.00
Zone-13	0.00	105.98	0.00	0.00
Zone-14	0.00	105.14	0.00	0.00
Zone-9	0.00	107.73	0.00	0.00
Zone-10	0.00	107.13	0.00	0.00

Zone-11	0.00	107.26	0.00	0.00
Zone-12	0.00	109.39	0.00	0.00
Zone-22	0.00	105.57	0.00	0.00
Zone-23	0.00	107.25	0.00	0.00
Zone-32	0.00	108.01	0.00	0.00
Zone-15	0.00	104.88	0.00	0.00
Zone-19	0.00	104.40	0.00	0.00
Zone-16	0.00	103.90	0.00	0.00
Zone-17	0.00	102.83	0.00	0.00
Zone-18	0.00	102.61	0.00	0.00
Zone-20	0.00	102.50	0.00	0.00
Zone-21	0.00	102.84	0.00	0.00
Zone-26	0.00	102.44	0.00	0.00
Zone-27	0.00	102.90	0.00	0.00
Zone-28	0.00	103.46	0.00	0.00
Zone-29	0.00	104.56	0.00	0.00
Zone-31	0.00	104.19	0.00	0.00
Zone-33	395.20	166.07	60.69	0.00
POND	-1081.19	103.80	0.00	0.00 Reservoir



Page 37

Link Results at 8:00 Hrs:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
1	-7.45	4.39	5840.53	Open
3	0.11	0.00	0.00	Open
4	0.11	0.00	0.00	Open
5	0.10	0.00	0.00	Open
6	0.10	0.00	0.00	Open
7	0.10	0.00	0.00	Open
8	0.10	0.00	0.00	Open
10	0.06	0.00	0.00	Open
11	0.06	0.00	0.00	Open
12	0.06	0.00	0.00	Open
13	0.05	0.00	0.00	Open
14	0.05	0.00	0.00	Open
15	0.04	0.00	0.00	Open
16	0.04	0.00	0.00	Open
18	0.03	0.00	0.00	Open
19	0.03	0.00	0.00	Open
20	0.02	0.00	0.00	Open
21	0.02	0.00	0.00	Open
22	0.01	0.00	0.00	Open
23	0.01	0.00	0.00	Open
24	0.00	0.00	0.00	Open
GV-30	0.00	0.00	0.00	Closed
26	0.01	0.00	0.00	Open
27	0.00	0.00	0.00	Open
28	0.00	0.00	0.00	Open

29	0.00	0.00	0.00	Open
GV-25	0.00	0.00	0.00	Closed
31	-0.01	0.00	0.00	Open
32	-0.01	0.00	0.00	Open
33	0.00	0.00	0.00	Open
GV-24	0.00	0.00	0.00	Closed
35	-0.02	0.00	0.00	Open
36	-0.02	0.00	0.00	Open
37	-0.02	0.00	0.00	Open
38	-0.02	0.00	0.00	Open
39	-0.03	0.00	0.00	Open
40	-0.03	0.00	0.00	Open
41	-0.04	0.00	0.00	Open
42	1081.09	1.02	9.13	Open
43	685.88	0.65	3.93	Open
44	685.88	1.46	28.31	Open
45	431.52	1.43	35.59	Open
46	181.79	0.60	7.18	Open
47	395.21	0.84	14.30	Open
48	0.00	0.00	0.00	Open
49	-0.01	0.00	0.00	Open
50	-0.01	0.00	0.00	Open



Page 38

Link Results at 8:00 Hrs: (continued)

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
51	-395.21	0.84	10.20	Open
52	395.20	3.35	298.45	Open
53	0.07	0.00	0.00	Open
54	0.06	0.00	0.00	Open
55	0.03	0.00	0.00	Open
56	0.03	0.00	0.00	Open
57	0.03	0.00	0.00	Open
GV-7	0.00	0.00	0.00	Closed
GV-6	0.00	0.00	0.00	Closed
GV-5	0.00	0.00	0.00	Closed
GV-3	181.79	1.54	70.84	Open
GV-2	249.73	1.25	35.53	Open
GV-1	254.36	1.28	36.76	Open
GV-4	0.00	0.00	0.00	Closed
GV-8	0.00	0.00	0.00	Closed
GV-13	0.00	0.00	0.00	Closed
GV-14	0.00	0.00	0.00	Closed
GV-9	0.00	0.00	0.00	Closed
GV-10	0.00	0.00	0.00	Closed
GV-11	0.00	0.00	0.00	Closed
GV-12	0.00	0.00	0.00	Closed
GV-22	0.00	0.00	0.00	Closed
GV-23	0.00	0.00	0.00	Closed

GV-32	0.00	0.00	0.00	Closed
GV-15	0.00	0.00	0.00	Closed
GV-19	0.00	0.00	0.00	Closed
GV-16	0.00	0.00	0.00	Closed
GV-17	0.00	0.00	0.00	Closed
GV-18	0.00	0.00	0.00	Closed
GV-20	0.00	0.00	0.00	Closed
GV-21	0.00	0.00	0.00	Closed
GV-26	0.00	0.00	0.00	Closed
GV-27	0.00	0.00	0.00	Closed
GV-28	0.00	0.00	0.00	Closed
GV-29	0.00	0.00	0.00	Closed
GV-31	0.00	0.00	0.00	Closed
GV-33	395.20	3.35	298.46	Open
PUMP	1088.65	0.00	-75.93	Open Pump

EMITTER COEFF. (Ke)

The K-factor is a constant that relates the flow rate through a sprinkler to the pressure at its inlet. It is derived using the formula:

$K = Q / \sqrt{P}$

Where:

- K = discharge coefficient (LPM / $\sqrt{\text{bar}}$)
- Q = flow rate (LPM)
- P = operating pressure (bar)

For the given sprinkler:

- Q = 14.76 LPM
- P = 3.0 bar
- $K = 14.76 / \sqrt{3.0} = 8.52 \text{ LPM} / \sqrt{\text{bar}}$

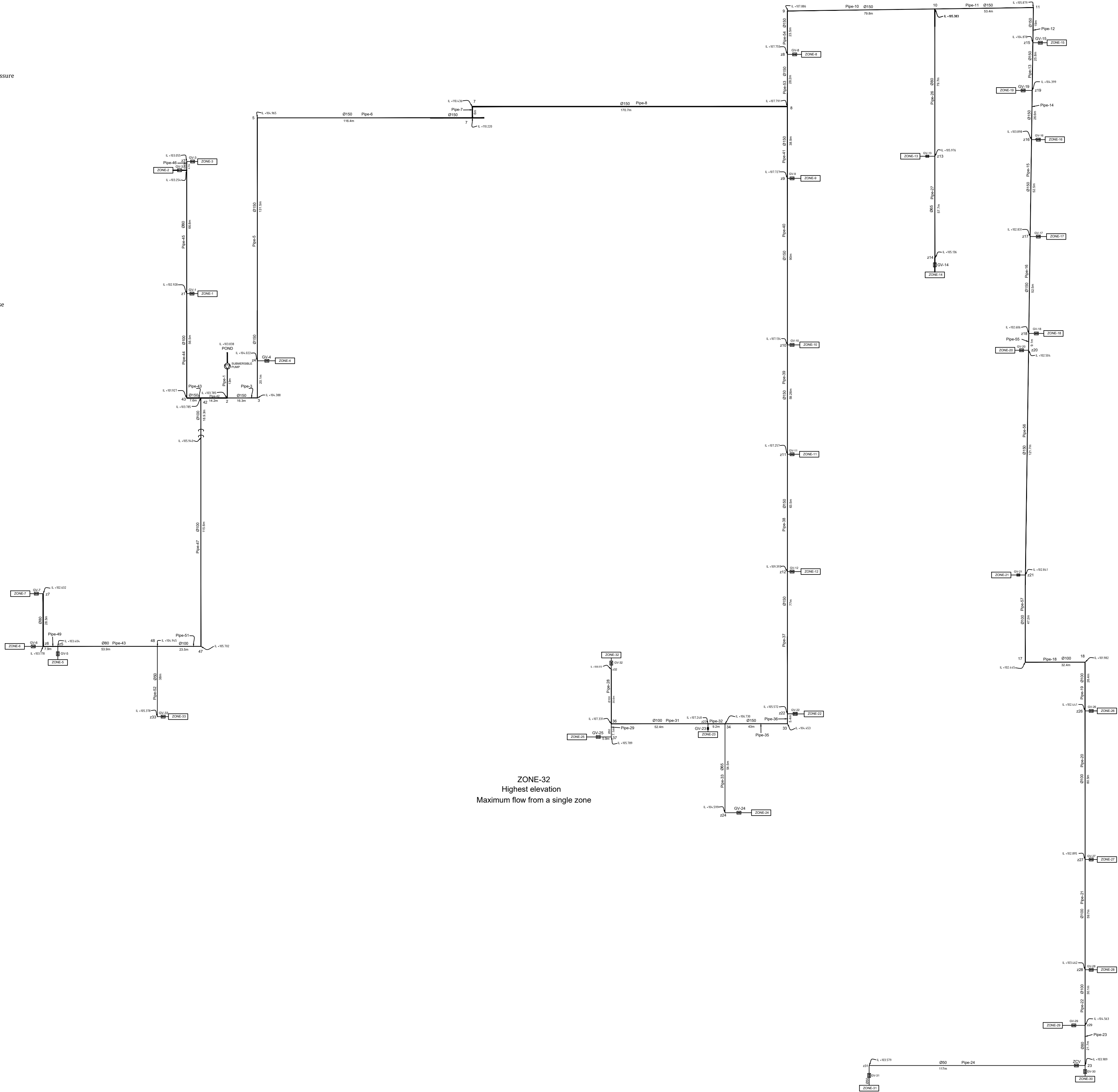
The equivalent Ke in LPM/ $\sqrt{\text{m}}$ is:

$Ke = 8.52 \times \sqrt{10.197} = 2.67 \text{ LPM} / \sqrt{\text{m}}$ per sprinkler

Therefore, for a junction with N sprinklers connected:

$Ke_{\text{total}} = 2.67 \times N$

This value was entered into the 'Emitter Coeff' field in EPANET for each node. Base Demand for those nodes was set to zero to ensure that all demand was pressure-dependent.



ZONE	NO. OF SPRINKLERS	EMMITER COEFF. (Ke)
Zone-1	11	29.37
Zone-2	11	29.37
Zone-3	8	21.36
Zone-4	9	24.03
Zone-5	9	24.03
Zone-6	15	40.05
Zone-7	13	34.71
Zone-8	8	21.36
Zone-9	10	26.70
Zone-10	10	26.70
Zone-11	10	26.70
Zone-12	9	24.03
Zone-13	14	37.38
Zone-14	11	29.37
Zone-15	13	34.71
Zone-16	13	34.71
Zone-17	13	34.71
Zone-18	13	34.71
Zone-19	15	40.05
Zone-20	13	34.71
Zone-21	17	45.39
Zone-22	11	29.37
Zone-23	20	53.40
Zone-24	19	50.73
Zone-25	9	24.03
Zone-26	14	37.38
Zone-27	13	34.71
Zone-28	13	34.71
Zone-29	11	29.37
Zone-30	14	37.38
Zone-31	11	29.37
Zone-32	22	58.74
Zone-33	19	50.73

SCHEMATIC DRAWING FOR
HYDRAULIC ANALYSIS IN EPANET