

| Name    | Invest | Rm Elev. | Ag. Depth | Max. Hgt.     | Time (M/D/Y) | Inflow (cfs) | Max. Total | Flow   | Error (%) | Surcharge (ft) | Hour | Max. Surge (ft) | Freeboard (ft) | Min. | Hour Flooded | Rate Flooded | Rate (cfs) | Total Flood | Vol. Contributing |
|---------|--------|----------|-----------|---------------|--------------|--------------|------------|--------|-----------|----------------|------|-----------------|----------------|------|--------------|--------------|------------|-------------|-------------------|
| J-HC-19 | 129    | 155      | 2.58      | 134.66        | 9:01 AM      | 410.9        | 106        | 0.013  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 1604.931          |
| J-HC-13 | 169    | 155      | 0.08      | 170.68        | 8:34 AM      | 270.36       | 106        | 0      | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 1120.231          |
| J-HC-40 | 320    | 155      | 0.26      | 296.65        | 8:06 AM      | 96.43        | 106        | 0.004  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 361.561           |
| J-HC-34 | 177    | 155      | 0.7       | 241.28        | 8:31 AM      | 111.3        | 106        | 0.001  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 466.127           |
| J-HC-34 | 177    | 155      | 1.82      | 181.01        | 8:31 AM      | 263.28       | 106        | 0.002  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 109.708           |
| J-HC-34 | 177    | 155      | 0.45      | 172.33        | 8:00 AM      | 33.14        | 106        | 0      | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 77.62             |
| J-HC-34 | 177    | 155      | 0.71      | 186.43        | 8:00 AM      | 36.2         | 106        | 0.002  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 108.699           |
| J-HC-34 | 177    | 155      | 0.73      | 171.12        | 8:01 AM      | 37.41        | 106        | 0.003  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 111.998           |
| J-HC-34 | 177    | 155      | 2.23      | 144.4         | 8:54 AM      | 365.52       | 106        | 0.003  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 1409.633          |
| J-HC-34 | 177    | 155      | 1.34      | 130.45        | 9:01 AM      | 499.6        | 106        | -0.002 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 109.708           |
| J-HC-34 | 177    | 155      | 1.78      | 167.38        | 8:02 AM      | 72.55        | 106        | 0      | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 140.717           |
| J-HC-34 | 177    | 155      | 0.53      | 121.73        | 8:00 AM      | 69.71        | 106        | 0.001  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 101.95            |
| J-HC-34 | 177    | 155      | 0.57      | 121.28        | 8:01 AM      | 44.57        | 106        | 0.001  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 86.353            |
| J-HC-34 | 177    | 155      | 0.47      | 121.25        | 8:01 AM      | 39.4         | 106        | 0      | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 101.95            |
| J-HC-34 | 177    | 155      | 2.09      | 106.72        | 9:18 AM      | 590.45       | 106        | 0.004  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 77.62             |
| J-HC-34 | 177    | 155      | 3.89      | 110.98        | 9:05 AM      | 554.83       | 106        | 0.005  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 77.62             |
| J-HC-34 | 177    | 155      | 1.54      | 114.4         | 9:06 AM      | 479.32       | 106        | 0.001  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 77.62             |
| J-HC-34 | 177    | 155      | 1.94      | 155.18        | 8:43 AM      | 366.71       | 106        | -0.009 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 1428.126          |
| J-HC-34 | 177    | 155      | 1.68      | 168.39        | 8:37 AM      | 307.89       | 106        | 0.013  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 1224.436          |
| J-HC-34 | 177    | 155      | 1.49      | 207.39        | 8:13 AM      | 219.07       | 106        | -0.006 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 892.449           |
| J-HC-34 | 177    | 155      | 0.46      | 306.18        | 8:03 AM      | 51.98        | 106        | -0.003 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 137.04            |
| J-HC-34 | 177    | 155      | 0.55      | 364.24        | 8:00 AM      | 36.52        | 106        | 0      | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 23.659            |
| J-HC-34 | 177    | 155      | 0.08      | 156.64        | 8:01 AM      | 8.53         | 106        | 0.001  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 137.04            |
| J-HC-34 | 177    | 155      | 2.47      | 129.62        | 9:19 AM      | 588.96       | 106        | 0      | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 23.659            |
| J-HC-34 | 177    | 155      | 0.35      | 159.18        | 8:00 AM      | 6.91         | 106        | 0.005  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 55.214            |
| J-HC-34 | 177    | 155      | 1.87      | 268.4001/2013 | 14:35 AM     | 14.89        | 106        | 0.561  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 47.074            |
| J-HC-34 | 177    | 155      | 0.16      | 202.14        | 7:59 AM      | 1.28         | 106        | 0.003  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 2.999             |
| J-HC-34 | 177    | 155      | 0.19      | 165.49        | 8:00 AM      | 3.97         | 106        | 0.005  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 6.839             |
| J-HC-34 | 177    | 155      | 0.56      | 177.88        | 8:00 AM      | 36.14        | 106        | 0.001  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 108.699           |
| J-HC-34 | 177    | 155      | 0.38      | 21.74         | 8:00 AM      | 4            | 106        | -0.004 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 44.92             |
| J-HC-34 | 177    | 155      | 0.4       | 166.8         | 8:10 AM      | 18.03        | 106        | 0.009  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 131.944           |
| J-HC-34 | 177    | 155      | 0.2       | 181.2         | 8:00 AM      | 5.8          | 106        | 0.005  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 11.906            |
| J-HC-34 | 177    | 155      | 0.45      | 218.18        | 8:00 AM      | 15.44        | 106        | -0.01  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 27.553            |
| J-HC-34 | 177    | 155      | 0.25      | 228.89        | 8:00 AM      | 6.08         | 106        | -0.012 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 6.232             |
| J-HC-34 | 177    | 155      | 0.13      | 280.33        | 8:03 AM      | 7.82         | 106        | 0.017  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 40.957            |
| J-HC-34 | 177    | 155      | 0.13      | 219.28        | 8:00 AM      | 15.85        | 106        | 0.001  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 40.957            |
| J-HC-34 | 177    | 155      | 0.43      | 434.31        | 8:00 AM      | 9.77         | 106        | 0.002  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 38.713            |
| J-HC-34 | 177    | 155      | 0.34      | 433.3         | 7:59 AM      | 9.77         | 106        | 0      | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 38.713            |
| J-HC-34 | 177    | 155      | 0.29      | 225.77        | 8:01 AM      | 6.4          | 106        | -0.532 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 16.228            |
| J-HC-34 | 177    | 155      | 0.06      | 185.86        | 8:00 AM      | 0.99         | 106        | 0.001  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 2.999             |
| J-HC-34 | 177    | 155      | 0.27      | 169.9         | 8:00 AM      | 6.88         | 106        | 0      | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 12.514            |
| J-HC-34 | 177    | 155      | 0.15      | 260.33        | 8:32 AM      | 7.37         | 106        | -0.008 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 8.14              |
| J-HC-34 | 177    | 155      | 0.15      | 238.26        | 8:00 AM      | 4.15         | 106        | 0.001  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 43.284            |
| J-HC-34 | 177    | 155      | 0.33      | 193.65        | 8:00 AM      | 20.55        | 106        | 0.035  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 40.957            |
| J-HC-34 | 177    | 155      | 0.68      | 260.97        | 8:32 AM      | 24.7         | 106        | 0.003  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 43.284            |
| J-HC-34 | 177    | 155      | 0.44      | 238.5001/2013 | 16:00 AM     | 4.15         | 106        | 0      | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 55.214            |
| J-HC-34 | 177    | 155      | 0.48      | 228.85        | 8:00 AM      | 10.6         | 106        | 0.003  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 55.214            |
| J-HC-34 | 177    | 155      | 0.25      | 228.76        | 8:00 AM      | 6.07         | 106        | 0.003  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 55.214            |
| J-HC-34 | 177    | 155      | 0.35      | 336.7501/2013 | 20:04 AM     | 13.9         | 106        | 0.003  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 30.523            |
| J-HC-34 | 177    | 155      | 0.21      | 203.3         | 8:00 AM      | 3.97         | 106        | 0.659  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 7.91              |
| J-HC-34 | 177    | 155      | 0.18      | 120.5         | 8:00 AM      | 5.9          | 106        | -0.064 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 11.471            |
| J-HC-34 | 177    | 155      | 0.44      | 195.85        | 8:33 AM      | 6.68         | 106        | -0.268 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 12.636            |
| J-HC-34 | 177    | 155      | 0.7       | 195.78        | 8:06 AM      | 27.52        | 106        | 0.04   | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 88.477            |
| J-HC-34 | 177    | 155      | 0.56      | 234.54        | 8:00 AM      | 27.72        | 106        | -0.021 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 88.477            |
| J-HC-34 | 177    | 155      | 1.77      | 267.7001/2013 | 14:37 AM     | 4.85         | 106        | 0.003  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 47.074            |
| J-HC-34 | 177    | 155      | 0.82      | 196.64        | 8:01 AM      | 39.32        | 106        | 0.006  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 113.272           |
| J-HC-34 | 177    | 155      | 0.78      | 356.87        | 8:01 AM      | 36.49        | 106        | 0.006  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 16.924            |
| J-HC-34 | 177    | 155      | 0.39      | 173.34        | 7:16 AM      | 10.43        | 106        | 0.001  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 2.999             |
| J-HC-34 | 177    | 155      | 0.05      | 151.34        | 8:00 AM      | 0.99         | 106        | 0.006  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 10.88             |
| J-HC-34 | 177    | 155      | 0.37      | 242.1         | 8:03 AM      | 8.17         | 106        | -0.182 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 16.277            |
| J-HC-34 | 177    | 155      | 0.78      | 242.1         | 8:03 AM      | 17.49        | 106        | -0.007 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 5.22              |
| J-HC-34 | 177    | 155      | 0.22      | 186.22        | 8:01 AM      | 2.83         | 106        | 0.471  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 55.697            |
| J-HC-34 | 177    | 155      | 1.1       | 156.64        | 9:02 AM      | 56.47        | 106        | 15.077 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 11.86             |
| J-HC-34 | 177    | 155      | 0.68      | 103.58        | 9:49 AM      | 76.09        | 106        | 1.52   | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 54.527            |
| J-HC-34 | 177    | 155      | 0.08      | 191.28        | 8:33 AM      | 14.25        | 106        | -0.005 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 47.074            |
| J-HC-34 | 177    | 155      | 0.16      | 310.4         | 8:01 AM      | 15.12        | 106        | -0.561 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 19.23             |
| J-HC-34 | 177    | 155      | 0.23      | 312.61        | 8:00 AM      | 1.11         | 106        | 0.006  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 19.23             |
| J-HC-34 | 177    | 155      | 0.27      | 147.15        | 8:00 AM      | 6.31         | 106        | -0.001 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 19.23             |
| J-HC-34 | 177    | 155      | 0.52      | 151.51        | 8:00 AM      | 52.16        | 106        | 0.001  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 19.23             |
| J-HC-34 | 177    | 155      | 0.88      | 357.18        | 8:00 AM      | 46.09        | 106        | 0.002  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 19.23             |
| J-HC-34 | 177    | 155      | 0.17      | 141.7         | 8:00 AM      | 10.78        | 106        | -0.108 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 25.543            |
| J-HC-34 | 177    | 155      | 0.28      | 162.39        | 8:00 AM      | 12.7         | 106        | 0.002  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 25.543            |
| J-HC-34 | 177    | 155      | 0.28      | 162.39        | 8:00 AM      | 12.7         | 106        | 0.002  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 25.543            |
| J-HC-34 | 177    | 155      | 0.24      | 170.71        | 8:00 AM      | 13.58        | 106        | -0.129 | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 25.543            |
| J-HC-34 | 177    | 155      | 0.14      | 156.94        | 8:41 AM      | 309.43       | 106        | 0.017  | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 1228.736          |
| J-HC-34 | 177    | 155      | 0.29      | 188.22        | 8:00 AM      | 8.57         | 106        | 1.44   | 0         | 0              | 0    | 0               | 0              | 0    | 0            | 0            | 0          | 0           | 13.884            |
| J-HC-34 | 177    | 155      | 0.17      | 153.57        | 8:00 AM</    |              |            |        |           |                |      |                 |                |      |              |              |            |             |                   |

Junctions CIP Model

| Name      | Invert Elev. (ft) | Rim Elev. (ft) | Avg. Depth (ft) | Max. HGL (ft) | Time Max. HGL (M/D/Y) | Max. Total Inflow (cfs) | Total Inflow (MG) | Flow Error (%) | Hours Surcharged (h) | Max. Surcharge (ft) | Min. Freeboard (ft) | Hours Flooded (h) | Max. Flood Rate (cfs) | Total Flood Vol. (MG) | Contributing Area (ac) |
|-----------|-------------------|----------------|-----------------|---------------|-----------------------|-------------------------|-------------------|----------------|----------------------|---------------------|---------------------|-------------------|-----------------------|-----------------------|------------------------|
| J-HC-37   | 196               | 220            | 1.32            | 199.33        | 8:37 AM               | 233.11                  | 53.1              | 0.043          | 0                    | 0                   | 35.362              | 0                 | 0                     | 0                     | 946.528                |
| J-HCT3-01 | 132.64            | 165            | 0.59            | 133.95        | 8:05 AM               | 94.82                   | 17.4              | -0.022         | 0                    | 0                   | 47.795              | 0                 | 0                     | 0                     | 199.829                |
| J-HCT3-03 | 155               | 165            | 0.29            | 155.78        | 8:02 AM               | 84.46                   | 15.4              | -0.003         | 0                    | 0                   | 15.206              | 0                 | 0                     | 0                     | 171.016                |
| J-HCT3-05 | 162.3             | 170            | 1.17            | 165.28        | 8:02 AM               | 73.35                   | 13.1              | 0              | 0                    | 0                   | 9.659               | 0                 | 0                     | 0                     | 142.318                |
| J-HCT3-04 | 160.4             | 165            | 1.4             | 163.8         | 8:02 AM               | 77.18                   | 14.2              | 0              | 0                    | 0                   | 9.239               | 0                 | 0                     | 0                     | 155.43                 |
| J35       | 253.8             | 256.69         | 0.15            | 254.16        | 8:07 AM               | 10.09                   | 1.97              | -1.192         | 0                    | 0                   | 3.801               | 0                 | 0                     | 0                     | 27.344                 |
| J-HC-36   | 180.5             | 187            | 1.74            | 184.38        | 8:39 AM               | 247.7                   | 59.3              | 0.017          | 0                    | 0                   | 34.812              | 0                 | 0                     | 0                     | 1041.79                |
| J-HC-15   | 125               | 140            | 1.41            | 128.08        | 9:04 AM               | 449.36                  | 116               | 0.003          | 0                    | 0                   | 39.303              | 0                 | 0                     | 0                     | 1722.143               |
| J-HC-20   | 133.8             | 143.8          | 2.28            | 139.19        | 8:58 AM               | 403.54                  | 103               | 0.002          | 0                    | 0                   | 36.735              | 0                 | 0                     | 0                     | 1579.288               |
| J-HC-21   | 136               | 146            | 2.26            | 141.24        | 8:56 AM               | 398.51                  | 102               | 0.002          | 0                    | 0                   | 36.755              | 0                 | 0                     | 0                     | 1561.085               |
| J-HC-23   | 137.76            | 147.76         | 2.51            | 143.84        | 8:55 AM               | 384.6                   | 97.9              | 0.001          | 0                    | 0                   | 35.903              | 0                 | 0                     | 0                     | 1517.249               |
| J-HC-22   | 137               | 147            | 3.02            | 143.69        | 8:55 AM               | 395.77                  | 101               | 0.002          | 0                    | 0                   | 35.405              | 0                 | 0                     | 0                     | 1550.987               |
| J-HC-24   | 139               | 149            | 2.1             | 144.29        | 8:54 AM               | 383.16                  | 97.3              | -0.001         | 0                    | 0                   | 36.693              | 0                 | 0                     | 0                     | 1510.779               |
| J-HCT4-02 | 166.4             | 188.4          | 0.66            | 167.56        | 8:01 AM               | 41.18                   | 9.93              | 0.014          | 0                    | 0                   | 24.921              | 0                 | 0                     | 0                     | 119.088                |
| J-HC-28   | 151.8             | 170            | 2.21            | 156.17        | 8:41 AM               | 326.29                  | 78.3              | 0.007          | 0                    | 0                   | 13.83               | 0                 | 0                     | 0                     | 1282.653               |
| J-HC-30   | 162               | 180            | 2.43            | 166.86        | 8:36 AM               | 308.1                   | 73.9              | -0.007         | 0                    | 0                   | 13.14               | 0                 | 0                     | 0                     | 1228.876               |
| J-HC-03   | 97.2              | 168.5          | 2.48            | 103.64        | 9:22 AM               | 591.09                  | 165               | -0.002         | 0                    | 0                   | 64.86               | 0                 | 0                     | 0                     | 2328.259               |
| J-HC-07   | 105.3             | 140            | 3.63            | 111           | 7:45 AM               | 486.21                  | 129               | 0.013          | 0                    | 0                   | 36.671              | 0                 | 0                     | 0                     | 1890.152               |
| J-HC-16   | 126               | 147            | 1.59            | 129.43        | 8:55 AM               | 457.2                   | 116               | 0.002          | 0                    | 0                   | 39.303              | 0                 | 0                     | 0                     | 1718.441               |
| J-HC-13   | 117               | 140            | 2.46            | 121.78        | 9:07 AM               | 462.96                  | 122               | 0.009          | 0                    | 0                   | 31.693              | 0                 | 0                     | 0                     | 1794.656               |
| J-HC-14   | 120.5             | 150            | 2.63            | 125.51        | 9:06 AM               | 460.31                  | 121               | 0.017          | 0                    | 0                   | 37.723              | 0                 | 0                     | 0                     | 1782.099               |
| J-HC-12   | 115.43            | 140            | 2.67            | 120.3         | 9:07 AM               | 465.97                  | 123               | 0.005          | 0                    | 0                   | 31.603              | 0                 | 0                     | 0                     | 1807.58                |
| J-HC-11   | 112.5             | 119            | 1.58            | 115.46        | 9:06 AM               | 472.85                  | 125               | 0.01           | 0                    | 0                   | 39.411              | 0                 | 0                     | 0                     | 1833.724               |
| J-HCT3-02 | 146.8             | 155            | 0.37            | 147.75        | 8:03 AM               | 92.48                   | 17                | 0.009          | 0                    | 0                   | 33.937              | 0                 | 0                     | 0                     | 193.978                |
| J-HCT2-01 | 107               | 165            | 0.66            | 108.59        | 8:04 AM               | 54.78                   | 10.5              | -0.098         | 0                    | 0                   | 56.41               | 0                 | 0                     | 0                     | 131.552                |
| J-HC-09   | 109               | 145            | 1.32            | 111.46        | 9:09 AM               | 483.72                  | 128               | -0.01          | 0                    | 0                   | 39.911              | 0                 | 0                     | 0                     | 1878.682               |
| STM61213  | 167.5             | 174            | 0.12            | 167.89        | 8:00 AM               | 3.96                    | 0.666             | -0.008         | 0                    | 0                   | 6.11                | 0                 | 0                     | 0                     | 6.398                  |
| STU141    | 167.21            | 173.9          | 1.2             | 168.68        | 12:02 AM              | 4.81                    | 0.759             | 0.23           | 0                    | 0                   | 5.22                | 0                 | 0                     | 0                     | 9.068                  |
| STU0917   | 226.69            | 235.97         | 0.38            | 231.39        | 8:00 AM               | 9.08                    | 1.55              | 0              | 1.33                 | 3.452               | 4.578               | 0                 | 0                     | 0                     | 32.163                 |
| STU0919   | 225.32            | 235.16         | 0.3             | 228.05        | 8:00 AM               | 9.08                    | 1.55              | 0              | 0.11                 | 1.482               | 7.108               | 0                 | 0                     | 0                     | 32.163                 |
| STU0915   | 216.42            | 225.09         | 0.41            | 221           | 8:00 AM               | 9.1                     | 1.55              | 0              | 1.4                  | 3.331               | 4.089               | 0                 | 0                     | 0                     | 32.163                 |
| STU0924   | 221.3             | 230.64         | 0.26            | 224.75        | 8:00 AM               | 9.09                    | 1.55              | 0              | 0.38                 | 2.201               | 5.889               | 0                 | 0                     | 0                     | 32.163                 |
| STU0111   | 215.6             | 221.89         | 0.38            | 218.78        | 8:00 AM               | 9.1                     | 1.55              | 0              | 1.25                 | 1.925               | 3.115               | 0                 | 0                     | 0                     | 32.163                 |
| STU0923   | 224.31            | 232.52         | 0.24            | 226.65        | 8:00 AM               | 9.08                    | 1.55              | 0              | 0.03                 | 1.092               | 6.268               | 0                 | 0                     | 0                     | 32.163                 |
| STU0927   | 219.25            | 228.25         | 0.27            | 223.14        | 8:00 AM               | 9.1                     | 1.55              | 0              | 0.62                 | 2.642               | 5.108               | 0                 | 0                     | 0                     | 32.163                 |
| STU01012  | 215.31            | 221.89         | 0.39            | 217.99        | 8:00 AM               | 9.11                    | 1.55              | 0.001          | 1.18                 | 1.43                | 3.9                 | 0                 | 0                     | 0                     | 32.163                 |
| STU0916   | 226.92            | 235.59         | 0.42            | 232.15        | 8:00 AM               | 9.07                    | 1.55              | -0.004         | 1.38                 | 3.978               | 3.442               | 0                 | 0                     | 0                     | 32.163                 |
| STU0991   | 226.87            | 235.7          | 0.56            | 218.64        | 8:15 AM               | 26.73                   | 5.56              | 0              | 0                    | 0                   | 7.06                | 0                 | 0                     | 0                     | 82.303                 |
| STU0911   | 232.75            | 239.68         | 0.16            | 233.29        | 8:00 AM               | 6.02                    | 1.14              | 0.009          | 0                    | 0                   | 6.39                | 0                 | 0                     | 0                     | 18.223                 |
| STU081    | 253.03            | 261.07         | 0.32            | 259.58        | 7:37 AM               | 5.41                    | 0.996             | 0.002          | 1.29                 | 5.554               | 1.486               | 0                 | 0                     | 0                     | 16.281                 |
| STU1064   | 212.68            | 221.34         | 0.17            | 213.29        | 8:00 AM               | 3.99                    | 0.671             | 0              | 0                    | 0                   | 8.05                | 0                 | 0                     | 0                     | 6.613                  |
| STU1245   | 160               | 167.67         | 0.39            | 161.35        | 8:00 AM               | 27.3                    | 3.64              | 0.001          | 0                    | 0                   | 6.32                | 0                 | 0                     | 0                     | 42.285                 |
| STU0985   | 239.64            | 248.48         | 0.51            | 231.89        | 8:15 AM               | 25.52                   | 5.3               | 0              | 0.18                 | 0.046               | 6.594               | 0                 | 0                     | 0                     | 79.012                 |
| STU09105  | 249.39            | 257.4          | 0.36            | 250.55        | 7:59 AM               | 11.85                   | 2.49              | 0              | 0                    | 0                   | 7.19                | 0                 | 0                     | 0                     | 36.104                 |
| STU1069   | 194.56            | 202.19         | 0.17            | 195.16        | 8:01 AM               | 3.99                    | 0.671             | 0              | 0                    | 0                   | 7.03                | 0                 | 0                     | 0                     | 6.613                  |
| STU1066   | 198.06            | 206.48         | 0.18            | 198.7         | 8:01 AM               | 3.99                    | 0.671             | 0              | 0                    | 0                   | 7.78                | 0                 | 0                     | 0                     | 6.613                  |
| STU1194   | 193.95            | 202.49         | 0.71            | 202.49        | 7:20 AM               | 20.63                   | 3.38              | -0.008         | 1.74                 | 5.541               | 0                   | 0.01              | 0.36                  | 0                     | 38.373                 |
| STU0965   | 256.31            | 262.57         | 0.13            | 256.74        | 8:00 AM               | 1.28                    | 0.218             | 0              | 0                    | 0                   | 5.83                | 0                 | 0                     | 0                     | 2.734                  |
| STU102    | 216               | 223.89         | 0.12            | 216.32        | 8:00 AM               | 3.8                     | 0.627             | 0              | 0                    | 0                   | 7.57                | 0                 | 0                     | 0                     | 7.338                  |
| STU1030   | 220.8             | 229.41         | 0.42            | 222.03        | 8:16 AM               | 27.63                   | 5.77              | 0              | 0                    | 0                   | 7.38                | 0                 | 0                     | 0                     | 84.471                 |
| STU1050   | 215.72            | 223.64         | 0.42            | 217.29        | 8:03 AM               | 27.63                   | 5.77              | 0              | 0                    | 0                   | 6.35                | 0                 | 0                     | 0                     | 84.471                 |
| STU09125  | 248.36            | 254.25         | 0.34            | 249.79        | 8:00 AM               | 5.42                    | 0.996             | 0              | 0.66                 | 0.181               | 4.459               | 0                 | 0                     | 0                     | 16.281                 |
| STU1070   | 190.71            | 198.43         | 0.2             | 191.39        | 8:01 AM               | 3.99                    | 0.671             | -0.001         | 0                    | 0                   | 7.04                | 0                 | 0                     | 0                     | 6.613                  |
| STU1116   | 164.54            | 173            | 0.14            | 164.34        | 8:00 AM               | 4.4                     | 0.948             | 0              | 0                    | 0                   | 6.04                | 0                 | 0                     | 0                     | 17.896                 |
| STU1063   | 218.91            | 227.26         | 0.17            | 218.51        | 8:00 AM               | 3.99                    | 0.671             | 0              | 0                    | 0                   | 7.75                | 0                 | 0                     | 0                     | 6.613                  |
| STU1033   | 235               | 242.98         | 0.36            | 236.62        | 8:14 AM               | 15.31                   | 2.27              | -0.002         | 0                    | 0                   | 6.36                | 0                 | 0                     | 0                     | 71.722                 |
| STU1055   | 213.5             | 221.11         | 0.16            | 214.04        | 8:00 AM               | 1.81                    | 0.299             | 0              | 0                    | 0                   | 7.07                | 0                 | 0                     | 0                     | 3.52                   |
| STU1021   | 215.79            | 223.18         | 0.23            | 216.52        | 8:00 AM               | 3.67                    | 0.687             | 0.003          | 0                    | 0                   | 6.66                | 0                 | 0                     | 0                     | 32.571                 |
| STU09103  | 250.92            | 259.42         | 0.37            | 252.17        | 8:00 AM               | 11.9                    | 2.49              | 0              | 0                    | 0                   | 7.25                | 0                 | 0                     | 0                     | 36.104                 |
| STU092    | 233.85            | 240.58         | 0.33            | 239.53        | 7:10 AM               | 4.78                    | 0.791             | 0              | 1.47                 | 4.426               | 1.054               | 0                 | 0                     | 0                     | 9.778                  |
| STU1034   | 223.24            | 226.14         | 0.26            | 226.14        | 8:01 AM               | 9.15                    | 1.58              | 0.003          | 0.11                 | 1.651               | 0                   | 0.01              | 0.22                  | 0                     | 22.781                 |
| STU09111  | 247.51            | 252.83         | 0.27            | 248.41        | 8:00 AM               | 5.41                    | 0.996             | 0              | 0                    | 0                   | 4.42                | 0                 | 0                     | 0                     | 16.281                 |
| STU0983   | 232.3             | 238.26         | 0               | 232.3         | 12:00 AM              | 0                       | 0                 | 0              | 0                    | 0                   | 5.96                | 0                 | 0                     | 0                     | 0                      |
| STU0968   | 254.2             | 260.11         | 0.09            | 254.48        | 8:00 AM               | 1.28                    | 0.218             | 0              | 0                    | 0                   | 5.63                | 0                 | 0                     | 0                     | 2.734                  |
| STU09104  | 252.46            | 259.49         | 0.3             | 253.36        | 8:00 AM               | 11.91                   | 2.49              | 0              | 0                    | 0                   | 6.13                | 0                 | 0                     | 0                     | 36.104                 |
| STU1020   | 224.82            | 233.6          | 0.1             | 224.87        | 8:00 AM               | 4.4                     | 0.948             | 0              | 0                    | 0                   | 7.57                | 0                 | 0                     | 0                     | 82.303                 |
| STU0916   | 230.8             | 236.94         | 0.12            | 231.2         | 8:00 AM               | 1.57                    | 0.259             | 0              | 0                    | 0                   | 5.74                | 0                 | 0                     | 0                     | 2.929                  |
| STU1149   | 203.31            | 211.36         | 0.16            | 203.82        | 8:00 AM               | 2.04                    | 0.35              | 0.002          | 0                    | 0                   | 7.54                | 0                 | 0                     | 0                     | 3.874                  |
| J-SBT4-05 | 167.77            | 173            | 0.09            | 168           | 8:01 AM               | 4.3                     | 0.631             | -0.245         | 0                    | 0                   | 5                   | 0                 | 0                     | 0                     | 9.33                   |
| STU0957   | 255.36            | 261.56         | 0.09            | 255.66        | 8:00 AM               | 1.28                    | 0.218             | 0              | 0                    | 0                   | 5.9                 | 0                 | 0                     | 0                     | 2.734                  |
| STU09124  | 247.94            | 253.53         | 0.3             | 248.95        | 8:00 AM               | 5.42                    | 0.996             | 0              | 0                    | 0                   | 4.58                | 0                 | 0                     | 0                     | 16.281                 |
| STU0972   | 242.5             | 251.43         | 1.09            | 244.59        | 8:31 AM               | 8.58                    | 2.65              | 0.034          | 0                    | 0                   | 6.84                | 0                 | 0                     | 0                     | 45.102                 |
| STU1027   | 211               | 220.35         | 0.69            | 216.34        | 8:03 AM               | 29.86                   | 6.41              | -0.001         | 1.57                 | 2.838               | 4.012               | 0                 | 0                     | 0                     | 112.363                |
| STU0992   | 226.18            | 235.09         | 0.56            | 227.96        | 8:15 AM               | 26.73                   | 5.56              | 0              | 0                    | 0                   | 7.13                | 0                 | 0                     | 0                     | 82.303                 |
| STU1135   | 159.82            | 172.66         | 0.72            | 168.55        | 7:25 AM               | 20.32                   | 3.41              | 0.008          | 1.54                 | 6.705               | 4.105               | 0                 | 0                     | 0                     | 37.592                 |
| STM1146   | 197.83            | 206            | 0.14            | 198.27        | 8:00 AM               | 10.34                   | 1.74              | -0.005         | 0                    | 0                   | 7.73                | 0                 | 0                     | 0                     | 19.153                 |
| STU0970   | 249.55            | 255.38         | 0.1             | 249.87        | 8:00 AM               | 1.28                    | 0.218             | 0              | 0                    | 0                   | 6.11                | 0                 | 0                     | 0                     | 2.734                  |
| STU1080   | 207.16            | 213.16         | 0.6             | 209.15        | 8:00 AM               | 55.13                   | 11.1              | 0              | 0                    | 0                   | 4.01                | 0                 | 0                     | 0                     | 167.806                |
| STU1062   | 220               | 228.39         | 0.21            | 220.77        | 8:00 AM               | 3.99                    | 0.671             | 0              | 0                    | 0                   | 7.62                | 0                 | 0                     | 0                     | 6.613                  |
| STU0966   | 255.84            | 261.68         | 0.14            | 256.32        | 8:00 AM               | 1.28                    | 0.218             | 0              | 0                    | 0                   | 5.36                | 0                 | 0                     | 0                     | 2.734                  |
| STU0977   | 240.65            | 247.71         | 0.31            | 241.4         | 8:03 AM               | 10.39                   | 3.02              | 0              | 0                    | 0                   | 6.31                | 0                 | 0                     | 0                     | 49.659                 |
| STU10109  | 223               | 231.69         | 0.41            | 224.22        | 8:16 AM               | 26.73                   | 5.56              | 0              | 0                    | 0                   | 7.47                | 0                 | 0                     | 0                     | 82.303                 |
| STU0926   | 230.4             | 236.93         | 0.13            | 230.81        | 8:00 AM               | 1.57                    | 0.259             | 0              | 0                    | 0                   | 6.12                | 0                 | 0                     | 0                     | 2.929                  |
| STU0990   | 227.59            | 238.2          | 0.56            | 229.36        | 8:15 AM               | 26.73                   | 5.56              | 0              | 0                    | 0                   | 8.84                | 0                 | 0                     | 0                     | 82.303                 |
| STU1056   |                   |                |                 |               |                       |                         |                   |                |                      |                     |                     |                   |                       |                       |                        |



[illegible]

Junction CIP Model

| Name     | Invert Elev. (ft) | Rim Elev. (ft) | Avg Depth (ft) | Max. HGL (ft) | Time Max. HGL (M/D/Y) | Max. Total Inflow (cfs) | Total Inflow (MG) | Flow Error (%) | Hours Surcharged (h) | Max. Surge (ft) | Min. Freeboard (ft) | Hours Flooded (h) | Max. Flood Rate (cfs) | Total Flood Vol. (MG) | Contributing Area (ac) |
|----------|-------------------|----------------|----------------|---------------|-----------------------|-------------------------|-------------------|----------------|----------------------|-----------------|---------------------|-------------------|-----------------------|-----------------------|------------------------|
| STMA1222 | 259.18            | 269.43         | 0.07           | 259.39        | 8:00 AM               | 1.08                    | 0.182             | 0              | 0                    | 0               | 10.34               | 0                 | 0                     | 0                     | 2.632                  |
| STMA1225 | 187.19            | 187.05         | 0.15           | 187.7         | 8:00 AM               | 1.6                     | 0.266             | 0              | 0                    | 0               | 4.35                | 0                 | 0                     | 0                     | 2.887                  |
| STMA1235 | 189.66            | 196.45         | 0.13           | 190.1         | 8:00 AM               | 1.35                    | 0.223             | 0              | 0                    | 0               | 6.35                | 0                 | 0                     | 0                     | 2.784                  |
| STMA1239 | 168.4             | 177.56         | 0.38           | 169.36        | 8:00 AM               | 3.8                     | 0.631             | 0              | 0                    | 0               | 7.9                 | 0                 | 0                     | 0                     | 9.33                   |
| STMA1112 | 210               | 218.58         | 0.11           | 210.36        | 8:00 AM               | 4.05                    | 0.669             | 0              | 0                    | 0               | 8.22                | 0                 | 0                     | 0                     | 8.208                  |
| STMA1211 | 188.97            | 197.21         | 0.12           | 189.39        | 8:00 AM               | 4.05                    | 0.669             | 0              | 0                    | 0               | 7.95                | 0                 | 0                     | 0                     | 6.627                  |
| STMA1216 | 162.3             | 175.82         | 0.18           | 162.07        | 8:00 AM               | 3.58                    | 0.511             | 0              | 0                    | 0               | 7.95                | 0                 | 0                     | 0                     | 6.627                  |
| STMA1114 | 162.3             | 175.82         | 0.18           | 162.07        | 8:00 AM               | 3.58                    | 0.511             | 0              | 0                    | 0               | 7.95                | 0                 | 0                     | 0                     | 6.627                  |
| STMA1212 | 163.17            | 171.35         | 0.26           | 164.05        | 8:00 AM               | 8.88                    | 1.47              | 0              | 0                    | 0               | 7.95                | 0                 | 0                     | 0                     | 18.275                 |
| STMA1234 | 166.39            | 173.8          | 0.23           | 167.31        | 8:00 AM               | 12.38                   | 2.08              | 0              | 0                    | 0               | 6.49                | 0                 | 0                     | 0                     | 26.021                 |
| STMA1235 | 156.63            | 167.17         | 0.23           | 157.41        | 8:00 AM               | 3.58                    | 0.621             | 0              | 0                    | 0               | 9.76                | 0                 | 0                     | 0                     | 8.862                  |
| STMA1138 | 171.55            | 178.22         | 0.27           | 172.46        | 8:00 AM               | 12.39                   | 2.08              | 0              | 0                    | 0               | 5.76                | 0                 | 0                     | 0                     | 26.021                 |
| STMA1116 | 165.41            | 174.14         | 0.17           | 165.97        | 8:00 AM               | 3.38                    | 0.568             | 0              | 0                    | 0               | 8.17                | 0                 | 0                     | 0                     | 7.796                  |
| STMA1228 | 166.09            | 170.32         | 0.14           | 166.55        | 8:00 AM               | 4.41                    | 0.734             | 0              | 0                    | 0               | 3.77                | 0                 | 0                     | 0                     | 9.61                   |
| STMA1111 | 190.91            | 200.03         | 0.12           | 191.29        | 8:00 AM               | 3.8                     | 0.631             | 0              | 0                    | 0               | 8.74                | 0                 | 0                     | 0                     | 9.33                   |
| STMA1141 | 184               | 198.14         | 0.14           | 184.43        | 8:00 AM               | 3.43                    | 0.601             | 0              | 0                    | 0               | 13.71               | 0                 | 0                     | 0                     | 7.795                  |
| STMA1120 | 184.6             | 195.95         | 0.24           | 185.34        | 8:00 AM               | 3.81                    | 0.768             | 0              | 0                    | 0               | 7.61                | 0                 | 0                     | 0                     | 11.185                 |
| STMA1128 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1129 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1129 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1216 | 204.42            | 218.41         | 0.11           | 204.73        | 8:00 AM               | 2.8                     | 0.481             | 0              | 0                    | 0               | 12.88               | 0                 | 0                     | 0                     | 10.485                 |
| STMA1239 | 164.8             | 173.07         | 0.19           | 165.41        | 8:00 AM               | 12.38                   | 2.08              | 0              | 0                    | 0               | 7.66                | 0                 | 0                     | 0                     | 26.021                 |
| STMA1235 | 156.63            | 167.17         | 0.23           | 157.41        | 8:00 AM               | 3.58                    | 0.621             | 0              | 0                    | 0               | 9.76                | 0                 | 0                     | 0                     | 8.862                  |
| STMA1138 | 171.55            | 178.22         | 0.27           | 172.46        | 8:00 AM               | 12.39                   | 2.08              | 0              | 0                    | 0               | 5.76                | 0                 | 0                     | 0                     | 26.021                 |
| STMA1116 | 165.41            | 174.14         | 0.17           | 165.97        | 8:00 AM               | 3.38                    | 0.568             | 0              | 0                    | 0               | 8.17                | 0                 | 0                     | 0                     | 7.796                  |
| STMA1228 | 166.09            | 170.32         | 0.14           | 166.55        | 8:00 AM               | 4.41                    | 0.734             | 0              | 0                    | 0               | 3.77                | 0                 | 0                     | 0                     | 9.61                   |
| STMA1111 | 190.91            | 200.03         | 0.12           | 191.29        | 8:00 AM               | 3.8                     | 0.631             | 0              | 0                    | 0               | 8.74                | 0                 | 0                     | 0                     | 9.33                   |
| STMA1141 | 184               | 198.14         | 0.14           | 184.43        | 8:00 AM               | 3.43                    | 0.601             | 0              | 0                    | 0               | 13.71               | 0                 | 0                     | 0                     | 7.795                  |
| STMA1120 | 184.6             | 195.95         | 0.24           | 185.34        | 8:00 AM               | 3.81                    | 0.768             | 0              | 0                    | 0               | 7.61                | 0                 | 0                     | 0                     | 11.185                 |
| STMA1128 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1129 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1129 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1216 | 204.42            | 218.41         | 0.11           | 204.73        | 8:00 AM               | 2.8                     | 0.481             | 0              | 0                    | 0               | 12.88               | 0                 | 0                     | 0                     | 10.485                 |
| STMA1239 | 164.8             | 173.07         | 0.19           | 165.41        | 8:00 AM               | 12.38                   | 2.08              | 0              | 0                    | 0               | 7.66                | 0                 | 0                     | 0                     | 26.021                 |
| STMA1235 | 156.63            | 167.17         | 0.23           | 157.41        | 8:00 AM               | 3.58                    | 0.621             | 0              | 0                    | 0               | 9.76                | 0                 | 0                     | 0                     | 8.862                  |
| STMA1138 | 171.55            | 178.22         | 0.27           | 172.46        | 8:00 AM               | 12.39                   | 2.08              | 0              | 0                    | 0               | 5.76                | 0                 | 0                     | 0                     | 26.021                 |
| STMA1116 | 165.41            | 174.14         | 0.17           | 165.97        | 8:00 AM               | 3.38                    | 0.568             | 0              | 0                    | 0               | 8.17                | 0                 | 0                     | 0                     | 7.796                  |
| STMA1228 | 166.09            | 170.32         | 0.14           | 166.55        | 8:00 AM               | 4.41                    | 0.734             | 0              | 0                    | 0               | 3.77                | 0                 | 0                     | 0                     | 9.61                   |
| STMA1111 | 190.91            | 200.03         | 0.12           | 191.29        | 8:00 AM               | 3.8                     | 0.631             | 0              | 0                    | 0               | 8.74                | 0                 | 0                     | 0                     | 9.33                   |
| STMA1141 | 184               | 198.14         | 0.14           | 184.43        | 8:00 AM               | 3.43                    | 0.601             | 0              | 0                    | 0               | 13.71               | 0                 | 0                     | 0                     | 7.795                  |
| STMA1120 | 184.6             | 195.95         | 0.24           | 185.34        | 8:00 AM               | 3.81                    | 0.768             | 0              | 0                    | 0               | 7.61                | 0                 | 0                     | 0                     | 11.185                 |
| STMA1128 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1129 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1129 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1216 | 204.42            | 218.41         | 0.11           | 204.73        | 8:00 AM               | 2.8                     | 0.481             | 0              | 0                    | 0               | 12.88               | 0                 | 0                     | 0                     | 10.485                 |
| STMA1239 | 164.8             | 173.07         | 0.19           | 165.41        | 8:00 AM               | 12.38                   | 2.08              | 0              | 0                    | 0               | 7.66                | 0                 | 0                     | 0                     | 26.021                 |
| STMA1235 | 156.63            | 167.17         | 0.23           | 157.41        | 8:00 AM               | 3.58                    | 0.621             | 0              | 0                    | 0               | 9.76                | 0                 | 0                     | 0                     | 8.862                  |
| STMA1138 | 171.55            | 178.22         | 0.27           | 172.46        | 8:00 AM               | 12.39                   | 2.08              | 0              | 0                    | 0               | 5.76                | 0                 | 0                     | 0                     | 26.021                 |
| STMA1116 | 165.41            | 174.14         | 0.17           | 165.97        | 8:00 AM               | 3.38                    | 0.568             | 0              | 0                    | 0               | 8.17                | 0                 | 0                     | 0                     | 7.796                  |
| STMA1228 | 166.09            | 170.32         | 0.14           | 166.55        | 8:00 AM               | 4.41                    | 0.734             | 0              | 0                    | 0               | 3.77                | 0                 | 0                     | 0                     | 9.61                   |
| STMA1111 | 190.91            | 200.03         | 0.12           | 191.29        | 8:00 AM               | 3.8                     | 0.631             | 0              | 0                    | 0               | 8.74                | 0                 | 0                     | 0                     | 9.33                   |
| STMA1141 | 184               | 198.14         | 0.14           | 184.43        | 8:00 AM               | 3.43                    | 0.601             | 0              | 0                    | 0               | 13.71               | 0                 | 0                     | 0                     | 7.795                  |
| STMA1120 | 184.6             | 195.95         | 0.24           | 185.34        | 8:00 AM               | 3.81                    | 0.768             | 0              | 0                    | 0               | 7.61                | 0                 | 0                     | 0                     | 11.185                 |
| STMA1128 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1129 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1129 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1216 | 204.42            | 218.41         | 0.11           | 204.73        | 8:00 AM               | 2.8                     | 0.481             | 0              | 0                    | 0               | 12.88               | 0                 | 0                     | 0                     | 10.485                 |
| STMA1239 | 164.8             | 173.07         | 0.19           | 165.41        | 8:00 AM               | 12.38                   | 2.08              | 0              | 0                    | 0               | 7.66                | 0                 | 0                     | 0                     | 26.021                 |
| STMA1235 | 156.63            | 167.17         | 0.23           | 157.41        | 8:00 AM               | 3.58                    | 0.621             | 0              | 0                    | 0               | 9.76                | 0                 | 0                     | 0                     | 8.862                  |
| STMA1138 | 171.55            | 178.22         | 0.27           | 172.46        | 8:00 AM               | 12.39                   | 2.08              | 0              | 0                    | 0               | 5.76                | 0                 | 0                     | 0                     | 26.021                 |
| STMA1116 | 165.41            | 174.14         | 0.17           | 165.97        | 8:00 AM               | 3.38                    | 0.568             | 0              | 0                    | 0               | 8.17                | 0                 | 0                     | 0                     | 7.796                  |
| STMA1228 | 166.09            | 170.32         | 0.14           | 166.55        | 8:00 AM               | 4.41                    | 0.734             | 0              | 0                    | 0               | 3.77                | 0                 | 0                     | 0                     | 9.61                   |
| STMA1111 | 190.91            | 200.03         | 0.12           | 191.29        | 8:00 AM               | 3.8                     | 0.631             | 0              | 0                    | 0               | 8.74                | 0                 | 0                     | 0                     | 9.33                   |
| STMA1141 | 184               | 198.14         | 0.14           | 184.43        | 8:00 AM               | 3.43                    | 0.601             | 0              | 0                    | 0               | 13.71               | 0                 | 0                     | 0                     | 7.795                  |
| STMA1120 | 184.6             | 195.95         | 0.24           | 185.34        | 8:00 AM               | 3.81                    | 0.768             | 0              | 0                    | 0               | 7.61                | 0                 | 0                     | 0                     | 11.185                 |
| STMA1128 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1129 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1129 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1216 | 204.42            | 218.41         | 0.11           | 204.73        | 8:00 AM               | 2.8                     | 0.481             | 0              | 0                    | 0               | 12.88               | 0                 | 0                     | 0                     | 10.485                 |
| STMA1239 | 164.8             | 173.07         | 0.19           | 165.41        | 8:00 AM               | 12.38                   | 2.08              | 0              | 0                    | 0               | 7.66                | 0                 | 0                     | 0                     | 26.021                 |
| STMA1235 | 156.63            | 167.17         | 0.23           | 157.41        | 8:00 AM               | 3.58                    | 0.621             | 0              | 0                    | 0               | 9.76                | 0                 | 0                     | 0                     | 8.862                  |
| STMA1138 | 171.55            | 178.22         | 0.27           | 172.46        | 8:00 AM               | 12.39                   | 2.08              | 0              | 0                    | 0               | 5.76                | 0                 | 0                     | 0                     | 26.021                 |
| STMA1116 | 165.41            | 174.14         | 0.17           | 165.97        | 8:00 AM               | 3.38                    | 0.568             | 0              | 0                    | 0               | 8.17                | 0                 | 0                     | 0                     | 7.796                  |
| STMA1228 | 166.09            | 170.32         | 0.14           | 166.55        | 8:00 AM               | 4.41                    | 0.734             | 0              | 0                    | 0               | 3.77                | 0                 | 0                     | 0                     | 9.61                   |
| STMA1111 | 190.91            | 200.03         | 0.12           | 191.29        | 8:00 AM               | 3.8                     | 0.631             | 0              | 0                    | 0               | 8.74                | 0                 | 0                     | 0                     | 9.33                   |
| STMA1141 | 184               | 198.14         | 0.14           | 184.43        | 8:00 AM               | 3.43                    | 0.601             | 0              | 0                    | 0               | 13.71               | 0                 | 0                     | 0                     | 7.795                  |
| STMA1120 | 184.6             | 195.95         | 0.24           | 185.34        | 8:00 AM               | 3.81                    | 0.768             | 0              | 0                    | 0               | 7.61                | 0                 | 0                     | 0                     | 11.185                 |
| STMA1128 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1129 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1129 | 194.85            | 205.55         | 0.14           | 195.19        | 8:00 AM               | 16.78                   | 3.15              | 0.001          | 0                    | 0               | 6.36                | 0                 | 0                     | 0                     | 35.526                 |
| STMA1216 | 204.42            | 218.41         | 0.11           | 204.73        | 8:00 AM               | 2.8                     | 0.481             | 0              | 0                    | 0               | 12.88               | 0                 | 0                     | 0                     | 10.485                 |
| STMA1239 | 164.8             | 173.07         | 0.19           | 165.41        | 8:00 AM               | 12.38                   | 2.08              | 0              | 0                    | 0               | 7.66                | 0                 | 0                     | 0                     | 26.021                 |
| STMA1235 | 156.63            | 167.17         | 0.23           | 157.41        | 8:00 AM               | 3.58                    | 0.621             | 0              | 0                    | 0               | 9.76                | 0                 | 0                     | 0                     | 8.862                  |
| STMA1138 | 171.55            | 178.22         | 0.27           | 172.46        | 8:00 AM               | 12.39                   | 2.08              | 0              | 0                    | 0               | 5.76                | 0                 | 0                     | 0                     | 26.021                 |
| STMA1116 | 165.41            | 174.14         | 0.17           | 165.97        | 8:00 AM               | 3.38                    | 0.568             | 0              | 0                    | 0               | 8.17                | 0                 | 0                     | 0                     | 7.796                  |
| STMA1228 |                   |                |                |               |                       |                         |                   |                |                      |                 |                     |                   |                       |                       |                        |

[illegible]





| Junctions CIP Model |                   |                |                 |               |                       |                         |                   |                |                      |                       |                     |                   |                       |                       |                        |
|---------------------|-------------------|----------------|-----------------|---------------|-----------------------|-------------------------|-------------------|----------------|----------------------|-----------------------|---------------------|-------------------|-----------------------|-----------------------|------------------------|
| Name                | Invert Elev. (ft) | Rim Elev. (ft) | Avg. Depth (ft) | Max. HGL (ft) | Time Max. HGL (H/D/Y) | Max. Total Inflow (cfs) | Total Inflow (MG) | Flow Error (%) | Hours Surcharged (h) | Max. Surgecharge (ft) | Min. Freeboard (ft) | Hours Flooded (h) | Max. Flood Rate (cfs) | Total Flood Vol. (MG) | Contributing Area (ac) |
| E57                 | 171.91            | 176            | 0.26            | 172.65        | 8:01 AM               | 2.52                    | 0.468             | 0.001          | 0                    | 0                     | 3.35                | 0                 | 0                     | 0                     | 6.592                  |
| E58                 | 214.76            | 233            | 0.37            | 221.04        | 7:24 AM               | 5.95                    | 1.15              | 0.007          | 1.23                 | 5.035                 | 11.955              | 0                 | 0                     | 0                     | 14.483                 |
| E59                 | 215.89            | 223            | 0.23            | 216.73        | 8:00 AM               | 8.31                    | 1.39              | 0              | 0                    | 0                     | 6.27                | 0                 | 0                     | 0                     | 15.278                 |
| E60                 | 207.89            | 215            | 0.24            | 208.73        | 8:00 AM               | 8.31                    | 1.39              | 0              | 0                    | 0                     | 6.27                | 0                 | 0                     | 0                     | 15.278                 |
| E61                 | 197.41            | 204            | 0.08            | 197.66        | 8:00 AM               | 0.37                    | 0.062             | 0              | 0                    | 0                     | 6.34                | 0                 | 0                     | 0                     | 0.637                  |
| E62                 | 198.16            | 206            | 0.08            | 198.42        | 8:00 AM               | 0.37                    | 0.062             | 0              | 0                    | 0                     | 7.58                | 0                 | 0                     | 0                     | 0.637                  |
| E63                 | 197.53            | 206            | 0.18            | 198.14        | 8:00 AM               | 2.66                    | 0.45              | 0              | 0                    | 0                     | 7.86                | 0                 | 0                     | 0                     | 4.631                  |
| E64                 | 199.61            | 207            | 0.18            | 200.22        | 8:00 AM               | 2.66                    | 0.45              | 0              | 0                    | 0                     | 6.78                | 0                 | 0                     | 0                     | 4.631                  |
| E65                 | 201.87            | 210            | 0.18            | 202.48        | 8:00 AM               | 2.66                    | 0.45              | 0              | 0                    | 0                     | 7.52                | 0                 | 0                     | 0                     | 4.631                  |
| E66                 | 187.96            | 197            | 0.63            | 194.13        | 7:59 AM               | 4.43                    | 0.754             | 0.024          | 3.96                 | 5.171                 | 2.869               | 0                 | 0                     | 0                     | 7.766                  |
| E67                 | 210.4             | 219            | 0.13            | 210.82        | 8:00 AM               | 2.01                    | 0.333             | -0.001         | 0                    | 0                     | 8.18                | 0                 | 0                     | 0                     | 3.757                  |
| E68                 | 206.5             | 214            | 0.18            | 207.15        | 8:00 AM               | 2.01                    | 0.333             | 0.001          | 0                    | 0                     | 6.85                | 0                 | 0                     | 0                     | 3.757                  |
| E69                 | 203.79            | 211            | 0.38            | 208.08        | 7:59 AM               | 4.86                    | 0.815             | 0              | 1.55                 | 3.293                 | 2.317               | 0                 | 0                     | 0                     | 8.479                  |
| E70                 | 202.54            | 211            | 0.38            | 204.85        | 7:58 AM               | 4.86                    | 0.815             | 0              | 1.07                 | 0.987                 | 6.153               | 0                 | 0                     | 0                     | 8.479                  |
| E71                 | 202.28            | 211            | 0.33            | 204.13        | 7:59 AM               | 4.86                    | 0.815             | 0              | 1.06                 | 0.652                 | 6.871               | 0                 | 0                     | 0                     | 8.479                  |
| E72                 | 201.7             | 211            | 0.22            | 202.45        | 8:00 AM               | 4.86                    | 0.815             | 0              | 0                    | 0                     | 8.55                | 0                 | 0                     | 0                     | 8.479                  |
| E73                 | 201.19            | 211            | 0.24            | 201.96        | 8:00 AM               | 4.86                    | 0.815             | 0              | 0                    | 0                     | 9.04                | 0                 | 0                     | 0                     | 8.479                  |
| E74                 | 203.34            | 211            | 0.18            | 203.97        | 8:00 AM               | 1.86                    | 0.312             | 0              | 0                    | 0                     | 7.03                | 0                 | 0                     | 0                     | 3.234                  |
| E75                 | 202.4             | 210            | 0.18            | 203.04        | 8:00 AM               | 1.86                    | 0.312             | 0              | 0                    | 0                     | 6.96                | 0                 | 0                     | 0                     | 3.234                  |
| E76                 | 201.53            | 209            | 0.15            | 202.05        | 8:00 AM               | 1.86                    | 0.312             | 0              | 0                    | 0                     | 6.95                | 0                 | 0                     | 0                     | 3.234                  |
| E77                 | 199.11            | 206            | 0.13            | 199.56        | 8:00 AM               | 1.86                    | 0.312             | 0              | 0                    | 0                     | 6.44                | 0                 | 0                     | 0                     | 3.234                  |
| E78                 | 195.01            | 202            | 0.14            | 195.47        | 8:01 AM               | 1.86                    | 0.312             | 0              | 0                    | 0                     | 6.53                | 0                 | 0                     | 0                     | 3.234                  |
| E79                 | 190.75            | 198            | 0.14            | 191.2         | 8:01 AM               | 1.86                    | 0.312             | 0              | 0                    | 0                     | 6.8                 | 0                 | 0                     | 0                     | 3.234                  |
| E80                 | 186.37            | 194            | 0.13            | 186.82        | 8:02 AM               | 1.86                    | 0.312             | 0              | 0                    | 0                     | 7.18                | 0                 | 0                     | 0                     | 3.234                  |
| E81                 | 182.38            | 191            | 0.15            | 182.87        | 8:02 AM               | 1.86                    | 0.312             | 0              | 0                    | 0                     | 8.13                | 0                 | 0                     | 0                     | 3.234                  |
| E82                 | 178.71            | 186            | 0.13            | 179.12        | 8:02 AM               | 1.86                    | 0.312             | 0              | 0                    | 0                     | 6.88                | 0                 | 0                     | 0                     | 3.234                  |
| E83                 | 177.36            | 186            | 0.14            | 177.82        | 8:02 AM               | 1.86                    | 0.312             | 0              | 0                    | 0                     | 8.18                | 0                 | 0                     | 0                     | 3.234                  |
| E84                 | 176.34            | 184            | 0.14            | 176.79        | 8:03 AM               | 1.86                    | 0.312             | 0              | 0                    | 0                     | 7.21                | 0                 | 0                     | 0                     | 3.234                  |
| E85                 | 173.56            | 182            | 0.13            | 174.01        | 8:03 AM               | 1.86                    | 0.312             | 0              | 0                    | 0                     | 7.99                | 0                 | 0                     | 0                     | 3.234                  |
| E86                 | 172.16            | 181            | 0.13            | 172.61        | 8:03 AM               | 1.86                    | 0.312             | 0              | 0                    | 0                     | 8.39                | 0                 | 0                     | 0                     | 3.234                  |
| E87                 | 170.85            | 179            | 0.14            | 171.32        | 8:03 AM               | 1.86                    | 0.312             | 0              | 0                    | 0                     | 7.68                | 0                 | 0                     | 0                     | 3.234                  |
| E88                 | 169.16            | 178            | 0.14            | 169.65        | 8:03 AM               | 1.86                    | 0.312             | 0              | 0                    | 0                     | 8.35                | 0                 | 0                     | 0                     | 3.234                  |
| E89                 | 164.17            | 177            | 0.17            | 164.72        | 8:04 AM               | 1.86                    | 0.312             | 0              | 0                    | 0                     | 12.28               | 0                 | 0                     | 0                     | 3.234                  |
| E90                 | 169.03            | 177            | 0.09            | 169.33        | 7:15 AM               | 1.04                    | 0.176             | 0              | 0                    | 0                     | 7.67                | 0                 | 0                     | 0                     | 1.65                   |
| E91                 | 168.44            | 176            | 0.11            | 168.81        | 7:15 AM               | 1.04                    | 0.176             | 0              | 0                    | 0                     | 7.19                | 0                 | 0                     | 0                     | 1.65                   |
| E92                 | 168.11            | 176            | 0.1             | 168.44        | 7:15 AM               | 1.04                    | 0.176             | 0              | 0                    | 0                     | 7.56                | 0                 | 0                     | 0                     | 1.65                   |
| E93                 | 167.29            | 175            | 0.1             | 167.62        | 7:15 AM               | 1.04                    | 0.176             | 0              | 0                    | 0                     | 7.38                | 0                 | 0                     | 0                     | 1.65                   |
| E94                 | 166.56            | 174            | 0.1             | 166.89        | 7:15 AM               | 1.04                    | 0.176             | 0              | 0                    | 0                     | 7.11                | 0                 | 0                     | 0                     | 1.65                   |
| E95                 | 165.09            | 173            | 0.11            | 165.45        | 8:00 AM               | 1.04                    | 0.176             | 0              | 0                    | 0                     | 7.55                | 0                 | 0                     | 0                     | 1.65                   |
| E97                 | 162.7             | 170            | 0.11            | 163.05        | 8:00 AM               | 1.04                    | 0.176             | 0              | 0                    | 0                     | 6.95                | 0                 | 0                     | 0                     | 1.65                   |
| E98                 | 160.11            | 168            | 0.11            | 160.46        | 8:00 AM               | 1.04                    | 0.176             | 0              | 0                    | 0                     | 7.54                | 0                 | 0                     | 0                     | 1.65                   |
| E99                 | 158.69            | 166            | 0.09            | 158.97        | 8:00 AM               | 1.04                    | 0.176             | 0              | 0                    | 0                     | 7.03                | 0                 | 0                     | 0                     | 1.65                   |
| E100                | 158.27            | 167            | 0.17            | 158.84        | 8:00 AM               | 3.42                    | 0.571             | -0.001         | 0                    | 0                     | 8.16                | 0                 | 0                     | 0                     | 5.702                  |
| E101                | 169.38            | 169            | 0.08            | 169.62        | 7:59 AM               | 3.42                    | 0.571             | 0              | 0                    | 0                     | 1.01                | 0                 | 0                     | 0                     | 5.702                  |
| E102                | 161.96            | 171            | 7.43            | 170.24        | 7:12 AM               | 3.42                    | 0.573             | 0.154          | 47.13                | 6.84                  | 0.76                | 0                 | 0                     | 0                     | 5.702                  |
| E103                | 162.43            | 171            | 6.97            | 170.39        | 7:14 AM               | 2.28                    | 0.383             | 0.144          | 47.11                | 6.61                  | 0.71                | 0                 | 0                     | 0                     | 3.758                  |
| E104                | 167.14            | 175            | 2.39            | 170.77        | 7:56 AM               | 2.28                    | 0.384             | 0.164          | 47.04                | 2.53                  | 4.23                | 0                 | 0                     | 0                     | 3.758                  |
| E105                | 167.91            | 177            | 1.66            | 171.09        | 7:58 AM               | 2.28                    | 0.384             | 0.086          | 0.99                 | 0.336                 | 5.914               | 0                 | 0                     | 0                     | 3.758                  |
| E106                | 170.42            | 174            | 0.07            | 170.63        | 8:00 AM               | 1.13                    | 0.19              | -0.001         | 0                    | 0                     | 3.37                | 0                 | 0                     | 0                     | 1.943                  |
| E107                | 171.07            | 178            | 0.17            | 171.63        | 8:00 AM               | 1.14                    | 0.19              | 0              | 0                    | 0                     | 6.37                | 0                 | 0                     | 0                     | 1.943                  |
| E108                | 171.19            | 178            | 0.14            | 171.66        | 8:00 AM               | 2.28                    | 0.384             | 0              | 0                    | 0                     | 6.34                | 0                 | 0                     | 0                     | 3.758                  |
| E109                | 181.19            | 188            | 0.06            | 181.4         | 8:00 AM               | 0.33                    | 0.055             | 0              | 0                    | 0                     | 6.6                 | 0                 | 0                     | 0                     | 0.565                  |
| E110                | 179.82            | 187            | 0.07            | 180.05        | 8:00 AM               | 0.33                    | 0.055             | 0              | 0                    | 0                     | 6.95                | 0                 | 0                     | 0                     | 0.565                  |
| E111                | 178.89            | 185            | 0.06            | 179.08        | 8:00 AM               | 0.33                    | 0.055             | 0              | 0                    | 0                     | 5.92                | 0                 | 0                     | 0                     | 0.565                  |
| E112                | 177.36            | 184            | 0.06            | 177.55        | 8:00 AM               | 0.33                    | 0.055             | 0              | 0                    | 0                     | 6.45                | 0                 | 0                     | 0                     | 0.565                  |
| E113                | 179.44            | 186            | 0.07            | 179.68        | 8:00 AM               | 0.33                    | 0.055             | 0.001          | 0                    | 0                     | 6.32                | 0                 | 0                     | 0                     | 0.565                  |
| E114                | 187.02            | 197            | 0.64            | 192.84        | 8:38 AM               | 4.44                    | 0.754             | 0.018          | 4.23                 | 4.723                 | 4.157               | 0                 | 0                     | 0                     | 7.766                  |
| E115                | 191.5             | 198            | 0.36            | 193.08        | 8:00 AM               | 6.67                    | 1.12              | 0              | 0.23                 | 0.08                  | 4.92                | 0                 | 0                     | 0                     | 7.766                  |
| J10                 | 187.25            | 196            | 0.64            | 193.04        | 8:32 AM               | 4.43                    | 0.754             | -0.016         | 4.14                 | 4.69                  | 2.96                | 0                 | 0                     | 0                     | 11.179                 |
| J11                 | 130.415           | 137.415        | 0.1             | 130.7         | 8:04 AM               | 10.44                   | 2.26              | 0.004          | 0                    | 0                     | 38.422              | 0                 | 0                     | 0                     | 0                      |
| J13                 | 110.449           | 150.798        | 1.65            | 113.53        | 9:08 AM               | 479.49                  | 127               | 0.014          | 0                    | 0                     | 39.29               | 0                 | 0                     | 0                     | 1851.169               |
| dmf131004           | 135.96            | 150            | 0.57            | 137.61        | 8:00 AM               | 38.37                   | 6.19              | -0.001         | 0                    | 0                     | 23.373              | 0                 | 0                     | 0                     | 68.688                 |
| J12                 | 175.5             | 180            | 0.44            | 176.63        | 8:01 AM               | 27.38                   | 4.86              | -0.004         | 0                    | 0                     | 3.37                | 0                 | 0                     | 0                     | 59.196                 |
| J14                 | 182               | 189            | 0.17            | 182.55        | 8:04 AM               | 4.44                    | 0.761             | 0.004          | 0                    | 0                     | 6.45                | 0                 | 0                     | 0                     | 8.409                  |
| J15                 | 188               | 193            | 0.16            | 193           | 7:36 AM               | 2                       | 0.334             | 0.006          | 0.63                 | 4                     | 0                   | 0.01              | 0.16                  | 0                     | 3.67                   |
| J16                 | 193               | 196            | 0.12            | 193.41        | 8:00 AM               | 2                       | 0.334             | 0              | 0                    | 0                     | 2.59                | 0                 | 0                     | 0                     | 3.67                   |
| J17                 | 196               | 199            | 0.09            | 196.29        | 8:00 AM               | 1.27                    | 0.212             | 0.008          | 0                    | 0                     | 2.71                | 0                 | 0                     | 0                     | 2.349                  |
| J18                 | 185               | 195            | 0.38            | 189.95        | 8:01 AM               | 3.27                    | 0.546             | -0.004         | 0                    | 0                     | 5.05                | 0                 | 0                     | 0                     | 6.019                  |
| J19                 | 195               | 198            | 0.09            | 195.3         | 8:00 AM               | 1.3                     | 0.216             | 0              | 0                    | 0                     | 2.7                 | 0                 | 0                     | 0                     | 2.39                   |
| J20                 | 184.5             | 193            | 0.36            | 188.54        | 8:02 AM               | 4.49                    | 0.761             | 0.004          | 0                    | 0                     | 4.46                | 0                 | 0                     | 0                     | 8.409                  |
| J21                 | 183.5             | 191            | 0.29            | 185.75        | 8:03 AM               | 4.46                    | 0.761             | 0              | 0                    | 0                     | 5.25                | 0                 | 0                     | 0                     | 8.409                  |
| J22                 | 193               | 196            | 0               | 193           | 12:00 AM              | 0                       | 0                 | 0              | 0                    | 0                     | 3                   | 0                 | 0                     | 0                     | 0                      |
| J23                 | 188               | 191            | 0               | 188           | 12:00 AM              | 0                       | 0                 | 0              | 0                    | 0                     | 3                   | 0                 | 0                     | 0                     | 0                      |
| J24                 | 150.012           | 159.355        | 0.3             | 151.24        | 7:50 AM               | 21.1                    | 3.13              | 0              | 0                    | 0                     | 8.115               | 0                 | 0                     | 0                     | 40.65                  |
| J25                 | 184.739           | 188.66         | 0.87            | 187.86        | 7:43 AM               | 39.21                   | 7.27              | -0.001         | 0.71                 | 0.376                 | 0.795               | 0                 | 0                     | 0                     | 94.822                 |
| J26                 | 183.299           | 186.073        | 0.8             | 185.4         | 8:03 AM               | 54.97                   | 9.72              | 0.001          | 0                    | 0                     | 0.92                | 0                 | 0                     | 0                     | 124.022                |
| J27                 | 191.194           | 201.001        | 0.55            | 193.14        | 8:03 AM               | 31.18                   | 5.37              | 0.001          | 0                    | 0                     | 7.861               | 0                 | 0                     | 0                     | 73.271                 |
| J28                 | 158               | 166.975        | 0.55            | 160.89        | 7:40 AM               | 41.61                   | 6.75              | 0              | 0.41                 | 0.39                  | 6.085               | 0                 | 0                     | 0                     | 73.471                 |
| J29                 | 164               | 174            | 0.28            | 164.26        | 8:00 AM               | 10.04                   | 1.59              | -0.002         | 0                    | 0                     | 9.04                | 0                 | 0                     | 0                     | 27.52                  |
| J31                 | 160               | 170.846        | 0.5             | 167.45        | 7:17 AM               | 21.85                   | 3.46              | 0.001          | 0.92                 | 5.447                 | 3.399               | 0                 | 0                     | 0                     | 37.118                 |
| J32                 | 157               | 170            | 0.37            | 158.25        | 8:00 AM               | 50.42                   | 8.21              | 0              | 0                    | 0                     | 11.75               | 0                 | 0                     | 0                     | 90.344                 |



Conduits CIP Model

| Name     | Inlet Node | Outlet Node | Length (ft) | Roughness | Inlet Elev. (ft) | Outlet Elev. (ft) | Cross-Section | Geom1 (ft) | Barrels | Transect | Slope (ft/ft) | Max. Flow (cfs) | Time Max. Flow (M/D/Y) | Max. Velocity (ft/s) | Max/Full Flow | Max/Full Depth | Capacity Limited (h) | Contributing Area (ac) |
|----------|------------|-------------|-------------|-----------|------------------|-------------------|---------------|------------|---------|----------|---------------|-----------------|------------------------|----------------------|---------------|----------------|----------------------|------------------------|
| STGM1975 | STMF0929   | STMF097     | 35.04       | 0.012     | 192.41           | 190.32            | CIRCULAR      | 1          | 1       |          | 0.05975       | 1.57            | 1/1/2013 8:00          | 4.28                 | 0.17          | 0.48           | 0                    | 3.215                  |
| STGM1992 | STMG1027   | STMG1029    | 247.32      | 0.012     | 195              | 190.5             | CIRCULAR      | 2.75       | 1       |          | 0.0182        | 8.52            | 1/1/2013 8:00          | 7.55                 | 0.12          | 0.25           | 0                    | 21.622                 |
| STGM1148 | STMG0718   | STMG0715    | 112.61      | 0.012     | 256.68           | 254.03            | CIRCULAR      | 1          | 1       |          | 0.02354       | 4.27            | 1/1/2013 8:00          | 9.02                 | 0.72          | 0.58           | 0                    | 8.578                  |
| STGM987  | J3514      | J3516       | 46.07       | 0.013     | 224.8            | 224.36            | CIRCULAR      | 1.5        | 1       |          | 0.00955       | 7.5             | 1/1/2013 8:14          | 9.42                 | 0.73          | 0.91           | 0.01                 | 22.85                  |
| STGM1372 | STMG0860   | STMG0859    | 218.3       | 0.012     | 250.4            | 245.36            | CIRCULAR      | 1.25       | 1       |          | 0.02309       | 8.17            | 1/1/2013 8:00          | 7.68                 | 0.77          | 0.83           | 0.01                 | 20.414                 |
| STGM2210 | J3530      | STMG1036    | 313.92      | 0.012     | 217              | 201               | CIRCULAR      | 1.5        | 1       |          | 0.05103       | 8.31            | 1/1/2013 8:01          | 9.97                 | 0.32          | 0.48           | 0                    | 21.194                 |
| STGM1828 | STMG0714   | STMG0713    | 260.82      | 0.012     | 295.85           | 280.5             | CIRCULAR      | 1          | 1       |          | 0.05896       | 3.7             | 1/1/2013 8:00          | 12.62                | 0.39          | 0.4            | 0                    | 6.891                  |
| STGM3553 | STMG0863   | STMG0824    | 88.38       | 0.013     | 223.96           | 223.21            | CIRCULAR      | 3          | 1       |          | 0.00849       | 49.63           | 1/1/2013 7:58          | 9.09                 | 0.81          | 1              | 0.01                 | 104.497                |
| STGM3732 | STMF0917   | STMF0922    | 113.88      | 0.012     | 189.31           | 188.07            | CIRCULAR      | 1.5        | 1       |          | 0.01089       | 10.53           | 1/1/2013 8:00          | 6.69                 | 0.89          | 1              | 0.01                 | 20.618                 |
| STGM3929 | STMG0837   | STMF085     | 132.48      | 0.013     | 208              | 207.36            | CIRCULAR      | 2.75       | 1       |          | 0.00483       | 22.53           | 1/1/2013 8:00          | 7.93                 | 0.61          | 0.48           | 0                    | 44.495                 |
| STGM2013 | STMG0852   | STMG0830    | 242.28      | 0.012     | 234.17           | 231.75            | CIRCULAR      | 2.25       | 1       |          | 0.00999       | 28.47           | 1/1/2013 8:01          | 8.12                 | 0.85          | 0.95           | 0.01                 | 61.522                 |
| STGM2999 | STMG144    | STMG141     | 261.49      | 0.013     | 157.5            | 154.32            | CIRCULAR      | 1          | 1       |          | 0.01216       | 4.2             | 1/1/2013 7:59          | 6.27                 | 1.07          | 0.84           | 0.01                 | 7.824                  |
| STGM938  | J4572      | J-CT1-07    | 509.71      | 0.04      | 150              | 130               | IRREGULAR     | 0          | 1       | STGM938  | 0.03927       | 12.48           | 1/1/2013 8:00          | 3.5                  | 0.13          | 0.38           | 0                    | 57.007                 |
| STGM3167 | STMG1411   | STMG1410    | 226.8       | 0.013     | 155.62           | 137.22            | CIRCULAR      | 1          | 1       |          | 0.0814        | 4.62            | 1/1/2013 8:00          | 14.72                | 0.45          | 0.42           | 0                    | 8.832                  |
| STGM2311 | STMG0851   | STMG0852    | 262.28      | 0.012     | 238.1            | 234.17            | CIRCULAR      | 2          | 1       |          | 0.01499       | 20.62           | 1/1/2013 8:00          | 8.56                 | 0.69          | 0.8            | 0.01                 | 41.108                 |
| STGM575  | STMG087    | STMF081     | 115.51      | 0.013     | 213.97           | 212.38            | CIRCULAR      | 1          | 1       |          | 0.01377       | 3.17            | 1/1/2013 8:00          | 5.83                 | 0.76          | 0.68           | 0                    | 6.277                  |
| STGM4047 | STMG0815   | STMG0817    | 310.8       | 0.013     | 231.5            | 226.04            | CIRCULAR      | 1.25       | 1       |          | 0.01757       | 6.77            | 1/1/2013 8:00          | 6.08                 | 0.79          | 0.85           | 0.01                 | 14.311                 |
| STGM3439 | STMF101    | STMF1014    | 92.59       | 0.013     | 154.8            | 152.3             | CIRCULAR      | 1.5        | 1       |          | 0.02701       | 16.09           | 1/1/2013 8:01          | 11.3                 | 0.93          | 0.75           | 0                    | 34.835                 |
| STGM1532 | J3664      | J3666       | 375.26      | 0.04      | 200.3            | 200               | IRREGULAR     | 0          | 1       | STGM1532 | 0.0008        | 69.92           | 1/1/2013 7:47          | 2.18                 | 0.4           | 0.56           | 0                    | 157.684                |
| STGM800  | STMF092    | STMF092     | 33.63       | 0.013     | 199.28           | 198               | CIRCULAR      | 3          | 1       |          | 0.03809       | 71.93           | 1/1/2013 8:16          | 15.83                | 0.55          | 0.98           | 0.01                 | 160.683                |
| STGM2761 | STMF1262   | OF J3682    | 295.71      | 0.013     | 149              | 93                | CIRCULAR      | 1          | 1       |          | 0.19286       | 12.1            | 1/1/2013 8:00          | 21.89                | 0.77          | 0.66           | 0                    | 22.469                 |
| STGM4201 | STMG0824   | STMG0825    | 24.087      | 0.013     | 223.21           | 222.92            | CIRCULAR      | 3          | 1       |          | 0.01204       | 49.64           | 1/1/2013 7:58          | 8.69                 | 0.68          | 1              | 0.01                 | 104.497                |
| STGM1212 | J3692      | J3694       | 59.55       | 0.013     | 185              | 184.5             | CIRCULAR      | 1.5        | 1       |          | 0.0084        | 13.58           | 1/1/2013 8:00          | 7.68                 | 1.41          | 1              | 1.34                 | 28.509                 |
| STGM1741 | STMF0824   | STMF0825    | 108.34      | 0.012     | 199.23           | 198               | CIRCULAR      | 1.5        | 1       |          | 0.01135       | 7.46            | 1/1/2013 8:00          | 7.42                 | 0.62          | 0.55           | 0                    | 14.673                 |
| STGM1093 | STMG1310   | STMG1312    | 262.42      | 0.013     | 164.5            | 163.1             | CIRCULAR      | 1.25       | 1       |          | 0.00534       | 8.32            | 1/1/2013 8:00          | 6.78                 | 1.76          | 1              | 0.45                 | 15.373                 |
| STGM753  | STMG1414   | STMG1412    | 20.93       | 0.013     | 161              | 158.8             | CIRCULAR      | 1.5        | 1       |          | 0.1057        | 5.34            | 1/1/2013 8:00          | 9.17                 | 0.16          | 0.36           | 0                    | 10.109                 |
| STGM3444 | STMG145    | STMG146     | 267.282     | 0.013     | 159.65           | 157               | CIRCULAR      | 1.25       | 1       |          | 0.00992       | 4.7             | 1/1/2013 8:00          | 7.24                 | 0.73          | 0.52           | 0                    | 9.415                  |
| STGM4119 | STMG0739   | STMG0738    | 113.48      | 0.012     | 245.3            | 245.09            | CIRCULAR      | 1.5        | 1       |          | 0.00185       | 7.34            | 1/1/2013 8:00          | 5.69                 | 1.5           | 0.69           | 0.01                 | 14.879                 |
| STGM2495 | J3728      | J3730       | 25.52       | 0.013     | 195.5            | 194.8             | CIRCULAR      | 2          | 1       |          | 0.02744       | 46.43           | 1/1/2013 8:02          | 15.1                 | 1.24          | 0.95           | 0.01                 | 92.626                 |
| STGM1534 | STMF078    | STMG0718    | 121.38      | 0.012     | 258.86           | 256.68            | CIRCULAR      | 1          | 1       |          | 0.01796       | 4.27            | 1/1/2013 8:00          | 7.61                 | 0.83          | 0.67           | 0                    | 8.578                  |
| STGM3369 | STMG1323   | STMG1324    | 461.326     | 0.013     | 157.3            | 157               | CIRCULAR      | 1.75       | 1       |          | 0.00065       | 12.49           | 1/1/2013 8:00          | 6.86                 | 3.09          | 0.71           | 0.01                 | 57.007                 |
| STGM1885 | STMF0812   | J3760       | 35.38       | 0.013     | 189.7            | 185.9             | CIRCULAR      | 3          | 1       |          | 0.10803       | 44.12           | 1/1/2013 8:01          | 9.01                 | 0.2           | 0.65           | 0.01                 | 92.462                 |
| STGM865  | STMF0923   | STMF0924    | 335.94      | 0.012     | 186.61           | 183.64            | CIRCULAR      | 1.5        | 1       |          | 0.00884       | 11.82           | 1/1/2013 7:59          | 7.13                 | 1.1           | 0.92           | 0.01                 | 23.327                 |
| STGM1261 | STMG0772   | J3780       | 39.872      | 0.013     | 244.3            | 243.1             | CIRCULAR      | 1.5        | 1       |          | 0.03545       | 7.3             | 1/1/2013 8:00          | 9.28                 | 0.37          | 0.46           | 0                    | 14.457                 |
| STGM8    | STMF1012   | J3786       | 98.24       | 0.013     | 149.35           | 143.5             | CIRCULAR      | 2.75       | 1       |          | 0.05965       | 84.18           | 1/1/2013 8:04          | 19.73                | 0.65          | 0.68           | 0                    | 186.598                |
| STGM1727 | STMF0821   | STMF0813    | 18.68       | 0.013     | 205.66           | 204.29            | CIRCULAR      | 2          | 1       |          | 0.07354       | 19.5            | 1/1/2013 8:00          | 10.48                | 0.32          | 0.57           | 0                    | 39.421                 |
| STGM298  | STMG0711   | STMG0717    | 113.45      | 0.012     | 254.03           | 249.02            | CIRCULAR      | 1          | 1       |          | 0.0442        | 4.27            | 1/1/2013 8:00          | 8.99                 | 0.53          | 0.58           | 0                    | 8.578                  |
| STGM533  | STMG0815   | STMG0815    | 279.18      | 0.013     | 235.61           | 231.5             | CIRCULAR      | 1.25       | 1       |          | 0.01472       | 6.78            | 1/1/2013 8:00          | 7.32                 | 0.87          | 0.71           | 0                    | 14.311                 |
| STGM2486 | STMG098    | STMG097     | 101.94      | 0.013     | 205.33           | 204.55            | CIRCULAR      | 2.5        | 1       |          | 0.00765       | 24.72           | 1/1/2013 8:01          | 5.59                 | 0.69          | 0.9            | 0.01                 | 57.828                 |
| STGM1524 | STMF0932   | STMF091     | 155.4       | 0.013     | 185.81           | 184.65            | CIRCULAR      | 3          | 1       |          | 0.00746       | 89.6            | 1/1/2013 8:00          | 13.44                | 1.55          | 0.9            | 0.01                 | 202.825                |
| STGM32   | STMG0811   | STMG0818    | 123.07      | 0.013     | 226.04           | 225.36            | CIRCULAR      | 1.25       | 1       |          | 0.00553       | 6.77            | 1/1/2013 8:00          | 5.52                 | 1.41          | 1              | 1.33                 | 14.311                 |
| STGM2845 | STMF0821   | STMF0822    | 328.26      | 0.012     | 204.32           | 203.22            | CIRCULAR      | 1          | 1       |          | 0.00335       | 3.36            | 1/1/2013 8:00          | 4.38                 | 1.5           | 0.94           | 0.01                 | 6.467                  |
| STGM2383 | STMF0924   | J3838       | 130.71      | 0.012     | 183.64           | 182.3             | CIRCULAR      | 1.5        | 1       |          | 0.01025       | 11.8            | 1/1/2013 8:00          | 8.7                  | 1.02          | 0.72           | 0.01                 | 23.327                 |
| STGM1325 | STMG077    | STMG0831    | 217.44      | 0.012     | 241              | 238.07            | CIRCULAR      | 1.5        | 1       |          | 0.01068       | 12.85           | 1/1/2013 8:00          | 9.06                 | 1.09          | 0.79           | 0.01                 | 25.332                 |
| STGM1417 | J3700      | J-CT1-03    | 113.79      | 0.04      | 140              | 118               | IRREGULAR     | 0          | 1       | STGM1417 | 0.19706       | 4.14            | 1/1/2013 7:57          | 5.71                 | 0             | 0.03           | 0                    | 7.824                  |
| STGM2669 | STMF0720   | STMF0833    | 216.18      | 0.012     | 202.21           | 200.47            | CIRCULAR      | 1          | 1       |          | 0.00805       | 2.08            | 1/1/2013 8:00          | 4.34                 | 0.6           | 0.59           | 0                    | 3.841                  |
| STGM3652 | STMG0761   | STMG0754    | 144.95      | 0.012     | 324              | 307.92            | CIRCULAR      | 1          | 1       |          | 0.11209       | 1.45            | 1/1/2013 8:00          | 10.86                | 0.11          | 0.23           | 0                    | 3.4                    |
| STGM348  | STMG0845   | STMG0835    | 82.49       | 0.013     | 216.5            | 212.96            | CIRCULAR      | 1          | 1       |          | 0.04295       | 4.93            | 1/1/2013 8:00          | 7.33                 | 0.67          | 0.8            | 0.01                 | 9.635                  |
| STGM1276 | STMF0814   | STMF0815    | 163.18      | 0.012     | 205              | 204.5             | CIRCULAR      | 1          | 1       |          | 0.03056       | 1.19            | 1/1/2013 8:00          | 3.07                 | 0.56          | 0.49           | 0                    | 2.243                  |
| STGM3527 | STMG1023   | STMG1024    | 231.24      | 0.012     | 182.1            | 180.74            | CIRCULAR      | 1.25       | 1       |          | 0.00588       | 2.1             | 1/1/2013 8:01          | 2.1                  | 0.39          | 0.9            | 0.01                 | 4.058                  |
| STGM2167 | STMF0829   | STMF0827    | 26.43       | 0.012     | 198.35           | 198.03            | CIRCULAR      | 1.25       | 1       |          | 0.01211       | 5.61            | 1/1/2013 8:00          | 8.58                 | 0.73          | 0.51           | 0                    | 10.487                 |
| STGM106  | STMF087    | STMF0876    | 176.36      | 0.012     | 193.06           | 191.96            | CIRCULAR      | 1          | 1       |          | 0.00615       | 3.04            | 1/1/2013 8:00          | 4.55                 | 1             | 0.79           | 0                    | 5.884                  |
| STGM1378 | STMG1340   | STMG1335    | 138.16      | 0.013     | 161.5            | 160.27            | CIRCULAR      | 1          | 1       |          | 0.00455       | 4.72            | 1/1/2013 7:48          | 6.12                 | 1.96          | 1              | 0.32                 | 21.469                 |
| STGM1615 | STMF1227   | STMF1226    | 52.798      | 0.013     | 158.04           | 157.4             | CIRCULAR      | 3          | 1       |          | 0.01212       | 41.6            | 1/1/2013 8:00          | 10.53                | 0.57          | 0.55           | 0                    | 74.624                 |
| STGM742  | STMG071    | STMG073     | 113.54      | 0.013     | 222.75           | 221.95            | CIRCULAR      | 1.5        | 1       |          | 0.07075       | 10.39           | 1/1/2013 8:00          | 6.15                 | 1.18          | 0.91           | 0.01                 | 21.466                 |
| STGM4170 | STMG0751   | STMG0750    | 133.36      | 0.012     | 286.67           | 284.09            | CIRCULAR      | 1          | 1       |          | 0.01935       | 1.44            | 1/1/2013 8:01          | 4.35                 | 0.27          | 0.44           | 0                    | 3.4                    |
| STGM3871 | STMF077    | STMF073     | 121.71      | 0.012     | 262.39           | 257               | CIRCULAR      | 1          | 1       |          | 0.04433       | 2.59            | 1/1/2013 8:00          | 6.15                 | 0.32          | 0.69           | 0.01                 | 5.535                  |
| STGM3524 | STMF072    | STMF072     | 18.5        | 0.013     | 220.65           | 220.3             | CIRCULAR      | 1.5        | 1       |          | 0.01892       | 10.39           | 1/1/2013 8:00          | 6.88                 | 0.72          | 1              | 0.01                 | 21.466                 |
| STGM612  | STMF0835   | STMF0836    | 338.43      | 0.012     | 195.93           | 192.16            | CIRCULAR      | 1          | 1       |          | 0.01114       | 3               | 1/1/2013 8:00          | 6.1                  | 0.74          | 0.6            | 0                    | 5.75                   |
| STGM4043 | J3932      | J-CT1-02    | 814.56      | 0.04      | 160              | 140               | IRREGULAR     | 0          | 1       | STGM4043 | 0.02456       | 6.7             | 1/1/2013 8:05          | 2.89                 | 0.01          | 0.13           | 0                    | 19.388                 |
| STGM970  | STMG0936   | STMG0937    | 97.5        | 0.012     | 210.16           | 208.73            | CIRCULAR      | 2          | 1       |          | 0.01467       | 24.81           | 1/1/2013 8:00          | 10.27                | 0.84          | 0.72           | 0                    | 57.828                 |
| STGM1234 | J4400      | J3514       | 87.11       | 0.012     | 227.5            | 224.8             | CIRCULAR      | 1          | 1       |          | 0.03101       | 1.49            | 1/1/2013 8:09          | 2.72                 | 0.22          | 0.66           | 0.01                 | 8.539                  |
| STGM592  | STMF0919   | STMF0921    | 204.53      | 0.012     | 198.53           | 190.78            | CIRCULAR      | 1          | 1       |          | 0.03792       | 3.51            | 1/1/2013 8:00          | 5.63                 | 0.47          | 0.74           | 0.01                 | 6.674                  |
| STGM414  | STMF0914   | STMF0915    | 30.203      | 0.012     | 192.61           | 192.18            | CIRCULAR      | 1.25       | 1       |          | 0.01424       | 3.88            | 1/1/2013 8:00          | 5.48                 | 0.46          | 0.56           | 0                    | 7.383                  |
| STGM725  | STMG0825   | STMG0849    | 291.42      | 0.013     | 227.89           | 225.39            | CIRCULAR      | 3          | 1       |          | 0.00858       | 49.62           | 1/1/2013 7:58          | 9.33                 | 0.8           | 1              | 0.01                 | 104.497                |
| STGM2961 | STMF0913   | STMF094     | 89.48       | 0.        |                  |                   |               |            |         |          |               |                 |                        |                      |               |                |                      |                        |



| Capacity |            |             |             |           |                 |                  |                    |           |         |          |               |                  |                       |                  |                    |                        |                         |
|----------|------------|-------------|-------------|-----------|-----------------|------------------|--------------------|-----------|---------|----------|---------------|------------------|-----------------------|------------------|--------------------|------------------------|-------------------------|
| Name     | Inlet Node | Outlet Node | Length (ft) | Roundness | Inlet Elev (ft) | Outlet Elev (ft) | Cross-Section (ft) | Geom (ft) | Barrels | Transact | Stage (ft/ft) | Max Flow (ft³/s) | Time Max Flow (h/day) | Max Flow (ft³/s) | Max Flow (ft³/min) | Capacity Limited (ft³) | Contributing Area (ft²) |
| STGM1258 | 2584       | J350        | 258.68      | 0.012     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02514  | 12.11         | 1/12013.800      | 9.25                  | 0.67             | 0.60               | 0                      | 211.84                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53          | 240.5            | CIRCULAR           | 1.5       | 1       | 0.02586  | 8.31          | 1/12013.800      | 8.31                  | 0.79             | 0.53               | 0                      | 213.82                  |
| STGM2425 | 2426       | J350        | 242.68      | 0.013     | 247.53</        |                  |                    |           |         |          |               |                  |                       |                  |                    |                        |                         |







Conduits CIP Model

| Name     | Inlet Node | Outlet Node | Length (ft) | Rightness | Inlet Elev. (ft) | Outlet Elev. (ft) | Cross-Section | Geom. | Barrels | Transsect | Slope (ft/ft) | Max. (cfs) | Time Max. Flow (MGD/yr) | Max. (ft/s) | Max/Full Flow | Max/Full Depth | Capacity Limited (h) | Contributing Area (ac) |
|----------|------------|-------------|-------------|-----------|------------------|-------------------|---------------|-------|---------|-----------|---------------|------------|-------------------------|-------------|---------------|----------------|----------------------|------------------------|
| STGM3596 | STMG125    | STMG326     | 305.96      | 0.013     | 166.36           | 163               | CIRCULAR      | 2     | 1       |           | 0.01294       | 12.4       | 1/1/2013 8:00           | 10.8        | 0.48          | 0.39           | 0                    | 22,971                 |
| STGM285  | STMG125    | STMG1015    | 112.94      | 0.013     | 209              | 205               | CIRCULAR      | 1     | 1       |           | 0.03544       | 1.4        | 1/1/2013 8:00           | 4.68        | 0.21          | 0.41           | 0                    | 2,761                  |
| STGM2726 | STH118     | STMG1015    | 199.97      | 0.013     | 190.63           | 186.91            | CIRCULAR      | 1.5   | 1       |           | 0.0086        | 8.57       | 1/1/2013 8:00           | 5.95        | 0.88          | 0.76           | 0                    | 13,884                 |
| STGM1003 | STMG1312   | STH118      | 119.96      | 0.012     | 147.62           | 132.64            | CIRCULAR      | 1     | 1       |           | 0.012586      | 2.65       | 1/1/2013 8:00           | 11.04       | 0.19          | 0.65           | 0.01                 | 5,951                  |
| STGM1333 | STMG10924  | 4A002       | 138.61      | 0.013     | 189.37           | 182.33            | CIRCULAR      | 3     | 1       |           | 0.04146       | 12.21      | 1/1/2013 8:00           | 8.98        | 0.29          | 0.25           | 0                    | 29,12                  |
| STGM630  | STH0945    | STH0944     | 47.83       | 0.012     | 246.93           | 246.33            | CIRCULAR      | 1     | 1       |           | 0.00627       | 4.9        | 1/1/2013 8:00           | 6.34        | 1.6           | 0.96           | 0.01                 | 18,277                 |
| STGM1312 | STMG096    | STMG097     | 202.67      | 0.013     | 224              | 223               | CIRCULAR      | 2     | 1       | STGM9826  | 0.009592      | 10.43      | 1/1/2013 7:59           | 6.39        | 0.68          | 0.53           | 0                    | 35,022                 |
| STGM3628 | 3614       | 4A282       | 388.69      | 0.014     | 172              | 169.7             | IRREGULAR     | 2     | 1       | STGM9826  | 0.009592      | 6.57       | 1/1/2013 8:00           | 1.42        | 0.05          | 0.3            | 0                    | 11,029                 |
| STGM4217 | 75620      | 4A050       | 531.29      | 0.013     | 187.5            | 187               | CIRCULAR      | 2.75  | 1       | STGM4217  | 0.003076      | 2.34       | 1/1/2013 8:45           | 2.8         | 0.27          | 0.69           | 0                    | 17,535                 |
| STGM3274 | 5906       | 4A738       | 138.02      | 0.013     | 228              | 226               | IRREGULAR     | 2     | 1       | STGM4217  | 0.003076      | 2.34       | 1/1/2013 8:32           | 0.52        | 0.05          | 0.53           | 0                    | 8,14                   |
| STGM526  | STMG103    | STMG1015    | 50.12       | 0.013     | 205              | 204.8             | CIRCULAR      | 2     | 1       |           | 0.01449       | 10.15      | 1/1/2013 8:00           | 6.7         | 0.37          | 0.49           | 0                    | 55.54                  |
| STGM461  | STMG103    | STMG1015    | 153.15      | 0.013     | 177.8            | 174.7             | CIRCULAR      | 2     | 1       |           | 0.00399       | 1.4        | 1/1/2013 8:00           | 10.42       | 0.62          | 0.39           | 0                    | 2,761                  |
| STGM262  | JHC-18     | JHC-17      | 203.4       | 0.013     | 128              | 127               | CIRCULAR      | 6     | 1       |           | 0.00255       | 21.4       | 1/1/2013 8:00           | 21.7        | 1.68          | 0.76           | 0.01                 | 41,861                 |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       | 0.013     | 157.7            | 149.66            | CIRCULAR      | 1     | 1       |           | 0.02022       | 2.23       | 1/1/2013 8:00           | 15.31       | 0.14          | 0.24           | 0                    | 4,871                  |
| STGM223  | STMG1353   | STMG136     | 95.35       |           |                  |                   |               |       |         |           |               |            |                         |             |               |                |                      |                        |





| Conduits CIP Model |            |             |             |           |                  |                   |               |            |         |           |               |                   |                        |                        |               |                |                      |                        |  |
|--------------------|------------|-------------|-------------|-----------|------------------|-------------------|---------------|------------|---------|-----------|---------------|-------------------|------------------------|------------------------|---------------|----------------|----------------------|------------------------|--|
| Name               | Inlet Node | Outlet Node | Length (ft) | Roughness | Inlet Elev. (ft) | Outlet Elev. (ft) | Cross-Section | Geom1 (ft) | Barrels | Transsect | Slope (ft/ft) | Max. [Flow] (cfs) | Time Max. Flow (M/D/Y) | Max. [Velocity] (ft/s) | Max/Full Flow | Max/Full Depth | Capacity Limited (h) | Contributing Area (ac) |  |
| STGM434            | STU0127    | STU1226     | 167.85      | 0.012     | 160.59           | 159.59            | CIRCULAR      | 1          | 1       |           | 0.00596       | 4.05              | 1/1/2013 8:00          | 5.33                   | 1.36          | 0.93           | 0.01                 | 8.208                  |  |
| STGM4376           | STU0917    | STU0919     | 192.83      | 0.012     | 226.69           | 225.32            | CIRCULAR      | 1.25       | 1       |           | 0.0071        | 9.08              | 1/1/2013 8:00          | 7.4                    | 1.54          | 1              | 0.11                 | 32.163                 |  |
| STGM4360           | STU1236    | STU1237     | 122.26      | 0.013     | 165.95           | 163.11            | CIRCULAR      | 2          | 1       |           | 0.02324       | 9.24              | 1/1/2013 8:01          | 9.98                   | 0.27          | 0.34           | 0                    | 20.137                 |  |
| STGM3636           | STU1222    | STU1221     | 208.17      | 0.012     | 163.17           | 160.93            | CIRCULAR      | 1.75       | 1       |           | 0.01076       | 8.88              | 1/1/2013 8:00          | 7.63                   | 0.5           | 0.49           | 0                    | 18.527                 |  |
| STGM2863           | STU1228    | STU1227     | 267.81      | 0.012     | 159.59           | 146.32            | CIRCULAR      | 1.25       | 1       |           | 0.04961       | 12.7              | 1/1/2013 8:00          | 14.08                  | 0.81          | 0.69           | 0                    | 26.994                 |  |
| STGM4181           | STU1111    | STU1173     | 211.74      | 0.012     | 209.2            | 199.33            | CIRCULAR      | 1          | 1       |           | 0.01828       | 2.47              | 1/1/2013 8:00          | 5.76                   | 0.47          | 0.54           | 0                    | 4.563                  |  |
| STGM4142           | STU1118    | STU1118     | 112.82      | 0.013     | 167.33           | 165.41            | CIRCULAR      | 1          | 1       |           | 0.01702       | 3.38              | 1/1/2013 8:00          | 6.88                   | 0.73          | 0.6            | 0                    | 7.296                  |  |
| STGM4144           | STU1229    | STU1222     | 38.73       | 0.012     | 138.19           | 136.14            | CIRCULAR      | 1.25       | 1       |           | 0.053         | 12.7              | 1/1/2013 8:00          | 21                     | 0.79          | 0.49           | 0                    | 26.994                 |  |
| STGM4140           | STU1223    | STU1224     | 353.27      | 0.012     | 263.91           | 244.69            | CIRCULAR      | 1          | 1       |           | 0.05449       | 2.73              | 1/1/2013 8:00          | 10.42                  | 0.3           | 0.37           | 0                    | 6.598                  |  |
| STGM4239           | STU1142    | STU1143     | 263.73      | 0.013     | 181.8            | 176               | CIRCULAR      | 2          | 1       |           | 0.02          | 3.42              | 1/1/2013 8:00          | 6.34                   | 0.1           | 0.23           | 0                    | 7.795                  |  |
| STGM3371           | STU1210    | STU1219     | 108.45      | 0.012     | 169.93           | 163.14            | CIRCULAR      | 1          | 1       |           | 0.06273       | 4.05              | 1/1/2013 8:00          | 6.64                   | 0.42          | 0.78           | 0.01                 | 8.308                  |  |
| STGM201            | STU1113    | STU1123     | 445.13      | 0.013     | 193.31           | 189.65            | CIRCULAR      | 3          | 1       |           | 0.00822       | 92.16             | 1/1/2013 8:18          | 19.04                  | 1.52          | 1              | 1.49                 | 241.442                |  |
| STGM91             | STU1217    | STU1216     | 430.83      | 0.012     | 178.84           | 175.24            | CIRCULAR      | 1.25       | 1       |           | 0.00836       | 3.91              | 1/1/2013 8:00          | 6.02                   | 0.61          | 0.52           | 0                    | 7.16                   |  |
| STGM2225           | STU125     | STU126      | 495.9       | 0.012     | 181.17           | 173.71            | CIRCULAR      | 1          | 1       |           | 0.01505       | 0.86              | 1/1/2013 8:00          | 2.11                   | 0.18          | 0.52           | 0                    | 1.656                  |  |
| STGM1305           | STU1121    | STU1120     | 211.46      | 0.012     | 186.07           | 184.6             | CIRCULAR      | 1          | 1       |           | 0.00695       | 3.81              | 1/1/2013 8:00          | 5.25                   | 1.18          | 0.87           | 0.01                 | 11.185                 |  |
| STGM3189           | STU1235    | STU1115     | 180.84      | 0.012     | 156.63           | 155.74            | CIRCULAR      | 1.25       | 1       |           | 0.00492       | 3.58              | 1/1/2013 8:00          | 4.81                   | 0.73          | 0.58           | 0                    | 8.662                  |  |
| STGM1978           | STU0911    | STU0912     | 77.13       | 0.012     | 247.51           | 247.12            | CIRCULAR      | 1.5        | 1       |           | 0.00506       | 5.41              | 1/1/2013 8:00          | 6.46                   | 0.67          | 0.48           | 0                    | 16.281                 |  |
| STGM1917           | STU0912    | STU0914     | 139.85      | 0.012     | 248.36           | 247.94            | CIRCULAR      | 1.25       | 1       |           | 0.003         | 5.42              | 1/1/2013 8:00          | 4.64                   | 1.41          | 0.91           | 0.01                 | 16.281                 |  |
| STGM2889           | STU1164    | STU1163     | 48.7        | 0.012     | 190.45           | 189.92            | CIRCULAR      | 1          | 1       |           | 0.01088       | 0.57              | 1/1/2013 8:00          | 3.41                   | 0.14          | 0.27           | 0                    | 1.066                  |  |
| STGM693            | STU1115    | STU1162     | 339.05      | 0.012     | 190.96           | 189.01            | CIRCULAR      | 1          | 1       |           | 0.00575       | 1.47              | 1/1/2013 8:00          | 4.4                    | 0.5           | 0.44           | 0                    | 2.784                  |  |
| STGM2755           | STU1172    | STU1171     | 54.37       | 0.012     | 198.19           | 197.53            | CIRCULAR      | 1          | 1       |           | 0.01214       | 2.47              | 1/1/2013 8:00          | 5.52                   | 0.58          | 0.55           | 0                    | 4.563                  |  |
| STGM1281           | STU1066    | STU1069     | 174.93      | 0.012     | 198.06           | 194.56            | CIRCULAR      | 1          | 1       |           | 0.02001       | 3.99              | 1/1/2013 8:01          | 7.81                   | 0.73          | 0.62           | 0                    | 6.613                  |  |
| STGM3951           | STU0926    | STU0915     | 98.22       | 0.013     | 230.4            | 229.7             | CIRCULAR      | 1.75       | 1       |           | 0.00713       | 1.57              | 1/1/2013 8:00          | 3.81                   | 0.12          | 0.23           | 0                    | 2.929                  |  |
| STGM1026           | STU1218    | STU1217     | 123.78      | 0.012     | 180.87           | 178.84            | CIRCULAR      | 1          | 1       |           | 0.0164        | 1.6               | 1/1/2013 8:00          | 3.54                   | 0.32          | 0.56           | 0                    | 2.887                  |  |
| STGM984            | STU0916    | STU0926     | 51.08       | 0.013     | 230.8            | 230.4             | CIRCULAR      | 1.75       | 1       |           | 0.00783       | 1.57              | 1/1/2013 8:00          | 3.78                   | 0.11          | 0.23           | 0                    | 2.929                  |  |
| STGM4123           | STU092     | STU091      | 68.87       | 0.024     | 220.75           | 220.03            | CIRCULAR      | 2.25       | 1       |           | 0.01046       | 10.54             | 1/1/2013 7:56          | 5.36                   | 0.61          | 0.5            | 0                    | 26.412                 |  |
| STGM4122           | J4092      | J4094       | 929.08      | 0.04      | 202              | 189.43            | IRREGULAR     | 0          | 1       | STGM4122  | 0.01353       | 6.15              | 1/1/2013 8:08          | 1.72                   | 0.08          | 0.47           | 0                    | 21.507                 |  |
| STGM4090           | J4118      | J4114       | 433.3       | 0.04      | 241.5            | 234               | IRREGULAR     | 0          | 1       | STGM4090  | 0.01731       | 4.31              | 1/1/2013 8:01          | 1.51                   | 0.03          | 0.43           | 0                    | 12.731                 |  |
| STGM3882           | STU1022    | STU1012     | 270.81      | 0.013     | 214              | 212.2             | CIRCULAR      | 2.25       | 1       |           | 0.00665       | 17.43             | 1/1/2013 8:01          | 6.71                   | 0.69          | 0.95           | 0.01                 | 39.726                 |  |
| STGM4001           | J4116      | J4118       | 54.14       | 0.013     | 242              | 241.5             | CIRCULAR      | 2          | 1       |           | 0.00924       | 2.03              | 1/1/2013 8:00          | 3.27                   | 0.09          | 0.25           | 0                    | 6.848                  |  |
| STGM323            | STU1170    | STU1169     | 58.54       | 0.012     | 196.84           | 196.34            | CIRCULAR      | 1.25       | 1       |           | 0.00854       | 2.47              | 1/1/2013 8:00          | 4.33                   | 0.38          | 0.47           | 0                    | 4.563                  |  |
| STGM3159           | STU1027    | J4122       | 239.23      | 0.013     | 211              | 209.5             | CIRCULAR      | 2.5        | 1       |           | 0.00627       | 29.86             | 1/1/2013 8:08          | 6.64                   | 0.92          | 1              | 0.01                 | 112.363                |  |
| STGM4067           | STU1115    | STU1177     | 89.15       | 0.013     | 186.78           | 185.02            | CIRCULAR      | 3          | 1       |           | 0.01975       | 92.86             | 1/1/2013 8:09          | 16.03                  | 0.99          | 0.76           | 0                    | 245.56                 |  |
| STGM3546           | STU081     | STU081      | 219.62      | 0.012     | 253.03           | 250.14            | CIRCULAR      | 1          | 1       |           | 0.01316       | 5.41              | 1/1/2013 8:00          | 6.89                   | 1.22          | 1              | 1.03                 | 16.281                 |  |
| STGM2729           | STU1029    | STU1050     | 118.53      | 0.013     | 217.94           | 215.72            | CIRCULAR      | 2.5        | 1       |           | 0.01873       | 27.63             | 1/1/2013 8:16          | 11.31                  | 0.49          | 0.56           | 0                    | 84.471                 |  |
| STGM1360           | STU1010    | STU1012     | 157.23      | 0.012     | 185.18           | 181.23            | CIRCULAR      | 1          | 1       |           | 0.00513       | 0.83              | 1/1/2013 8:00          | 3.81                   | 0.14          | 0.35           | 0                    | 1.524                  |  |
| STGM3521           | J4292      | J4150       | 661.17      | 0.013     | 179.9            | 175               | CIRCULAR      | 1.5        | 1       |           | 0.00741       | 4.43              | 1/1/2013 8:00          | 5.63                   | 0.49          | 0.46           | 0                    | 9.601                  |  |
| STGM835            | STU1218    | STU1219     | 252.65      | 0.012     | 135.56           | 127.73            | CIRCULAR      | 1          | 1       |           | 0.03101       | 3                 | 1/1/2013 8:00          | 8.34                   | 0.44          | 0.47           | 0                    | 6.612                  |  |
| STGM1994           | STU104     | STU1010     | 59.22       | 0.013     | 233.15           | 232.65            | CIRCULAR      | 1.25       | 1       |           | 0.00844       | 4.77              | 1/1/2013 8:00          | 5.38                   | 0.8           | 0.68           | 0                    | 9.778                  |  |
| STGM504            | STU1122    | STU1121     | 203.6       | 0.012     | 196.81           | 190.2             | CIRCULAR      | 1          | 1       |           | 0.03248       | 8.37              | 1/1/2013 8:00          | 11.27                  | 1.2           | 0.9            | 0.01                 | 24.347                 |  |
| STGM885            | STU1141    | STU1142     | 95.19       | 0.013     | 184              | 181.8             | CIRCULAR      | 2          | 1       |           | 0.02312       | 3.43              | 1/1/2013 8:00          | 6.94                   | 0.1           | 0.21           | 0                    | 7.795                  |  |
| STGM4081           | STU0928    | STU0985     | 185.77      | 0.012     | 233.7            | 232.3             | CIRCULAR      | 1.75       | 1       |           | 0.00754       | 15.29             | 1/1/2013 8:15          | 7.14                   | 1.03          | 0.83           | 0.01                 | 71.722                 |  |
| STGM921            | STU1126    | STU1127     | 220.45      | 0.012     | 173.71           | 170.29            | CIRCULAR      | 1.25       | 1       |           | 0.01552       | 5.76              | 1/1/2013 8:00          | 7.41                   | 0.66          | 0.61           | 0                    | 10.465                 |  |
| STGM1194           | STU1219    | STU1220     | 59.39       | 0.012     | 127.73           | 125.95            | CIRCULAR      | 1          | 1       |           | 0.02998       | 3                 | 1/1/2013 8:00          | 6.41                   | 0.45          | 0.58           | 0                    | 6.612                  |  |
| STGM391            | STU1114    | STU1113     | 83.65       | 0.013     | 194              | 193.32            | CIRCULAR      | 3.5        | 1       |           | 0.00813       | 78.62             | 1/1/2013 8:46          | 8.17                   | 0.87          | 1              | 0.01                 | 203.069                |  |
| STGM3989           | STU1217    | STU1217     | 177.25      | 0.012     | 247.63           | 221.37            | CIRCULAR      | 1          | 1       |           | 0.14981       | 0.96              | 1/1/2013 8:00          | 10.29                  | 0.06          | 0.18           | 0                    | 3.185                  |  |
| STGM3560           | J4268      | J4270       | 218.63      | 0.04      | 245              | 243               | IRREGULAR     | 0          | 1       | STGM3560  | 0.00915       | 9.68              | 1/1/2013 8:01          | 0.75                   | 0.03          | 0.28           | 0                    | 29.354                 |  |
| STGM623            | STU1218    | STU1218     | 26.98       | 0.012     | 181.2            | 180.87            | CIRCULAR      | 1          | 1       |           | 0.01223       | 1.6               | 1/1/2013 8:00          | 5.31                   | 0.37          | 0.41           | 0                    | 2.887                  |  |
| STGM2304           | STU1229    | STU1244     | 147.16      | 0.012     | 171.98           | 170               | CIRCULAR      | 1.5        | 1       |           | 0.01346       | 10.29             | 1/1/2013 8:00          | 7.6                    | 0.78          | 0.72           | 0                    | 18.796                 |  |
| STGM1581           | STU1119    | STU1117     | 140.69      | 0.012     | 168.4            | 167.96            | CIRCULAR      | 1.25       | 1       |           | 0.00313       | 3.81              | 1/1/2013 8:00          | 4.02                   | 0.97          | 0.72           | 0                    | 9.33                   |  |
| STGM627            | J4284      | J5BT7-02    | 142.83      | 0.013     | 174.8            | 174.2             | CIRCULAR      | 2          | 1       |           | 0.0042        | 41.47             | 1/1/2013 8:43          | 13.2                   | 2.83          | 1              | 2.09                 | 129.247                |  |
| STGM757            | J4150      | STU1128     | 60.18       | 0.013     | 175              | 173               | CIRCULAR      | 1          | 1       |           | 0.03325       | 4.42              | 1/1/2013 8:00          | 6.54                   | 0.68          | 0.8            | 0.01                 | 9.601                  |  |
| STGM356            | STU1124    | J4292       | 103.8       | 0.013     | 180.75           | 179.9             | CIRCULAR      | 1          | 1       |           | 0.00819       | 4.45              | 1/1/2013 8:00          | 6.07                   | 1.38          | 0.88           | 0.01                 | 9.601                  |  |
| STGM4405           | STU0927    | STU0915     | 120.44      | 0.012     | 219.25           | 216.42            | CIRCULAR      | 1.25       | 1       |           | 0.0235        | 9.1               | 1/1/2013 8:00          | 7.42                   | 0.85          | 1              | 0.01                 | 32.163                 |  |
| STGM3039           | STU1224    | STU1229     | 259.82      | 0.012     | 174.83           | 171.98            | CIRCULAR      | 1.5        | 1       |           | 0.01097       | 10.29             | 1/1/2013 8:00          | 7.88                   | 0.86          | 0.69           | 0                    | 18.796                 |  |
| STGM334            | STU1080    | STU1078     | 162.62      | 0.013     | 207.16           | 204.07            | CIRCULAR      | 2.5        | 1       |           | 0.019         | 55.11             | 1/1/2013 8:00          | 14.67                  | 0.97          | 0.72           | 0                    | 167.806                |  |
| STGM1040           | STU0983    | STU0916     | 197.63      | 0.013     | 232.3            | 230.8             | CIRCULAR      | 1.75       | 1       |           | 0.00759       | 0                 | 1/1/2013 0:00          | 0                      | 0             | 0.11           | 0                    | 0                      |  |
| STGM1895           | STU1224    | STU1225     | 63.74       | 0.012     | 244.69           | 239.49            | CIRCULAR      | 1          | 1       |           | 0.08185       | 2.73              | 1/1/2013 8:00          | 12.96                  | 0.25          | 0.31           | 0                    | 6.598                  |  |
| STGM2880           | STU1161    | STU1160     | 48.22       | 0.012     | 188.4            | 187.86            | CIRCULAR      | 1          | 1       |           | 0.0112        | 0.57              | 1/1/2013 8:00          | 1.47                   | 0.14          | 0.49           | 0                    | 1.066                  |  |
| STGM1611           | STU1177    | J5BT1-08    | 153.25      | 0.013     | 185.02           | 182               | CIRCULAR      | 3.5        | 1       |           | 0.01971       | 95.1              | 1/1/2013 8:18          | 24.31                  | 0.66          | 0.42           | 0                    | 245.56                 |  |
| STGM773            | STU0968    | STU0970     | 113.4       | 0.012     | 254.2            | 249.75            | CIRCULAR      | 1          | 1       |           | 0.03925       | 1.28              | 1/1/2013 8:00          | 7.22                   | 0.17          | 0.28           | 0                    | 2.734                  |  |
| STGM3464           | STU1126    | STU1126     | 157.19      | 0.012     | 249.84           | 248.74            | CIRCULAR      | 1          | 1       |           | 0.00363       | 48.16             | 1/1/2013 8:00          | 6.89                   | 1.61          | 0.75           | 0                    | 16.281                 |  |
| STGM3674           | J4424      | J4426       | 311.89      | 0.013     | 202              | 200.5             | CIRCULAR      | 3.5        | 1       |           | 0.01137       | 48.16             | 1/1/2013 8:37          | 7.72                   | 0.41          | 0.75           | 0.01                 | 47.508                 |  |
| STGM760            | STU1143    | STU1149     | 83.39       | 0.013     | 159.08           | 158.85            | CIRCULAR      | 2.25       | 1       |           | 0.00276       | 25.62             | 1/1/2013 8:00          | 6.44                   | 1.58          | 1              | 1.48                 | 48.833                 |  |
| STGM1213           | STU1056    | STU1048     | 205.69      | 0.013     | 213              | 209.79            | CIRCULAR      | 1          | 1       |           | 0.01561       | 1.81              |                        |                        |               |                |                      |                        |  |



| Conduits CIP Model |            |                    |           |             |                  |               |            |         |               |                   |                        |                      |                     |                      |                        |         |        |
|--------------------|------------|--------------------|-----------|-------------|------------------|---------------|------------|---------|---------------|-------------------|------------------------|----------------------|---------------------|----------------------|------------------------|---------|--------|
| Name               | Inlet Node | Outlet Length (ft) | Roughness | Inlet Elev. | Outlet Elev.(ft) | Cross-Section | Geom3 (ft) | Barrels | Slope (ft/ft) | Max. Flow (M/O/V) | Time Max. Flow (M/O/V) | Max. Velocity (ft/s) | Max./Full Depth (h) | Capacity Limited (h) | Contributing Area (ac) |         |        |
| STGM2032           | STMI128    | ST711245           | 60.64     | 173         | 160              | CIRCULAR      | 2          | 1       | 0.02161       | 20.4              | 1/2013.800             | 10.22                | 0.57                | 0                    | 37.319                 |         |        |
| STGM4002           | STMI128    | ST711245           | 0.012     | 220         | 219.11           | CIRCULAR      | 1          | 1       | 0.01201       | 3.99              | 1/2013.800             | 6.13                 | 0.94                | 0.77                 | 0                      | 6.613   |        |
| STGM2217           | STMI122    | STMI1223           | 420.81    | 0.012       | 183.38           | 176.8         | CIRCULAR   | 1       | 0.01564       | 3.09              | 1/2013.800             | 4.64                 | 0.64                | 0.79                 | 0.01                   | 5.256   |        |
| STGM5374           | STMI069    | ST5870.03          | 63.40     | 0.012       | 190.71           | 189.88        | CIRCULAR   | 1.25    | 0.00995       | 3.59              | 1/2013.801             | 7.16                 | 0.57                | 0.46                 | 0                      | 6.613   |        |
| STGM5374           | STMI069    | ST11070            | 160.43    | 0.012       | 194.56           | 189.71        | CIRCULAR   | 1       | 0.01021       | 3.787             | 1/2013.801             | 10.62                | 0.49                | 0.81                 | 0.01                   | 84.471  |        |
| STGM1403           | STMI128    | STMI1223           | 238.86    | 0.012       | 204.42           | 174.52        | CIRCULAR   | 1       | 0.01271       | 3.88              | 1/2013.801             | 6.92                 | 0.43                | 0.42                 | 0                      | 7.266   |        |
| STGM1930           | STMI064    | STMI1065           | 199.43    | 0.012       | 212.68           | 208.11        | CIRCULAR   | 1       | 0.00764       | 10.58             | 1/2013.800             | 14.39                | 0.36                | 0.43                 | 0                      | 21.925  |        |
| STGM1356           | JS582      | JS578              | 193.08    | 0.04        | 214.65           | 205           | IRREGULAR  | 0       | 0.02292       | 3.99              | 1/2013.800             | 11.56                | 0.2                 | 0.34                 | 0                      | 7.265   |        |
| STGM1439           | JS578      | JS48               | 903.36    | 0.04        | 205              | 185           | IRREGULAR  | 0       | 0.007109      | 9                 | 1/2013.800             | 8.8                  | 0.68                | 0.61                 | 0                      | 6.613   |        |
| STGM4173           | STMI116    | STMI113            | 89.51     | 0.012       | 210.16           | 207.67        | CIRCULAR   | 1       | 0.02214       | 48.92             | 1/2013.802             | 14.72                | 0.09                | 0.55                 | 0                      | 92.163  |        |
| STGM14             | STMI136    | STMI116            | 108.82    | 0.012       | 179.68           | 173.64        | CIRCULAR   | 1.25    | 0.02783       | 1.53              | 1/2013.800             | 6.13                 | 0.13                | 0.26                 | 0                      | 2.647   |        |
| STGM3955           | STJ050     | STMI1028           | 132.55    | 0.012       | 215.72           | 213.2         | CIRCULAR   | 2.5     | 0.00559       | 8.36              | 1/2013.800             | 13.78                | 0.92                | 0.72                 | 0                      | 24.347  |        |
| STGM1937           | STMI137    | STMI1136           | 134.51    | 0.012       | 164.26           | 162.55        | CIRCULAR   | 1.25    | 0.01902       | 27.87             | 1/2013.814             | 10.62                | 0.49                | 0.81                 | 0.01                   | 84.471  |        |
| STGM1348           | STMI122    | STMI1226           | 111.11    | 0.012       | 133.4            | 125.95        | CIRCULAR   | 1.5     | 0.01271       | 3.88              | 1/2013.801             | 7.55                 | 0.67                | 0.64                 | 0                      | 6.613   |        |
| STGM1034           | STMI002    | STMI0051           | 61.11     | 0.012       | 133.4            | 125.95        | CIRCULAR   | 1.5     | 0.00764       | 10.58             | 1/2013.800             | 14.39                | 0.36                | 0.43                 | 0                      | 21.925  |        |
| STGM1034           | STMI002    | STMI0051           | 61.11     | 0.012       | 133.4            | 125.95        | CIRCULAR   | 1.5     | 0.00764       | 10.58             | 1/2013.800             | 14.39                | 0.36                | 0.43                 | 0                      | 21.925  |        |
| STGM2051           | STMI074    | STMI0761           | 81.55     | 0.012       | 242.11           | 240.53        | CIRCULAR   | 1.25    | 0.008153      | 22.26             | 1/2013.803             | 7.42                 | 22.49               | 1.28                 | 0.75                   | 0.01    | 48.359 |
| STGM2051           | STMI074    | STMI0761           | 81.55     | 0.012       | 242.11           | 240.53        | CIRCULAR   | 1.25    | 0.008153      | 22.26             | 1/2013.803             | 7.42                 | 22.49               | 1.28                 | 0.75                   | 0.01    | 48.359 |
| STGM1934           | STMI122    | STMI1222           | 231.45    | 0.012       | 172.59           | 165.74        | CIRCULAR   | 1.25    | 0.00934       | 9.15              | 1/2013.801             | 8.25                 | 1.02                | 1                    | 0.02                   | 22.781  |        |
| STGM1934           | STMI122    | STMI1222           | 231.45    | 0.012       | 172.59           | 165.74        | CIRCULAR   | 1.25    | 0.00934       | 9.15              | 1/2013.801             | 8.25                 | 1.02                | 1                    | 0.02                   | 22.781  |        |
| STGM1466           | STMI138    | STMI1218           | 246.75    | 0.012       | 219.3            | 214.51        | CIRCULAR   | 1       | 0.00919       | 14.62             | 1/2013.800             | 8.59                 | 0.48                | 0                    | 35.526                 |         |        |
| STGM1466           | STMI138    | STMI1218           | 246.75    | 0.012       | 219.3            | 214.51        | CIRCULAR   | 1       | 0.00919       | 14.62             | 1/2013.800             | 8.59                 | 0.48                | 0                    | 35.526                 |         |        |
| CS2                | MS90       | STMI1218           | 246.75    | 0.012       | 219.3            | 214.51        | CIRCULAR   | 1       | 0.00919       | 14.62             | 1/2013.800             | 8.59                 | 0.48                | 0                    | 35.526                 |         |        |
| STGM4632           | STMI133    | STMI109            | 89.83     | 0.012       | 190.42           | 185.95        | IRREGULAR  | 0       | 0.02531       | 2.33              | 1/2013.801             | 9.45                 | 0.21                | 0.13                 | 0                      | 4.163   |        |
| STGM4632           | STMI133    | STMI109            | 89.83     | 0.012       | 190.42           | 185.95        | IRREGULAR  | 0       | 0.02531       | 2.33              | 1/2013.801             | 9.45                 | 0.21                | 0.13                 | 0                      | 4.163   |        |
| STGM1321           | STMI133    | STMI1212           | 245.72    | 0.013       | 184.1            | 179.21        | CIRCULAR   | 2.5     | 0.01971       | 10.77             | 1/2013.800             | 8.43                 | 0.26                | 0.36                 | 0                      | 33.084  |        |
| STGM1321           | STMI133    | STMI1212           | 245.72    | 0.013       | 184.1            | 179.21        | CIRCULAR   | 2.5     | 0.01971       | 10.77             | 1/2013.800             | 8.43                 | 0.26                | 0.36                 | 0                      | 33.084  |        |
| STGM4525           | STMI125    | STMI1229           | 302.77    | 0.013       | 180.4            | 170.43        | CIRCULAR   | 1.25    | 0.0034        | 4.41              | 1/2013.759             | 3.6                  | 1.17                | 1                    | 0.84                   | 7.781   |        |
| STGM4525           | STMI125    | STMI1229           | 302.77    | 0.013       | 180.4            | 170.43        | CIRCULAR   | 1.25    | 0.0034        | 4.41              | 1/2013.759             | 3.6                  | 1.17                | 1                    | 0.84                   | 7.781   |        |
| STGM4525           | STMI125    | STMI1233           | 382.78    | 0.012       | 178              | 175           | CIRCULAR   | 1       | 0.00784       | 3.76              | 1/2013.800             | 5.63                 | 1.1                 | 0.82                 | 0.01                   | 17.552  |        |
| STGM4525           | STMI125    | STMI1233           | 382.78    | 0.012       | 178              | 175           | CIRCULAR   | 1       | 0.00784       | 3.76              | 1/2013.800             | 5.63                 | 1.1                 | 0.82                 | 0.01                   | 17.552  |        |
| STGM4542           | STMI124    | STMI1227           | 338.44    | 0.013       | 175              | 174.3         | CIRCULAR   | 1.5     | 0.00433       | 10.79             | 1/2013.759             | 6.11                 | 1.33                | 1                    | 1.42                   | 25.062  |        |
| STGM4542           | STMI124    | STMI1227           | 338.44    | 0.013       | 175              | 174.3         | CIRCULAR   | 1.5     | 0.00433       | 10.79             | 1/2013.759             | 6.11                 | 1.33                | 1                    | 1.42                   | 25.062  |        |
| STGM4512           | STMI124    | STMI1227           | 293.17    | 0.012       | 176.5            | 175           | CIRCULAR   | 1.5     | 0.00512       | 10.79             | 1/2013.800             | 6.11                 | 1.33                | 1                    | 1.42                   | 25.062  |        |
| STGM4512           | STMI124    | STMI1227           | 293.17    | 0.012       | 176.5            | 175           | CIRCULAR   | 1.5     | 0.00512       | 10.79             | 1/2013.800             | 6.11                 | 1.33                | 1                    | 1.42                   | 25.062  |        |
| STGM4598           | STMI1227   | STMI1227           | 11.77     | 0.013       | 174.4            | 174.3         | CIRCULAR   | 1.5     | 0.0085        | 11.48             | 1/2013.800             | 8.21                 | 0.75                | 0.01                 | 25.062                 |         |        |
| STGM4598           | STMI1227   | STMI1227           | 11.77     | 0.013       | 174.4            | 174.3         | CIRCULAR   | 1.5     | 0.0085        | 11.48             | 1/2013.800             | 8.21                 | 0.75                | 0.01                 | 25.062                 |         |        |
| STGM4544           | STMI1229   | STMI1228           | 645.87    | 0.012       | 179.71           | 176.3         | CIRCULAR   | 1.5     | 0.00497       | 7.58              | 1/2013.759             | 4.29                 | 0.94                | 1                    | 0.01                   | 17.652  |        |
| STGM4544           | STMI1229   | STMI1228           | 645.87    | 0.012       | 179.71           | 176.3         | CIRCULAR   | 1.5     | 0.00497       | 7.58              | 1/2013.759             | 4.29                 | 0.94                | 1                    | 0.01                   | 17.652  |        |
| STGM1348           | STMI137    | STMI1136           | 134.51    | 0.013       | 165.25           | 163.98        | CIRCULAR   | 2       | 0.00245       | 13.75             | 1/2013.723             | 4.38                 | 1.2                 | 0.01                 | 10.584                 |         |        |
| STGM1348           | STMI137    | STMI1136           | 134.51    | 0.013       | 165.25           | 163.98        | CIRCULAR   | 2       | 0.00245       | 13.75             | 1/2013.723             | 4.38                 | 1.2                 | 0.01                 | 10.584                 |         |        |
| STGM1937           | STMI137    | STMI1136           | 134.51    | 0.013       | 165.25           | 163.98        | CIRCULAR   | 2       | 0.00245       | 13.75             | 1/2013.723             | 4.38                 | 1.2                 | 0.01                 | 10.584                 |         |        |
| STGM1937           | STMI137    | STMI1136           | 134.51    | 0.013       | 165.25           | 163.98        | CIRCULAR   | 2       | 0.00245       | 13.75             | 1/2013.723             | 4.38                 | 1.2                 | 0.01                 | 10.584                 |         |        |
| STGM4542           | STMI137    | STMI1136           | 134.51    | 0.013       | 165.25           | 163.98        | CIRCULAR   | 2       | 0.00245       | 13.75             | 1/2013.723             | 4.38                 | 1.2                 | 0.01                 | 10.584                 |         |        |
| STGM4542           | STMI137    | STMI1136           | 134.51    | 0.013       | 165.25           | 163.98        | CIRCULAR   | 2       | 0.00245       | 13.75             | 1/2013.723             | 4.38                 | 1.2                 | 0.01                 | 10.584                 |         |        |
| STGM4556           | STMI137    | STMI1139           | 137.91    | 0.013       | 161.23           | 160.73        | CIRCULAR   | 2       | 0.00348       | 16.67             | 1/2013.723             | 5.3                  | 1.25                | 1                    | 0.73                   | 24.003  |        |
| STGM4556           | STMI137    | STMI1139           | 137.91    | 0.013       | 161.23           | 160.73        | CIRCULAR   | 2       | 0.00348       | 16.67             | 1/2013.723             | 5.3                  | 1.25                | 1                    | 0.73                   | 24.003  |        |
| STGM2664           | STMI137    | STMI1137           | 184.13    | 0.013       | 162.42           | 161.23        | CIRCULAR   | 2       | 0.00348       | 16.64             | 1/2013.723             | 5.3                  | 1.24                | 1                    | 0.77                   | 29.866  |        |
| STGM2664           | STMI137    | STMI1137           | 184.13    | 0.013       | 162.42           | 161.23        | CIRCULAR   | 2       | 0.00348       | 16.64             | 1/2013.723             | 5.3                  | 1.24                | 1                    | 0.77                   | 29.866  |        |
| STGM371            | STMI139    | STMI1301           | 38.13     | 0.013       | 169.75           | 160.3         | CIRCULAR   | 2       | 0.00244       | 16.64             | 1/2013.800             | 5.9                  | 1.49                | 1                    | 1.54                   | 30.718  |        |
| STGM371            | STMI139    | STMI1301           | 38.13     | 0.013       | 169.75           | 160.3         | CIRCULAR   | 2       | 0.00244       | 16.64             | 1/2013.800             | 5.9                  | 1.49                | 1                    | 1.54                   | 30.718  |        |
| STGM2004           | STMI134    | STMI1210           | 361.98    | 0.024       | 222.05           | 216.25        | CIRCULAR   | 1.75    | 0.01603       | 1.78              | 1/2013.800             | 2.31                 | 0.16                | 0.37                 | 0                      | 3.448   |        |
| STGM2004           | STMI134    | STMI1210           | 361.98    | 0.024       | 222.05           | 216.25        | CIRCULAR   | 1.75    | 0.01603       | 1.78              | 1/2013.800             | 2.31                 | 0.16                | 0.37                 | 0                      | 3.448   |        |
| STGM2304           | STMI134    | STMI1210           | 361.98    | 0.024       | 222.05           | 216.25        | CIRCULAR   | 1.75    | 0.01603       | 1.78              | 1/2013.800             | 2.31                 | 0.16                | 0.37                 | 0                      | 3.448   |        |
| STGM2304           | STMI134    | STMI1210           | 361.98    | 0.024       | 222.05           | 216.25        | CIRCULAR   | 1.75    | 0.01603       | 1.78              | 1/2013.800             | 2.31                 | 0.16                | 0.37                 | 0                      | 3.448   |        |
| STGM379            | STMI149    | STMI1146           | 149.03    | 0.013       | 203.31           | 197.83        | CIRCULAR   | 1       | 0.01399       | 2.04              | 1/2013.800             | 5.53                 | 0.5                 | 0.48                 | 0                      | 18.796  |        |
| STGM379            | STMI149    | STMI1146           | 149.03    | 0.013       | 203.31           | 197.83        | CIRCULAR   | 1       | 0.01399       | 2.04              | 1/2013.800             | 5.53                 | 0.5                 | 0.48                 | 0                      | 18.796  |        |
| STGM2662           | JS960      | STMI124            | 180.02    | 0.013       | 183.3            | 180.73        | CIRCULAR   | 1       | 0.00878       | 2.73              | 1/2013.800             | 3.69                 | 0.82                | 1                    | 0.01                   | 6.489   |        |
| STGM2662           | JS960      | STMI124            | 180.02    | 0.013       | 183.3            | 180.73        | CIRCULAR   | 1       | 0.00878       | 2.73              | 1/2013.800             | 3.69                 | 0.82                | 1                    | 0.01                   | 6.489   |        |
| STGM3952           | STMI136    | STMI1364           | 192.85    | 0.012       | 178.28           | 172.07        | CIRCULAR   | 1.75    | 0.00402       | 18.51             | 1/2013.800             | 13.67                | 0.58                | 0.55                 | 0                      | 95.919  |        |
| STGM3952           | STMI136    | STMI1364           | 192.85    | 0.012       | 178.28           | 172.07        | CIRCULAR   | 1.75    | 0.00402       | 18.51             | 1/2013.800             | 13.67                | 0.58                | 0.55                 | 0                      | 95.919  |        |
| STGM4375           | STMI136    | STMI1364           | 192.85    | 0.012       | 178.28           | 172.07        | CIRCULAR   | 1.75    | 0.00402       | 18.51             | 1/2013.800             | 13.67                | 0.58                | 0.55                 | 0                      | 95.919  |        |
| STGM4375           | STMI136    | STMI1364           | 192.85    | 0.012       | 178.28           | 172.07        | CIRCULAR   | 1.75    | 0.00402       | 18.51             | 1/2013.800             | 13.67                | 0.58                | 0.55                 | 0                      | 95.919  |        |
| STGM6              | JS8102     | JS8106             | 106.51    | 0.013       | 180              | 176           | CIRCULAR   | 5       | 0.00612       | 8.36              | 1/2013.800             | 13.67                | 1.02                | 0.05                 | 0.01                   | 24.347  |        |
| STGM6              | JS8102     | JS8106             | 106.51    | 0.013       | 180              | 176           | CIRCULAR   | 5       | 0.00612       | 8.36              | 1/2013.800             | 13.67                | 1.02                | 0.05                 | 0.01                   | 24.347  |        |
| STGM4065           | JS8102     | JS8106             | 106.51    | 0.013       | 180              | 176           | CIRCULAR   | 5       | 0.00612       | 8.36              | 1/2013.800             | 13.67                | 1.02                | 0.05                 | 0.01                   | 24.347  |        |
| STGM4065           | JS8102     | JS8106             | 106.51    | 0.013       | 180              | 176           | CIRCULAR   | 5       | 0.00612       | 8.36              | 1/2013.800             | 13.67                | 1.02                | 0.05                 | 0.01                   | 24.347  |        |
| STGM3804           | STMI021    | STMI023            | 483.12    | 0.013       | 215.79           | 212.09        | CIRCULAR   | 1.25    | 0.00786       | 7.62              | 1/2013.800             | 4.31                 | 1.21                | 0.41                 | 0                      | 278.942 |        |
| STGM3804           | STMI021    | STMI023            | 483.12    | 0.013       | 215.79           | 212.09        | CIRCULAR   | 1.25    | 0.00786       | 7.62              | 1/2013.800             | 4.31                 | 1.21                | 0.41                 | 0                      | 278.942 |        |
| STGM1934           | STMI122    | STMI1222           | 231.45    | 0.012       | 172.59           | 165.74        | CIRCULAR   | 1.25    | 0.00961       | 3.66              | 1/2013.800             | 5.51                 | 0.65                | 0.79                 | 0.01                   | 42.571  |        |
| STGM1934           | STMI122    | STMI1222           | 231.45    | 0.012       | 172.59           | 165.74        | CIRCULAR   | 1.25    | 0.00961       | 3.66              | 1/2013.800             | 5.51                 | 0.65                | 0.79                 | 0.01                   | 42.571  |        |
| STGM1934           | STMI122    | STMI1222           | 231.45    | 0.012       | 172.59           |               |            |         |               |                   |                        |                      |                     |                      |                        |         |        |







Conduits CP Model

| Name    | Inlet Node | Outlet Node | Length(ft) | Reignish s | Inlet Elev. (ft) | Outlet Elev. (ft) | Cross-Section | Geom. (ft) | Barrels | Transsect | Slope | Max. Flow (cfs) | Time Max. Flow (M/D/Y) | Max. Velocity (ft/s) | May/Full Flow | May/Full Depth | Capacity (lb) | Contributing Area (ac) |
|---------|------------|-------------|------------|------------|------------------|-------------------|---------------|------------|---------|-----------|-------|-----------------|------------------------|----------------------|---------------|----------------|---------------|------------------------|
| sgm2884 | sgm12186   | sgm12185    | 48.749     | 0.013      | 175.23           | 174.94            | CIRCULAR      | 2.5        | 1       | 0.00442   | 16.33 | 1/1/2013 7:59   | 8.92                   | 0.52                 | 0.4           | 0              | 28.496        | 13.634                 |
| sgm2749 | sgm10131   | E17         | 214.873    | 0.013      | 185.06           | 184.11            | CIRCULAR      | 2.5        | 1       | 0.00442   | 16.33 | 1/1/2013 7:59   | 8.92                   | 0.52                 | 0.4           | 0              | 28.496        | 13.634                 |
| sgm2272 | sgm121201  | sgm121207   | 129.384    | 0.013      | 176.36           | 175.72            | CIRCULAR      | 2.5        | 1       | 0.00495   | 16.33 | 1/1/2013 8:00   | 6.06                   | 0.57                 | 0.54          | 0              | 28.496        | 13.634                 |
| sgm2094 | sgm12184   | sgm12183    | 78.986     | 0.013      | 173.059          | 165.1             | CIRCULAR      | 2.5        | 1       | 0.00983   | 16.33 | 1/1/2013 8:01   | 7.83                   | 0.4                  | 0.44          | 0              | 28.496        | 13.634                 |
| sgm1826 | sgm12183   | sgm12182    | 153.652    | 0.013      | 162.61           | 161.1             | CIRCULAR      | 2.5        | 1       | 0.00983   | 16.33 | 1/1/2013 8:00   | 6.71                   | 0.49                 | 0.5           | 0              | 28.496        | 13.634                 |
| sgm1801 | sgm12202   | sgm12201    | 66.164     | 0.013      | 176.9            | 176.46            | CIRCULAR      | 2.5        | 1       | 0.00331   | 6.67  | 1/1/2013 8:00   | 3.78                   | 1.1                  | 1             | 0.21           | 12.636        | 7.558                  |
| sgm1190 | E115       | sgm11016    | 30.224     | 0.013      | 191.62           | 179.3             | CIRCULAR      | 1.5        | 1       | 0.02183   | 4.38  | 1/1/2013 8:00   | 6.04                   | 0.38                 | 0.43          | 0              | 0.134         | 12.636                 |
| sgm1175 | sf112043   | sf112044    | 27.046     | 0.013      | 179.62           | 179.4             | CIRCULAR      | 1.5        | 1       | 0.00151   | 6.67  | 1/1/2013 8:00   | 3.78                   | 1.63                 | 0.1           | 0.38           | 12.636        | 7.558                  |
| sgm1138 | sgm10028   | sgm10036    | 330.285    | 0.013      | 192.3            | 191.8             | CIRCULAR      | 1.5        | 1       | 0.00958   | 4.38  | 1/1/2013 8:00   | 5.59                   | 0.43                 | 0.46          | 0              | 0.955         | 12.636                 |
| sgm0801 | sgm12224   | sf112043    | 188.842    | 0.013      | 181.5            | 179.78            | CIRCULAR      | 1.5        | 1       | 0.01248   | 0.33  | 1/1/2013 8:00   | 3.11                   | 0.08                 | 0.19          | 0              | 0.955         | 12.636                 |
| sgm0681 | E112       | sgm12016    | 37.754     | 0.013      | 177.36           | 176.87            | CIRCULAR      | 1          | 1       | 0.00983   | 16.33 | 1/1/2013 8:01   | 7.83                   | 0.4                  | 0.44          | 0              | 28.496        | 13.634                 |
| sgm0170 | sgm12182   | sgm12183    | 63.011     | 0.013      | 160.9            | 160.28            | CIRCULAR      | 2.5        | 1       | 0.01747   | 16.33 | 1/1/2013 8:00   | 13.64                  | 0.18                 | 0.29          | 0              | 28.496        | 13.634                 |
| sgm0109 | sgm12185   | sgm12184    | 39.013     | 0.013      | 174.94           | 173.09            | CIRCULAR      | 2.5        | 1       | 0.00287   | 6.67  | 1/1/2013 8:00   | 4.64                   | 1.45                 | 0.78          | 0.01           | 12.636        | 7.558                  |
| sgm0079 | sgm10114   | sgm01114    | 209.16     | 0.013      | 191.4            | 190.8             | CIRCULAR      | 1.5        | 1       | 0.00833   | 0.06  | 1/1/2013 8:00   | 2.5                    | 0.02                 | 0.07          | 0              | 0.134         | 12.636                 |
| sgm5582 | sf1131003  | E21         | 12         | 0.013      | 111.8            | 111.7             | CIRCULAR      | 1          | 1       | 0.008     | 0.06  | 1/1/2013 8:00   | 1.59                   | 0.02                 | 0.09          | 0              | 0.134         | 12.636                 |
| sgm5581 | sf1131003  | sf1131003   | 25         | 0.012      | 112              | 111.8             | CIRCULAR      | 1          | 1       | 0.008     | 0.06  | 1/1/2013 8:00   | 1.59                   | 0.02                 | 0.09          | 0              | 0.134         | 12.636                 |
| sgm5580 | sf1131003  | sf1131003   | 28         | 0.013      | 113.4            | 113.25            | CIRCULAR      | 1          | 1       | 0.00536   | 0.06  | 1/1/2013 8:00   | 1.42                   | 0.02                 | 0.1           | 0              | 0.134         | 12.636                 |
| sgm5579 | sf1131003  | sf1131003   | 22         | 0.013      | 113.4            | 113.25            | CIRCULAR      | 1          | 1       | 0.00536   | 0.06  | 1/1/2013 8:00   | 1.42                   | 0.02                 | 0.1           | 0              | 0.134         | 12.636                 |
| sgm5578 | sf1131003  | sf1131003   | 201        | 0.013      | 150.08           | 149.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5577 | sf1131003  | sf1131003   | 215        | 0.013      | 151.44           | 150.41            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5576 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5575 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5574 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5573 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5572 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5571 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5570 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5569 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5568 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5567 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5566 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5565 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5564 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5563 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5562 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5561 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5560 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5559 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5558 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5557 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5556 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5555 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5554 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5553 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5552 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5551 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5550 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5549 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5548 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5547 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5546 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5545 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5544 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5543 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5542 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5541 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5540 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5539 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5538 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5537 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5536 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5535 | sf1131003  | sf1131003   | 241        | 0.013      | 152.42           | 151.73            | CIRCULAR      | 3          | 1       | 0.00347   | 38.37 | 1/1/2013 8:00   | 7.33                   | 0.98                 | 0.69          | 0              | 68.688        | 18.688                 |
| sgm5534 |            |             |            |            |                  |                   |               |            |         |           |       |                 |                        |                      |               |                |               |                        |

Conduits OP Model

| Name    | Inlet Node | Outlet Node | Length (ft) | Roughness | Inlet Elev. (ft) | Outlet Elev. (ft) | Cross-Section | Geom. (ft) | Barrels | Transverse | Slope (ft/ft) | Max. Flow (cfs) | Time Max. Flow (M/D/V) | Max. Velocity (ft/s) | Max/Frill Flow | Max/Frill Depth | Capacity Utilized (ft) | Contributing Area (ac) |
|---------|------------|-------------|-------------|-----------|------------------|-------------------|---------------|------------|---------|------------|---------------|-----------------|------------------------|----------------------|----------------|-----------------|------------------------|------------------------|
| sgm2379 | stnH11093  | stnH11097   | 95.869      | 0.013     | 200.09           | 199.67            | CIRCULAR      | 1.5        | 1       | 0.00489    | 4.66          | 1/1/2013 5:00   | 4.62                   | 0.66                 | 0.58           | 0               | 8.979                  |                        |
| sgm2324 | stnH11123  | stnH1126    | 80.832      | 0.013     | 183.21           | 182.32            | CIRCULAR      | 2.167      | 1       | 0.0076     | 18.1          | 1/1/2013 6:00   | 7.07                   | 0.66                 | 0.59           | 0               | 28.114                 |                        |
| sgm2186 | E93        | E94         | 45.635      | 0.013     | 167.29           | 166.56            | CIRCULAR      | 1          | 1       | 0.036      | 8.04          | 1/1/2013 6:00   | 4.67                   | 0.23                 | 0.33           | 0               | 1.65                   |                        |
| sgm2165 | stnH11149  | stnH1146    | 142.352     | 0.013     | 200.98           | 199.19            | CIRCULAR      | 2          | 1       | 0.00937    | 8.41          | 1/1/2013 6:00   | 6.5                    | 0.38                 | 0.43           | 0               | 13.931                 |                        |
| sgm2151 | stnH11149  | stnH1146    | 142.352     | 0.013     | 197.97           | 195.8             | CIRCULAR      | 2.167      | 1       | 0.01525    | 8.3           | 1/1/2013 6:00   | 7.16                   | 0.35                 | 0.35           | 0               | 15.278                 |                        |
| sgm2092 | stnH11202  | stnH1207    | 85.821      | 0.013     | 161.07           | 160.39            | CIRCULAR      | 2.5        | 1       | 0.00792    | 17.96         | 1/1/2013 6:00   | 5.64                   | 1.75                 | 1              | 1.59            | 7.766                  |                        |
| sgm2088 | E66        | J10         | 120.449     | 0.013     | 187.96           | 187.35            | CIRCULAR      | 1          | 1       | 0.00506    | 4.43          | 1/1/2013 6:02   | 6.84                   | 0.47                 | 0.48           | 0               | 28.114                 |                        |
| sgm2005 | E88        | E89         | 41.416      | 0.013     | 169.16           | 168.67            | CIRCULAR      | 1          | 1       | 0.01183    | 1.86          | 1/1/2013 6:04   | 4.88                   | 0.48                 | 0.49           | 0               | 3.324                  |                        |
| sgm1970 | E88        | STMH1141    | 196.019     | 0.013     | 206.5            | 205.4             | CIRCULAR      | 2.5        | 1       | 0.00551    | 2.01          | 1/1/2013 6:00   | 3.87                   | 0.75                 | 0.63           | 0               | 3.757                  |                        |
| sgm1863 | stnH11097  | stnH11099   | 330.328     | 0.013     | 199.57           | 198.91            | CIRCULAR      | 1          | 1       | 0.01024    | 8.41          | 1/1/2013 6:00   | 6.77                   | 0.55                 | 0.57           | 0               | 8.479                  |                        |
| sgm1855 | stnH11002  | stnH11009   | 395.328     | 0.013     | 206.6            | 204.6             | CIRCULAR      | 1.75       | 1       | 0.00169    | 1.04          | 1/1/2013 6:00   | 4.17                   | 0.27                 | 0.36           | 0               | 1.65                   |                        |
| sgm1820 | stnH11149  | stnH1146    | 142.352     | 0.013     | 165.09           | 162.8             | CIRCULAR      | 2          | 1       | 0.00161    | 8.3           | 1/1/2013 6:00   | 6.76                   | 0.35                 | 0.41           | 0               | 15.278                 |                        |
| sgm1809 | stnH11149  | stnH1146    | 142.352     | 0.013     | 202.22           | 199.59            | CIRCULAR      | 2          | 1       | 0.00263    | 8.3           | 1/1/2013 6:00   | 7.24                   | 0.33                 | 0.39           | 0               | 3.234                  |                        |
| sgm1802 | E93        | E97         | 35.883      | 0.013     | 203.31           | 202.49            | CIRCULAR      | 1          | 1       | 0.01173    | 1.04          | 1/1/2013 6:00   | 4.17                   | 0.27                 | 0.35           | 0               | 1.65                   |                        |
| sgm1794 | E98        | E99         | 15.883      | 0.013     | 178.8            | 177.6             | CIRCULAR      | 2.5        | 1       | 0.00391    | 16.1          | 1/1/2013 6:01   | 6.46                   | 0.31                 | 0.31           | 0               | 28.114                 |                        |
| sgm1781 | stnH11056  | stnH11058   | 116.707     | 0.013     | 184.81           | 187.06            | CIRCULAR      | 2.5        | 1       | 0.00354    | 16.46         | 1/1/2013 6:01   | 7.5                    | 0.33                 | 1              | 0.01            | 37.712                 |                        |
| sgm1737 | stnH11056  | stnH11048   | 112.774     | 0.013     | 184.81           | 187.06            | CIRCULAR      | 2.5        | 1       | 0.00354    | 16.46         | 1/1/2013 6:01   | 7.5                    | 0.33                 | 1              | 0.01            | 37.712                 |                        |
| sgm1721 | stnH11279  | stnH11048   | 55.317      | 0.013     | 194.03           | 193.45            | CIRCULAR      | 2.5        | 1       | 0.00354    | 16.46         | 1/1/2013 6:01   | 7.5                    | 0.33                 | 1              | 0.01            | 37.712                 |                        |
| sgm1716 | E48        | stnH11042   | 137.175     | 0.013     | 198.34           | 197.83            | CIRCULAR      | 2          | 1       | 0.00354    | 16.46         | 1/1/2013 6:01   | 7.5                    | 0.33                 | 1              | 0.01            | 37.712                 |                        |
| sgm1694 | stnH11200  | stnH11402   | 109.5       | 0.013     | 162.08           | 160.32            | CIRCULAR      | 2          | 1       | 0.00312    | 17.96         | 1/1/2013 6:02   | 7.48                   | 0.49                 | 0.49           | 0               | 31.348                 |                        |
| sgm1683 | stnH11200  | stnH11402   | 109.5       | 0.013     | 205.08           | 203.32            | CIRCULAR      | 2          | 1       | 0.00312    | 17.96         | 1/1/2013 6:02   | 7.48                   | 0.49                 | 0.49           | 0               | 31.348                 |                        |
| sgm1677 | E45        | stnH11029   | 114.004     | 0.013     | 202.49           | 201.64            | CIRCULAR      | 1.25       | 1       | 0.00146    | 8.41          | 1/1/2013 6:03   | 5.5                    | 0.41                 | 0.45           | 0               | 3.234                  |                        |
| sgm1515 | E85        | stnH11029   | 114.004     | 0.013     | 202.49           | 201.64            | CIRCULAR      | 1.25       | 1       | 0.00146    | 8.41          | 1/1/2013 6:03   | 5.5                    | 0.41                 | 0.45           | 0               | 3.234                  |                        |
| sgm1498 | E81        | E82         | 31.883      | 0.013     | 187.38           | 178.81            | CIRCULAR      | 1          | 1       | 0.01495    | 1.86          | 1/1/2013 6:02   | 4.82                   | 0.49                 | 0.49           | 0               | 3.234                  |                        |
| sgm1406 | stnH11111  | stnH11052   | 98.72       | 0.013     | 196.51           | 195.05            | CIRCULAR      | 2          | 1       | 0.00179    | 6.61          | 1/1/2013 6:00   | 7.2                    | 0.34                 | 0.33           | 1               | 1.06                   | 8.479                  |
| sgm1385 | E70        | E71         | 38.155      | 0.013     | 202.54           | 202.47            | CIRCULAR      | 1          | 1       | 0.00165    | 4.86          | 1/1/2013 6:00   | 5.31                   | 0.39                 | 0.61           | 0               | 4.631                  |                        |
| sgm1352 | E78        | E79         | 279.989     | 0.013     | 190.85           | 190.85            | CIRCULAR      | 1          | 1       | 0.00165    | 4.86          | 1/1/2013 6:00   | 5.31                   | 0.39                 | 0.61           | 0               | 4.631                  |                        |
| sgm1049 | E77        | E78         | 26.218      | 0.013     | 199.11           | 197.53            | CIRCULAR      | 1.75       | 1       | 0.00604    | 6.61          | 1/1/2013 6:01   | 5.21                   | 0.54                 | 0.52           | 0               | 11.64                  |                        |
| sgm0997 | E89        | stnH12099   | 42.155      | 0.013     | 164.17           | 163.96            | CIRCULAR      | 1.25       | 1       | 0.00561    | 1.86          | 1/1/2013 6:01   | 5.41                   | 0.42                 | 0.45           | 0               | 3.234                  |                        |
| sgm0931 | stnH12099  | stnH12099   | 141.929     | 0.013     | 181.44           | 180.38            | CIRCULAR      | 2.167      | 1       | 0.00498    | 1.86          | 1/1/2013 6:01   | 5.41                   | 0.42                 | 0.45           | 0               | 3.234                  |                        |
| sgm0879 | stnH11048  | stnH11056   | 73.65       | 0.013     | 188.95           | 188.22            | CIRCULAR      | 2          | 1       | 0.00938    | 16.1          | 1/1/2013 6:01   | 7.81                   | 0.71                 | 0.62           | 0               | 28.114                 |                        |
| sgm0879 | stnH11048  | stnH11056   | 73.65       | 0.013     | 192.52           | 191.89            | CIRCULAR      | 2          | 1       | 0.00938    | 16.1          | 1/1/2013 6:01   | 7.81                   | 0.71                 | 0.62           | 0               | 28.114                 |                        |
| sgm0877 | stnH1207   | stnH12121   | 143.263     | 0.013     | 159.18           | 158.02            | CIRCULAR      | 2          | 1       | 0.00647    | 9.27          | 1/1/2013 6:00   | 5.82                   | 0.51                 | 0.51           | 0               | 16.271                 |                        |
| sgm0829 | stnH12099  | stnH12121   | 69.354      | 0.013     | 162.71           | 162.16            | CIRCULAR      | 2.5        | 1       | 0.00881    | 17.96         | 1/1/2013 6:02   | 7.41                   | 0.49                 | 0.49           | 0               | 31.348                 |                        |
| sgm0756 | stnH111056 | stnH11048   | 49.453      | 0.013     | 187.28           | 185.62            | CIRCULAR      | 2.5        | 1       | 0.00408    | 16.1          | 1/1/2013 6:00   | 11.3                   | 0.35                 | 0.46           | 0               | 28.114                 |                        |
| sgm0754 | E75        | E76         | 154.277     | 0.013     | 207.4            | 201.62            | CIRCULAR      | 1          | 1       | 0.00506    | 1.86          | 1/1/2013 6:00   | 3.71                   | 0.74                 | 0.61           | 0               | 3.234                  |                        |
| sgm0689 | E63        | stnH11279   | 43.313      | 0.013     | 197.53           | 197.01            | CIRCULAR      | 1          | 1       | 0.00184    | 2.66          | 1/1/2013 6:00   | 5.32                   | 0.69                 | 0.61           | 0               | 4.631                  |                        |
| sgm0685 | stnH11048  | stnH11048   | 134.816     | 0.013     | 193.43           | 192.72            | CIRCULAR      | 2.5        | 1       | 0.00337    | 8.93          | 1/1/2013 6:00   | 5.3                    | 0.3                  | 0.38           | 0               | 20.804                 |                        |
| sgm0686 | E59        | E60         | 299.305     | 0.013     | 215.89           | 209.99            | CIRCULAR      | 1.25       | 1       | 0.00264    | 8.31          | 1/1/2013 6:00   | 9.48                   | 0.79                 | 0.67           | 0               | 15.278                 |                        |
| sgm0686 | E65        | E64         | 183.656     | 0.013     | 201.87           | 199.7             | CIRCULAR      | 1          | 1       | 0.00181    | 2.66          | 1/1/2013 6:00   | 5.31                   | 0.69                 | 0.61           | 0               | 4.631                  |                        |
| sgm0678 | E65        | E70         | 275.107     | 0.013     | 203.79           | 202.86            | CIRCULAR      | 1          | 1       | 0.00481    | 4.46          | 1/1/2013 6:00   | 6.19                   | 1.87                 | 1              | 1.07            | 8.479                  |                        |
| sgm0678 | stnH11048  | stnH11048   | 134.816     | 0.013     | 188.1            | 185.78            | CIRCULAR      | 1.5        | 1       | 0.00048    | 4.43          | 1/1/2013 6:00   | 4.28                   | 0.61                 | 1              | 0.01            | 7.766                  |                        |
| sgm0644 | E47        | E48         | 98.929      | 0.013     | 192.54           | 198.34            | CIRCULAR      | 2          | 1       | 0.00392    | 8.41          | 1/1/2013 6:00   | 6.02                   | 0.07                 | 0.33           | 0               | 19.153                 |                        |
| sgm0630 | stnH11048  | stnH11111   | 49.443      | 0.013     | 212.84           | 212.81            | CIRCULAR      | 2.42       | 1       | 0.00392    | 8.41          | 1/1/2013 6:00   | 6.02                   | 0.07                 | 0.33           | 0               | 19.153                 |                        |
| sgm0625 | stnH12054  | stnH12044   | 91.164      | 0.013     | 176.31           | 174.84            | CIRCULAR      | 2.5        | 1       | 0.00502    | 0.23          | 1/1/2013 6:00   | 2.34                   | 0.09                 | 0.18           | 0               | 0.507                  |                        |
| sgm0621 | stnH1151   | stnH1154    | 57.316      | 0.013     | 194.65           | 194.84            | CIRCULAR      | 2.42       | 1       | 0.00502    | 0.23          | 1/1/2013 6:00   | 2.34                   | 0.09                 | 0.18           | 0               | 0.507                  |                        |
| sgm0620 | E76        | E77         | 245.153     | 0.013     | 201.53           | 199.23            | CIRCULAR      | 1          | 1       | 0.00502    | 0.23          | 1/1/2013 6:00   | 2.34                   | 0.09                 | 0.18           | 0               | 0.507                  |                        |
| sgm0541 | stnH12044  | stnH12044   | 15.5        | 0.013     | 162.62           | 162.57            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0540 | stnH12044  | stnH12044   | 28.82       | 0.013     | 163.12           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0539 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0538 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0535 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0535 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0535 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0535 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0535 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0535 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0535 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0535 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0535 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0535 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0535 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0535 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0535 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0535 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0535 | stnH12044  | stnH12044   | 89.59       | 0.013     | 163.02           | 162.96            | CIRCULAR      | 1          | 1       | 0.00497    | 1.11          | 1/1/2013 6:00   | 7.11                   | 0.14                 | 0.25           | 0               | 2.464                  |                        |
| sgm0535 | stnH1204   |             |             |           |                  |                   |               |            |         |            |               |                 |                        |                      |                |                 |                        |                        |

Conduits CIP Model

| Name    | Inlet Node | Outlet Node | Outlet Length (ft) | Roughness | Inlet Elev. (ft) | Outlet Elev. (ft) | Cross-Section (ft) | Geom. (ft) | Barrels | Transsect | Slope (ft/ft) | Max. Flow (MGD) | Time Max. Flow (MGD) | Max. Velocity (ft/s) | Max/Full Depth (ft) | Capacity Limited (ft) | Contributing Area (sq. ft) |       |
|---------|------------|-------------|--------------------|-----------|------------------|-------------------|--------------------|------------|---------|-----------|---------------|-----------------|----------------------|----------------------|---------------------|-----------------------|----------------------------|-------|
| STGM207 | STF0602    | STF0601     | 38                 | 0.013     | 232.3            | 232.3             | CIRCULAR           | 1          | 1       |           | 0.15717       | 0.32            | 1/1/2013.000         | 2.37                 | 0.02                | 0.1                   | 0.751                      |       |
| STGM208 | STF0603    | STF0602     | 38                 | 0.013     | 232.3            | 232.3             | CIRCULAR           | 1          | 1       |           | 0.15717       | 0.32            | 1/1/2013.000         | 2.37                 | 0.02                | 0.1                   | 0.751                      |       |
| STGM209 | STF0604    | STF0603     | 38                 | 0.013     | 232.3            | 232.3             | CIRCULAR           | 1          | 1       |           | 0.14053       | 0.63            | 1/1/2013.000         | 3.48                 | 0.17                | 0.28                  | 0                          | 1.479 |
| STGM210 | STF0605    | STF0604     | 38                 | 0.013     | 232.3            | 232.3             | CIRCULAR           | 1          | 1       |           | 0.14053       | 0.63            | 1/1/2013.000         | 3.48                 | 0.17                | 0.28                  | 0                          | 1.479 |
| STGM211 | STF0606    | STF0605     | 61.62              | 0.013     | 230.35           | 238.79            | CIRCULAR           | 1          | 1       |           | 0.00375       | 2.32            | 1/1/2013.000         | 3.69                 | 0.77                | 0.74                  | 0                          | 5.769 |
| STGM212 | STF0607    | STF0606     | 37.52              | 0.013     | 231.68           | 231.68            | CIRCULAR           | 1          | 1       |           | 0.00375       | 1.7             | 1/1/2013.000         | 3.43                 | 0.84                | 0.6                   | 0                          | 4.29  |
| STGM213 | STF0608    | STF0607     | 146.5              | 0.013     | 231.24           | 230.65            | CIRCULAR           | 1          | 1       |           | 0.00403       | 1.69            | 1/1/2013.000         | 3.44                 | 0.75                | 0.6                   | 0                          | 4.29  |
| STGM214 | STF0609    | STF0608     | 173.3              | 0.013     | 231.69           | 219.2             | CIRCULAR           | 1          | 1       |           | 0.00403       | 1.69            | 1/1/2013.000         | 3.44                 | 0.75                | 0.6                   | 0                          | 4.29  |
| STGM215 | STF0610    | STF0609     | 71.33              | 0.013     | 218.95           | 218.08            | CIRCULAR           | 1          | 1       |           | 0.00502       | 0.52            | 1/1/2013.000         | 2.83                 | 0.18                | 0.28                  | 0                          | 1.243 |
| STGM216 | STF0611    | STF0610     | 33                 | 0.013     | 193.76           | 193.61            | CIRCULAR           | 1          | 1       |           | 0.00455       | 0.86            | 1/1/2013.000         | 2.56                 | 0.4                 | 0                     | 1.643                      |       |
| STGM217 | STF0612    | STF0611     | 55                 | 0.013     | 193.53           | 193.27            | CIRCULAR           | 1          | 1       |           | 0.00436       | 0.86            | 1/1/2013.000         | 2.52                 | 0.36                | 0.4                   | 0                          | 1.643 |
| STGM218 | STF0613    | STF0612     | 119                | 0.013     | 193.74           | 192.57            | CIRCULAR           | 1          | 1       |           | 0.0042        | 0.86            | 1/1/2013.000         | 2.39                 | 0.37                | 0.47                  | 0                          | 1.643 |
| STGM219 | STF0614    | STF0613     | 58                 | 0.013     | 194.47           | 192.67            | CIRCULAR           | 1          | 1       |           | 0.00421       | 1.18            | 1/1/2013.000         | 2.78                 | 0.95                | 0.53                  | 0                          | 2.893 |
| STGM220 | STF0615    | STF0614     | 132                | 0.013     | 193.17           | 192.85            | CIRCULAR           | 1          | 1       |           | 0.00461       | 0.86            | 1/1/2013.000         | 2.92                 | 0.95                | 0.4                   | 0                          | 1.643 |
| STGM221 | STF0616    | STF0615     | 96                 | 0.013     | 192.2            | 186.09            | CIRCULAR           | 1.75       | 1       |           | 0.00491       | 0.23            | 1/1/2013.000         | 1.16                 | 0.07                | 1                     | 0.01                       | 0.019 |
| STGM222 | STF0617    | STF0616     | 68                 | 0.013     | 192.42           | 192.1             | CIRCULAR           | 1          | 1       |           | 0.00471       | 0.22            | 1/1/2013.759         | 0.18                 | 0.01                | 0.68                  | 0.01                       | 0.029 |
| STGM223 | STF0618    | STF0617     | 28                 | 0.013     | 191.9            | 191.73            | CIRCULAR           | 1          | 1       |           | 0.00471       | 2.04            | 1/1/2013.000         | 3.82                 | 0.83                | 0.64                  | 0                          | 4.186 |
| STGM224 | STF0619    | STF0618     | 30                 | 0.013     | 186.63           | 189.49            | CIRCULAR           | 1          | 1       |           | 0.01375       | 2.17            | 0.01/2013.16:38 PM   | 3.95                 | 0.52                | 1                     | 0.01                       | 4.186 |
| STGM225 | STF0620    | STF0619     | 44                 | 0.013     | 186.29           | 188.71            | CIRCULAR           | 1          | 1       |           | 0.00467       | 1.92            | 1/1/2013.000         | 2.45                 | 0.79                | 1                     | 1.62                       | 4.186 |
| STGM226 | STF0621    | STF0620     | 310.7              | 0.013     | 179.55           | 177               | CIRCULAR           | 2.25       | 1       |           | 0.00318       | 1.92            | 1/1/2013.000         | 2.54                 | 0.96                | 0.01                  | 4.186                      |       |
| STGM227 | STF0622    | STF0621     | 52.67              | 0.013     | 180.7            | 179.8             | CIRCULAR           | 2.25       | 1       |           | 0.00318       | 1.92            | 1/1/2013.000         | 2.54                 | 0.96                | 0.01                  | 4.186                      |       |
| STGM228 | STF0623    | STF0622     | 423.04             | 0.013     | 182.93           | 180.8             | CIRCULAR           | 2.25       | 1       |           | 0.00318       | 1.92            | 1/1/2013.000         | 2.54                 | 0.96                | 0.01                  | 4.186                      |       |
| STGM229 | STF0624    | STF0623     | 40                 | 0.013     | 176.69           | 184.9             | CIRCULAR           | 1          | 1       |           | 0.00318       | 1.92            | 1/1/2013.000         | 2.54                 | 0.96                | 0.01                  | 4.186                      |       |
| STGM230 | STF0625    | STF0624     | 57.56              | 0.013     | 185.1            | 184.9             | CIRCULAR           | 1          | 1       |           | 0.00318       | 1.92            | 1/1/2013.000         | 2.54                 | 0.96                | 0.01                  | 4.186                      |       |
| STGM231 | STF0626    | STF0625     | 42.21              | 0.013     | 185.1            | 184.9             | CIRCULAR           | 1          | 1       |           | 0.00318       | 1.92            | 1/1/2013.000         | 2.54                 | 0.96                | 0.01                  | 4.186                      |       |
| STGM232 | STF0627    | STF0626     | 151.7              | 0.013     | 185.1            | 184.9             | CIRCULAR           | 1          | 1       |           | 0.00318       | 1.92            | 1/1/2013.000         | 2.54                 | 0.96                | 0.01                  | 4.186                      |       |
| STGM233 | STF0628    | STF0627     | 18                 | 0.013     | 167.75           | 160.54            | CIRCULAR           | 1          | 1       |           | 0.00318       | 1.92            | 1/1/2013.000         | 2.54                 | 0.96                | 0.01                  | 4.186                      |       |
| STGM234 | STF0629    | STF0628     | 160.34             | 0.013     | 167.75           | 160.54            | CIRCULAR           | 1          | 1       |           | 0.00318       | 1.92            | 1/1/2013.000         | 2.54                 | 0.96                | 0.01                  | 4.186                      |       |
| STGM235 | STF0630    | STF0629     | 28.4               | 0.013     | 174.2            | 174.2             | CIRCULAR           | 2          | 1       |           | 0.00318       | 1.92            | 1/1/2013.000         | 2.54                 | 0.96                | 0.01                  | 4.186                      |       |
| STGM236 | STF0631    | STF0630     | 551                | 0.013     | 174.2            | 174.2             | CIRCULAR           | 2          | 1       |           | 0.00318       | 1.92            | 1/1/2013.000         | 2.54                 | 0.96                | 0.01                  | 4.186                      |       |
| STGM237 | STF0632    | STF0631     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM238 | STF0633    | STF0632     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM239 | STF0634    | STF0633     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM240 | STF0635    | STF0634     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM241 | STF0636    | STF0635     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM242 | STF0637    | STF0636     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM243 | STF0638    | STF0637     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM244 | STF0639    | STF0638     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM245 | STF0640    | STF0639     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM246 | STF0641    | STF0640     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM247 | STF0642    | STF0641     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM248 | STF0643    | STF0642     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM249 | STF0644    | STF0643     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM250 | STF0645    | STF0644     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM251 | STF0646    | STF0645     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM252 | STF0647    | STF0646     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM253 | STF0648    | STF0647     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM254 | STF0649    | STF0648     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM255 | STF0650    | STF0649     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM256 | STF0651    | STF0650     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM257 | STF0652    | STF0651     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM258 | STF0653    | STF0652     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM259 | STF0654    | STF0653     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM260 | STF0655    | STF0654     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM261 | STF0656    | STF0655     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM262 | STF0657    | STF0656     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM263 | STF0658    | STF0657     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM264 | STF0659    | STF0658     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM265 | STF0660    | STF0659     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM266 | STF0661    | STF0660     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM267 | STF0662    | STF0661     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM268 | STF0663    | STF0662     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM269 | STF0664    | STF0663     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM270 | STF0665    | STF0664     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM271 | STF0666    | STF0665     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM272 | STF0667    | STF0666     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM273 | STF0668    | STF0667     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM274 | STF0669    | STF0668     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM275 | STF0670    | STF0669     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM276 | STF0671    | STF0670     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM277 | STF0672    | STF0671     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM278 | STF0673    | STF0672     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM279 | STF0674    | STF0673     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM280 | STF0675    | STF0674     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM281 | STF0676    | STF0675     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             | 0               | 0                    | 0                    | 0                   | 0                     | 4.655                      |       |
| STGM282 | STF0677    | STF0676     | 34.8               | 0.013     | 171.91           | 171.91            | CIRCULAR           | 1.5        | 1       |           | 0             |                 |                      |                      |                     |                       |                            |       |

## Appendix C: Channel Vulnerability Data

DRAFT



## Section 4

# Stream Channel Vulnerability Assessment

Section 4 documents the stream channel vulnerability assessment that was conducted to evaluate and assess existing and potential future channel conditions in the streams within Newberg. The field visits for this assessment occurred between October 15 and 17, 2013.

The primary objectives of the stream channel vulnerability assessment included the following:

- Assess existing physical channel conditions relative to the current flow regime and level of development.
- Identify existing problem areas, including areas of bank instability or excessive erosion.
- Assess the potential for future channel issues that could occur as a result of increased flows or watershed changes.

Figure 4-1 shows the location of mapped stream channels, floodplains, and stream corridor zoning within the City of Newberg.

## 4.1 Methods

The methodology used in this stream vulnerability assessment included:

1. review of existing documentation;
2. qualitative field assessment of selected stream channels within the City limits; and
3. comparison of hydrologic and hydraulic modeling results to observed channel morphology.

### 4.1.1 Data Review

Several data sources were reviewed prior to conducting the field assessment. The list of sources and description of contents is shown below.

**City of Newberg Data** – City staff occasionally walk stream channels within the city to assess water quality conditions and document outfall conditions. The City provided photos and data sheets to BC, documenting previously observed conditions. The City also provided photos of past flood events, documenting water elevations resulting from high flows. These data were reviewed relative to current data, and were used to augment the field data collected in October 2013, since not all stream channel reaches were walked within the timeframe allotted for this project.

**George Fox University Data** – George Fox University (GFU) students have been collecting data and conducting restoration projects in the reach of Hess Creek that runs through the GFU campus. The City provided BC with stream channel cross section data collected by the students. Additionally, Clyde Thomas, facility manager and stream restoration facilitator at GFU provided details on work that is being conducted on Hess Creek on the GFU campus.

**City GIS Data** – City GIS data were reviewed prior to conducting the stream visit, including the following:

- stormwater infrastructure
- zoning





- streams and wetlands
- floodplains
- city boundary
- aerial photograph
- LiDAR imagery

**Chehalem Watershed Assessment**—The Yamhill Basin Council conducted a Chehalem Watershed Assessment in June 2001 through an Oregon Watershed Enhancement Board (OWEB) grant and local matching funds (Yamhill Basin Council. 2001). The Chehalem Watershed includes Chehalem Creek, Hess Creek, and Spring Brook. This document was reviewed specifically for information about the stream channels that are situated in Newberg, including Hess Creek, tributaries of Spring Brook, and a small tributary of Chehalem Creek. Regional geologic information was obtained from this report, as well as information on fish habitat and barriers, wetlands, and other watershed characteristics.

#### 4.1.2 Field Assessment

A field assessment was conducted between October 15 and October 17, 2013, during a relatively dry period, with no measured rainfall in the previous 5 days. Approximately 3 miles of stream channel were walked, including portions of the following reaches, shown on Figure 4-1. The field assessment included the following reaches:

- Hess Creek
  - Upstream of Villa Road in the vicinity of Mountainview Drive (upper reach)
  - George Fox University (middle reach)
  - Hoover Park (middle reach)
  - Corinne Drive Tributary
  - Wyooski Street/Wastewater Treatment Plant (lower reach)
- Chehalem Creek Tributary
  - Upstream of Hwy 240 to Columbia Drive
  - Upstream of Sunnycrest Road
- Spring Brook
  - Benjamin Road and Lake Shore Drive reach (outside City limits)
  - West Tributary between Fred Meyer (Hayes Road) and Fernwood Road (West Tributary reach)

General observations of bank and bed materials, vegetation, erosion, general confinement, and outfalls were made. Photos were taken to document conditions, and occasional measurements of bankfull widths and depths were taken with a stadia rod (in tenths of feet). Latitude and longitude coordinates along with elevations were recorded using a hand-held GPS unit.

The field data and locations of photographs were recorded in a field notebook. Field notes were scanned, and data and photos were transferred to excel spreadsheets. These field notes are provided in Appendix C.







### 4.1.3 Flow modeling

A PC-SWMM hydrologic and hydraulic model was constructed to evaluate existing and future stream flows based on predicted land use changes (described in Section 3). Existing conditions modeled flows were compared to observed channel morphology to evaluate patterns and potential morphological changes that might occur with increased flows as predicted in the future condition models.

## 4.2 Results

Descriptions of the general stream channel characteristics in the reaches observed during our field investigation are provided in Table 4-1 and with more detail in Appendix C. In general, the condition of stream channels within the city limits are variable and likely dependent on a number of factors including riparian conditions (i.e., width of riparian area and vegetation); stream channel gradient and valley confinement; land uses in the general vicinity; and stormwater outfall locations.

### 4.2.1 Geologic Conditions and Erosivity

The predominant geology of Hess Creek and the other tributaries within the city is Willamette silt (Yamhill Basin Council, 2001), lacustrine (lake) and fluvial (river) deposits consisting of unconsolidated and semi-consolidated silt, clay, sand and gravel. With the exception of the upper reaches of Hess Creek in the vicinity of Mountainview Drive, the bed and bank material of all of the stream channels that were walked consisted of silt and clay. Downstream of Mountainview Drive, conglomerate (mixed sand and small rounded gravel) was observed in the banks. Upstream of Mountainview Drive, bedrock (siltstone) was present in the streambed.

The geologic material for which these stream channels are situated are resistant to slumping and can result in nearly vertical banks. Erosion was observed downstream of culverts or outfalls where flow was concentrated. Outside of these predictable locations where flow is concentrated erosion was also observed in several reaches where blocks of silt have caved into the channel. This type of bank failure is most likely a result of destabilization from undercut banks, animal activity (burrows from mountain beavers or nutria), surface disturbance, or soil saturation. This type of erosion was observed most notably in the Chehalem Creek tributary upstream of Highway 240, the Crestview reach of Hess Creek upstream of the railroad, and the lower reach of Hess Creek near the confluence with the Corinne Drive Tributary.

#### 4.2.1.1 Specific Problem Areas

Below are specific problem areas or poor conditions that were noted during our stream walks. These are locations where restoration, repair or maintenance projects should be considered.

##### 4.2.1.1.1 Chehalem Tributary

- Hill slope failure upstream of Highway 240 on the west bank. Re-vegetation and stabilization would prevent future slumping.
- Beaver dam at Sheridan Road crossing (downstream of Highway 240). The beaver dam observed during our stream walk was removed; however, this location is likely prone to beaver activity and should be monitored to ensure beavers do not get re-established. The road fill above the culvert is at least 30 feet high, and a large storm event that coincides with a culvert blockage could have devastating consequences.

Table 4-1. Summary of Stream Channel Characteristics

| Stream             | Segment                                               | Location of modeled flow               | Drainage area (acres) | 2-year max total inflow (cfs) |        | Percent change | 2-year unit discharge (cfs/acre) |        | Average bankfull width (ft) | Average bankfull depth (ft) | Average gradient (ft/ft) |
|--------------------|-------------------------------------------------------|----------------------------------------|-----------------------|-------------------------------|--------|----------------|----------------------------------|--------|-----------------------------|-----------------------------|--------------------------|
|                    |                                                       |                                        |                       | Existing                      | Future |                | Existing                         | Future |                             |                             |                          |
| Chehalem Tributary | North of Hwy 240                                      | Creelside Lane and Creekside Court     | 329.5                 | 42.5                          | 45     | 5.56           | 0.13                             | 0.14   | 8                           | 4                           | 0.016                    |
|                    | South of Hwy 240                                      | West Sheridan Street (downstream side) | 753                   | 132.5                         | 136.5  | 2.93           | 0.18                             | 0.18   | 6                           | 4                           | 0.006                    |
| Hess Creek         | North of Mountainview Drive                           | Edgewood Drive and Aldersgate Drive    | 946.5                 | 56.2                          | 62.5   | 10.08          | 0.06                             | 0.07   | 9                           | 3                           | 0.008                    |
|                    | Mountainview Drive to Villa Road/Railroad             | Crestview Drive                        | 1,135.20              | 72.1                          | 80.6   | 10.55          | 0.06                             | 0.07   | 9                           | 3                           | 0.008                    |
|                    | Villa Road/Railroad to Hwy 99W                        | Fulton Street (downstream side)        | 1,451.10              | 100.2                         | 110.7  | 9.49           | 0.07                             | 0.08   | 10                          | 3                           | 0.005                    |
|                    | Hwy 99W to City Limit (near Wynooski Street)          | Merlin Lane                            | 1,861.70              | 174.4                         | 181.8  | 4.07           | 0.09                             | 0.10   | 11                          | 2.5                         | 0.002                    |
| Spring Brook       | West Tributary, Hwy 99W to City Limit (Fernwood Road) | Hayes Street                           | 358.4                 | 74.4                          | 80.6   | 7.69           | 0.21                             | 0.22   | 7                           | 3                           | 0.012                    |
|                    | North of Hwy 99W near Benjamin Road                   | Benjamin Road                          | 465.1                 | 21.4                          | 22.5   | 4.89           | 0.05                             | 0.05   | 8                           | 3                           | 0.008                    |

#### 4.2.1.1.2 Hess Creek

- Upstream of Mountainview Drive, a stormwater ditch outfalls above Hess Creek on the hill slope. This discharge has resulted in extensive erosion at the outfall. Additional energy dissipation should be installed in this area, and consideration extending pipe directly to Hess Creek would help alleviate the hill slope erosion.
- In the reach above the railroad (Crestview), the stream has eroded material away from a sanitary sewer manhole that is now located in the stream channel. This manhole should be inspected for integrity and evaluated with respect to potential future impacts to channel migration and erosion.
- GFU has spent a lot of time and energy on the restoration of Hess Creek through the campus. Care should be taken to minimize changes to flow or hydraulics (such as Fulton Street culvert) that could negatively impact the restoration that has occurred.
- Significant erosion is occurring at the outfall location of the detention pond located on the Corinne Drive tributary to Hess Creek.



#### 4.2.1.1.3 General Problem Observations

- Erosion is occurring at numerous stormwater outfalls and culvert crossings throughout the city. Outfalls and culvert crossing should be designed with sufficient energy dissipation with a mix of material sizes or geotextile fabric to minimize erosion of the fine grained silt.
- Invasive vegetation species such as reed canary grass, blackberries, and nightshade are prevalent in all the stream reaches (except GFU where restoration work as occurred). There are many opportunities to improve riparian vegetation conditions along Hess Creek (especially in the lower reach) and other Newberg tributaries.

#### 4.2.2 Channel Geomorphology

Channel dimensions were plotted against drainage area and modeled 2-year discharges to evaluate for potential relationships between channel shape and flow conditions.

There is a fairly good correlation of drainage area to bankfull channel width for the stream channels walked in October 2013 (Figure 4-2).

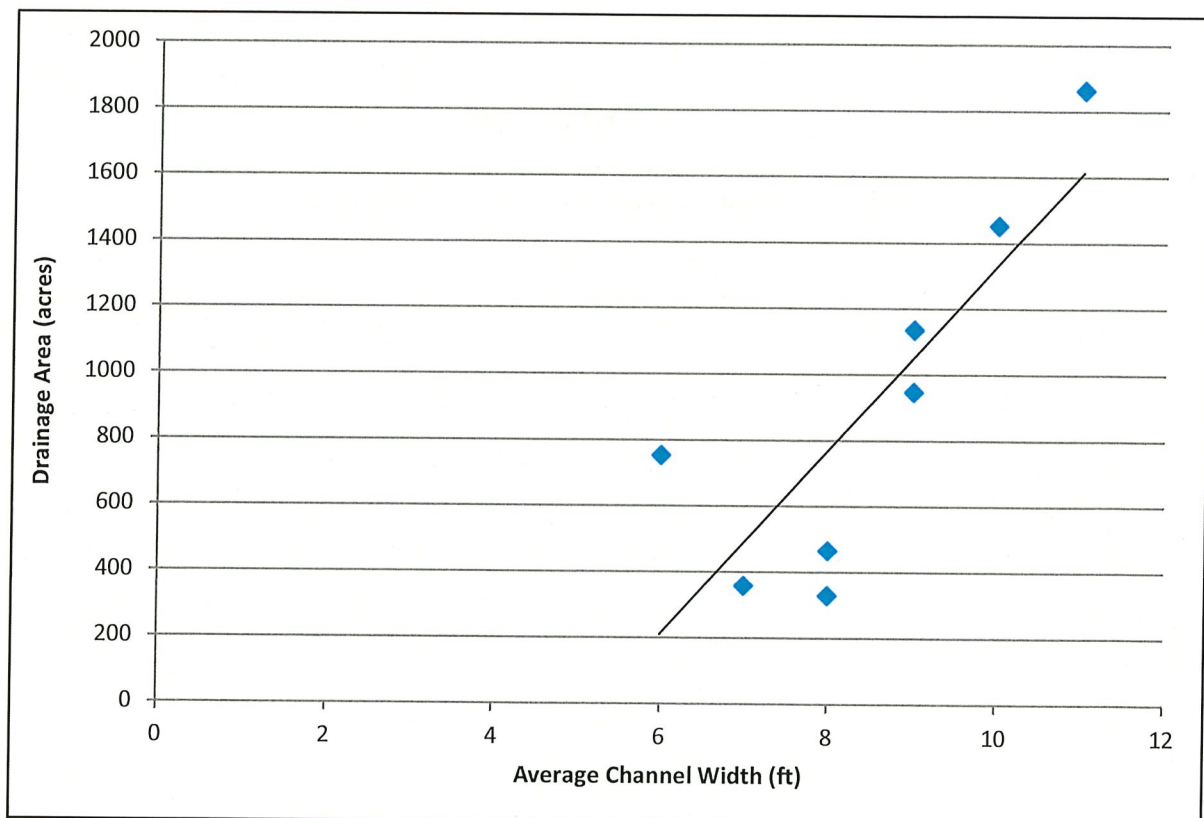


Figure 4-2. Drainage area versus channel width

However, a correlation was not found between discharge and stream channel width (Figure 4-3) or area (Figure 4-4).



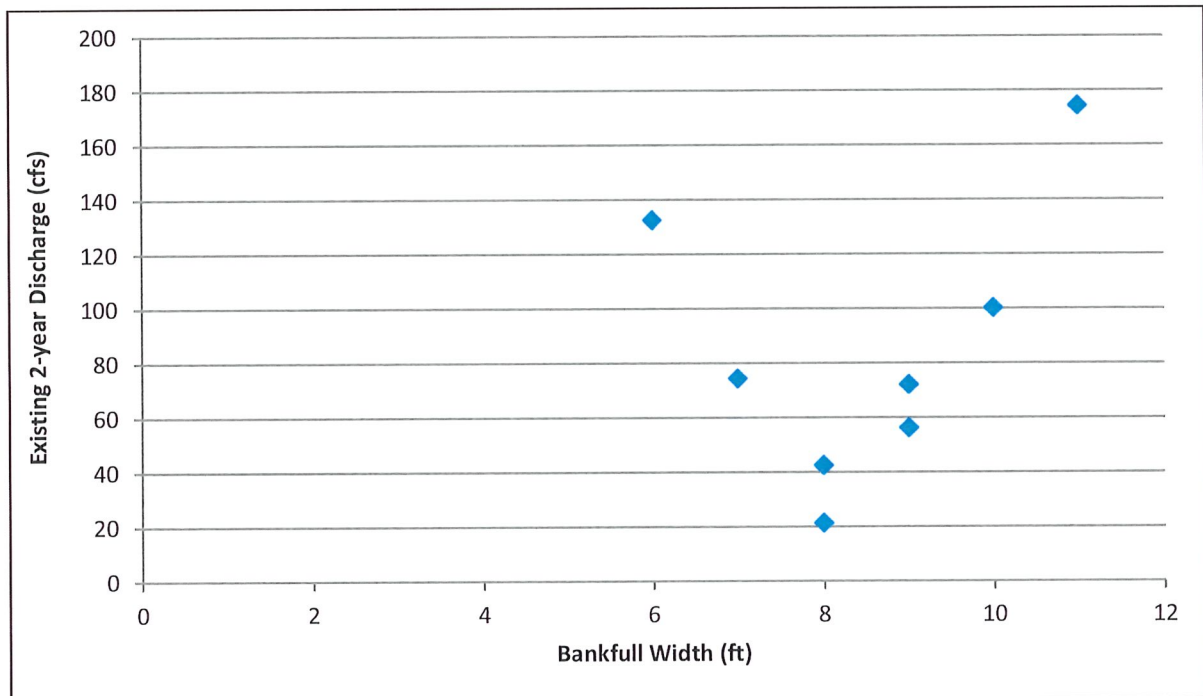


Figure 4-3. Existing 2-year discharge versus bankfull width

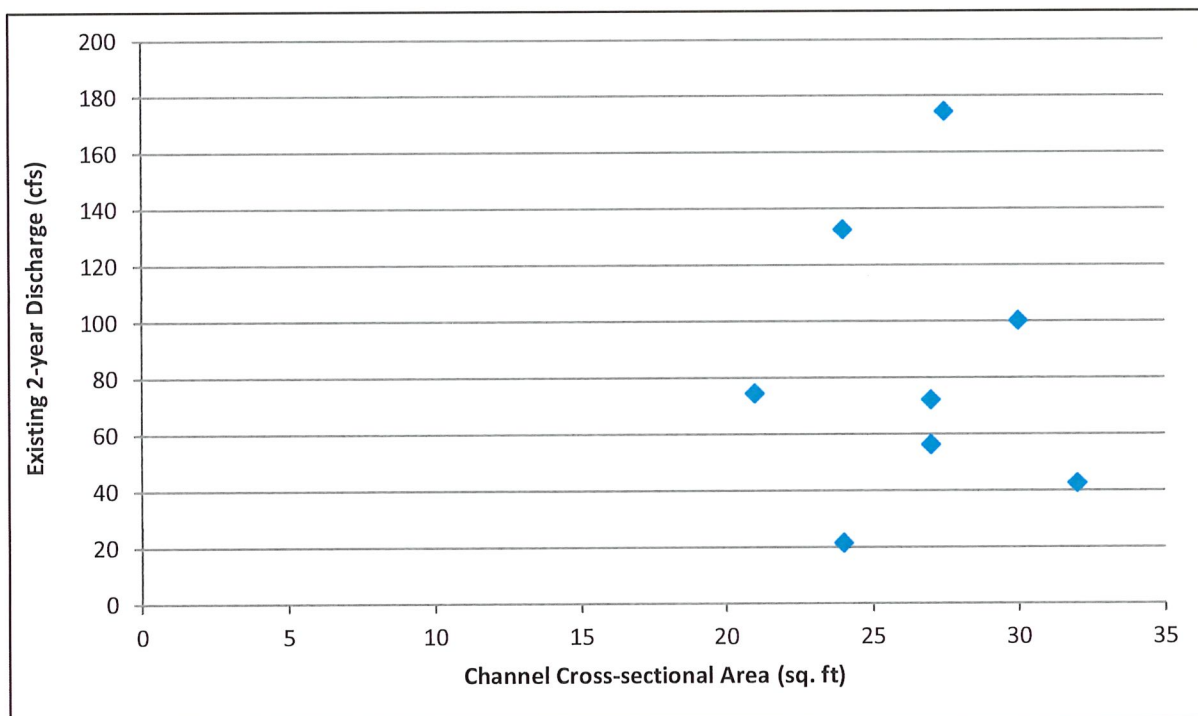


Figure 4-4. Existing 2-year discharge versus channel cross-sectional area



Figures 4-3 and 4-4 indicate that other factors besides stream channel discharge are likely influencing the geomorphology of stream channels in Newberg. For instance, constrictions in the stream channels such as culvert crossings tend to dampen the impact of peak flows and resulting erosion in downstream reaches. Examples of this include the Fulton Street culvert upstream of GFU, and the Sheridan Street crossing on the Chehalem Tributary on the west side of the city. Additionally, wide floodplains for which stream channels have room to move, and where overbank flooding can occur without risk of damage to infrastructure also dampens the erosive effects of high stream flow discharges.

The stream channel section with the highest unit area discharge (0.21 cfs/acre) is the Spring Brook tributary downstream of Hayes Street. This reach of stream channel was in relatively good condition despite the high velocity discharges it experiences relative to the overall drainage area. This could be because there are retention/detention facilities upstream that were not included in the model, the fairly wide riparian area that consists of large trees and native vegetation, and the connection of the stream channel to its floodplain. Flow control or stormwater detention in other parts of the city could have positive effects for stream channel conditions as well.

The City has designated "stream corridor zoning," limiting the type and location of development near stream channels based on a study completed in 1995 to comply with statewide planning Goal 5, "Open Spaces, Scenic and Historic Areas, and Natural Resources." The stream corridor zoning coincides with the natural floodplain area of stream channels within the city limits, providing fairly wide and undeveloped riparian areas in some cases.

#### 4.2.3 Future Conditions

The area of the city that is expected to further develop in the next several years is located north of Mountainview Drive where large agricultural properties will be converted to residential developments. Flow increases are predicted for the upper reaches of Hess Creek based on modeling results. These increases will be less apparent downstream because of hydraulic conditions in the middle reaches (culvert crossings, etc.). The reach that is most vulnerable to increased flows is upstream of the railroad tracks (Crestview), where erosion is already prevalent.

Based on the modeling effort, flow increases are also expected on the west tributary of Spring Brook, particularly as the Austin Property is developed.

Future development of the South Industrial Area is located outside (downstream) of the modeling limits for this Stormwater Master Plan. Design standards to protect streams evaluated in this study should be carried into the South Industrial Area to protect existing stream channels.

No future flooding in the open stream channels is predicted for the 10-year flows based on hydraulic modeling, however, stream channel erosion could occur if measures aren't taken to control flows, maintain wide riparian areas and open floodplains, or dissipate energy at outfall locations and culvert crossings.

### 4.3 Recommendations

The City has already taken steps that help alleviate channel erosivity by designating stream corridors for protection in the zoning code. Other measures that should be considered to reduce potential future channel impacts include the following:

- Encourage or require new development to maximize infiltration of stormwater runoff when soil conditions allow. The infiltration of stormwater runoff reduces the impact of increase flows on stream corridors and is critical to the reduction of the channel forming annual flow events.
- Require flow control measures for smaller storms for new development. The 24-hour synthetic storms used for sizing detention can be conservative and therefore the small channel forming flows

are not addressed in the standards. Although this will not fully address all smaller storm events we recommend adding half the 2-year, 24-hour storm as a flow control storm in addition to the larger storms.

- Ensure culvert crossings, stormwater outfalls, and stream channel crossings (bridges) are designed and installed properly (e.g., aligned with stream flow and include energy dissipation) to minimize erosion downstream.
- Conduct regular field screenings of outfalls and other areas of previously observed erosion to document changes in bank conditions and identify locations for stream bank stability projects. Allocating at least one day per month for stream observation would allow City staff to visit areas of concern several times a year on a rotational basis.
- Vegetation does contribute to stream bank stability, and if invasive species such as reed canary grass are removed, replacement vegetation should be planted immediately.



# CITY OF NEWBERG

## STREAM VULNERABILITY ASSESSMENT STREAM REACH DESCRIPTIONS



Chehalem Creek Tributary, Upstream of Sunnycrest Road

### Stream

Chehalem Creek Newberg Tributary

### Reach

Lower Reach (upstream of Sunnycrest)

### General Characteristics

Gradient:  $\approx 0.006$  ft/ft  
 Valley Width: 100 – 150 feet  
 Planform: Meandering  
 Average BFW:  $\approx 6$  ft  
 Average BFD:  $\approx 4$  ft  
 Substrate: Silt  
 Vegetation: Blackberries, ferns, mixed forest.  
 Beaver Activity: Upstream of Sheridan Road culvert.

### Issues

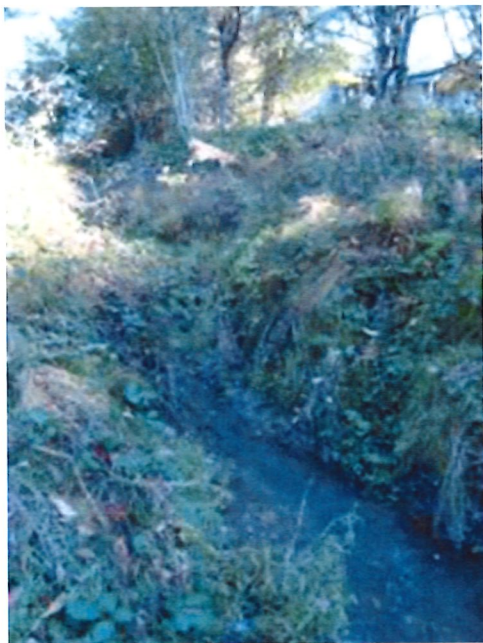
Some bank erosion and slumps.



Aerial view of Chehalem Creek Tributary, Sunnycrest (W 1st St) Reach



# CITY OF NEWBERG STREAM VULNERABILITY ASSESSMENT STREAM REACH DESCRIPTIONS



Typical stream section above Highway 240

## Stream

Chehalem Creek Newberg Tributary

## Reach

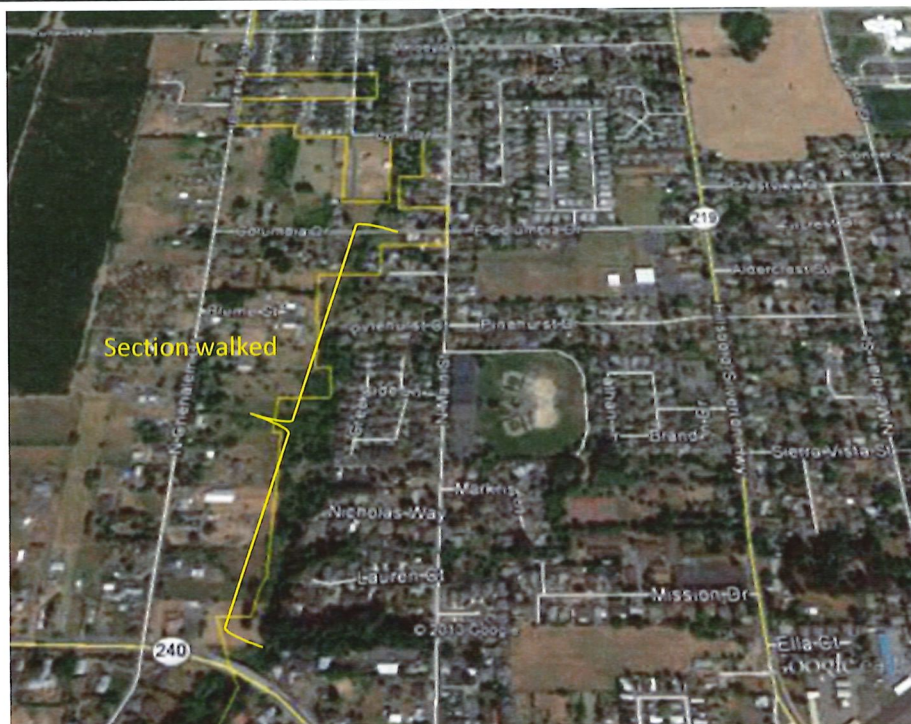
Upper Reach (upstream of Hwy 240)

## General Characteristics

|                  |                                              |
|------------------|----------------------------------------------|
| Gradient:        | ≈ 0.016 ft/ft                                |
| Valley Width:    | 50 – 100 feet                                |
| Planform:        | Relatively straight                          |
| Average BFW:     | ≈ 8 ft                                       |
| Average BFD:     | ≈ 4 ft                                       |
| Substrate:       | Silt                                         |
| Vegetation:      | Blackberries, ferns,<br>narrow mixed forest. |
| Beaver Activity: | None                                         |

## Issues

Bank slumps, erosion and hillslope failures.



Aerial view of Chehalem Creek Tributary, upstream Hwy 240 reach



# CITY OF NEWBERG

## STREAM VULNERABILITY ASSESSMENT STREAM REACH DESCRIPTIONS

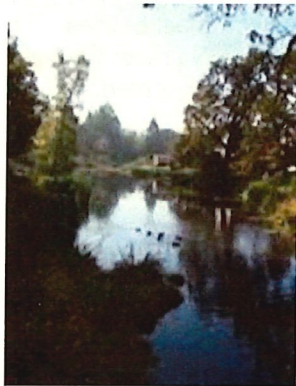


Photo of Corrine Drive  
Tributary channel upstream of  
detention pond/lake (bottom  
photo).

### Stream

Hess Creek

### Reach

East Tributary (Corrine Drive)

### General Characteristics

Gradient:  $\approx 0.01$  ft/ft  
Valley Width:  $<100$  feet  
Planform: Relatively straight  
Average BFW:  $\approx 5$  ft (City data)  
Average BFD:  $\approx 2.7$  ft (City data)  
Substrate: Silt above detention  
pond, and  
downstream at  
confluence

Vegetation: Mixed

Beaver Activity: None

### Issues

Erosion at detention pond outlet. Channel  
incision downstream (City data).



Aerial view of Hess Creek, Corrine Drive Tributary



## CITY OF NEWBERG STREAM VULNERABILITY ASSESSMENT STREAM REACH DESCRIPTIONS



Hess Creek channel about WWTP

### Stream

Hess Creek

### Reach

Lower Reach (WWTP)

### General Characteristics

|                  |                                    |
|------------------|------------------------------------|
| Gradient:        | ≈ 0.002 ft/ft                      |
| Valley Width:    | 250 – 300 feet                     |
| Planform:        | Meandering                         |
| Average BFW:     | ≈ 9 ft                             |
| Average BFD:     | ≈ 4 ft                             |
| Substrate:       | Silt                               |
| Vegetation:      | Reed canary grass,<br>blackberries |
| Beaver Activity: | No recent activity<br>observed.    |

### Issues

Invasive vegetation. Very long piped section downstream of WWTP.



Aerial view of Hess Creek, WWTP reach.



# CITY OF NEWBERG

## STREAM VULNERABILITY ASSESSMENT STREAM REACH DESCRIPTIONS



Example photos of stream reach above Crestview. Significant bank erosion in this reach.

### Stream

Hess Creek

### Reach

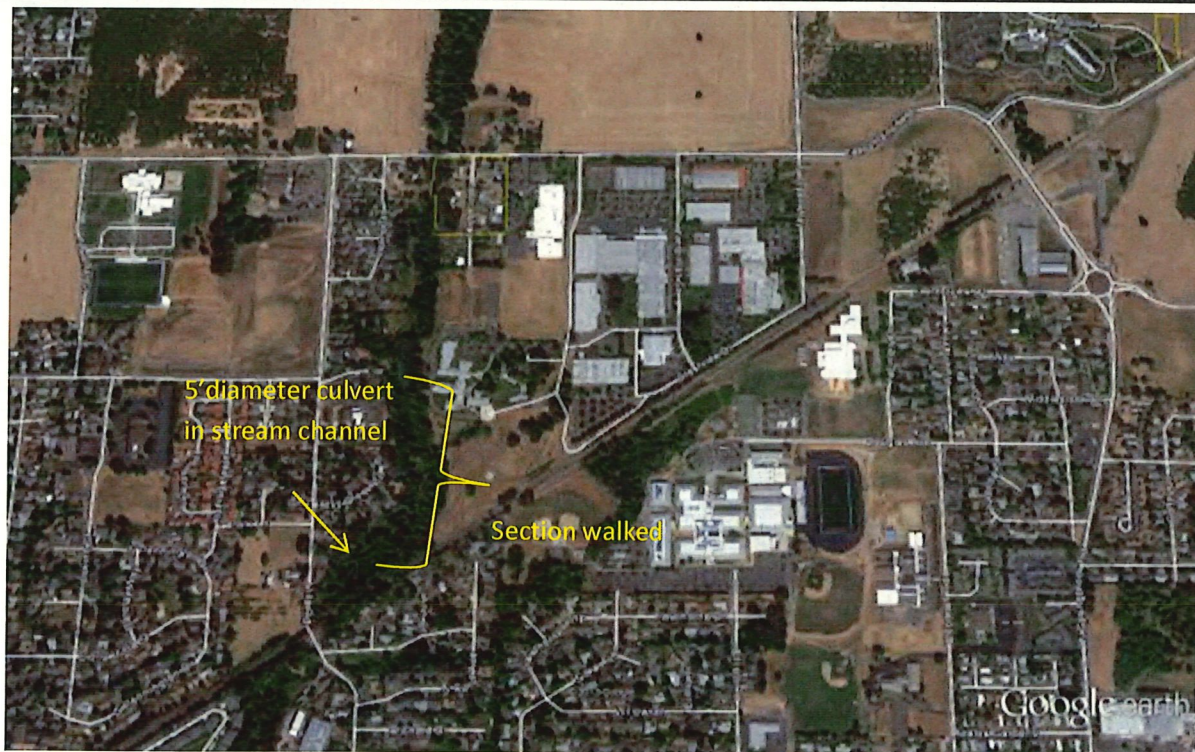
Upper Reach (Above Crestview)

### General Characteristics

Gradient:  $\approx 0.008$  ft/ft  
 Valley Width: 100 – 150 feet  
 Planform: Meandering  
 Average BFW:  $\approx 9$  feet  
 Average BFD:  $\approx 3$  feet  
 Substrate: Silt (loose and thick in places)  
 Vegetation: Residential pasture, blackberries, reed canary grass  
 Beaver Activity: Moderate

### Issues

Bank erosion (exposed sewer manhole)  
 Culvert of unknown purpose



Aerial view of Hess Creek, Crestview Reach



# CITY OF NEWBERG

## STREAM VULNERABILITY ASSESSMENT STREAM REACH DESCRIPTIONS



Photo of mainstem Hess Creek at confluence with Corrine Drive Tributary

### Stream

Hess Creek

### Reach

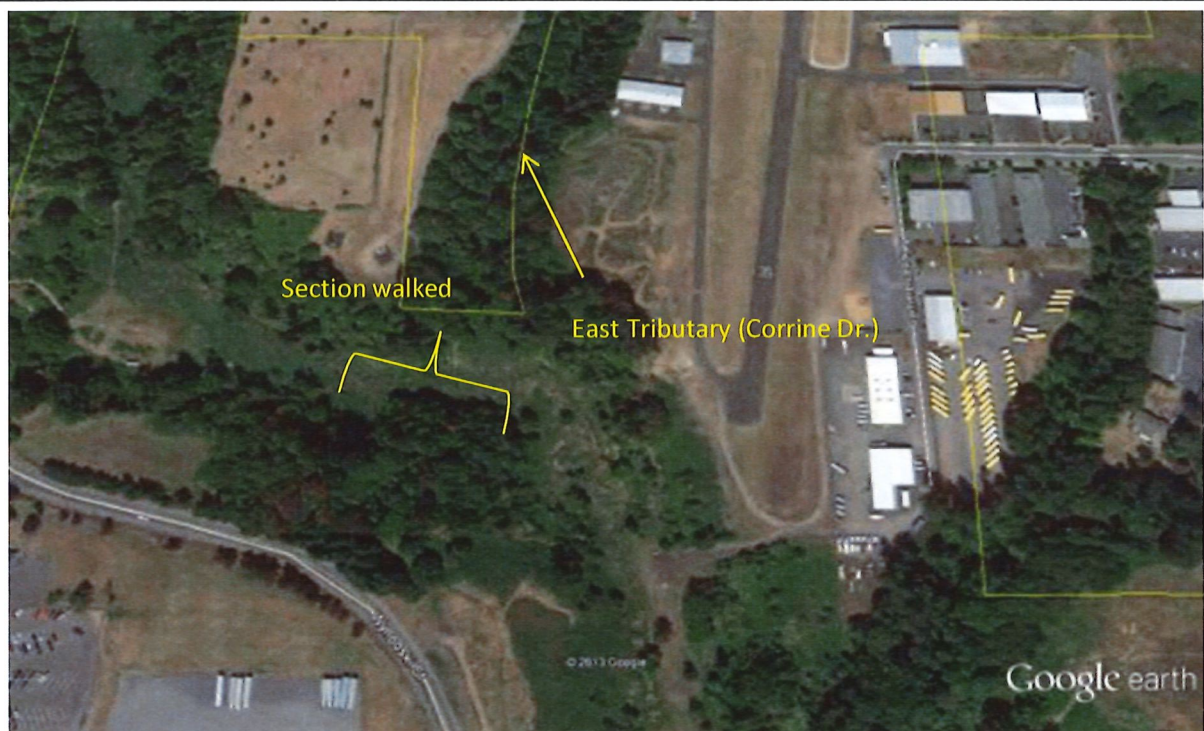
Lower Reach (Near Confluence with East Trib)

### General Characteristics

|                  |                                                                                |
|------------------|--------------------------------------------------------------------------------|
| Gradient:        | ≈ 0.002 ft/ft                                                                  |
| Valley Width:    | 200 – 300 feet                                                                 |
| Planform:        | Meandering                                                                     |
| Average BFW:     | ≈ 11 feet                                                                      |
| Average BFD:     | ≈ 2.5 feet                                                                     |
| Substrate:       | Silt                                                                           |
| Vegetation:      | Reed canary grass, blackberries, mixed vegetation along slopes at forest edge. |
| Beaver Activity: | None                                                                           |

### Issues

Fair amount of bank slumping in this reach



Aerial view of Hess Creek, East Tributary Confluence Reach



# CITY OF NEWBERG

## STREAM VULNERABILITY ASSESSMENT STREAM REACH DESCRIPTIONS



Typical stream section upstream of NE Benjamin Road

### Stream

Spring Brook Mainstem

### Reach

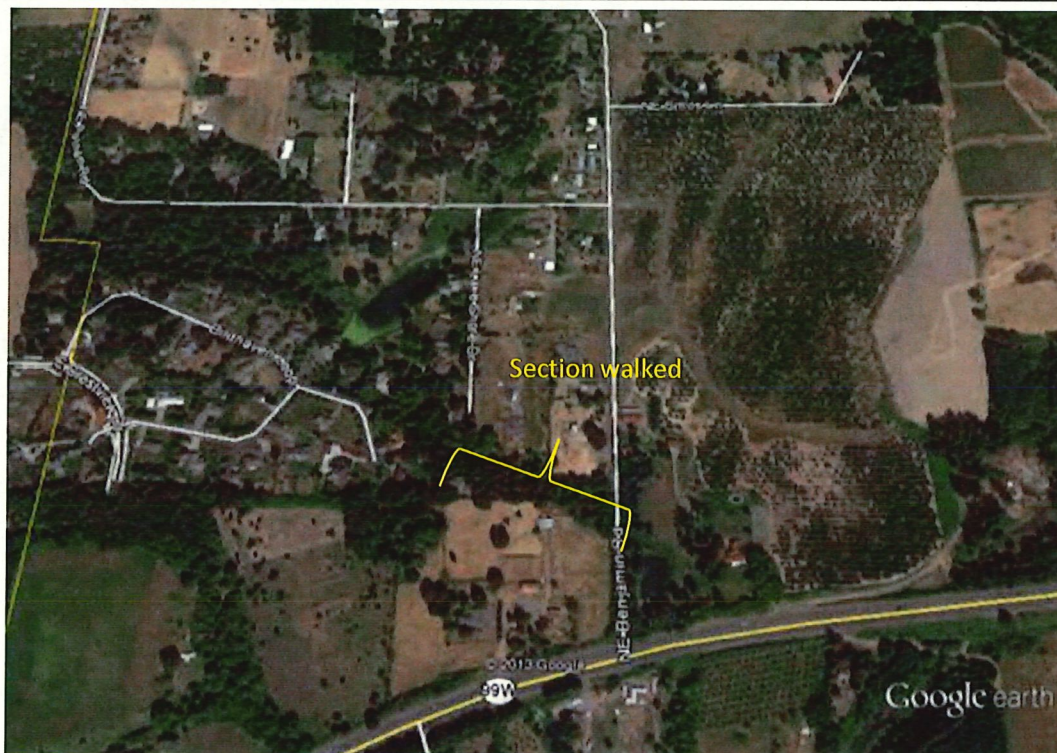
Upper Reach (Upstream of Benjamin Road)

### General Characteristics

Gradient:  $\approx 0.008$  ft/ft  
Valley Width: 100 – 150 feet  
Planform: Meandering  
Average BFW:  $\approx 8$  ft  
Average BFD:  $\approx 3$  ft  
Substrate: Silt  
Vegetation: Shrubs, lawn  
(residential areas)  
Beaver Activity: None

### Issues

Flooding at Benjamin Road during larger events



Aerial view of Spring Brook in the vicinity of NE Benjamin Road



# CITY OF NEWBERG

## STREAM VULNERABILITY ASSESSMENT STREAM REACH DESCRIPTIONS



Example photos of Hess Creek through Hoover Park (downstream of Hwy 99), and flooding during January 2011.

### Stream

Hess Creek

### Reach

Lower Reach (Hoover Park)

### General Characteristics

|                  |                                                                |
|------------------|----------------------------------------------------------------|
| Gradient:        | ≈ 0.006 ft/ft                                                  |
| Valley Width:    | 200 – 300 feet                                                 |
| Planform:        | Channelized                                                    |
| Average BFW:     | ≈ 8 feet                                                       |
| Average BFD:     | ≈ 3 feet                                                       |
| Substrate:       | Silt                                                           |
| Vegetation:      | Lawn, blackberries and reed canary grass in undeveloped areas. |
| Beaver Activity: | None                                                           |

### Issues

Park flooding during larger storms.

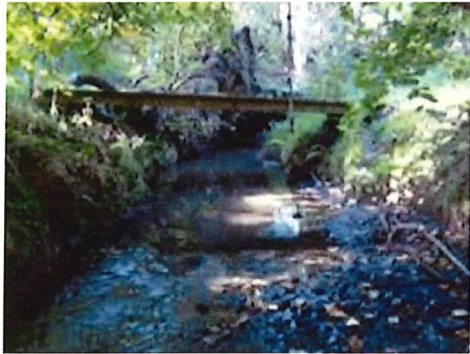


Aerial view of Hess Creek, Hoover Park reach



# CITY OF NEWBERG

## STREAM VULNERABILITY ASSESSMENT STREAM REACH DESCRIPTIONS



Example photos of stream reach below Mountainview Drive. Residential drainage pipes enter channel on west side.

### Stream

Hess Creek

### Reach

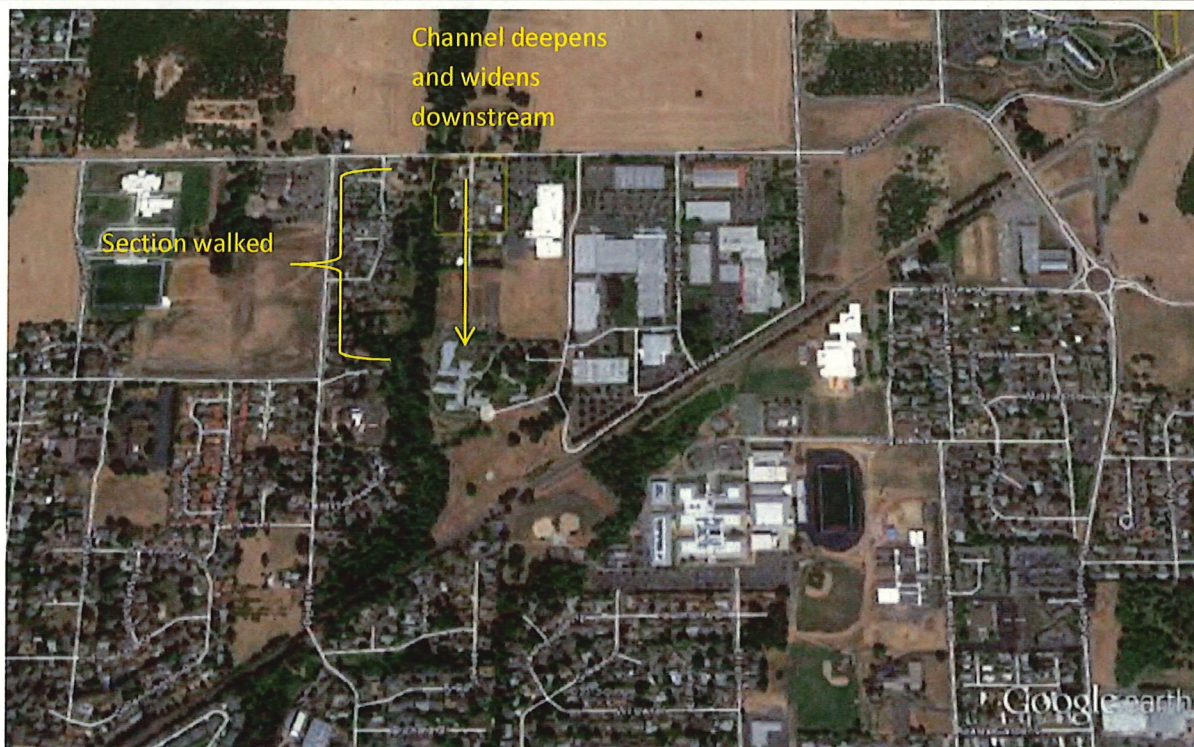
Upper Reach (Below Mtn. View Dr.)

### General Characteristics

Gradient:  $\approx 0.008$  ft/ft  
 Valley Width: 100 -150 feet  
 Planform: Meandering  
 Average BFW:  $\approx 7$  feet (3 - 12)  
 Average BFD:  $\approx 3$  feet (2 - 10)  
 Substrate: Primarily silt, some gravel  
 Vegetation: Residential landscaping, lawn, trees adjacent to channel  
 Beaver Activity: None

### Issues

Downcutting. Some bank erosion.



Aerial view of Hess Creek, Mountainview downstream



# CITY OF NEWBERG

## STREAM VULNERABILITY ASSESSMENT STREAM REACH DESCRIPTIONS



One of many beaver dams in the Hess Creek reach above Mountainview Drive

### Stream

Hess Creek

### Reach

Upper Reach (Above Mtn. View Dr.)

### General Characteristics

|                  |                                                            |
|------------------|------------------------------------------------------------|
| Gradient:        | ≈ 0.008 ft/ft                                              |
| Valley Width:    | 100 – 150 feet                                             |
| Planform:        | Meandering                                                 |
| Average BFW:     | ≈ 9 feet                                                   |
| Average BFD:     | ≈ 3 feet                                                   |
| Substrate:       | Primarily silt, some gravel, bedrock above Mountainview Dr |
| Vegetation:      | Narrow forested riparian area, reed canary grass           |
| Beaver Activity: | Significant                                                |

### Issues

Significant erosion at ditch outfall



Aerial view of Hess Creek, Mountainview Drive Reach



# CITY OF NEWBERG

## STREAM VULNERABILITY ASSESSMENT STREAM REACH DESCRIPTIONS



Typical stream section between Fernwood Rd and Hayes St

### Stream

Spring Brook West Tributary

### Reach

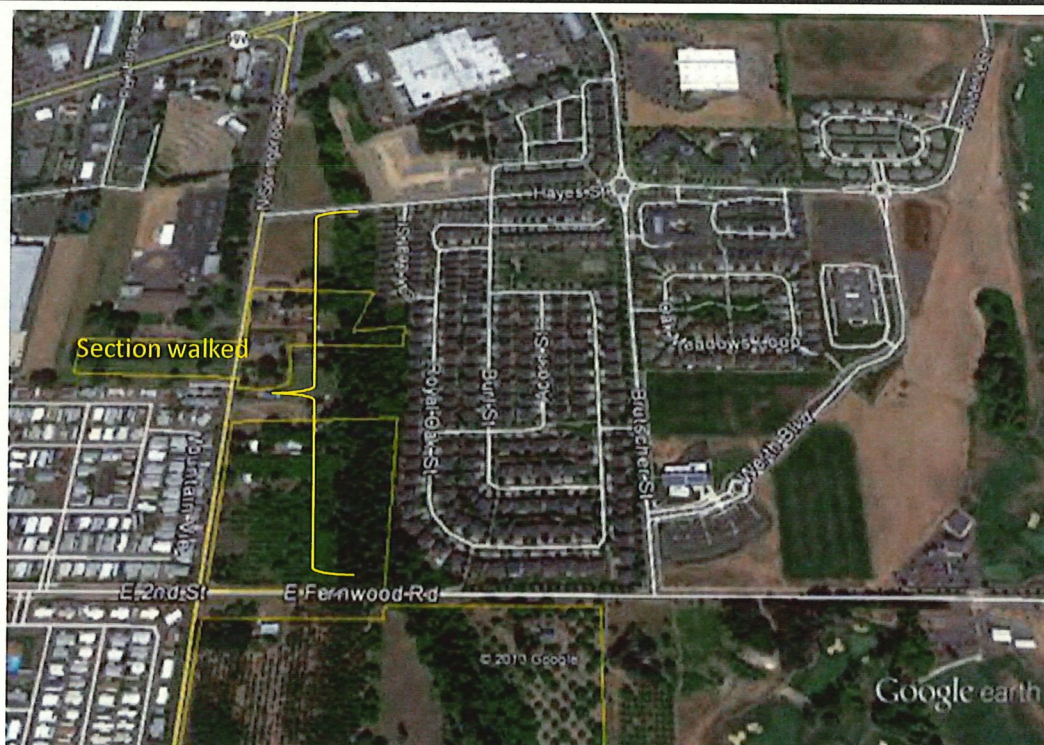
Upper Reach (Upstream of Fernwood)

### General Characteristics

Gradient:  $\approx 0.012$  ft/ft  
 Valley Width: 50 – 100 feet  
 Planform: Relatively straight  
 Average BFW:  $\approx 7$  ft  
 Average BFD:  $\approx 3$  ft  
 Substrate: Silt  
 Vegetation: Mixed forest. Fairly nice riparian area.  
 Beaver Activity: None

### Issues

Many groundwater seeps, especially on west bank.



Aerial view of Spring Brook West Tributary in the vicinity of E Fernwood Rd



## CITY OF NEWBERG STREAM VULNERABILITY ASSESSMENT STREAM REACH DESCRIPTIONS



Example photo of Hess Creek through GFU campus

### Stream

Hess Creek

### Reach

Middle Reach (George Fox University)

### General Characteristics

|                  |                                                        |
|------------------|--------------------------------------------------------|
| Gradient:        | ≈ 0.005 ft/ft                                          |
| Valley Width:    | 150 – 200 feet                                         |
| Planform:        | Meandering                                             |
| Average BFW:     | ≈ 10 feet                                              |
| Average BFD:     | ≈ 3 feet                                               |
| Substrate:       | Silt                                                   |
| Vegetation:      | Native plants<br>(significant<br>restoration activity) |
| Beaver Activity: | None                                                   |

### Issues

No significant issues. GFU has and continues to restore reach.



Aerial view of Hess Creek, George Fox University Reach

## **Appendix D: CIP Fact Sheets and Cost Estimate**

DRAFT



### Recommended Projects Prioritization

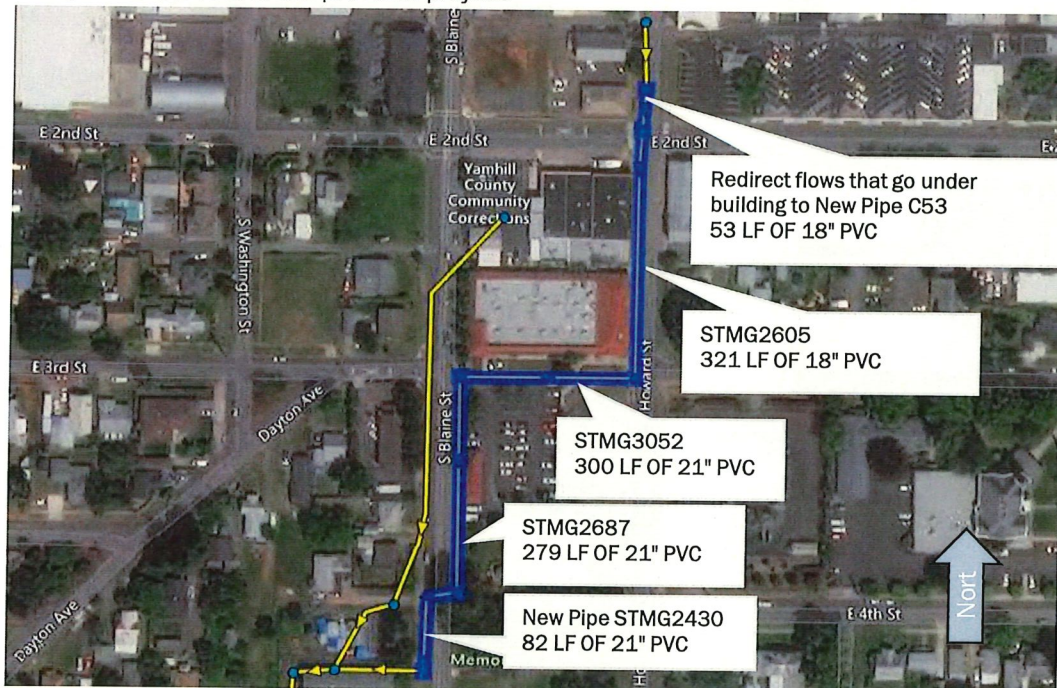
| No.                                                | Project Name                               | Preliminary Estimated Cost |
|----------------------------------------------------|--------------------------------------------|----------------------------|
| <b>Priority 1 Projects(0-5 years)</b>              |                                            | <b>\$6,624,256</b>         |
| C-B                                                | S Center St. Improvements                  | \$2,415,715                |
| C-C                                                | Oxford St. Improvements - Section 1        | \$177,193                  |
| C-C                                                | Oxford St. Improvements - Section 2        | \$142,677                  |
| C-C                                                | Oxford St. Improvements - Section 3        | \$58,622                   |
| C-L                                                | N Edwards St. Improvements                 | \$1,024,049                |
| C-M                                                | E Third St. Improvements                   | \$647,954                  |
| C-N                                                | E North St. Improvements                   | \$650,305                  |
| C-Q                                                | Wynooski St. Improvements                  | \$309,198                  |
| C-U                                                | N Springbrook Rd. Improvements - Section 1 | \$94,466                   |
| C-U                                                | N Springbrook Rd. Improvements - Section 2 | \$1,104,077                |
| <b>Priority 2 Projects(6-10 years)</b>             |                                            | <b>\$1,730,653</b>         |
| C-A                                                | S Blaine St. Improvements                  | \$325,711                  |
| C-D                                                | 6th & Blaine St. Improvements              | \$224,530                  |
| C-E                                                | Pinehurst Dr. Improvements                 | \$364,280                  |
| C-H                                                | Illinois St. Improvements                  | \$139,183                  |
| C-I                                                | Ditch & Pinehurst Dr. Improvements         | \$283,916                  |
| C-P                                                | Crestview Dr. Improvements                 | \$131,819                  |
| C-R                                                | 2nd St. Crossing                           | \$41,056                   |
| C-V                                                | Libra St. Improvements                     | \$220,159                  |
| <b>Priority 3 Projects(11-20 years)</b>            |                                            | <b>\$1,077,768</b>         |
| C-F                                                | Crater Ln. Improvements                    | \$12,274                   |
| C-G                                                | Partridge Ln. Improvements                 | \$80,980                   |
| C-J                                                | Charles St. Improvements                   | \$51,140                   |
| C-K                                                | Center St. Improvements                    | \$138,377                  |
| C-O                                                | Mountainview Dr. Improvements              | \$384,725                  |
| C-S                                                | E 2nd St. @ River St. Improvements         | \$121,007                  |
| C-T                                                | E 2nd St. @ Arduus St. Improvements        | \$216,600                  |
| C-W                                                | Brutscher St. Improvements                 | \$72,666                   |
| <b>Total Recommended Improvement Project Costs</b> |                                            | <b>\$9,432,678</b>         |

## C-A: S Blaine St. Improvements (Priority 2)

|                            |                                                                                                              |
|----------------------------|--------------------------------------------------------------------------------------------------------------|
| Drainage                   | Chehalem Creek                                                                                               |
| Flooding Occurs            | 2 year event                                                                                                 |
| Contributing Drainage Area | 39 acres                                                                                                     |
| In 2014 CIP?               | Yes, but updated for new design criteria                                                                     |
| Objective(s) Addressed     | Pipe replacement of those under structure, pipe material replacement, maintenance replacement, flood control |

### Project Description:

Decommission the stormwater pipes which are in private property and add/upsue pipes to 18" and 21" to convey flows and connect to the new stormwater system along S Blaine St. A previous project ended at 5th street, this is the rest of the previous project.



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs       |
|------------------------------------------|----------|------|-----------|-------------------|
| 18" PVC Pipeline                         | 374      | LF   | \$ 147    | \$ 54,978         |
| 21" PVC Pipeline                         | 661      | LF   | \$ 176    | \$ 116,336        |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 171,314</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 17,131         |
| Traffic Control                          | 5%       | LS   |           | \$ 8,566          |
| Erosion Control                          | 2%       | LS   |           | \$ 3,426          |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 200,437</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 60,131         |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 260,569</b> |
| Engineering                              | 20%      | LS   |           | \$ 52,114         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 13,028         |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 325,711</b> |



## C-B: S Center St. Improvements (Priority 1)

|                            |                                                                                |
|----------------------------|--------------------------------------------------------------------------------|
| Drainage                   | Chehalem Creek                                                                 |
| Flooding Occurs            | 2 year event                                                                   |
| Contributing Drainage Area | 100 acres                                                                      |
| In 2014 CIP?               | Yes, but flows are routed differently                                          |
| Objective(s) Addressed     | Flood control, PACP report, maintenance replacement, avoiding private property |

### Project Description:

Flooding along E 8th St, E 7th St, and S Center St occurs. There are proposed improvements to River St. and the Center St. flooding can be routed along a new trunk line in River St. to the river. This will include upsizing some existing stormwater pipes.



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs         |
|------------------------------------------|----------|------|-----------|---------------------|
| 18" PVC Pipeline                         | 1289     | LF   | \$ 147    | \$ 189,483          |
| 21" PVC Pipeline                         | 550      | LF   | \$ 176    | \$ 96,800           |
| 24" PVC Pipeline                         | 606      | LF   | \$ 191    | \$ 115,746          |
| 30" PVC Pipeline                         | 3604     | LF   | \$ 241    | \$ 868,564          |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 1,270,593</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 127,059          |
| Traffic Control                          | 5%       | LS   |           | \$ 63,530           |
| Erosion Control                          | 2%       | LS   |           | \$ 25,412           |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 1,486,594</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 445,978          |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 1,932,572</b> |
| Engineering                              | 20%      | LS   |           | \$ 386,514          |
| Legal and Administrative                 | 5%       | LS   |           | \$ 96,629           |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 2,415,715</b> |

## C-C: Oxford St. Improvements - Section 1 (Priority 1)

|                            |                                       |
|----------------------------|---------------------------------------|
| Drainage                   | Chehalem Creek                        |
| Flooding Occurs            | 2 year event                          |
| Contributing Drainage Area | 166 acres                             |
| In 2014 CIP?               | Yes, but flows are routed differently |
| Objective(s) Addressed     | Flood control                         |

### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding.



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs       |
|------------------------------------------|----------|------|-----------|-------------------|
| 18" PVC Pipeline                         | 634      | LF   | \$ 147    | \$ 93,198         |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 93,198</b>  |
| Mobilization/Demobilization              | 10%      | LS   | \$        | 9,320             |
| Traffic Control                          | 5%       | LS   | \$        | 4,660             |
| Erosion Control                          | 2%       | LS   | \$        | 1,864             |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 109,042</b> |
| Construction Contingency                 | 30%      | LS   | \$        | 32,712            |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 141,754</b> |
| Engineering                              | 20%      | LS   | \$        | 28,351            |
| Legal and Administrative                 | 5%       | LS   | \$        | 7,088             |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 177,193</b> |

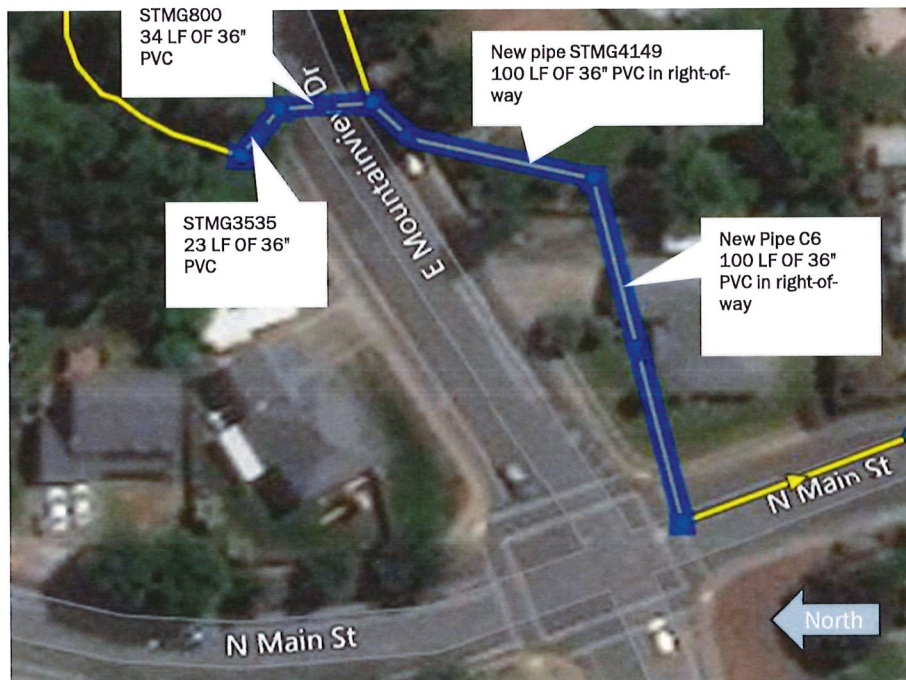


## C-C: Oxford St. Improvements - Section 2 (Priority 1)

|                            |                                       |
|----------------------------|---------------------------------------|
| Drainage                   | Chehalem Creek                        |
| Flooding Occurs            | 2 year event                          |
| Contributing Drainage Area | 166 acres                             |
| In 2014 CIP?               | Yes, but flows are routed differently |
| Objective(s) Addressed     | Flood control, avoid private property |

### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding. The new pipes will be in the right-of-way, and not under private property.



### Cost Estimate:

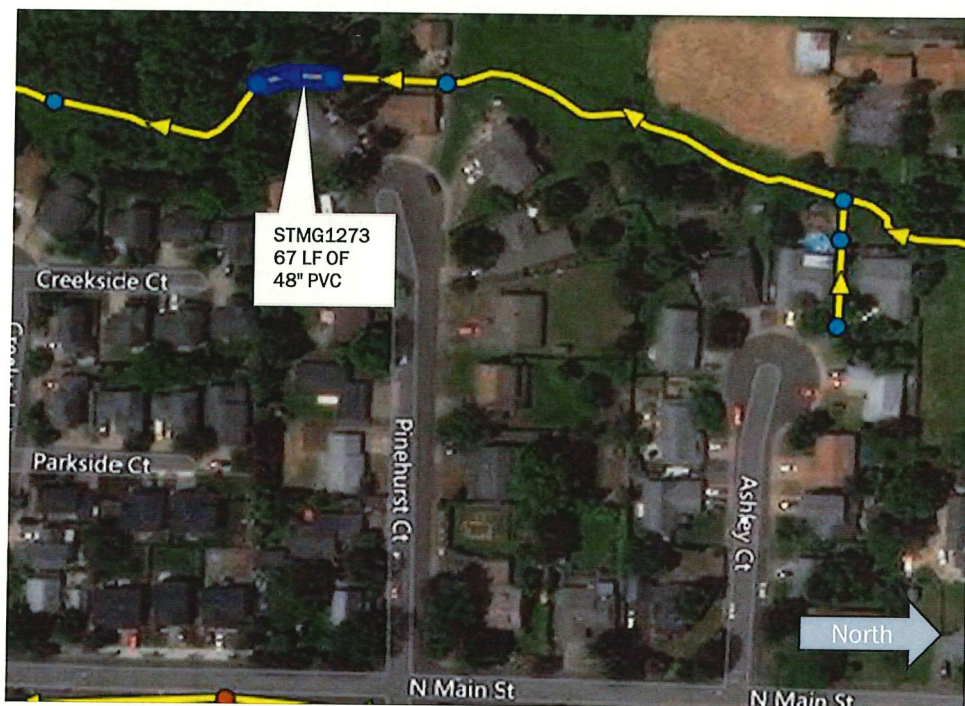
| Description                              | Quantity | Unit | Unit Cost | Total Costs       |
|------------------------------------------|----------|------|-----------|-------------------|
| 36" PVC Pipeline                         | 257      | LF   | \$ 292    | \$ 75,044         |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 75,044</b>  |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 7,504          |
| Traffic Control                          | 5%       | LS   |           | \$ 3,752          |
| Erosion Control                          | 2%       | LS   |           | \$ 1,501          |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 87,801</b>  |
| Construction Contingency                 | 30%      | LS   |           | \$ 26,340         |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 114,142</b> |
| Engineering                              | 20%      | LS   |           | \$ 22,828         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 5,707          |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 142,677</b> |

## C-C: Oxford St. Improvements - Section 3 (Priority 1)

|                            |                                       |
|----------------------------|---------------------------------------|
| Drainage                   | Chehalem Creek                        |
| Flooding Occurs            | 2 year event                          |
| Contributing Drainage Area | 166 acres                             |
| In 2014 CIP?               | Yes, but flows are routed differently |
| Objective(s) Addressed     | Flood control                         |

### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding.



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs      |
|------------------------------------------|----------|------|-----------|------------------|
| 48" PVC Pipeline                         | 67       | LF   | \$ 354    | \$ 23,718        |
| Short Pipe Surcharge                     | 1        | %    | 30%       | \$ 7,115         |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 30,833</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 3,083         |
| Traffic Control                          | 5%       | LS   |           | \$ 1,542         |
| Erosion Control                          | 2%       | LS   |           | \$ 617           |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 36,075</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 10,823        |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 46,898</b> |
| Engineering                              | 20%      | LS   |           | \$ 9,380         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 2,345         |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 58,622</b> |

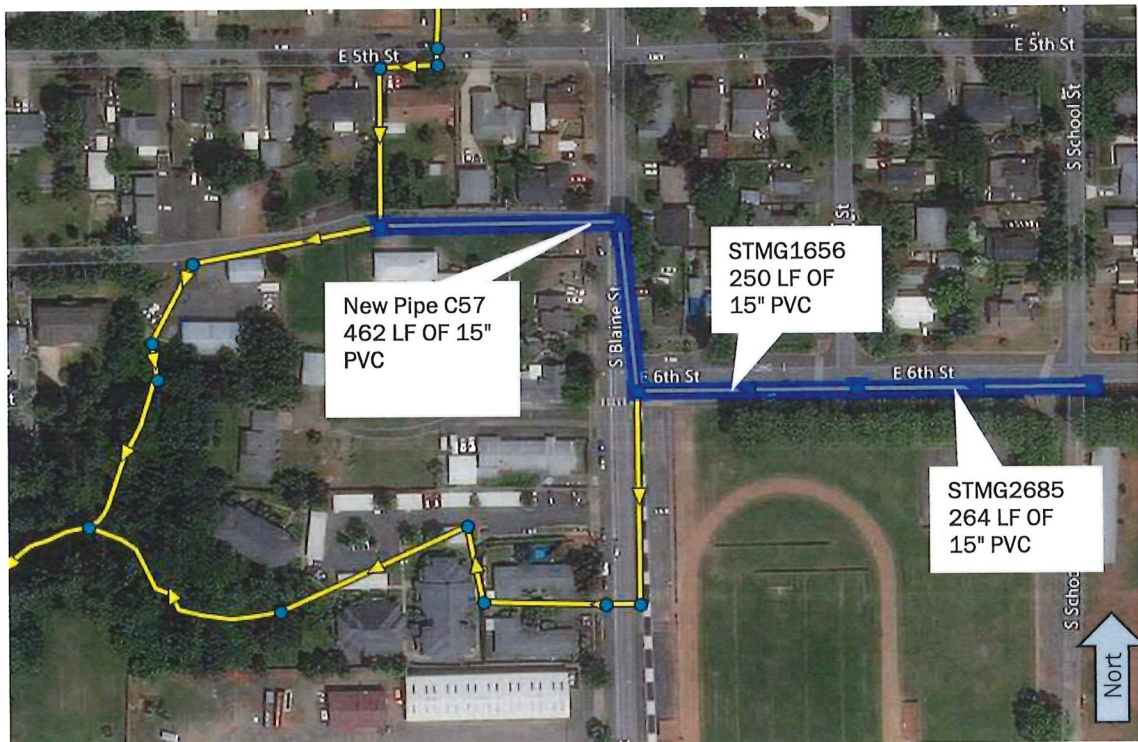


## C-D: 6th & Blaine St. Improvements (Priority 2)

|                            |                            |
|----------------------------|----------------------------|
| Drainage                   | Chehalem Creek             |
| Flooding Occurs            | 2 year event               |
| Contributing Drainage Area | 25.4 acres                 |
| In 2014 CIP?               | No                         |
| Objective(s) Addressed     | Flood control, PACP report |

### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding.



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs       |
|------------------------------------------|----------|------|-----------|-------------------|
| 15" PVC Pipeline                         | 976      | LF   | \$ 121    | \$ 118,096        |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 118,096</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 11,810         |
| Traffic Control                          | 5%       | LS   |           | \$ 5,905          |
| Erosion Control                          | 2%       | LS   |           | \$ 2,362          |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 138,172</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 41,452         |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 179,624</b> |
| Engineering                              | 20%      | LS   |           | \$ 35,925         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 8,981          |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 224,530</b> |

## C-E: Pinehurst Dr. Improvements (Priority 2)

|                            |                |
|----------------------------|----------------|
| Drainage                   | Chehalem Creek |
| Flooding Occurs            | 2 year event   |
| Contributing Drainage Area | 13 acres       |
| In 2014 CIP?               | No             |
| Objective(s) Addressed     | Flood control  |

### Project Description:

Flow is constricted through pipes in park, so flow should be routed through Pinehurst Dr. and line through the park can be abandoned.



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs       |
|------------------------------------------|----------|------|-----------|-------------------|
| 15" PVC Pipeline                         | 467      | LF   | \$ 121    | \$ 56,507         |
| 18" PVC Pipeline                         | 919      | LF   | \$ 147    | \$ 135,093        |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 191,600</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 19,160         |
| Traffic Control                          | 5%       | LS   |           | \$ 9,580          |
| Erosion Control                          | 2%       | LS   |           | \$ 3,832          |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 224,172</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 67,252         |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 291,424</b> |
| Engineering                              | 20%      | LS   |           | \$ 58,285         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 14,571         |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 364,280</b> |

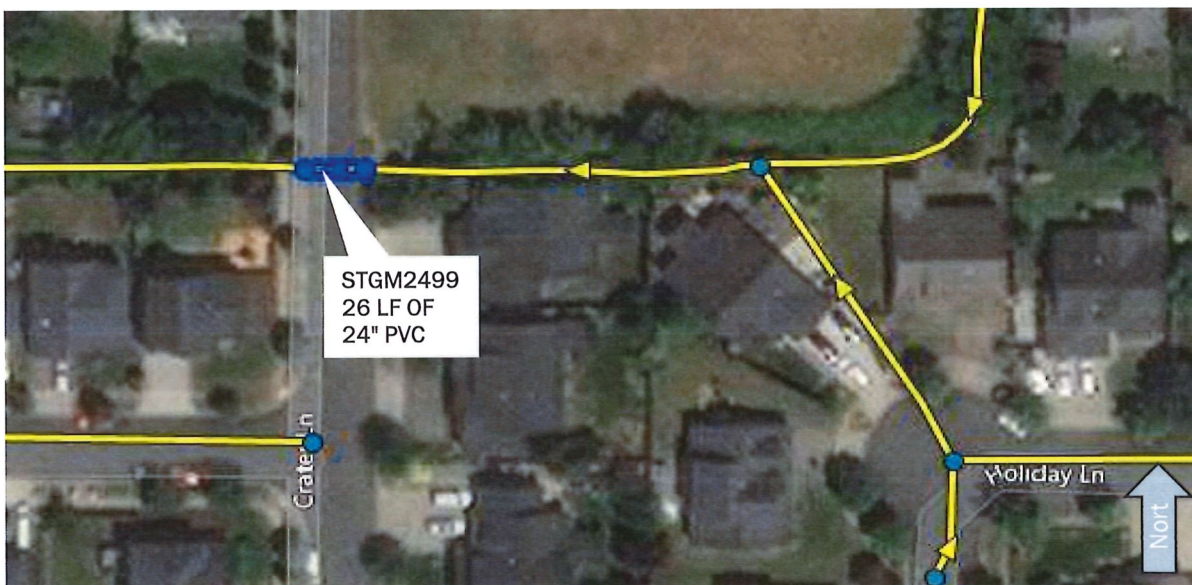


### C-F: Crater Ln. Improvements (Priority 3)

|                            |                                |
|----------------------------|--------------------------------|
| Drainage                   | Chehalem Creek                 |
| Flooding Occurs            | Less than 1 hr @ 25 year event |
| Contributing Drainage Area | 142 acres                      |
| In 2014 CIP?               | No                             |
| Objective(s) Addressed     | Flood control                  |

#### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding.



#### Cost Estimate:

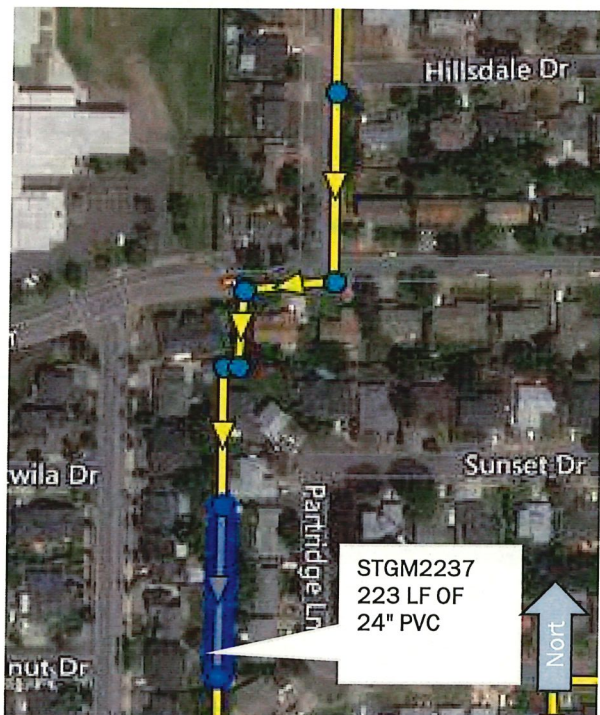
| Description                              | Quantity | Unit | Unit Cost | Total Costs      |
|------------------------------------------|----------|------|-----------|------------------|
| 24" PVC Pipeline                         | 26       | LF   | \$ 191    | \$ 4,966         |
| Short Pipe Surcharge                     | 1        | %    | 30%       | \$ 1,490         |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 6,456</b>  |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 646           |
| Traffic Control                          | 5%       | LS   |           | \$ 323           |
| Erosion Control                          | 2%       | LS   |           | \$ 129           |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 7,553</b>  |
| Construction Contingency                 | 30%      | LS   |           | \$ 2,266         |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 9,819</b>  |
| Engineering                              | 20%      | LS   |           | \$ 1,964         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 491           |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 12,274</b> |

### C-G: Partridge Ln. Improvements (Priority 3)

|                            |                             |
|----------------------------|-----------------------------|
| Drainage                   | Chehalem Creek              |
| Flooding Occurs            | Only 6 min. @ 25 year event |
| Contributing Drainage Area | 30 acres                    |
| In 2014 CIP?               | No                          |
| Objective(s) Addressed     | Flood control               |

#### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding.



#### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs      |
|------------------------------------------|----------|------|-----------|------------------|
| 24" PVC Pipeline                         | 223      | LF   | \$ 191    | \$ 42,593        |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 42,593</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 4,259         |
| Traffic Control                          | 5%       | LS   |           | \$ 2,130         |
| Erosion Control                          | 2%       | LS   |           | \$ 852           |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 49,834</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 14,950        |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 64,784</b> |
| Engineering                              | 20%      | LS   |           | \$ 12,957        |
| Legal and Administrative                 | 5%       | LS   |           | \$ 3,239         |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 80,980</b> |



## C-H: Illinois St. Improvements (Priority 2)

|                            |                |
|----------------------------|----------------|
| Drainage                   | Chehalem Creek |
| Flooding Occurs            | 10 year event  |
| Contributing Drainage Area | 2 acres        |
| In 2014 CIP?               | No             |
| Objective(s) Addressed     | Flood control  |

### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding.



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs       |
|------------------------------------------|----------|------|-----------|-------------------|
| 18" PVC Pipeline                         | 498      | LF   | \$ 147    | \$ 73,206         |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 73,206</b>  |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 7,321          |
| Traffic Control                          | 5%       | LS   |           | \$ 3,660          |
| Erosion Control                          | 2%       | LS   |           | \$ 1,464          |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 85,651</b>  |
| Construction Contingency                 | 30%      | LS   |           | \$ 25,695         |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 111,346</b> |
| Engineering                              | 20%      | LS   |           | \$ 22,269         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 5,567          |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 139,183</b> |

## C-I: Ditch & Pinehurst Dr. Improvements (Priority 2)

|                            |                            |
|----------------------------|----------------------------|
| Drainage                   | Chehalem Creek             |
| Flooding Occurs            | 2 year event               |
| Contributing Drainage Area | 136 acres                  |
| In 2014 CIP?               | No                         |
| Objective(s) Addressed     | Flood control, PACP report |

### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding.



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs       |
|------------------------------------------|----------|------|-----------|-------------------|
| 24" PVC Pipeline                         | 525      | LF   | \$ 191    | \$ 100,275        |
| 36" PVC Pipeline                         | 168      | LF   | \$ 292    | \$ 49,056         |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 149,331</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 14,933         |
| Traffic Control                          | 5%       | LS   |           | \$ 7,467          |
| Erosion Control                          | 2%       | LS   |           | \$ 2,987          |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 174,717</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 52,415         |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 227,132</b> |
| Engineering                              | 20%      | LS   |           | \$ 45,426         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 11,357         |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 283,916</b> |



### C-J: Charles St. Improvements (Priority 3)

|                            |                |
|----------------------------|----------------|
| Drainage                   | Chehalem Creek |
| Flooding Occurs            | 10 year event  |
| Contributing Drainage Area | 12 acres       |
| In 2014 CIP?               |                |
| Objective(s) Addressed     | Flood control  |

#### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding. Trenchless methods will likely be needed since this line goes through residential yards. Considering the relatively small amount of flooding that occurs in the area (0.02 inches at the 25-year event), and the relative difficulty of construction under these conditions, it may be better to leave this project undone.



#### Cost Estimate:

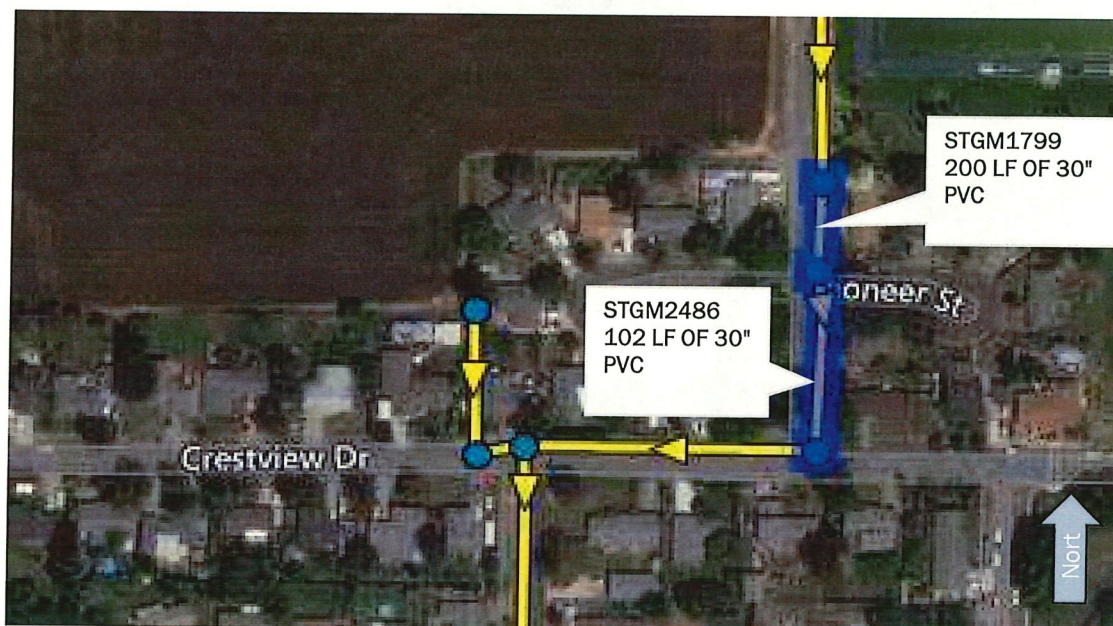
| Description                              | Quantity | Unit | Unit Cost | Total Costs      |
|------------------------------------------|----------|------|-----------|------------------|
| 15" PVC Pipeline                         | 171      | LF   | \$ 121    | \$ 20,691        |
| Short Pipe Surcharge                     | 1        | %    | 30%       | \$ 6,207         |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 26,898</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 2,690         |
| Traffic Control                          | 5%       | LS   |           | \$ 1,345         |
| Erosion Control                          | 2%       | LS   |           | \$ 538           |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 31,471</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 9,441         |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 40,912</b> |
| Engineering                              | 20%      | LS   |           | \$ 8,182         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 2,046         |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 51,140</b> |

### C-K: Center St. Improvements (Priority 3)

|                            |                |
|----------------------------|----------------|
| Drainage                   | Chehalem Creek |
| Flooding Occurs            | 25 year event  |
| Contributing Drainage Area | 58 acres       |
| In 2014 CIP?               | No             |
| Objective(s) Addressed     | Flood control  |

#### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding.



#### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs       |
|------------------------------------------|----------|------|-----------|-------------------|
| 30" PVC Pipeline                         | 302      | LF   | \$ 241    | \$ 72,782         |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 72,782</b>  |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 7,278          |
| Traffic Control                          | 5%       | LS   |           | \$ 3,639          |
| Erosion Control                          | 2%       | LS   |           | \$ 1,456          |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 85,155</b>  |
| Construction Contingency                 | 30%      | LS   |           | \$ 25,546         |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 110,701</b> |
| Engineering                              | 20%      | LS   |           | \$ 22,140         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 5,535          |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 138,377</b> |

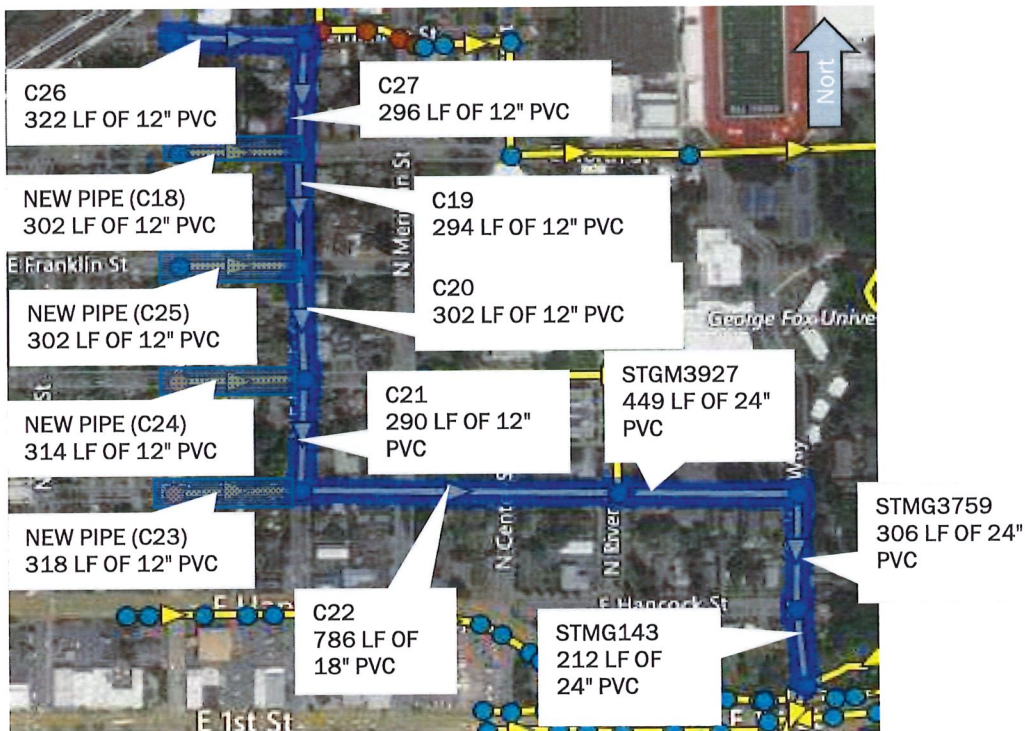


## C-L: N Edwards St. Improvements (Priority 1)

|                            |                                          |
|----------------------------|------------------------------------------|
| Drainage                   | Hess Creek                               |
| Flooding Occurs            | 2 year event                             |
| Contributing Drainage Area | 19 acres                                 |
| In 2014 CIP?               | Yes, but updated for new design criteria |
| Objective(s) Addressed     | Flood control, pipe material             |

### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding. There are also several streets with no pipes that are experiencing flooding. There are new pipes added in those areas.



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs         |
|------------------------------------------|----------|------|-----------|---------------------|
| 12" PVC Pipeline                         | 2740     | LF   | \$ 87     | \$ 238,380          |
| 18" PVC Pipeline                         | 786      | LF   | \$ 147    | \$ 115,542          |
| 24" PVC Pipeline                         | 967      | LF   | \$ 191    | \$ 184,697          |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 538,619</b>   |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 53,862           |
| Traffic Control                          | 5%       | LS   |           | \$ 26,931           |
| Erosion Control                          | 2%       | LS   |           | \$ 10,772           |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 630,184</b>   |
| Construction Contingency                 | 30%      | LS   |           | \$ 189,055          |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 819,239</b>   |
| Engineering                              | 20%      | LS   |           | \$ 163,848          |
| Legal and Administrative                 | 5%       | LS   |           | \$ 40,962           |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 1,024,049</b> |

## C-M: E Third St. Improvements (Priority 1)

|                            |                                          |
|----------------------------|------------------------------------------|
| Drainage                   | Hess Creek                               |
| Flooding Occurs            | 2 year event                             |
| Contributing Drainage Area | 28 acres                                 |
| In 2014 CIP?               | Yes, but updated for new design criteria |
| Objective(s) Addressed     | Flood control, pipe material             |

### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding. To completely remove flooding in the area, along E First. Coordination is needed with ODOT to upsize the pipes in 1st street to 18".



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs       |
|------------------------------------------|----------|------|-----------|-------------------|
| 12" PVC Pipeline                         | 100      | LF   | \$ 87     | \$ 8,700          |
| 15" PVC Pipeline                         | 502      | LF   | \$ 121    | \$ 60,742         |
| 18" PVC Pipeline                         | 1846     | LF   | \$ 147    | \$ 271,362        |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 340,804</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 34,080         |
| Traffic Control                          | 5%       | LS   |           | \$ 17,040         |
| Erosion Control                          | 2%       | LS   |           | \$ 6,816          |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 398,741</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 119,622        |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 518,363</b> |
| Engineering                              | 20%      | LS   |           | \$ 103,673        |
| Legal and Administrative                 | 5%       | LS   |           | \$ 25,918         |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 647,954</b> |



## C-N: E North St. Improvements (Priority 1)

|                            |                              |
|----------------------------|------------------------------|
| Drainage                   | Hess Creek                   |
| Flooding Occurs            | 2 year event                 |
| Contributing Drainage Area | 25 acres                     |
| In 2014 CIP?               | No                           |
| Objective(s) Addressed     | Flood control, pipe material |

### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding.



### Cost Estimate:

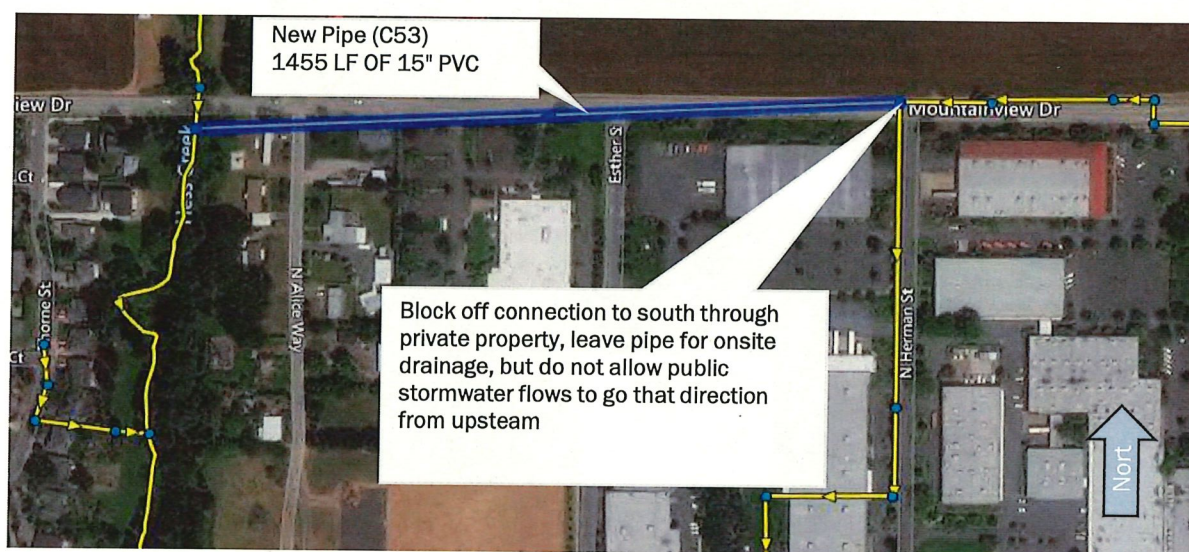
| Description                              | Quantity | Unit | Unit Cost | Total Costs       |
|------------------------------------------|----------|------|-----------|-------------------|
| 18" PVC Pipeline                         | 435      | LF   | \$ 147    | \$ 63,945         |
| 24" PVC Pipeline                         | 1456     | LF   | \$ 191    | \$ 278,096        |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 342,041</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 34,204         |
| Traffic Control                          | 5%       | LS   |           | \$ 17,102         |
| Erosion Control                          | 2%       | LS   |           | \$ 6,841          |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 400,188</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 120,056        |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 520,244</b> |
| Engineering                              | 20%      | LS   |           | \$ 104,049        |
| Legal and Administrative                 | 5%       | LS   |           | \$ 26,012         |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 650,305</b> |

## C-O: Mountainview Dr. Improvements (Priority 3)

|                            |               |
|----------------------------|---------------|
| Drainage                   | Hess Creek    |
| Flooding Occurs            | 10 year event |
| Contributing Drainage Area | 78 acres      |
| In 2014 CIP?               | No            |
| Objective(s) Addressed     | Flood control |

### Project Description:

There is flooding because major upland flows come through lines on private property, so it is proposed they will be rerouted west Mountainview Dr.



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs       |
|------------------------------------------|----------|------|-----------|-------------------|
| 15" PVC Pipeline                         | 1455     | LF   | \$ 121    | \$ 176,055        |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 176,055</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 17,606         |
| Traffic Control                          | 5%       | LS   |           | \$ 8,803          |
| Erosion Control                          | 2%       | LS   |           | \$ 3,521          |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 205,984</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 61,795         |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 267,780</b> |
| Engineering                              | 20%      | LS   |           | \$ 53,556         |
| Environmental Permitting for New Outfall | 1        | LS   |           | \$ 50,000         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 13,389         |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 384,725</b> |



## C-P: Crestview Dr. Improvements (Priority 2)

|                            |               |
|----------------------------|---------------|
| Drainage                   | Hess Creek    |
| Flooding Occurs            | 10 year event |
| Contributing Drainage Area | 29 acres      |
| In 2014 CIP?               | No            |
| Objective(s) Addressed     | Flood control |

### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding.



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs       |
|------------------------------------------|----------|------|-----------|-------------------|
| 15" PVC Pipeline                         | 573      | LF   | \$ 121    | \$ 69,333         |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 69,333</b>  |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 6,933          |
| Traffic Control                          | 5%       | LS   |           | \$ 3,467          |
| Erosion Control                          | 2%       | LS   |           | \$ 1,387          |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 81,120</b>  |
| Construction Contingency                 | 30%      | LS   |           | \$ 24,336         |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 105,455</b> |
| Engineering                              | 20%      | LS   |           | \$ 21,091         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 5,273          |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 131,819</b> |

## C-Q: Wynooski St. Improvements (Priority 1)

|                            |                                           |
|----------------------------|-------------------------------------------|
| Drainage                   | Hess Creek                                |
| Flooding Occurs            | 2 year event                              |
| Contributing Drainage Area | 21 acres                                  |
| In 2014 CIP?               | No                                        |
| Objective(s) Addressed     | Flood control, pipe material, PACP report |

### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding. Some of the pipes are within the segment of Wynooski St. That is in County Jurisdiction.



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs       |
|------------------------------------------|----------|------|-----------|-------------------|
| 15" PVC Pipeline                         | 818      | LF   | \$ 121    | \$ 98,978         |
| 18" PVC Pipeline                         | 433      | LF   | \$ 147    | \$ 63,651         |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 162,629</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 16,263         |
| Traffic Control                          | 5%       | LS   |           | \$ 8,131          |
| Erosion Control                          | 2%       | LS   |           | \$ 3,253          |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 190,276</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 57,083         |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 247,359</b> |
| Engineering                              | 20%      | LS   |           | \$ 49,472         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 12,368         |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 309,198</b> |

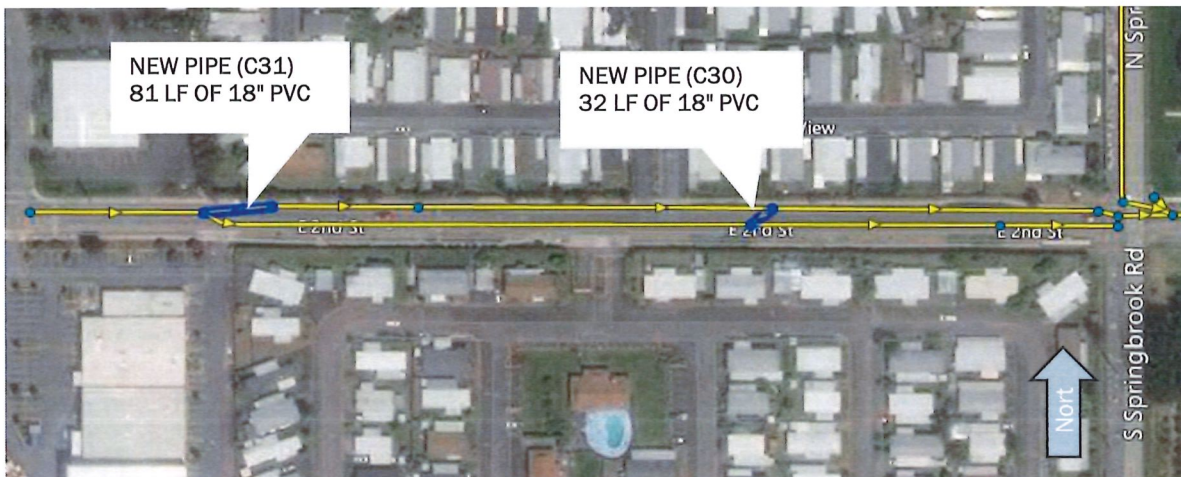


## C-R: 2nd St. Crossing (Priority 2)

|                            |                    |
|----------------------------|--------------------|
| Drainage                   | Spring Brook Creek |
| Flooding Occurs            | 2 year event       |
| Contributing Drainage Area | 10.5 acres         |
| In 2014 CIP?               | No                 |
| Objective(s) Addressed     | Flood control      |

### Project Description:

The city reports that the houses along mountain view have undersized laterals, so the properties flood before the mainlines flood, but the mainlines are still undersized. The easiest fix is to redirect flows from one line in 2nd St, to the other line in 2nd St.



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs      |
|------------------------------------------|----------|------|-----------|------------------|
| 18" PVC Pipeline                         | 113      | LF   | \$ 147    | \$ 16,611        |
| Short Pipe Surcharge                     | 1        | %    | 30%       | \$ 4,983         |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 21,594</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 2,159         |
| Traffic Control                          | 5%       | LS   |           | \$ 1,080         |
| Erosion Control                          | 2%       | LS   |           | \$ 432           |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 25,265</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 7,580         |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 32,845</b> |
| Engineering                              | 20%      | LS   |           | \$ 6,569         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 1,642         |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 41,056</b> |

## C-S: E 2nd St. @ River St. Improvements (Priority 3)

|                            |               |
|----------------------------|---------------|
| Drainage                   | Hess Creek    |
| Flooding Occurs            | 10 year event |
| Contributing Drainage Area | 6 acres       |
| In 2014 CIP?               | No            |
| Objective(s) Addressed     | Flood control |

### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding.



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs       |
|------------------------------------------|----------|------|-----------|-------------------|
| 15" PVC Pipeline                         | 526      | LF   | \$ 121    | \$ 63,646         |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 63,646</b>  |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 6,365          |
| Traffic Control                          | 5%       | LS   |           | \$ 3,182          |
| Erosion Control                          | 2%       | LS   |           | \$ 1,273          |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 74,466</b>  |
| Construction Contingency                 | 30%      | LS   |           | \$ 22,340         |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 96,806</b>  |
| Engineering                              | 20%      | LS   |           | \$ 19,361         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 4,840          |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 121,007</b> |



### C-T: E 2nd St. @ Ardu St. Improvements (Priority 3)

|                            |               |
|----------------------------|---------------|
| Drainage                   | Hess Creek    |
| Flooding Occurs            | 10 year event |
| Contributing Drainage Area | 13.6 acres    |
| In 2014 CIP?               | No            |
| Objective(s) Addressed     | Flood control |

#### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding.



#### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs       |
|------------------------------------------|----------|------|-----------|-------------------|
| 18" PVC Pipeline                         | 775      | LF   | \$ 147    | \$ 113,925        |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 113,925</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 11,393         |
| Traffic Control                          | 5%       | LS   |           | \$ 5,696          |
| Erosion Control                          | 2%       | LS   |           | \$ 2,279          |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 133,292</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 39,988         |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 173,280</b> |
| Engineering                              | 20%      | LS   |           | \$ 34,656         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 8,664          |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 216,600</b> |

### C-U: N Springbrook Rd. Improvements - Section 1 (Priority 1)

|                            |                                          |
|----------------------------|------------------------------------------|
| Drainage                   | Spring Brook Creek                       |
| Flooding Occurs            | 2 year event                             |
| Contributing Drainage Area | 173 acres                                |
| In 2014 CIP?               | Yes, but updated for new design criteria |
| Objective(s) Addressed     | Flood control                            |

#### Project Description:

Modeling shows flooding problems along N Springbrook Rd. Upsize the stormwater pipes along N Springbrook Rd to 30" diameter and connect the system to the existing system to the south. It also includes a new pipe on the north end that distributes flow.



#### Cost Estimate:

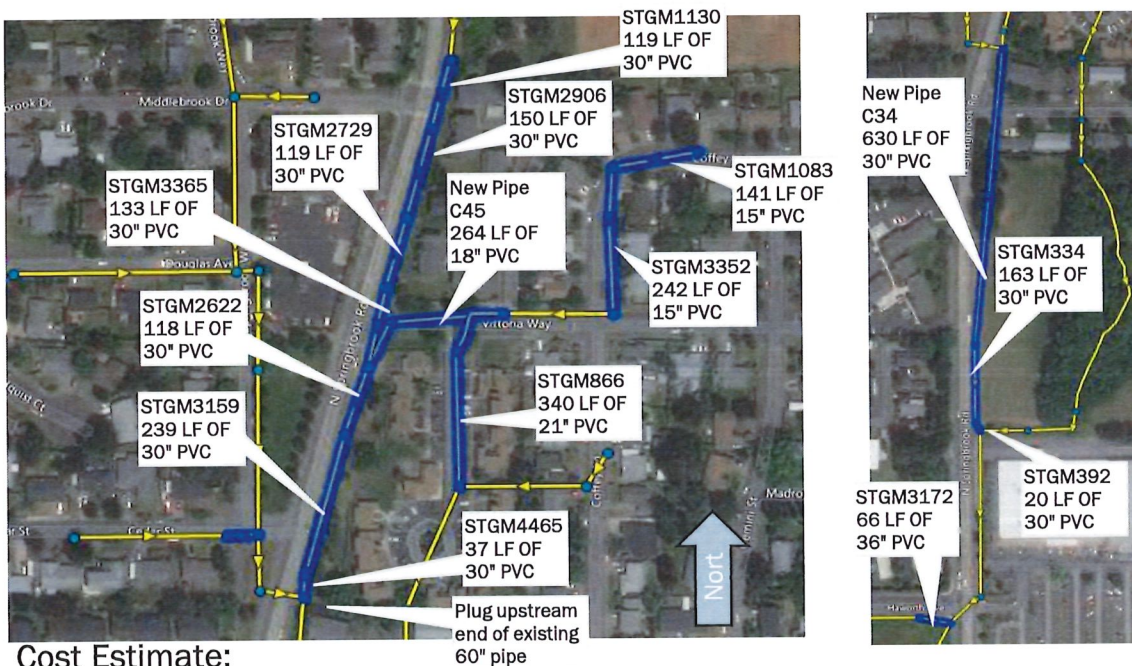
| Description                              | Quantity | Unit | Unit Cost | Total Costs      |
|------------------------------------------|----------|------|-----------|------------------|
| 18" PVC Pipeline                         | 338      | LF   | \$ 147    | \$ 49,686        |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 49,686</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 4,969         |
| Traffic Control                          | 5%       | LS   |           | \$ 2,484         |
| Erosion Control                          | 2%       | LS   |           | \$ 994           |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 58,133</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 17,440        |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 75,572</b> |
| Engineering                              | 20%      | LS   |           | \$ 15,114        |
| Legal and Administrative                 | 5%       | LS   |           | \$ 3,779         |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 94,466</b> |



## C-U: N Springbrook Rd. Improvements - Section 2 (Priority 1)

|                             |                                          |
|-----------------------------|------------------------------------------|
| Drainage                    | Spring Brook Creek                       |
| Flooding Occurs             | 2 year event                             |
| Contributing Drainage Area  | 173 acres                                |
| In 2014 CIP?                | Yes, but updated for new design criteria |
| Objective(s) Addressed      | Flood control                            |
| <b>Project Description:</b> |                                          |

Modeling shows flooding problems along N Springbrook Rd. Upsize the stormwater pipes along N Springbrook Rd to 30" diameter and connect the system to the existing system to the south. It also includes a new pipe on the north end that distributes flow.



### Cost Estimate:

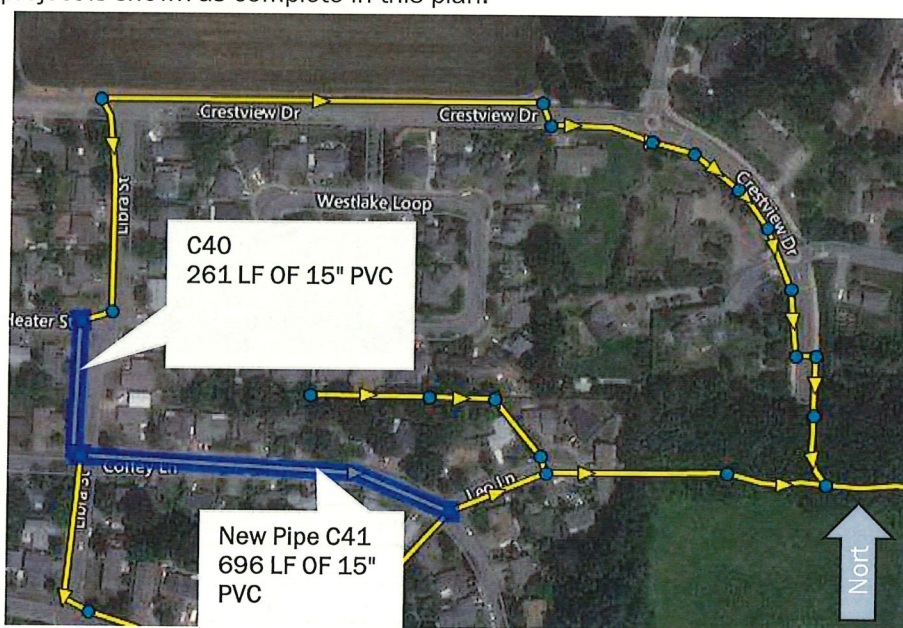
| Description                              | Quantity | Unit | Unit Cost | Total Costs         |
|------------------------------------------|----------|------|-----------|---------------------|
| 15" PVC Pipeline                         | 383      | LF   | \$ 121    | \$ 46,343           |
| 18" PVC Pipeline                         | 264      | LF   | \$ 147    | \$ 38,808           |
| 21" PVC Pipeline                         | 340      | LF   | \$ 176    | \$ 59,840           |
| 30" PVC Pipeline                         | 1728     | LF   | \$ 241    | \$ 416,448          |
| 36" PVC Pipeline                         | 66       | LF   | \$ 292    | \$ 19,272           |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 580,711</b>   |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 58,071           |
| Traffic Control                          | 5%       | LS   |           | \$ 29,036           |
| Erosion Control                          | 2%       | LS   |           | \$ 11,614           |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 679,432</b>   |
| Construction Contingency                 | 30%      | LS   |           | \$ 203,830          |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 883,261</b>   |
| Engineering                              | 20%      | LS   |           | \$ 176,652          |
| Legal and Administrative                 | 5%       | LS   |           | \$ 44,163           |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 1,104,077</b> |

## C-V: Libra St. Improvements (Priority 2)

|                            |                                             |
|----------------------------|---------------------------------------------|
| Drainage                   | Spring Brook Creek                          |
| Flooding Occurs            | 2 year event                                |
| Contributing Drainage Area | 33 acres                                    |
| In 2014 CIP?               | Yes, but rerouted                           |
| Objective(s) Addressed     | Flood control, Reduce Maintenance Frequency |

### Project Description:

Modeling shows flooding problems along Libra St. This system needs frequent maintenance to address silt accumulation. This project works in combination with a project that is currently underway in Crestview Dr. That project is shown as complete in this plan.



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs       |
|------------------------------------------|----------|------|-----------|-------------------|
| 15" PVC Pipeline                         | 957      | LF   | \$ 121    | \$ 115,797        |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 115,797</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 11,580         |
| Traffic Control                          | 5%       | LS   |           | \$ 5,790          |
| Erosion Control                          | 2%       | LS   |           | \$ 2,316          |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 135,482</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 40,645         |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 176,127</b> |
| Engineering                              | 20%      | LS   |           | \$ 35,225         |
| Legal and Administrative                 | 5%       | LS   |           | \$ 8,806          |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 220,159</b> |



## C-W: Brutscher St. Improvements (Priority 3)

|                            |                                          |
|----------------------------|------------------------------------------|
| Drainage                   | Spring Brook Creek                       |
| Flooding Occurs            | 10 year event                            |
| Contributing Drainage Area | 19 acres                                 |
| In 2014 CIP?               | Yes, but updated for new design criteria |
| Objective(s) Addressed     | Flood control                            |

### Project Description:

Flow is currently restricted by undersized pipes that are upsized to reduce flooding.



### Cost Estimate:

| Description                              | Quantity | Unit | Unit Cost | Total Costs      |
|------------------------------------------|----------|------|-----------|------------------|
| 18" PVC Pipeline                         | 260      | LF   | \$ 147    | \$ 38,220        |
| <b>Capital Expenses Subtotal</b>         |          |      |           | <b>\$ 38,220</b> |
| Mobilization/Demobilization              | 10%      | LS   |           | \$ 3,822         |
| Traffic Control                          | 5%       | LS   |           | \$ 1,911         |
| Erosion Control                          | 2%       | LS   |           | \$ 764           |
| <b>Construction Cost Subtotal</b>        |          |      |           | <b>\$ 44,717</b> |
| Construction Contingency                 | 30%      | LS   |           | \$ 13,415        |
| <b>Capital Expense Total</b>             |          |      |           | <b>\$ 58,133</b> |
| Engineering                              | 20%      | LS   |           | \$ 11,627        |
| Legal and Administrative                 | 5%       | LS   |           | \$ 2,907         |
| <b>Capital Implementation Cost Total</b> |          |      |           | <b>\$ 72,666</b> |

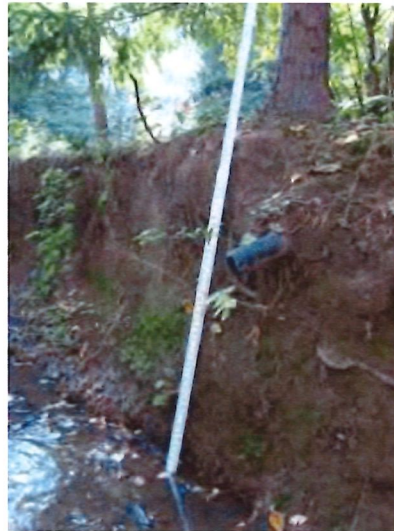
| Description                     | Unit | Quantity | Unit Cost* | Total Costs |
|---------------------------------|------|----------|------------|-------------|
| <b>Pipe Unit Cost</b>           |      |          |            |             |
| PVC Inlet Lead (12", 2-5' Deep) | LF   |          | \$1        |             |
| 12" PVC Pipeline                | LF   |          | \$87       |             |
| 15" PVC Pipeline                | LF   |          | \$121      |             |
| 18" PVC Pipeline                | LF   |          | \$147      |             |
| 21" PVC Pipeline                | LF   |          | \$176      |             |
| 24" PVC Pipeline                | LF   |          | \$191      |             |
| 27" PVC Pipeline                | LF   |          | \$224      |             |
| 30" PVC Pipeline                | LF   |          | \$241      |             |
| 33" PVC Pipeline                | LF   |          | \$274      |             |
| 36" PVC Pipeline                | LF   |          | \$292      |             |
| 42" PVC Pipeline                | LF   |          | \$333      |             |
| 48" PVC Pipeline                | LF   |          | \$354      |             |
| 60" PVC Pipeline                | LF   |          | \$509      |             |
| Channel                         | LF   |          | \$300      |             |

\*Unit costs include trenching, backfill, manholes, pavement resoration, and catch basins. They are based on recent projects and previous estimates. They are only preliminary estimates to use for budgeting purchases and are not a guarantee of future pricing. The cost of construction and building materials is continually changing.

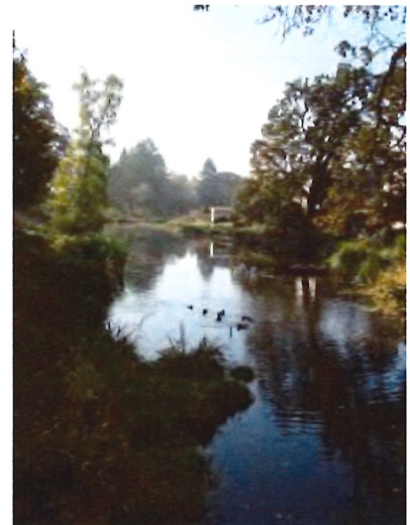




*West Bank Chehalem Creek  
Streambank Erosion*



*Hess Creek (DS of Mountainview Drive)  
Residential Stormwater Outfall*



*Corrine Tributary to Hess Creek  
Detention Pond Outfall Retrofit*

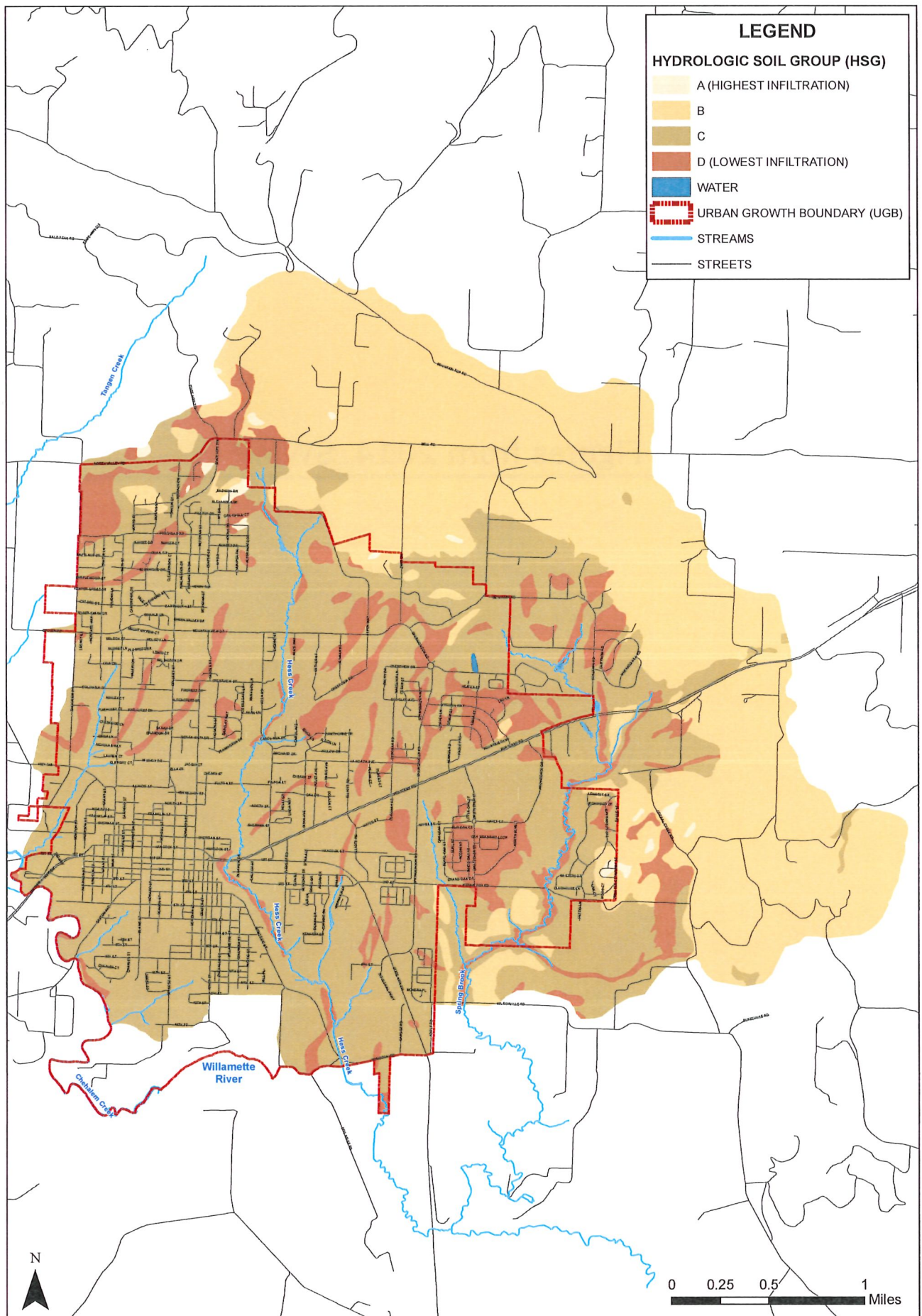
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Project Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | A-1: Streambank Protection Improvements      |
| Drainage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Hess Creek, Chehalem Creek, and Spring Brook |
| Contributing Drainage Area                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | N/A                                          |
| Associated Modeled Pipes/Conduits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | N/A                                          |
| Objective(s) Addressed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Water Quality, Stream Restoration            |
| <b>Project Description</b><br>The stream channel assessment identified problem areas in the creek where erosion was significant. <ul style="list-style-type: none"> <li>A. West Bank Chehalem Creek (Upstream of Hwy 240)               <ul style="list-style-type: none"> <li>• This project addresses stream bank protection and riparian restoration and landscaping along the west bank of Chehalem Creek.</li> </ul> </li> <li>B. Hess Creek (Downstream of Mountainview Drive)               <ul style="list-style-type: none"> <li>• This project addresses an outfall improvement, stream bank protection, and riparian restoration and landscaping along Hess Creek.</li> </ul> </li> <li>C. Corinne Tributary to Hess Creek               <ul style="list-style-type: none"> <li>• This project addresses an outfall improvement, stream bank protection, and riparian restoration and landscaping at the detention pond outfall along Corinne Tributary.</li> </ul> </li> <li>D. Two Additional Outfall Protection and Bank Restoration Projects               <ul style="list-style-type: none"> <li>• This cost accounts for two additional outfall protection and bank restoration projects. The locations are to be determined upon City field investigation.</li> </ul> </li> </ul> |                                              |
| <b>Estimated Planning Cost (2014 dollars, rounded to the thousand)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                              |
| Capital Expense Sub-total (See Appendix E for details)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | \$ 100,000                                   |
| Mobilization/Demobilization (10%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | \$ 10,000                                    |
| Traffic Control/Utility Relocation (5%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | \$ 5,000                                     |
| Erosion Control (2%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | \$ 2,000                                     |
| Construction Cost Sub-total                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | \$ 117,000                                   |
| Construction Contingency (30%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | \$ 35,100                                    |
| Capital Expense Total                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | \$ 152,100                                   |
| Engineering and Permitting (20%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | \$ 30,400                                    |
| Construction Administration (5%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | \$ 7,600                                     |
| <b>Capital Project Implementation Cost Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>\$190,100</b>                             |
| Existing to Future % Flow Increase <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | N/A                                          |
| <b>Design Assumptions/Notes:</b> Additional project locations to be determined through stream channel observations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                              |

<sup>1</sup> Existing to future percent flow increase is based on the 25-year percent peak flow increase from the contributing drainage area between the existing and future land use scenarios for each CIP.

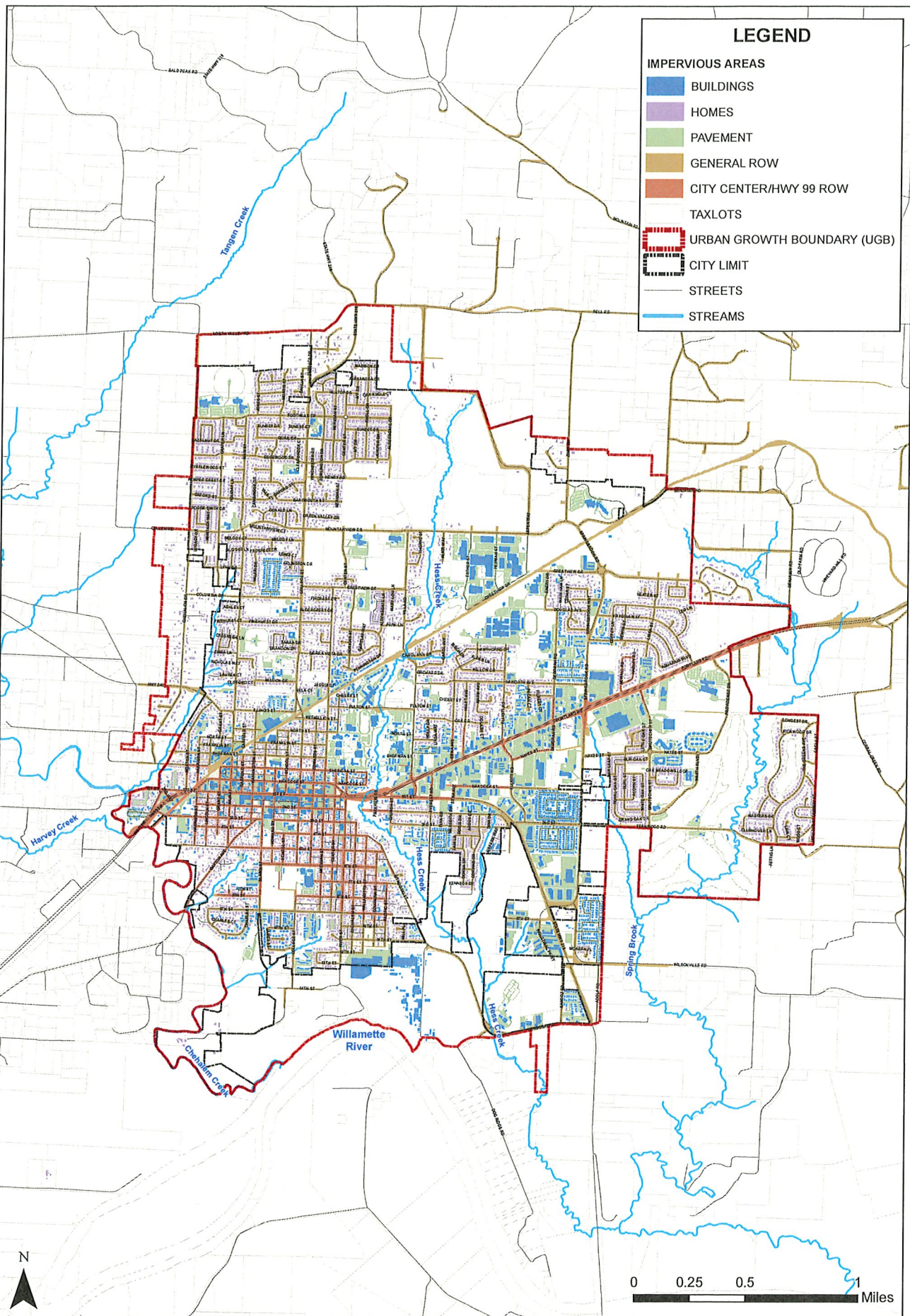
## **Appendix E: Figures from 2014 SWMP**

DRAFT









## STORMWATER MASTER PLAN UPDATE

FIGURE 2-4. EXISTING IMPERVIOUS AREAS



NEWBERG, OREGON



JUNE 2014



## Appendix F: Attributes for Shapefile Submittal by Developments

---

DRAFT

The following attributes should be included by engineers submitting shapefiles to the City as part of developments.

#### Pipes/Channels

| Attribute  | What it is                                           | Input Value Options                                                                        |
|------------|------------------------------------------------------|--------------------------------------------------------------------------------------------|
| enabled    | Is it actively enabled in the system                 | "1" if active, "0" if not                                                                  |
| lifecycles | What life cycle                                      | "Active" "Abandoned" or "Removed"                                                          |
| material   | Pipe material                                        | "ZZZ" "XXX" "VCP" "SP" "RCP"<br>"PVC-P" "PVC" "PE"<br>"Not Known" "DIP" "CMP"<br>"CAS" " " |
| crosssecti | Shape of Cross section                               | "C"                                                                                        |
| upstream   | Upstream invert elevation of pipe                    | In ft. in the NAVD88                                                                       |
| downstream | downstream invert elevation of pipe                  | In ft. in the NAVD88                                                                       |
| pipesize   | Diameter of                                          | pipe in inches                                                                             |
| installdat | Date pipe was installed                              | date                                                                                       |
| type       | Type of stormwater pipe                              | "Abandoned" "Collector"<br>"Collector-Pvt" "Removed"<br>"Trench Drain"                     |
| Roadtype   | What type of road is it in                           | "major collector" "minor arterial" etc.                                                    |
| PipeLength | Length of pipe                                       | In feet                                                                                    |
| Owner      | Owner of pipe                                        | "Newberg" "ODOT" "County"<br>"Private"                                                     |
| Up_Node    | The node (catch basin or manhole) upstream of pipe   | The unique ID of the the node upstream                                                     |
| Down_Node  | The node (catch basin or manhole) downstream of pipe | The unique ID of the node downstream                                                       |
| SLOPE      | Slope of pipe                                        | In percent                                                                                 |



## Outlets

| Attribute             | What it is                           | Input Value Options                                                               |
|-----------------------|--------------------------------------|-----------------------------------------------------------------------------------|
| enabled               | Is it actively enabled in the system | "true" or "false"                                                                 |
| installdate           | Date pipe was installed              | date                                                                              |
| Location description  | Description of location              | location                                                                          |
| lifecyclestatus       | What life cycle                      | "Active" "Abandoned" or "Removed"                                                 |
| outletdimension       | Diameter of outlet                   | pipe in inches                                                                    |
| SubtypeCD             | type                                 | "outlet"                                                                          |
| OutletInvertElevation | Invert elevation                     | Elevation in ft.                                                                  |
| GroundElev            | Elevation of ground                  | Elevation in ft.                                                                  |
| Outletshape           | Shape of outlet                      | "Circular", "open channel", "trapezoid"                                           |
| Material              | Pipe material                        | "ZZZ" "XXX" "VCP" "SP" "RCP" "PVC-P" "PVC" "PE" "Not Known" "DIP" "CMP" "CAS" " " |
| Owner                 | Owner of facility                    | "Newberg" "ODOT" "County" "Private"                                               |

## Inlets

| Attribute           | What it is                                      | Input Value Options                 |
|---------------------|-------------------------------------------------|-------------------------------------|
| enabled             | Is it actively enabled in the system            | "true" or "false"                   |
| locationdescription | Description of location                         | location                            |
| lifecyclestatus     | What life cycle                                 | "Active" "Abandoned" or "Removed"   |
| SubtypeCD           | type                                            | "1"                                 |
| date_obs            | Date observed                                   | Date                                |
| collectmethod       | How was elevation determined                    | Text                                |
| pelican             | Is a pelican present                            | "Present" and "Not Present"         |
| grate               | How many grates are there                       | "Single", "Double", "None" <null>   |
| type                | Description of inlet type                       | Text                                |
| installdate         | Date pipe was installed                         | date                                |
| Owner               | Owner of facility                               | "Newberg" "ODOT" "County" "Private" |
| Fish Marker         | Is it labeled for fish                          | "YES", "Yes" or <null>              |
| Sump                | Lowest IE or sump elevation, whatever is lowest | Elevation in ft.                    |
| Ground              | Ground elevation                                | Elevation in ft.                    |

## Manholes

| Attribute           | What it is                                      | Input Value Options                 |
|---------------------|-------------------------------------------------|-------------------------------------|
| enabled             | Is it actively enabled in the system            | "true" or "false"                   |
| locationdescription | Description of location                         | location                            |
| lifecyclestatus     | What life cycle                                 | "Active" "Abandoned" or "Removed"   |
| AccessDiameter      | Diameter of access hole                         | Diameter in inches                  |
| AccessType          | Type of cover                                   | "Cover" "Lid" "door"                |
| invertlevation      | Lid elevation                                   | Elevation in ft.                    |
| wallmaterial        | What are the walls made out of                  | "concrete" "Precast"                |
| SubtypeCD           | type                                            | "Manhole" "Vault"                   |
| editorname          | Name of editor                                  | Name                                |
| Lastupdate          | Time of last update                             | Date and time                       |
| date_obs            | Date observed                                   | Date                                |
| collectmethod       | How was elevation determined                    | Text                                |
| installdate         | Date pipe was installed                         | date                                |
| Owner               | Owner of facility                               | "Newberg" "ODOT" "County" "Private" |
| Sump                | Lowest IE or sump elevation, whatever is lowest | Elevation in ft.                    |
| Ground              | Ground elevation                                | Elevation in ft.                    |



**Exhibit “B” to Planning Commission Resolution 2021-367  
Findings – File CPTA20-0005**

---

**APPROVAL CRITERIA**

**A. Statewide Planning Goals (the “Goals”)**

**GOAL 1: CITIZEN INVOLVEMENT**

To develop a citizen involvement program that ensures the opportunity for citizens to be involved in all phases of the planning process.

**Finding:** The City meets this requirement by having various citizen committees and commissions with opportunities for the public to testify on general or specific matters. For the Stormwater Master Plan it included a Citizen Advisory Committee that met four times, went before the Newberg Planning Commission on May 13, 2021 and Newberg City Council on June 7, 2021, which provided the opportunity for public comment. Finally, notice was published in the Newberg Graphic newspaper and posted in four public places.

The amendment is subject to the Type IV Legislative process, which requires public notification and public hearings before the Planning Commission and the City Council. This process has been established by the City and determined to be consistent with Goal I of the Oregon Statewide Planning Goals. The public hearing notice of the action and decision, and the hearings on this case before the Planning Commission and the City Council are all recognized as opportunities for citizen participation.

The Goal is met.

**GOAL 2: LAND USE PLANNING**

To establish a land use planning process and policy framework as a basis for all decisions and actions related to use of land and to assure an adequate factual base for such decisions and actions.

**Finding:** This Goal requires that actions related to land use be consistent with acknowledged comprehensive plans of cities and counties. The City of Newberg last updated its Stormwater Master Plan in 2014. The 2021 Stormwater Master Plan will be incorporated by reference into the Newberg Comprehensive Plan as noted in Exhibit “C”.

The 2020 Stormwater Master Plan, Exhibit “A” and Exhibit “C”, was based on an adequate factual base as documented in 2021 Stormwater Master Plan. Implementation measures in the proposed 2020 Stormwater Master Plan are consistent with and adequate to carry out relevant Comprehensive Plan policies and intended types of development for land use designations as noted in these findings, including the protection of natural and cultural resources.

This Goal is met.

*“Working Together For A Better Community-Serious About Service”*  
Z:\MISC\WP5FILES\FILES.CPTA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx

### **GOAL 3: AGRICULTURAL LANDS**

To preserve and maintain agricultural lands.

**Finding:** Not applicable because the proposal does not propose any land use regulation changes to agricultural lands outside of the Newberg Urban Growth Boundary.

### **GOAL 4: FOREST LANDS**

To conserve forest lands by maintaining the forest land base and to protect the state's forest economy by making possible economically efficient forest practices that assure the continuous growing and harvesting of forest tree species as the leading use on forest land consistent with sound management of soil, air, water, and fish and wildlife resources and to provide for recreational opportunities and agriculture.

**Finding:** Not applicable because the proposal does not propose any land use regulation changes to forest lands outside of the Newberg Urban Growth Boundary.

### **GOAL 5: NATURAL RESOURCES, SCENIC AND HISTORIC AREAS, AND OPEN SPACES**

To protect natural resources and conserve scenic and historic areas and open spaces.

**Finding:** The proposed amendments will not negatively impact inventoried Goal 5 resources because the amendments do not change protections that already exist in the Newberg Municipal Code to protect these resources as they related to the stormwater drainage system. Newberg has an acknowledged Stream Corridor designation, inventoried historic resources, and identified open spaces in compliance with Goal 5.

This Goal is met.

### **GOAL 6: AIR, WATER AND LAND RESOURCES QUALITY**

To maintain and improve the quality of the air, water and land resources of the state.

**Finding:** Goal 6 addresses the quality of air, water, and land resources. In the context of a comprehensive plan amendment, a local government complies with Goal 6 by explaining why it is reasonable to expect that the proposed uses authorized by the plan amendment will be able to satisfy applicable federal and state environmental standards, including air and water quality standards. The 2021 Stormwater Master Plan address the land use pattern and density consistent with the acknowledged Newberg Comprehensive Plan to ensure that air, water and land resource quality through efficient use of the land supply through the provision of wastewater facilities.

Newberg has an acknowledged Comprehensive Plan that complies with this goal. Protections are already in place for air, water, and land resource quality. This proposal does not modify the existing goals and policies.

This Goal is met.



## **GOAL 7: AREAS SUBJECT TO NATURAL HAZARDS**

To protect people and property from natural hazards.

**Finding:** Newberg has an acknowledged Comprehensive Plan that complies with this goal. This proposal does not modify the City's natural hazards requirements such as flood plain areas. This proposal does not modify the existing goals and policies.

This Goal is met.

## **GOAL 8: RECREATIONAL NEEDS**

To satisfy the recreational needs of the citizens of the state and visitors and, where appropriate, to provide for the siting of necessary recreational facilities including destination resorts.

**Finding:** Newberg has an acknowledged Comprehensive Plan that complies with this goal. This proposal does not modify the City's recreational needs goals and policies.

This Goal is met.

## **GOAL 9: ECONOMIC DEVELOPMENT**

To provide adequate opportunities throughout the state for a variety of economic activities vital to the health, welfare, and prosperity of Oregon's citizens.

**Finding:** The 2021 Stormwater Master Plan provides for an adequate stormwater system for all residential, commercial, and industrial uses that are anticipated in the acknowledged Newberg Comprehensive Plan through the identification of necessary stormwater system improvements based on projected population growth which will ensure a diverse and stable economic base of the community over the 20-year planning horizon.

This Goal is met.

## **GOAL 10: HOUSING**

To provide for the housing needs of citizens of the state.

**Finding:** The 2020 Stormwater Master Plan has been developed to provide a community wide stormwater system to support housing development for lands within the city limits and the Urban Growth Boundary (UGB).

Below is the population excerpt for the next 20 years as provided by Portland State University's Population Research Center (June 2020). As illustrated below, the City of Newberg 2020 projected population is 24,877 and is estimated to grow by 17,500 to a total of 42,377 by 2060. The projected increase in population indicates a continued need for additional residential housing.

**Table 1: Population Forecast 2020-2060**

| City       | 2020   | 2025   | 2030   | 2035   | 2040   | 2045   | 2050   | 2055   | 2060   |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Newberg    | 24,877 | 26,557 | 28,432 | 30,576 | 32,780 | 34,929 | 37,247 | 39,907 | 42,377 |
| Change     |        | +1,680 | +1,857 | +2,144 | +2,204 | +2,149 | +2,318 | +2,660 | +2,470 |
| % Increase |        | 6.7%   | 6.9%   | 7.5%   | 7.2%   | 6.5%   | 6.6%   | 7.1%   | 6.1%   |

Source: Population Research Center, Portland State University, March 31, 2020. Proposed forecasts represent populations as of July 1 of each year

Newberg's Comprehensive Plan shows a need for additional MDR (Medium Density Residential) and COM (Commercial) land. In 2005, the City Council adopted amendments to the Comprehensive Plan, including updated residential land need and supply numbers for LDR (Low Density Residential), MDR (Medium Density Residential) and HDR (High Density Residential) land designations. The updates were based on data from the Housing and Residential Land Needs Report compiled by Johnson-Gardner in 2004. The amendments were adopted and acknowledged through the post-acknowledgment plan amendment process in 2005. The 2005 Comprehensive Plan has residential land data for the 20-year period from 2005-2025, and the future planning period out to 2040. This data shows that the City had a demonstrated need for 173 buildable acres of MDR (Medium Density Residential) through 2025, and an additional 191 acres of HDR land through 2040 (see table below). Buildable land includes vacant and redevelopable land in the existing Urban Growth Boundary (UGB).

| <b>Newberg Comprehensive Plan, Table V-7 Buildable Residential Land Needs vs. Supply</b> |                                         |                                      |                                        |                                         |
|------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------|----------------------------------------|-----------------------------------------|
| <b>Plan Designation</b>                                                                  | <b>Buildable Acres Needed 2005-2025</b> | <b>Buildable Acres in UGB (2004)</b> | <b>Surplus (Deficit) for 2005-2025</b> | <b>Buildable Acres Needed 2026-2040</b> |
| LDR                                                                                      | 612                                     | 359                                  | (253)                                  | 735                                     |
| MDR                                                                                      | 173                                     | 142                                  | (31)                                   | 191                                     |
| HDR                                                                                      | 89                                      | 13                                   | (76)                                   | 83                                      |
| <b>Total</b>                                                                             | <b>874</b>                              | <b>514</b>                           | <b>(380)</b>                           | <b>1009</b>                             |

In 2009 the City proposed an update to the Housing Element of the Comprehensive Plan. This item was appealed to LUBA and remanded; it has not yet been revised and readopted, so the 2005 amendments are the latest acknowledged estimates. A preliminary Buildable Lands Inventory (BLI) was completed for the City in 2016 utilizing the Simplified Method for Urban Growth Boundary

*"Working Together For A Better Community-Serious About Service"*

Z:\MISC\WP5\FILES\FILES.CPTA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx



(UGB) expansion; however, the BLI has not been finalized because several issues with the methodology were identified by the consultant and City staff.

Since 2015 there have been six Comprehensive Plan Map amendments including:

- CPA-15-001/ZMA3-15-001 – Martell Commons – 5.91 acres going from LDR to HDR
- CPMA18-0001/ZMA18-0002 – 1109 S River Street – 1.33 acres going from LDR to HDR
- CPMA18-0005/ZMA18-0002 – 501 and 507 E Illinois Street – 2.87 acres going from MDR to HDR
- CPMA18-0006 – 1303 S River Street (Riverlands) – 1.56 acres going from COM to MDR
- CPMA19-0001/ZMA19-0001 – 502 S St. Paul Highway (Beaudry) – 1.11 acres going from MDR to IND
- CPMA20-0001/ZMA20-0001 - 717 N College Street - .08 acres from LDR to MDR and .49 acres from COM to MDR

The above changes to HDR, MDR, and IND acreage are utilized along with additional data found within the staff reports from these previous comprehensive plan updates to update the 2005 buildable lands data.

**Table 2: Buildable Residential Needs vs. Supply after Proposed Comp Plan Change 2020-2035**

| Land Designation | Buildable Acres Needed | Buildable Acres Before Comp Plan Change | Building Acres After Comp Plan Change | Surplus/(Deficit) Before Comp Plan Change | Surplus/(Deficit) After Comp Plan Change |
|------------------|------------------------|-----------------------------------------|---------------------------------------|-------------------------------------------|------------------------------------------|
| LDR              | 301                    | 385                                     | 384.91                                | 84                                        | 83.91                                    |
| MDR              | 132                    | 81.57                                   | 82.64                                 | (50.43)                                   | (49.36)                                  |
| HDR              | 46                     | 9                                       | 12.7                                  | (37)                                      | (33.33)                                  |
| Total            | 479                    | 475.57                                  | 480.25                                | (3.43)                                    | (8.78)                                   |

Table 2 utilizes the data from the six comprehensive map amendments and the Riverfront Master Plan amendment (CPMA20-0002/ZMA20-0002), due to this data being the most up-to-date for residential buildable land. As illustrated in Table 2 there is a deficit of 49.36 acres of MDR and 33.33 acres of HDR land after the adoption of the Riverfront Master Plan amendment. This does not take into consideration the COM/RD designation which will allow mixed commercial with commercial activities on the ground floor and residential above. There is no density minimum or maximum for residential on the COM/RD designation above the ground floor which needs to be commercial. Exhibit “A” provides additional information on the uses. Overall the Riverfront area proposed residential designations increased the number of potential residential units.

The above analysis is based on the 2005 Housing Needs Analysis (HNA). In 2021 the City Council accepted the 2021 HNA (it was not officially adopted as a precursor to a potential UGB expansion). The 2021 HNA identified an overall deficiency of 81 acres (37 acres MDR, and 44 acres of HDR) of residential land.

The 2021 Stormwater Master Plan ensures an adequate stormwater system to support the future housing within the Newberg UGB.

The Goal is met.

#### **GOAL 11: PUBLIC FACILITIES AND SERVICES**

To plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development.

**Finding:** The 2021 Stormwater Master Plan outlines the provision of the City of Newberg's stormwater system for conveyance and capital improvement program as identified in Exhibit "A". The plan lays out the necessary improvements for the system including improvements and extensions of the stormwater system to service all lands within the Newberg Urban Growth Boundary in a timely, orderly and efficient arrangement for urban development.

This Goal is met.

#### **GOAL 12: TRANSPORTATION**

To provide and encourage a safe, convenient and economic transportation system.

**Finding:** Not applicable because the proposal does not address a transportation system.

#### **GOAL 13: ENERGY CONSERVATION**

To conserve energy.

**Finding:** The 2021 Stormwater Master Plan has taken into consideration the acknowledged Newberg Comprehensive Plan and the Population Forecasts for Newberg prepared by Portland State University in June 2020 to provide an energy efficient conveyance and treatment of the stormwater system within the Newberg Urban Growth Boundary.

This Goal is met.

#### **GOAL 14: URBANIZATION**

To provide for an orderly and efficient transition from rural to urban land use, to accommodate urban population and urban employment inside urban growth boundaries, to ensure efficient use of land, and to provide for livable communities.

**Finding:** The proposed amendments do not include an expansion of the Urban Growth Boundary (UGB). There are properties within the UGB that are not annexed into the city limits but are within the UGB. Annexation of these properties will be critical to providing needed stormwater infrastructure and realizing the development vision for Newberg. Development of lands within the

*"Working Together For A Better Community-Serious About Service"*

Z:\MISC\WP5FILES\FILES.CPTA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx



UGB and will maintain Newberg's identity and enhance the quality living environment by balancing growth and providing cultural activities.  
This Goal is met.

**GOAL 15: WILLAMETTE RIVER GREENWAY**

To protect, conserve, enhance and maintain the natural, scenic, historical, agricultural, economic and recreational qualities of lands along the Willamette River as the Willamette River Greenway.

**Finding:** Not applicable because the proposal does not propose any land use regulation changes to the Willamette River Greenway.

## **B. Newberg Comprehensive Plan**

### **II. GOALS AND POLICIES**

#### **A. CITIZEN INVOLVEMENT**

**GOAL:** To maintain a Citizen Involvement Program that offers citizens the opportunity for involvement in all phases of the planning process.

**Finding:** The City meets this requirement by having various citizen committees and commissions with opportunities for the public to testify on general or specific matters. For the Stormwater Master Plan it included a Citizen Advisory Committee that met four times, went before the Newberg Planning Commission on May 13, 2021 and Newberg City Council on June 7, 2021, which provided the opportunity for public comment. Finally, notice was published in the Newberg Graphic newspaper and posted in four public places.

The amendment is subject to the Type IV Legislative process, which requires public notification and public hearings before the Planning Commission and the City Council. This process has been established by the City and determined to be consistent with Goal I of the Oregon Statewide Planning Goals. The public hearing notice of the action and decision, and the hearings on this case before the Planning Commission and the City Council are all recognized as opportunities for citizen participation.

The Goal is met.

#### **B. LAND USE PLANNING**

**GOAL:** To maintain an on-going land use planning program to implement statewide and local goals. The program shall be consistent with natural and cultural resources and needs.

**POLICY:** 2. The Comprehensive Plan and implementing ordinances shall be reviewed continually and revised as needed. Major reviews shall be conducted during the State periodic review process.

**Finding:** This Goal requires that actions related to land use be consistent with acknowledged comprehensive plans of cities and counties. The City of Newberg last updated its Stormwater Master Plan in 2014. The 2020 Stormwater Master Plan will be incorporated by reference into the Newberg Comprehensive Plan as noted in Exhibit "C".

The 2021 Stormwater Master Plan, Exhibit "A" and Exhibit "C", was based on an adequate factual base as documented in 2020 Stormwater Master Plan. Implementation measures in the proposed 2020 Stormwater Master Plan are consistent with and adequate to carry out relevant Comprehensive Plan policies and intended types of development for land use designations as noted in these findings, including the protection of natural and cultural resources.

This Goal is met.



### **C. AGRICULTURAL LANDS**

GOAL: To provide for the orderly and efficient transition from rural to urban land uses.

**Finding:** Not applicable because the proposal does not propose any land use regulation changes to agricultural lands outside of the Newberg Urban Growth Boundary.

### **D. WOODED AREAS**

GOAL: To retain and protect wooded areas.

**Finding:** Not applicable because the proposal does not propose any land use regulation changes to the Stream Corridor that protects wooded areas within the Newberg Urban Growth Boundary.

### **E. AIR, WATER, AND LAND RESOURCE QUALITY**

GOAL: To maintain and, where feasible, enhance the air, water and land resource qualities within the community.

POLICY: 1. Development shall not exceed the carrying capacity of the air, water or land resource base.

**Finding:** Newberg has an acknowledged Comprehensive Plan that complies with this goal. Protections are already in place for air, water, and land resource quality. The population forecast information will be used to assist in evaluating future land use planning efforts on the carrying capacity of the air, water or land resource base. This proposal does not modify the existing goals and policies.

This Goal is met.

### **F. AREAS SUBJECT TO NATURAL HAZARDS**

GOAL: To protect life and property from flooding and other natural hazards.

**Finding:** Newberg has an acknowledged Comprehensive Plan that complies with this goal. This proposal does not modify the City's natural hazards requirements such as flood plain areas. This proposal does not modify the existing goals and policies.

This Goal is met.

### **G. OPEN SPACE, SCENIC, NATURAL, HISTORIC AND RECREATIONAL RESOURCES**

GOALS:

1. To ensure that adequate land shall be retained in permanent open space use and that natural, scenic and historic resources are protected.
2. To provide adequate recreational resources and opportunities for the citizens of the community and visitors.
3. To protect, conserve, enhance and maintain the Willamette River Greenway.

**Finding:** Newberg has an acknowledged Comprehensive Plan that complies with this goal. This

*"Working Together For A Better Community-Serious About Service"*

Z:\MISC\WP5FILES\FILES.CPTA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx

proposal does not modify the City's recreational needs goals and policies. The population forecast information will be used to assist in evaluating future land use planning efforts related to open space, scenic historic and recreational resources.

These Goals are met.

## **H. THE ECONOMY**

GOAL: To develop a diverse and stable economic base.

POLICY: 1. General Policies. b. The City shall encourage economic expansion consistent with local needs.

**Finding:** The 2021 Stormwater Master Plan provides for an adequate stormwater system for all residential, commercial, and industrial uses that are anticipated in the acknowledged Newberg Comprehensive Plan through the identification of necessary stormwater system improvements based on projected population growth which will ensure a diverse and stable economic base of the community over the 20-year planning horizon.

This Goal is met.

## **I. HOUSING**

GOAL: To provide for diversity in the type, density and location of housing within the City to ensure there is an adequate supply of affordable housing units to meet the needs of City residents of various income levels. (Ordinance 2006-2634)

**Finding:** The analysis above under A. Statewide Planning Goals (the "Goals"), GOAL 10: HOUSING, To provide for the housing needs of citizens of the state, details how the proposed 2020 Stormwater Master Plan amendment ensures an adequate stormwater system to support housing.

This Goal is met.

## **J. URBAN DESIGN**

GOAL 1: To maintain and improve the natural beauty and visual character of the City.

GOAL 2: To develop and maintain the physical context needed to support the livability and unique character of Newberg.

**Finding:** Not applicable because the proposal does not propose any land use regulation changes to urban design policies or regulations.

## **K. TRANSPORTATION**

GOAL 1: Establish cooperative agreements to address transportation based planning, development, operation and maintenance.

GOAL 2: Establish consistent policies which require concurrent consideration of transportation/land use system impacts.

GOAL 3: Promote reliance on multiple modes of transportation and reduce reliance on the automobile.

*"Working Together For A Better Community-Serious About Service"*

Z:\MISC\WP5FILES\FILES.CPTA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx

GOAL 4: Minimize the impact of regional traffic on the local transportation system.  
 GOAL 5: Maximize pedestrian, bicycle and other non-motorized travel throughout the City.  
 GOAL 6: Provide effective levels of non-auto oriented support facilities (e.g. bus shelters, bicycle racks, etc.).  
 GOAL 7: Minimize the capital improvement and community costs to implement the transportation plan.  
 GOAL 8: Maintain and enhance the City's image, character and quality of life.  
 GOAL 9: Create effective circulation and access for the local transportation system.  
 GOAL 10: Maintain the viability of existing rail, water and air transportation systems.  
 GOAL 11: Establish fair and equitable distribution of transportation improvement costs.  
 GOAL 12: Minimize the negative impact of a Highway 99 bypass on the Newberg community.  
 GOAL 13: Utilize the Yamhill County Transit Authority (YCTA) Transit Development Plan (TDP) as a Guidance Document.  
 GOAL 14: Coordinate with Yamhill County Transit Area.  
 GOAL 15: Implement Transit-Supportive Improvements.

**Finding:** No applicable because the proposal does not address a transportation system.

#### **L. PUBLIC FACILITIES AND SERVICES**

GOAL: To plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban development.

**Finding:** The 2021 Stormwater Master Plan outlines the provision of the City of Newberg's stormwater system for conveyance and capital improvement program as identified in Exhibit "A". The plan lays out the necessary improvements for the system including improvements and extensions of the stormwater system to service all lands within the Newberg Urban Growth Boundary in a timely, orderly and efficient arrangement for urban development.

This Goal is met.

#### **M. ENERGY**

GOAL: To conserve energy through efficient land use patterns and energy- related policies and ordinances.

**Finding:** The 2021 Stormwater Master Plan has taken into consideration the acknowledged Newberg Comprehensive Plan and the Population Forecasts for Newberg prepared by Portland State University in June 2020 to provide an energy efficient conveyance and treatment of the stormwater system within the Newberg Urban Growth Boundary.

This Goal is met.

#### **N. URBANIZATION**

GOALS:

1. To provide for the orderly and efficient transition from rural to urban land uses.
2. To maintain Newberg's identity as a community which is separate from the Portland

*"Working Together For A Better Community-Serious About Service"*

Z:\MISC\WP5FILES\FILES.CPTA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx



Metropolitan area.

3. To create a quality living environment through a balanced growth of urban and cultural activities.

**Finding:** The proposed amendments do not include an expansion of the Urban Growth Boundary (UGB). There are properties within the UGB that are not annexed into the city limits but are within the UGB. Annexation of these properties will be critical to providing needed stormwater infrastructure and realizing the development vision for Newberg. Development of lands within the UGB and will maintain Newberg's identity and enhance the quality living environment by balancing growth and providing cultural activities.

These Goals are met.

## C. Oregon Revised Statutes and Oregon Administrative Rules

### Applicable Oregon Revised Statute

*197.712 Commission duties; comprehensive plan provisions; public facility plans; state agency coordination plans; compliance deadline; rules.*

*(2) By the adoption of new goals or rules, or the application, interpretation or amendment of existing goals or rules, the Land Conservation and Development Commission shall implement all of the following:*

*(e) A city or county shall develop and adopt a public facility plan for areas within an urban growth boundary containing a population greater than 2,500 persons. The public facility plan shall include rough cost estimates for public projects needed to provide sewer, water and transportation for the land uses contemplated in the comprehensive plan and land use regulations. Project timing and financing provisions of public facility plans shall not be considered land use decisions.*

**Finding:** The 2021 Stormwater Master Plan is an element of the City of Newberg public facility plan covering the Urban Growth Boundary of the City and updates the 2014 Stormwater Master Plan. The City of Newberg population is 24,120 which is larger than the baseline population requirement to have a public facilities plan. The 2021 Stormwater Master Plan includes cost estimates for infrastructure improvements based on the land uses contemplated in the comprehensive plan and land use regulations and meets the requirement.

### Applicable Oregon Administrative Rules (OARs)

#### OAR Chapter 660, Division 11 Public Facilities Planning

*OAR 660-011-0000*

##### *Purpose*

*The purpose of this division is to aid in achieving the requirements of Goal 11, Public Facilities and Services, OAR 660-015-0000(11), interpret Goal 11 requirements regarding public facilities and services on rural lands, and implement ORS 197.712(2)(e), which requires that a city or county shall develop and adopt a public facility plan for areas within an urban growth boundary containing a population greater than 2,500 persons. The purpose of the plan is to help assure that urban development in such urban growth boundaries is guided and supported by types and levels of urban facilities and services appropriate for the needs and requirements of the urban areas to be serviced, and that those facilities and services are provided in a timely, orderly and efficient arrangement, as required by Goal 11. The division contains definitions relating to a public facility plan, procedures and standards for developing, adopting, and amending such a plan, the date for submittal of the plan to the Commission and standards for Department review of the plan.*

**Finding:** The City of Newberg is a community of 24,120 (PSC PRC estimate) individuals with an acknowledged Comprehensive Plan and Urban Growth Boundary. Because the population is greater than 2,500 Newberg is required to have an adopted public facility plan (Wastewater Master Plan). The City of Newberg currently has a 2014 Stormwater Master Plan which is proposed to be updated

*"Working Together For A Better Community-Serious About Service"*  
Z:\MISC\WP5\FILES\FILES.CPTA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx

by the 2020 Stormwater Master Plan to assure that urban development in the Urban Growth Boundary is guided and supported by types and levels of urban facilities and services appropriate for the needs and requirements of the urban area to be serviced, and that stormwater facilities are provided in a timely, orderly and efficient arrangement. The proposed 2020 Stormwater Master is consistent with the Purpose of OAR 660-011-0000.

OAR 660-011-0005

### *Definitions*

*(1) "Public Facilities Plan": A public facility plan is a support document or documents to a comprehensive plan. The facility plan describes the water, sewer and transportation facilities which are to support the land uses designated in the appropriate acknowledged comprehensive plans within an urban growth boundary containing a population greater than 2,500. Certain elements of the public facility plan also shall be adopted as part of the comprehensive plan, as specified in OAR 660-11-045.*

**Finding:** The City of Newberg population forecast as of July 2020, as determined by Portland State University Population Research Center, was 24,877. The 2020 Stormwater Master Plan is being adopted as a support document and as part of the Newberg Comprehensive Plan. The 2021 Stormwater Master Plan supports the land use designations in the acknowledged Newberg Comprehensive Plan which covers the Newberg Urban Growth Boundary. The 2020 Stormwater Master Plan is part of the overall Public Facilities Plan meets the definition of OAR 660-011-0005(1).

*(2) "Rough Cost Estimates": Rough cost estimates are approximate costs expressed in current-year (year closest to the period of public facility plan development) dollars. It is not intended that project cost estimates be as exact as is required for budgeting purposes.*

**Finding:** The 2020 Stormwater Master Plan, Exhibit "A", contains cost estimates as noted under OAR 660-011-0010 and meets the definition.

*(3) "Short Term": The short term is the period from year one through year five of the facility plan.*

**Finding:** The 2020 Stormwater Master Plan, Exhibit "A", contains a short term horizon of Priority 1 projects covering the first 5 years consistent with the definition of OAR 660-011-0005(3).

*(4) "Long Term": The long term is the period from year six through the remainder of the planning period.*

**Finding:** The 2020 Stormwater Master Plan, Exhibit "A", contains a long term horizon of six years to the end of the planning horizon of 20-years consistent with the definition of OAR 660-011-0005(3).

*(5) "Public Facility": A public facility includes water, sewer, and transportation facilities, but does not include buildings, structures or equipment incidental to the direct operation of those facilities.*

*"Working Together For A Better Community-Serious About Service"*

Z:\MISC\WP5FILES\FILES.CPTA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx



**Finding:** The 2021 Stormwater Master Plan, Exhibit “A”, is a public facility per the definition of OAR 660-011-0005(5).

*(6) "Public Facility Project": A public facility project is the construction or reconstruction of a water, sewer, or transportation facility within a public facility system that is funded or utilized by members of the general public.*

**Finding:** The 2021 Stormwater Master Plan, Exhibit “A”, contains identified projects per the definition of OAR 660-011-0005(6).

*(7) "Public Facility Systems": Public facility systems are those facilities of a particular type that combine to provide water, sewer or transportation services.*

*For purposes of this division, public facility systems are limited to the following:*

*(a) Water:*

*(A) Sources of water;*

*(B) Treatment system;*

*(C) Storage system;*

*(D) Pumping system;*

*(E) Primary distribution system.*

**Finding:** The 2020 Stormwater Master Plan is not a water master plan and does not apply.

*(b) Sanitary sewer:*

*(A) Treatment facilities system;*

*(B) Primary collection system.*

**Finding:** The 2021 Stormwater Master Plan, Exhibit “A”, is not a sanitary sewer master plan and does not apply

*(c) Storm sewer*

*(A) Major drainageways (major trunk lines, streams, ditches, pump stations and retention basins);*

*(B) Outfall locations.*

**Finding:** The 2020 Stormwater Master Plan is a part of the Public Facility System and includes the

*“Working Together For A Better Community-Serious About Service”*

Z:\MISC\WP5FILES\FILES.CPTA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx

required elements of OAR 660-011-0005(7)(b).

*(8) "Land Use Decisions": In accordance with ORS 197.712(2)(e), project timing and financing provisions of public facility plans shall not be considered land use decisions as specified under ORS 197.015(10).*

**Finding:** The City of Newberg has a rolling Five Year Capital Improvement Program that addresses project timing and financing and is not considered a land use decision per OAR 660-011-0005(8). The Five Year Capital Improvement Program for stormwater is included as Exhibit "B", Attachment 2.

*(9) "Urban Growth Management Agreement": In accordance with OAR 660-003-0010(2)(c), and urban growth management agreement is a written statement, agreement or set of agreements setting forth the means by which a plan for management of the unincorporated area within the urban growth boundary will be completed and by which the urban growth boundary may be modified (unless the same information is incorporated in other acknowledged documents).*

**Finding:** The City of Newberg has a Newberg Urban Area Growth Management Agreement with Yamhill County that was initially adopted in 1979 (as amended) that is an agreement on the management of the unincorporated area within the Newberg Urban Growth Boundary and contains requirements on how the Urban Growth Boundary may be modified consistent with the definition in OAR 660-011-0005(9). This Agreement is included as Exhibit "B", Attachment 1.

OAR 660-011-0010

#### *The Public Facility Plan*

*(1) The public facility plan shall contain the following items:*

*(a) An inventory and general assessment of the condition of all the significant public facility systems which support the land uses designated in the acknowledged comprehensive plan;*

**Finding:** The 2021 Stormwater Master Plan, Exhibit "A", includes an assessment of the condition of the overall stormwater system that supports the designated uses in the acknowledged Newberg Comprehensive Plan and meets the requirement.

*(b) A list of the significant public facility projects which are to support the land uses designated in the acknowledged comprehensive plan. Public facility project descriptions or specifications of these projects as necessary;*

**Finding:** The 2021 Stormwater Master Plan, Exhibit "A", Section 5, Table 5-2, pages 5-10, 5-11 and 5-12 and Appendix D identifies the priority projects with descriptions to support the estimated population and land uses identified in the acknowledged Newberg Comprehensive Plan and meets the requirement.

*(c) Rough cost estimates of each public facility project;*

*"Working Together For A Better Community-Serious About Service"*

Z:\MISC\WP5FILES\FILES\CPTA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx

**Finding:** The 2021 Stormwater Master Plan, Exhibit “A”, Section 5, Table 5-2, pages 5-10, 5-11 and 5-12 and Appendix D provides costs estimates for projects and meets the requirement.

*(d) A map or written description of each public facility project's general location or service area;*

**Finding:** The 2020 Stormwater Master Plan, Exhibit “A”, contains descriptions and maps of the public facility projects and meets the requirement.

*(e) Policy statement(s) or urban growth management agreement identifying the provider of each public facility system. If there is more than one provider with the authority to provide the system within the area covered by the public facility plan, then the provider of each project shall be designated;*

**Finding:** The 2021 Stormwater Master Plan, Exhibit “A”, identifies that the City of Newberg is the stormwater service provider within the city limits and as annexations occur to lands within the Urban Growth Boundary. This is consistent with the Newberg Urban Area Growth Management Agreement included as Exhibit “B”, Attachment 1 and meets the requirement.

*(f) An estimate of when each facility project will be needed; and*

**Finding:** The 2021 Stormwater Master Plan, Exhibit “A”, Section 5, Table 5-2, pages 5-10, 5-11 and 5-12 and Appendix D includes an estimate of the time horizons of when stormwater system capital improvements are estimated to occur. This is broken out in the horizons of Priority 1 projects (1-5 years) and long term projects (Priority 2 & 3; 6-20 years) which meets the requirement.

*(g) A discussion of the provider's existing funding mechanisms and the ability of these and possible new mechanisms to fund the development of each public facility project or system.*

**Finding:** The 2021 Stormwater Master Plan, Exhibit “A”, Section 5, Table 5-2, pages 5-10, 5-11 and 5-12 and Appendix D identifies the proposed capital improvement projects, costs and funding mechanisms and meets the requirement.

*(2) Those public facilities to be addressed in the plan shall include, but need not be limited to those specified in OAR 660-011-0005(5). Facilities included in the public facility plan other than those included in OAR 660-011-0005(5) will not be reviewed for compliance with this rule.*

**Finding:** OAR 660-011-0005(5)(c) identifies wastewater and its subsets of treatment facilities system and primary collection system. The 2021 Stormwater Master Plan addresses these components as noted in Exhibit “A” and meets the requirement.

*(3) It is not the purpose of this division to cause duplication of or to supplant existing applicable facility plans and programs. Where all or part of an acknowledged comprehensive plan, facility master plan either of the local jurisdiction or appropriate special district, capital improvement program, regional functional plan, similar plan or any combination of such plans meets all or some of the requirements of this division, those plans, or programs may be incorporated by reference into*

*“Working Together For A Better Community-Serious About Service”*

Z:\MISC\WP5FILES\FILES\CPTA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx



*the public facility plan required by this division. Only those referenced portions of such documents shall be considered to be a part of the public facility plan and shall be subject to the administrative procedures of this division and ORS Chapter 197.*

**Finding:** The City of Newberg is proposing to update the existing stormwater system master plan and adopt the 2021 Stormwater Master Plan. Other than the proposed Stormwater Capital Improvement Plan included as Exhibit “A” no other special district or regional functional plan is being referenced or is applicable.

*OAR 660-011-0015*

#### *Responsibility for Public Facility Plan Preparation*

*(1) Responsibility for the preparation, adoption and amendment of the public facility plan shall be specified within the urban growth management agreement. If the urban growth management agreement does not make provision for this responsibility, the agreement shall be amended to do so prior to the preparation of the public facility plan. In the case where an unincorporated area exists within the Portland Metropolitan Urban Growth Boundary which is not contained within the boundary of an approved urban planning area agreement with the County, the County shall be the responsible agency for preparation of the facility plan for that unincorporated area. The urban growth management agreement shall be submitted with the public facility plan as specified in OAR 660-011-0040.*

**Finding:** The Newberg Urban Area Growth Management Agreement, Exhibit “B”, Attachment 1, Section V. Urban Services identifies the City of Newberg as the ultimate provider of urban services within the Urban Growth Boundary and specifically notes that service expansion plans are the responsibility of the City of Newberg, which meets the requirement of OAR 660-011-0015.

*(2) The jurisdiction responsible for the preparation of the public facility plan shall provide for the coordination of such preparation with the city, county, special districts and, as necessary, state and federal agencies and private providers of public facilities. The Metropolitan Service District is responsible for public facility plans coordination within the District consistent with ORS 197.190 and 268.390.*

**Finding:** The 2020 Stormwater Master Plan, Exhibit “A”, has been coordinated with Yamhill County. No other service providers are responsible for stormwater service provisions within the Newberg Urban Growth Boundary, which meets the requirement of OAR 660-011-0015(2). As part of the Post Acknowledgement Plan Amendment process through the Oregon Department of Land Conservation and Development and other State agencies that have an interest in Newberg’s Stormwater Master Plan will be notified to be in compliance with OAR Chapter 333, Division 61.

*(3) Special districts, including port districts, shall assist in the development of the public facility plan for those facilities they provide. Special districts may object to that portion of the facilities plan adopted as part of the comprehensive plan during review by the Commission only if they have completed a special district agreement as specified under ORS 197.185 and 197.254(3) and (4) and participated in the development of such portion of the public facility plan.*

*“Working Together For A Better Community-Serious About Service”*

Z:\MISC\WP5\FILES\CPIA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx

**Finding:** Chehalem Park and Recreation District provides park and trail system development within the Newberg UGB. The Chehalem Park and Recreation District participated in the preparation of the 2020 Stormwater Master Plan. There is no special district agreement between the City and Chehalem Park and Recreation District.

*(4) Those state agencies providing funding for or making expenditures on public facility systems shall participate in the development of the public facility plan in accordance with their state agency coordination agreement under ORS 197.180 and 197.712(2)(f).*

**Finding:** No State agency funding sources have been identified at this time for capital expenditures to implement the 2021 Stormwater Master Plan. Future opportunities may be identified.

OAR 660-011-0020

*Public Facility Inventory and Determination of Future Facility Projects*

*(1) The public facility plan shall include an inventory of significant public facility systems. Where the acknowledged comprehensive plan, background document or one or more of the plans or programs listed in OAR 660-011-0010(3) contains such an inventory, that inventory may be incorporated by reference. The inventory shall include:*

*(a) Mapped location of the facility or service area;*

*(b) Facility capacity or size; and*

*(c) General assessment of condition of the facility (e.g., very good, good, fair, poor, very poor).*

**Finding:** The 2021 Stormwater Master Plan, Exhibit “A”, contains an inventory of all significant stormwater facility systems and includes a mapped location, facility capacity and size, and an assessment of the condition of the stormwater system in compliance with OAR 660-011-0020(1)(a-c) and meets the requirement.

*(2) The public facility plan shall identify significant public facility projects which are to support the land uses designated in the acknowledged comprehensive plan. The public facility plan shall list the title of the project and describe each public facility project in terms of the type of facility, service area, and facility capacity.*

**Finding:** The 2021 Stormwater Master Plan, Exhibit “A”, identifies stormwater system facility projects that support the projected population and land uses designated in the acknowledged Newberg Comprehensive Plan, and lists by project title and description each project within the plan in compliance with OAR 660-011-0020(2) and meets the requirement.

*(3) Project descriptions within the facility plan may require modifications based on subsequent environmental impact studies, design studies, facility master plans, capital improvement programs, or site availability. The public facility plan should anticipate these changes as specified in OAR 660-*

*“Working Together For A Better Community-Serious About Service”*

Z:\MISC\WP5FILES\FILES\CPTA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx

011-0045.

**Finding:** The 20121 Stormwater Master Plan, Exhibit “A”, identifies capital improvement projects over the next 20 years. As these projects are further developed through the City’s 5-Year Stormwater Capital Improvement Program (Exhibit “B”, Attachment 2) and as project designs start, the environmental impacts, facility master plans and capital improvement program adjustments may be necessary and will be addressed at that time and any necessary project description modifications in the 2020 Stormwater Master Plan will be addressed, which meets the requirement.

OAR 660-011-0025

#### *Timing of Required Public Facilities*

*(1) The public facilities plan shall include a general estimate of the timing for the planned public facility projects. This timing component of the public facilities plan can be met in several ways depending on whether the project is anticipated in the short term or long term. The timing of projects may be related directly to population growth, e.g., the expansion or new construction of water treatment facilities. Other facility projects can be related to a measure of the facility's service level being met or exceeded, e.g., a major arterial or intersection reaching a maximum vehicle-per-day standard. Development of other projects may be more long term and tied neither to specific population levels nor measures of service levels, e.g., sewer projects to correct infiltration and inflow problems. These projects can take place over a long period of time and may be tied to the availability of long-term funding. The timing of projects may also be tied to specific years.*

**Finding:** The 2021 Stormwater Master Plan, Exhibit “A”, includes a general estimate of the timing of the planned public improvements based on population and urban development activities within the Newberg Urban Growth Boundary. The timing is broken down into time horizons of Priority 1 projects (1-5 years) and long term projects Priority 2 & 3 in the 6-20 year horizon which meets the requirement of OAR 660-011-0025(1).

*(2) Given the different methods used to estimate the timing of public facilities, the public facility plan shall identify projects as occurring in either the short term or long term, based on those factors which are related to project development. For those projects designated for development in the short term, the public facility plan shall identify an approximate year for development. For those projects designated for development over the long term, the public facility plan shall provide a general estimate as to when the need for project development would exist, e.g., population level, service level standards, etc. Timing provisions for public facility projects shall be consistent with the acknowledged comprehensive plan's projected growth estimates. The public facility plan shall consider the relationships between facilities in providing for development.*

**Finding:** The 2021 Stormwater Master Plan, Exhibit “A”, identifies short-term and longer term projects identified as horizons of Priority 1 projects in the 1-5 years with the balance identified in the 6-20 year horizon. The Plan does identify the estimated year within the 1-5 year horizon, but also notes the individual schedule for each project will be refined during pre-design phase for each proposed improvement. The City is utilizing its 5-Year Capital Improvement Program to identify the timing of the short term projects. A copy of the most recent 5-Year Capital Improvement Program is

*“Working Together For A Better Community-Serious About Service”*

Z:\MISC\WP5FILES\FILES.CPTA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx



included as Exhibit “B”, Attachment 2. Long term projects are correlated to population growth estimates provided by Portland State University, 2020, which must be used for planning purposes. The requirement to comply with OAR 660-011-0025(2) has been met.

*(3) Anticipated timing provisions for public facilities are not considered land use decisions as specified in ORS 197.712(2)(e), and, therefore, cannot be the basis of appeal under ORS 197.610(1) and (2) or 197.835(4).*

**Finding:** The 2021 Stormwater Master Plan, Exhibit “A”, identifies Priority 1 – 3 projects with Priority 1 in the first five year horizon.

*OAR 660-011-0030*

#### *Location of Public Facility Projects*

*(1) The public facility plan shall identify the general location of the public facility project in specificity appropriate for the facility. Locations of projects anticipated to be carried out in the short term can be specified more precisely than the locations of projects anticipated for development in the long term.*

**Finding:** The 2021 Stormwater Master Plan, Exhibit “A”, Section 5, Table 5-2, pages 5-10, 5-11 and 5-12 and Appendix D identifies the general location of short term and long term projects in compliance with OAR 660-011-0030(1) and meets the requirement.

*(2) Anticipated locations for public facilities may require modifications based on subsequent environmental impact studies, design studies, facility master plans, capital improvement programs, or land availability. The public facility plan should anticipate those changes as specified in OAR 660-011-0045.*

**Finding:** The 2021 Stormwater Master Plan, Exhibit “A”, identifies capital improvement projects over the next 20 years. As these projects are further developed through the City’s 5-Year Capital Improvement Plan and project designs start then environmental impacts, facility master plans and capital improvement program adjustments may be necessary and will be addressed at that time and any necessary project description modifications in the 2021 Stormwater Master Plan will be addressed, which meets the requirement.

*OAR 660-011-0035*

#### *Determination of Rough Cost Estimates for Public Facility Projects and Local Review of Funding Mechanisms for Public Facility Systems*

*(1) The public facility plan shall include rough cost estimates for those sewer, water, and transportation public facility projects identified in the facility plan. The intent of these rough cost estimates is to:*

*(a) Provide an estimate of the fiscal requirements to support the land use designations in the*

*“Working Together For A Better Community-Serious About Service”*

Z:\MISC\WP5FILES\FILES.CPTA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx

*acknowledged comprehensive plan; and*

*(b) For use by the facility provider in reviewing the provider's existing funding mechanisms (e.g., general funds, general obligation and revenue bonds, local improvement district, system development charges, etc.) and possible alternative funding mechanisms. In addition to including rough cost estimates for each project, the facility plan shall include a discussion of the provider's existing funding mechanisms and the ability of these and possible new mechanisms to fund the development of each public facility project or system. These funding mechanisms may also be described in terms of general guidelines or local policies.*

**Finding:** The 2021 Stormwater Master Plan, Exhibit “A”, contains cost estimates for the stormwater system. The Newberg City Council accepted the 2021-2026 Stormwater Capital Improvement Program and the funding sources for the stormwater improvements. This overall process meets the requirement of OAR 660-011-0035(1)(a). The 2021 Stormwater Master Plan, Exhibit “A”, identifies the funding methodology for stormwater system improvements in compliance with OAR 660-011-0035(1)(b). The City is also evaluating an urban renewal program for possible stormwater funding. An Urban Renewal Feasibility Study was accepted on July 20, 2020 by Resolution 2020-3685 and an urban renewal agency was established on August 17, 2020 by Ordinance No. 2020-2865. The urban renewal plan and report is now under development. This overall process meets the requirement of OAR 660-011-0035(1)(a). The 2021 Stormwater Master Plan, Exhibit “A”, identifies the funding methodology for stormwater system improvements in compliance with OAR 660-011-0035(1)(b).

*(2) Anticipated financing provisions are not considered land use decisions as specified in ORS 197.712(2)(e) and, therefore, cannot be the basis of appeal under ORS 197.610(1) and (2) or 197.835(4).*

**Finding:** The 2021 Stormwater Master Plan, Exhibit “A”, has financing provisions included in Section 6, Table 6-3 for System Development Charges and City funded eligibility responsibilities to implement the Stormwater Master Plan and meets the requirement. System Development Charge adjustments for the Riverfront area are pending per the urban renewal plan and report development and will addressed pending the outcome of formation the urban renewal program.

OAR 660-011-0040

#### *Date of Submittal of Public Facility Plans*

*The public facility plan shall be completed, adopted, and submitted by the time of the responsible jurisdiction's periodic review. The public facility plan shall be reviewed under OAR Chapter 660, Division 25, "Periodic Review" with the jurisdiction's comprehensive plan and land use regulations. Portions of public facility plans adopted as part of comprehensive plans prior to the responsible jurisdiction's periodic review will be reviewed pursuant to OAR Chapter 660, Division 18, "Post Acknowledgment Procedures".*

**Finding:** The 2021 Stormwater Master will be reviewed under OAR Chapter 660, Division 18, "Post Acknowledgment Procedures" as the City of Newberg is not currently in a Periodic Review process under OAR Chapter 660, Division 25 and meets the requirement.

*"Working Together For A Better Community-Serious About Service"*

Z:\MISC\WP5\FILES\FILES.CPTA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx

OAR 660-011-0045

*Adoption and Amendment Procedures for Public Facility Plans*

*(1) The governing body of the city or county responsible for development of the public facility plan shall adopt the plan as a supporting document to the jurisdiction's comprehensive plan and shall also adopt as part of the comprehensive plan:*

*(a) The list of public facility project titles, excluding (if the jurisdiction so chooses) the descriptions or specifications of those projects;*

*(b) A map or written description of the public facility projects' locations or service areas as specified in sections (2) and (3) of this rule; and*

*(c) The policy(ies) or urban growth management agreement designating the provider of each public facility system. If there is more than one provider with the authority to provide the system within the area covered by the public facility plan, then the provider of each project shall be designated.*

**Finding:** The 2021 Stormwater Master Plan, Exhibit "A", is being adopted as a supporting document to the acknowledged Newberg Comprehensive Plan and is being adopted as part of the Newberg Comprehensive Plan as noted in Exhibit "C" and complies with OAR 660-011-0045(1). The 2020 Stormwater Master Plan includes a listing of projects as identified in Exhibit "A" and meets the requirement of OAR 660-011-0045(1)(a). A map of the location of stormwater system improvements is included in Exhibit "A" and meets the requirement of OAR 660-011-0045(1)(b). The Newberg Urban Area Growth Management Agreement (Exhibit "B", Attachment 1) identifies that the City of Newberg is the service provider of the stormwater system within the Urban Growth Boundary and the Newberg city limits and meets the requirement of OAR 660-011-0045(1)(c).

*(2) Certain public facility project descriptions, location or service area designations will necessarily change as a result of subsequent design studies, capital improvement programs, environmental impact studies, and changes in potential sources of funding. It is not the intent of this division to:*

*(a) Either prohibit projects not included in the public facility plans for which unanticipated funding has been obtained;*

*(b) Preclude project specification and location decisions made according to the National Environmental Policy Act; or*

*(c) Subject administrative and technical changes to the facility plan to ORS 197.610(1) and (2) or 197.835(4).*

**Finding:** The 2021 Stormwater Master Plan, Exhibit "A", has a list of capital projects to be implemented over the 20 year period. As new funding options may be identified in the future or environmental reviews requiring modifications to a proposed project, the plan may have to be revisited on an as needed basis in conformance with OAR 660-011-0045(2)(a-c).

*"Working Together For A Better Community-Serious About Service"*

Z:\MISC\WP5FILES\FILES\CPTA (Comp Plan TXT Amendment)\2020\CPTA20-0005 Stormwater Master Plan Update\Planning Commission\CPTA20-0005 Stormwater.docx



*(3) The public facility plan may allow for the following modifications to projects without amendment to the public facility plan:*

*(a) Administrative changes are those modifications to a public facility project which are minor in nature and do not significantly impact the project's general description, location, sizing, capacity, or other general characteristic of the project;*

*(b) Technical and environmental changes are those modifications to a public facility project which are made pursuant to "final engineering" on a project or those that result from the findings of an Environmental Assessment or Environmental Impact Statement conducted under regulations implementing the procedural provisions of the National Environmental Policy Act of 1969 (40 CFR Parts 1500-1508) or any federal or State of Oregon agency project development regulations consistent with that Act and its regulations.*

*(c) Public facility project changes made pursuant to subsection (3)(b) of this rule are subject to the administrative procedures and review and appeal provisions of the regulations controlling the study (40 CFR Parts 1500-1508 or similar regulations) and are not subject to the administrative procedures or review or appeal provisions of ORS Chapter 197, or OAR Chapter 660 Division 18.*

**Finding:** No administrative or technical changes are anticipated at this time for the 2021 Stormwater Master Plan. If these situations arise the City of Newberg will comply with the provisions of OAR 660-011-0045(3)(a-b).

*(4) Land use amendments are those modifications or amendments to the list, location or provider of, public facility projects, which significantly impact a public facility project identified in the comprehensive plan and which do not qualify under subsection (3)(a) or (b) of this rule. Amendments made pursuant to this subsection are subject to the administrative procedures and review and appeal provisions accorded "land use decisions" in ORS Chapter 197 and those set forth in OAR Chapter 660 Division 18.*

**Finding:** No land use amendments are anticipated at this time that would trigger OAR 660-011-0045(4). If such amendments occur in the future the City of Newberg will comply with OAR 660-011-0045(4).

## D. Newberg Municipal Code

### Chapter 15.100 LAND USE PROCESSES AND PROCEDURES

#### 15.100.060 Type IV procedure – Legislative.

A. Type IV Actions Are Legislative. The planning commission shall hold a public hearing and make a recommendation to the city council. The city council shall hold another public hearing and make a final decision.

B. Legislative actions include, but are not limited to:

1. Amendments to the Newberg comprehensive plan text;
2. Amendments to the Newberg development code;
3. The creation of any land use regulation.

C. The public hearing before the planning commission shall be held in accordance with the requirements of this code. Notice of a hearing on a legislative decision need not include a mailing to property owners or posting of property (refer to NMC 15.100.200 et seq.).

D. Interested persons may present evidence and testimony relevant to the proposal. If criteria are involved, the planning commission shall make findings for each of the applicable criteria.

E. The city council shall conduct a new hearing pursuant to this code. At the public hearing, the staff shall present the report of the planning commission and may provide other pertinent information. Interested persons shall be given the opportunity to present new testimony and information relevant to the proposal that was not heard before the planning commission.

F. To the extent that a finding of fact is required, the city council shall make a finding for each of the applicable criteria and in doing so may sustain or reverse a finding of the planning commission. In granting an approval, the city council may delete, add, or modify any of the provisions in the proposal or attach certain conditions beyond those warranted for the compliance with standards if the city council determines that the conditions are necessary to fulfill the approval criteria.

G. The city council's decision shall become final upon the effective date of the ordinance or resolution.

**Finding:** Public hearings with the Planning Commission and the City Council will be required to finalize a decision regarding the application for the amendment to the Comprehensive Plan

This requirement can be met.

**Conclusion:** The proposed Comprehensive amendment meets the applicable requirements of the Statewide Planning Goals, and the Newberg Comprehensive Plan, and should be approved.

# EXHIBIT "B" - ATTACHMENT 1

## Resolution No. 2021-367

### Newberg Urban Area Growth Management Agreement

**Adopted by Newberg City Council on July 2, 1979 and Yamhill County Board of Commissioners on June 20, 1979; As Amended by Newberg City Council on November 2, 1998 and Yamhill County Board of Commissioners on December 3, 1998; As Further Amended by Newberg City Council on June 5, 2000 and Yamhill County Board of Commissioners on December 14, 2000.**

#### Preface

Seen from above, the modern city edges imperceptibly out of its setting. There are no clear boundaries. Just now the white trace of the super highway passed through cultivated fields; now it is an asphalt image of streets and buildings. As one drives in from the airport or looks out from the train window, clumps of suburban houses, industrial complexes, and occasional green space flash by; it is hard to tell where city begins or county ends." (Oscar Handlin, "The Modern City as a Field of Historical Study" in The Historian and the City (Cambridge, Mass. 1963, p.1).

#### I. Introduction

The City of Newberg and Yamhill County recognize the need for coordination and cooperation in the management of growth in and around the Newberg Urban Area. This agreement is formulated in accordance with this principle.

This agreement establishes a process for maintaining ongoing planning efforts, designed to keep pace with growth and change. It is essential that intergovernmental coordination be maintained to assure the citizens of the City of Newberg and Yamhill County that growth occurs in an orderly and efficient manner.

To that end, this agreement sets forth the means by which a plan for management of the unincorporated area within the Urban Growth Boundary will be implemented and by which the Urban Growth Boundary may be modified.

#### II. Definitions

---

Area of Influence - An area of land designated by the City of Newberg and Yamhill County that extends one mile outside Newberg's Urban Growth Boundary wherein the County will give the City an opportunity to participate in land use actions to be taken by the County.

---

Urban Growth Boundary - A line jointly adopted by the City of Newberg and Yamhill County that encircles the City and separates rural and urbanizable land. Newberg's Urban Growth Boundary is shown on the attached map.



### III. General

1. Plan Map Conflicts. The 1979 Comprehensive plan Land Use Map adopted by the City of Newberg on July 2, 1979 shall be the plan map for the area within the Urban Growth Boundary, and shall replace conflicting portions of the Yamhill County Comprehensive Plan Map (1974) pertinent to this area. Where said maps conflict, Yamhill County shall initiate the process necessary for consideration of a map amendment.
2. Urban Growth Boundary. In accordance with the comprehensive Plan of the City of Newberg, the jointly adopted Urban Growth Boundary shall define the geographical limits of urbanization. The City of Newberg shall prepare for the orderly extension of public facilities and services within the boundary. -Lands outside the boundary shall be maintained in accordance with the Yamhill County Comprehensive
3. Urbanization. The City of Newberg and Yamhill County shall encourage urbanization within the boundary to occur in an orderly and efficient manner, resulting in a compact, balanced urban center meeting long-term economic and social needs of the residents of the area regardless of political boundaries.
4. Implementation and Coordination. The very nature of planning requires continual refinement of various elements of the Comprehensive Plan. This includes the preparation of implementing ordinances, refinement plans and functional plans. As the Newberg Comprehensive Plan is implemented, the City and County will work together in a coordinated effort to achieve the goals of the Yamhill County and Newberg Comprehensive Plans.
5. Concurrence and Recommendation. The legitimate interests of the City and County overlap within the City's Urban Growth Boundary and Area of Influence. This agreement attempts to resolve these overlapping interests by providing for concurrence of City and County governing bodies for certain decisions and by providing for recommendations of one governing body to the other for other decisions.
  - a. Concurrence. Where concurrence is required, the City and County shall agree upon a decision. If agreement cannot be reached, procedures outlined in ORS 197.300 may be invoked.
  - b. Recommendation. Where a recommendation is required, the City and County need not agree upon a decision. The procedures are these: The right to object to any item referred to a jurisdiction for a recommendation shall be deemed to have been waived unless the referring jurisdiction is notified otherwise within thirty days; the time limit for consideration of items referred for recommendation shall begin to run from the time the item is received by the jurisdiction whose recommendation is being solicited; each jurisdiction shall have standing to appeal the decision of the other governing body.

#### IV. Term of this Agreement; Amendment

1. The term of this agreement runs from July 2, 1979, to July 2, 1980, and may be extended thereafter by increments of one year. During the term of the agreement or extension, the agreement may be changed by mutual consent of the parties hereto. This agreement is automatically renewed at the end of such term or extension unless either party hereto requests revision of the agreement by so notifying the other party at least ninety days before the end of the current term or extension.

#### V. Urban Services

1. The City of Newberg is recognized as the ultimate provider of urban services within the Urban Growth Boundary. To this end:
  - a. Special Districts. Before Yamhill County shall create any special district for the provision of utilities, transportation, or other public facilities or services, the matter shall be referred to the City of Newberg for a recommendation. The County shall not act contrary to such recommendation.
  - b. Service Capacity. Development within the Urban Growth Boundary shall not exceed the capacity of existing services.
  - c. Annexation. Annexation shall occur in accordance with the Newberg Comprehensive Plan. Before final action by the City Council on an annexation proposal, the proposal shall be forwarded to the Board of County Commissioners for its recommendation. In order to provide the board with advance notice of reasoning for a proposed annexation, the findings adopted by the City Planning Commission shall be referred to the board following the Commission action.
  - d. Service Expansion Plans. As the ultimate provider of urban services, the City shall prepare and from time to time update utility expansion plans. These plans shall provide a basis for the extension of services within the Urban Growth Boundary and as such shall be referred to Yamhill County for information and comment.
  - e. Roads. The County and City shall cooperatively develop an implementation policy regarding streets and roads within the Urban Growth Boundary which is consistent with the City Comprehensive Plan. Such policy shall include, but not be limited to, the following:
    - (1) The circumstances under which the City will assume ownership of and maintenance responsibility for County roads within the corporate limits.
    - (2) The conditions under which new public streets and roads will be developed within the urban Growth Boundary.

- (3) The conditions under which existing roads designated as future arterial in the City Comprehensive Plan will be improved.
  - (4) The conditions under which County and other roads should meet City standards within the Urban Growth Boundary. Roads should be compatible with City street alignments and extensions. Upon annexation of property, roads adjacent to (and which serve) such property should also be annexed.
- f. The County and the City through its departments shall coordinate their planning efforts and actions that affect land use with those of special districts.

VI. Establishment of the Newberg Urban Area Management Commission

The City of Newberg and Yamhill County do hereby establish the Newberg Urban Area Management Commission (NUAMC) as a hearings officer in accordance with ORS 215.406. The NUAMC shall be composed of the following members:

- Commissioner of the Yamhill County Board of Commissioners designated by the board.
- Mayor or council person of the City of Newberg designated by the Council.
- Member of Newberg Planning Commission designated by the City Council.
- Member of the Yamhill County Planning Commission Designated by the Board of County Commissioners.
- Member of the Newberg-Dundee P.A.C. designated by the Board of County Commissioners.
- Member of the Newberg Citizen Involvement Advisory Committee designated by the City Council.
- Member-at-large chosen by the above NUAMC members and ratified by the City Council and County Board.

---

Duties and Responsibilities. The NUAMC shall function in accordance with by-laws to be adopted by the Newberg City Council and the Yamhill County Board of Commissioners.

It shall be the responsibility of the Newberg Urban Area Management Commission to hold hearings, make findings, and present its decision to City and County governing bodies as outlined in this agreement and the by-laws.



## VII. Establishment of Land Use Review Procedures

### 1. Urban Growth Boundary Amendment

Amendment of the Urban Growth Boundary may be initiated by the Yamhill County Board of Commissioners, the Newberg City Council, or by an individual owner(s) of property who request(s) inclusion in or exclusion from the Urban Growth Boundary.

Amendment of the Urban Growth Boundary shall be treated as a map amendment to both the City and County Comprehensive Plan maps.

The joint fee for individual amendment shall be the sum of fees established from time to time by each governing body.

Each application shall include a map and sufficient information to make a decision based on the following factors:

- a. Demonstrated need to accommodate long-range urban population growth requirements consistent with LCDC goals;
- b. Need for housing, employment opportunities, and livability;
- c. Orderly and economic provision for public facilities and services;
- d. Maximum efficiency of land uses within and on the fringe of the existing urban area;
- e. Environmental, energy, economic and social consequences;
- f. Retention of agricultural land as defined, with Class I being the highest priority for retention and Class VI the lowest priority; and,
- g. Compatibility of the proposed urban uses with nearby agricultural activities.

Applications shall be filed with the Newberg Planning Department which shall collect the joint fee and forward the Yamhill County fee along with notice to the Yamhill County Department of Planning and Development. Applications must be complete prior to consideration by the Newberg Urban Area Management Commission.

Applications shall be accumulated and referred quarterly to the Newberg Urban Area Management Commission for a Public Hearing for which at least ten days advance public notice shall be given by publication in a newspaper of general circulation in the County (or published in the territory so concerned--ORS 215.060).

Following the Public Hearing, the NUAMC shall make and forward its findings and decision directly to the governing body of each jurisdiction which shall then make a determination based

upon the facts and record presented at the NUAMC hearing and shall not be required to hold a public hearing thereon.

Nothing included in this process requires or prohibits the City or County from referring the application to its respective Planning Commissions for information.

If the governing bodies do not concur in their final decision within sixty days of referral of the matter to them by the NUAMC, a joint meeting shall be held to resolve differences. If agreement cannot be reached, procedures for resolutions of conflict provided within ORS 197.300 may be invoked.

2. Comprehensive Plan Amendment

- a. Inside U.G.B., but outside city limits. This amendment shall be filed with Yamhill County, and shall otherwise be treated as an amendment to the Urban Growth Boundary.
- b. Inside city limits. The application shall be processed by the City of Newberg and shall be referred to Yamhill County for a recommendation.
- c. Outside the Urban Growth Boundary, but within the "Area of Influence". This amendment shall be processed by Yamhill County and shall be referred to the City of Newberg for a recommendation.

3. Zone Changes

---

The City of Newberg and Yamhill County recognize that each jurisdiction has authority to zone within its legal boundaries. However, the Urban Growth Boundary recognizes the eventual assumption of authority by the City of Newberg. Therefore, the following procedures are established:

- a. Zone change outside city limits but within the Urban Growth Boundary. Prior to filing an application with Yamhill County, the applicant shall apply for and receive a recommendation from the City of Newberg concerning the requested land use action. Requests shall be processed following the procedures outlined in the Addendum to this agreement, Section 2, item 5 (b). No fee shall be charged for processing a recommendation from the City of Newberg. Applications submitted without this recommendation will be deemed incomplete. The application then shall be processed in accordance with Yamhill County ordinances, except that the application will be referred to the NUAMC for a hearing in lieu of the Yamhill County Planning Commission. Appeals of the NUAMC decision shall be heard by the Yamhill County Board of Commissioners.
- b. Inside city limits. The application shall be processed by the City of Newberg and shall be referred to Yamhill County for information and/or comment.

- c. Outside the Urban Growth Boundary but within the "Area of Influence". The application shall be processed by Yamhill County and shall be referred to the City of Newberg for information and/or comment.

4. Other Items Affecting Land Use

- a. Items having a substantial impact upon land use under the jurisdiction of Yamhill County within Newberg's Area of Influence shall be referred to the City of Newberg for information and comment. Items having a substantial impact upon land use under the jurisdiction of Yamhill County within Newberg's U.G.B. shall be reviewed by the City of Newberg. Prior to filing an application with Yamhill County, the applicant shall apply for and receive a recommendation from the City of Newberg concerning the requested land use action. Requests shall be processed following the procedures outlined in the Addendum to this agreement, Section 2, item 5 (b). No fee shall be charged for processing a recommendation from the City of Newberg. Applications submitted without this recommendation will be deemed incomplete. Items not having a substantial impact may be so referred. Items having a substantial impact upon land use shall include but are not limited to:

- (1) Conditional Use Permits, (Excluding Temporary Hardship Dwellings)
- (2) Planned Unit Developments
- (3) Subdivisions and Partitions
- (4) Public Improvement Projects
- (5) Health Hazards
- (6) Special Exceptions
- (7) Capital Improvement Programs
- (8) Major Transportation Improvements

- b. Within the U.G.B., when Yamhill County ordinances require a Planning Commission public hearing on any of the above items, either as a recommendation or as a final action, the application shall be referred to NUAMC who shall hear the matter in lieu of the Yamhill County Planning Commission. Appeals of the NUAMC decision shall be heard by the Yamhill County Board of Commissioners.
- c. Items having substantial impact upon land use under the jurisdiction of the City of Newberg shall be referred to Yamhill County for information and/or comment. Items not having a substantial impact may be so referred. Items having a substantial impact upon land use shall include but are not limited to:



- (1) Conditional Use Permits
  - (2) Planned Unit Developments
  - (3) Subdivisions and Partitions
  - (4) Public Improvement Projects
  - (5) Extension of the Public Sewer, Water or Storm Drainage systems
  - (6) Capital Improvement Programs
  - (7) Major Transportation Improvements
5. Any of the above applications which may affect an agency identified in the City of Newberg or Yamhill County agency coordination list shall be referred to said agency for information and/or comment.

## **ADDENDUM TO NEWBERG URBAN AREA GROWTH MANAGEMENT AGREEMENT**

This Addendum to Newberg Urban Area Growth Management Agreement pursuant to Newberg City Ordinance #1967 dated July 2, 1979 (hereinafter "Addendum") is made by agreement between Yamhill County ("County") and the City of Newberg ("City").

### **RECITALS**

- A. The City and the County have previously entered into an intergovernmental agreement known as the Newberg Urban Area Growth Management Agreement ("NUAGMA") pursuant to Newberg City Ordinance #1967 dated July 2, 1979 and Yamhill County Ordinance 214 dated June 20, 1979, setting forth their respective rights and responsibilities with respect to the Urban Growth Boundary (UGB) and Area of Influence.
- B. The County and the City have previously adopted an Urban Reserve Area for the City of Newberg as required by OAR Chapter 660, Division 21, as shown on their comprehensive plan and zoning maps, plan policies and land use regulations, to guide the management of these areas in accordance with the requirements of OAR Chapter 660 Division 21. Newberg City Ordinance 95-2397, Yamhill County Ordinance 596 (copies attached).
- C. The Urban Reserve Area is intended over time to be incorporated into an urban growth boundary. Because full urban services are not yet available in the area, urban level development is not permitted. Very limited rural development of property can occur in the area, but only when such usage is consistent with and does not impede the future urbanization of property.
- D. The purpose of this Addendum is to clarify planning and zoning intents and add provisions to the existing intergovernmental agreement for the purpose of satisfying the requirements of OAR Chapter 660, Division 21 relating to Urban Reserve Areas.

### **AGREEMENT**

NOW, THEREFORE, the City and County agree as follows:

#### **Section 1 Definitions:**

- (1) "Urban Reserve Area" has the same meaning as set forth in OAR 660-021-0010 (1), and means lands outside of an urban growth boundary identified as highest priority for inclusion in the urban growth boundary when additional urbanizable land is needed in accordance with the requirements of Goal 14.

#### **Section 2. Compliance with OAR Chapter 660, Division 21.** In accordance with the applicable requirements of Chapter 660, Division 21, City and County agree as follows:

- (1) As required by OAR 660-021-0040(3):

- (a) The County shall prohibit zone amendments allowing more intensive uses, including higher residential density, than permitted at the date of this agreement.
- (2) As required by OAR 660-021-0050(1), unless otherwise agreed to, designation of the local government responsible for building code administration and land use regulation in the URA shall be:
  - (a) Prior to inclusion within the UGB: County
  - (b) After inclusion within the UGB : County
  - (c) After annexation into the city: City
- (3) Designation of service responsibility, as required by OAR 660-021-0050(2):
  - (a) The local government or special district responsible for services (including sewer, water, fire protection, parks, transportation, storm water) for areas within the URA are designated and shown on map(s) attached hereto and incorporated herein as Exhibit "1A."
  - (b) The areas projected for future urban service responsibility after inclusion in the urban growth boundary are shown on map(s) attached hereto and incorporated herein as Exhibit "1A."
- (4) As required by OAR 660-021-0050(3), the terms and conditions under which service responsibility will be transferred or expanded, for areas where the provider of service is expected to change over time, is described in Exhibit "1B," attached hereto and incorporated herein.
- (5) As required by OAR 660-021-0050(4), procedures for notification and review of land use actions to ensure involvement by all affected local governments and special districts:
  - (a) Within the Urban Reserve Area, Comprehensive Plan Amendments, zone changes, and other applications affecting land use, including conditional use, PUDs, subdivisions and partitions, public improvement projects, health hazards, capital improvement programs and major transportation improvements, shall be processed by Yamhill County. Prior to filing an application with Yamhill County, the applicant shall apply for and receive a recommendation from the City of Newberg concerning the requested land use decision. Applications submitted without this recommendation will be deemed incomplete.
  - (b) Upon request or application for a recommendation on a requested land use decision in the URA, the City shall use the following procedures in developing a recommendation (see Exhibit 1C for criteria to be used by the City in the recommendation process):



- (1) Applicant shall file with the City a substantially complete Yamhill County application and include a future development plan as provided in this agreement.
- (2) The City staff or City Council may refer the application to the City Planning Commission for a recommendation to the City Council.
- (3) The recommendation to Yamhill County shall be from the City Council.
- (4) Notice of any hearings shall be to the general public and any hearings shall be legislative in nature. Additional notice may be provided as the City deems necessary. This shall not be a quasi-judicial hearing since the City of Newberg is making a recommendation.
- (5) The City of Newberg shall furnish to the applicant its recommendation to Yamhill County within 60 days of the date that the request for recommendation is filed with the City of Newberg. City staff may request additional information from the applicant concerning the application prior to making a recommendation. Unless otherwise agreed between City and applicant, failure to furnish the recommendation within 60 days will waive the requirement to have a recommendation accompany the application.
- (6) The City reserves the right to make additional recommendations and comments concerning the application to Yamhill County during the Yamhill County process.
- (7) Nothing in this agreement limits the rights of either party in participating in the land use process before either jurisdiction.
- (8) Nothing in this agreement shall be construed as mandatory county approval criteria.

Section 3. In all other respects, the Newberg Urban Area Growth Management Agreement shall remain in full force and effect.

Section 4. Effective Date. This Addendum becomes effective on November 2, 1998.

# **EXHIBIT 1A** **URBAN RESERVE AREA MAPS**

