



# **E** Appendix - Water Resource Calculations

## APPENDIX E – WATER RESOURCES CALCULATIONS

### Growth Estimates per Planning Area

#### Planning Area 1 - Aberdeen

| Zoning Class                       | Current Acreage | Future Acreage | Developable Area | Maximum Density Yield (du/ac) | Minimum Density Yield                                 | Average Density Dwelling Units Created | Associated Population Yield (Avg) | Total EDUs Max Density |
|------------------------------------|-----------------|----------------|------------------|-------------------------------|---|--|-----------------------------------|------------------------|
| High Density Residential           | 201.7           | 351.83         | 36.14            | 20                            | 10  | 271                                    | 672                               | 723                    |
| Medium Density Residential         | 498.53          | 429.82         | 32.47            | 10                            | 3.5   | 225                                    | 558                               | 325                    |
| Low Density Residential            | 718.65          | 670.98         | 133.26           | 3.5                           | 1   | 164                                    | 407                               | 466                    |
| Mixed Use                          | 97.68           | 110.28         | 1.15             | 10                            | 3.5   | 6                                      | 15                                | 12                     |
| <b>Residential Total</b>           | <b>1516.57</b>  | <b>1562.91</b> | <b>203.02</b>    |                               |   | <b>669</b>                             | <b>1,652</b>                      | <b>1525</b>            |
| Non-Residential Zoning Class       |                 |                | Developable Area | Estimated Lot Coverage (ac)   | EDU Conversion Ratio (# of DU per acre of land cover) | Resulting EDUs                         |                                   | Total EDUs Max Density |
| Commercial                         | 443.19          | 492.59         | 139.11           | 104.33                        | 11.92   | 1244                                   |                                   | 10877                  |
| Integrated Business District (IBD) | 71.26           | 486.53         | 372.68           | 209.63                        | 27.96   | 6970                                   |                                   |                        |
| Industrial                         | 635.93          | 630.99         | 107.83           | 60.65                         | 18.76   | 1138                                   |                                   |                        |
| Institutional                      | 195.81          | 195.81         | 0                |                               |   | 0                                      |                                   |                        |
| Open Space /Recreation/ Forested   | 970.43          | 464.36         | 0                |                               |   | 0                                      |                                   |                        |
| Transportation                     | 37.79           | 37.79          | 0                |                               |   | 0                                      |                                   |                        |
| <b>Non-Residential Total</b>       | <b>2354.41</b>  | <b>2308.07</b> | <b>619.62</b>    | <b>374.61</b>                 |   | <b>9352</b>                            |                                   |                        |
| <b>Total</b>                       | <b>3870.98</b>  | <b>3870.98</b> |                  |                               |   | <b>10,021</b>                          |                                   |                        |

# Appendix E- Water Resources Calculations

## Planning Area 2 – Swan Creek

| Land Use     | Current Acreage | Future Acreage | Future Developable Area | Maximum Density Yield (du/ac) | Minimum Density Yield | Average Density Dwelling Units Created | Associated Population Yield (Avg) | Total EDUs Max Density |
|--------------|-----------------|----------------|-------------------------|-------------------------------|-----------------------|--|-----------------------------------|------------------------|
| Agriculture  | 360.55          | 360.55         | 0.00                    |                               |                       | 0                                      | 0                                 | 0                      |
| <b>Total</b> | <b>360.55</b>   | <b>360.55</b>  | <b>0.00</b>             |                               |                       | <b>0</b>                               | <b>0</b>                          | <b>0</b>               |

## Planning Area 3 - Pulaski

| Land Use                    | Current Acreage | Future Acreage | Future Developable Area | Maximum Density Yield (du/ac) | Minimum Density Yield           | Average Density Dwelling Units Created | Associated Population Yield (Avg) | Total EDUs Max Density |
|-----------------------------|-----------------|----------------|-------------------------|-------------------------------|---------------------------------|--|-----------------------------------|------------------------|
| Low Density Residential     | 47.75           | 47.75          | 28.69                   | 3.50                          | 1.00                            | 48                                     | 119                               | 75                     |
| (Non-Residential Land Uses) |                 |                |                         |                               | Resulting Avg Lot Coverage (ac) | Estimated Equivalent Dwelling Units    |                                   |                        |
| High Intensity Commercial   | 120.85          | 120.85         | 23.07                   |                               | 12.68                           | 606                                    | 0                                 | 606                    |
| Industrial                  | 53.05           | 53.05          | 3.62                    |                               | 1.99                            | 37                                     | 0                                 | 37                     |
| <b>Total</b>                | <b>221.65</b>   | <b>221.65</b>  | <b>55.38</b>            |                               |                                 | <b>691</b>                             | <b>119</b>                        | <b>718</b>             |

## Planning Area 4 - Barkess

| Land Use                   | Current Acreage | Future Acreage | Future Developable Area | Maximum Density Yield (du/ac) | Minimum Density Yield | Average Density Dwelling Units Created | Associated Population Yield (Avg) | Total EDUs Max Density |
|----------------------------|-----------------|----------------|-------------------------|-------------------------------|-----------------------|--|-----------------------------------|------------------------|
| Agriculture                | 142.35          | 85.67          | 76.84                   | 0.05                          | 0.005                 | 2                                      | 5                                 | 2                      |
| Low Density Residential    | 4.96            | 4.96           | 0                       | 0                             | 0                     | 0                                      | 0                                 |                        |
| Medium Density Residential | 45.94           | 235.43         | 176.51                  | 3.5                           | 1                     | 298                                    | 739                               | 463                    |
| Open Space / Forested      | 195.07          | 62.26          | 0                       | 0                             | 0                     | 0                                      | 0                                 |                        |
| <b>Total</b>               | <b>388.32</b>   | <b>388.32</b>  | <b>253.35</b>           |                               |                       | <b>300</b>                             | <b>744</b>                        | <b>465</b>             |

# Appendix E- Water Resources Calculations



## Planning Area 5 – Old Robinhood

| Land Use                    | Current Acreage | Future Acreage | Future Developable Area | Maximum Density Yield (du/ac) | Minimum Density Yield | Average Density Dwelling Units Created | Associated Population Yield (Avg)   | Total EDUs Max Density |
|-----------------------------|-----------------|----------------|-------------------------|-------------------------------|-----------------------|--|-------------------------------------|------------------------|
| Low Density Residential     | 339.33          | 0.00           | 0.00                    |                               |                       | 0                                      | 0                                   |                        |
| Medium Density Residential  | 0.00            | 339.33         | 202.37                  | 10.00                         | 3.50                  | 1025                                   | 2542                                | 1518                   |
| (Non-Residential Land Uses) |                 |                |                         |                               |                       | Resulting Avg Lot Coverage (ac)        | Estimated Equivalent Dwelling Units |                        |
| Open Space / Forested       | 168.97          | 168.97         | 0.00                    |                               |                       | 0                                      | 0                                   |                        |
| <b>Total</b>                | <b>508.30</b>   | <b>508.30</b>  | <b>202.37</b>           |                               |                       | <b>1025</b>                            | <b>2542</b>                         | <b>1518</b>            |

## Planning Area 6 – Titan Terrace

| Land Use                    | Current Acreage | Future Acreage | Future Developable Area | Maximum Density Yield (du/ac) | Minimum Density Yield | Average Density Dwelling Units Created | Associated Population Yield (Avg)   | Total EDUs Max Density |
|-----------------------------|-----------------|----------------|-------------------------|-------------------------------|-----------------------|--|-------------------------------------|------------------------|
| Low Density Residential     | 166.70          | 223.85         | 121.56                  | 3.50                          | 1.00                  | 205                                    | 508                                 | 319                    |
| Medium Density Residential  | 114.44          | 114.44         | 11.72                   | 10.00                         | 3.50                  | 59                                     | 146                                 | 88                     |
| (Non-Residential Land Uses) |                 |                |                         |                               |                       | Resulting Avg Lot Coverage (ac)        | Estimated Equivalent Dwelling Units |                        |
| Open Space / Forested       | 128.68          | 71.54          | 0.00                    |                               |                       | 0                                      | 0                                   |                        |
| <b>Total</b>                | <b>409.82</b>   | <b>409.83</b>  | <b>133.28</b>           |                               |                       | <b>264</b>                             | <b>654</b>                          | <b>407</b>             |

## Planning Area 7 - Paradise

| Land Use                    | Current Acreage | Future Acreage | Future Developable Area | Maximum Density Yield (du/ac) | Minimum Density Yield | Average Density Dwelling Units Created | Associated Population Yield (Avg)   | Total EDUs Max Density |
|-----------------------------|-----------------|----------------|-------------------------|-------------------------------|-----------------------|--|-------------------------------------|------------------------|
| Agriculture                 | 135.44          | 0.67           | 0                       |                               |                       | 0                                      | 0                                   |                        |
| Low Density Residential     | 75.86           | 0              | 0                       |                               |                       | 0                                      | 0                                   |                        |
| Medium Density Residential  | 0               | 210.63         | 152.54                  | 10                            | 3.5                   | 695                                    | 1724                                | 1030                   |
| (Non-Residential Land Uses) |                 |                |                         |                               |                       | Resulting Avg Lot Coverage (ac)        | Estimated Equivalent Dwelling Units |                        |
| Open Space / Forested       | 40.81           | 40.81          | 0                       |                               |                       | 0                                      | 0                                   |                        |
| <b>Total</b>                | <b>252.11</b>   | <b>252.11</b>  | <b>152.54</b>           |                               |                       | <b>695</b>                             | <b>1724</b>                         | <b>1030</b>            |

# Appendix E- Water Resources Calculations



## Planning Area 8 – Aldino-Stepney

| Land Use                    | Current Acreage | Future Acreage | Future Developable Area | Maximum Density Yield (du/ac) | Minimum Density Yield           | Average Density Dwelling Units Created | Associated Population Yield (Avg) | Total EDUs Max Density |
|-----------------------------|-----------------|----------------|-------------------------|-------------------------------|---------------------------------|--|-----------------------------------|------------------------|
| Agriculture                 | 391.03          | 171.07         | 152.72                  | 0.05                          | 0.01                            | 4                                      | 10                                | 4                      |
| Low Density Residential     | 119.89          | 470.77         | 302.17                  | 3.50                          | 1.00                            | 510                                    | 1265                              | 793                    |
| (Non-Residential Land Uses) |                 |                |                         |                               | Resulting Avg Lot Coverage (ac) | Estimated Equivalent Dwelling Units    |                                   |                        |
| Open Space / Forested       | 290.60          | 159.68         | 0.00                    |                               |                                 | 0                                      | 0                                 |                        |
| Transportation              | 57.15           | 57.15          | 0.00                    |                               |                                 | 0                                      | 0                                 |                        |
| <b>Total</b>                | <b>801.52</b>   | <b>801.52</b>  | <b>454.89</b>           |                               |                                 | <b>514</b>                             | <b>1275</b>                       | <b>797</b>             |

## Planning Area 9 - Gilbert

| Land Use                    | Current Acreage | Future Acreage | Future Developable Area | Maximum Density Yield (du/ac) | Minimum Density Yield           | Average Density Dwelling Units Created | Associated Population Yield (Avg) | Total EDUs Max Density |
|-----------------------------|-----------------|----------------|-------------------------|-------------------------------|---------------------------------|--|-----------------------------------|------------------------|
| Agriculture                 | 0.03            | 0.03           | 0                       |                               |                                 | 0                                      | 0                                 |                        |
| Low Density Residential     | 219.96          | 105.69         | 17.42                   | 3.5                           | 1                               | 29                                     | 72                                | 46                     |
| Medium Density Residential  | 0               | 114.27         | 20.92                   | 10                            | 3.5                             | 106                                    | 263                               | 157                    |
| Mixed Use                   | 0               | 50.01          | 44.71                   | 20                            | 5                               | 419                                    | 1039                              | 671                    |
| (Non-Residential Land Uses) |                 |                |                         |                               | Resulting Avg Lot Coverage (ac) | Estimated Equivalent Dwelling Units    |                                   |                        |
| Transportation              | 19.21           | 19.21          | 0                       |                               | 0                               | 0                                      | 0                                 |                        |
| Open Space / Forested       | 50.01           | 0              | 0                       |                               | 0                               | 0                                      | 0                                 |                        |
| <b>Total</b>                | <b>289.21</b>   | <b>289.21</b>  | <b>83.05</b>            |                               |                                 | <b>554</b>                             | <b>1374</b>                       | <b>874</b>             |

# Appendix E- Water Resources Calculations



## Planning Area 10 – Long/Heat

| Land Use                    | Current Acreage | Future Acreage | Future Developable Area | Maximum Density Yield (du/ac) | Minimum Density Yield           | Average Density Dwelling Units Created | Associated Population Yield (Avg) | Total EDUs Max Density |
|-----------------------------|-----------------|----------------|-------------------------|-------------------------------|---------------------------------|--|-----------------------------------|------------------------|
| Low Density Residential     | 102.06          | 0.00           | 0.00                    |                               |                                 | 0                                      | 0                                 |                        |
| Mixed Use                   | 0.00            | 102.06         | 52.44                   | 20.00                         | 5.00                            | 442                                    | 1096                              | 708                    |
| (Non-Residential Land Uses) |                 |                |                         |                               | Resulting Avg Lot Coverage (ac) | Estimated Equivalent Dwelling Units    |                                   |                        |
| Institutional               | 151.14          | 151.14         | 81.06                   |                               | 40.12                           | 1334                                   | 0                                 | 1334                   |
| Open Space / Forested       | 40.91           | 40.91          | 0.00                    |                               |                                 | 0                                      | 0                                 |                        |
| <b>Total</b>                | <b>294.11</b>   | <b>294.11</b>  | <b>133.50</b>           |                               |                                 | <b>1776</b>                            | <b>1096</b>                       | <b>2042</b>            |

## Planning Area 11 – Grays

| Land Use                    | Current Acreage | Future Acreage | Future Developable Area | Maximum Density Yield (du/ac) | Minimum Density Yield           | Average Density Dwelling Units Created | Associated Population Yield (Avg) | Total EDUs Max Density |
|-----------------------------|-----------------|----------------|-------------------------|-------------------------------|---------------------------------|--|-----------------------------------|------------------------|
| Low Density Residential     | 280.78          | 360.92         | 272.77                  | 3.5                           | 1                               | 460                                    | 1141                              | 716                    |
| (Non-Residential Land Uses) |                 |                |                         |                               | Resulting Avg Lot Coverage (ac) | Estimated Equivalent Dwelling Units    |                                   |                        |
| Open Space / Forested       | 556.05          | 475.91         | 0                       |                               |                                 | 0                                      | 0                                 |                        |
| Institutional               | 0.04            | 0.04           | 0                       |                               |                                 | 0                                      | 0                                 |                        |
| <b>Total</b>                | <b>836.87</b>   | <b>836.87</b>  | <b>272.77</b>           |                               |                                 | <b>460</b>                             | <b>1141</b>                       | <b>716</b>             |

# Appendix E- Water Resources Calculations



## Planning Area 12 – Bush Chapel

| Land Use                    | Current Acreage | Future Acreage | Future Developable Area | Maximum Density Yield (du/ac) | Minimum Density Yield | Average Density Dwelling Units Created | Associated Population Yield (Avg)   | Total EDUs Max Density |
|-----------------------------|-----------------|----------------|-------------------------|-------------------------------|-----------------------|--|-------------------------------------|------------------------|
| Agriculture                 | 234.07          | 0.00           | 0.00                    |                               |                       | 0                                      | 0                                   |                        |
| Low Density Residential     | 136.97          | 0.00           | 0.00                    |                               |                       | 0                                      | 0                                   |                        |
| Medium Density Residential  | 0.00            | 269.97         | 231.08                  | 10                            | 3.5                   | 1170                                   | 2902                                | 2656                   |
| High Density Residential    | 0.00            | 136.19         | 83.76                   | 20                            | 10                    | 942                                    | 1560                                | 1256                   |
| (Non-Residential Land Uses) |                 |                |                         |                               |                       | Resulting Avg Lot Coverage (ac)        | Estimated Equivalent Dwelling Units |                        |
| Industrial                  | 9.19            | 9.19           | 8.17                    |                               | 4.49                  | 84                                     | 0                                   | 84                     |
| Institutional               | 0.03            | 0.03           | 0                       |                               |                       | 0                                      | 0                                   |                        |
| Transportation              | 4.22            | 4.22           | 0                       |                               |                       | 0                                      | 0                                   |                        |
| Open Space / Forested       | 391.48          | 355.58         | 0                       |                               |                       | 0                                      | 0                                   |                        |
| <b>Total</b>                | <b>775.97</b>   | <b>775.19</b>  | <b>323.01</b>           |                               |                       | <b>2196</b>                            | <b>4462</b>                         | <b>3996</b>            |

## Planning Area 13 – Old Philadelphia

| Land Use                    | Current Acreage | Future Acreage | Future Developable Area | Maximum Density Yield (du/ac) | Minimum Density Yield | Average Density Dwelling Units Created | Associated Population Yield (Avg)   | Total EDUs Max Density |
|-----------------------------|-----------------|----------------|-------------------------|-------------------------------|-----------------------|--|-------------------------------------|------------------------|
| Low Density Residential     | 35.94           | 0              | 0                       |                               |                       | 0                                      | 0                                   |                        |
| Medium Density Residential  | 0               | 55.89          | 27.99                   | 10                            | 3.5                   | 142                                    | 352                                 | 210                    |
| (Non-Residential Land Uses) |                 |                |                         |                               |                       | Resulting Avg Lot Coverage (ac)        | Estimated Equivalent Dwelling Units |                        |
| High Intensity Commercial   | 57.86           | 57.86          | 3.13                    |                               | 1.72                  | 82                                     | 0                                   | 82                     |
| Industrial                  | 5.34            | 5.34           | 0                       |                               |                       | 0                                      | 0                                   |                        |
| Open Space / Forested       | 67.45           | 47.5           | 0                       |                               |                       | 0                                      | 0                                   |                        |
| <b>Total</b>                | <b>166.59</b>   | <b>166.59</b>  | <b>31.12</b>            |                               |                       | <b>224</b>                             | <b>352</b>                          | <b>292</b>             |

# Appendix E- Water Resources Calculations



## Water Flows for City of Aberdeen & Proposed Growth Areas (in GPD) for Average Density Yield

| Location  |                       | EDU           | City             |                  | No Planned Service <sup>4</sup> |                 | Total (City + No Planned Service) |                  |
|---|-----------------------|---------------|------------------|------------------|---------------------------------|-----------------|-----------------------------------|------------------|
|   |                       |               | AD <sup>1</sup>  | PD <sup>2</sup>  | AD <sup>1</sup>                 | PD <sup>2</sup> | AD <sup>1</sup>                   | PD <sup>2</sup>  |
| Planning Area 1—Aberdeen  | Existing <sup>3</sup> | 5,301         | 1,325,268        | 1,709,596        |                                 |                 | 1,325,268                         | 1,709,596        |
|   | Infill                | 10,021        | 2,505,250        | 3,231,773        |                                 |                 | 2,505,250                         | 3,231,773        |
| Planning Area 2—Swan Creek                                      |                       | 0             | 0                | 0                |                                 |                 | 0                                 | 0                |
| Planning Area 3—Pulaski   |                       | 236           | 59,000           | 76,110           |                                 |                 | 59,000                            | 76,110           |
| Planning Area 4—Barkess   |                       | 300           | 75,000           | 96,750           |                                 |                 | 75,000                            | 96,750           |
| Planning Area 5—Old Robinhood                                   |                       | 1,025         | 256,250          | 330,563          |                                 |                 | 256,250                           | 330,563          |
| Planning Area 6—Titan Terrace                                   |                       | 264           | 66,000           | 85,140           |                                 |                 | 66,000                            | 85,140           |
| Planning Area 7—Paradise  |                       | 695           | 173,750          | 224,138          |                                 |                 | 173,750                           | 224,138          |
| Planning Area 8—Aldino-Stepney                                  |                       | 514           |                  |                  | 128,500                         | 165,765         | 128,500                           | 165,765          |
| Planning Area 9—Gilbert   |                       | 554           |                  |                  | 138,500                         | 178,665         | 138,500                           | 178,665          |
| Planning Area 10—Long/Heat                                      |                       | 1,776         | 444,000          | 572,760          |                                 |                 | 444,000                           | 572,760          |
| Planning Area 11—Grays  |                       | 460           |                  |                  | 115,000                         | 148,350         | 115,000                           | 148,350          |
| Planning Area 12—Bush Chapel                                    |                       | 1,609         | 402,250          | 518,903          |                                 |                 | 402,250                           | 518,903          |
| Planning Area 13—Old Philadelphia                               |                       | 587           |                  |                  | 146,750                         | 189,308         | 146,750                           | 189,308          |
| <b>New Demand</b>   |                       | <b>18,041</b> | <b>3,981,500</b> | <b>5,136,135</b> | <b>528,750</b>                  | <b>682,088</b>  | <b>4,510,250</b>                  | <b>5,818,223</b> |
| <b>Total (Existing + New)</b>                                   |                       | <b>23,342</b> | <b>5,306,768</b> | <b>8,367,908</b> | <b>528,750</b>                  | <b>682,088</b>  | <b>7,015,500</b>                  | <b>9,049,995</b> |
| Currently Available from City Sources (wells and bulk purchase) |                       |               | <b>3,300,000</b> | <b>4,000,000</b> |                                 |                 | <b>3,300,000</b>                  | <b>4,000,000</b> |
| WWTP 80% Permit Capacity  |                       |               | <b>2,640,000</b> | <b>3,200,000</b> |                                 |                 | <b>2,640,000</b>                  | <b>3,200,000</b> |

<sup>1</sup>Average Day (AD) demand determined as 248 gpd/EDU.

<sup>2</sup>Peaking Factor of 1.29 and is used to determine Peak Day (PD) demand. See Table 10-2 for Peak Factor calculation.

<sup>3</sup>Existing EDUs based on average daily influent flow from 2017 to 2021 (5-yr average) divided by 250 gpd/EDU.

<sup>4</sup>Areas mapped as “No Planned Service” in the Harford County Water and Sewer Master Plan. Proposed EDU’s for these growth areas is zero. Infrastructure extension to these areas is not expected in the near future.



# Appendix E- Water Resources Calculations



## Wastewater Flows for City of Aberdeen & Proposed Growth Areas (in GPD) for Average Density Yield

| Location                                | EDU                   | City             |                   | No Planned Service <sup>4</sup> |                  | Total AWWTP Flows (City + No Planned Service) |                   |
|---|-----------------------|------------------|-------------------|---------------------------------|------------------|---|-------------------|
|   |                       | AD <sup>1</sup>  | PD <sup>2</sup>   | AD <sup>1</sup>                 | PD <sup>2</sup>  | AD <sup>1</sup>                               | PD <sup>2</sup>   |
| Planning Area 1—Aberdeen                | Existing <sup>3</sup> | 7,133            | 1,783,333         | 6,520,000                       |                  | 1,783,333                                     | 6,520,000         |
|   | Infill                | 10,021           | 2,505,250         | 9,144,163                       |                  | 2,505,250                                     | 9,144,163         |
| Planning Area 2—Swan Creek <sup>4</sup> | 0                     | 0                | 0                 |                                 |                  | 0   | 0                 |
| Planning Area 3—Pulaski                 | 0                     | 0                | 0                 |                                 |                  | 0   | 0                 |
| Planning Area 4—Barkess                 | 236                   | 59,000           | 215,350           |                                 |                  | 59,000  | 215,350           |
| Planning Area 5—Old Robinhood           | 300                   | 75,000           | 273,750           |                                 |                  | 75,000  | 273,750           |
| Planning Area 6—Titan Terrace           | 1,025                 | 256,250          | 935,313           |                                 |                  | 256,250                                       | 935,313           |
| Planning Area 7—Paradise                | 264                   | 66,000           | 240,900           |                                 |                  | 66,000  | 240,900           |
| Planning Area 8—Aldino-Stepney          | 695                   |                  |                   | 173,750                         | 634,188          | 173,750                                       | 634,188           |
| Planning Area 9—Gilbert                 | 514                   |                  |                   | 128,500                         | 469,025          | 128,500                                       | 469,025           |
| Planning Area 10—Long/Heat              | 554                   | 138,500          | 505,525           |                                 |                  | 138,500                                       | 505,525           |
| Planning Area 11—Grays                  | 1,776                 |                  |                   | 444,000                         | 1,620,600        | 444,000                                       | 1,620,600         |
| Planning Area 12—Bush Chapel            | 460                   | 115,000          | 419,750           |                                 |                  | 115,000                                       | 419,750           |
| Planning Area 13—Old Philadelphia       | 1,609                 |                  |                   | 402,250                         | 1,468,213        | 402,250                                       | 1,468,213         |
| <b>New Demand</b>                       | <b>17,454</b>         | <b>3,215,000</b> | <b>11,734,750</b> | <b>1,148,500</b>                | <b>4,192,025</b> | <b>4,363,500</b>                              | <b>15,926,775</b> |
| <b>Total (Existing + New)</b>           | <b>24,587</b>         | <b>4,998,333</b> | <b>20,878,913</b> | <b>1,148,500</b>                | <b>4,192,025</b> | <b>6,146,833</b>                              | <b>22,446,775</b> |
| <b>WWTP Permit Capacity</b>             |                       | <b>4,000,000</b> |                   |                                 |                  | <b>4,000,000</b>                              |                   |
| <b>WWTP 80% Permit Capacity</b>         |                       | <b>3,200,000</b> |                   |                                 |                  | <b>3,200,000</b>                              |                   |

<sup>1</sup>Average Day (AD) demand determined as 248 gpd/EDU.

<sup>2</sup>Peaking Factor of 3.65 and is used to determine Peak Day (PD) demand. See Table 10-5 for Peak Factor calculation.

<sup>3</sup>Existing EDUs based on average daily influent flow from 2019 to 2021 (3-yr average) divided by 250 gpd/EDU.

<sup>4</sup>Areas mapped as “No Planned Service” in the Harford County Water and Sewer Master Plan. Proposed EDU’s for these growth areas is zero. Infrastructure extension to these areas is not expected in the near future.

## STORMWATER ASSESSMENT

The non-point source pollution and stormwater management discussion in Chapter 10 is intended to inform the land use process by evaluating receiving waters and ensuring that the land use planning and management process is used as an instrument to manage non-point source pollution. This process aims to support anti-degradation goals for water quality by balancing the assimilative capacity of receiving waters with estimated pollutant loads stemming from current, and future, point- and non-point sources of water pollution. The calculations and data featured in Chapter 10 utilized the following assumptions and criteria.

- Pollutant loads from primary sources for the existing condition scenario were estimated using the Simple Method<sup>1</sup> calculations for each of the three watersheds covering Aberdeen and the Planning Areas. These existing conditions were compared to estimated pollutant loads from primary sources associated with the future growth scenarios for each watershed.
  - Primary sources of pollutant load in this context are total nitrogen (TN), total phosphorous (TP), total suspended solids (TSS) and Fecal Coliform (FC). This Appendix contains calculations for all four primary sources of pollutant loads.
  - Nutrient pollution is defined as excess amounts of nitrogen and phosphorous in aquatic systems. Therefore, the comparisons within the text of Chapter 10 focus on the nitrogen and phosphorous loads.
- The only secondary pollutant load sources that were considered in this analysis were those sites with an active NPDES Discharge permit. Tables detailing wastewater treatments plants, permitted pollutant loads and permit thresholds are listed in Chapter 10.
- To develop an estimate of the non-point source pollutant loading stemming from projected future growth scenarios, impervious cover percentages associated with each generalized land use designation were derived from materials created by the Center for Watershed Protection and are shown below<sup>2</sup>:

<sup>1</sup> The Simple Method estimates pollutant loads for chemical constituents as a product of annual runoff volume and pollutant concentration, as:

$$L=0.266 \times R \times C$$

Where:

L = Annual load (lbs)

R = Annual runoff (inches)

C = Pollutant concentration (mg/l)

A = Area (acres)

0.226 = A conversion factor

<sup>2</sup> See Cappiella, K. and K. Brown. 2000. *Derivations of Impervious Cover for Suburban Land Uses in the Chesapeake Bay Watershed*. Center for Watershed Protection. Ellicott City, MD.

| Table 3.2 Impervious Cover (%) for Various Land Uses<br>(adapted from: Cappiella and Brown, 2000) |                   |                           |
|---|-------------------|---------------------------|
| Land Use Category   | Sample Number (N) | Mean Impervious Cover (%) |
| Agriculture   | 8                 | 2                         |
| Open Urban Land   | 11                | 9                         |
| 2 Acre Lot Residential  | 12                | 11                        |
| 1 Acre Lot Residential  | 23                | 14                        |
| 1/2 Acre Lot Residential  | 20                | 21                        |
| 1/4 Acre Lot Residential  | 23                | 28                        |
| 1/8 Acre Lot Residential  | 10                | 33                        |
| Townhome Residential  | 20                | 41                        |
| Multifamily Residential   | 18                | 44                        |
| Institutional   | 30                | 34                        |
| Light Industrial  | 20                | 53                        |
| Commercial  | 23                | 72                        |
| Roadway*  | --                | 80                        |

\* % for roadway was obtained using best professional judgment

- Converting the impervious cover to quantifiable pollutant loads for each land use class also utilized research from the Center for Watershed Protection in conjunction with the University of Alabama.
  - The pollutant concentrations from urban land<sup>3</sup> uses were calculated using the following values<sup>4</sup>:
    - Total Nitrogen (mg/l)
      - Residential 2.1
      - Commercial 2.1
      - Roadway 2.3
      - Industrial 2.2
    - Total Phosphorus (mg/l)
      - Residential 0.31
      - Commercial 0.22

<sup>3</sup> Urban land includes seven general categories: residential, commercial, industrial, forest, rural and open water. Residential land use is then broken into four more detailed land use categories: low-, medium-, and high-density and multifamily.

<sup>4</sup> Values obtain from Pitt, R., Maestre, A., Morquecho, R., Brown, T., Schueler, T., Cappiella, K., and Sturm, P. (2005). *Evaluation of NPDES Phase I Municipal Stormwater Monitoring Data*. University of Alabama and the Center for Watershed Protection.

- Roadway 0.25
- Industrial 0.25
- The pollutant concentrations from the non-urban<sup>5</sup> land uses were calculated using the following values<sup>6</sup>:
  - Total Nitrogen (lbs/acre/year)
    - Forest 2.0
    - Rural 5.0
  - Total Phosphorus (lbs/acre/year)
    - Forest 0.2
    - Rural 0.5
- For the purposes of these calculations:
  - “Park” land use was considered “Forest”
  - “Agricultural” land use was considered “Rural”
  - “Municipal,” “Mixed Office,” “University,” and “Military” land uses were considered “Commercial”
  - “Transportation” land use was considered “Roadway”
- The analysis to compare the pollutant loads associated with the existing conditions against pollutant loads from proposed conditions did not integrate (as a discount or credit) any existing or proposed stormwater control programs such as public education efforts, erosion and sediment controls, street sweeping, impervious cover disconnection, stream restoration, or similar direct and indirect treatment methods.

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<sup>5</sup> Non-urban land includes rural land and forest.

<sup>6</sup> Values utilized are roughly the average of the values noted in Lizarraga, J. 1997. Estimation and Analysis of Nutrient and Suspended Sediment Loads at Selected Sites in the Potomac River Basin, 1993-1995. USGS. *Water Resources Investigations Report*. 97-4154 .

# Appendix E- Water Resources Calculations

## Stormwater Pollutant Source Primary Loads Existing

### Existing Land Use Acres by Watershed

| Row Labels                                 | Sum of ACRE        |
|--|--------------------|
| <b>Aberdeen</b>                            | <b>4428.663982</b> |
| <b>Aberdeen Proving Ground</b>             | <b>516.9277609</b> |
| ABERDEEN PROVING GROUND                    | 3.2036E-05         |
| INDUSTRIAL/EMPLOYMENT                      | 1.266570469        |
| MUNICIPAL                                  | 515.6611584        |
| <b>Bush River</b>                          | <b>1134.943617</b> |
| AGRICULTURE                                | 8.19434E-07        |
| HIGH INTENSITY                             | 0.057639577        |
| INDUSTRIAL/EMPLOYMENT                      | 0.020387821        |
| MEDIUM INTENSITY                           | 0.603821242        |
| MUNICIPAL                                  | 1133.952726        |
| UNIVERSITY CENTER OF NORTHEASTERN MARYLAND | 0.309041302        |
| <b>Swan Creek</b>                          | <b>2776.792604</b> |
| AGRICULTURE                                | 279.4197435        |
| HIGH INTENSITY                             | 0.001876101        |
| LOW INTENSITY                              | 9.439104216        |
| MIXED OFFICE                               | 129.3541741        |
| MUNICIPAL                                  | 2314.838083        |
| PARK                                       | 43.73950406        |
| UNIVERSITY CENTER OF NORTHEASTERN MARYLAND | 0.000118525        |

Scenario 1

# Appendix E- Water Resources Calculations

|  |                    |
|--|--------------------|
| <b>Aldino-Stepney</b>                      | <b>859.2867557</b> |
| Swan Creek                                 | 859.2867557        |
| AGRICULTURE                                | 857.6069612        |
| LOW INTENSITY                              | 1.647034339        |
| MUNICIPAL                                  | 0.032760243        |
| <b>Barlows</b>                             | <b>383.5454622</b> |
| Swan Creek                                 | 383.5454622        |
| INDUSTRIAL/EMPLOYMENT                      | 45.93800601        |
| LOW INTENSITY                              | 337.4314472        |
| MUNICIPAL                                  | 0.175304067        |
| PARK                                       | 0.000204899        |
| <b>Bush Chapel</b>                         | <b>654.6871853</b> |
| Bush River                                 | 654.6871853        |
| AGRICULTURE                                | 0.002187484        |
| HIGH INTENSITY                             | 134.2791128        |
| MEDIUM INTENSITY                           | 518.9909626        |
| MUNICIPAL                                  | 0.64329838         |
| UNIVERSITY CENTER OF NORTHEASTERN MARYLAND | 0.766603985        |
| <b>Gilbert</b>                             | <b>289.3703405</b> |
| Swan Creek                                 | 289.3703405        |
| AGRICULTURE                                | 266.3899359        |
| MIXED OFFICE                               | 21.87862654        |
| MUNICIPAL                                  | 0.101778104        |
| <b>Grays</b>                               | <b>637.4786024</b> |
| Bush River                                 | 637.4786024        |
| AGRICULTURE                                | 640.3460431        |
| MEDIUM INTENSITY                           | 0.072487888        |
| UNIVERSITY CENTER OF NORTHEASTERN MARYLAND | 197.0600714        |
| Long/Heist                                 | 294.506396         |
| Bush River                                 | 226.6398321        |
| MIXED OFFICE                               | 0.424002789        |
| UNIVERSITY CENTER OF NORTHEASTERN MARYLAND | 226.2158293        |
| Swan Creek                                 | 67.86656395        |
| AGRICULTURE                                | 0.000168404        |
| MIXED OFFICE                               | 54.38784993        |
| MUNICIPAL                                  | 0.021731278        |
| UNIVERSITY CENTER OF NORTHEASTERN MARYLAND | 13.45681434        |
| <b>Old Philadelphia</b>                    | <b>1065.130468</b> |
| Aberdeen Proving Ground                    | 146.3144185        |
| ABERDEEN PROVING GROUND                    | 1.593484498        |
| INDUSTRIAL/EMPLOYMENT                      | 144.720934         |
| Bush River                                 | 918.8160494        |
| ABERDEEN PROVING GROUND                    | 0.010443866        |
| HIGH INTENSITY                             | 107.6824414        |
| INDUSTRIAL EMPLOYMENT                      | 101.8993498        |
| INDUSTRIAL/EMPLOYMENT                      | 431.9108318        |
| LOW INTENSITY                              | 13.75607984        |
| MEDIUM INTENSITY                           | 363.1271519        |
| MUNICIPAL                                  | 0.436995493        |
| WATER                                      | 0.002752222        |

Scenario 2

Scenario 2

# Appendix E- Water Resources Calculations

|                         |                    |
|-------------------------|--------------------|
| <b>Old Robinhood</b>    | <b>508.7171498</b> |
| Swan Creek              | 508.7171498        |
| LOW INTENSITY           | 508.7167289        |
| MUNICIPAL               | 0.000420948        |
| <b>Paradise</b>         | <b>252.1813931</b> |
| Swan Creek              | 252.1813931        |
| AGRICULTURE             | 0.680763288        |
| LOW INTENSITY           | 251.3788789        |
| MUNICIPAL               | 0.121750838        |
| <b>Pulaski</b>          | <b>224.6242993</b> |
| Swan Creek              | 224.6242993        |
| HIGH INTENSITY          | 120.920026         |
| LOW INTENSITY           | 103.5306791        |
| MUNICIPAL               | 0.139008668        |
| PARK                    | 0.034585371        |
| <b>Swan Creek</b>       | <b>381.6211745</b> |
| Swan Creek              | 381.6211745        |
| ABERDEEN PROVING GROUND | 0.132746165        |
| LOW INTENSITY           | 358.621181         |
| MUNICIPAL               | 2.187947773        |
| PARK                    | 0.029085375        |
| WATER                   | 0.690214203        |
| <b>Titan Terrace</b>    | <b>410.3067797</b> |
| Swan Creek              | 410.3067797        |
| INDUSTRIAL/EMPLOYMENT   | 4.927357785        |
| LOW INTENSITY           | 405.0189464        |
| MUNICIPAL               | 0.360475574        |
| <b>Grand Total</b>      | <b>10570.11997</b> |

Scenario 2

# Appendix E- Water Resources Calculations

## Loads from Primary Sources - Simple Method Calculations

APD Watershed - Aberdeen Existing - Infill

| PRIMARY SOURCES - Land Use |                     |                    | Concentrations |      |      |       | Annual Loading Rates |                |                 |                 | Annual Load  |            |                |                |
|----------------------------|---------------------|--------------------|----------------|------|------|-------|----------------------|----------------|-----------------|-----------------|--------------|------------|----------------|----------------|
|                            | Area (Acres)        | Impervious Cover % | TN             | TP   | TSS  | PC    | TN                   | TP             | TSS             | PC              | TN           | TP         | TSS            | PC             |
|                            |                     |                    | mg/l           | mg/l | mg/l | #/100 | lb/acre              | lb/acre        | lb/acre         | lb/acre         | lb/acre      | lb/acre    | lb/acre        | lb/acre        |
| Residential                | 0 (-) 144/acre      | 11                 | 2              | 0.28 | 88   | 20000 | 2.8                  | 0.4            | 88              | 100             |              |            |                |                |
| MOR (-) 144/acre           | 21                  | 21                 | 2              | 0.28 | 88   | 20000 | 4.8                  | 0.8            | 128             | 200             |              |            |                |                |
| HDR (-) 144/acre           | 33                  | 33                 | 2              | 0.28 | 88   | 20000 | 6.8                  | 0.8            | 182             | 302             |              |            |                |                |
| Multifamily                | 44                  | 44                 | 2              | 0.28 | 88   | 20000 | 8.8                  | 1.1            | 228             | 388             |              |            |                |                |
|                            |                     |                    |                |      |      |       | 1.3                  | 0.1            | 88              | 12              |              |            |                |                |
|                            |                     |                    |                |      |      |       | 1.3                  | 0.1            | 88              | 12              |              |            |                |                |
|                            |                     |                    |                |      |      |       | 1.3                  | 0.1            | 88              | 12              |              |            |                |                |
|                            |                     |                    |                |      |      |       | 1.3                  | 0.1            | 88              | 12              |              |            |                |                |
|                            |                     |                    |                |      |      |       | 1.3                  | 0.1            | 88              | 12              |              |            |                |                |
| Commercial                 | 819,887,1904        | 73                 | 2              | 0.28 | 88   | 20000 | 13.2                 | 1.7            | 347             | 408             | 1,082        | 888        | 189,268        | 214,227        |
|                            |                     |                    |                |      |      |       | 0.0                  | 0.0            | 0               |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       | 0.0                  | 0.0            | 0               |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       | 0.0                  | 0.0            | 0               |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       | 0.0                  | 0.0            | 0               |                 |              |            |                |                |
| Roadway                    |                     | 80                 | 2              | 0.28 | 88   | 20000 | 14.7                 | 1.8            | 408             | 471             |              |            |                |                |
|                            |                     |                    |                |      |      |       | 0.0                  | 0.0            | 0               |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       | 0.0                  | 0.0            | 0               |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       | 0.0                  | 0.0            | 0               |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       | 0.0                  | 0.0            | 0               |                 |              |            |                |                |
| Industrial                 | 1,248,875,688       | 83                 | 2              | 0.28 | 88   | 20000 | 18.1                 | 1.3            | 377             | 488             | 13           | 2          | 281            | 882            |
|                            |                     |                    |                |      |      |       | 0.0                  | 0.0            | 0               |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       | 0.0                  | 0.0            | 0               |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       | 0.0                  | 0.0            | 0               |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       | 0.0                  | 0.0            | 0               |                 |              |            |                |                |
| Forest                     |                     |                    |                |      |      |       | 2.8                  | 0.2            | 108             | 12              |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
| Rural                      |                     |                    |                |      |      |       | 4.8                  | 0.7            | 108             | 28              |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
|                            |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
| Open Water                 |                     |                    |                |      |      |       | 12.8                 | 0.8            | 188             |                 |              |            |                |                |
| Active Construction        |                     |                    |                |      |      |       |                      |                |                 |                 |              |            |                |                |
| Wood Lots                  |                     |                    |                |      |      |       | 0                    | 0              | 0               | 0               |              |            |                |                |
| <b>Total</b>               | <b>819,887,1904</b> | <b>71.8856882</b>  |                |      |      |       | <b>13.21747</b>      | <b>1.72871</b> | <b>368.7804</b> | <b>487.8881</b> | <b>4.084</b> | <b>888</b> | <b>189,268</b> | <b>214,227</b> |

| Pollutant              | TN  | TP  | TSS | PC  |
|------------------------|-----|-----|-----|-----|
| Fraction on Storm Load | 80% | 70% | 80% | 80% |

|                          |          |
|--------------------------|----------|
| Annual Rainfall (inches) | 47       |
| Watershed Area (acres)   | 819,8274 |
| Stream Length (miles)    |          |
| Flushing Volume (years)  | 28       |



# Appendix E- Water Resources Calculations



## Loads from Primary Sources - Simple Method Calculations

APG Watershed - Existing - Growth Area

| PRIMARY SOURCES - Land Use |               | Area (Acres)       | Impervious Cover % | Concentrations |         |          |                 | Annual Loading Rates |               |                |               | Annual Load |               |               |         |
|----------------------------|---------------|--------------------|--------------------|----------------|---------|----------|-----------------|----------------------|---------------|----------------|---------------|-------------|---------------|---------------|---------|
|                            |               |                    |                    | TN mg/l        | TP mg/l | TSS mg/l | PC BPN/100 ft   | TN Billion/yr        | TP Billion/yr | TSS Billion/yr | PC Billion/yr | TN T/yr     | TP T/yr       | TSS T/yr      | PC T/yr |
| Residential                | 0 (146/146)   | 11                 | 3                  | 0.20           | 00      | 30000    | 2.0             | 0.4                  | 00            | 130            | 0             | 0           | 0             | 0             |         |
|                            | MSR (146/146) | 31                 | 3                  | 0.20           | 00      | 30000    | 6.0             | 0.8                  | 120           | 300            | 0             | 0           | 0             | 0             |         |
|                            | MGR (146/146) | 33                 | 3                  | 0.20           | 00      | 30000    | 6.0             | 0.8                  | 180           | 300            | 0             | 0           | 0             | 0             |         |
|                            | Multifamily   | 48                 | 3                  | 0.20           | 00      | 30000    | 6.0             | 1.1                  | 230           | 300            | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          | 1.3             | 0.1                  | 00            | 12             | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          | 1.3             | 0.1                  | 00            | 12             | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          | 1.3             | 0.1                  | 00            | 12             | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          | 1.3             | 0.1                  | 00            | 12             | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          | 1.3             | 0.1                  | 00            | 12             | 0             | 0           | 0             | 0             |         |
| Commercial                 | 1,000,000,000 | 12                 | 3                  | 0.20           | 00      | 30000    | 13.3            | 1.7                  | 287           | 600            | 21            | 1           | 800           | 800           |         |
|                            |               |                    |                    |                |         |          | 0.0             | 0.0                  | 0             | 0              | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          | 0.0             | 0.0                  | 0             | 0              | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          | 0.0             | 0.0                  | 0             | 0              | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          | 0.0             | 0.0                  | 0             | 0              | 0             | 0           | 0             | 0             |         |
| Roadway                    |               | 00                 | 3                  | 0.20           | 00      | 30000    | 16.7            | 1.8                  | 400           | 671            | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          | 0.0             | 0.0                  | 0             | 0              | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          | 0.0             | 0.0                  | 0             | 0              | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          | 0.0             | 0.0                  | 0             | 0              | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          | 0.0             | 0.0                  | 0             | 0              | 0             | 0           | 0             | 0             |         |
| Industrial                 | 100,000,000   | 00                 | 3                  | 0.20           | 00      | 30000    | 10.1            | 1.3                  | 207           | 600            | 1,400         | 100         | 60,101        | 60,600        |         |
|                            |               |                    |                    |                |         |          | 0.0             | 0.0                  | 0             | 0              | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          | 0.0             | 0.0                  | 0             | 0              | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          | 0.0             | 0.0                  | 0             | 0              | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          | 0.0             | 0.0                  | 0             | 0              | 0             | 0           | 0             | 0             |         |
| Forest                     |               |                    |                    |                |         |          | 3.0             | 0.3                  | 100           | 12             | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          |                 |                      |               |                |               |             |               |               |         |
|                            |               |                    |                    |                |         |          |                 |                      |               |                |               |             |               |               |         |
| Rural                      |               |                    |                    |                |         |          | 0.0             | 0.7                  | 100           | 10             | 0             | 0           | 0             | 0             |         |
|                            |               |                    |                    |                |         |          |                 |                      |               |                |               |             |               |               |         |
|                            |               |                    |                    |                |         |          |                 |                      |               |                |               |             |               |               |         |
|                            |               |                    |                    |                |         |          |                 |                      |               |                |               |             |               |               |         |
|                            |               |                    |                    |                |         |          |                 |                      |               |                |               |             |               |               |         |
|                            |               |                    |                    |                |         |          |                 |                      |               |                |               |             |               |               |         |
|                            |               |                    |                    |                |         |          |                 |                      |               |                |               |             |               |               |         |
|                            |               |                    |                    |                |         |          |                 |                      |               |                |               |             |               |               |         |
| Open Water                 |               |                    |                    |                |         |          | 12.0            | 0.0                  | 100           |                |               |             |               |               |         |
| Active Construction        |               |                    |                    |                |         |          | 0               | 0                    | 0             | 0              |               |             |               |               |         |
| Wetland Lots               |               |                    |                    |                |         |          | 0               | 0                    | 0             | 0              |               |             |               |               |         |
| <b>Total</b>               |               | <b>100,000,000</b> | <b>02,000,000</b>  |                |         |          | <b>10,11000</b> | <b>1,310010</b>      | <b>270,07</b> | <b>600,000</b> | <b>1,470</b>  | <b>100</b>  | <b>60,600</b> | <b>67,620</b> |         |

| Partition                       | TN  | TP  | TSS | PC   |
|---------------------------------|-----|-----|-----|------|
| Forested Fraction of Storm Load | 90% | 70% | 90% | 100% |

|                          |         |
|--------------------------|---------|
| Annual Rainfall (inches) | 47      |
| Watershed Area (acres)   | 100,000 |
| Stream Length (miles)    |         |
| Planning Horizon (years) | 20      |

# Appendix E- Water Resources Calculations



## Loads from Primary Sources - Simple Method Calculations

Bath Watershed - Aberdeen Existing - Infill

| PRIMARY SOURCES - Land Use |                  | Area (Acres)      | Impervious Cover % | Concentrations |         |          |             | Annual Loading Rates |                 |                 |                 | Annual Load   |              |                |                     |  |
|----------------------------|------------------|-------------------|--------------------|----------------|---------|----------|-------------|----------------------|-----------------|-----------------|-----------------|---------------|--------------|----------------|---------------------|--|
|                            |                  |                   |                    | TN mg/l        | TP mg/l | TSS mg/l | PC mg/100 m | TN lbs/acre          | TP lbs/acre     | TSS lbs/acre    | PC lbs/acre     | TN lbs/year   | TP lbs/year  | TSS lbs/year   | PC lbs/billion/year |  |
| Residential                | DR (<10 acres)   |                   | 11                 | 3              | 0.28    | 80       | 20000       | 2.8                  | 0.4             | 80              | 120             |               |              |                |                     |  |
|                            | MOR (1-10 acres) | 0.003821342       | 21                 | 3              | 0.28    | 80       | 20000       | 4.4                  | 0.6             | 120             | 200             | 3             | 0            | 26             | 120                 |  |
|                            | MOR (>10 acres)  | 0.007428817       | 32                 | 3              | 0.28    | 80       | 20000       | 6.8                  | 0.9             | 180             | 300             | 0             | 0            | 11             | 17                  |  |
|                            | Multi-family     |                   | 64                 | 3              | 0.28    | 80       | 20000       | 8.8                  | 1.3             | 240             | 400             |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             | 1.2                  | 0.1             | 60              | 10              |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             | 1.2                  | 0.1             | 60              | 10              |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             | 1.2                  | 0.1             | 60              | 10              |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             | 1.2                  | 0.1             | 60              | 10              |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             | 1.2                  | 0.1             | 60              | 10              |               |              |                |                     |  |
| Commercial                 |                  | 1124.281787       | 73                 | 3              | 0.28    | 80       | 20000       | 13.3                 | 1.7             | 367             | 600             | 10,737        | 1,040        | 414,270        | 688,004             |  |
|                            |                  |                   |                    |                |         |          |             | 0.0                  | 0.0             | 0               |                 |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             | 0.0                  | 0.0             | 0               |                 |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             | 0.0                  | 0.0             | 0               |                 |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             | 0.0                  | 0.0             | 0               |                 |               |              |                |                     |  |
| Highway                    |                  |                   | 88                 | 3              | 0.28    | 80       | 20000       | 14.7                 | 1.9             | 458             | 671             |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             | 0.0                  | 0.0             | 0               |                 |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             | 0.0                  | 0.0             | 0               |                 |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             | 0.0                  | 0.0             | 0               |                 |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             | 0.0                  | 0.0             | 0               |                 |               |              |                |                     |  |
| Industrial                 |                  | 0.00187821        | 83                 | 3              | 0.28    | 80       | 20000       | 10.1                 | 1.3             | 317             | 488             | 0             | 0            | 0              | 0                   |  |
|                            |                  |                   |                    |                |         |          |             | 0.0                  | 0.0             | 0               |                 |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             | 0.0                  | 0.0             | 0               |                 |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             | 0.0                  | 0.0             | 0               |                 |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             | 0.0                  | 0.0             | 0               |                 |               |              |                |                     |  |
| Forest                     |                  |                   |                    |                |         |          |             | 3.8                  | 0.2             | 100             | 10              |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             |                      |                 |                 |                 |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             |                      |                 |                 |                 |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             |                      |                 |                 |                 |               |              |                |                     |  |
| Rural                      |                  | 0.18428817        |                    |                |         |          |             | 4.8                  | 0.7             | 150             | 20              | 0             | 0            | 0              | 0                   |  |
|                            |                  |                   |                    |                |         |          |             |                      |                 |                 |                 |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             |                      |                 |                 |                 |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             |                      |                 |                 |                 |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             |                      |                 |                 |                 |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             |                      |                 |                 |                 |               |              |                |                     |  |
|                            |                  |                   |                    |                |         |          |             |                      |                 |                 |                 |               |              |                |                     |  |
| Open Water                 |                  |                   |                    |                |         |          |             | 12.0                 | 0.0             | 100             |                 |               |              |                |                     |  |
| Active Construction        |                  |                   |                    |                |         |          |             |                      |                 |                 |                 |               |              |                |                     |  |
| Newest Lots                |                  |                   |                    |                |         |          |             | 0                    | 0               | 0               | 0               |               |              |                |                     |  |
| <b>Total</b>               |                  | <b>1124.62817</b> | <b>71.87064487</b> |                |         |          |             | <b>13.36901</b>      | <b>1.700386</b> | <b>388.8673</b> | <b>607.8622</b> | <b>10,741</b> | <b>1,040</b> | <b>414,267</b> | <b>688,007</b>      |  |

| Pollutant Fraction on Stream Load | TN  | TP  | TSS | PC  |
|-----------------------------------|-----|-----|-----|-----|
|                                   | 80% | 70% | 90% | 90% |

|  |            |
|--|------------|
| Annual Rainfall (inches)                       | 87         |
| Watershed Area (acres)                         | 1124.62817 |
| Stream Length (miles) Planning Horizon (years) | 30         |

# Appendix E- Water Resources Calculations



## Loads from Primary Sources - Simple Method Calculations

### Rural Watershed - Existing - Growth Areas

| PRIMARY SOURCES - Land Use |                 | Area (Acres)  | Impervious Cover % | Concentrations |         |          |               | Annual Loading Rates |             |              |               | Annual Load |            |             |                 |
|----------------------------|-----------------|---------------|--------------------|----------------|---------|----------|---------------|----------------------|-------------|--------------|---------------|-------------|------------|-------------|-----------------|
|                            |                 |               |                    | TN mg/l        | TP mg/l | TSS mg/l | PC MPN/100 ml | TN lbs/acre          | TP lbs/acre | TSS lbs/acre | PC million/lb | TN lb/year  | TP lb/year | TSS lb/year | PC #/million/yr |
| Residential                | R (1-3 Units)   | 73,786,788    | 11                 | 3              | 0.30    | 80       | 20000         | 2.8                  | 0.8         | 80           | 130           | 20          | 0          | 1,200       | 1,700           |
|                            | MDR (1-3 Units) | 762,180,024   | 21                 | 3              | 0.30    | 80       | 20000         | 6.6                  | 0.8         | 130          | 300           | 3,074       | 600        | 60,283      | 162,000         |
|                            | MDR (4-8 Units) | 241,801,884   | 30                 | 3              | 0.30    | 80       | 20000         | 6.6                  | 0.8         | 182          | 300           | 1,800       | 300        | 64,100      | 73,902          |
|                            | MultiFamily     |               | 60                 | 3              | 0.30    | 80       | 20000         | 0.0                  | 1.1         | 230          | 300           | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 1.3                  | 0.1         | 80           | 12            | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 1.3                  | 0.1         | 80           | 12            | 0           | 0          | 0           | 0               |
| Commercial                 |                 | 421,802,082   | 72                 | 3              | 0.30    | 80       | 20000         | 12.3                 | 1.7         | 387          | 600           | 6,079       | 730        | 104,179     | 268,831         |
|                            |                 |               |                    |                |         |          |               | 0.0                  | 0.0         | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0.0                  | 0.0         | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0.0                  | 0.0         | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0.0                  | 0.0         | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0.0                  | 0.0         | 0            | 0             | 0           | 0          | 0           | 0               |
| Roadway                    |                 |               | 80                 | 3              | 0.30    | 80       | 20000         | 16.7                 | 1.8         | 600          | 871           | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0.0                  | 0.0         | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0.0                  | 0.0         | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0.0                  | 0.0         | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0.0                  | 0.0         | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0.0                  | 0.0         | 0            | 0             | 0           | 0          | 0           | 0               |
| Industrial                 |                 | 821,810,104   | 80                 | 3              | 0.30    | 80       | 20000         | 18.1                 | 1.3         | 277          | 600           | 6,079       | 600        | 147,804     | 348,130         |
|                            |                 |               |                    |                |         |          |               | 0.0                  | 0.0         | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0.0                  | 0.0         | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0.0                  | 0.0         | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0.0                  | 0.0         | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0.0                  | 0.0         | 0            | 0             | 0           | 0          | 0           | 0               |
| Forest                     |                 |               |                    |                |         |          |               | 2.8                  | 0.2         | 100          | 12            | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0                    | 0           | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0                    | 0           | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0                    | 0           | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0                    | 0           | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0                    | 0           | 0            | 0             | 0           | 0          | 0           | 0               |
| Rural                      |                 | 640,348,204   |                    |                |         |          |               | 6.6                  | 0.7         | 100          | 20            | 3,000       | 600        | 64,000      | 24,876          |
|                            |                 |               |                    |                |         |          |               | 0                    | 0           | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0                    | 0           | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0                    | 0           | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0                    | 0           | 0            | 0             | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0                    | 0           | 0            | 0             | 0           | 0          | 0           | 0               |
| Open Water                 |                 | 0,000,000,000 |                    |                |         |          |               | 12.0                 | 0.0         | 100          |               | 0           | 0          | 0           | 0               |
|                            |                 |               |                    |                |         |          |               | 0                    | 0           | 0            | 0             | 0           | 0          | 0           | 0               |
| Various Construction       |                 |               |                    |                |         |          |               |                      |             |              |               |             |            |             |                 |
| Grand Total                |                 |               |                    |                |         |          |               | 7,287,717            | 6,872,940   | 194,8380     | 286,771       | 18,223      | 2,046      | 871,884     | 768,780         |

| Pollutant Fraction of Storm Load | TN  | TP  | TSS | PC   |
|----------------------------------|-----|-----|-----|------|
|                                  | 80% | 70% | 80% | 100% |

|                          |          |
|--------------------------|----------|
| Annual Rainfall (inches) | 47       |
| Watershed Area (acres)   | 2027,622 |
| Stream Length (miles)    |          |
| Planning Horizon (years) | 30       |

# Appendix E- Water Resources Calculations



## Loads from Primary Sources - Simple Method Calculations

Swan Watershed - Aberdeen Existing - Infill

| PRIMARY SOURCES - Land Use |                   | Area (Acres)    | Impervious Cover % | Concentrations |         |          |            | Annual Loading Rates |                 |                 |                 | Annual Load   |              |                |                    |
|----------------------------|-------------------|-----------------|--------------------|----------------|---------|----------|------------|----------------------|-----------------|-----------------|-----------------|---------------|--------------|----------------|--------------------|
|                            |                   |                 |                    | TN mg/l        | TP mg/l | TSS mg/l | PC MPG/100 | TN Release           | TP Release      | TSS Release     | PC Release      | TN \$/year    | TP \$/year   | TSS \$/year    | PC \$/billion/year |
|                            |                   |                 |                    |                |         |          |            |                      |                 |                 |                 |               |              |                |                    |
| Residential                | R-1 (Single)      | 8,628,104       | 11                 | 3              | 0.28    | 80       | 20000      | 2.8                  | 0.8             | 80              | 130             | 27            | 3            | 880            | 1,328              |
|                            | MGR (1-4 stories) | 21              | 3                  | 0.28           | 80      | 20000    | 0.8        | 0.8                  | 120             | 208             |                 |               |              |                |                    |
|                            | MGR (>4 stories)  | 0,000,000       | 33                 | 3              | 0.28    | 80       | 20000      | 0.8                  | 0.8             | 180             | 302             | 0             | 0            | 0              | 1                  |
|                            | Multifamily       | 64              | 3                  | 0.28           | 80      | 20000    | 0.8        | 1.1                  | 230             | 389             |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            | 1.3                  | 0.1             | 80              | 12              |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            | 1.3                  | 0.1             | 80              | 12              |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            | 1.3                  | 0.1             | 80              | 12              |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            | 1.3                  | 0.1             | 80              | 12              |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            | 1.3                  | 0.1             | 80              | 12              |               |              |                |                    |
| Commercial                 |                   | 3,666,180       | 73                 | 3              | 0.28    | 80       | 20000      | 11.3                 | 1.7             | 587             | 608             | 10,818        | 4,248        | 887,830        | 1,484,818          |
|                            |                   |                 |                    |                |         |          |            | 0.0                  | 0.0             | 0               |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            | 0.0                  | 0.0             | 0               |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            | 0.0                  | 0.0             | 0               |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            | 0.0                  | 0.0             | 0               |                 |               |              |                |                    |
| Resort                     |                   | 80              | 3                  | 0.28           | 80      | 20000    | 18.7       | 1.8                  | 688             | 871             |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            | 0.0                  | 0.0             | 0               |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            | 0.0                  | 0.0             | 0               |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            | 0.0                  | 0.0             | 0               |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            | 0.0                  | 0.0             | 0               |                 |               |              |                |                    |
| Industrial                 |                   | 80              | 3                  | 0.28           | 80      | 20000    | 10.1       | 1.3                  | 277             | 489             |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            | 0.0                  | 0.0             | 0               |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            | 0.0                  | 0.0             | 0               |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            | 0.0                  | 0.0             | 0               |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            | 0.0                  | 0.0             | 0               |                 |               |              |                |                    |
| Forest                     |                   |                 |                    |                |         |          |            | 0.0                  | 0.2             | 188             | 12              |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            |                      |                 |                 |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            |                      |                 |                 |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            |                      |                 |                 |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            |                      |                 |                 |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            |                      |                 |                 |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            |                      |                 |                 |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            |                      |                 |                 |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            |                      |                 |                 |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            |                      |                 |                 |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            |                      |                 |                 |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            |                      |                 |                 |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            |                      |                 |                 |                 |               |              |                |                    |
|                            |                   |                 |                    |                |         |          |            |                      |                 |                 |                 |               |              |                |                    |
| Open Water                 |                   |                 |                    |                |         |          |            | 12.8                 | 0.8             | 188             |                 |               |              |                |                    |
| Active Construction        |                   |                 |                    |                |         |          |            |                      |                 |                 |                 |               |              |                |                    |
| Vacant Lots                |                   |                 |                    |                |         |          |            | 0                    | 0               | 0               | 0               |               |              |                |                    |
| <b>Total</b>               |                   | <b>2778,768</b> | <b>63.8128787</b>  |                |         |          |            | <b>13,2881</b>       | <b>1,859833</b> | <b>124,9888</b> | <b>880,3818</b> | <b>28,112</b> | <b>4,879</b> | <b>936,188</b> | <b>1,588,888</b>   |

| Pollutant Fraction as Storm Load | TN  | TP  | TSS | PC   |
|----------------------------------|-----|-----|-----|------|
|                                  | 80% | 70% | 90% | 100% |

|                          |          |
|--------------------------|----------|
| Annual Rainfall (inches) | 47       |
| Watershed Area (acres)   | 2778,768 |
| Stream Length (miles)    |          |
| Planning Horizon (years) | 20       |

# Appendix E- Water Resources Calculations

## Loads from Primary Sources - Simple Method Calculations

Swan Watershed - Existing - Growth Areas

| PRIMARY SOURCES - Land Use |                |                    |                    | Concentrations |           |            |             | Annual Loading Rates |                 |                 |                 | Annual Load   |              |                |                |
|----------------------------|----------------|--------------------|--------------------|----------------|-----------|------------|-------------|----------------------|-----------------|-----------------|-----------------|---------------|--------------|----------------|----------------|
|                            |                | Area (Acres)       | Impervious Cover % | TN (mg/l)      | TP (mg/l) | TSS (mg/l) | PC (PPM100) | TN (lb/acre)         | TP (lb/acre)    | TSS (lb/acre)   | PC (lb/acre)    | TN (lb/year)  | TP (lb/year) | TSS (lb/year)  | PC (lb/year)   |
| Residential                | R (1/4/acre)   | 1000.000000        | 11                 | 2              | 0.20      | 01         | 20000       | 2.0                  | 0.4             | 90              | 100             | 0.002         | 720          | 170.871        | 200.202        |
|                            | MSR (1/4 acre) |                    | 21                 | 2              | 0.20      | 01         | 20000       | 4.0                  | 0.8             | 120             | 200             |               |              |                |                |
|                            | MSR (1/4 acre) | 100.000000         | 10                 | 2              | 0.20      | 01         | 20000       | 2.0                  | 0.4             | 100             | 100             | 0.02          | 180          | 22.000         | 20.000         |
|                            | Multifamily    |                    | 44                 | 2              | 0.20      | 01         | 20000       | 8.8                  | 1.7             | 250             | 300             |               |              |                |                |
|                            |                |                    |                    |                |           |            |             | 1.3                  | 0.1             | 90              | 10              |               |              |                |                |
|                            |                |                    |                    |                |           |            |             | 1.3                  | 0.1             | 90              | 10              |               |              |                |                |
|                            |                |                    |                    |                |           |            |             | 1.3                  | 0.1             | 90              | 10              |               |              |                |                |
|                            |                |                    |                    |                |           |            |             | 1.3                  | 0.1             | 90              | 10              |               |              |                |                |
|                            |                |                    |                    |                |           |            |             | 1.3                  | 0.1             | 90              | 10              |               |              |                |                |
| Commercial                 |                | 50.000000          | 70                 | 2              | 0.20      | 01         | 20000       | 14.0                 | 2.8             | 307             | 600             | 1.200         | 180          | 34.400         | 67.001         |
|                            |                |                    |                    |                |           |            |             | 0.0                  | 0.0             | 0               | 0               |               |              |                |                |
|                            |                |                    |                    |                |           |            |             | 0.0                  | 0.0             | 0               | 0               |               |              |                |                |
|                            |                |                    |                    |                |           |            |             | 0.0                  | 0.0             | 0               | 0               |               |              |                |                |
|                            |                |                    |                    |                |           |            |             | 0.0                  | 0.0             | 0               | 0               |               |              |                |                |
| Roadway                    |                |                    | 80                 | 2              | 0.20      | 01         | 20000       | 16.0                 | 3.2             | 400             | 870             |               |              |                |                |
|                            |                |                    |                    |                |           |            |             | 0.0                  | 0.0             | 0               | 0               |               |              |                |                |
|                            |                |                    |                    |                |           |            |             | 0.0                  | 0.0             | 0               | 0               |               |              |                |                |
|                            |                |                    |                    |                |           |            |             | 0.0                  | 0.0             | 0               | 0               |               |              |                |                |
|                            |                |                    |                    |                |           |            |             | 0.0                  | 0.0             | 0               | 0               |               |              |                |                |
| Industrial                 |                | 50.000000          | 10                 | 2              | 0.20      | 01         | 20000       | 10.0                 | 2.0             | 277             | 600             | 0.10          | 87           | 14.000         | 20.000         |
|                            |                |                    |                    |                |           |            |             | 0.0                  | 0.0             | 0               | 0               |               |              |                |                |
|                            |                |                    |                    |                |           |            |             | 0.0                  | 0.0             | 0               | 0               |               |              |                |                |
|                            |                |                    |                    |                |           |            |             | 0.0                  | 0.0             | 0               | 0               |               |              |                |                |
|                            |                |                    |                    |                |           |            |             | 0.0                  | 0.0             | 0               | 0               |               |              |                |                |
| Forest                     |                |                    |                    |                |           |            |             | 2.0                  | 0.2             | 100             | 10              |               |              |                |                |
|                            |                |                    |                    |                |           |            |             |                      |                 |                 |                 |               |              |                |                |
|                            |                |                    |                    |                |           |            |             |                      |                 |                 |                 |               |              |                |                |
| Rural                      |                | 1000.000000        |                    |                |           |            |             | 4.0                  | 0.7             | 100             | 20              | 0.770         | 787          | 112.470        | 40.000         |
|                            |                |                    |                    |                |           |            |             |                      |                 |                 |                 |               |              |                |                |
|                            |                |                    |                    |                |           |            |             |                      |                 |                 |                 |               |              |                |                |
|                            |                |                    |                    |                |           |            |             |                      |                 |                 |                 |               |              |                |                |
|                            |                |                    |                    |                |           |            |             |                      |                 |                 |                 |               |              |                |                |
|                            |                |                    |                    |                |           |            |             |                      |                 |                 |                 |               |              |                |                |
|                            |                |                    |                    |                |           |            |             |                      |                 |                 |                 |               |              |                |                |
| Open Water                 |                | 0.000000           |                    |                |           |            |             | 10.0                 | 0.0             | 100             | 0               | 0             | 0            | 100            | 0              |
| Active Construction        |                |                    |                    |                |           |            |             |                      |                 |                 |                 |               |              |                |                |
| Recent Lots                |                |                    |                    |                |           |            |             | 0                    | 0               | 0               | 0               |               |              |                |                |
| <b>Total</b>               |                | <b>3307.000000</b> | <b>10.607000</b>   |                |           |            |             | <b>2.070000</b>      | <b>0.800000</b> | <b>107.2710</b> | <b>123.0000</b> | <b>13.301</b> | <b>1,000</b> | <b>260.547</b> | <b>470.177</b> |

| Pollutant                | TN  | TP  | TSS | PC   |
|--------------------------|-----|-----|-----|------|
| Proportion as Storm Load | 80% | 70% | 90% | 100% |

|                          |          |
|--------------------------|----------|
| Annual Rainfall (inches) | 47       |
| Watershed Area (acres)   | 3307.000 |
| Stream Length (miles)    |          |
| Planning Horizon (years) | 20       |

# Appendix E- Water Resources Calculations



Stormwater Pollutant Source Primary Loads Future

Future Land Use Acres by Watershed

| MDE8NAME                   | Bush River         |
|----------------------------|--------------------|
|                            |                    |
| Row Labels                 | Sum of REV_Acres   |
| <b>Aberdeen</b>            | <b>1134.442732</b> |
| Industrial                 | 0.020348861        |
| Institutional              | 0.268373353        |
| Municipal                  | 1134.15401         |
| <b>Bush Chapel</b>         | <b>652.8530105</b> |
| Agriculture                | 0.002119714        |
| High Density Residential   | 136.1925762        |
| Industrial                 | 9.194990546        |
| Institutional              | 0.028316386        |
| Medium Density Residential | 209.7322966        |
| Municipal                  | 0.003878271        |
| Open Space / Forested      | 293.4723176        |
| Transportation             | 4.226515201        |
| <b>Grays</b>               | <b>836.8679534</b> |
| Institutional              | 0.038025123        |
| Low Density Residential    | 360.9150482        |
| Open Space / Forested      | 475.9148801        |
| <b>Long/Heat</b>           | <b>175.2124246</b> |
| Institutional              | 151.1363612        |
| Open Space / Forested      | 24.07606338        |
| <b>Old Philadelphia</b>    | <b>167.0291003</b> |
| Aberdeen Proving Ground    | 0.01049468         |
| High Intensity Commercial  | 57.86302598        |
| Industrial                 | 5.338309782        |
| Medium Density Residential | 55.89079146        |
| Municipal                  | 0.423118039        |
| Open Space / Forested      | 47.50060858        |
| Water                      | 0.002751804        |
| <b>Grand Total</b>         | <b>2966.405221</b> |

  

| MDE8NAME                | Aberdeen Proving Ground |
|-------------------------|-------------------------|
|                         |                         |
| Row Labels              | Sum of REV_Acres        |
| <b>Aberdeen</b>         | <b>517.3728698</b>      |
| Industrial              | 0.008675838             |
| Municipal               | 517.364194              |
| <b>Old Philadelphia</b> | <b>1.593583807</b>      |
| Aberdeen Proving Ground | 1.593583807             |
| <b>Grand Total</b>      | <b>518.9664536</b>      |

# Appendix E- Water Resources Calculations



| MDE8NAME                   | Swan Creek         |
|----------------------------|--------------------|
| Row Labels                 | Sum of REV_Acres   |
| <b>Aberdeen</b>            | <b>2749.212849</b> |
| Agriculture                | 3.7742E-05         |
| Institutional              | 0.000118283        |
| Medium Density Residential | 0.07862993         |
| Mixed Use                  | 0.187421693        |
| Municipal                  | 2734.107748        |
| Transportation             | 14.83889311        |
| <b>Aldino-Stepney</b>      | <b>858.6674248</b> |
| Agriculture                | 171.0682821        |
| Low Density Residential    | 470.7681273        |
| Municipal                  | 0.032752379        |
| Open Space / Forested      | 159.6829703        |
| Transportation             | 57.11529278        |
| <b>Barkess</b>             | <b>388.491679</b>  |
| Agriculture                | 85.66947474        |
| Low Density Residential    | 4.955485277        |
| Medium Density Residential | 235.4328184        |
| Municipal                  | 0.174835646        |
| Open Space / Forested      | 62.25906492        |
| <b>Gilbert</b>             | <b>289.2161909</b> |
| Agriculture                | 0.034053436        |
| Low Density Residential    | 105.6940952        |
| Medium Density Residential | 114.2665131        |
| Mixed Use                  | 50.01458356        |
| Transportation             | 19.2069456         |
| <b>Long/Heat</b>           | <b>119.1764397</b> |
| Agriculture                | 0.000168708        |
| Mixed Use                  | 102.0598186        |
| Municipal                  | 0.282359501        |
| Open Space / Forested      | 16.83409285        |
| <b>Old Robinhood</b>       | <b>508.2923912</b> |
| Low Density Residential    | 0.026819838        |
| Medium Density Residential | 339.2992889        |
| Municipal                  | 0.000155513        |
| Open Space / Forested      | 168.966127         |
| <b>Paradise</b>            | <b>252.1265618</b> |
| Agriculture                | 0.67433975         |
| Medium Density Residential | 210.6344756        |
| Municipal                  | 0.005400662        |
| Open Space / Forested      | 40.81234578        |
| <b>Pulaski</b>             | <b>246.3843502</b> |
| High Intensity Commercial  | 120.8479006        |
| Industrial                 | 77.78260487        |
| Low Density Residential    | 47.75384466        |
| <b>Swan Creek</b>          | <b>361.3344914</b> |
| Aberdeen Proving Ground    | 0.132762854        |
| Agriculture                | 360.5522151        |
| Municipal                  | 0.00813454         |
| Water                      | 0.641378895        |
| <b>Titan Terrace</b>       | <b>410.1737512</b> |
| Low Density Residential    | 223.8478715        |
| Medium Density Residential | 114.4396196        |
| Municipal                  | 0.346482652        |
| Open Space / Forested      | 71.53977737        |
| <b>Grand Total</b>         | <b>6183.076129</b> |

# Appendix E- Water Resources Calculations



| PRIMARY SOURCES - Land Use |                    |                    |  | Concentrations |         |          |               | Annual Loading Rates |                 |                 |                 | Annual Load  |            |                |                |
|----------------------------|--------------------|--------------------|--|----------------|---------|----------|---------------|----------------------|-----------------|-----------------|-----------------|--------------|------------|----------------|----------------|
|                            | Area (Acres)       | Impervious Cover % |  | TN mg/l        | TP mg/l | TSS mg/l | FC MPN/100 ml | TN lb/acre           | TP lb/acre      | TSS lb/acre     | FC billion/ac   | TN lb/year   | TP lb/year | TSS lb/year    | FC # billion/y |
| Residential                | R (<1du/acre)      | 11                 |  | 2              | 0.26    | 55       | 20000         | 2.8                  | 0.4             | 90              | 130             | -            | -          | -              | -              |
|                            | MDR (1-4 du/acre)  | 21                 |  | 2              | 0.26    | 55       | 20000         | 4.6                  | 0.6             | 126             | 208             | -            | -          | -              | -              |
|                            | HDR (>4 du/acre)   | 33                 |  | 2              | 0.26    | 55       | 20000         | 6.6                  | 0.9             | 182             | 302             | -            | -          | -              | -              |
|                            | Multifamily        | 44                 |  | 2              | 0.26    | 55       | 20000         | 8.5                  | 1.1             | 235             | 389             | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               | 1.3                  | 0.1             | 90              | 12              | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               | 1.3                  | 0.1             | 90              | 12              | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               | 1.3                  | 0.1             | 90              | 12              | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               | 1.3                  | 0.1             | 90              | 12              | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               | 1.3                  | 0.1             | 90              | 12              | -            | -          | -              | -              |
| Commercial                 | 517.364194         | 72                 |  | 2              | 0.26    | 55       | 20000         | 13.3                 | 1.7             | 367             | 608             | 6,904        | 898        | 189,873        | 314,673        |
|                            |                    |                    |  |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -            | -          | -              | -              |
| Roadway                    |                    | 80                 |  | 2              | 0.26    | 55       | 20000         | 14.7                 | 1.9             | 405             | 671             | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -            | -          | -              | -              |
| Industrial                 | 0.008675838        | 53                 |  | 2              | 0.26    | 55       | 20000         | 10.1                 | 1.3             | 277             | 459             | 0            | 0          | 2              | 4              |
|                            |                    |                    |  |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -            | -          | -              | -              |
| Forest                     |                    |                    |  |                |         |          |               | 2.5                  | 0.2             | 100             | 12              | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               |                      |                 |                 |                 | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               |                      |                 |                 |                 | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               |                      |                 |                 |                 | -            | -          | -              | -              |
| Rural                      |                    |                    |  |                |         |          |               | 4.6                  | 0.7             | 100             | 39              | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               |                      |                 |                 |                 | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               |                      |                 |                 |                 | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               |                      |                 |                 |                 | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               |                      |                 |                 |                 | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               |                      |                 |                 |                 | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               |                      |                 |                 |                 | -            | -          | -              | -              |
|                            |                    |                    |  |                |         |          |               |                      |                 |                 |                 | -            | -          | -              | -              |
| Open Water                 |                    |                    |  |                |         |          |               | 12.8                 | 0.5             | 155             |                 | -            | -          | -              | -              |
| Active Construction        |                    |                    |  |                |         |          |               |                      |                 |                 |                 |              |            |                |                |
| Vacant Lots                |                    |                    |  |                |         |          |               | 0                    | 0               | 0               | 0               |              |            |                |                |
| <b>Total</b>               | <b>517.3728698</b> | <b>71.99968139</b> |  |                |         |          |               | <b>13.34543</b>      | <b>1.734905</b> | <b>366.9992</b> | <b>608.2207</b> | <b>6,905</b> | <b>898</b> | <b>189,875</b> | <b>314,677</b> |

| Partitioning Coefficients for Rural and Forest Land |     |     |     |      |
|---|-----|-----|-----|------|
| Pollutant Fraction as Storm Load                    | TN  | TP  | TSS | FC   |
|   | 50% | 70% | 90% | 100% |

| Watershed Data           |          |
|--------------------------|----------|
| Annual Rainfall (inches) | 47       |
| Watershed Area (acres)   | 517.3729 |
| Stream Length (miles)    |          |
| Planning Horizon (years) | 20       |



# Appendix E- Water Resources Calculations



| PRIMARY SOURCES - Land Use |              |                    |                |         |          |               |                      |            |             |               |             |            |             |                |  |
|----------------------------|--------------|--------------------|----------------|---------|----------|---------------|----------------------|------------|-------------|---------------|-------------|------------|-------------|----------------|--|
|                            | Area (Acres) | Impervious Cover % | Concentrations |         |          |               | Annual Loading Rates |            |             |               | Annual Load |            |             |                |  |
|                            |              |                    | TN mg/l        | TP mg/l | TSS mg/l | FC MPN/100 ml | TN lb/acre           | TP lb/acre | TSS lb/acre | FC billion/ac | TN lb/year  | TP lb/year | TSS lb/year | FC # billion/y |  |
| Residential R (<1du/acre)  |              | 11                 | 2              | 0.26    | 55       | 20000         | 2.8                  | 0.4        | 90          | 130           | -           | -          | -           | -              |  |
| MDR (1-4 du/acre)          |              | 21                 | 2              | 0.26    | 55       | 20000         | 4.6                  | 0.6        | 126         | 208           | -           | -          | -           | -              |  |
| HDR (>4 du/acre)           |              | 33                 | 2              | 0.26    | 55       | 20000         | 6.6                  | 0.9        | 182         | 302           | -           | -          | -           | -              |  |
| Multifamily                |              | 44                 | 2              | 0.26    | 55       | 20000         | 8.5                  | 1.1        | 235         | 389           | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               | 1.3                  | 0.1        | 90          | 12            | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               | 1.3                  | 0.1        | 90          | 12            | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               | 1.3                  | 0.1        | 90          | 12            | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               | 1.3                  | 0.1        | 90          | 12            | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               | 1.3                  | 0.1        | 90          | 12            | -           | -          | -           | -              |  |
| Commercial                 | 1.593583807  | 72                 | 2              | 0.26    | 55       | 20000         | 13.3                 | 1.7        | 367         | 608           | 21          | 3          | 585         | 969            |  |
|                            |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -              |  |
| Roadway                    |              | 80                 | 2              | 0.26    | 55       | 20000         | 14.7                 | 1.9        | 405         | 671           | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -              |  |
| Industrial                 |              | 53                 | 2              | 0.26    | 55       | 20000         | 10.1                 | 1.3        | 277         | 459           | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -              |  |
| Forest                     |              |                    |                |         |          |               | 2.5                  | 0.2        | 100         | 12            | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               |                      |            |             |               | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               |                      |            |             |               | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               |                      |            |             |               | -           | -          | -           | -              |  |
| Rural                      |              |                    |                |         |          |               | 4.6                  | 0.7        | 100         | 39            | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               |                      |            |             |               | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               |                      |            |             |               | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               |                      |            |             |               | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               |                      |            |             |               | -           | -          | -           | -              |  |
|                            |              |                    |                |         |          |               |                      |            |             |               | -           | -          | -           | -              |  |
| Open Water                 |              |                    |                |         |          |               | 12.8                 | 0.5        | 155         |               | -           | -          | -           | -              |  |
| Active Construction        |              |                    |                |         |          |               |                      |            |             |               |             |            |             |                |  |
| Vacant Lots                |              |                    |                |         |          |               | 0                    | 0          | 0           | 0             |             |            |             |                |  |
| Total                      | 1.593583807  | 72                 |                |         |          |               | 13.34548             | 1.734913   | 367.0007    | 608.2232      | 21          | 3          | 585         | 969            |  |

| Partitioning Coefficients for Rural and Forest Land |     |     |     |      |
|---|-----|-----|-----|------|
| Pollutant   | TN  | TP  | TSS | FC   |
| Fraction as Storm Load                              | 50% | 70% | 90% | 100% |

| Watershed Data           |          |
|--------------------------|----------|
| Annual Rainfall (inches) | 47       |
| Watershed Area (acres)   | 1.593584 |
| Stream Length (miles)    |          |
| Planning Horizon (years) | 20       |

# Appendix E- Water Resources Calculations



| PRIMARY SOURCES - Land Use |                    |                    |                |         |          |               |                      |                 |                 |                 |               |              |                |                |     |
|----------------------------|--------------------|--------------------|----------------|---------|----------|---------------|----------------------|-----------------|-----------------|-----------------|---------------|--------------|----------------|----------------|-----|
|                            | Area (Acres)       | Impervious Cover % | Concentrations |         |          |               | Annual Loading Rates |                 |                 |                 | Annual Load   |              |                |                |     |
|                            |                    |                    | TN mg/l        | TP mg/l | TSS mg/l | FC MPN/100 ml | TN lb/acre           | TP lb/acre      | TSS lb/acre     | FC billion/ac   | TN lb/year    | TP lb/year   | TSS lb/year    | FC # billion/y |     |
| Residential                | R (<1du/acre)      | 11                 | 2              | 0.26    | 55       | 20000         | 2.8                  | 0.4             | 90              | 130             | -             | -            | -              | -              | -   |
|                            | MDR (1-4 du/a)     | 0.58921612         | 21             | 2       | 0.26     | 55            | 20000                | 4.6             | 0.6             | 126             | 208           | 3            | 0              | 74             | 123 |
|                            | HDR (>4 du/a)      | 0.04783055         | 33             | 2       | 0.26     | 55            | 20000                | 6.6             | 0.9             | 182             | 302           | 0            | 0              | 9              | 14  |
|                            | Multifamily        | 44                 | 2              | 0.26    | 55       | 20000         | 8.5                  | 1.1             | 235             | 389             | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               | 1.3                  | 0.1             | 90              | 12              | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               | 1.3                  | 0.1             | 90              | 12              | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               | 1.3                  | 0.1             | 90              | 12              | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               | 1.3                  | 0.1             | 90              | 12              | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               | 1.3                  | 0.1             | 90              | 12              | -             | -            | -              | -              | -   |
| Commercial                 | 1134.422383        | 72                 | 2              | 0.26    | 55       | 20000         | 13.3                 | 1.7             | 367             | 608             | 15,139        | 1,968        | 416,334        | 689,982        |     |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -              | -   |
| Roadway                    |                    | 80                 | 2              | 0.26    | 55       | 20000         | 14.7                 | 1.9             | 405             | 671             | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -              | -   |
| Industrial                 | 0.020348861        | 53                 | 2              | 0.26    | 55       | 20000         | 10.1                 | 1.3             | 277             | 459             | 0             | 0            | 6              | 9              |     |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -              | -   |
| Forest                     |                    |                    |                |         |          |               | 2.5                  | 0.2             | 100             | 12              | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               |                      |                 |                 |                 | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               |                      |                 |                 |                 | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               |                      |                 |                 |                 | -             | -            | -              | -              | -   |
| Rural                      |                    |                    |                |         |          |               | 4.6                  | 0.7             | 100             | 39              | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               |                      |                 |                 |                 | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               |                      |                 |                 |                 | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               |                      |                 |                 |                 | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               |                      |                 |                 |                 | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               |                      |                 |                 |                 | -             | -            | -              | -              | -   |
|                            |                    |                    |                |         |          |               |                      |                 |                 |                 | -             | -            | -              | -              | -   |
| Open Water                 |                    |                    |                |         |          |               | 12.8                 | 0.5             | 155             |                 | -             | -            | -              | -              | -   |
| Active Construction        |                    |                    |                |         |          |               |                      |                 |                 |                 |               |              |                |                |     |
| Vacant Lots                |                    |                    |                |         |          |               | 0                    | 0               | 0               | 0               |               |              |                |                |     |
| <b>Total</b>               | <b>1135.079779</b> | <b>71.97154205</b> |                |         |          |               | <b>13.34058</b>      | <b>1.734276</b> | <b>366.8661</b> | <b>608.0001</b> | <b>15,143</b> | <b>1,969</b> | <b>416,422</b> | <b>690,129</b> |     |

| Pollutant              | TN  | TP  | TSS | FC   |
|------------------------|-----|-----|-----|------|
| Fraction as Storm Load | 50% | 70% | 90% | 100% |

|                          |         |
|--------------------------|---------|
| Annual Rainfall (inches) | 47      |
| Watershed Area (acres)   | 1135.08 |
| Stream Length (miles)    |         |
| Planning Horizon (years) | 20      |

# Appendix E- Water Resources Calculations



| PRIMARY SOURCES - Land Use |                |                    |                |         |          |               |                      |            |             |               |             |            |             |                |         |
|----------------------------|----------------|--------------------|----------------|---------|----------|---------------|----------------------|------------|-------------|---------------|-------------|------------|-------------|----------------|---------|
|                            | Area (Acres)   | Impervious Cover % | Concentrations |         |          |               | Annual Loading Rates |            |             |               | Annual Load |            |             |                |         |
|                            |                |                    | TN mg/l        | TP mg/l | TSS mg/l | FC MPN/100 ml | TN lb/acre           | TP lb/acre | TSS lb/acre | FC billion/ac | TN lb/year  | TP lb/year | TSS lb/year | FC # billion/y |         |
| Residential                | R (<1du/a)     | 360.9150482        | 11             | 2       | 0.26     | 55            | 20000                | 2.8        | 0.4         | 90            | 130         | 1,028      | 134         | 32,482         | 46,860  |
|                            | MDR (1-4 du/a) | 265.6230881        | 21             | 2       | 0.26     | 55            | 20000                | 4.6        | 0.6         | 126           | 208         | 1,214      | 158         | 33,379         | 55,319  |
|                            | HDR (>4 du/a)  | 194.0556021        | 33             | 2       | 0.26     | 55            | 20000                | 6.6        | 0.9         | 182           | 302         | 1,287      | 167         | 35,405         | 58,676  |
|                            | Multifamily    |                    | 44             | 2       | 0.26     | 55            | 20000                | 8.5        | 1.1         | 235           | 389         | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      | 1.3        | 0.1         | 90            | 12          | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      | 1.3        | 0.1         | 90            | 12          | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      | 1.3        | 0.1         | 90            | 12          | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      | 1.3        | 0.1         | 90            | 12          | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      | 1.3        | 0.1         | 90            | 12          | -          | -           | -              | -       |
| Commercial                 |                | 209.5032197        | 72             | 2       | 0.26     | 55            | 20000                | 13.3       | 1.7         | 367           | 608         | 2,796      | 363         | 76,888         | 127,425 |
|                            |                |                    |                |         |          |               |                      | 0.0        | 0.0         | 0             | -           | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      | 0.0        | 0.0         | 0             | -           | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      | 0.0        | 0.0         | 0             | -           | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      | 0.0        | 0.0         | 0             | -           | -          | -           | -              | -       |
| Roadway                    |                | 4.226515201        | 80             | 2       | 0.26     | 55            | 20000                | 14.7       | 1.9         | 405           | 671         | 62         | 8           | 1,711          | 2,836   |
|                            |                |                    |                |         |          |               |                      | 0.0        | 0.0         | 0             | -           | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      | 0.0        | 0.0         | 0             | -           | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      | 0.0        | 0.0         | 0             | -           | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      | 0.0        | 0.0         | 0             | -           | -          | -           | -              | -       |
| Industrial                 |                | 14.53330033        | 53             | 2       | 0.26     | 55            | 20000                | 10.1       | 1.3         | 277           | 459         | 146        | 19          | 4,027          | 6,674   |
|                            |                |                    |                |         |          |               |                      | 0.0        | 0.0         | 0             | -           | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      | 0.0        | 0.0         | 0             | -           | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      | 0.0        | 0.0         | 0             | -           | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      | 0.0        | 0.0         | 0             | -           | -          | -           | -              | -       |
| Forest                     |                | 840.9638697        |                |         |          |               |                      | 2.5        | 0.2         | 100           | 12          | 2,102      | 168         | 84,096         | 10,092  |
|                            |                |                    |                |         |          |               |                      |            |             |               |             | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      |            |             |               |             | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      |            |             |               |             | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      |            |             |               |             | -          | -           | -              | -       |
| Rural                      |                | 0.002119714        |                |         |          |               |                      | 4.6        | 0.7         | 100           | 39          | 0          | 0           | 0              | 0       |
|                            |                |                    |                |         |          |               |                      |            |             |               |             | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      |            |             |               |             | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      |            |             |               |             | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      |            |             |               |             | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      |            |             |               |             | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      |            |             |               |             | -          | -           | -              | -       |
|                            |                |                    |                |         |          |               |                      |            |             |               |             | -          | -           | -              | -       |
| Open Water                 |                | 0.002751804        |                |         |          |               |                      | 12.8       | 0.5         | 155           |             | 0          | 0           | 0              | -       |
| Active Construction        |                |                    |                |         |          |               |                      |            |             |               |             |            |             |                |         |
| Vacant Lots                |                |                    |                |         |          |               |                      | 0          | 0           | 0             | 0           |            |             |                |         |
| Total                      |                | 1889.825515        | 17.00929686    |         |          |               |                      | 4.569982   | 0.538472    | 141.8066      | 162.9149    | 8,636      | 1,018       | 267,990        | 307,881 |

| Pollutant              | TN  | TP  | TSS | FC   |
|------------------------|-----|-----|-----|------|
| Fraction as Storm Load | 50% | 70% | 90% | 100% |

|                          |          |
|--------------------------|----------|
| Annual Rainfall (inches) | 47       |
| Watershed Area (acres)   | 1889.826 |
| Stream Length (miles)    |          |
| Planning Horizon (years) | 20       |

# Appendix E- Water Resources Calculations



## Loads from Primary Sources - Simple Method Calculations

Swan Watershed - Aberdeen Future Growth - Infill

| PRIMARY SOURCES - Land Use |                   | Area (Acres) | Impervious Cover % | Concentrations |         |          |               | Annual Loading Rates |            |             |               | Annual Load |            |             |                   |
|----------------------------|-------------------|--------------|--------------------|----------------|---------|----------|---------------|----------------------|------------|-------------|---------------|-------------|------------|-------------|-------------------|
|                            |                   |              |                    | TN mg/l        | TP mg/l | TSS mg/l | FC MPN/100 ml | TN lb/acre           | TP lb/acre | TSS lb/acre | FC billion/ac | TN lb/year  | TP lb/year | TSS lb/year | FC # billion/year |
| Residential                | R (<1du/acre)     |              | 11                 | 2              | 0.26    | 55       | 20000         | 2.8                  | 0.4        | 90          | 130           | -           | -          | -           | -                 |
|                            | MDR (1-4 du/acre) | 0.07862993   | 21                 | 2              | 0.26    | 55       | 20000         | 4.6                  | 0.6        | 126         | 208           | 0           | 0          | 10          | 16                |
|                            | HDR (>4 du/acre)  |              | 33                 | 2              | 0.26    | 55       | 20000         | 6.6                  | 0.9        | 182         | 302           | -           | -          | -           | -                 |
|                            | Multifamily       |              | 44                 | 2              | 0.26    | 55       | 20000         | 8.5                  | 1.1        | 235         | 389           | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | 1.3                  | 0.1        | 90          | 12            | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          | 1.3           | 0.1                  | 90         | 12          | -             | -           | -          | -           |                   |
|                            |                   |              |                    |                |         |          | 1.3           | 0.1                  | 90         | 12          | -             | -           | -          | -           |                   |
|                            |                   |              |                    |                |         |          | 1.3           | 0.1                  | 90         | 12          | -             | -           | -          | -           |                   |
|                            |                   |              |                    |                |         |          | 1.3           | 0.1                  | 90         | 12          | -             | -           | -          | -           |                   |
| Commercial                 |                   | 2734.295288  | 72                 | 2              | 0.26    | 55       | 20000         | 13.3                 | 1.7        | 367         | 608           | 36,490      | 4,744      | 1,003,488   | 1,663,062         |
|                            |                   |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -                 |
| Roadway                    |                   | 14.83889311  | 80                 | 2              | 0.26    | 55       | 20000         | 14.7                 | 1.9        | 405         | 671           | 218         | 28         | 6,008       | 9,956             |
|                            |                   |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -                 |
| Industrial                 |                   |              | 53                 | 2              | 0.26    | 55       | 20000         | 10.1                 | 1.3        | 277         | 459           | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | 0.0                  | 0.0        | 0           | -             | -           | -          | -           | -                 |
| Forest                     |                   |              |                    |                |         |          |               | 2.5                  | 0.2        | 100         | 12            | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | -                    | -          | -           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | -                    | -          | -           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | -                    | -          | -           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | -                    | -          | -           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | -                    | -          | -           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | -                    | -          | -           | -             | -           | -          | -           | -                 |
| Rural                      |                   | 3.7742E-05   |                    |                |         |          |               | 4.6                  | 0.7        | 100         | 39            | 0           | 0          | 0           | 0                 |
|                            |                   |              |                    |                |         |          |               | -                    | -          | -           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | -                    | -          | -           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | -                    | -          | -           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | -                    | -          | -           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | -                    | -          | -           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | -                    | -          | -           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | -                    | -          | -           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | -                    | -          | -           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | -                    | -          | -           | -             | -           | -          | -           | -                 |
|                            |                   |              |                    |                |         |          |               | -                    | -          | -           | -             | -           | -          | -           | -                 |
| Open Water                 |                   |              |                    |                |         |          |               | 12.8                 | 0.5        | 155         | -             | -           | -          | -           | -                 |
| Active Construction        |                   |              |                    |                |         |          |               |                      |            |             |               |             |            |             |                   |
| Vacant Lots                |                   |              |                    |                |         |          |               | 0                    | 0          | 0           | 0             |             |            |             |                   |
| Total                      |                   | 2749.212849  | 72.04172042        |                |         |          |               | 13.35266             | 1.735846   | 367.1981    | 608.5504      | 36,709      | 4,772      | 1,009,506   | 1,673,035         |

| Partitioning Coefficients for Rural and Forest Land |     |     |     |      |
|---|-----|-----|-----|------|
| Pollutant Fraction as Storm Load                    | TN  | TP  | TSS | FC   |
|   | 50% | 70% | 90% | 100% |

| Watershed Data           |          |
|--------------------------|----------|
| Annual Rainfall (inches) | 47       |
| Watershed Area (acres)   | 2749.213 |
| Stream Length (miles)    |          |
| Planning Horizon (years) | 20       |

# Appendix E- Water Resources Calculations



| PRIMARY SOURCES - Land Use |                    |                    |                |         |          |               |                      |                 |                 |                 |               |              |                |                   |  |
|----------------------------|--------------------|--------------------|----------------|---------|----------|---------------|----------------------|-----------------|-----------------|-----------------|---------------|--------------|----------------|-------------------|--|
|                            | Area (Acres)       | Impervious Cover % | Concentrations |         |          |               | Annual Loading Rates |                 |                 |                 | Annual Load   |              |                |                   |  |
|                            |                    |                    | TN mg/l        | TP mg/l | TSS mg/l | FC MPN/100 ml | TN lb/acre           | TP lb/acre      | TSS lb/acre     | FC billion/ac   | TN lb/year    | TP lb/year   | TSS lb/year    | FC # billion/year |  |
| Residential R (<1du/ac)    | 853.0462438        | 11                 | 2              | 0.26    | 55       | 20000         | 2.8                  | 0.4             | 90              | 130             | 2,430         | 316          | 76,774         | 110,756           |  |
| MDR (1-4 du/a)             | 1014.072716        | 21                 | 2              | 0.26    | 55       | 20000         | 4.6                  | 0.6             | 126             | 208             | 4,634         | 602          | 127,432        | 211,191           |  |
| HDR (>4 du/acre)           |                    | 33                 | 2              | 0.26    | 55       | 20000         | 6.6                  | 0.9             | 182             | 302             | -             | -            | -              | -                 |  |
| Multifamily                |                    | 44                 | 2              | 0.26    | 55       | 20000         | 8.5                  | 1.1             | 235             | 389             | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | 1.3                  | 0.1             | 90              | 12              | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | 1.3                  | 0.1             | 90              | 12              | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | 1.3                  | 0.1             | 90              | 12              | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | 1.3                  | 0.1             | 90              | 12              | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | 1.3                  | 0.1             | 90              | 12              | -             | -            | -              | -                 |  |
| Commercial                 | 273.7724237        | 72                 | 2              | 0.26    | 55       | 20000         | 13.3                 | 1.7             | 367             | 608             | 3,654         | 475          | 100,475        | 166,515           |  |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -                 |  |
| Roadway                    | 76.32223838        | 80                 | 2              | 0.26    | 55       | 20000         | 14.7                 | 1.9             | 405             | 671             | 1,124         | 146          | 30,900         | 51,209            |  |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -                 |  |
| Industrial                 | 77.78260487        | 53                 | 2              | 0.26    | 55       | 20000         | 10.1                 | 1.3             | 277             | 459             | 784           | 102          | 21,553         | 35,719            |  |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | 0.0                  | 0.0             | 0               | -               | -             | -            | -              | -                 |  |
| Forest                     | 520.0943782        |                    |                |         |          |               | 2.5                  | 0.2             | 100             | 12              | 1,300         | 104          | 52,009         | 6,241             |  |
|                            |                    |                    |                |         |          |               | -                    | -               | -               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | -                    | -               | -               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | -                    | -               | -               | -               | -             | -            | -              | -                 |  |
| Rural                      | 617.9985338        |                    |                |         |          |               | 4.6                  | 0.7             | 100             | 39              | 2,843         | 433          | 61,800         | 24,102            |  |
|                            |                    |                    |                |         |          |               | -                    | -               | -               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | -                    | -               | -               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | -                    | -               | -               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | -                    | -               | -               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | -                    | -               | -               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | -                    | -               | -               | -               | -             | -            | -              | -                 |  |
|                            |                    |                    |                |         |          |               | -                    | -               | -               | -               | -             | -            | -              | -                 |  |
| Open Water                 | 0.641378895        |                    |                |         |          |               | 12.8                 | 0.5             | 155             |                 | 8             | 0            | 99             | -                 |  |
| Active Construction        |                    |                    |                |         |          |               |                      |                 |                 |                 |               |              |                |                   |  |
| Vacant Lots                |                    |                    |                |         |          |               | 0                    | 0               | 0               | 0               |               |              |                |                   |  |
| <b>Total</b>               | <b>3433.730517</b> | <b>17.65395014</b> |                |         |          |               | <b>4.885734</b>      | <b>0.634353</b> | <b>137.1808</b> | <b>176.4066</b> | <b>16,776</b> | <b>2,178</b> | <b>471,042</b> | <b>605,733</b>    |  |

| Partitioning Coefficients for Rural and Forest Land |     |     |     |      |
|---|-----|-----|-----|------|
| Pollutant   | TN  | TP  | TSS | FC   |
| Fraction as Storm Load                              | 50% | 70% | 90% | 100% |

| Watershed Data           |          |
|--------------------------|----------|
| Annual Rainfall (inches) | 47       |
| Watershed Area (acres)   | 3433.731 |
| Stream Length (miles)    |          |
| Planning Horizon (years) | 20       |