



# LANDSCAPE PERFORMANCE SERIES

## Snoqualmie Falls Upper Park – City of Snoqualmie, WA Methodology for Landscape Performance Benefits

### Environmental

- ***Designed to capture all of stormwater runoff generated on the site and will save nearly \$28,000 over the next decade on stormwater management fees assessed by the County.***

The site design accommodates all of the projected runoff generated on the site through the use of planted areas, an enhanced wetland and onsite low-impact drainage facilities (enhanced wetland and drainage facilities to be brought online in next phase of construction). For the case study, the stormwater accommodation was relayed through conversations with lead designer and civil engineer on the project.

The cost savings were determined by calculating the annual costs assessed by King County for stormwater management fees (2011), reduced by utilizing on-site drainage techniques and low impact development practices. The costs assessed used 2011 King County stormwater management rates (accessed August 01, 2011). These rates are variable, changing on an annual basis, thus the savings projected is approximate.

- ***Sequesters approximately 36 metric tons of CO2 in the soil by restoring and enhancing nearly 1 acre of native upland habitat. Additional carbon is stored in the 111 canopy trees (91% of existing) that were preserved on the site.***

The amount of preservation and areas of restoration and enhancement activities were determined by examining the planting plan and calculating overall restored and enhanced areas.

- 111 of 122 canopy trees were preserved on the site. Only trees determined by an arborist to be 'at risk' for safety or health concerns were removed.
- Restoration and replanting of disturbed areas came to 28,000 sq ft.; Infill, enhancement planting occurred in 13,000 sq ft. of minimally disturbed areas where there was only invasive removal. Total 41,000 sq ft. (0.94 acres)

The amount of sequester carbon was determined using the Construction Carbon Calculator (<http://buildcarbonneutral.org/>). The model was utilized for landscape rehabilitation activities (disturbance and restoration/ enhancement only. The model requires the following parameters:

- Ecoregion [Northwestern Forested Mountains]
- Existing/ Installed Vegetation Type [Forest]
- Landscape Disturbed (SF) [28,000 SF]
- Landscape Installed (SF) [41,000 SF]

\*There are many assumptions integrated into the Build Carbon Neutral calculator. Prior to its use on a given project, they should be reviewed. They are accessible at:

<http://buildcarbonneutral.org/assumptions.php>

- ***Reduces potential annual landscape water use by about 950,000 gallons (enough to supply 21 single-family households) through the use of a water-efficient, low-flow irrigation system. This saves about \$3,000/year in water costs as compared to a standard, code-compliant system.***

The volume of annual landscape water savings was determined using a series of calculations:

- Estimating 2,700 minutes/year of irrigation (estimate from nationally recognized, local (Seattle area) irrigation company)
- Calculated an approximate number of irrigation heads required (based on 14 ft. spray radius): 615 SF (single head coverage) / 41,000 SF (area rehabilitated) = 67 (heads required)
- Determined annual difference between traditional (6.0 gpm) and efficient, low-flow (0.75 gpm) irrigation systems to cover planted area (determined from site plans)
- GPM irrigation for whole site determined by Rate X Number of heads.
- Gallons for entire year determined by multiplying the estimate of minutes per year (2,700) by required GPM.
- The difference represents the ~950,000 gpy of savings.

\*This series of calculations integrates several assumptions/theoretical conditions for computing irrigation savings. The most important are the use of a single-type head/sprayer for determining coverage and the rate of flow per head. While traditional heads do vary to some extent in their volume of release per minute, the low flow heads are can range anywhere from 1.5 – 0.5 gpm. This method was developed to compute landscape water savings generally. Actual savings from built systems will vary.

Residential water use is determined based on an estimated 5 ccf monthly water use converted to amount of annual consumption.

$$5 \text{ (ccf)} \times 748 \text{ (g/ccf)} \times 12 \text{ (months)} = 44,800 \text{ (g/yr)}$$

The result is divided by the annual savings to identify number of households.

The financial savings of the reduced water rates were calculated by taking the volume saved (950,000 g/yr) converting to ccf (100 ft<sup>3</sup>) and multiplying it by the Peak Usage (May 16th – Sept 15th) rate (\$5.92\*). This monthly cost was then multiplied by 4 months (120 days).

\*Commercial water rates collected from County provider (accessed 08/12/2011):

<http://www.seattle.gov/util/Services/Water/WaterRates.htm>

These rates change annually. The amount of savings provided does not include administrative or base charges.