Documentation for 2401 Tier 1 Graywater Reuse Application - XXX Street, Portland OR 97219

System Design Plan

1. Location of system:
   Rear yard at XXX street, Portland OR 97219 (see system diagram for detail)

2. List of intended uses
   The graywater system will be used to irrigate four fruiting shrubs during the irrigation season.

3. Fixtures entering system
   A single front-loading washer, fitted with a three-way valve to divert greywater to the yard during the growing season.

4. Estimated graywater flow from fixtures:

   The high-efficiency front loading washer generates 10 gallons per load. The two adults and one child (3) residents typically run five loads of laundry per week, generating 50 gallons per week and an average of 7.1 gallons per day. Peak use is three loads in one day or 30 gallons. No other household fixtures are diverted for on-site greywater reuse.

5. Description of graywater system including any treatment, tanks, or filters.

   This is a standard laundry-to-landscape system, which includes a diverter valve attached to the washer drain hose, an anti-siphon component (AAV), and 1-inch HDPE tubing in the landscape. Barbed reducing tees distribute water subsurface into mulch basins, located near the plants to be irrigated. The mulch basins are sized to accommodate the peak daily use of 30 gallons infiltrating at the measured infiltration rate of 5 inches per hour.

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Graywater Irrigation Site Evaluation Report

1. Parcel size: 5,000 square feet (0.11 acres)

2. Soil profile: Cascade-Urban land complex (USDA NRCS Web Soil Survey).

An onsite soil ribbon test confirmed the soil to be clay loam.

3. Infiltration rate of soil:

Measured at 40 inches/hour (by Ted Labbe using the City of Portland BES open pit procedure. Although the NRCS-mapped soil type indicates slow drainage, the yard has excellent drainage, likely due to amended soils.

SOIL TYPES AND INFILTRATION AREA

Soil type	Area needed to infiltrate each gallon of greywater (per day)
Sand	0.25 square foot
Sandy loam	0.4 square foot
Loam	0.5 square foot
Sandy or loamy clay	0.6 square foot
Clay	1 square foot

4. Required infiltration area (gallons/day X infiltration rate)

30 gallons per day X 0.6 = 18 square feet

5. Water table levels (List water table level. If not known, dig a 4-foot test hole)

According to PortlandMaps.com, the USGS reported depth to seasonal high groundwater is 100-120 feet.

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6. Description of vegetation in the reuse area:

A cherry tree, a plum tree, and two hydrangeas.

7. Evapotranspiration rates for vegetation during the period of reuse

Evapotranspiration Rate (found at https://www.epa.gov/watersense/water-budget-data-finder)

Monthly ET__6.20 inches (July)____ Weekly ET (divide monthly by 4) _1.55 inches_____

Species factor for plants (High water use plant 0.8, medium water use plan 0.5, low water use plant 0.2. To find species factor use reference such as Sunset Western Garden Book or CIMIS website.

Type of plant	Number of plants X	0.62 X (constant)	Area of plant X (footprint)	Species factor X	ET for irrigation period =	Gallons/week
Plum and cherry trees	2	0.62	27	0.5	1.55	26.0
Hydrangeas	2	0.62	27	0.5	1.55	26.0
					Total	**52.0**

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System Diagram

Mulch basins surrounding the two trees will measure approximately 6 square feet each, and 4 square feet each for the two bushes. Total mulch basin area will measure approximately 20 square feet x 1 inches deep to meet peak design system water storage needs in the landscape.