

8.1 New Construction Graywater

Applicability

This BMP is intended for a Municipal Water User Group (“utility”) that has new development in its service area where use of graywater can be an option for an additional water supply. This BMP does not include on-site wastewater treatment and reuse. Once a utility decides to adopt this BMP, the utility should follow the BMP closely in order to achieve the maximum water efficiency benefit from this BMP.

Description

Graywater has always been used in Texas. The most common example is using washing machine water for lawn or garden irrigation. Until 2003, Texas statutes contained very restrictive provisions for using graywater, primarily due to concerns about public health. In 2003, the Texas Legislature adopted House Bill (“HB”) 2661 which provides a more comprehensive definition of graywater and provisions for facilitating the use of graywater in a safe manner.

Graywater is defined in Texas as wastewater from clothes washers, showers, bathtubs, hand washing lavatories and sinks not used for the disposal of hazardous or toxic ingredients. Graywater cannot include water from clothes washers used for washing diapers, sinks used for food preparation, toilets, nor urinals.

HB 2661, passed by the 78th Legislature Regular Session, added a provision that allows graywater use without treatment of up to 400 gallons per day at a private house for landscape irrigation, gardening or composting as long as the graywater:

- 1) Is used by the occupants of the residence for gardening, composting, or landscaping;
- 2) Is collected using a system that overflows into a sewage collection system or on-site wastewater treatment and disposal system;
- 3) Is stored in tanks that are clearly labeled and that have restricted access;
- 4) Uses purple pipe or purple tape around the pipe;
- 5) Is not allowed to pond or run off across property lines; and
- 6) Is distributed by a surface or subsurface system that does not spray into the air unless the graywater receives additional treatment.

HB 2661 also encourages builders of new homes to install dual piping that provides the capacity to collect graywater from allowable sources and to install subsurface graywater systems around the foundation of new houses to minimize foundation movement and cracking. This approach can also provide irrigation for landscaping planted up to four feet from the foundation.

New duplexes, triplexes, fourplexes, town homes, condo units and apartments can all be designed for utilization of graywater. Graywater generated from office buildings and other commercial buildings, primarily through faucet use, can be used for landscape irrigation. HB 2661 requires the Texas Commission on Environmental Quality to adopt rules for graywater use for commercial purposes as well as for industrial purposes and these rules are expected to be released for public comment sometime in 2004.

In many cases the quantity of water available as graywater is declining due to water efficiency gains from water conserving showerheads, faucet aerators and clothes washers. In a new home, which would have efficient plumbing fixtures, the amount of graywater produced will range from 22 to 30 gallons per person per day¹. For an average size household of 2.7 persons that would be sufficient in most cases for both foundation stabilization and landscape irrigation in a four-foot strip around a 2,500 square foot house.

The suitability of graywater for irrigation will vary, and if graywater is the primary source for irrigation, a low water use landscape should be used. Irrigation systems should consider soil depth, soil permeability and flooding characteristics. Application options include drip, flood and subsurface irrigation. It is not appropriate to use spray irrigation unless the graywater is highly treated. Pumps may be required for pressure dosing and uniformity of flow.

Implementation

Implementation of this BMP includes following rules pertaining to graywater adopted by TCEQ (expected 2004) as well as any local City or County Health Department rules. To promote this BMP, stakeholder meetings should be held with builders, developers, realtors and other impacted groups.

Due to the high cost of retrofitting existing homes and buildings for collection and use of graywater, that option is not included in this BMP. A utility choosing to support such retrofits should include design standards as a component of its public information programs.

Under this BMP, the utility should:

- 1) Implement an incentive plan to encourage builders and owners of new homes and/or multi-unit properties to install plumbing that separately collects graywater from all eligible sources and distributes the graywater through a subsurface irrigation system around the foundation of the residence or building or for other landscape use. It may be effective for this BMP to be part of a Green Builder type rating system that also includes WaterWise landscaping, adequate soil depth and rainwater harvesting; or
- 2) Adopt regulations requiring all new homes and/or multi-unit properties to install plumbing that separately collects graywater from all eligible sources and distributes the graywater through a subsurface irrigation system either around the foundation of the residence or building or for other landscape use; or
- 3) Adopt regulations and/or incentives requiring new commercial properties to reuse graywater.

Schedule

The schedule for accomplishing this BMP depends upon the utility's choice of approach:

- 1) Incentive Approach: In the first six months, plan the program including stakeholder meetings as needed. Develop a plan for educating and training potential homebuyers, developers, plumbers, landscape professionals and realtors about this program. After six months, implement the program.
- 2) Ordinance Approach: In the first six months, hold stakeholder meetings to develop the ordinance. Consider offering incentives for the first year of implementation. Propose the ordinance or rules to local City Council or Board for approval. Develop plan for educating potential homebuyers, developers, plumbers, and realtors about this program. After six months, implement the program.

Scope

To accomplish this BMP, the utility should do the following:

- 1) Develop and implement an incentive program to encourage graywater use in new homes and/or multi-unit properties and/or certain new commercial developments such as office parks; Or,
- 2) Adopt an enforceable ordinance or rules requiring use of graywater on all new homes and/or multi-unit properties and/or certain new commercial developments such as office parks.

Documentation

To track the progress of this BMP, the utility should gather and have available the following documentation for each year of implementation:

- 1) Depending on which sectors the utility has decided to focus on, the number of new homes and/or multi-unit properties and/or certain new commercial developments such as office parks, started and completed after adoption of this BMP;
- 2) The number and type of graywater installations completed each year; and
- 3) The estimated graywater use in each graywater installation.

Determination of Water Savings

Water savings will vary depending on the type of installation and will likely be unique to each customer installing a graywater system. There may also be some cases where graywater use will provide more water for a purpose than is currently being met with potable water. Only the

reduction in potable water use should be calculated as the actual savings. In general, calculate water savings as follows:

- For single-family units, calculate gallons of potable water use replaced by graywater and multiply this estimated potable water savings per house times the number of houses installing a graywater system.
- For commercial and other properties, calculate gallons of potable water use replaced by graywater. In some cases, water savings for commercial developments can be calculated based on the number of employees and graywater discharge per employee.

Cost-Effectiveness Considerations

The costs to the utility will center around the administrative costs of working with existing and potential graywater projects, including review of plans and inspection of construction. Utilities may also consider offering incentives. Depending on program design and whether project inspections are required, staff labor cost should range from \$50 to \$100 per project. Marketing and outreach costs range from \$20 to \$50 per project. Administrative and overhead costs range from 10 to 20 percent of labor costs.

References for Additional Information

- 1) *Graywater System Guidelines, Green Building Program Sustainable Building Sourcebook.* <http://greenbuilder.com>
- 2) *Impacts of Demand Reduction on Water Utilities,* AWWA Research Foundation, 1996.
- 3) *Residential End Uses of Water,* AWWA Research Foundation, 1999.
- 4) *Quantifying the Effectiveness of Various Water Conservation Techniques in Texas,* Texas Water Development Board, May 2002.
- 5) *Waste Not, Want Not: The Potential for Urban Water Conservation in California,* Pacific Institute, November 2003.
http://www.pacinst.org/reports/urban_usage/waste_not_want_not_full_report.pdf
- 6) *Texas HB 2661.* <http://www.capitol.state.tx.us/tlo/78R/billtext/HB02661F.HTM>
- 7) *City of Austin Green Builder Program.* <http://www.ci.austin.tx.us/greenbuilder/>