



MEMORANDUM

To: Mayor and Council Members

From: Greg Meszaros, Director, Austin Water

CC: Marc A. Ott, City Manager
Robert D. Goode, P.E., Assistant City Manager
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Date: July 2, 2012

Subject: Response to Resolution 20120126-047 relating to Residential Graywater

Executive Summary

Resolution Number 20120126-047 directs the City Manager to work with the Graywater Working Group and other stakeholders to identify impediments to single-family residential graywater system implementation and tasks the City Manager with making recommendations on alleviating impediments related to the following four charges:

1. the exploration of the feasibility of code amendments and make recommendations, inclusive of both retrofitting and new construction;
2. a permitting and approval process for graywater systems;
3. a technical guidance document, with recommendations for the Environmental Criteria Manual; and
4. a program for staff support of graywater systems, potentially housed in the Austin Green Building Program, including recommendations on trainings, resources, and incentives and/or rebates for participation.

City staff from various departments, coordinated through Austin Water's Conservation Division, held a series of discussions with the Graywater Working Group to fulfill these charges. The appendix contains a list of impediments to residential graywater identified through those discussions, along with staff recommendations for code amendments and process changes. Staff continues to work with stakeholders on the remaining charges in the resolution. Consistent with the Council resolution and the number of departments which the issue involves, recommendations for technical guidance

documents and a staff support program are scheduled to be presented to Council by next spring.

Citizens and staff identified thirteen impediments to residential graywater systems and recommend an approach to relieve those concerns. The majority of these concerns can be addressed by:

- Adoption of certain applicable provisions of the 2012 Uniform Plumbing Code (UPC),
- Establishing a permit and permit process for auxiliary water systems, and
- Coordinating information about graywater through one City department.

It is staff's recommendation to proceed with adoption of those sections of the 2012 UPC that appear to ease the permitting of graywater systems through the typical code review and adoption process, with consideration of any local amendments deemed necessary to ensure protection of the public water supply or address other local concerns. Many of the regulations that are considered impediments are in place to ensure against contamination of the drinking water system from cross connections. Consequently, it is critical to maintain safeguards while seeking to make the gray water regulation process less cumbersome and more easily understood. Considering regulatory changes as part of the traditional UPC process will allow a variety of stakeholders and staff to participate in a deliberative public process, which includes board and commission review.

Additionally, Austin Water has issued a request for proposals seeking a consultant to assess risks and regulations related to all auxiliary water sources, and compare Austin regulations to those of other cities, states and countries. It is expected that this will generate specific recommendations for changes in regulations, including local amendments to the UPC. Proposals are in and staff is in the evaluation stage of the process.

Recommendations for a permit process are included in the following document, and staff has already begun working on the necessary programming changes to develop an auxiliary water permit through the One Stop Shop. It is further recommended that the Water Conservation Division of Austin Water be the primary source for information about graywater systems, and that other departments link to an information clearinghouse for graywater systems on the Austin Water website to ensure consistency.

Should you have any questions or comments, please do not hesitate to contact me.

APPENDIX

Definitions

For purposes of this document, **residential** is intended to mean one and two-family dwellings. It does not include multi-family properties.

Graywater is defined as water captured from laundry, lavatory and bath uses, and does not include water from kitchen sinks, toilets, or clothes washers used to clean soiled diapers.

Auxiliary water is a general term for non-potable water sources that may include well water, raw water, rainwater, graywater, air conditioner condensate and reclaimed water.

Reclaimed water is the term used to describe the highly treated (Type I) wastewater effluent supplied by Austin Water for irrigation and limited indoor uses.

Identified Graywater Impediments and Recommendations

City staff representing Austin Water Utility, Planning and Development Review, Watershed Protection, Health and Human Services and the Office of Sustainability met with stakeholders in the Graywater Working Group to identify impediments to residential graywater implementation within the City of Austin. Following is the list of impediments identified by the group that are potentially within the City's control, as well as staff recommendations for next steps in alleviating those impediments.

In many cases, requirements that are perceived to be impediments are in place for a specific reason, such as protecting public health or environmental features. In some cases, further review or clarification from regulatory agencies will be necessary to determine whether changes to current requirements may be allowed or desirable.

1. More than one City office for guidance and information

Under current processes, individuals seeking a plumbing permit that involves an auxiliary water system of any type must first go to the One Stop Shop (OSS) in the Planning and Development Review Department. There is currently no formal submittal and review process for graywater systems installed in one and two family residences. A citizen may be issued a permit, install a system that does not meet City regulations, and face costly redesign work to come into compliance with code. To help alleviate this, the Planning and Development Review Department started an interim procedure of referring citizens who wish to install auxiliary water systems, including graywater, to staff in the Building Inspection Division. The Building Inspection staff will consult with the applicant prior to permit issuance and notify Austin Water Utility's Special Services Division (SSD). Staff from SSD are located in a different building and request that applicants meet with them for an informal plan review and discussion of the proposed system and requirements. Development Review staff based out of OSS conduct field inspections during construction and final inspections.

Recommendation #1: Coordinate all permit processes through OSS so that the applicant has one point of contact, and coordinate all information about design requirements, helpful tips and cost/benefit of residential graywater through Austin Water's Conservation Division. Other departments should link to, rather than copy or reprint, information from Water Conservation to ensure one single, up-to-date message to the public.

2. Required depth of leach field distribution piping

Currently, the minimum required depth to the top of the leach field distribution piping is 12 inches per the chart referenced in the 2009 Uniform Plumbing Code (UPC), Chapter 16, Part 1, Section 1611.0. The Batchelder permitted system (the first permitted graywater system in the City of Austin) reduced the depth to the top of the leach field distribution piping to 4 inches, which allowed for graywater distribution closer to the effective root zone of the landscaping while still containing the maximum calculated discharge under the soil surface. This system leach field design was permitted by the Planning and Development Review Department as allowed by Section 1612.0(A) of the 2009 UPC as locally adopted. However, because there is no guidance as to which alternate methods of compliance may be acceptable to inspectors, many citizens feel the requirement stated in the code is an impediment to less costly designs. There is no state requirement related to any minimum depth for graywater leach field distribution piping. The 2012 UPC, although not currently adopted, has a minimum requirement of 2 inches to the top of the leach field distribution piping for subsurface irrigation fields per Chapter 16, Section 1602.11.1.1 and mulch basins per Chapter 16, Section 1602.11.2.3. The 10-inch trench depth is retained in the 2012 UPC as it relates to subsoil systems per Chapter 16, Table 1602.11.3.

Recommendation #2: Adopt applicable sections of the 2012 UPC with no additional local amendments relating to leach field depth. Post information on how to calculate leach field requirements on Graywater Information section of Water Conservation website (with links from other departments as appropriate).

3. Type of material required in trenches

The 2009 UPC allows clean stone, gravel, slag, or "similar filter material acceptable to (the City)" as the fill material for the leach field trenches per Chapter 16, Part 1, Section 1611.0(B). Gravel and other similar material are a typical drainage fill materials because they are easy to compact, provide drainage without absorption and possess structural longevity. The Batchelder permitted system uses a mulch basin instead of a subsoil irrigation field comprised of filter material in an effort to facilitate line replacement when clogged and to allow for the distributed graywater to remain closer to the effective root zone of the landscaping due to the absorptive capacity of the mulch. This mulch basin system was permitted by the Planning and Development Review Department as allowed by Section 1612.0(A) of the 2009 UPC as locally adopted. However, because there is no guidance as to which alternate methods of compliance may be acceptable to inspectors, many citizens feel the requirement stated in the code is an impediment to less costly designs. There is no state requirement related to trench fill material. The 2012 UPC allows for mulch basin

and mulch-covered subsurface irrigation field designs per Chapter 16, Section 1602.11.

Recommendation #3: Adopt applicable sections of the 2012 UPC with no additional local amendments limiting trench materials. Post information on benefits/concerns about various trench materials on Graywater Information section of Water Conservation website (with links from other departments as appropriate).

4. Requirement of multiple zones for the system

Current City of Austin plumbing code requirements state that you must have at least three zones on any permitted gray water system per the 2009 UPC, Chapter 16, Part 1, Section 1607.0. A single zone would simplify the design and reduce the cost associated with the current system. There is no state requirement related to multiple zones for graywater systems. The 2012 UPC requires a minimum of one drain line per valved zone according to Chapter 16, Table 1602.11.3.

Recommendation #4: Adopt applicable sections of the 2012 UPC with no additional local amendments relating to required number of zones.

5. Container requirement

There are multiple regulations related to holding tank configuration under current City of Austin plumbing code requirements per the 2009 UPC, Chapter 16, Part 1, Section 1609.0, Subsections A-I. Tables 16-1 through 16-4 provide design schematics for 4 types of systems; a gravity based system, a pumped system, a multiple tank system and an underground pumped system; all provided examples incorporate tanks into the system. Additionally, Texas Administrative Code, Chapter 210.83, Section A, Subsection 3, Lines A-E prescribe container requirements, as does Texas Administrative Code, Chapter 210.25, Sections A-I. The current container requirement adds to the additional cost of the system, contributes to the septic like build of the system and becomes a barrier to certain biological filtration designs. The 2012 UPC does not require a holding tank (surge tank) for systems that are able discharge the total estimated amount of graywater on a daily basis per Chapter 16, Section 1602.2.2; however, systems that are unable to fully discharge the daily estimated graywater amount must install a surge tank in accordance with Chapter 16, Section 1602.9.1.

In response to questions from the stakeholder group, Austin Water sought clarification of the container requirement from TCEQ. TCEQ clarified that a tank is required even in cases where the graywater system is designed to discharge completely on a daily basis. This is to ensure that the graywater is properly stored even when the soil in the discharge area is saturated. Additionally, TCEQ confirmed that the volume within a graywater system's piping may not be used to fulfill the container requirement.

Recommendation #5: Proceed with adoption of applicable sections of the 2012 UPC, incorporating local amendments to address TCEQ container requirements; consider whether to seek amendments to TCEQ rules relating to containers.

6. Cost issues related to septic-type build of 2009 UPC Chapter 16 design requirements

In many aspects the currently required graywater systems design mimics many of the design requirements for On-Site Sewage Facilities (OSSF). OSSFs are commonly referred to as Septic Tanks. Examples of similarities between the two systems include holding tanks, leach fields, perforated piping and multiple zone requirements. Some of the similarities are a result of both current state and local regulations related to graywater (holding tank) while other similarities are a result of local requirements only (leach fields, multiple zones, perforated piping). While some of these requirements are in place to address potential environmental, public health and public safety concerns, the similarities between the two system requirements do increase the overall cost of the graywater system. Chapter 16 of the 2012 UPC does provide some potential relief from a few of the similarities relaxing the requirements for the holding tank and multiple zones.

Recommendation #6: Adopt applicable sections of the 2012 UPC with local amendments relating to specific build types where required to ensure systems comply with State regulations.

7. Cross connection and backflow requirements

Currently, the City of Austin requires a reduced pressure zone backflow prevention assembly (RPZ) at the meter for any service connection with auxiliary water, including graywater, on the property. This is intended to protect the public water supply from any contamination by non-potable sources. Depending on system design, additional protections may be required by the City at possible connection points on the system itself and elsewhere on the property or its physical structures to protect the on-site potable water supply. These requirements add to the initial project cost, and require annual testing and inspections at an additional cost. State code requires additional protection at the meter in the form of an air gap or backflow prevention assembly only when an actual or potential hazard exists *and* the utility does not have an adequate internal cross-connection program.

Recommendation #7: As part of the regular process to adopt the City's plumbing code, adopt applicable sections of the 2012 UPC with consideration of local amendments to address concerns about potential hazards. Backflow protection requirements are not limited to residential graywater use. Since amendments could potentially apply to other types of auxiliary water use at both commercial and residential properties, it is important to consider backflow protection requirements in a broader context. Austin Water has issued an RFP for a consultant who will be tasked with assessing risk and proposing revisions to the City's auxiliary water regulations. The analysis conducted as part of that effort should be considered when developing any local amendments.

8. Customer Service Inspection (CSI) requirements

Customer Service Inspections (CSI) are independent of the annual backflow inspection and intended to identify potential cross connections between the potable and non-potable water systems. TCEQ rules require CSIs for new construction, major plumbing work, and when a contamination hazard is believed

to exist. City regulations require cross connection inspection and testing upon installation of a pressurized auxiliary water source, including graywater, used to supply a private pressurized water system inside or outside a building on a site served by City potable water. City regulations also provide that a periodic (other than annual) inspection of auxiliary water systems, including graywater, may be approved by the City, with the frequency based on system complexity, exposure for modifications, hidden or visible piping, hazardous materials used or stored, history of compliance, etc. In practice, the City generally requires auxiliary systems to undergo annual inspection. This additional inspection contributes to the overall cost of the system as well as reoccurring fees for the life of the system.

Recommendation #8: As part of the regular process to adopt the City's plumbing code, adopt applicable sections of the 2012 UPC with consideration of local amendments to address concerns about potential cross-connections. Austin Water has issued an RFP for a consultant who will be tasked with assessing risk and proposing revisions to the City's auxiliary water regulations. The analysis conducted as part of that effort should be considered when developing any local amendments, and should include recommendations relating to the frequency of required CSIs.

9. Lack of access to, communication about, and clarity of design requirements and definitions

In general, citizens feel that there is unclear information about what is required of a graywater system both in terms of code requirements and City communication about those requirements. For homeowners interested in using graywater, the lack of clarity about minimum system requirements, alternative methods of compliance, and what is or is not allowable creates a significant barrier. Additionally, there are a number of technical terms that may be unclear to the general public or used in different ways by different City departments, adding to confusion.

Recommendation #9: Coordinate all information about design requirements, links to relevant codes and definitions of terms relating to residential graywater through Austin Water's Conservation Division. Other departments should link to, rather than copy or reprint, information from Water Conservation to ensure one single, up-to-date message to the public. The City's practice and requirement is to provide a current copy of the adopted Austin Plumbing Code at the City Clerk's Office. Provide citizens a general summary about City requirements for graywater systems, which should include information on any requirements for professional design, leachfields, backflow and cross-connection prevention, and specific Code and regulatory references for plumbers or other design professionals.

10. Requirement for engineered design

Currently, the 2009 UPC, Chapter 16, Part 1, Section 1601.0, Subsection A, requires that all graywater systems be designed by a person registered or licensed to perform plumbing design work. The City adopted this requirement to ensure that persons with professional liability and familiar with current plumbing regulations design the graywater systems in order to minimize the potential for incorrectly or poorly designed systems from being installed. Currently, the City's building official

requires that graywater systems be designed by a Professional Engineer licensed in the State of Texas to ensure that design criteria are met. There is no state requirement related to a professional graywater design. The 2012 UPC does not require a person registered or licensed to perform plumbing design work for systems having a maximum discharge of 250 gallons per day according to Chapter 16, Section 1601.2, Exception 3.

Recommendation #10: Adopt applicable sections of the 2012 UPC, and establish procedures that require additional information to be submitted with a permit application in the form of an auxiliary water addendum. No plan review would be required for residential one and two family dwellings systems designed by a master plumber licensed with the state of Texas. A master plumber licensed with the state of Texas would be required to permit and install the system, therefore, depending on the scope of work, a plan review may not be required.

11. Lack of a clearly defined permit process specific to graywater

Under current City regulations, no permit process exists specific to graywater or any auxiliary water system. A citizen or the installer must obtain a plumbing permit to modify plumbing on the property and install the required reduced pressure zone device (RPZ). As a stop-gap measure, staff have developed the informal review process described in item # 1. As this process is evolving and crosses departments, there is a lack of clear information for applicants who enter the OSS and ask specifically about graywater. This results in applicant frustration, the potential for confusion or misinformation, and the potential that an owner may circumvent City processes.

Recommendation #11: Establish permit process for auxiliary water systems that is additional to any plumbing or building permits required, and which ensures moderate fees for residential graywater applications. Ensure that additional information is submitted with a permit application in the form of an auxiliary water addendum and reviewed by OSS staff prior to permit issuance. Applicants indicating that they meet one or more of the critical conditions as identified by City staff (distance from critical environmental features, intent to connect to a potable water supply, etc.) would receive plan review by affected departments prior to permit issuance.

12. Lack of technical plan review prior to permit issuance

Residential building and plumbing permits do not currently have a process for technical review of plans prior to installation. While an interim process to offer a review has been developed by PDR and SSD, the lack of a formal review can mean that an applicant installs a system that does not meet City requirements. Modifying the system to pass inspection can add significant costs to a project, and increases the staff time spent on multiple visits and corrective action.

Recommendation #12: Offer courtesy plan review upon request; require plan review when a submitted auxiliary water addendum indicates a critical condition as defined by City staff, and/or for Homeowner/Homestead permits.

13. Limited access to technical guides and codes

Specifications and design guidelines for graywater systems are outlined across several different codes, including Texas Administrative Code, the Utility Criteria Manual, local amendments to the plumbing code, and the 2009 Uniform Plumbing Code (UPC). While the first three items are available online, the UPC is available only by purchase through the publisher, and (in limited quantities) for checkout or review at public libraries. There is currently no document or guidance listing all sections of these codes which may be applicable or useful to those designing graywater systems.

Recommendation #13: Coordinate all information about design requirements, links to relevant codes and definitions of terms relating to residential graywater through Austin Water's Conservation Division. Other departments should link to, rather than copy or reprint, information from Water Conservation to ensure one single, up-to-date message to the public. The City's practice and requirement is to provide a current copy of the adopted Austin Plumbing Code at the City Clerk's Office. Provide citizens a general summary about City requirements for graywater systems, which should include information on any requirements for professional design, leachfields, backflow and cross-connection prevention, and specific Code and regulatory references for plumbers or other design professionals.

Graywater Permit Process

The adopted 2009 Uniform Plumbing Code (UPC) Chapter 16, Part 1, Section 1603.0 requires a permit for all residential graywater systems installed in one-and-two family dwellings regulated by the currently adopted 2006 International Residential Code. This requirement is currently satisfied with the issuance of a plumbing permit; however, the lack of a separate auxiliary water plumbing permit has led to confusion by city staff and citizens regarding the need for a permit during the installation of certain auxiliary water systems, including graywater.

A plan review process and a plumbing permitting process currently exist and are enforced for all auxiliary water systems that are regulated under the 2009 International Building Code. This includes all structures other than a one-and-two family dwelling.

The installation of auxiliary water systems in a one-and-two family dwelling is voluntary under the 2009 Uniform Plumbing Code. There is currently no anticipated change of this requirement under the adoption of the 2012 Uniform Plumbing Code.

Staff has been working on development of an auxiliary water plumbing permit process for several months, and expects to complete modifications to the AMANDA system that would enable implementation by the end of calendar year 2012.

The intent of the proposed auxiliary water plumbing permit is to ensure that citizens are aware of regulations on the front-end of the process and to make clear to citizens that certain auxiliary water systems, including residential graywater systems, do require a permit. The proposed permit would further allow a single point of contact for the applicant and coordinate the interests of multiple City departments charged with

protection of areas that may be affected by auxiliary water systems, including the public water system, critical environmental features, and public health and safety.

Staff from Austin Water, Planning and Development Review, and Watershed Protection have been involved with the development of the proposed permit, which follows the traditional permitting process. An applicant would apply for an auxiliary water plumbing permit at the One Stop Shop, and provide additional information in the form of an "auxiliary water addendum." Staff would then review the information in the application to determine if a permit is necessary, and whether the auxiliary water plumbing permit may be issued immediately or require further review. Further review will likely be required when the application:

- Does not include plans stamped by a licensed professional engineer or is not designed and installed by a state of Texas Master Plumber, whose license has been registered with the City of Austin.
- Exceeds specified capacities (likely 250 gallons per day);
- Indicates a location in proximity to a critical environmental feature (such as in the Barton Springs/Edwards Aquifer zone);
- Indicates an intent to connect to the potable water system; or
- Includes non-standard design elements.

While no residential plan review processes exist for other permits, a review could help citizens avoid costly reworking of systems that are found to be non-compliant during the inspection process including a final plumbing inspection. The "critical conditions" identified will trigger review by the specific department charged with oversight of that area. The presence of multiple conditions may trigger reviews by multiple departments before the application is returned to the applicant as approved or denied. In cases of permit denial, the applicant will be provided the reason for denial along with a contact in the affected department for further information. All information during the review process will be coordinated by One Stop Shop through the AMANDA system.