COUNTY OF LOS ANGELES
Public Health

LOS ANGELES COUNTY
DEPARTMENT OF PUBLIC HEALTH

Guidelines for Harvesting Rainwater, Stormwater, & Urban Runoff for Outdoor Non-Potable Uses
September 2011

Tier I — **On-site collection of rainwater in rain barrels for on-site use in gravity flow systems.**

Requirements	Use	Minimum Water Quality Standard	Treatment Process
• Rain barrels must have a screened inflow opening, a spigot and/or hose bib, and an overflow pipe or equivalent. • Rain barrels shall be labeled to indicate non-potable water use only. • The system may not be connected to indoor/outdoor municipal potable plumbing, and shall not be pressurized or sprayed. • The system must be installed in accordance with the rain barrel manufacturer's installation instructions, and installation requirements of local agencies.	Landscape irrigation	Not applicable	Not applicable
	Car washing	Not applicable	Not applicable

Tier II	On-site collection of rainwater in cisterns for on-site use.		
Requirements	**Use**	**Minimum Water Quality Standard**	**Treatment Process**
• Tier II systems must exclude rainwater collected from locations zoned for agricultural, manufacturing, or industrial use. • Tier II systems must: be installed in accordance with the manufacturer's instructions and local agency requirements; be equipped with an overflow device or rain diverter; be screened or otherwise equipped to prevent vector intrusion.[1] • Tier II systems require prior review by Los Angeles County Department of Public Health Cross Connections Program (DPH) or the appropriate local agency. This review is necessary in order to reduce risk of cross connection with potable water supplies. Spray irrigation of Tier II water is allowed only when there is negligible human exposure, such as between the hours of sunset and sunrise[2]	Drip or sub-surface irrigation	Not applicable	Pre-screening
	Spray irrigation Non-interactive outdoor water feature	Total coliforms < 10,000 Most Probable Number/100 milliliters (MPN/100 mL) Fecal coliforms < 400 MPN /100 mL Enterococcus < 104 MPN /100 mL	Pre-screening Disinfection – chlorination or equivalent treatment required for systems other than private residential systems. All Tier II systems will be inspected and approved by DPH.

Tier III	On-site or off-site collection of rainwater, stormwater and urban runoff in cisterns for on-site or off-site use. (Excludes water collected from locations zoned for high use transportation corridors, industrial, agricultural or manufacturing uses)		
Requirements	**Use**	**Minimum Water Quality Standard**	**Treatment Process**
• Tier III systems must be installed in accordance with the manufacturer's instructions and local agency requirements, and be equipped with an overflow device, vector control measures, and screened openings. • Tier III systems require prior project plan review by DPH and by the local building & safety department. • Spray irrigation of Tier III water is allowed only when there is negligible human exposure, such as between the hours of sunset and sunrise.[2, 5] A typical Tier III system for off-site collection may also require one or more of the following: [4] 1. Storm drain diversion 2. Pre-treatment screening/sedimentation device 3. Pump station (where applicable) 4. Underground retention facility and disinfection facility (where applicable) 5. Recirculation system	Drip or sub-surface irrigation	Not applicable	Pre-screening
	Spray irrigation Non-interactive outdoor water feature Street sweeping Dust control	Total coliforms < 10,000 MPN/100 mL Fecal coliforms < 400 MPN /100 mL Enterococcus < 104 MPN /100 mL Tier III water shall meet all bacterial limits at the point of use when distributed offsite.	Disinfection – chlorination, or equivalent For street sweeping, retention/sedimentation

6. Connection to distribution system 7. A supplemental water supply from a domestic source via an approved dedicated backflow prevention device Additional requirements may apply. Check with local regulatory agencies for further information.			

Tier IV	**On-site or off-site collection of rainwater, stormwater and urban runoff in cisterns for on-site or off-site use. (Includes water collected from locations zoned for high use transportation corridors, industrial, agricultural or manufacturing use)[3]**		
Requirements	**Use**	**Minimum Water Quality Standards**	**Treatment Process**
• Tier IV systems require prior review by DPH and by the local building & safety department. • Tier IV systems shall have a stormwater monitoring plan which includes sampling and analysis for a minimum of three storm events per year. Analyses shall be performed for metals, VOCs and semi-VOCs. The operator shall prepare and maintain on the premises, an annual summary of stormwater analyses. After nine storm events are sampled and analyzed, DPH will assess the sampling results and will notify the operator if continued sampling is required. • Tier IV systems must: be installed in accordance with the manufacturer's instructions and local agency requirements; be equipped with an overflow device; be equipped with screened openings for vector control. • When Tier IV treated water is present in the system, it shall be tested by the operator on a quarterly basis to determine compliance with the	On site drip or sub-surface irrigation	Not applicable	Pre-screening
	Spray irrigation Non-interactive outdoor water feature Street sweeping Dust control	Total coliforms < 10,000 MPN/100 mL Fecal coliforms < 400 MPN /100 mL Enterococcus < 104 MPN /100 mL All bacterial limits must be met at the point of use. Must also meet California Maximum Contaminant Levels, and the California Toxics Rule Standards	Pre-screening Disinfection – chlorination or equivalent For street sweeping, retention and sedimentation

referenced water quality standards. If the standards are exceeded, the operator shall cease further distribution of Tier IV treated water until such time that the water meets the quality standards, and shall promptly notify the local enforcement agency. • Spray irrigation of Tier IV water is allowed only when there is negligible human exposure, such as between the hours of sunset and sunrise.[2] A typical Tier IV system for off-site collection may also require any of the following: 1. Storm drain diversion 2. Pre-treatment screening/sedimentation device 3. Pump station (where applicable) 4. Underground retention facility, disinfection facility (where applicable) 5. Recirculation system 6. Connection to distribution system 7. A supplemental water supply from a domestic source via an approved dedicated backflow prevention device Additional requirements may apply. Check with local regulatory agencies for further information.			

FOOTNOTES

[1] Due to an absence of a national standard, a plan review by DPH or the local building & safety department is also necessary.

[2] Spray irrigation during daylight hours can be done if a dedicated supply of potable water is used, and the potable water is protected by an approved backflow device.

[3] The Tier IV water qualities will be reviewed case by case by Los Angeles County Department of Public Heath, Los Angeles Regional Water Quality Control Board, and other local agencies as applicable.

[4] If quarterly testing indicates compliance with state water Maximum Contaminant Levels (MCLs), then treated rainwater, stormwater and/or urban runoff can be used for spray irrigation, outdoor non-interactive water features, and street sweeping. If the testing indicates non-compliance with state water MCLs, but compliance with the California Toxics Rule standards for human health, the water can be used for spray irrigation only during the period sunset to sunrise and/or when there is negligible potential for human exposure. A dedicated supply of potable water protected with an approved backflow device is allowed to be connected to the cistern irrigation system to supplement spray irrigation during daylight hours.

[5] Studies of Tier III waters are not currently a requirement of this matrix, but proposed studies by the City of Los Angeles or other entities will be reviewed by DPH for consideration in future matrix revisions. DPH will review the results of studies of Tier III water to determine if modifications to the matrix are necessary.

Basis for development of the guidelines

Rainwater, stormwater, and urban runoff water harvesting systems are currently undefined within the existing regulations. These guidelines were developed in response to requests from the public on how to collect and safely use rainwater, stormwater, and urban runoff water. The Los Angeles County Department of Public Health, Environmental Health Division (EHD), categorizes non-potable rain barrel and cistern water, i.e., rainwater, stormwater, and urban runoff water, as alternative non-potable water sources, and provides these guidelines to enhance the available water resources of the County of Los Angeles and the surrounding region.

Prior to final approval of Tier II, III, and IV systems, EHD shall conduct project reviews to evaluate possible cross-connection hazards between the domestic potable water supply and any alternative non-potable water systems, i.e., rainwater harvesting systems (California Health & Safety Code sec. 116800). These projects will be reviewed in conjunction with local building & safety

departments or public works departments as they are the administrative authority as referenced in the California Plumbing Code (2007) for construction, and as such EHD recognizes their authority in the approval of these types of projects.

An annual review of this document shall be conducted by EHD until such time when the federal Environmental Protection Agency, or a state regulatory agency or local governing body, develops regulations pertaining to rainwater/stormwater runoff harvesting systems which supersedes these local requirements. Participation in research studies pertaining to rainwater and stormwater harvesting and use shall be a condition of approval of projects by EHD under these guidelines. The findings of those studies shall be used to modify and improve future revisions of these guidelines.

Definitions

Alternative non-potable water supply: a non-potable source of water which includes graywater, rainwater, stormwater, urban runoff (dry weather runoff), on-site treated water (non-potable), and recycled/reclaimed water.

Cistern: a rainwater/stormwater catchment and storage container used to store water for non-potable uses. Cisterns typically exceed 55 gallons in volume and are used in conjunction with pressurized delivery systems.

Graywater: wastewater generated from domestic activities such as laundry, bathing and sinks, but does not include water from toilets or kitchen sinks. Graywater can be used for on-site sub-surface landscape irrigation. A sewer connection or leach field associated with a septic tank is required for graywater overflow.

Harvested Rainwater: rainwater that is captured from the roofs of buildings and other impervious surfaces, which does not leave the land parcel where it was collected.

Non-potable cistern catchment system: a system using cisterns to collect harvested rainwater/stormwater from a rain event, or from urban runoff. Cisterns in Los Angeles County may serve as a secondary source of non-potable water for applications that do not require potable water, such as landscape irrigation, which can dramatically lower potable water demand and reduce offsite rainfall runoff.

Non-potable water: water which is not fit for consumption by humans.

Potable water: water which is fit for consumption by humans. The United States Environmental Protection Agency (EPA) identifies biological and chemical contaminants in drinking water that occur at levels that may adversely affect public health. The EPA establishes Maximum Contaminant Levels (MCLs) permissible in drinking water, which become enforceable standards.

Rain barrel: a container that collects rainwater that falls directly into the container or that is collected by an above ground collection system that prevents the collected water from contacting the ground. Rain barrels are connected to gravity flow systems only, and typically each rain barrel contains 55 gallons of water or less, but multiple rain barrels may be connected to increase water collection volume.

Rainwater: precipitation that falls on a distinct land parcel and that has not left that parcel.

Stormwater: rainwater that has left a distinct parcel and enters a municipal storm water system or conveyances owned by a State, city, or other public entity that collects rainwater that discharges to waters of the U.S. This does not include water from a combined sewer or from a Publicly Owned Treatment Works (POTW).

Urban runoff water: non-potable water from a wet or dry weather runoff catchment system, harvested from a municipal storm water system or from conveyances owned by a State, city, or other public entity that collects stormwater that discharges to waters of the U.S. This does not include water from a combined sewer or from a Publicly Owned Treatment Works (POTW).

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References:

1. Chau, Haan-Fawn, "Green Infrastructure for Los Angeles: Addressing Urban Runoff and Water Supply Through Low Impact Development", University of California School of Public Affairs, April 17, 2009.
2. Bellomo, Angelo J., "Rainwater Harvesting Policy 515.07", Los Angeles County Department of Public Health, January 25, 2010.
3. "Rainwater Catchment Design and Installation Standards", American Rainwater Catchment Systems Association, 2010.
4. "Green Plumbing & Mechanical Code Supplement", International Association of Plumbing and Mechanical Officials, 2010 rev.
5. "Rainwater Collection Systems (Cisterns)", Ventura County Resource Management Agency, 2006.

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