## RAIN GARDEN INSTALLATION BASICS



Jessica Farmer Seattle Public Utilities RainWise Program Manager



# CISTERN INSTALLATION BASICS

## **1.** What is a Cistern?

## **2.** Cistern specifications for RainWise

- a. Site Requirements
- **b.** Calculating roof area
- C. Installation Requirements
- d. RainWise Calculator
- **3.** Design Considerations
- **4.** Cistern Purchase Options



## CONTRACTOR RESOURCES



https://www.700milliongallons.org/rainwise/contractor-resources/

# WHAT IS A CISTERN?



- Used for the capture and detention of stormwater runoff from roofs
- Used to achieve reductions in peak flows and flow durations during storms
- Can hold water to irrigate landscape as an added benefit





# CISTERN SYSTEM PARTS

### Foundation

• Flat and level surface for cistern installation

## **Collection System**

• Gutters, downspouts, piping and any other conveyance needed to route runoff from the roof to the cistern.

## Cistern inlet access hatch with screen/debris excluder

• A filter screen or other debris barrier to prevent insects, leaves and other large debris from entering the system

## **Overflow outlet**

• Outlet pipe located near the top of the cistern to allow the system to overflow to a side sewer or vegetated area in the event of a large storm event

## Flow control outlet and low-flow valve

- Outlet pipe located near the bottom of the cistern. This outlet **must** be open during the rainy season. It allows the cistern to *slowly* drain to the sewer, right of way, or a rain garden. This control valve can be closed in late spring to provide irrigation water for summer.
- Note that this must be installed with at least 4" of area beneath, for sediment to accumulate



# SITE REQUIREMENTS

# See RainWise design specifications

You will need:

- ✓ A level location near a downspout, outside (not inside a building)
- ✓ To allow enough space for ingress and egress (minimum 3 feet from property line or structure to ensure access to backyard)
- ✓ Compliance with Seattle Department of Construction and Inspection (SDCI) Land Use Code SMC.23.44.014.C.17 requirement regarding the placement of cisterns on private property
- ✓ A solid base (packed gravel, concrete, Versagrid or other approved). Base dimensions will vary by cistern.
- A safe place to discharge the overflow (after cistern fills)



# SITE REQUIREMENTS

## See RainWise design specifications



#### **RAINWISE SITE REQUIREMENTS - CISTERNS**

RAINWISE CISTERN SITE REQUIREMENTS:

- SUBJECT PARCEL MUST BE IN A QUALIFYING CSO BASIN. 1
- A MINIMUM OF 400 SQUARE FEET OF ROOF DRAINAGE AREA MUST BE COLLECTED AND CONVEYED TO RAIN GARDEN AND/OR CISTERN TO QUALIFY FOR REBATE, A MINIMUM OF 300 SQUARE FEET OF ROOF AREA MUST BE COLLECTED AND CONVEYED TO A CISTERN.
- NO MORE THAN 1,000 SQUARE FEET OF CONTRIBUTING IMPERVIOUS. SURFACE MAY OVERELOW TO CITY SIDEWALK AT A SINGLE LOCATION. SYSTEMS IN EXCESS OF 1,000 SQUARE FEET SHALL HAVE TWO OR MORE OVERFLOWS (AS NECESSARY), EACH SEPARATED BY A DISTANCE OF 10 FEET OR MORE
- QUALIFYING CISTERNS MUST BE A MINIMUM OF 200 GALLONS AND A MINIMUM HEAD OF 2.0 FEET CISTERN LOW FLOW ORIFICE SIZE IS PROJECT SPECIFIC AND MUST MATCH REQUIRED SIZE REPORTED IN THE RAINWISE REBATE CALCULATOR.

# CALCULATING ROOF AREA



## **INSTALLATION REQUIREMENTS**



## **CISTERN SECTION**



#### STANDARD RAINWISE DETAILS 09/07/2022

SHEET



#### GENERAL NOTES:

- 1. CISTERNS SHALL MEET ALL REQUIREMENTS ON REFERENCE SHEET B AND SHALL BE INSTALLED PER MANUFACTURER RECOMMENDATIONS.
- 2. ALL CISTERN ENTRANCE LOCATIONS SHALL BE SECURED AS TO BE CHILDPROOF AND TAMPER RESISTANT. A SCREW-ON CISTERN LID MEETS THIS REQUIREMENT.
- CISTERNS WITH HEIGHT GREATER THAN THE NARROWEST DIMENSION (LENGTH, WIDTH, DIAMETER) SHALL BE RESTRAINED, AT INSPECTOR'S DISCRETION, TO PREVENT OVERTURNING.
- 4. SYSTEM MUST BE DESIGNED TO PROVIDE ACCESS TO CISTERN AND CISTERN FITTINGS FOR CLEANING AND REMOVAL OF SEDIMENT AND ALGAE. ACCESS SHALL BE THROUGH REMOVABLE LID OR 6 INCH (MINIMUM) INSPECTION PORT. CLEANOUT SHALL BE PROVIDED AT BOTTOM OF TANK (VIA BOTTOM BULKHEAD FITTING).
- 5. CISTERNS OVER 6.5 FEET TALL OR WITH STORAGE CAPACITY GREATER THAN 1,100 GALLONS REQUIRE CONSULTATION AND PRE-INSPECTION WITH RAINWISE INSPECTOR.
- ALL CISTERN PIPING MATERIALS SHALL BE RIGID. 12 LINEAR INCHES OF 2 INCH (MAXIMUM) DIAMETER FLEXIBLE PIPE MAY BE USED TO CONNECT TERMINUS OF FLOW CONTROL OUTLET TO OVERFLOW PIPING.
- OVERFLOW AND LOW FLOW PIPE CONFIGURATIONS (FITTINGS AND PIPE LENGTH) MAY VARY BY CISTERN, SEE SHEET 12. PIPE SUPPORT TO BE PROVIDED PER REFERENCE SHEET B.
- 8. PLASTIC CISTERNS MUST BE UV STABILIZED. ALL CISTERNS MUST BE NON-COLLAPSIBLE, WATERTIGHT, AND OF DURABLE MATERIAL TO PROVIDE A LONG SERVICE LIFE.
- 9. TO PREVENT FREEZING DAMAGE, ALL EXPOSED PIPE MUST BE FREE DRAINING.
- 10. PROVIDE WATER TIGHT FITTINGS AT ALL CISTERN CONNECTIONS.
- 11. LOCATE CISTERNS TO AVOID OBSTRUCTION OF UTILITIES, WINDOWS, OR OTHER SITE FEATURES THAT REQUIRE ACCESS.
- 12. SEE REFERENCE SHEET D FOR CISTERN SETBACK REQUIREMENTS.
- 13. SEE SHEET 13 FOR DESIGN REQUIREMENTS FOR CISTERNS IN SERIES.
- 14. INSTALL A REMOVABLE CAP ON ALL BELOW GROUND DOWNSPOUTS CUT FOR PROJECT INSTALLATION. SEE SHEET 3 FOR AN EXAMPLE.

# MAKE THE CONNECTION









#### NOTES:

 PROVIDE DEBRIS EXCLUDER WITH 1/16 INCH MAXIMUM MESH SCREEN SIZE AT CISTERN INLET. PROVIDE 3-INCH VERTICAL GAP BETWEEN DOWNSPOUT AND CISTERN INLET. DEBRIS EXCLUDER SHALL BE MAINTAINABLE AND LOCATED TO PROVIDE MAINTENANCE ACCESS. DEBRIS EXCLUDER AT CISTERN INLET MAY BE SUPPLEMENTED WITH A DOWNSPOUT FILTER OR DIVERTER TO REDUCE MAINTENANCE NEED.

# PIPE MATERIAL & SUPPORT

- Pipes in contact with the ground shall be schedule 40 PVC or approved equal
- Pipes not in contact with the ground shall be PVC schedule 40, SDR 35, or ABS
- All pipe and fitting joints shall be watertight and glued, bonded, or mechanically secured.
- Pipes shall be <u>supported</u> every 4 ft Horizontal, at changes in direction, and every 8 ft vertical



# **CISTERN OUTLETS**



# OVERFLOW OUTLET

- Allows stormwater exceeding the cistern capacity to overflow to an approved point of discharge by gravity flow.
- Must include a removable bulkhead fitting
- Pipe must be 3-4" in diameter
- Pipe must have 4-5" of clearance
- Connection may require a side sewer permit
- On the specs, see Sheet 10

### NOTES:

- CONNECTIONS TO SIDE SEWER MAY REQUIRE A SEPARATE SIDE SEWER PERMIT AND INSPECTION, SEE SHEET 14.
- 2. MINIMUM PIPE DIAMETER AND ASSOCIATED FITTING SIZE VARIES BASED ON CONTRIBUTING AREA AS FOLLOWS:
  - UP TO 2,000 SQUARE FEET: 3 INCH DIAMETER
  - 2,000 TO 5,000 SQUARE FEET: 4 INCH DIAMETER
- 3. CLEARANCE AT TOP OF OVERFLOW VARIES BASED ON OVERFLOW PIPE DIAMETER AS FOLLOWS:
  - 3 INCH PIPE DIAMETER: PROVIDE 4 INCHES CLEARANCE
  - 4 INCH PIPE DIAMETER: PROVIDE 5 INCHES CLEARANCE

# See RainWise design specifications



# **OVERFLOW OUTLET**



# FLOW CONTROL OUTLET

- Allows the cistern to discharge to a rain garden, right of way or back into the side sewer.
- Minimum diameter shall be 1", and shall match manufacturer's bulkhead fitting diameter
- Must provide a minimum 4" sump
- Includes the "low-flow kit"
- Additionally, if your overflow pipe is connecting back into a side sewer, a separate side sewer permit may be required.
- On the specs, see Sheet 12 & 15



# FLOW CONTROL OUTLET – LOW FLOW KIT





## FLOW CONTROL OUTLET -CLEANOUT





# SIDE SEWER CONNECTIONS



•A side sewer permit may be required when RainWise contractors are working on a side sewer.

•The RainWise Program puts the sole responsibility on the RainWise contractor to abide and comply with all Side Sewer permit processes and requirements.

•For more information on the Seattle Department of Construction & Inspections (SDCI) Side Sewer Permit, including how to apply, visit:

https://www.seattle.gov/sdci/permits/permit s-we-issue-(a-z)/side-sewer-permit

# **CISTERN FOUNDATIONS**



# CISTERN FOUNDATIONS

## There are 4 primary options for cistern foundations

- Timber frames
- Plastic gravel pavers
- Soil frames
- Cement foundation



# **CISTERN FOUNDATIONS**



# **CISTERN RESTRAINTS**



 CISTERNS WITH HEIGHT GREATER THAN THE NARROWEST DIMENSION (LENGTH, WIDTH, DIAMETER) SHALL BE RESTRAINED, AT INSPECTOR'S DISCRETION, TO PREVENT OVERTURNING.

# RAINWISE CALCULATOR



### **Before the Project Starts**

Before construction begins on a RainWise project, contractors are responsible for the completion of these forms.

- <u>RainWise Customer Understanding Form</u>
- <u>RainWise Infiltration Test Form</u>
- Sample Site Plan
- <u>RainWise Rebate Calculator</u> (Updated September 2022)

## https://www.700milliongallons.org/rainwise/contractor-resources/



# **DESIGN CONSIDERATIONS**



### Pumps

- Many cistern customers are interested in pumps to make summer watering easier.
  - Many options are available (including solarpowered ones).
- Pumps are not covered by the RainWise rebate, but Contractor can help with pump installation separate from rebate.

## **Aesthetic Options**

• art, landscaping, or fencing



# **CISTERN PURCHASE OPTIONS**



#### Seattle Vendors for Cistern & Rain Garden Plumbing Supplies

There are variances depending on price, selection, and buying in bulk versus single purchases, and convenience of location. Contractors should call to see which is the best deal depending on their needs. If you are aware of a plumbing vendor we have missed, please contact <u>rainwise@seattle.gov</u>.

Ferguson Plumbing Supply 206-767-7700 4100 W Marginal Way SW, Seattle, WA 98106

McClendon Hardware 206-762-4090 10210 16th Ave SW, Seattle, WA 98146

Keller Supply Co 206-340-0800 737 S Stacy St, Seattle, WA 98134

H D Fowler Company 253-863-8600 1417 Thornton Ave SW, Pacific, WA 98047

Pacific Plumbing Supply Company LLC North: 206-364-2300 10721 Midvale Ave N, Seattle WA 98133 South: 206-762-5920 7115 W Marginal Way SW, Seattle, WA 98106

Seattle Conservation Corps

Seattle Parks and Recreation has a variety of products for sole to RoinWise contractors through the Seattle Conservation Corps, including cisterns and low-flow kits. https://www.seattle.exv/Documents/Departments/ /ParksAndBecceation/Business/RainTanks.odf 206-884-0190 7727 63rd Awe, NE, Suite 201. Morgan's Kitchen, Bath, Electric & Plumbing 206-789-3205 8055 15th Ave NW, Seattle, WA 98117

Stoneway Hardware Wallingford (PERMANENTLY CLOSED) Ballard: 206-724-0571 4910 15th Ave NW, Seattle, WA 98107

Grainger Industrial Supply 800-471-4643 4100 W Marginal Way SW, Seattle, WA 98106

#### Home Depot (Various Locations) Typically carry 3" and 4" PVC and ABS schedule 40 parts and pipes Bellevus: 425-451-7551 Downtown Seattle: 206-467-9200 North Seattle: 206-361-9600 West Seattle: 206-782-2126 Shoreline: 206-546-1900 Tukwila: 206-575-9200

Lowse (Various Locations) Typically carry 37 and 47 PVC and ABS schedule 40 ports and pipes, plus some carry a lighter weight foam core 3° schedule 40 pipe. South Seattle: 206-766-0382 Vurniwood: 425-744-8411 Renton: 425-73-5320 Tukwaliz: 206-243-5470 Kent: 206-543-5470

For more information, please visit: 700milliongallons.org/rainwise/contractor-resources/

### **Cistern Distributors**

One of the benefits of coordinating bulk orders on cisterns with other contractors is saving on shipping fees. Price and selection between the below vendors will vary. Please contact these distributors for more information. If your name is not on the list, but you are a distributor for a Rainwater harvesting tank manufacturer and are interested in coordinating bulk orders with other contractors, please contact rainwise@seattle.gov.

#### Bushman/Norwesco

David Hymel Rain Dog Designs (253) 389-2060 (cell) RainDogDesigns.com/Wordpress

Tim Griffen Monsoon Rain Gardens A Division of Garden Seasoning, Inc. 206-782-0418 www.monsoonraingardens.com

Some of the Plumbing Supply vendors listed on Page 1 may have Bushman/Norweso tanks in stock. Contact them for pricing and availability.

Norwesco/Bushman tanks may also be shipped directly to the client's home. Shipping fees apply.

Premier Plastics Inc. Jim Bristow Bristow Enterprises 206-841-1964 jameseb63@amail.com

Premier Plastics tanks may also be available through Keller Supply and H D Fowler Company.

#### **Cypress Designs**

Seattle Conservation Corps Seattle Parks and Recreation offers a variety of products for sale to RainWise contractors through the Seattle Conservation Corps. Contact Penny for sizes and availability. 206-684-0190 <u>7727 63rd Ave. NE, Suite 201</u>

## https://www.700milliongallons.org/rainwise/contractor-resources/

# CISTERN PURCHASE OPTIONS



- Partnership with Seattle Parks & Recreation and Seattle Conservation Corps (SCC)
- Warehouse located at Magnuson Park 7727 63rd Ave NE Seattle, WA 98155
- RainWise will invoice you within 60 days; payment is due within 30 days
- **NEW in 2022:** Cypress Design cisterns manufactured in Bellingham, Washington Available exclusively for RainWise contractors
- Additional cisterns available for purchase directly through the SCC
- To learn more about the process for purchasing, see the RainWise Cistern Invoice Process at https://www.700milliongallons.org/rainwise/contractor-resources/





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## RAIN GARDEN INSTALLATION BASICS



Rex Davis Seattle Public Utilities Inspections Lead



Sabine Jessel King County Inspections Lead



Jessica Farmer Jessica.Farmer@seattle.gov 206.586.2297

Q&A