CISTERN INSTALLATION BASICS

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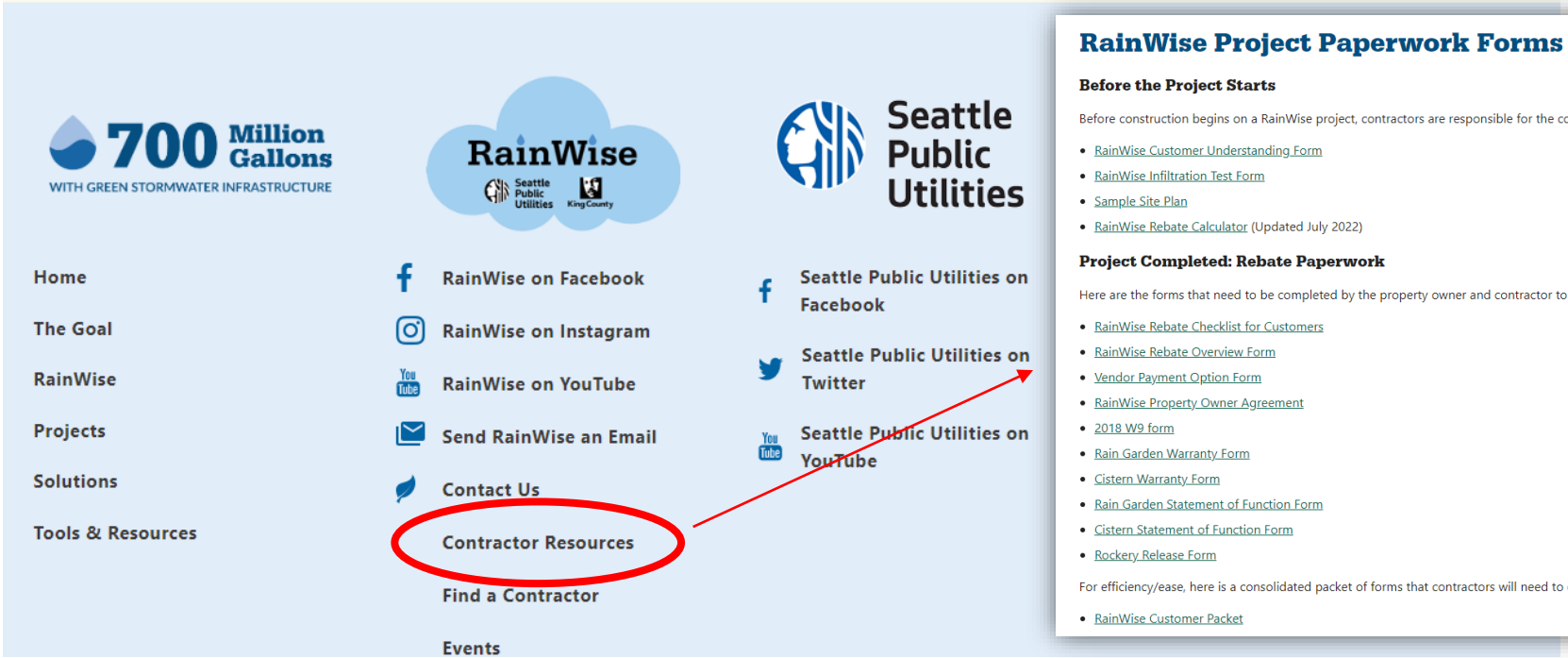
RainWise
Seattle Public Utilities
King County

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

Cypress Design

Bushman

PREMIER PLASTICS

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

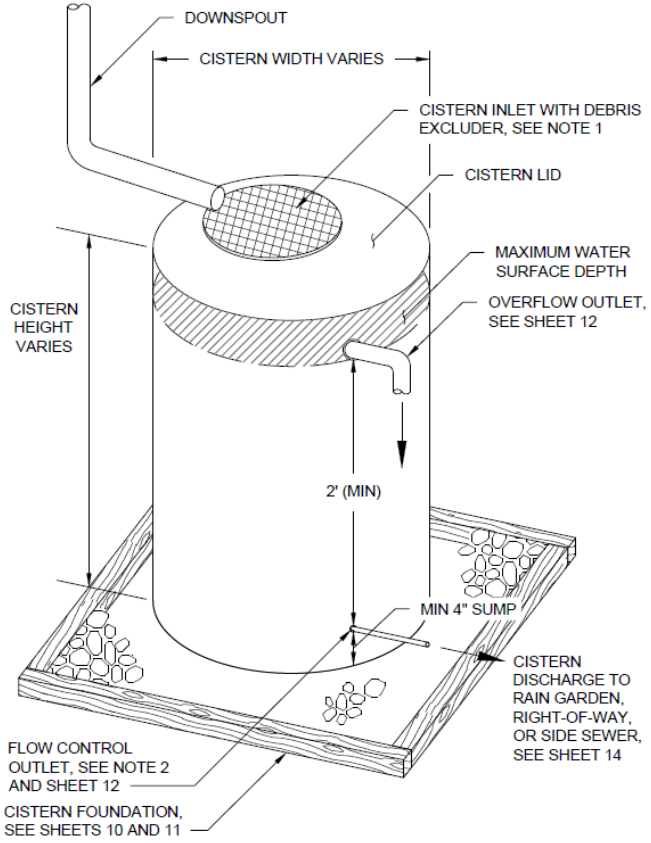
- A filter screen or other debris barrier to prevent insects, leaves and other large debris from entering the system

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

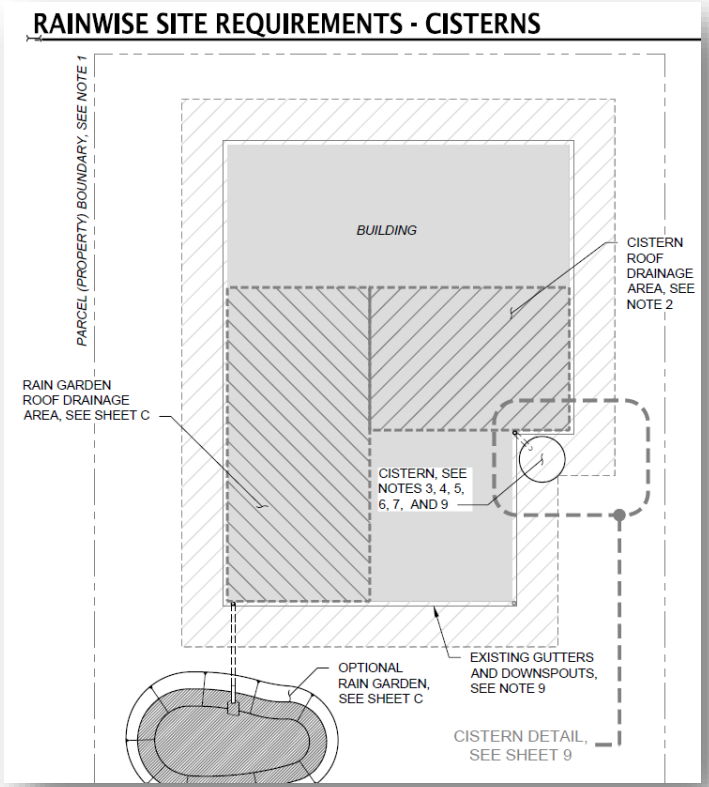
See RainWise design specifications

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

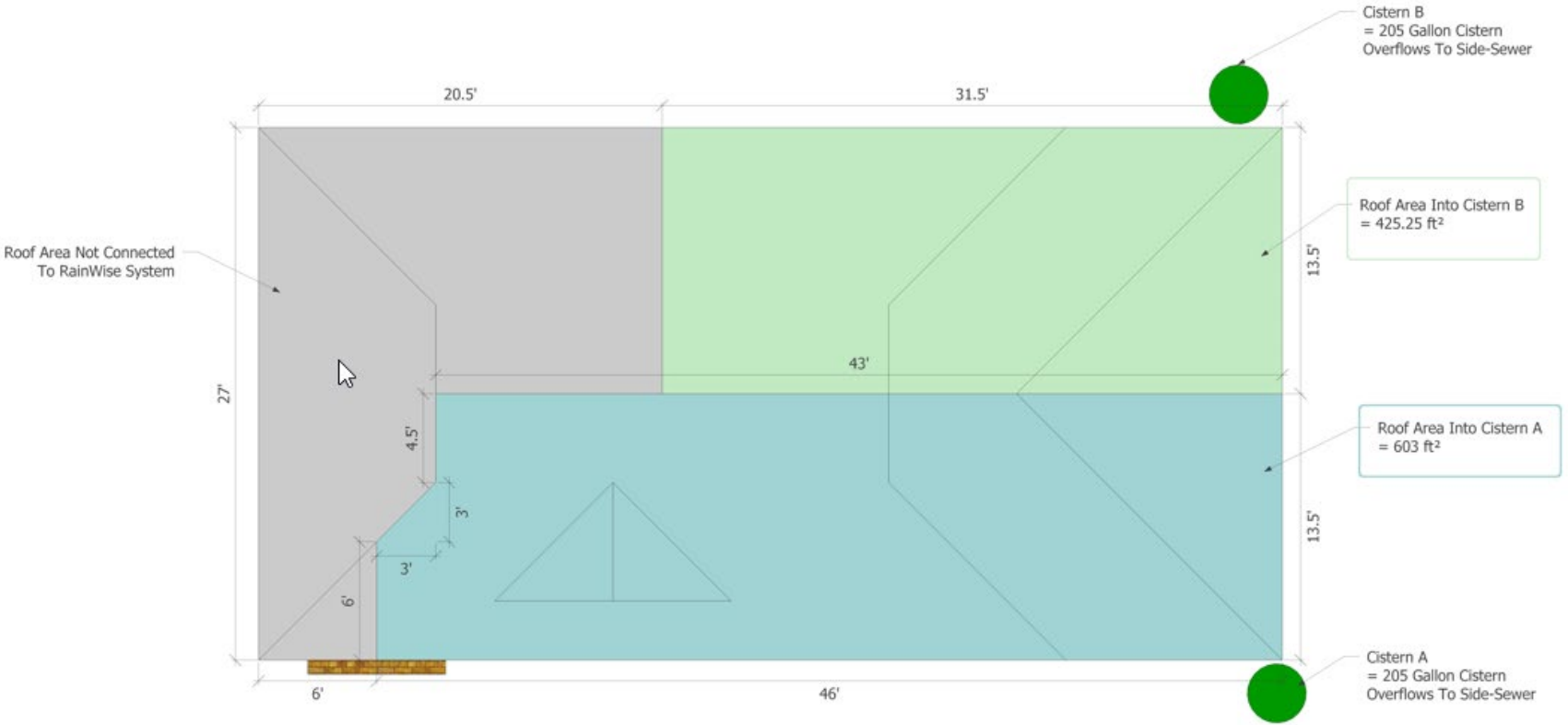
See RainWise design specifications



RAINWISE CISTERN SITE REQUIREMENTS:

1. SUBJECT PARCEL MUST BE IN A QUALIFYING CSO BASIN.
2. 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.
3. NO MORE THAN 1,000 SQUARE FEET OF CONTRIBUTING IMPERVIOUS SURFACE MAY OVERFLOW 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.
4. 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

GENERAL NOTES

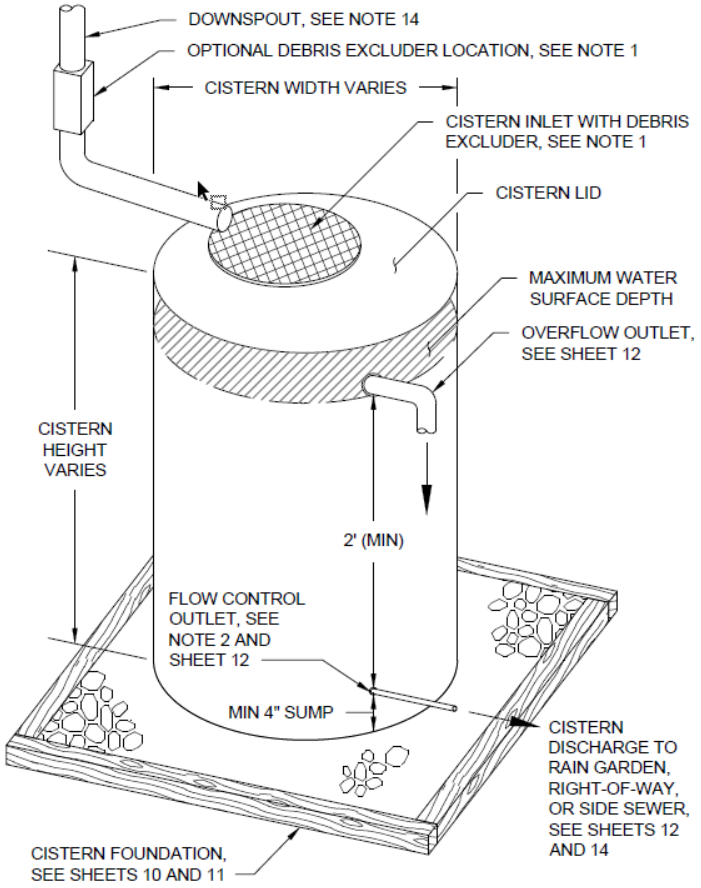
REFERENCE SHEET **B**
STANDARD RAINWISE DETAILS
09/07/2022

RainWise
Managing Storm Water at Home

RAINWISE GENERAL NOTES:

1. ALL WORK SHALL CONFORM TO THE CURRENT CITY OF SEATTLE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION; THE CITY OF SEATTLE STANDARD PLANS FOR MUNICIPAL CONSTRUCTION, CURRENT EDITION; CITY OF SEATTLE DIRECTORS RULES: 5-2009, 5-2004, 31-2017, 4-2019, 11-2020, 10-2021; AND CODES ADOPTED BY REFERENCE INCLUDING THE SEATTLE BUILDING CODE AND SEATTLE FIRE CODE.
2. A RAINWISE PROJECT MUST MITIGATE RUNOFF FROM AT LEAST 400 SQUARE FEET OF TOTAL ROOF AREA TO QUALIFY FOR A RAINWISE REBATE. A CISTERN MUST COLLECT RUNOFF FROM A MINIMUM OF 300 SQUARE FEET OF ROOF AREA; THERE IS NO MINIMUM ROOF AREA FOR A RAINGARDEN.
3. ROOF DRAINAGE AREAS GREATER THAN 2,000 SQUARE FEET **REQUIRES CONSULTATION WITH RAINWISE INSPECTOR.** ROOF DRAINAGE AREAS GREATER THAN 2,000 SQUARE FEET ARE NOT ELIGIBLE FOR A PRE-INSPECTION WAIVER.
4. ALL DISCHARGE FROM RAIN GARDENS AND/OR CISTERNS MUST BE SAFELY CONVEYED OFF SITE BELOW GROUND IN A SIDE SEWER OR ABOVE GROUND TO THE RIGHT-OF-WAY. DISCHARGE MUST HAVE A SAFE FLOW PATHWAY WITHIN THE RIGHT-OF-WAY TO THE PUBLIC DRAINAGE SYSTEM (MANMADE OR NATURAL) THAT DOES NOT HARM PRIVATE OR PUBLIC PROPERTY OR STRUCTURES.
5. IN ACCORDANCE WITH VOLUME 3, SECTION 4.3 OF COS DIRECTOR'S RULE 10-2021 (SEATTLE STORMWATER MANUAL), OVERFLOW CONVEYANCE MUST SAFELY CONVEY THE 25-YEAR STORM.
6. ALL CONVEYANCE PIPE DOWNSTREAM OF THE EXISTING DOWNSPOUT MUST MEET RAINWISE REQUIREMENTS.
7. CONNECTIONS TO A SIDE SEWER MAY REQUIRE A SEPARATE SIDE SEWER PERMIT AND INSPECTION. A SIDE SEWER PERMIT AND INSPECTION IS NEEDED IF:
   - THE SIDE SEWER CONNECTION IS NEW, OR
   - THE SIDE SEWER CONNECTION IS MADE BELOW GRADE, OR
   - THE PROJECT RESULTS IN MORE ROOF AREA CONNECTED TO THE SIDE SEWER.
8. DOWNSPOUT TO RAIN GARDEN PIPES SHALL BE A MINIMUM OF 3-INCHES IN DIAMETER. SEE SHEET 3 FOR COMPLETE SIZING REQUIREMENTS.
9. RAIN GARDEN OVERFLOW PIPES SHALL BE A MINIMUM OF 4-INCHES IN DIAMETER. SEE SHEET 7 FOR COMPLETE SIZING REQUIREMENTS.
10. CISTERN OVERFLOW PIPES SHALL BE A MINIMUM OF 3-INCHES IN DIAMETER. SEE SHEET 12 FOR COMPLETE SIZING REQUIREMENTS.
11. PIPE MATERIAL SHALL BE
    - SDR 35 PVC AND SHALL MEET ASTM D 3034,
    - SCHEDULE 40 OR SCHEDULE 80 PVC AND SHALL MEET ASTM D 1785, F 1732, OR D 2729 WITH FITTINGS PER ASTM D 2466 AND D 2467,
    - OR APPROVED EQUAL.
12. FLEXIBLE TUBING OR HOSE MAY ONLY BE USED FOR A PORTION OF CISTERN FLOW CONTROL OUTLET PIPING, SEE SHEET 15. TUBING OR HOSE SHALL BE NON-CLEAR AND UV RESISTANT.
13. DRAIN, WASTE, AND VENT (DWV) PIPING SHALL NOT BE USED. PIPE DUAL MARKED FOR DWV AND PRESSURE APPLICATIONS IS ALLOWED.
14. PER UPC 2.3.3, PIPES SHALL NOT BE EXPOSED TO DIRECT SUNLIGHT. PIPES MAY BE PAINTED BY HOMEOWNER IF THE HOMEOWNER AGREES TO PERFORM SUCH WORK. PAINT SHALL BE APPROPRIATE FOR PIPE MATERIAL TYPE.
15. PIPES NOT FULLY BURIED SHALL BE ANCHORED TO THE GROUND OR AGAINST A WALL TO RESIST MOVEMENT.
16. PER UPC 2.5.2, PIPES SHALL BE SUPPORTED EVERY 4 FEET HORIZONTALLY, AT EVERY CHANGE IN DIRECTION, AT EVERY JOINT, AND EVERY 8 FEET VERTICALLY. PIPE SUPPORTS SHALL BE SECURED TO A FIRM SUBSTRATE. PIPE SUPPORTS SHALL BE DOUBLE-ANCHORED PIPE HANGER STRAPPING, HANGERS, OR APPROVED EQUAL.
17. ALL PIPE AND FITTING JOINTS SHALL BE WATERTIGHT AND GLUED, BONDED, OR MECHANICALLY SECURED AS APPROPRIATE PER PIPE MATERIAL.
18. ANY FLOW CONTROL OUTLET MUST REMAIN OPEN DURING THE WET SEASON (SEPTEMBER TO MAY).
19. CISTERNS WITH HEIGHT GREATER THAN THE NARROWEST DIMENSION (LENGTH, WIDTH, DIAMETER) SHALL BE RESTRAINED, AT INSPECTOR'S DISCRETION, TO PREVENT OVERTURNING.

CISTERN SECTION



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.
3. 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.
6. 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.
7. 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.

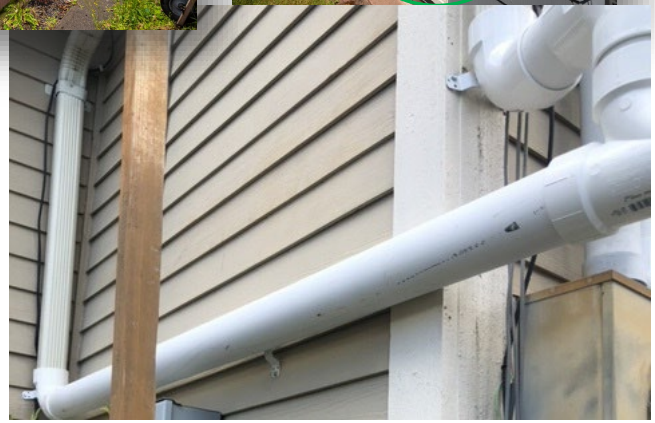
MAKE THE CONNECTION

NOTES:

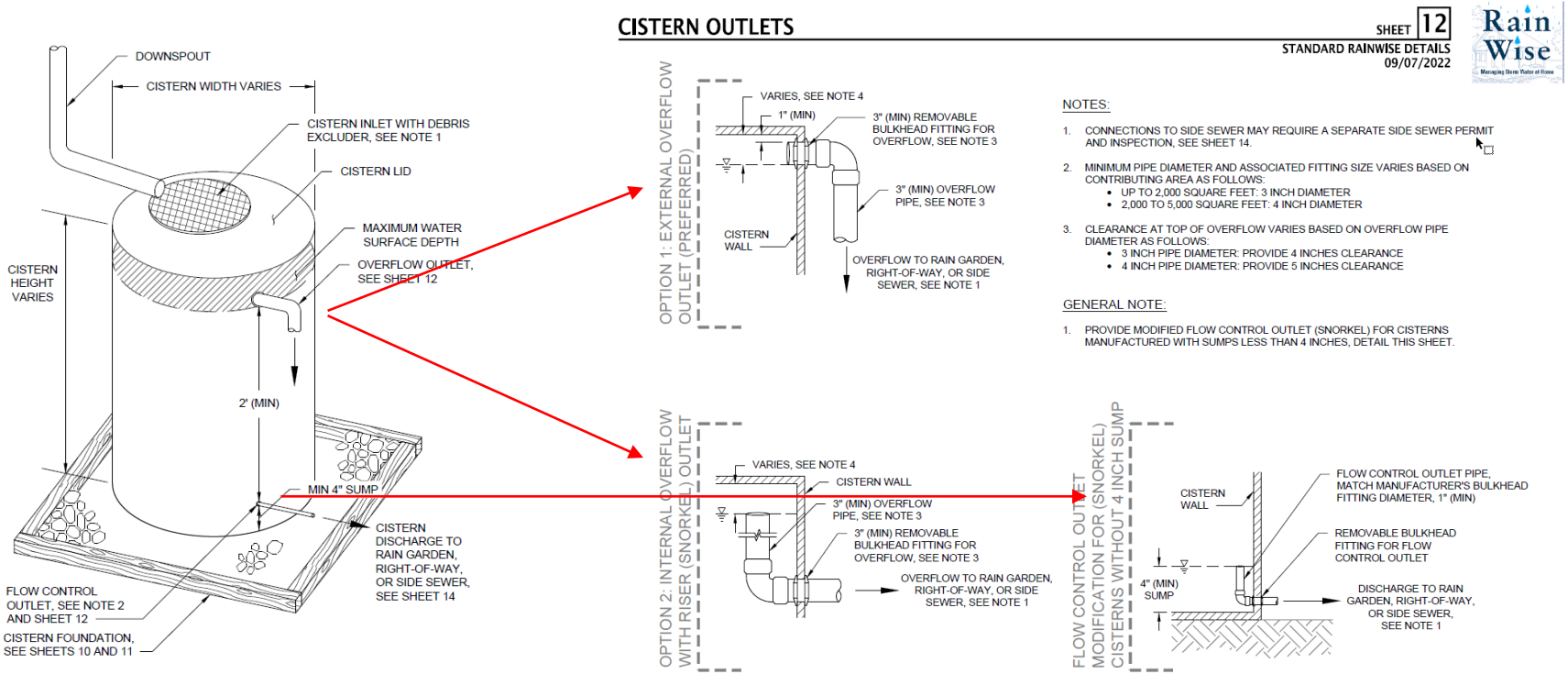
1. PROVIDE DEBRIS EXCLUDER WITH 1/16 INCH MAXIMUM MESH SCREEN SIZE AT CISTERN INLET. PROVIDE 3-INCH VERTICAL GAP BETWEEN DOWNSPOUT AND CISTERN INLET. DEBRIS EXCLUDER SHALL BE MAINTAINABLE AND LOCATED TO PROVIDE MAINTENANCE ACCESS. DEBRIS EXCLUDER AT CISTERN INLET MAY BE SUPPLEMENTED WITH A DOWNSPOUT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

See RainWise design specifications

- 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

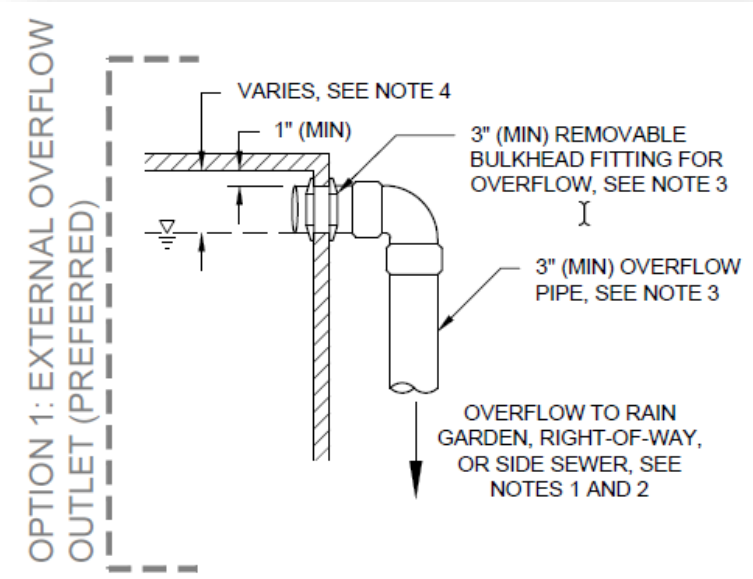
NOTES:

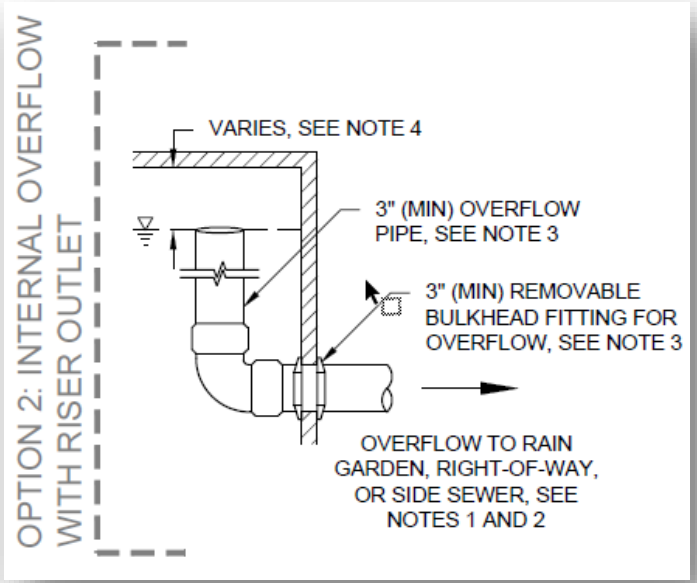
1. CONNECTIONS TO SIDE SEWER MAY REQUIRE A SEPARATE SIDE SEWER PERMIT AND INSPECTION, SEE SHEET 14.

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

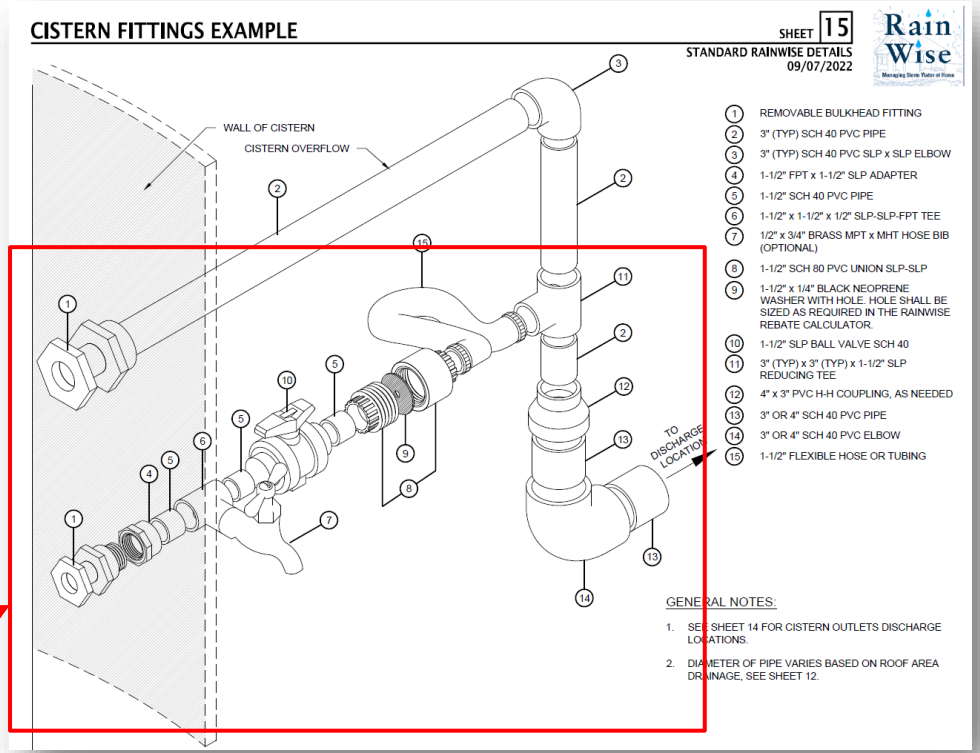
OVERFLOW OUTLET



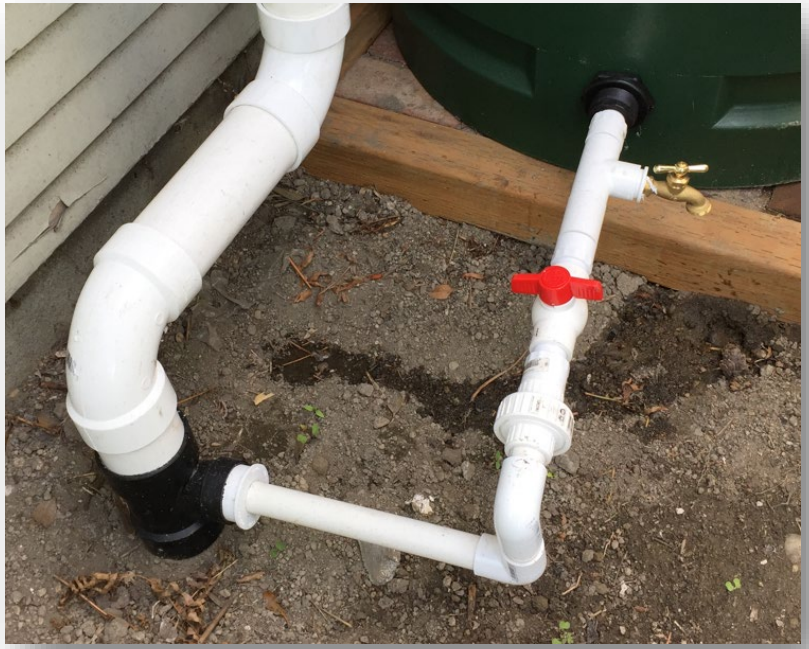


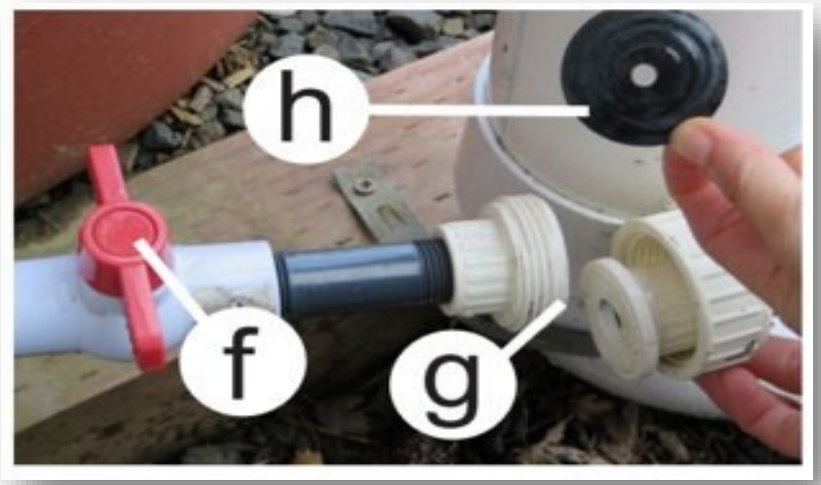
FLOW CONTROL OUTLET

- 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



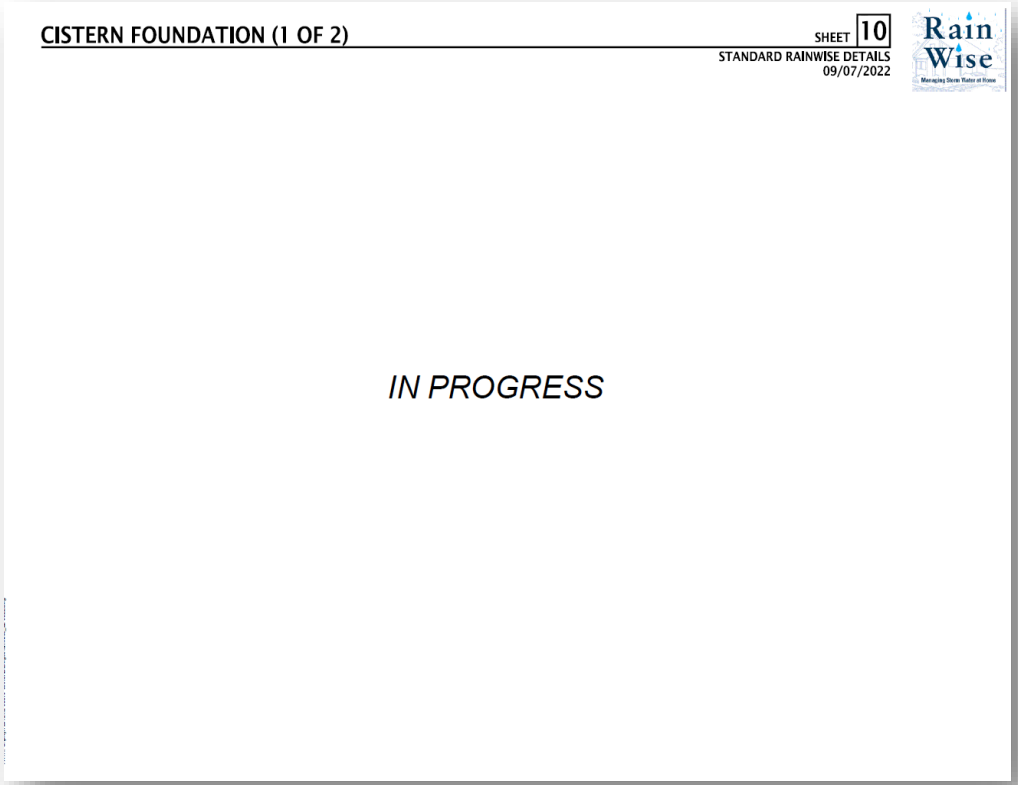


FLOW CONTROL OUTLET - CLEANOUT

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 Rain Wise 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/permits-we-issue-(a-z)/side-sewer-permit

CISTERN FOUNDATIONS



CISTERN FOUNDATIONS

There are 4 primary options for cistern foundations

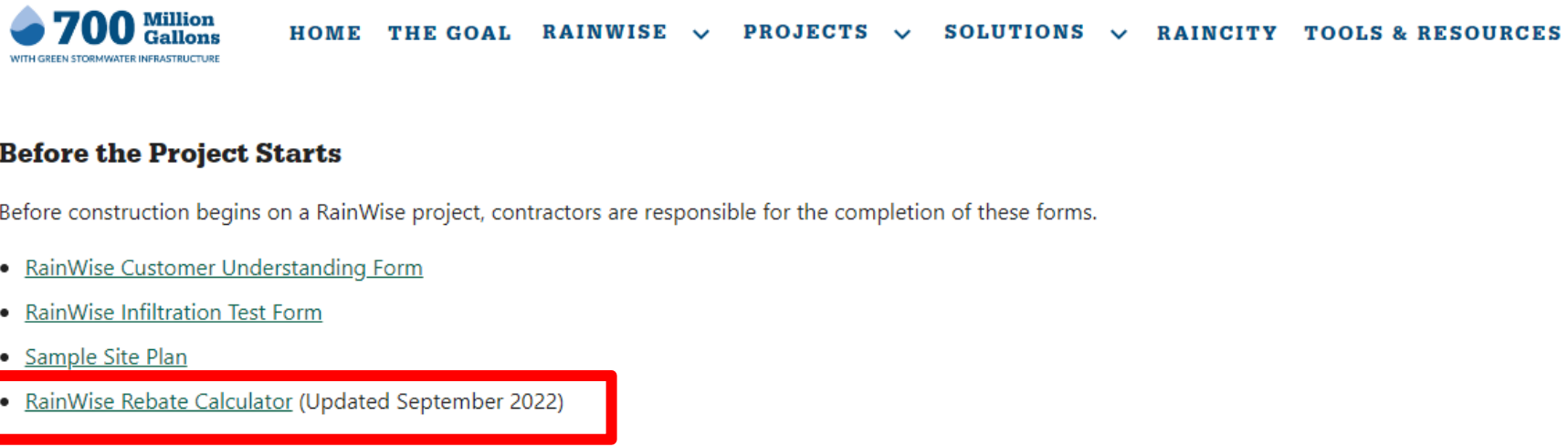
- Timber frames
- Plastic gravel pavers
- Soil frames
- Cement foundation

CISTERN FOUNDATIONS

CISTERN RESTRAINTS

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

RAINWISE CALCULATOR



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

RainWise Sizing and Rebate Calculator

Contractor Name	EXAMPLE VENDOR	Contributing Roof Area [1]	1 sf
Client Name	Jane Doe	Project Type [2]	2 Cistern
Project Address	EXAMPLE SW Seattle 98106		
Notes			

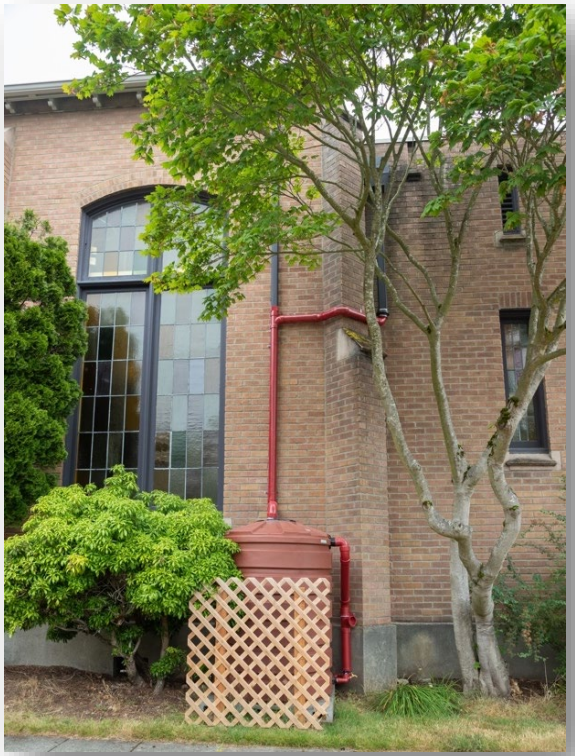
Cistern

No. Connected Cisterns	3 1	
Cistern Type [3]	Bushman BRTT205 - 183 gal	
Cistern Overflow Height [4]		ft
Total Cistern Height [5]		ft
Single Cistern Volume [6]		gal
Cistern Diameter [7]		in

RainWise Rebate

% Construction Rebate →	0%	Enter contributing roof area
Construction Rebate Rate [8,9] →	$0.00	per square foot contributing area
Total Rebate →	$0.00	
Gallons Managed Annually [10] →	0	gallons
Required Orifice Size [11] →	N/A	

DESIGN CONSIDERATIONS



Pumps

- Many cistern customers are interested in pumps to make summer watering easier.
    - Many options are available (including solar-powered 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 Public Utilities | King County | Be RainWise

Manage your rain water at home

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 rainwise@seattle.gov.

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 sale to RainWise contractors through the Seattle Conservation Corps, including cisterns and low-flow kits.
https://www.seattle.gov/Documents/Departments/ParksAndRecreation/Business/RainTanks.pdf
206-684-0190
7727 63rd Ave. 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
Bellevue: 425-451-7351
Downtown Seattle: 206-467-9200
North Seattle: 206-361-9600
West Seattle: 206-762-2126
Shoreline: 206-546-1900
Tukwila: 206-575-9200

Lowes (Various Locations)
Typically carry 3" and 4" PVC and ABS schedule 40 parts and pipes, plus some carry a lighter weight foam core 3" schedule 40 pipe.
South Seattle: 206-760-0832
North Seattle: 206-366-0365
Lynnwood: 425-744-8411
Renton: 425-757-5520
Tukwila: 206-243-5470
Kent: 206-651-9036

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@gmail.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
7727 63rd Ave. NE, Suite 201

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/

Seattle Parks & Recreation

Seattle Conservation Corps · City of Seattle ·

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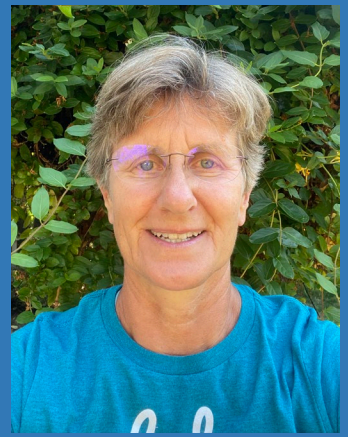
Rex Davis
Seattle Public Utilities
Inspections Lead



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Q&A