Tierra Contenta Headstart:

Rainwater Harvesting System

Santa Fe, New Mexico

This is a rainwater harvesting system for a preschool facility. Care was taken to make the parts visually descriptive so that the system could serve as a teaching model to the community. The tank paint was matched to the building for aesthetics.

Safety was an issue as well. Vermin screening was installed at every point of inflow and outflow from the tank. Locks were added to the lid as a safety pre-caution.

The water was for irrigation, but it was extremely likely that children would drink it. The pipe on the left is a “foul flush” that takes the first dirty water from each rainfall and diverts it to a tree before the cleaner water is harvested. The foul flush drains automatically between rainfalls. As a final precaution, an ozone water purification system was installed. Ozone can be switched off during winter, and a float switch automatically shuts off ozone when the water level in the tank is low. All controls and apparatus are in a locked metal box.

EARTHWRIGHTS DESIGNS

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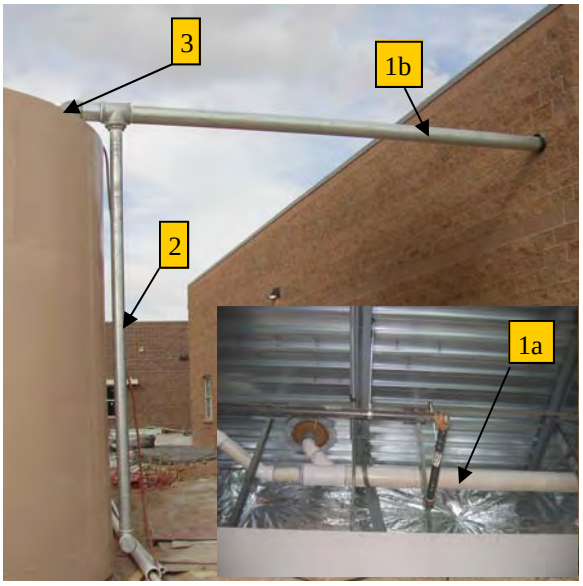
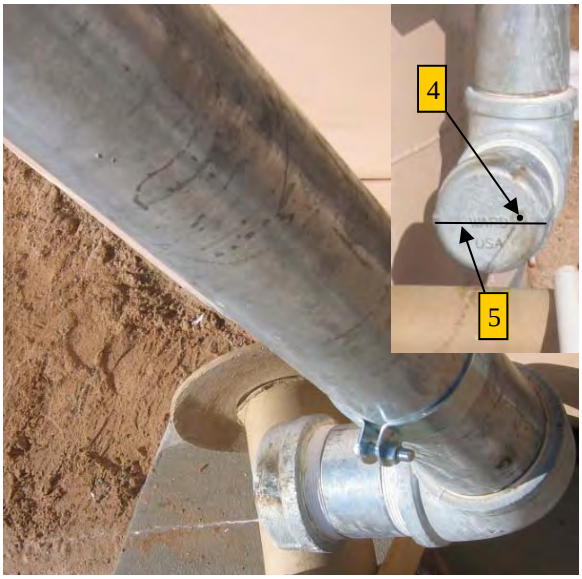
RAINWATER HARVEST SYSTEM: COLLECTION, CONVEYANCE, FLUSH, FROM CENTRAL BUILDING

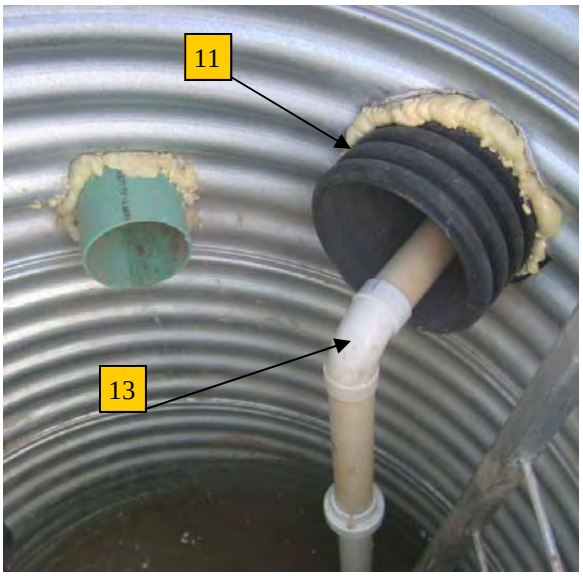




Rainwater enters the roof drains and is carried by the horizontal pipe (#1a) above the ceiling and through the building and out of the wall (#1b) and into the top of the tank (#3). The Vertical pipe (#2) intercepts the first water and also allows sediment to drop continuously. Each time that it rains, the flush water continuously leaks out the 1/8" hole (#4). When the cap is screwed on, the hole is set at 3:00 O'clock as shown or at 9:00 O'clock. This allows sediment to build up in the pipe up to the line (#5) without blocking the hole .

Conveyance and First Flush from the North and South Wings of the building. Rainwater enters the roof drains and is carried by buried horizontal pipe to the Collection Sump (#6). There are two collection lines, North (#7) and South (#8). The sump has an area that collects water below the transfer pumps (#9) which are set in an aluminum table to raise them off of the floor. The transfer pumps (#10) send collected rainwater to the two storage tanks.

RAINWATER HARVEST SYSTEM: OVERFLOW AND FIRST FLUSH FROM THE NORTH AND SOUTH WINGS OF THE BUILDING

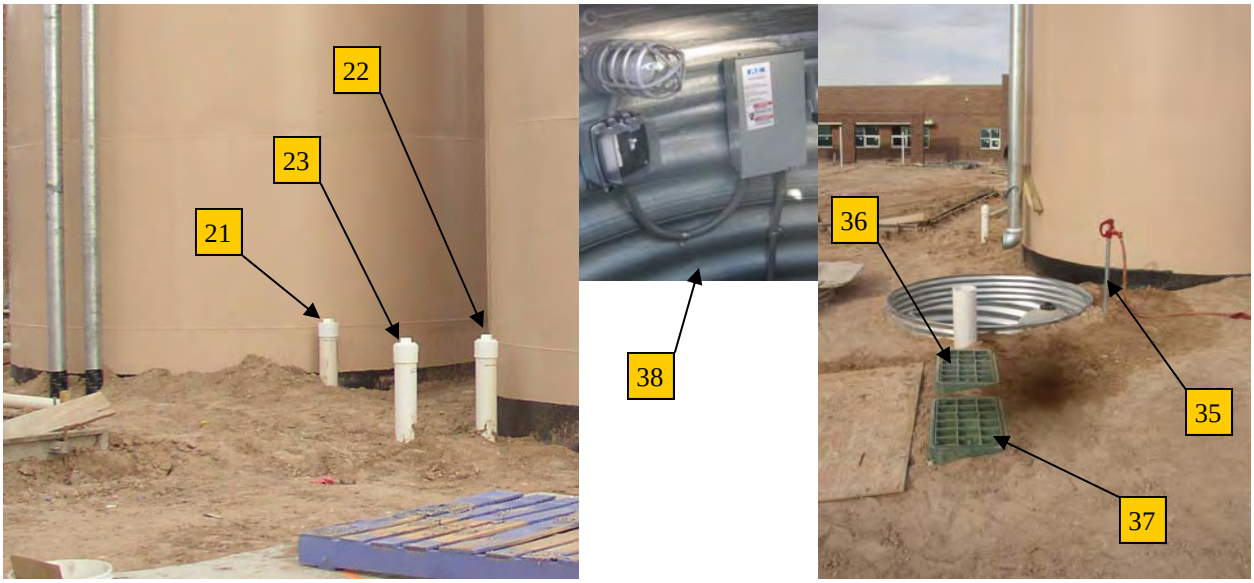


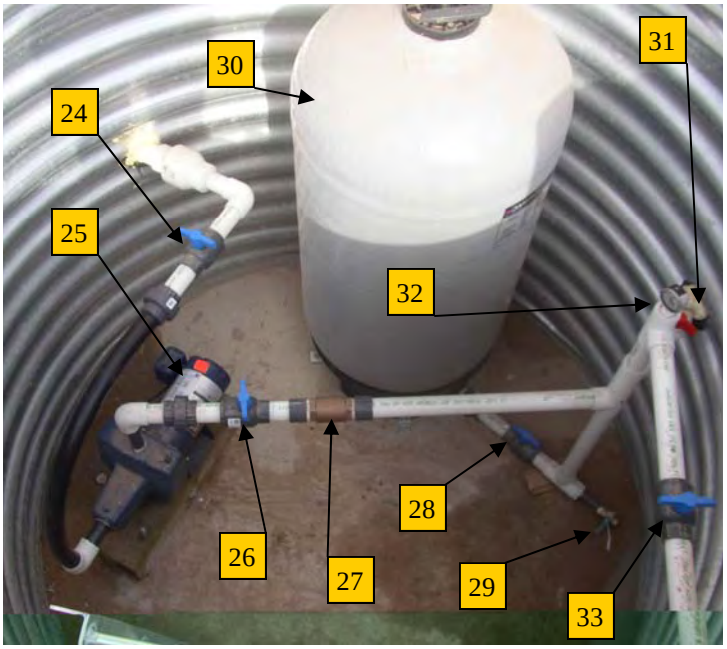
There are several ways that the system will overflow. The large pipe (#11) is a gravity overflow that will carry excess water to the drainage swale that is west of the tanks. Because of site constraints, the water can sometimes backup slightly in the conveyance pipes from the north and south during large storms. At those times the third pump (#12) will come on and eject extra water though the 3 inch pipe (#13) that runs through the 12" pipe. Pump three also acts as the first flush for the north and south conveyance. The area below the two transfer pumps fills up first and also collects sediment. This cannot be pumped to the tank because it is below the inlet of the transfer pumps. Instead it is pumped out every day by the third pump. When there is no collected water, the pump will not turn on. This explained in the section on controls.

RAINWATER HARVEST SYSTEM: SITE

The collected rainwater is stored in the two cisterns, tank 1 (#14) and tank 2 (#15). The water is delivered to the tanks by the fill pipes (#16). Each tank has a vent (#17) to allow air to enter and leave in balance with the water. The system is set to automatically stop pumping to the tanks when they are full. Water will still come from the central roof through the conveyance pipe (#1), so an overflow (#18) is included. At the time the pictures were taken the overflow is above ground. It will be plumbed to the western swale. The sump with the transfer pumps is located at the west of the tanks (#19). The irrigation pump and pressure tank are in the pump pit (#20).

RAINWATER HARVEST SYSTEM: IRRIGATION COMPONENTS





The stored water is removed from the tanks by underground pipes. There are valves to isolate the tanks. This allows for future service to a tank while the system continues to function. Tank 1 can be isolated by a valve in the standpipe (#21), Tank 2 by the valve at #22. An additional valve (#23) was added to isolate both tanks. The water enters the pit at the suction line ball valve (#24). The pump (#25) pressurizes the system by charging the pressure tank (#30). The system is constantly pressurized downstream of the check valve (#27). Service valves (#26 and #28) allow for isolation of the pump or tank. The system can be drained by valve #29. A pressure gauge (#32) shows system status. Valve #31 isolates the yard hydrant (#35). Valve #33 isolates the drip irrigation system. The drip system has a valve box for master valve and filter (#36). Irrigation valves are located in the second box (#37) irrigation system is used for irrigation systems. An electrical disconnect, light, and outlet are available for future service (#38)

When the hydrant is opened for the school garden, or when an irrigation valve opens, water flows from the pressure tank. When the pressure drops enough the pump will come on and recharge the tank. The system will pump water until the valve is closed and the pressure tank is recharged.

César Chávez Public School is located on the South Side of Santa Fe in the area that is experiencing rapid growth. This growth has required that portable classrooms be added. As the photos on this page indicate, there was virtually nothing green on the school property. Lynn Osborne, a science teacher for grades 4 and 5, decided to do something. She applied for a grant from Partners in Education. Her intent was to create a water harvesting system and garden that would be a teaching model and inspiration for the school and community. The $1200 that she received was enough to cover some expenses but was far short of what would be needed to create any project. Earthwrights Designs volunteered to donate design, materials, classroom time, and project administration. The donors listed below supplied materials and labor. Lynn Osborne supplied the consistent effort to keep the project on track and she also acted as the representative for the project when dealing with the school administration.

The system was designed and constructed over a period of 2 years. Whenever a task was safe and age appropriate, the students contributed their labor. This culminated in the landscape planting and irrigation where the labor was mostly supplied by the students.

Rainwater Harvest Demonstration System at César Chávez Public School

Santa Fe, New Mexico

Project Creator and Administrator: Lynn Osborne

Donors:

AAA Allied Septic, Earthwrights Designs, Ecoscapes Landscapes, The Firebird, Partners In Education, Plants of the Southwest, Santa Fe Greenhouses Starite Pumps, Weathermatic

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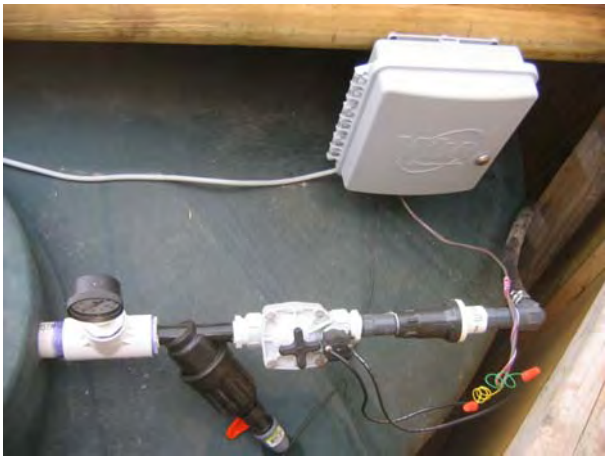
Students smoothing and leveling the base for the tank

Students passing cobble stones for retaining walls

Lynn Osborne and the rainwater tank

The tank is installed in a plywood enclosure and two roofs are piped with first flush diverters

Inlet Filtration



Controls and valves were installed inside of the enclosure.