



GLOBAL WATER RESOURCES (“GLOBAL WATER”)

DESIGN STANDARD

IRRIGATION AND LAND USE REQUIREMENTS

PURPOSE

The purpose of this Design Standard is to define the optimum landscape configuration to allow for a minimum of supplemental water and a maximum usage of recycled water. It also defines the required design criteria for recycled water retention structures.

MODEL

A model has been developed which determines, on a monthly flow basis, what the requirements for irrigation, supplemental addition of raw water, and flows to the AzPDES point are for a typical section. The goal of the model is to provide the basis from which a determination on the optimum land-use configuration for the utility can be established.

The model minimizes the use of groundwater and maximizes the use of recycled water. This minimizes supplemental water in the summer months, and minimizes discharge of water to the AzPDES points in the winter.

The model operates under the following constraints:

1. One section = 640 acres.
2. Occupancy = 3.5 dwellings units (DU) per acre.
3. Open Space = 15%.
4. Trees in Turf = 375 per section.
5. Recycled water production = 162 gallons per day per DU.
6. Storage must result in a minimum storage of 6 days of recycled water production.
7. The maximum recycled water retention structure size is 3 acres.
8. Occupancy is varied from 100% in winter to 90% in summer.

OUTPUT

In order to minimize the use of groundwater, the following configuration is required:

Turf = 22% (21.44 ac)
Xeriscape = 75% (71.88 ac)
Retention Structure = 3% (2.67 ac)
Retention Structure Freeboard = 2 feet



DESIGN CRITERIA

Recycled water retention structures shall be designed with the following criteria:

1. Storage shall be provided such that the Recycled Water Retention Structure is capable of handling 6 days of recycled water production with no irrigation use. Recycled water production ("RWP") shall be calculated based on the following:

$$\text{RWP} = 0.90 \times 162 \text{ GPD per dwelling unit} \times \text{number of dwelling units} \times 6 \text{ days}$$

Commercial units shall be reduced to equivalent dwelling units for the purpose of this calculation.

This requirement results in a minimum of 2 feet of vertical retention structure freeboard above design high water level.

2. A minimum configuration of the following is required:

Turf	=	22% of Open Space
Xeriscape	=	75% of Open Space
Retention Structure	=	3% of Open Space

The configuration is based on the 15% open space of a typical 640 acre development with model assumptions made which may not be accurate for a particular development. Changing the configuration is possible if the recycled water balance proves a more optimum configuration, but may result in additional costs to the developer, if it results in increased costs to Global Water.

3. DISCHARGE OF STORM WATER OR ROADWAY RUN-OFF TO THE RECYCLED WATER RETENTION STRUCTURE IS NOT ACCEPTABLE UNDER ANY CONDITION.
4. A minimum air gap of 24 inches shall be provided between retention structure high level and raw and/or recycled water inlets.
5. Retention structure level control vault design must conform to Global Water Standard Detail No. 321.
6. An RTU developed to Global Water Standard Detail or Specification.
7. Retention structure level sensor in accordance with Global Water Standard Detail 321.



8. Electrical service (120 V, 1 ϕ).
9. Ethernet cable or wireless equivalent network capable of providing a continuous IP network connection (as approved by Global Water) to retention structure control vault.
10. Flow meters with a 4-20 mA analog output signal in accordance with Global Water Standard Detail 321 are required.
11. Motorized valves in accordance with Global Standard Detail 321 are required to control flow to the recycled water retention structures.
12. A potable water feed stubbed to the vault for future connection.
13. Easements deeded to Global Water which encompass the following:
 - a. Retention structure level control vault;
 - b. Recycled, raw and potable water pipelines to vault;
 - c. RTU; and
 - d. Electrical service.

DESIGN SUBMITTALS

A recycled water master plan shall be submitted that as a minimum provides the following:

1. Acreage and percentage breakdown of total open space and turf, xeriscape and retention structure areas, and approximate number of trees associated with the landscaping plan;
2. Anticipated irrigation usage by month based on landscaping plan;
3. Anticipated recycled water production;
4. Table indicating recycled water production, anticipated irrigation demand and resulting recycled water balance broken down by month;
5. Calculated peak hour and peak day irrigation demands; and
6. Design drawings showing recycled water retention structure general arrangement, including plan, elevation and cross-section.