



# **Recommendations and Best Practices: City of Goodyear Demonstration Garden**

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## 1 Introduction

Goodyear was established in 1917 by the Goodyear Tire and Rubber Company. It went through several growth periods until it was finally established as a city in 1985. Goodyear has been an industrial city throughout its history, but is currently dealing with groundwater contamination near the Phoenix-Goodyear Airport. This land is considered a Superfund site, and creates a barren and deteriorated landscape around the Historic District and City Hall. Crane Company has been working to address the contamination issues.

## 2 Background and purpose

The City of Goodyear sees the cleanup of this site as an opportunity to repurpose the land to address local water issues. Goodyear's 73,832 residents are currently using 40-60% of water for outdoor purposes (Goodyear City Council, 2014). Therefore, the City approached universities and other interested third parties to help them develop a demonstration garden on the Superfund site with the following goals:

1. Provide an education and recreation amenity
2. Identify solutions to problems of arid cities
3. Advance significant reduction of outdoor water use
4. Revitalize the historic district
5. Build partnerships

The City is excited to use this as a project for influencing behavior and policy change. They hope to attract builders, landscape professionals, and residents, with children being a secondary audience. The demonstration site's design will include innovative research and design.

The purpose of this study is to document best practices that will help the City of Goodyear's demonstration garden create, "a beautiful, sustainable landscape design that will become an amenity for the neighborhood, a home for long-term research on impacts of landscape design, a resource for future landscape policy-making, and an asset for economic redevelopment" (Goodyear City Council, 2014).

### 3 Methods

According to the Merriam-Webster Dictionary (2014), a best practice is, “shown by research and experience to produce optimal results and [that] is established or proposed as a standard suitable for widespread adoption”. However, this dictionary definition does not sufficiently convey the ambiguity of this term. It was discovered during the research process that best practices can be very subjective and may not necessarily be backed by quantitative data. Therefore, this study uses information gathered from experts in the field, case studies, and practices from local demonstration sites to provide a comprehensive report.

A greater understanding of the demonstration project and its development was gained through conversations with Dr. Dan Childers, a Senior Sustainability Scientist at Arizona State University (ASU) and graduate students from the School of Design and School of Sustainability at ASU. The Watershed Management Group was consulted with to gain a perspective on best management water practices. To better understand the mitigation of the urban heat island effect (UHI) effect, Richard Adkins, Forestry Supervisor for the City of Phoenix Parks and Recreation Department, was contacted. The resources used for this project all focused on the following research questions:

1. How have other demonstration sites been used in the Phoenix Metropolitan Area?
2. What are best practices used at other repurposed Superfund sites?
3. What are the best strategies to reduce the urban heat island effect using water efficient landscaping?

### 4 Research

#### 4.1 Question 1

Research Question 1: How have other demonstration sites been used in the Phoenix Metropolitan Area?

##### 4.1.1 Education and Community Engagement

An educational component is prevalent among the demonstration gardens that were researched. The City of Scottsdale, similar to the proposed Goodyear site, was built as an educational tool to create awareness of outdoor water use. Their mission is “to provide an educational resource where growing regionally appropriate plants also grows public awareness to reduce outdoor water use, fosters development of sustainable landscaping and enlists community participation to conserve water

resources for our future” (“About the Garden”, 2014). The City of Scottsdale engages professionals in the industry through three partnership organizations, the EPA Watersense Partner, Water Use it Wisely, and the Arizona Municipal Water Users Association (AMWUA). Their workshops have covered topics including, irrigation controller systems, drip irrigation and design insulation and maintenance. They also have education components that include signage and plant identification plaques that provide background information on the plants and the landscape design used. The Glendale Xeriscape Garden also holds workshops and has partnered with local high schools, the Glendale Community College, the Maricopa County Master Gardener Program, and the Valley Permaculture Alliance.

The City of Glendale garden also created the Friends of the Garden (F.O.G.) volunteer program to assist the Glendale Water Conservation Office in maintaining the award-winning garden. F.O.G. volunteers assist in the upkeep and care of the garden and special events, participate in monthly group workdays, help out in the Water Conservation Office, and act as garden ambassadors to the greater community. Their strategy for community involvement has been successful in engaging local high schools, community colleges, and the general public.

#### 4.1.2 Art in the Garden

Art is another important feature that has been used in demonstration gardens. Sculpture work can be found at the xeriscape gardens in Glendale and Chandler. “The Watershed” and “The Blue Planet”, featured at the Glendale Xeriscape Garden, were funded through the City of Glendale Water Conservation Office through the “Art in the Garden” grant. The sculptures were used as an opportunity to engage the community and brought together forty students from the Sahuaro Ranch Elementary School AM/PM Recreation Program Site and another 250 volunteers including: F.O.G. volunteers, library patrons, Glendale Community Center teens, neighbors and Girl Scouts, to create water conservation themed art with local artist Juanita Hull-Carlson. Carlson was invited to create another mosaic sculpture piece entitled, “Use Water Wisely: A Desert Diamond” at the Chandler Xeriscape Garden. This sculpture, like Glendale was used to engage the community and is the result of a six-month neighborhood arts project. Scottsdale’s art, while different from the other two, is still focused on the theme of water in the desert. Scottsdale constructed a garden theater where, “curving hillside terraces channel water runoff down a central ridge and adjoining rib-like planters” (“Terraced Cascade”, 2014). This piece is meant to remind visitors of the significant impact humans can have on the desert landscape.





Figure 1: "The Watershed"



Figure 2: "The Blue Planet"

Source: Glendale Xeriscape Garden Website



Figure 3: "Use Water Wisely: A Desert Diamond"

Source: Chandler Xeriscape Garden Website

## 4.2 Question 2

Research Question 2: What are best practices used at other repurposed Superfund sites?

There are dozens of projects throughout the United States that have clearly demonstrated the benefits of taking Superfund sites and transforming them into educational and research sites. Case studies, documented by the EPA, illustrate how Superfund sites have become areas for economic redevelopment, parks and recreational facilities, storage sites, and more.

The Village of Questa in New Mexico partnered with Chevron Technology Ventures and the EPA to turn an old mining site into a demonstration and research site for concentrated photovoltaics (CPV). This site, in operation since February 2011, is home to over 175 solar panels. Located on 20 acres, it is being used for research and to showcase new technology. The energy produced by the solar panels is enough to power 500-600 homes. According to the EPA Superfund Redevelopment Initiative, "the CPV facility not only demonstrates and evaluates an emerging solar technology,

but also benefits the Village of Questa, bringing in new jobs to the region and supplying a clean, renewable power source in an area striving to address its mining legacy” (EPA Superfund Redevelopment Initiative, 2011).

The state of Illinois has a Superfund site that has incorporated several educational components, similar to what Goodyear would like to include on their future site. A forty acre landfill that closed in 1973 has been transformed into a place for year-round recreational use for hiking, cross country skiing and fishing; and includes ecological restoration and environmental education areas. The site is also used to study the DuPage River watershed and works on a variety of other water projects. There is a commitment to public access, and environmental education. With the help of the EPA, this district has become a model for how to transform Superfund sites into a useful community resource. While both of these Superfund sites are operating on a much larger scale, best practices can still be drawn from them.

### 4.3 Question 3

Research Question 3: What are the best strategies to reduce the urban heat island effect using water efficient landscaping?

According to the City of Phoenix Tree and Shade Master Plan (2010), the development of Phoenix has caused significant changes to the natural landscape through the construction of buildings, roads and other infrastructure. This has caused an increase in air temperature, which has had many negative cascading effects throughout the Valley.

The City of Goodyear recognizes this problem and would like to include UHI mitigating landscape strategies in the design of their project. Richard Adkins, Forestry Supervisor for the City of Phoenix Parks and Recreation Department, provided some of his best practices on this topic that stem from his research. In terms of tree recommendations, Adkins provided expertise on the placement and location of trees, and provided insight on drought resistant species. In terms of placement, Adkins recommends bundling trees in groups, as opposed to organizing them linearly. This is important, because bundled trees provide more canopy coverage, grow better when together and also use water more efficiently. Adkins also discussed how the location of trees is significant to their health. Different trees are more sensitive than others and may become sun burned from the sun reflecting off the pavement. Therefore, it is recommended to look at each tree species specifically and decide if they will perform better in either residential or commercial areas (R. Adkins. personal communication, December 1, 2014).

## 5 Recommendations

Based on the research above, there are a variety of recommendations that may help Goodyear achieve their goals. There are several common themes among demonstration gardens in the Valley that were found through research. Based on the practices of these demonstration gardens, it has been determined that the Goodyear Demonstration Garden should include: engaging signage to identify plant life, water management practices and other features. However, these sites are not being used for research purposes. Therefore, the City of Goodyear will be one of the first of its kind in this climate to use this as a research facility in partnership with ASU and U of A.

The demonstration site in Goodyear has the opportunity to set an example for other Superfund sites in Arizona as a research facility. As seen in Questa, NM and DuPage, IL the repurposing of Superfund sites has the ability to produce robust research. Therefore, it is recommended that this become one of the cornerstones of this project. Goodyear's Demonstration Garden has the potential to attract researchers and students from local universities. The City of Goodyear will be able to directly apply this research toward residential and commercial landscaping practices.

Building partnerships is also important to consider when creating a demonstration garden. As seen with a variety of other sites in the Valley, networking a variety of outside partners engages the community and provides expert advice. It is recommended that the City of Goodyear continue to foster already established relationships with universities, and seek out new opportunities as well. Richard Adkins from the City of Phoenix Parks and Recreation Department is a good resource. Not only can he put the City of Goodyear in contact with others from his department, but students that he has worked with in the past. There is also a variety of non-profits in the Valley that are focused on water conservation and landscaping, which include, the Watershed Management Group, the Arizona Municipal Water Users Association (AMWUA) and the Valley Permaculture Alliance.

## 6 Conclusion

The purpose of this report was to document best practices from other demonstration sites in the Valley, as well as investigate how other Superfund sites



have been repurposed and how to mitigate the UHI effect using water efficient landscaping. By adopting a selection of these practices referenced in the recommendations and continuing on the path to become a site where not only water efficient landscaping is demonstrated, but also researched, Goodyear's Demonstration Garden has the potential to become an example to other demonstration sites located in arid environments.

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