Upper Adams Creek Watershed Project

City of Broken Arrow Engineering & Construction Division Stormwater Management Tom Tolbert City of Broken Arrow Broken Arrow School System Fairway Park Detention Facility "Tiger Pond"



Tributary "E" Corridor Upper Adams Creek Watershed



City of Broken Arrow's

Park @ Adams Creek Wetlands



Adams Creek Tributary "E" watershed comprises 1,622 acres of urban and suburban Broken Arrow. It includes large tracks of big box store shopping, several strip centers, a large movie theater with enough parking for everyone in Broken Arrow, a major highway route bisects the upstream reaches of the watershed.

The general landform is moderately sloping to the east and northeast. Tree cover is mostly smaller growth trees that prevail in the shallower soils overlying bedrock. Streams tend to meander in a pool to riffle fashion.



This project started out simply enough as a teacher asking for permission to use a newly excavated detention pond for a hands on workshop for her AP environmental science students.

In the late fall of 2016 City of Broken Arrow Engineering and Construction Division, Stormwater Management explored the possible interest of the other Broken Arrow High School science departments in creating an area near an existing stormwater detention facility to be used as an outdoor science classroom.

As City Staff discussed this proposal the proverbial light bulb went off...between the City and the Broken Arrow School system we owned most the watershed of the "E" Tributary.

Kenneth Schwab, PE, CFM, City of Broken Arrow's Assistant City Manager; Jeff Bigby, PE, CFM, City of Broken Arrow's Stormwater Manager; Tom Tolbert, Stormwater Quality, City of Broken Arrow; Michelle Bergwall, Chief Operating Officer, Broken Arrow Public Schools; Donna Gradel, Broken Arrow AP Environmental Science and Oklahoma's State Teacher of the Year.



Long term plans were discussed that potentially included an ecology park, a trail system through the wetlands area and along the creek tying the shopping areas, the school and Nienhuis Park together with the numerous subdivisions in the area.

In September of 2017, Mr. Schwab presented this to the Broken Arrow City Council who were strongly in favor of the proposed collaboration.

Ecology Partnership

School and City partner to create outdoor classroom

Outdoor Classroom \ Ecology Park

Vision:

Utilize the existing Regional Detention Facility, the Natural Floodplains, and Regulatory Wetlands as an outdoor educational classroom and training center to provide flood protection, improve water quality, and enhance natural habitat.



COMPAN ADDOWN

In October the students of Broken Arrow High School, the Blue Thumb organization and various members of the Broken Arrow School Administration, members of the Broken Arrow City Council and the City Administration celebrated a kickoff of the project on the banks and in the water of the pond and creek.





Early in 2018 Broken Arrow Stormwater staff met with the students to discuss just what we were planning and who was going to participate in the floating wetland project.



What were we thinking...at least we asked them to put their ideas on paper.

We had everything from creating swimming beach to stocking the ponds with man eating fish.

There were a number of great suggestions.

An ecology park, nature walk paths, an observation tower overlooking the wetlands were suggested. Create habitats for waterfowl, planting lots of plants for that pollinators would utilize, bat houses, gazebos were all suggestions that are being considered.

The one thing they all seemed to like was the floating garden or wetland. The only thing was that they wanted to be able to see it from space...or at least Google Earth.

Shortly after the media story, the subdivisions that border the "E" Tributary corridor invited the City Stormwater Staff and the Assistant City Manger to their HOA meetings to discuss how the improvements might affect their properties.

Fearing the worst, we were pleasantly surprised at the positive reaction that we got.

They suggested that the area that bordered the nearest subdivision be turned into a park with attractions that favored older kids, items like log forts and elevated walks. Again the thought of trails and walkways were favored.

A gathering place with the ability to host music was also suggested for the commercial area of the project.



How the project kicked off. The Floating Treatment Wetland Concept

The Mrs. Gradel approached the City in 2016 about the use of the Fairway Detention Facility as an outdoor teaching area. The City of Broken Arrow's Assistant City Manager, Kenny Schwab; Jeff Bigby, the Stormwater Manager for the City, and Tom Tolbert spoke with the Broken Arrow Science Dept. teachers during a luncheon where we asked them how they would utilize the area for the kids. The various science disciplines had a wide diversity of possible uses. From chemical to biology, everything from solar powered waterfalls to wildlife habitat improvements.

Why a floating wetland?

Most wet detention ponds have steep slopes with no shelf to support wetland plants They have one function...store and release water at a controlled rate.

A great number of water bodies tend have an issue with hypertrophication, the middle pond of the Fairway Park Detention Facility also suffered this problem. It was noted that the upper pond, a sedimentation basin that was left natural, developed wetland plants and seldom suffered from eutrophication issues.

The Middle Pond will be used by the students to study and determine if floating wetlands are a viable treatment resource for removal of excess nutrients and to provide habitat for fish, amphibians, and waterfowl.

Why are we doing this? What are the goals for this project?

Why is this important to all of us?

There is a axiom in stormwater quality..."somebody always lives downstream".



Downstream near the confluence of Adams Creek and the old channel of the Verdigris River is the intake facility for the City of Broken Arrow's Water Treatment Plant. The water the citizens of Broken Arrow drink, cook their food with, wash their clothes and dishes in and bathe in comes from this watershed.

In early March the students took a tour of the Broken Arrow Water Treatment Facility.



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The primary goal of this project for the City of Broken Arrow is outreach and public participation.

By including those citizens who are not water quality professionals, making them aware of the conditions of our streams, creeks and lakes and by getting those citizens to participate through volunteerism in events such as this project, water quality awareness should improve.

There are also some aesthetic reasons for the project.

Who's been to Disney World? Ever notice the floating flower pots at the Epcot Center?





Design Workshop:

What is the function of this project?

Provide a platform for sustained and effective plant growth that utilize some of the nutrients in the water column. The root system should provide enough area for a healthy biofilm to develop.

How does a Floating Treatment Wetland (FTW) work? Besides the uptake of nutrients, what can we hope for?



Design:

HOW BIG? Shall we use the current Broken Arrow High School Logo? What kind of material? Cost considerations?





If we create this structure:

Can we use common materials? How many feet of 6" HDPE do we need? How do we make it float? How many 2 liter bottles do we need? How do we put the pieces together? What tools do we need? How much plastic hardware cloth? How much bedding material do we need? Can we build it modularly? Where? How do we move it, put it in the water? How do we anchor it so it won't get washed during flood events?



The structure will be comprised of 6" ADS corrugated drain pipe, filled with 2 liter bottles for buoyancy. The cover will be 30% woven shade cloth with an overlay of burlap fabric to hold moisture and protect the plant roots. Plants will be purchased and also harvested from the upper pond and from other sources that the students have easy access to.



What types of plants? Should we use flowering plants? Grasses and sedges? Milkweed?

Should we use native wetland plants that we gather or shall we buy the plants?

How many plants will we need?







Special thanks to ADS and Tommie Heltcel for providing the pipe and fittings utilized in the construction of the floating wetland.

Carla Grogg of Grogg's Green Barn in Tulsa was helpful in the selection and procurement of the wetland plants.

And Graham Brannin, of the M.E.T. for providing floatation in vast quantities. We repurposed 2 liter plastic bottles, with the lids on.