BROKEN ARROW

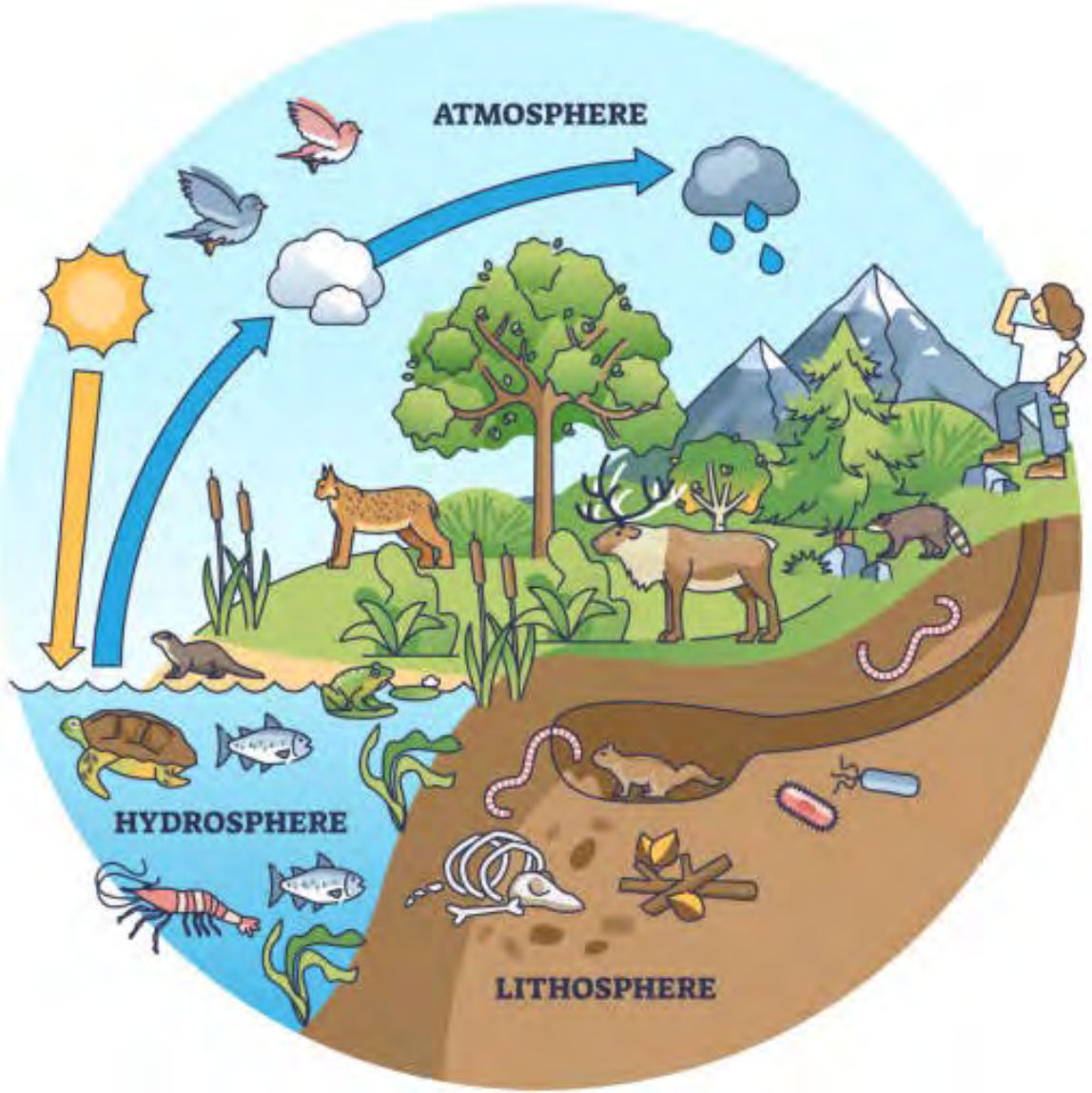
Where opportunity lives

STORMWATER QUALITY MANAGEMENT PROGRAM: DETENTION FACILITIES

Stormwater Quality BMPs Concepts

Stormwater Quality BMPs Concepts

Stormwater Quality BMPs Concepts



Stormwater Quality Management

What is the importance?

Prevents Water Pollution

Preserves Aquatic Ecosystems

Required by MS4 Permit

BROKEN ARROW
Where opportunity lives

Common Pollutants

- Nutrients (Nitrogen, Phosphorus)
- Sediment
- Heavy Metals (Lead, Copper, Zinc)
- Hydrocarbons
- Pathogens
- Trash and Debris

BROKEN ARROW
Where opportunity lives

How to Address Pollutants?

- Heavy Metals
  - Bioretention Systems
  - Vegetated Swales/Rain Gardens
  - Media Filtration Systems
  - Source Control
- Sediment
  - Buffer zones
  - Sediment basins/silt fences/erosion blankets
  - Street Sweeping
  - Retention Ponds/Forebays
- Nutrients
  - Rain Gardens/Bioswales
  - Proper Pet Waste Disposal
  - Retention Ponds
  - Constructed Wetlands
- Hydrocarbons
  - Source Control
  - Oil-water separators
  - Street Sweeping
  - Wetlands/Bioretention Cells
- Pathogens
  - Source Control
  - Retention Ponds/Wetlands
  - Monitoring
  - Bioswales/Rain Gardens
- Trash and Debris
  - Source Control
  - Street & Site Maintenance
  - Trash Racks and Screens
  - Community Engagement/Outreach

BROKEN ARROW
Where opportunity lives

Retention Ponds & Wetlands

- Sedimentation
  - As stormwater slows down in the pond, heavier particles-including nutrient bound sediment-settle to the bottom
- Biological Uptake
  - Aquatic plants and algae absorb nutrients like phosphorus and nitrogen for growth
- Microbial Activity
  - Bacteria in the pond break down organic matter and transform nutrients into less harmful forms
- Extended Detention
  - Holding water longer increases contact time with plants and microbes, improving treatment efficiency

BROKEN ARROW
Where opportunity lives

Case Study: Park on Florence

PROJECT HISTORY

- Park on Florence 2nd platted in 2004
- Detention Pond was oversized per request of the City to help with stormwater in surrounding neighborhoods (Regional Detention Pond)
- Covenants demonstrated that COBA intended to maintain pond after 1 year
- No agreement/formal donation of property to COBA

BROKEN ARROW
Where opportunity lives

Case Study: Park on Florence

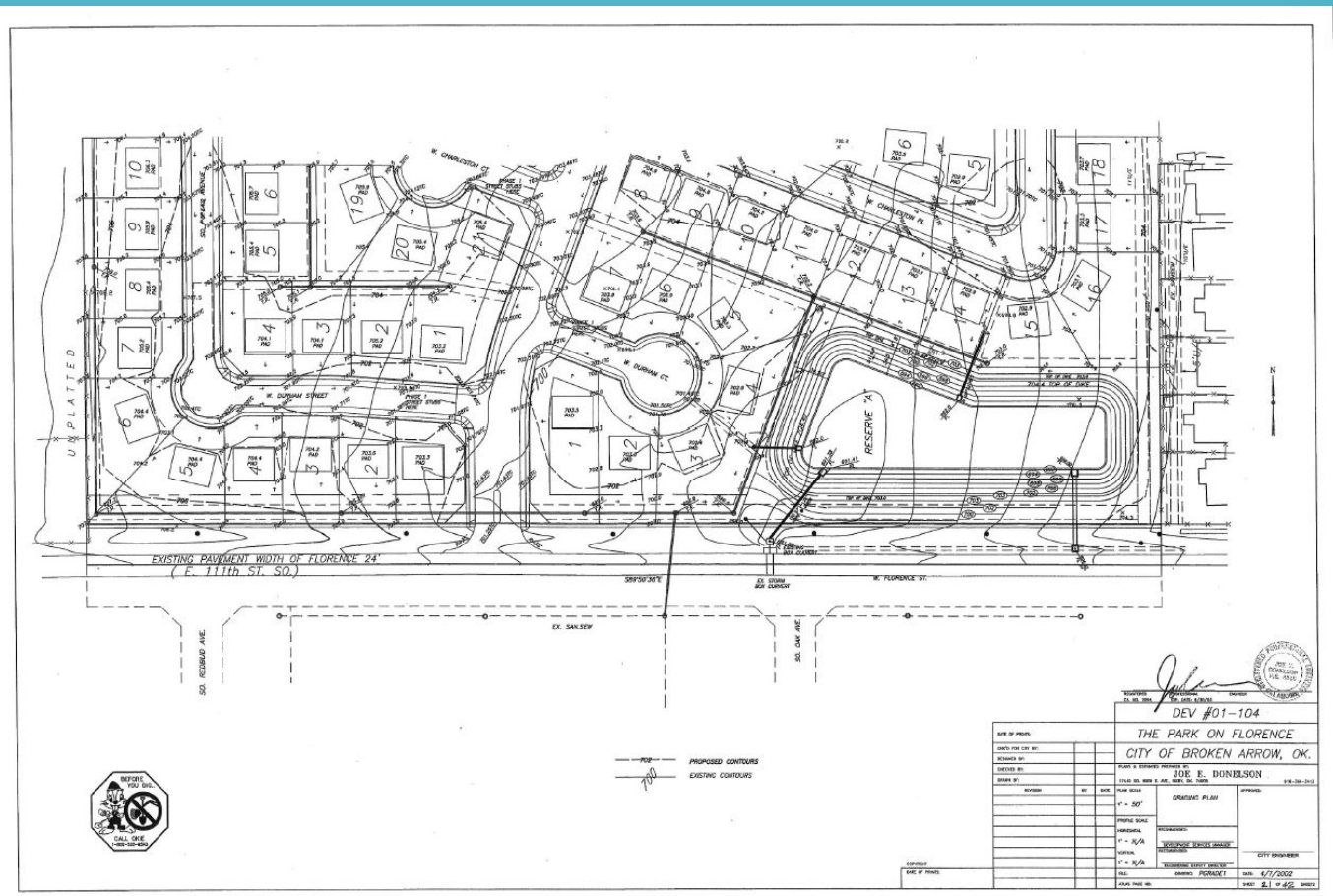
PROJECT HISTORY

- Facility maintained by the developer or City for 10 of its 16 years
- Land was officially deeded over to COBA early in 2020
- Detention Pond was originally designed as dry pond

BROKEN ARROW
Where opportunity lives

Case Study: Park on Florence

ORIGINAL PLAN DRAWINGS



BROKEN ARROW
Where opportunity lives

Case Study: Park on Florence

MAINTENANCE OVER TIME

Detention Pond 2006

PARK ON FLORENCE REGIONAL DETENTION FACILITY
HISTORICAL OVERVIEW AND MAINTENANCE RECORD

January 2003	Drainage report "No Exceptions Taken"
September 2004	Plat filed at Tulsa County Courthouse
October 2004	Pond was maintained (Developer Maintained)
October 2006	Pond was maintained (City Maintained)
May 2008	Pond was not maintained
March 2010	Pond was maintained (City Maintained)
June 2011	Pond was maintained (City Maintained)
August 2012	Pond was maintained (City Maintained)
April 2014	Pond was maintained (City Maintained)
March 2015	Pond was maintained (City Maintained)
September 2016	Pond was not maintained
May 2017	Pond was not maintained
March 2018	Pond was maintained (City Maintained)
January 2019	Pond was maintained (City Maintained)
July 2020	Pond was not maintained

BROKEN ARROW
Where opportunity lives

Case Study: Park on Florence

Maintenance Over Time 2008 & 2010

BROKEN ARROW
Where opportunity lives

Case Study: Park on Florence

Maintenance Over Time 2011 & 2012

BROKEN ARROW
Where opportunity lives

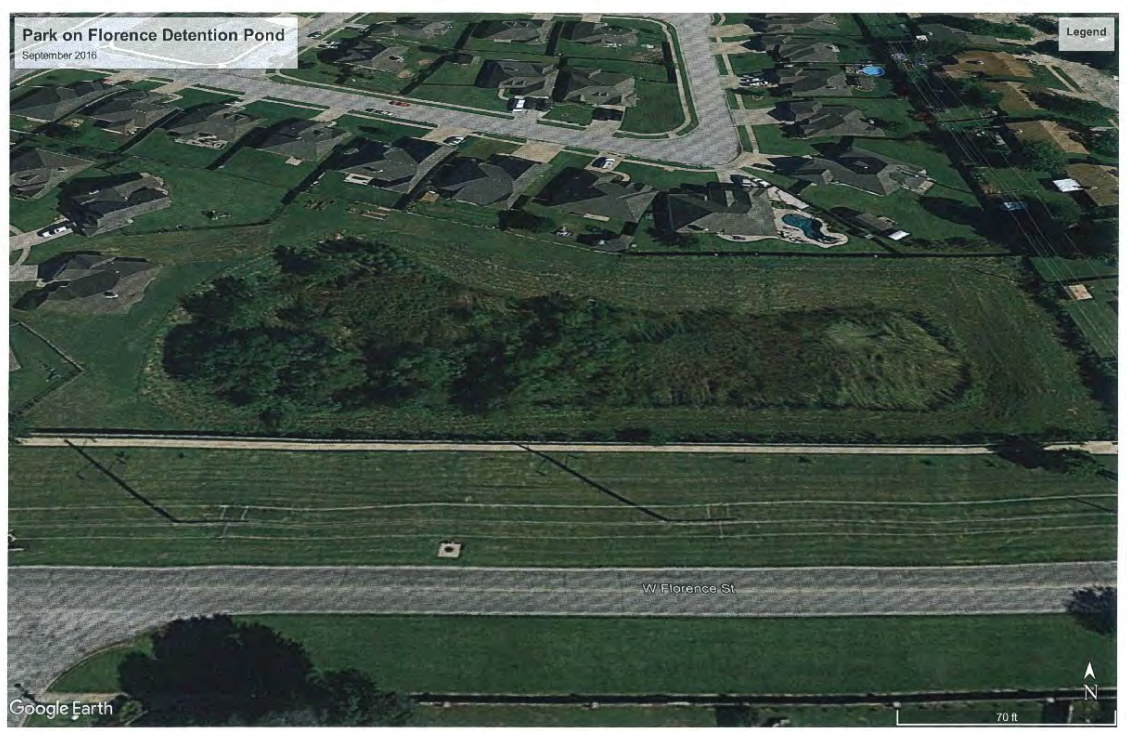
Case Study: Park on Florence

Maintenance Over Time 2014 & 2015

BROKEN ARROW
Where opportunity lives

Case Study: Park on Florence

Maintenance Over Time 2016 & 2017



BROKEN ARROW
Where opportunity lives

Case Study: Park on Florence

Maintenance Over Time 2018 & 2019

BROKEN ARROW
Where opportunity lives

Park on Florence – Pre-Improvements

BROKEN ARROW
Where opportunity lives

Park on Florence – Pre-Improvements

BROKEN ARROW
Where opportunity lives

Park on Florence – Pre-Improvements

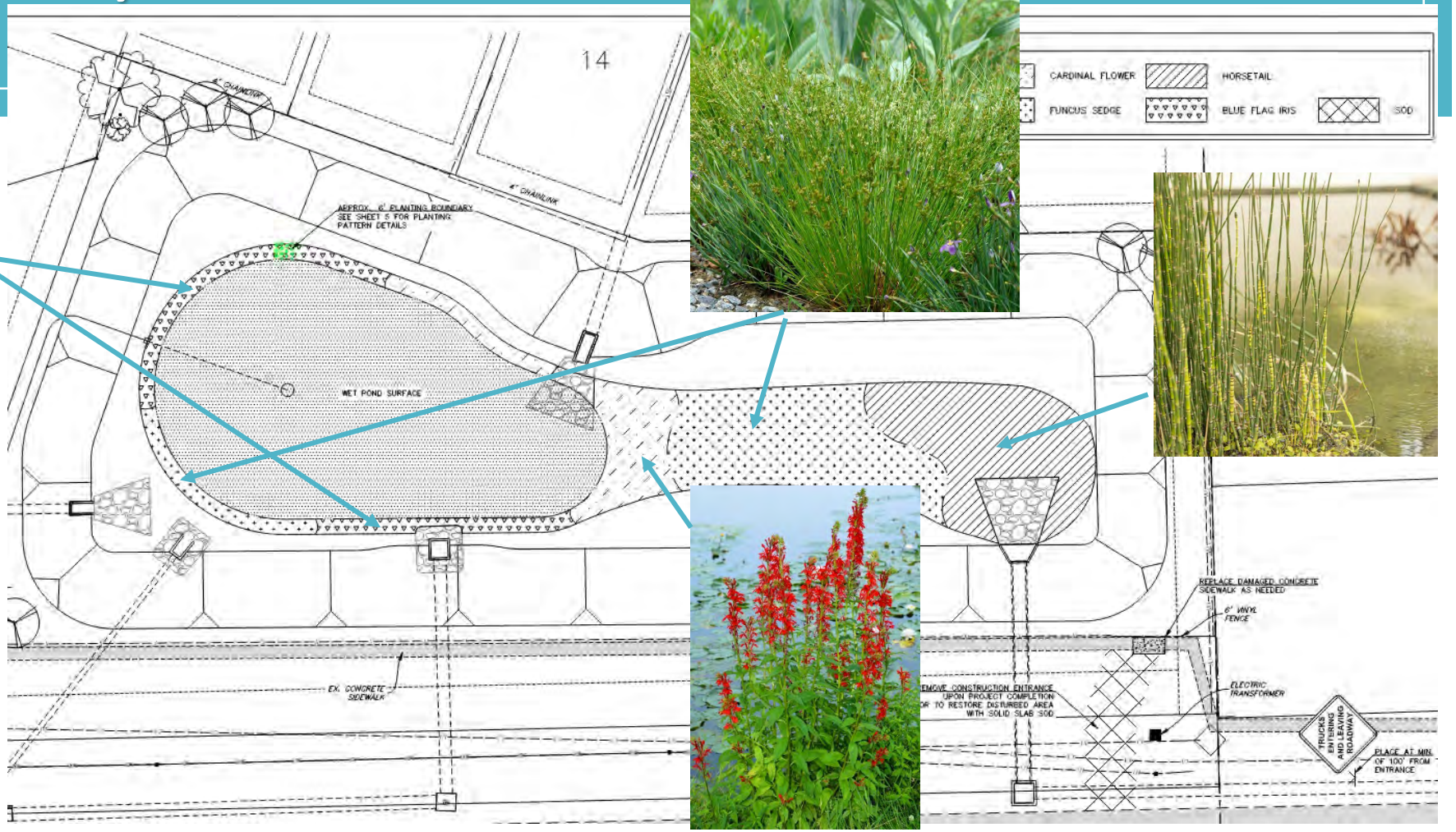
BROKEN ARROW
Where opportunity lives

Park on Florence – Pre-Improvements

BROKEN ARROW
Where opportunity lives

Case Study: Park on Florence

Planting Plan



BROKEN ARROW
Where opportunity lives

Park on Florence – Post-Improvements

BROKEN ARROW
Where opportunity lives

Park on Florence – Post-Improvements

BROKEN ARROW
Where opportunity lives

Park on Florence – Post-Improvements

BROKEN ARROW
Where opportunity lives

Summary

Why does Water Quality matter?

Water Quality matters because every drop flows somewhere, and someone downstream depends on it for drinking, recreation, agriculture or habitat.

BROKEN ARROW
Where opportunity lives

Questions?

BROKEN ARROW
Where opportunity lives