



2014  
Annual  
Report





## A Message from the Executive Director



Welcome to our annual reporting of 2014 activities. We try to emphasize those items of most interest to you, our ratepayers, who own property in neighborhoods, commercial districts, and business parks. High on the list is the maintenance

necessary to make sure street inlets, storm pipes, and road culverts are able to handle runoff from a typical summer day's rain shower. A robust maintenance Work Order process and real-time pipe inventory make this more achievable. Assessing priorities, identifying vulnerabilities, and getting ahead of a pipe failure are effective strategies to manage the roadway drainage system. Prevention truly does provide cost savings, increases efficiency, and is proving to be a wise investment.

I'd like to mention a couple of projects completed this year that I found particularly special. In August we moved into our new building, excited about the opportunity to put into practice the efficiencies learned since our formation in 2007. Located on the banks of one of our Dove Creek regional ponds, the building reflects the Cherry Creek Business Park buildings in the area, but it also incorporates several sustainable practices. Because SEMSWA's goal is to manage rainfall runoff as a resource and not a nuisance, we made sure to manage other natural resources in the same way. And in particular, made sure that the building features reflected our focus of effective and efficient stormwater infrastructure maintenance and management for many years to come.

Stream channel restoration will always be an essential SEMSWA capital construction effort: a stabilized channel prepares the stream to withstand the effects of increased urban runoff, decreases the erosion that leads to sediment transport, and improves stream water quality. But an unseen hero in the stormwater management world is the urban conveyance system underneath our traveled roadways. This system of street inlets, pipe, and outfalls into the creeks does its job without much notice, unless a large summer storm event overwhelms it and water ponds in the streets. One of the 2014 capital projects I am most pleased with is the upsizing of the storm sewer system in the Walnut Hills subdivision that also benefitted the Hunters Hill neighborhood, home of "Lake Verbena Way". Our staff realized first-hand the significance of this project, as a group of homeowners hosted our staff and the construction crew and celebrated this important street 'flood-proofing' project. We respect the pride you have in your neighborhoods; we will make every effort to honor it with worthwhile projects.

*John A. McCarty, PE, PWLF*



**SEMSWA building built adjacent to Dove Creek Regional Pond D-2**



**Residential street flooding caused by an undersized local storm system**



**Additional storm sewer pipe to move water from the streets to the system**

**The SEMSWA Mission:** Provide stormwater management services essential to the protection, preservation, and enhancement of our neighborhoods, community, and natural resources through flood control, water quality, construction, maintenance, and education.



# Maintenance Division

During 2014, maintenance efforts included routine sediment removal from channels and ponds as well as inlet, vault, and culvert cleaning. Additionally, the staff focused on pipe inspection efforts in 2014, committing a dedicated crew to staff the camera van and generate pipe system video, used to update SEMSWA's Asset Management database.

One of the more important functions of the Maintenance Division is to provide services to the capital construction program, taking advantage of rapid mobilization and flexibility in crew tasks. During 2014, maintenance staff removed trees and large shrubs, and cleaned inlets and pipe, prior to the Walnut Hills Outfall project as well as at various locations prior to Cured-in-Place Pipe rehabilitation. Additionally, senior maintenance staff were called upon again in 2014 to provide construction management services and expertise for projects associated with pipe replacement and pond retrofits.

An uncommon, but timely service provided by maintenance staff in 2014 was assistance in resolving a Floodplain Permit violation. An unsafe crossing was constructed on Piney Creek, without consideration of the damaging impacts that the structure would trigger if washed away in a storm event, including debris jams that could cause flooding on private properties. The crews removed the unpermitted bridge and resolved a safety issue. A new bridge will be properly designed and constructed as part of a 2015/16 CIP project.



Camera Van televising storm sewer pipe system



Prep work for the Walnut Hills capital project



Removing an illegal bridge obstruction in the Piney Creek floodplain to resolve a permit violation; a designed pedestrian bridge will be built as part of a CIP project.



Cleaning sediment collected in detention pond forebay

The Maintenance Program is responsible for inspecting and cleaning stormwater infrastructure so that storm flows are effectively conveyed, from pipes, culverts, and ponds, to the drainageway. 2014 Work Order numbers illustrate the extent of the infrastructure maintained:

- 5,600 inlets, outfalls, grates & vaults cleaned
- 1,900 feet storm pipe cleaned
- 1,300 tons sediment removed
- 70 dump trucks of debris and trash removed
- 90,000 feet storm sewer pipe inspected
- 400 service requests processed



Cleaning outfalls & inlets with the Vactor® truck



September marked the one-year anniversary of the Colorado flood disaster. Estimates indicate more than 25,000 homes were damaged and another 1,800 destroyed. Much of the damage was experienced outside the identified high risk flood zone. Since then, an emphasis has been placed on identifying potential risks, mapping those risks, and increasing awareness among property owners so they can make more informed decisions and participate in risk mitigation efforts, including exploring the use of flood insurance to transfer the risk of potential losses from flooding (see *FEMA Mapping article below*).

During 2014, SEMSWA received a visit from FEMA staff to verify that the City's Community Rating System (CRS) activities that SEMSWA implements are being conducted effectively. FEMA's CRS program provides guidelines for participating communities that want to continually improve their community's safety and resilience to flooding in return for flood insurance discounts. CRS efforts that SEMSWA conducts on behalf of the City promote sound floodplain management and reduce the impacts of flooding through alerting residents and businesses to potential flood dangers; promoting the purchase of flood insurance; incorporating a higher floodplain management Regulatory Standard into the City's Code; and enhancing public awareness of flood risk through maps, website information, and at events. The City's anticipated CRS score will increase the flood Insurance discount to 15%.

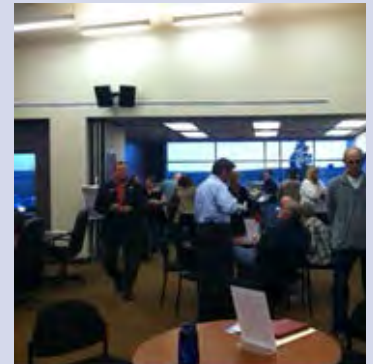
## Floodplain Program Statistics

During 2014, **30** floodplain permits were reviewed, approved, and issued for work in a floodplain, **30** floodplain studies were assessed for impacts from proposed work, and **six** requests for modification to a floodplain were reviewed. SEMSWA also provides a map information service, and responded to **40** inquiries requesting assistance in defining floodplain limits on a parcel and what that means to the property owner. Outreach efforts were significant in 2014, and included newsletter articles and mailings, local newspaper articles, and direct mailings with important flood risk information that reached over **40,000** residents.

## FEMA's Physical Map Revision Process

The Federal Emergency Management Agency (FEMA) is committed to providing communities timely information and maps about flood risk. In 2014, new mapping based on updated Flood Hazard Area Delineation (FHAD) studies completed by Urban Drainage & Flood Control District (UDFCD) were prepared for **First Creek, East Toll Gate Creek, Willow Creek, Cottonwood Creek and its tributaries, Piney Creek and Antelope Creek** basins. SEMSWA is working closely with FEMA and UDFCD to provide outreach for the new mapping based on these updated FHAD studies.

Three public meetings were held by SEMSWA in Fall 2014 to provide owners an opportunity to see their properties in relation to the new floodplain mapping. It is important for property owners to be aware of the map changes early in FEMA's Physical Map Revision (PMR) process to allow them time to investigate flood insurance options ahead of the effective regulatory date. SEMSWA will reach out to the public through the PMR process each time a new FHAD study requires a mapping update.



*Un-permitted bridge crossing violated floodplain regulations*

## Major Floodplain Violation Resolved

During 2014, a major floodplain violation was corrected by removing a potentially dangerous crossing constructed in Piney Creek without the required permits and floodplain impact analysis. SEMSWA maintenance staff dismantled the structure that posed a hazard to adjacent properties by creating an obstruction in the main stream channel, forcing storm flows to divert around the structure and erode additional stream channel on private property. Piney Creek is a FEMA-regulated floodplain and work in the floodplain requires an analysis and permit to make sure that no fill material is placed that may impact the stream's ability to handle storm flows within its floodplain limits, or impact another property.



During 2014, Colorado's General Permit for Municipal Separate Storm Sewer Systems (MS4) renewal process was suspended by the State, and the existing permit administratively continued. A second Public Notice to review and comment on the renewal MS4 General Permit is scheduled for late Spring 2015. SEMSWA is one of 64 state-designated MS4 communities.

In 2014, SEMSWA met the MS4 permit requirements to reduce pollutants in stormwater runoff from residential, commercial and industrial areas through permitting and inspecting sediment controls at over **150** construction sites; ensuring the proper construction of **10** water quality treatment facilities for new development; resolving **40** illicit discharge reports from the public; and sponsoring the safe disposal of **75,000** pounds of household hazardous waste collected via the 'At Your Door Special Collections' from over **665** County and City households.



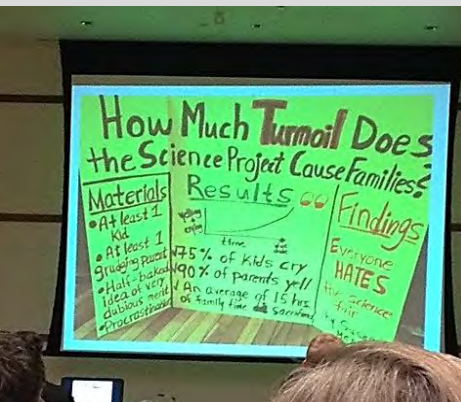
*Investigating a hydraulic fluid spill from a residential generator, requiring cleanup and abatement*

## Public Outreach

In 2014, SEMSWA participated in or sponsored over **30** events that provided an opportunity for the public to learn about water quality protection and what they could do to prevent negative impacts to our creeks and greenways. SEMSWA believes that these events strengthen the connection between people and their watershed, and reinforces that everyone has a role in protecting a stream's water quality. The goal of this outreach is to foster partnerships between SEMSWA and residents/businesses through education and shared natural resource values. In 2014, over **60,000** residents received utility or newsletter mailings. In addition, SEMSWA-sponsored outreach events reached **5,000** citizens via a combination of resource festivals; student, teacher, and civic projects; field tours; and HOA/volunteer events.

## Infiltration Study

In 2014, SEMSWA commenced a regional *Infiltration Study* to investigate the technical basis for assigning a level of water quality pretreatment that SEMSWA criteria requires for sites draining to Waters of the State upstream of, or within, our regional ponds. The study is evaluating four to six example sites to assess possible levels of pre-treatment achieved in grass swales and other vegetated areas through a test of infiltration and filtering potential. An additional goal of the project is to develop alternative criteria for on-site water quality facilities, expanding infiltration as a permanent best management practice that meets MS4 Permit requirements, and can be used for all development in SEMSWA's Service Area. The study will be completed in early 2015.

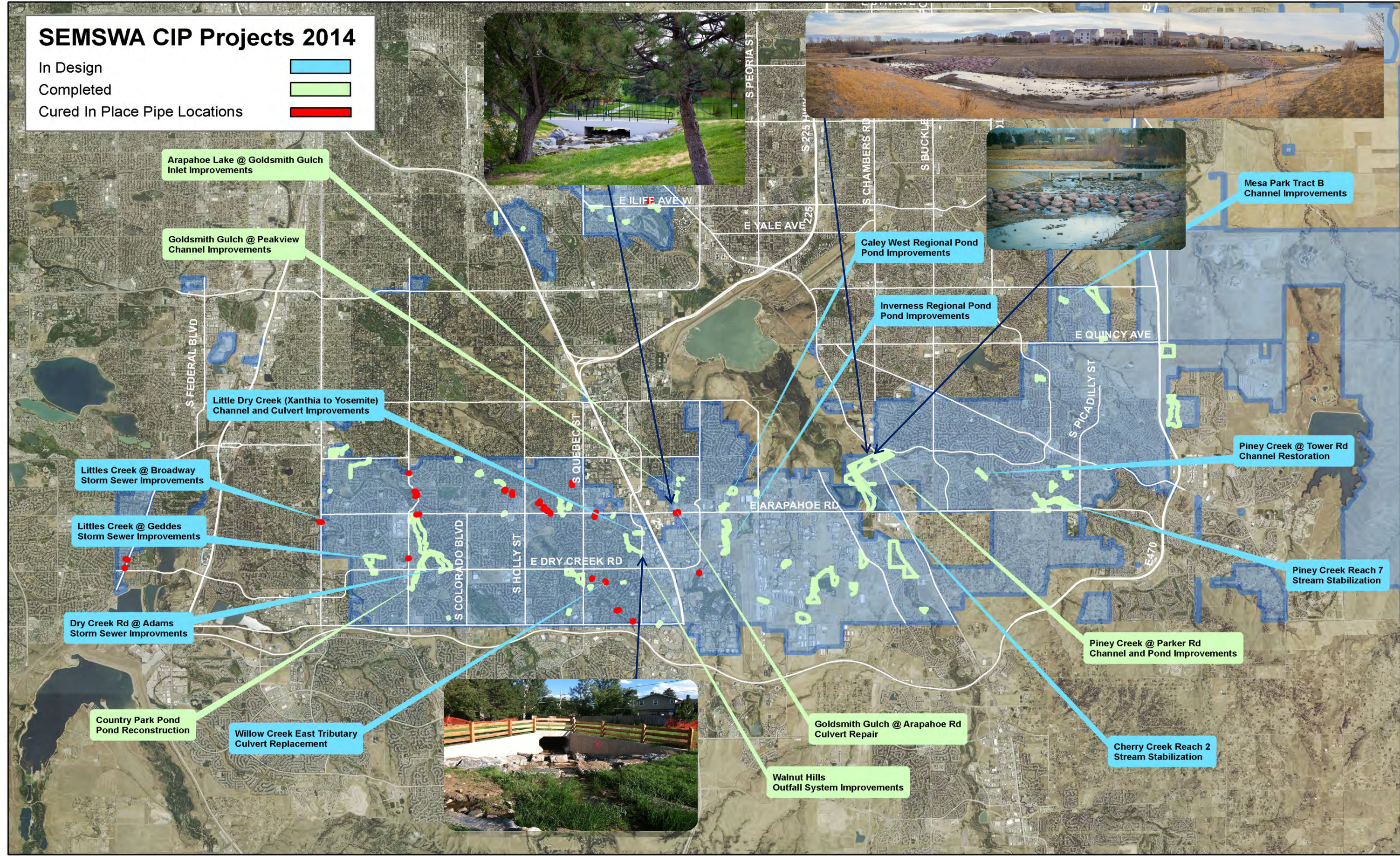


SEMSWA participated in the Denver Regional Science Fair, the Cherry Creek Watershed Rally Race, and a drainageway biological assessment with local students.



# SEMSWA CIP Projects 2014

- In Design
- Completed
- Cured In Place Pipe Locations







A new low water crossing replaced an older pedestrian bridge, and a new box culvert crossing replaced a break-away fence to ensure adequate flood conveyance.

SEMSWA implemented a multi-phased project along Goldsmith Gulch in unincorporated Arapahoe County (north of Arapahoe Road and east of Dayton Avenue) to establish improved channel function, decrease flooding damage, enhance water quality in the downstream Arapahoe Lake, and solve a floodplain violation. Arapahoe Lake, while private, plays an important role in the overall drainage system for the Gulch, its tributaries, and the local storm sewer system. The 3-acre lake acts as a low point for the collection of sediment, trash and debris, and provides flood storage for the higher flow events. The 2005 Master Plan for Goldsmith Gulch identified several projects to improve the channel and enhance water quality. The resulting multi-year project increased flood conveyance, improved the local storm sewer system, enhanced lake water quality, and improved channel function, at a total cost of \$1.7 million.

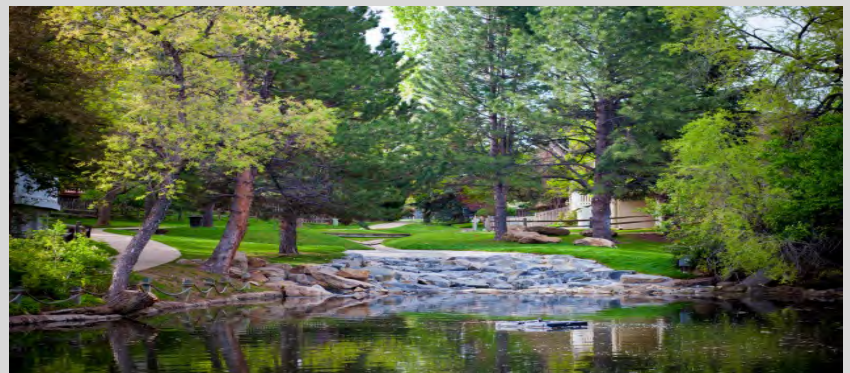
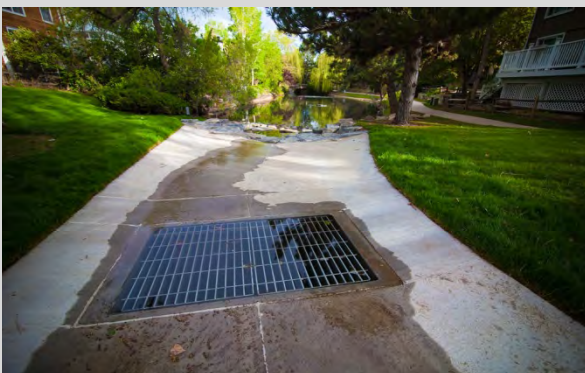


## "Lake Verbena Way", no more!

In 2014, SEMSWA CIP completed a major neighborhood stormwater conveyance project, including additional storm sewer pipe, street inlets and a new outfall to Little Dry Creek. The Hunters Hill and Walnut Hills subdivisions, located north of Dry Creek Road and West of Yosemite Avenue, experienced extensive street flooding during larger storm events due to a lack of capacity in the existing system. SEMSWA utilized existing easements and received additional drainage easements to complete the project - adding 1,400 feet of storm sewer and nearly three times the length of existing inlets, at a cost of \$1.4 Million.

## Completed Projects in 2014

- ✓ Goldsmith Gulch, Channel Improvements @ Peakview avenue
- ✓ Goldsmith Gulch, Arapahoe Lake Improvements
- ✓ Goldsmith Gulch, Arapahoe Road Culvert
- ✓ Little Dry Creek, Walnut Hills Outfall Improvements
- ✓ Big Dry Creek Tributary A, Country Park Pond Retrofit
- ✓ Piney Creek, Channel Stabilization at Parker Rd.
- ✓ Cured-in-Place Pipe (CIPP) Rehabilitation (20 locations)



A 'sump inlet' sediment collection facility was constructed immediately upstream of Arapahoe Lake along Goldsmith Gulch to improve the lake's water quality.



Land Development Program staff were busy in 2014 responding to a significant number of new land development applications. This continued the significant upward trend identified in 2013, with 113 cases in 2012, 140 cases in 2013, and **145** cases in 2014. Review staff attended **135** pre-submittal meetings in 2014, up from 105 in 2013, and 70 in 2012. Project submittals from an applicant typically include development plans, drainage reports, construction documents, and various permit applications reviewed for adherence to criteria. Land Development staff also review SEMSWA capital construction projects as well as City and County Public Works projects for adherence to standards, as part of the goal of ensuring responsible and resilient development of public infrastructure. Staff coordinate their reviews with Floodplain Management and Water Quality program staff to identify permitting requirements and discuss the technical merit of variances to the standards. This coordination assures the applicant of the smoothest path through the development process.

The Land Development staff were also excited to coordinate the final approvals for SEMSWA's new building in late 2014. The building site location, at a boundary between City and County jurisdictions in the Dove Valley Business Park, proved to be a valuable demonstration of the communication, coordination, and scheduling required for any development effort. The building has been a great financial planning success, and especially gratifying are the efficiencies available to maintenance crews as a result of the storage yard and equipment bays that put the necessary products, tools and machinery within easy reach at the start of each work day.



*The completed SEMSWA building and maintenance facility, built on SEMSWA-owned property located adjacent to Dove Creek Regional Detention and Water Quality Pond D-2.*

## Master Planning Program

Master Plans, completed in partnership with Urban Drainage and Flood Control District (UDFCD), are used to guide responsible development and identify future capital construction projects. This is accomplished through the delineation of flood hazard areas, identification of regional drainage and stormwater quality improvement opportunities, and recommendations for prioritizing efforts. Master planning for a basin may include several components, including major drainageway planning, outfall systems planning, and a flood hazard study, and it may take up to two years to fully complete the planning effort. During 2014, seven basins were studied, including **Senac Creek, Westerley Creek, Happy Canyon Creek, Box Elder Creek, Big Dry Creek, Sand Creek, and the Iliff Avenue corridor** in urban unincorporated Arapahoe County. The following master planning documents were completed in 2014:

- ✓ Senac Creek Major Drainageway Plan (MDP)
- ✓ Westerley Creek Flood Hazard Area Delineation (FHAD) study
- ✓ Happy Canyon Creek MDP and FHAD study
- ✓ Box Elder Creek MDP and FHAD study

Also during 2014, master planning efforts commenced for the following components in the studied basins:

- ✓ Big Dry Creek MDP and FHAD study
- ✓ Westerley Creek MDP
- ✓ Sand Creek Right Bank Tributaries MDP
- ✓ Iliff Avenue Outfall Systems Plan Addendum



*Big Dry Creek master planning concerns being addressed*





## CIP Special Project: Corrugated Metal Pipe Rehabilitation Program



*A corrugated metal pipe in critical condition*



*The Cured-in-Place (CIPP) pipe technology*



*The form-fitting resin tube being pressurized*

### Cured-in-Place Program

SEMSWA implemented a rehabilitation program to address corrugated metal pipe (CMP) storm sewers in critical condition using a Cured-in-Place Pipe (CIPP) technology. CIPP is the installation of a resin-impregnated flexible tube, which is inserted into an existing pipe, inflated and cured in place with various pressure techniques. The process provides a structurally sound, form fitting, and water-tight new 'pipe within a pipe', with a continuous and tight fit to the existing pipe. Though the new pipe diameter is slightly smaller than the previous CMP, the new smoother wall and joint-less pipe allows for better performance. The CIPP process has significantly lower costs and impacts associated with traffic control, trenching, asphalt replacement, and construction time as compared to full pipe replacement, while increasing the overall flow capacity through the improved pipe system. In 2012, SEMSWA completed its effort to video inspect all of the CMP pipe in the Service Area. Of the 41,100 linear feet of CMP within the SEMSWA Service Area, which includes 350 individual pipe segments, almost 10% were assessed as critical condition. The CIPP is a cost-effective, timely, and preventative strategy for preventing infrastructure failures, such as a road collapsing or a sink hole forming.



*A rehabilitated corrugated metal pipe outfall*

### Arapahoe Road at Goldsmith Gulch

An important CMP culvert under Arapahoe Road at Goldsmith Gulch also underwent structural reconstruction during 2014, essentially forming a new pipe within an existing structurally deteriorated pipe. The EcoCast™ System was used to install a liner inside the culvert that stops further water infiltration, rebuilds the structure surface and protects it from chemical attack. The pipe surface is cleaned and a geopolymer liner is spin-cast-applied to the interior surfaces. This method of pipe reconstruction is another method for pipe rehabilitation, and is especially merited for larger pipes under major arterial roadways for which failure could be very disruptive, hazardous to public health, and very expensive to repair after failure.



*Before*



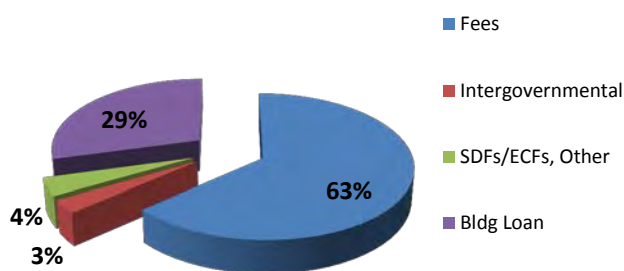
*After*



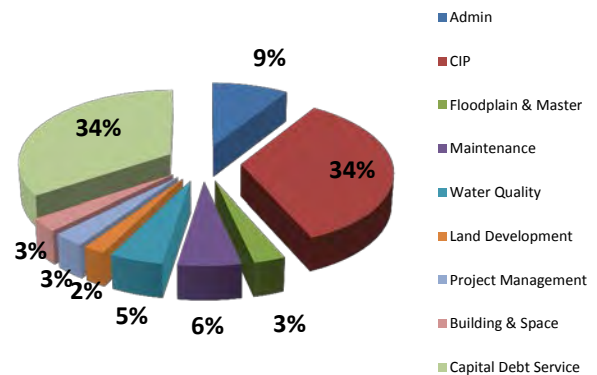
SEMSWA is a political subdivision and a public corporation of the State, falling under the guidelines of the Colorado Revised Statutes (C.R.S.) for a "drainage authority" (29-1-204.2 C.R.S.). SEMSWA is an enterprise activity that is financed by fees based on the amount of runoff each property contributes to the storm sewer system, calculated from the amount of impervious area (e.g. roof, driveway, parking lot) and density.

SEMSWA's purpose is to plan, fund, construct, and maintain drainage and flood control facilities within the service area. The SEMSWA Board has set fees to provide sufficient funds to properly manage stormwater runoff, protect water quality, and meet State and Federal regulatory requirements. Property owners can find more information about the fee calculations, including an appeals process, at [www.semswa.org](http://www.semswa.org).

### 2014 Revenue



### 2014 Expenses



## GIS/IT Solutions

During 2014, the Geographic Information System (GIS)/Information Technology (IT) Solutions group completed a stream channel inventory project, in collaboration with the Capital Improvement program, to collect data on channel, outfall, and infrastructure in need of restoration, maintenance, repair or replacement. All stream channel data was mapped with GPS and adds to the ongoing inventory of hard stormwater assets like pipe and structures. The goal is a comprehensive asset management database. The GIS/IT staff also continued to lead the integration of GIS data within all program areas.

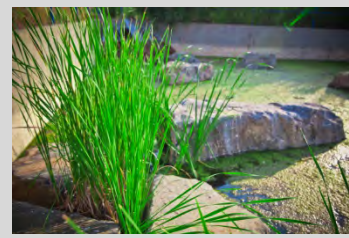
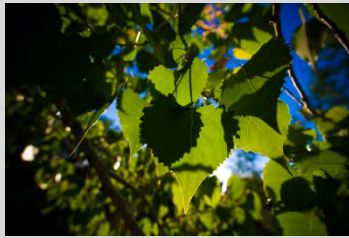
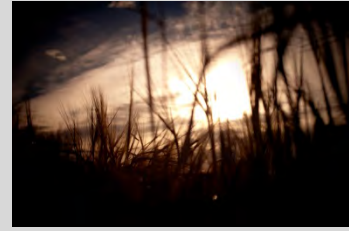
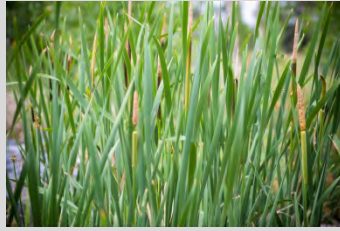
Also during 2014, the GIS/IT group continued the process of upgrading the existing data management and records software to an automated software system for permitting, plan review, Work Order, and stormwater asset management. SEMSWA purchased the EnerGov™ Land Management and Asset Management software suites, and associated review, customer portal, and mobile inspections modules.

A majority of 2014 was devoted to translating SEMSWA processes to system configurations, internal testing, building custom reports and maps, conversion testing, and verifying system acceptance. Data conversion, customizing, and user training will continue into 2015. EnerGov will assist SEMSWA in saving time, energy and dollars, by controlling the flow of documents, preventing them from being handled multiple times, stored in multiple places, misfiled or misplaced. In planning for future needs, the software will eventually allow customer access to check status of permitting for their development project.



Components of the EnerGov software upgrade to facilitate SEMSWA programs





*Some of the flora in the vicinity of completed projects in the SEMSWA Service area; photos provided by Vintage Spark Photography*

SEMSWA is a legal entity formed through an intergovernmental agreement between Arapahoe County, the City of Centennial, Arapahoe County Water and Wastewater Authority, East Cherry Creek Valley Water and Sanitation District, and the Inverness Water and Sanitation District. The boundaries of SEMSWA cover the City of Centennial and the developed areas of the unincorporated portions of the County. SEMSWA, which is also an Enterprise, provides the resources and funding to protect people and property from flooding while also complying with water quality regulations.

#### SEMSWA 2014 Board Members, Representation, and Contact Information

Rod Bockenfeld, Arapahoe County, [rbockenfeld@arapahoegov.com](mailto:rbockenfeld@arapahoegov.com)  
 Nancy Doty, Arapahoe County, [ndoty@arapahoegov.com](mailto:ndoty@arapahoegov.com)  
 Linda Lehrer, Special Districts, [Lehrer@q.com](mailto:Lehrer@q.com)  
 Bart Miller, Chair, City of Centennial, [bart.miller@state.co.us](mailto:bart.miller@state.co.us)  
 Stephanie Piko, City of Centennial, [spiko@centennialcolorado.com](mailto:spiko@centennialcolorado.com)  
 Ron Weidmann, City of Centennial, [ron\\_weidmann@comcast.net](mailto:ron_weidmann@comcast.net)  
 Nancy Sharpe, Arapahoe County Alternate, [nsharpe@arapahoegov.com](mailto:nsharpe@arapahoegov.com)  
 Andrea Suhaka, City of Centennial Alternate, [standy@ecentral.com](mailto:standy@ecentral.com)

