

2017 ANNUAL REPORT





A Message from the Executive Director

Welcome to the Southeast Metro Stormwater Authority's (SEMSWA) annual reporting of 2017 activities. We try to emphasize those items of most interest to you, our ratepayers, who own property in neighborhoods, commercial districts, and business parks. We hope these highlights provide insight into our stormwater program areas and the services we deliver.

SEMSWA celebrated 10 years of providing floodplain and stormwater management services in 2017. While our formation dates to the fall of 2006, it wasn't until 2007 that we began collecting fees to fund our essential program areas. These past 10 years have flown by, as each capital construction project, routine maintenance repair, and land development review has validated the bold decision to form an enterprise activity devoted to improving critical infrastructure, preserving drainageway floodplain capacities, and protecting our shared natural resources.

The work completed and the lessons learned in these 10 years have led to performance improvements in all of our program areas. In this report, you'll read about the significant ways we are increasing our maintenance level of service. We've upgraded our camera system and pipe inventory program from a singularly-focused condition assessment to a comprehensive, systematic look at pipe integrity that identifies vulnerabilities. This means a better handle on pipe and culvert damage that could cause future problems and an increased coordination with other entities that manage underground utilities.

We continue to evaluate and upgrade the regulatory part of our mission to make sure that we effectively respond to and assist with responsible development while

protecting natural resources. Our focus on maintenance program efforts forced us to stay ahead of the curve with more proactive permitting of routine maintenance activities.

SEMSWA continued the aggressive schedule to stabilize Piney Creek, setting the stage for a 2018 completion of the three-year, \$15 million capital construction effort to restore stream health and to safely convey flood flows. Experiences with this sandy tributary to Cherry Creek have illustrated the importance of acquiring necessary easements and finding new options and innovative ways for re-use, storage, and disposal of removed sediment. All of these important 'lessons learned' mean more effective management of funds that protect, preserve and enhance our storm system and your property.

John A. McCarty, PE, PWLF

***The SEMSWA Mission:
Providing flood control and
stormwater management services
to our community.***



BEFORE



AFTER

A new stream culvert crossing for Unnamed Creek results in a safe trail to Dakota Valley Elementary school



BEFORE



AFTER

A heavily eroded reach of Piney Creek reclaimed with channel grade control and a bank protection test section using tree root wads.



Maintenance and Inspections Division

The Maintenance and Inspections Division crews are responsible for quarterly inspections and routine maintenance at over 100 regional stormwater facilities, and thousands of stormwater infrastructure assets to ensure adequate storm flow conveyance and detention during rain events. In 2017, almost 100,000 feet of storm pipe, including roadway culverts, were inspected using a robotic camera and closed-circuit TV (CCTV) system. This identified potential damage that could cause future issues, like sinkholes in roadways. Also in 2017, vegetation, trash and debris removal activities were conducted along 6,600 linear feet of channel within regional on-line facilities.

The Maintenance Division must assess whether a sediment, vegetation or trash/debris removal site can be done with internal resources or requires specialized or larger equipment, for a longer period of time, that could negatively impact routine maintenance schedules. For these larger, longer maintenance projects, SEMSWA has the option to utilize Contractors from the On-Call Contractor list to preserve maintenance timetables and sustain the level of service needed for our drainageways, regional facilities, and system-wide infrastructure.

LEFT: Both pipes and structures can be viewed with the CCTV system to assess conditions and plan repair work **BELOW:** Debris in the drainageways comes in all forms, ranging from vegetation to sofas to encampments. SEMSWA, along with the Urban Drainage and Flood Control District, is responsible to make sure the conveyance of flood flows can be accommodated within the drainageway and to mitigate potential impacts to adjacent property from a debris clogged roadway culvert backing up flows.



Permitting for Routine Maintenance Projects



Stormwater management facilities can be permitted for routine maintenance with a Nationwide Permit 43, as long as wetland impacts are under 1/10 acre and returned to as-built conditions. Pond Outlet structure pictured above.

SEMSWA's routine maintenance activities for roadway inlets and storm pipes in the right-of-way do not require any environmental permitting. Other infrastructure assets that convey and detain stormwater are located in the vicinity of wetlands and riparian areas and are subject to federal permits, in addition to state and local permits, to work in Waters of the U.S. (WOTUS).

Several U.S. Army Corps of Engineers (USACE) Clean Water Act Section 404 nationwide permits (NWP), including NWP 3 (maintenance), NWP 13 (bank stabilization), and NWP 43 (stormwater facility), are used for routine maintenance of SEMSWA facilities and infrastructure assets associated with WOTUS. During 2017, SEMSWA staff pre-emptively permitted all regional facilities, and prioritized outfalls and culverts identified as vulnerable. This proactive permitting approach takes time, but allows more efficient scheduling of resources and effective use of staff and equipment with less downtime between activities.



Roadway culvert



Outfall structure w/forebay

Engineering & Construction Division



AFTER



BEFORE

Redefinition of the Piney Creek Reach 7 channel west of Liverpool Street, with stabilized banks decreasing sediment transport downstream to Cherry Creek

Capital Improvement Program (CIP)

SEMSWA continued to make progress in 2017 to reclaim Piney Creek, with two more projects completed and one last project in construction. The completed Piney and Antelope Creeks Confluence project included bank stabilization, channel protection and three grade control structures to reduce sediment loads to Cherry Creek and ultimately the Cherry Creek Reservoir. The completed Piney Creek at Liverpool - Reach 7 project Included similar stream and channel work, with six grade control structures, and an

innovative use of on-site tree root wads to pilot test a bio-engineering approach for bank protection alongside more typical soil riprap. The Piney Creek, Reach 6 - Phase 2 project is underway to address similar stream issues and mitigate a major source of sediment. The Cherry Creek Basin Water Quality Authority, a partner in the reclamation of Piney Creek, has estimated that almost 75 pounds of Phosphorous will be eliminated annually from transport to the Reservoir from the two completed Piney Creek projects.



Unnamed Creek Tributary: Mesa HOA Trail

SEMSWA partnered with Arapahoe Park and Recreation District (APRD) to complete drainageway open space/access trail improvements in the vicinity of Dakota Valley Elementary School. The heavily-used trail was unsafe during and after rain and snowfall events and required substantial sediment and vegetation removal, a new stream crossing culvert, and removal and replacement of some concrete trail sections. This work improved the drainage along the open space immediately upstream and downstream of the trail crossing and resulted in upgrades to the school access trail.

CIP Projects Completed:

Unnamed Tributary: Mesa HOA Tract C Channel Improvements

Piney & Antelope Creeks Confluence: Channel Improvements"

Piney Creek: Liverpool - Reach 7 Channel Improvements

CIP Projects In Progress:

Piney Creek: Reach 6 - Phase 2 Channel Improvements

Cherry Creek: Reach 2 Channel Improvements

Willow Creek: Quebec to Dry Creek Channel Improvements

Unnamed Tributary: Mesa HOA Tract B Channel Improvements

Big Dry Creek: E. Dry Creek Rd at S. Adams St. Storm Sewer Improvements

Innovative Bank Protection

A typical stream reclamation project like Piney Creek, where erosion has degraded the channel and disconnected the overbanks from the stream water source, exposes many dead or dying cottonwood trees. The Reach 7 project took advantage of a bad situation and harvested the trees and their root wads for a pilot project to test the level of bank protection the roots could provide. Since this was a test project, a hard armor behind the root wads provides back-up protection if the root wad fails to deflect storm flows adequately.



Tree root wads ready for placement along the bank



Root wads line the bank, reinforced by hard armoring



An influx of hotels and extended stay options in the City and County both support and promote new business, including Hampton Inn (left), WoodSpring Suites (middle), and Waterwalk Extended Stay (right).

Land Development Program

Land Development Program staff were busy in 2017 responding to 134 new applications for development in the City and urban unincorporated Arapahoe County. A sign of continued growth is the record number of Pre-submittal Meetings staff prepared for and attended: 186 pre-submittal meetings in 2017, up from 164 in 2016, and 151 in 2015. Project submittals from an Applicant typically include drainage reports, construction documents, and various permit applications reviewed for adherence to criteria. Staff also reviewed six SEMSWA capital construction projects as well as City and County Public Works projects for

adherence to standards, as part of the goal of ensuring resilient construction of public infrastructure. Staff coordinate their reviews with Floodplain and Water Quality program staff to identify permitting requirements and discuss the technical merit of requested variances to the standards. This coordination provides the Applicant and the Development Team the smoothest path through the development process.

In 2017, the Land Development staff coordinated plan approvals and site as-builts for several new hotel projects. These include

Hampton Inn in Arapahoe County's Inverness Business Park area, and Woodspring Extended Stay, Waterwalk Extended Stay, Uptown Suites, Home2 Suites, and Holiday Inn, all located along Arapahoe Road in Centennial. This developing south-metro area is continuing to see an influx of significant developments that make this a vibrant destination for new businesses. SEMSWA's regional system approach to stormwater management in these areas encourages the maximum developable footprint for these owner/developers, while protecting our resources.

Master Planning Program



The Big Dry Creek & Tributaries flood hazard areas that were approximately identified in the completed 2015 Master Plan will be formally delineated in the Flood Hazard Area Delineation study.

Master Plans, completed in partnership with Urban Drainage and Flood Control District (UDFCD), are used to guide responsible development by planning for adequate storm drainage infrastructure, and to identify future capital construction projects. Master planning includes the identification of flood hazard areas, classification of regional drainage and stormwater quality improvement opportunities, and recommendations for prioritizing capital construction projects and maintenance efforts.

Master planning for a basin takes various forms, including major drainageway planning, outfall systems planning, alternative analysis, administrative updates, and/or a flood hazard delineation study. Since several of these components may be concurrent, it may take

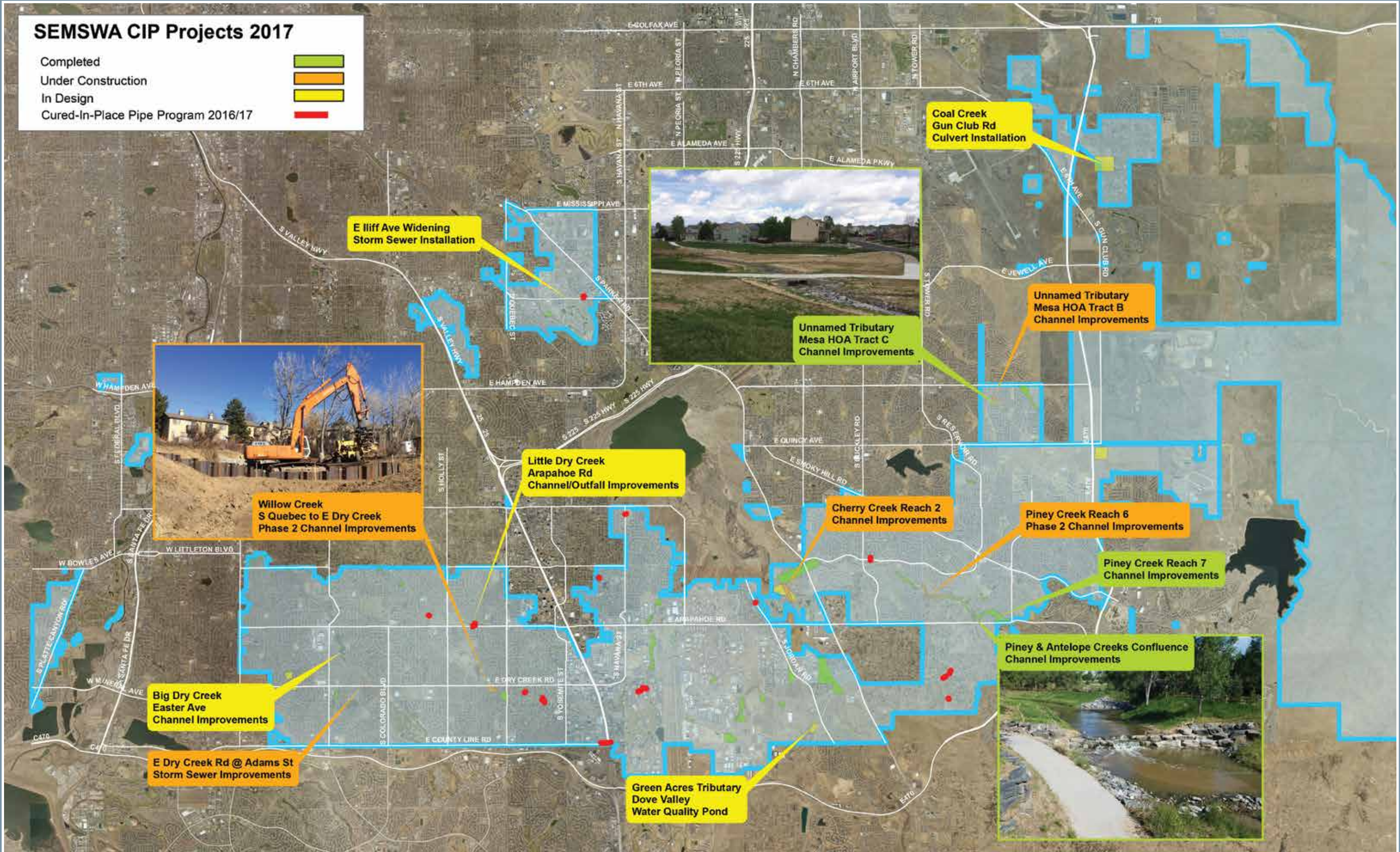
up to three years to fully complete the basin planning effort and receive State approval of the plan. During 2017, five basins, including Big Dry Creek, First Creek, SJCD 6100 North, Goldsmith Gulch, and the South Platte River, were studied. In addition, the Highline Canal continued to be studied in 2017, including options for providing regional water quality treatment.

Several master planning efforts commenced or were continued into 2017, and include:

- Big Dry Creek & Tributaries Flood Hazard Area Delineation (FHAD) Study
- First Creek, Outfall Systems Plan (OSP)
- South Platte River, FHAD
- SJCD 6100 N, Major Drainageway Plan (MDP) and FHAD
- Goldsmith Gulch, MDP and FHAD

SEMSWA CIP Projects 2017

- Completed
- Under Construction
- In Design
- Cured-In-Place Pipe Program 2016/17



Floodplain Management Program

Floodplain management is a comprehensive program of preventative and corrective measures to reduce losses associated with flooding. Floodplain management measures may include land use regulations for installation of flood control projects, floodproofing of structures, floodplain preservation through easements, acquisition of flood prone properties, and educational outreach on behalf of the City and County. SEMSWA regulates to the standard that natural floodplains provide many benefits to citizens, including natural attenuation of

flood peaks, water quality enhancement, groundwater recharge, wildlife habitat and movement corridors, and opportunities for recreation. Contrasting that, floods can result in loss of life, increased threats to public health and safety, damage to private property, damage to public infrastructure and utilities, and economic impacts to residents. SEMSWA has an important mission: preserve nature's own 'dedicated area' for storm flows.

Outreach efforts in 2017 provided flood risk information through newsletter articles that reached 60,000 residents and businesses, and direct mailings by UDFCD to 2,000 County and City citizens. SEMSWA also provided map information in response to many inquiries requesting assistance in defining floodplain limits and what that means to the property owner; call us at 303-8585-8844 if you need assistance. Mapping is also available from the FEMA Flood Map Service Center, <https://msc.fema.gov.portal>.

Elevation Certificate Grant Program

SEMSWA initiated the Elevation Certificate Grant Program (ECGP) in 2017 to provide an Elevation Certificate to residential property owners who are newly mapped into the flood hazard area as a result of flood map changes. The intent of the ECGP is to relieve homeowners of the financial burden of obtaining an Elevation Certificate.

The Elevation Certificate can be used to demonstrate that a residential structure is properly elevated out of the floodplain, to obtain an accurate flood insurance rating quote, or potentially negate the need for any flood insurance. At this time, commercial properties are not eligible for the ECGP; however, a residential rental property is eligible. A property must meet criteria to be considered eligible; the ECGP implementation procedure document is available at www.SEMSWA.org.

Floodplain Easement Acquisition



Many floodplain areas are privately owned without dedicated Floodplain easements. SEMSWA cannot conduct inspections, perform routine maintenance or construct improvements on private property. These activities are critical to reducing flood risk.

In 2017, SEMSWA initiated efforts to work with private property owners to acquire Floodplain easements. Through this effort, SEMSWA will advise property owners

of their current floodplain risk, update future capital construction plans, share news of upcoming maintenance, and advise on applicable regulations. It is also an opportunity for the property owner to inform SEMSWA of historical flooding or current issues to help us prioritize future maintenance and capital improvements, and identify drainageways needing master planning.

Obtaining Floodplain Permits



A Floodplain Development Permit (FPDP) is required for any development or activity proposed in the Floodplain. Development is defined as "any man-made change to improved or un-improved real estate, including but not limited to buildings or other structures,

mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment and materials". The FPDP is required prior to issuance of a building permit, issuance of a street cut or right-of-way use permit, issuance of a grading permit, issuance of a public improvement permit, and any other development,

use or change in the use of land located in the Floodplain.

All activities proposed in the floodplain, regardless of impact, need to be permitted to assess the impact and review compliance with codes and requirements. In 2017, SEMSWA issued 38 FPDPs and reviewed eight floodplain modification requests.



During 2017, the SEMSWA Water Quality group worked with the Inspections group to update the Grading, Sediment and Erosion Control (GESC) Manual and streamline permitting and application processes. The trimmed GESC Manual will be a recognition of the advances in understanding construction site water quality protections by developers, Design Engineers and Contractors. GESC measures at construction sites comprise a critical program area of SEMSWA's Municipal Separate Storm Sewer System (MS4) Permit from the State.

In 2017, 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 230 construction sites; ensuring the proper construction of 10 water quality treatment facilities for new development; resolving 32 illicit discharge reports from the public; and sponsoring the safe disposal of 41,000 pounds of household hazardous waste collected via 433 curbside collections.

Erosion Control Blanket is a GESC measure used along Piney Creek to protect the creek from sediment run-on until the banks are vegetated and can protect stream quality.

APWA Environmental Award

In 2017, SEMSWA received an award from the American Public Works Association (APWA) for the SEMSWA Water Quality Landscape Demonstration site. The award recognized the construction of an 'infiltration infrastructure demonstration site' that maximizes the use of landscaped spaces for pollutant removal and direct runoff reduction for the SEMSWA building's hardscape areas. Infiltration via infrastructure like vegetated bioswales, wet meadows, and living walls, has overall superior water quality improvement. Incorporating these water quality enhancements in a landscape project highlights the ability for a developer to maximize the functionality and sustainability of lot-level stormwater treatment infrastructure to meet SEMSWA's MS4 Permit regulations. These infiltration measures optimize the aesthetics of the urban landscape, while targeting and removing pollutants from urban stormwater runoff.



The SEMSWA Building final landscape included attractive green infrastructure

Public Outreach

SEMSWA sponsors outreach events to strengthen the connection between people and their watershed, and reaches thousands of citizens via a combination of public meetings, festivals, classroom & field projects, field tours/workshops, and volunteer events. In 2017, SEMSWA participated in, or sponsored, 22 events that provided an opportunity for the public to learn about stormwater and what role they have in protecting a stream's water quality. Also in 2017, over 60,000 residents received our annual report highlighting stormwater management services. SEMSWA also sponsored 12 local newspaper ads, and installed 44 drainage basin signs.

SPLASH Training Opportunities

The Stormwater Permittees for Local Awareness of Stream Health (SPLASH) group, consisting of Arapahoe County MS4 Permit holders, continued its stormwater quality training schedule this year. Special training held at SEMSWA included *Stormwater Chemistry: Principles and Applications*, and an update on the *U.S. Army Corps of Engineers 2017 Nationwide Permit*. Over 70 attendees took advantage of this free training.



During 2017, SEMSWA sponsored and participated in the Cherry Creek Bike Tour, Stewardship Partners Annual Conference, and Centennial's Public Works Week.

On-Call Consultant and Contractor Services



In 2017, SEMSWA requested Statements of Qualifications (SOQ) from local, experienced professional firms with the goal of developing both a Consultant and Contractor shortlist for several On-Call categories, including engineering design, geotechnical services, surveying, floodplain modeling, environmental permitting, ecology assessments, and Contract Maintenance. These On-Call Shortlists provide external consulting and contracting resources that are specialized to perform discrete and short-term Tasks, which extends SEMSWA's capability to complete important projects.

The Environmental Resources Division utilized several On-Call consultants to enhance SEMSWA's program to meet MS4 Permit requirements for Post-Construction Control Measures and Public Education and Outreach efforts. A joint project with UDFCD and Douglas County developed a draft runoff reduction fact sheet and spreadsheet for Design Engineers to optimize site area for



The iNaturalist© app allows visitors to the Eco Park to be citizen scientists. (ABOVE)
Grass Swales are green infrastructure that can minimize hard control structures. (BELOW)

infiltration green infrastructure, minimizing the more costly hard structure control measures. Another consultant assisted SEMSWA with maximizing the visitor experience at the popular Ecological Park along Cherry Creek with a specialized App within the iNaturalist© environmental data tracking program software.

The Maintenance Division managed On-Call Contractors to conduct large maintenance projects that are more complex, have extensive water control to keep the site dry during operations, require specialized or larger equipment, and have a longer duration. These contracted maintenance projects allow SEMSWA to 'catch up' those sites where

maintenance has not been performed for many years, and where committing SEMSWA crews could jeopardize the schedule of routine maintenance services needed in neighborhoods. This two-pronged approach, scheduled in-house routine maintenance and catch up contracted maintenance, leads to a consistent level of service by keeping internal focus on local systems and external resources on one-time extensive efforts. These catch up sites will then be incorporated into a routine maintenance schedule. An example is vegetation management along Windmill Creek within Regional Pond W-4 (Below).

Dense and unfavorable vegetation along Windmill Creek within Regional Pond W-4 obstructed storm runoff conveyance prior to removing and recycling.



Administration Division

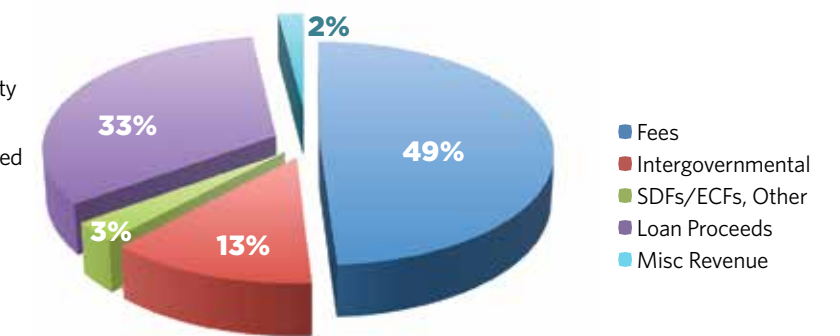
SEMSWA Financials

SEMSWA is a political subdivision and a public corporation of the State, formed pursuant to Section 29-1-204.2 of the Colorado Revised Statutes. SEMSWA is an enterprise activity that is financed by fees based on the amount of runoff each property contributes to the storm drainage system, calculated from the amount of impervious area (e.g. roof, driveway, parking lot) and density.

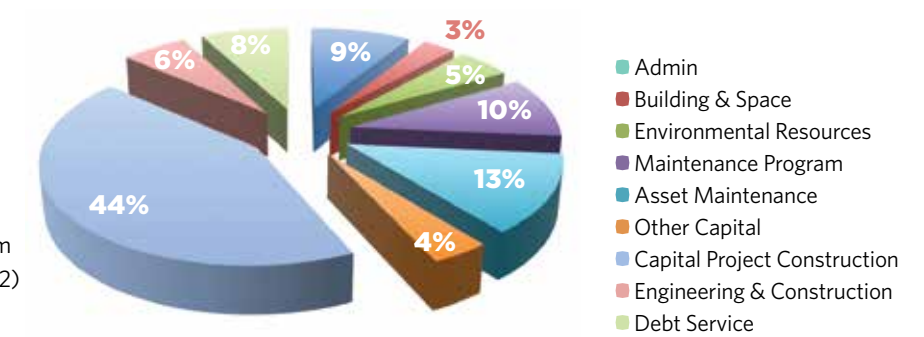
SEMSWA's purpose is to plan, fund, construct, and maintain drainage and flood control facilities within the service area. The SEMSWA Board has set fees to provide sufficient funds to effectively and efficiently convey flood flows, protect water quality, and meet State and Federal regulatory requirements. Property owners can find more information about the fee calculations at www.semswa.org.

These charts show 2017 revenue and expenditure percentages. All program area expenses for 2017 were typical for any given year, with two exceptions: 1) maintenance categories that show increases resulting from a better understanding of the level of service needed; and 2) additional capital construction debt service resulting from the repayment of the Loan obtained to complete Piney Creek improvements. Revenues for 2017 included the \$7 Million loan proceeds to fund the extensive improvements needed to expeditiously construct the Piney Creek projects.

2017 Revenue (\$21,329,214)



2017 Expenditures (\$16,797,602)



GIS/IT Solutions

Closed Circuit Television Infrastructure Assessment

During 2017, SEMSWA implemented an update to the Closed Circuit Television (CCTV) pipe video inspection program to support asset management efforts. During 2016, the new CCTV software system was fully integrated with GIS software and data, making CCTV inspections more visual and easily located. Routine database updates were automated as well, bringing mobile inspections into the office for immediate use, keeping databases synchronized without extensive staff effort or time investment.

In 2017, SEMSWA switched the focus of CCTV efforts from a discrete

infrastructure condition assessment that documented pipe sections as good, fair, poor and critical, to a comprehensive CCTV assessment/GIS- assisted tracking of all infrastructure within a neighborhood, or Routine Maintenance Area (RMA). All issues found and documented with the robotic camera system can now be systematically identified for next step Work Orders, including Vector™ truck sediment removal, followed by either scheduled pipe repair or replacement, or pipe lining with the Cured-In-Place Pipe (CIPP) Program. Knowledge gained during these RMA evaluations tracked in GIS also leads to an appropriate level of routine maintenance



service. Well-maintained infrastructure goes a long way to mitigate our vulnerabilities during rain events with high storm flows.

2017 ANNUAL REPORT



Damaged corrugated metal pipe discovered initially during 2017 CCTV inspections that will result in multiple pipe-lining projects or full pipe replacement projects.

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 provides the resources and funding to protect people and property from flooding while also complying with water quality regulations.



SEMSWA 2017 Board Members, Representation, and Contact Information

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- Nancy Sharpe, Arapahoe County, nsharpe@arapahoegov.com
- Linda Lehrer, Special Districts, lehrer@q.com
- Bart Miller, Chair, City of Centennial, bart.miller@state.co.us
- Stephanie Piko, City of Centennial, spiko@centennialgov.com
- Ron Weidmann, City of Centennial, ron_weidmann@comcast.net
- Kathleen Conti, Arapahoe County Alternate, kconti@arapahoegov.com
- Carrie Penalzo, City of Centennial Alternate, cpenalzo@centennialgov.com

This annual report is an informal compilation of activities to provide a continuing history of our program area achievements.