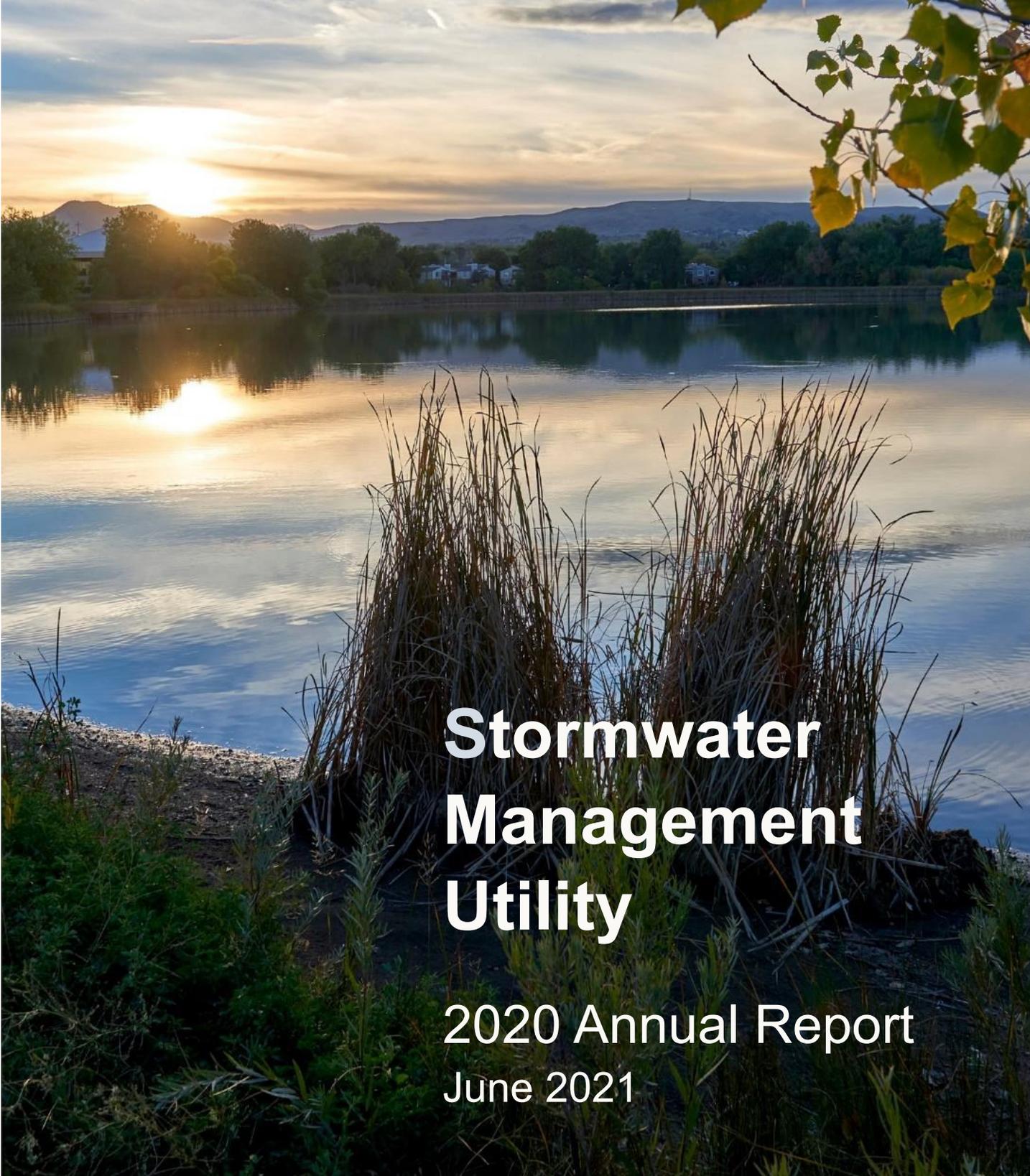




Lakewood
Public Works Department

A landscape photograph of a lake at sunset. The sun is low on the horizon, casting a golden glow across the sky and reflecting on the water. In the foreground, there are tall, thin reeds and some green plants. The background shows a line of trees and distant hills under a cloudy sky.

Stormwater Management Utility

2020 Annual Report
June 2021

The Stormwater Management Utility provides services and improvements throughout the city including:

- Maintenance of existing drainage facilities
- Water quality monitoring, testing, and resolution of pollution issues
- Funding for improvements to the drainage system
- Replacement of older, deteriorated facilities
- Emergency response to street and drainageway flooding problems during and after significant storm events

Maintenance

Without maintenance, many drainage facilities lose their capacity to handle the amount of water for which they were designed. Debris is washed into the drainage system where it accumulates and decreases the capacity of inlets, channels, culverts and pipes. Reduced conveyance capacity increases flooding risk.

The Stormwater Management Utility is focused on minimizing damage to property by ensuring the stormwater system is clean and functioning properly. The maintenance program is a cyclical program that ensures certain facilities are inspected every two years. All obstructions are removed the same year as they are identified during inspection. Last year, the following routine work was completed:

- 1,223 inlets were inspected
- Over 6 miles of gulches were inspected
- 311 cubic yards of debris were removed from gulches and waterways
- Approximately 80 trash racks and grates were inspected after every storm

The effectiveness of inlets is reduced when the grates get plugged with debris.



Many abandoned camps were found along drainageways. Trash and debris creates environmental problems and can wash into the stream during storms, clogging culverts and polluting the stormwater. In 2020 Stormwater Utility crews and contractors removed trash from several camps throughout the city.



The Utility hired a contractor to remove trash and debris and to clear brush from these camping areas along Dry Gulch. The contractor removed 173 cubic yards of trash for a cost of approximately \$20,000. Clearing the brush and removing tree limbs to eight feet off the ground has opened up these sections of the gulch and camping has diminished.

This camp was set up inside the large box culvert that carries North Dry Gulch under Harlan Street, north of 13th Avenue, creating the potential for harm to the campers due to quickly rising stormwater. The Utility regularly inspects the large culverts to remove the camps. Utility crews removed 13 cubic yards of debris from this camp at a cost of \$1,100.



Before



After the clean-up

Years of debris clogged most of this large culvert carrying Lakewood Gulch under Kipling Street at 10th Avenue. Utility crews removed 24 cubic yards of tree limbs, tires, trash and silt.



When the blockage was discovered, most of the capacity of the culvert was restricted by the debris.

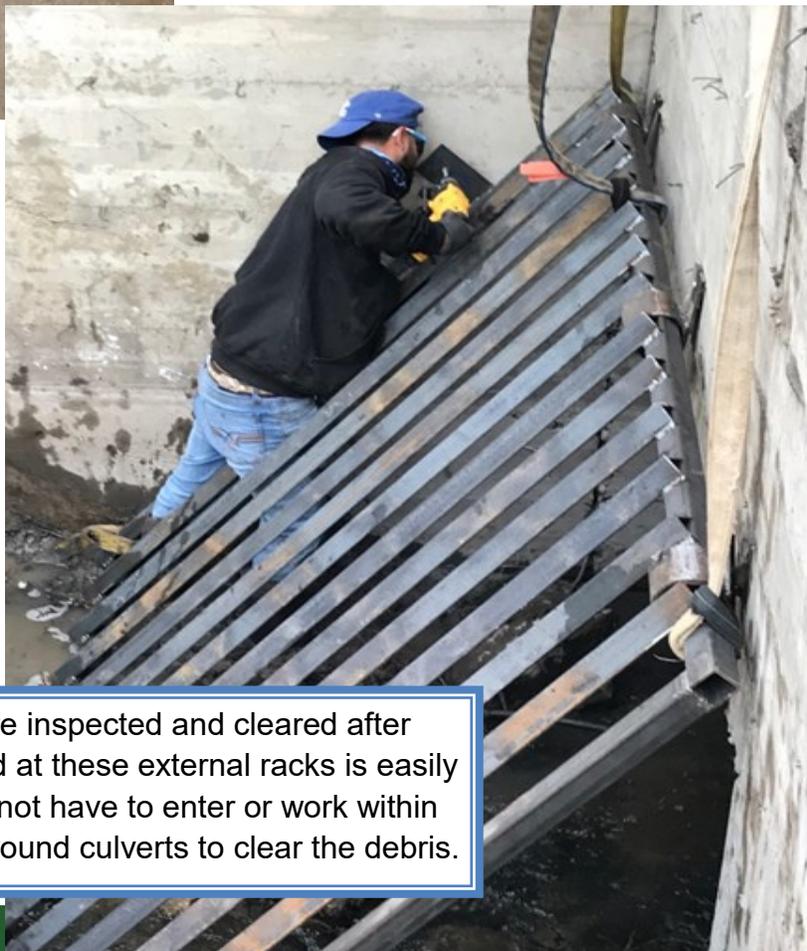


After the clean-up, the capacity of the culvert was restored, allowing the free flow of stormwater.

To prevent the blockage shown on the previous page, Stormwater Utility crews installed a trash rack at the upstream end of the culvert to trap tree limbs and large debris outside of the culvert. Materials and labor to clean the culvert and install the trash rack totaled approximately \$15,500.



Utility crews fabricated the trash rack in the maintenance shop and then installed it at the entrance to the box culvert.



Trash racks throughout the city are inspected and cleared after major rain storms. Debris trapped at these external racks is easily removed and the Utility crews do not have to enter or work within the confined space of the underground culverts to clear the debris.

Some of the underground storm sewer system has reached the end of its useful life and the Stormwater Management Utility replaces pipes and culverts as necessary. This page and the next page show several locations where Utility crews replaced storm sewer in 2020.



At this location at 6th Avenue and Flora Street, 105 feet of corroded metal pipe was replaced with 15-inch polyethylene pipe for a cost of approximately \$16,250.



Sixty feet of metal pipe was replaced on South Harlan Street for a cost of approximately \$4,800.



At 23rd Avenue and Iris Street, a small corroded pipe was replaced with a larger diameter plastic pipe under the street. Utility crews installed the new pipe and restored the pavement for a cost of approximately \$5,200.

Construction Projects

The Stormwater Management Utility undertakes construction of several drainage projects each year. Before construction can begin, the Utility activities include:

- Obtaining input from affected property owners during the design process
- Designing the improvements and preparing plans
- Acquiring necessary easements for the proposed work
- Identifying funding from the Utility's revenue and the Mile High Flood District
- Receiving bids from contractors
- Notifying adjacent property owners of the construction activities

The Utility often partners with the Mile High Flood District to improve major drainageways and for maintenance projects along major drainageways. The District provides technical expertise and funds for many of the Utility's projects. The District's funds are derived from a property tax collected throughout the metropolitan region. Obtaining District funds for major improvement projects requires city matching funds. For years prior to the creation of the Utility, Lakewood was not able to match the District's funds and the District spent funds available to Lakewood in other jurisdictions. The Stormwater Management Utility now provides the required matching funds. The Utility prioritizes the District's maintenance projects and routine maintenance activities, which do not require matching funds.

Mile High Flood District funds budgeted for use in Lakewood during the year included:

- Capital projects: \$700,000
- Flood Hazard Area Delineation projects: \$100,000
- Maintenance/restoration projects: \$230,000
- Routine maintenance activities: \$64,000

The following pages highlight some of the construction activities during the year.

McIntyre Gulch at S. Urban Street - Bank Stabilization and Channel Repair:

Erosion along the bottom of McIntyre Gulch downstream of South Urban Street created a “scour hole” causing a separation of the south wing wall from the box culvert. Repair work included filling in the scour hole with rip rap to remove the standing water, stabilizing the wing wall footings, grouting the gap between the wing wall and box culvert, and rip rap stabilization along a portion of the south bank. The design and construction costs of \$10,000 were entirely funded by the Mile High Flood District’s maintenance program.



Before



After

Lakewood Gulch at 891 Garrison Street - Channel Repairs

Channel banks were repaired along four locations of Lakewood Gulch between Garrison Street and Independence Street. Restoration work included installation of riprap, boulders, soil lifts and reseeding. Design and construction costs were \$81,000 and were funded entirely by the Mile High Flood District's maintenance program.



Before



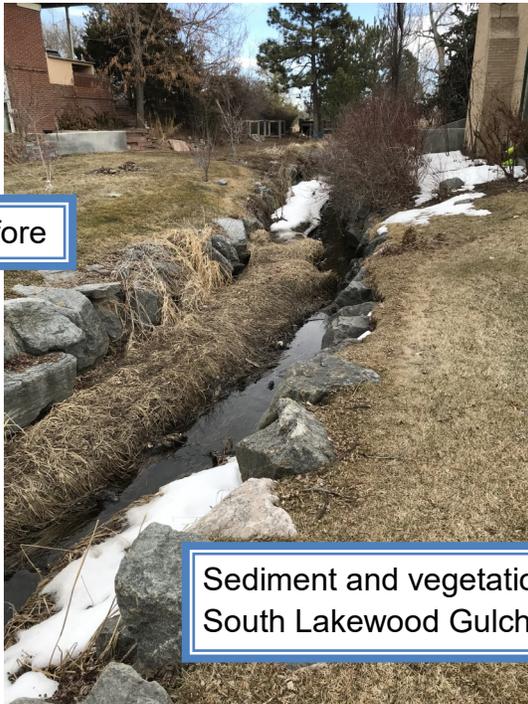
After



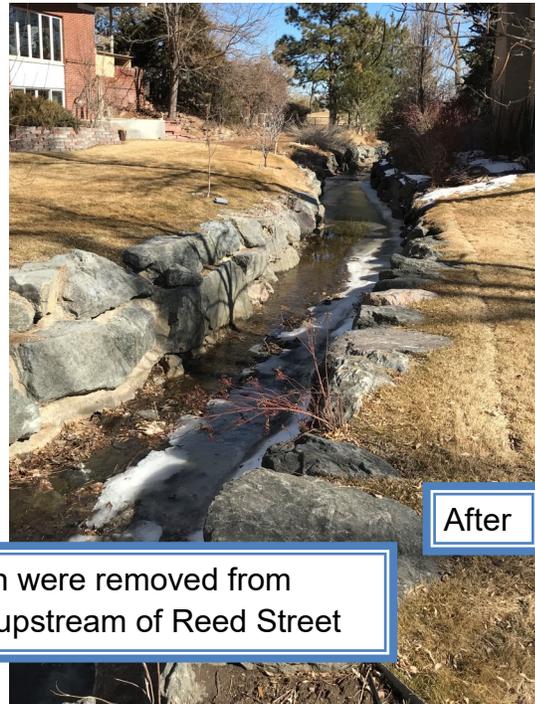
Drainageway Maintenance Projects

Drainageway maintenance projects in 2020 included sediment removal and routine maintenance along several Lakewood drainageways. Routine maintenance typically includes trash and debris clean-up, vegetation management and weed control, tree thinning and other minor maintenance activities. The cost of these maintenance projects totaled over \$95,000 and was entirely funded by the Mile High Flood District's maintenance program. Two examples of the maintenance work are shown here.

Before

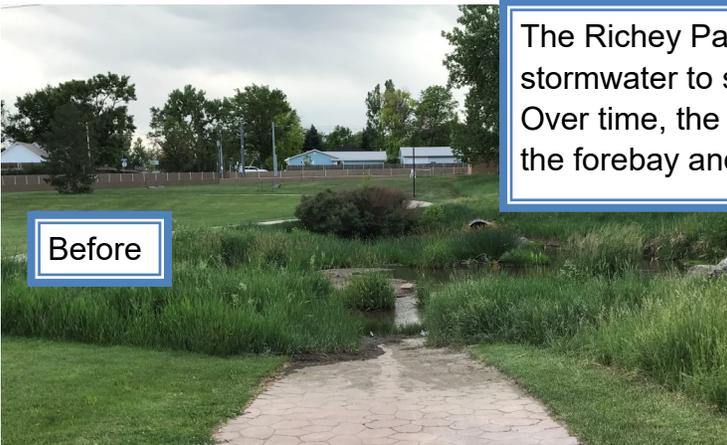


After



Sediment and vegetation were removed from South Lakewood Gulch upstream of Reed Street

Before



After



The Richey Park Forebay along Dry Gulch allows sediment in the stormwater to settle out before getting into the main detention pond. Over time, the sediment and vegetation reduce the effectiveness of the forebay and need to be removed.

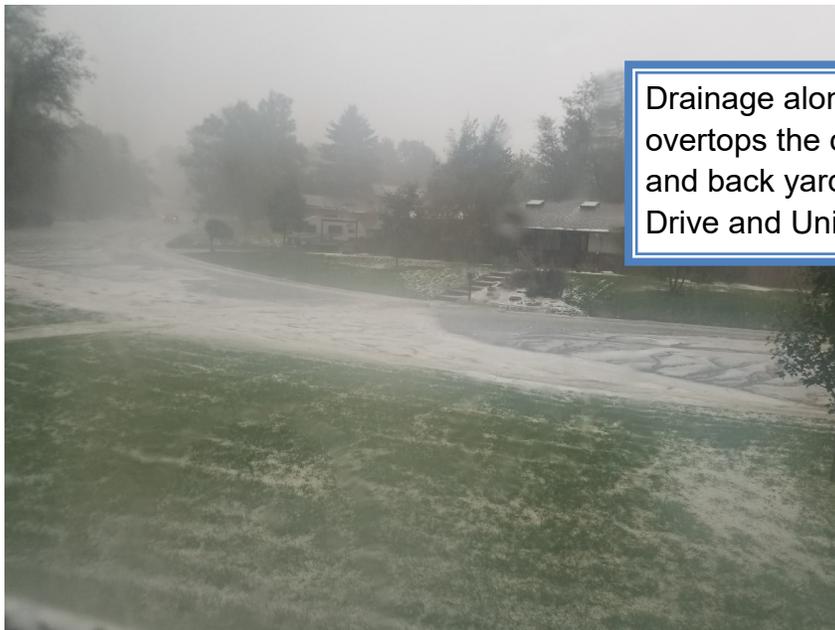
Projects in the Design Stage

Several projects are in the pre-construction stages. Pre-construction activities include:

- Obtaining input from affected property owners
- Designing the improvements
- Acquiring necessary property rights
- Identifying funding from the Utility's revenue and the Mile High Flood District
- Receiving bids from contractors

The following projects are examples of the projects in the pre-construction stages:

20th Avenue and Union Area Drainage Improvements - Design work continued in 2020 to reduce localized flooding north of 20th Ave on Urban Drive and Union Drive, with construction anticipated in 2022. The design and construction is currently estimated to cost approximately \$750,000 and is being provided by the Stormwater Management Utility.



Drainage along 20th Avenue and side streets overtops the curb and flows through the side and back yards of several homes on Urban Drive and Union Drive

20th Avenue Drainage Improvements —Quail Street to Nelson Street - A storm sewer system will be extended upstream of 20th Avenue and Nelson Street, with new inlets to collect stormwater. This Stormwater Management Utility project is being combined with a sidewalk project to minimize disruption along 20th Avenue. Construction is anticipated to begin in 2022. The design and construction for the stormwater portion of the work is currently estimated to cost approximately \$500,000 and is being provided by the Stormwater Management Utility.

North Dry Gulch—14th Avenue and Newland Street to Colfax Avenue and Dover Street - Work was underway in 2020 to design a culvert system that will collect storm runoff from the drainageway area that runs parallel to Colfax Avenue from Lamar Street Station Plaza (formerly JCRS) to the Whitlock Recreation Center. Over the years, storm drains have been constructed to carry some of the runoff flows. The existing systems are inadequate for larger storms, resulting in street flooding that creates a risk to residents and visitors driving through the corridor. More than 100 private properties along North Dry Gulch are affected by flooding during major storms.



This street flooding at Reed Street and 15th Place is typical during rainstorms that overtax the existing undersized drainage system on North Dry Gulch. Larger culverts will help alleviate this street flooding.

The North Dry Gulch project will be a multi-year construction project and will begin with the installation of a storm sewer lateral along 14th Avenue from Saulsbury Street to Lamar Street starting in 2022. The entire project from Newland Street to Dover Street is estimated to cost \$40,000,000 and is being funded by the Stormwater Management Utility and the Mile High Flood District.

Stay updated on the progress of this major stormwater project by visiting the project webpage at www.lakewood.org/NorthDryGulch and subscribe to the page for periodic email updates.

Drainageway Maintenance Projects under Design:

Dry Gulch from Saulsbury Street to Pierce Street— sediment removal was planned for 2020; however, the deterioration of portions of the concrete channel lining required further investigation. Design to restore the channel is underway with construction anticipated in 2021 and 2022. Design and construction costs are funded by the Mile High Flood District maintenance program.



Sediment in the bottom of the channel will be removed. Portions of the concrete lining the sides of the channel have failed and will be restored.

Upper Weir Gulch from South Quail Way to approximately West Tennessee Drive (extended) - Alternatives for stabilizing the existing low flow channel and minimizing impacts to existing trees were evaluated in 2020. Final design will continue in 2021, with construction anticipated in 2022. This project will be funded by the Mile High Flood District.

Drainage Master Planning and Updated Floodplain Studies

Major drainageways often cross jurisdictional boundaries and the Stormwater Management Utility partners with the Mile High Flood District and other jurisdictions to coordinate master planning efforts. This results in cost-effective and cohesive planning among jurisdictions.

Floodplain mapping is updated to reflect current conditions in the watershed and to accurately show the limits of the floodplain. Flood Hazard Area Delineation studies are sponsored by the Mile High Flood District with participation from the Stormwater Management Utility and other affected jurisdictions.

The Stormwater Management Utility took part in the following drainage master plan and floodplain updates in 2020:

- McIntyre Gulch – from confluence with Lakewood Gulch northwest of 6th Avenue and Wadsworth Boulevard to Green Mountain

The Utility and the Mile High Flood District partnered to complete a baseline hydrology report in 2020 for McIntyre Gulch. The report updated peak flows and modeling that are necessary for preparing the Flood Hazard Area Delineation (FHAD) study in 2021. The approximate \$100,000 cost for the baseline hydrology report and FHAD is paid for entirely by the Mile High Flood District.

- Lena Gulch and Tributary H - from confluence with Clear Creek near 41st Avenue and Kipling Street to US 40 and I-70.

In 2020, the City of Golden, Mile High Flood District, Jefferson County, City of Wheat Ridge, and the Utility partnered to begin a planning study that will lead to a major drainageway plan (MDP) for Lena Gulch and Tributary H. Work on the MDP will begin in 2021. The cost of the study is shared among the participating jurisdictions and the Mile High Flood District.

Floodplain Changes

Improvements to major drainageways sometimes result in the 100-year floodplain or floodway being narrowed or removed from properties. These modifications result in reduced potential for flood damage and in some cases relieve property owners from the need to obtain flood insurance.

These floodplain changes were approved by The Federal Emergency Management Agency (FEMA) in 2020:

- Dry Gulch – at Lamar Street between 11th Avenue and 13th Avenue

The Stormwater Management Utility and the Mile High Flood District installed a new larger culvert under Lamar Street, south of 13th Avenue. The larger culvert allows the 100-year storm to pass through the culvert without overtopping the roadway. A Letter of Map Revision (LOMR) was issued by FEMA to document the changes. The changes removed the floodplain from two structures.

- Dry Gulch – At Wadsworth Boulevard and 12th Avenue

A recent CDOT roadway project on Wadsworth Boulevard included installation of a new box culvert under Wadsworth. The new culvert carries large storm flows and eliminated flooding on the street and on one property on the west side of Wadsworth. FEMA issued a LOMR to document the floodplain changes.

- Physical Map Revision

FEMA is amending the National Flood Insurance Rate Map for Lakewood to include the recent floodplain updates that had been approved for Sanderson Gulch, North Sanderson Gulch and Sloan's Lake Drainageway. This makes the federally-supplied flood hazard maps consistent with the local floodplain mapping. Lakewood, FEMA and the Mile High Flood District are partnering on this project, which is funded entirely by FEMA.

Stormwater Quality

The discharge of natural precipitation through Lakewood's storm sewer system affects the health of aquatic life in Lakewood and downstream in the South Platte River. The city is required by the Colorado Department of Public Health and Environment (CDPHE) to provide a water quality program designed to:

- Educate our residents about water quality and their actions that can harm or improve water quality
- Respond to all reports of water pollution and eliminate any pollutant sources
- Monitor the stormwater quality in Lakewood's waterways

Monitoring is conducted at suspect locations within the city to identify and eliminate pollutant sources. Additional monitoring is also conducted in cooperation with other entities. The Utility's cooperative approach results in significant cost efficiencies and logical solutions to stormwater issues that cross jurisdictional boundaries. Some of the joint project efforts include:

- Sharing technical data and costs among Denver, Aurora, Mile High Flood District and Lakewood for implementation of State-required permit provisions.
- Participating as a member of the Bear Creek Watershed Association to protect water quality in Bear Creek and Bear Creek Lake.
- Monitoring stormwater quality at five sites in Bear Creek Lake, seven locations on Turkey and Bear Creeks upstream of the park, and six locations along the South Platte River. Monitoring was done in partnership with Denver, Aurora, the Mile High Flood District and Jefferson and Clear Creek Counties.

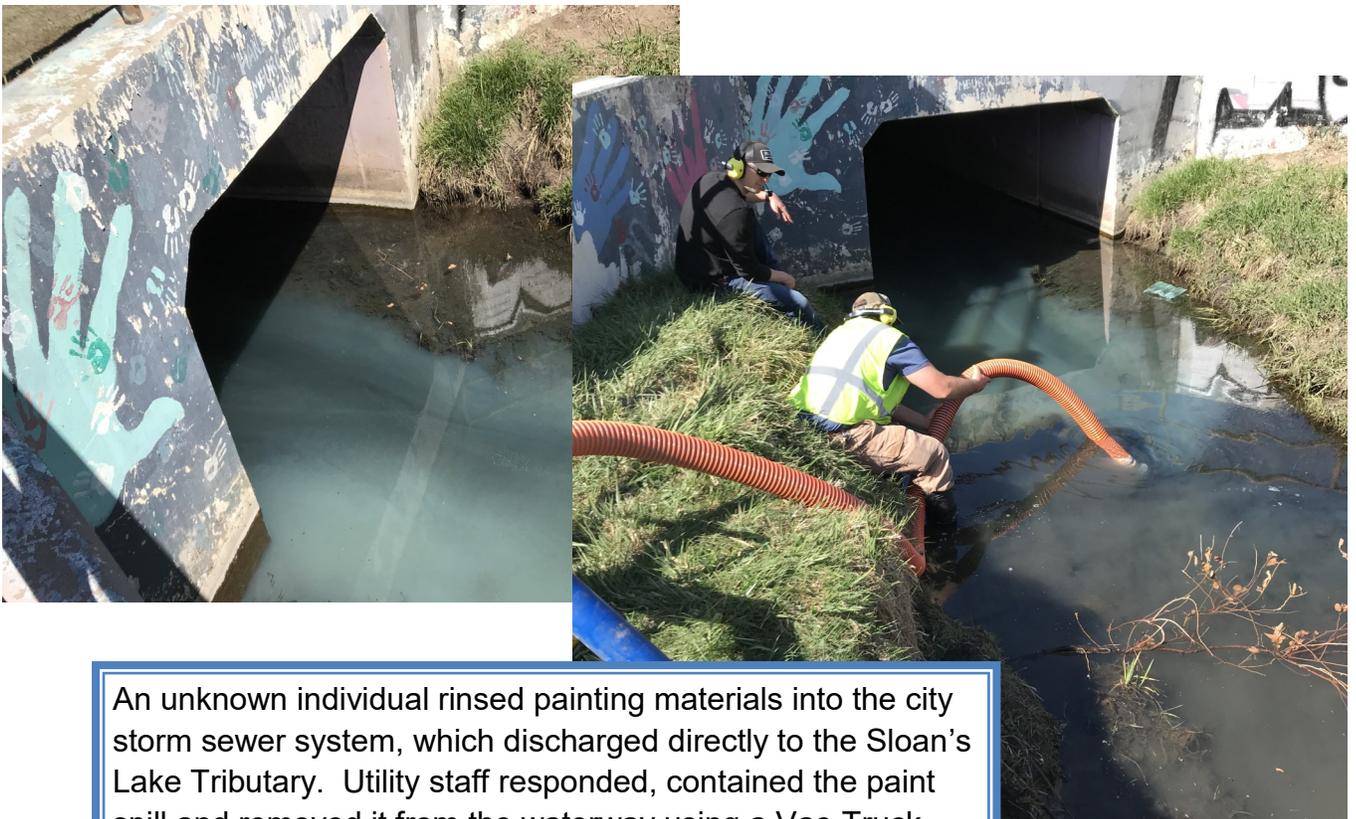


The Utility worked with Community Resources to post notices for park users when blue green algae was detected in the Stone House Pond in 2020. This type of algae can be harmful to people and pets if ingested.

Numerous pollution problems were identified and resolved. More than 30 illicit discharges of gasoline, motor oil, antifreeze, hydraulic fluid, concrete washout water, restaurant grease, raw sewage and sediment were remediated.



This grease spill originated at a restaurant on Alameda Avenue. The restaurant engaged an environmental contractor to remove and properly dispose of the discharge. Utility crews monitored the cleanup and ensured that none of the grease made it to the gulch.



An unknown individual rinsed painting materials into the city storm sewer system, which discharged directly to the Sloan's Lake Tributary. Utility staff responded, contained the paint spill and removed it from the waterway using a Vac-Truck.

Educational efforts are designed to reach as many groups as possible that may affect municipal stormwater quality. Educational programs during the year included:

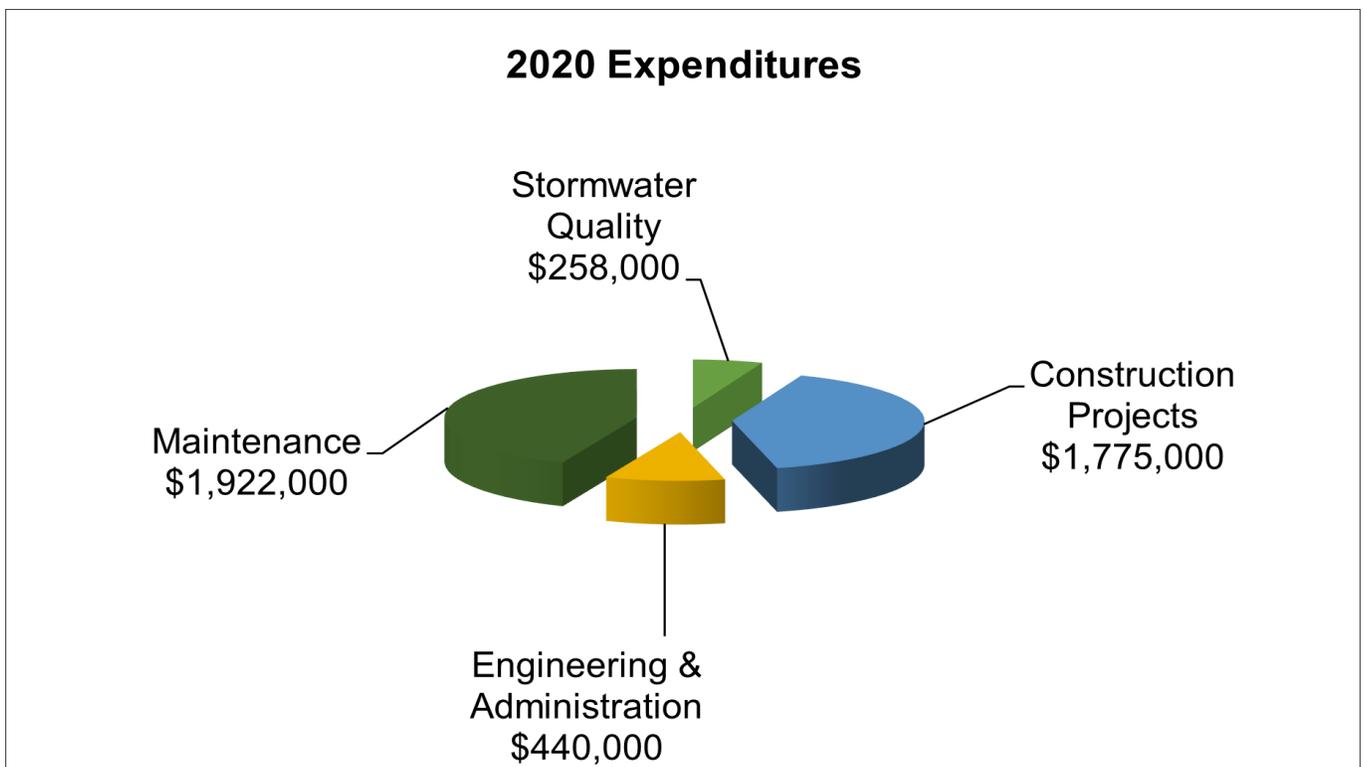
- Installing “Dump No Waste - Drains to Stream” medallions on storm sewer inlets.
- Distributing pollution prevention booklets to industrial and commercial businesses.
- Providing a brochure titled “Managing Your Household Wastes” to residents.
- Electronically distributing brochures encouraging contractors to participate in the Red Rocks Community College courses on erosion, sediment control and construction site management.
- Airing YouTube videos about proper disposal of used cooking oil and “No Leaf Left Behind,” a video to encourage bagging or composting yard waste.
- Continuing to air “Protecting Our Waterways Through BMPs” and other water quality public service announcements on Lakewood8.



Financial Summary

The Utility was established in 1998 and at that time, the city's capital need for drainage improvement was estimated to be \$60 million. Since then, the construction cost inflation and identification of additional needs have pushed the estimated cost to between \$125 and \$155 million.

Total Stormwater Management Utility revenue in 2020 was approximately \$5.25 million dollars. The Utility's expenditures do not equal revenue every year. During some years, revenues will exceed expenses as funds are set aside for larger projects. Many projects will require several million dollars for completion. During years when larger projects are constructed, expenditures exceed revenue.



Beginning in 2000, property owners throughout Lakewood have received annual bills for stormwater management. Nearly 38,000 properties are billed each year. In 2021, single-family homeowners will pay a fee of \$49.92 per year. Other property owners pay a proportional amount based on the impervious area on each property.

In 1998 when the Lakewood fee was established, the average cost of Colorado stormwater utilities was \$3.11 per month. The average cost has since almost tripled to \$9.11 per month. The chart below compares monthly costs for stormwater utilities in Colorado.

Community	Monthly cost for a Single-Family Home in dollars
Berthoud	24.50
Boulder	19.64
Greeley	17.15
Loveland	14.79
Longmont	13.05
Erie	11.98
Fort Collins	10.87
Denver	10.84
Aurora	10.46
Englewood	10.27
Windsor	9.48
Parker	7.73
Golden	7.19
Castle Rock	7.12
Southeast Metro Stormwater Authority	6.99
Westminster	6.00
Littleton	5.57
Pueblo	5.36
Colorado Springs	5.00
Lakewood	4.16
Arvada	3.42
Federal Heights	3.15
Woodland Park	2.00
Northglenn	2.00



Summary

For decades, the City of Lakewood was unable to adequately maintain its drainage facilities. The investment in pipes, inlets, ditches and gulches was substantial and the potential for property damage and personal injury was increasing because of inadequate maintenance. The Stormwater Management Utility is providing care for the existing drainage system with a limited systematic maintenance program.

Many of the pipes and culverts in the stormwater system are nearing the end of the expected service life. In recent years more of the Utility's resources have been needed for repair and replacement, often in an emergency after a pipe failure. This is expected to continue and accelerate as the stormwater system ages.

The Stormwater Management Utility is providing revenue to match available funds from the Mile High Flood District. Improvements are being made and federally mandated water quality program requirements are being met.

Cover photo: Sunset at Kendrick Lake courtesy of the Community Resources Department

All other photos courtesy of Stormwater Management Utility staff