# ACKNOWLEDGMENTS

## CITY & COUNTY OF DENVER

**DENVER CITY COUNCIL**

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<td>Mary Beth Susman</td>
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**DEPARTMENT OF PUBLIC WORKS**

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<td>Eulois Cleckley</td>
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<td>Lesley Thomas</td>
<td>City Engineer</td>
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<td>Jennifer Williams</td>
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<td>Mike Anderson</td>
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**DEPARTMENT OF PARKS AND RECREATION**

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<td>Allegra “Happy” Haynes</td>
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**URBAN DRAINAGE AND FLOOD CONTROL DISTRICT**

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<td>Shea Thomas</td>
<td>Manager, Watershed Services</td>
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**STAKEHOLDER VISION IMPLEMENTATION TEAM (VIT)**

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<tr>
<td>Hilarie Portell</td>
<td>Colfax Mayfair BID</td>
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<td>Monica Martinez</td>
<td>Fax Partnership</td>
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<tr>
<td>Laurie Bogue</td>
<td>Bellevue-Hale RNO</td>
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<tr>
<td>Jeff Poland</td>
<td>Cranmer Park / Hilltop Civic Association</td>
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<td>Wayne Graham</td>
<td>Crestmoor Park Homes Association</td>
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<td>David McCord</td>
<td>Historic Montclair Community Association</td>
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<td>Tracey McDermott</td>
<td>Greater Park Hill Community, Inc.</td>
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<td>John van Sciver</td>
<td>Congress Park Neighbors, Inc.</td>
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<td>Merrit Pullam</td>
<td>Mayfair Neighbors, Inc.</td>
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**CONSULTANT TEAM**

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EXECUTIVE SUMMARY

1 INTRODUCTION AND APPROACH
2 UNDERSTANDING THE BASIN
3 INTEGRATING THE COMMUNITY
4 EXPLORING SOLUTIONS
5 CONCEPT DESIGN
6 APPENDIX
The Upper Montclair Basin measures nearly six square miles, stretching from Fairmount Cemetery to City Park. The basin is fairly flat and prone to flooding at certain low points. Without an open waterway, the current stormwater drainage system needs to be improved in some key areas; localized flooding has been a problem in this area for decades. Recently, this basin has been identified as a priority basin for not only storm drainage improvements, but also water quality improvements. To address the unique challenges of this basin, Urban Drainage and Flood Control District (UDFCD) and the City and County of Denver partnered to complete this stormwater systems study, and subsequent concept design process, to identify and recommend key projects that improve local conditions.

This study is rooted in fruitful community engagement and holistic urban planning. Unlike traditional stormwater systems planning, this study approached the drainage issues with a community-first philosophy, allowing the study to find solutions that not only address the storm drainage and water quality issues, but also provide new amenities like more green space, more walkable streets, and better connected neighborhoods. The recommendations blend traditional gray infrastructure (pipes) with green infrastructure to create a more resilient community.

Located on the map above, the study identifies four improvement areas that can reduce local flooding risk while building upon local assets. These areas were carefully selected through community collaboration and community planning and are designed to create a significant improvement in flooding and water quality. Each recommendation is covered in detail in subsequent chapters.
EXECUTIVE SUMMARY

THE PROJECT’S GUIDING PRINCIPLES

Developed in collaboration with the community and technical professionals, the following principles guided this study:

- Minimize the impact of flooding associated with minor to moderate storm events
- Think critically and creatively about stormwater resiliency in a built, urban environment
- Increase public education and awareness of the community’s role in adapting to flood conditions in the built environment
- Examine the basin characteristics as a test-case, to identify implementable strategies that support resilient communities throughout Denver

RECOMMENDATIONS IN BRIEF

A 16th Ave Green Streets Strategy

East of Colorado Boulevard, between Colfax and 17th Avenue, explore green streets solutions that maintain neighborhood character and aesthetics. Specific interventions could include: intersection bulb-outs, permeable streets, and/or green alleys.

B Hale Pkwy and Severn System

Create hybrid, open channel and underground pipe drainage improvements that address area flooding risks. Build upon the concept design (presented in Chapter 5) and develop a detailed design at Hale Parkway to convey water by reconfiguring the existing roadway to include a greenway, multi-use trail and additional amenities.

C Colfax Corridor and Mayfair Town Center

Take advantage of opportunities along East Colfax to make the corridor more flood resilient: incorporate significant green infrastructure into Colfax Bus Rapid Transit final design; create a new Mayfair Town Center with green space and improvements to private properties and public streets; and, adopt special land use regulations around inundation zones.

D Community Education and Resources

Continue connecting residents and flood prevention resources; partner with local organizations and advocacy to distribute a Community Resource Guide; encourage and incentivize improvements to individual properties like rain barrels, rain gardens, and removal of impervious surfaces.
INTRODUCTION AND APPROACH

On July 14, 1912, a torrential downpour left much of Denver underwater, flooding the Cherry Creek and Montclair watershed.

Over 100 years later, Denver is still trying to control stormwater.

ABOUT THE STUDY

The Upper Montclair Basin, covering many of Denver’s east side neighborhoods, has faced flooding and drainage challenges for over a century. Through decades of urbanization, natural drainageways and detention areas have been replaced by buildings and pavement, while aging infrastructure has become increasingly overwhelmed. In the summer of 2016, the Upper Montclair Basin Stormwater Systems Study was developed to recommend significant stormwater solutions in this basin that will serve the community for generations.

With a focus on resilience and sustainability, the study developed a strategic planning process and public education program that better connects traditional stormwater infrastructure design with community planning and urban design principles. The planning team focused on improvements that would not only provide much-needed flooding relief, but also positively impact the community through added green space, improved walkability, and an enhanced quality of life.

The study kicked off in the fall of 2016 and concluded with a general public meeting in April 2018. This study was jointly funded by the Urban Drainage and Flood Control District (UDFCD) and the City and County of Denver Public Works (DPW). A concept design process to develop technical details around a few select projects began in fall of 2018 and was completed in spring of 2019. Inherent in the process was focused and meaningful public and stakeholder involvement, which occurred during all phases of both study and concept design. The robust public engagement philosophy was rooted in a community-first approach.
COMMUNITY-FIRST APPROACH

Traditionally, stormwater infrastructure planning involves burying pipes underground to convey water safely away from people and property. It is a technical exercise to determine the most efficient and effective means of managing stormwater; simply, as drainage needs increase, pipe sizes increase. While this approach may manage the stormwater, it provides little opportunity for community input or emphasis on complementary neighborhood goals.

The Upper Montclair Basin Stormwater Systems Study flips this traditional approach on its head. The approach begins with providing education and funding resources to the community; a well-informed community that understands flooding and flood risk, as well as potential tools, is better able to identify opportunities in their neighborhood. Once a common understanding is achieved, engineers, designers, planners, and the community can communicate more effectively using a shared knowledge base.

This philosophy also provides the ability to leverage money and resources dedicated to stormwater infrastructure into holistic, community-supporting design. By planning for stormwater facilities with an approach that puts community first, this study establishes a broader view of the opportunities within the community.

![Figure 1.3 Community-First Approach](image)
INTRODUCTION AND APPROACH

STUDY GOALS

Study goals were developed to reflect the community-first approach. These goals were created through a collaborative process among local residents, planners, engineers, and stakeholders.

- Develop a new approach to stormwater planning in Denver that empowers the community

- Minimize the impact of flooding associated with minor to moderate storm events and improve water quality throughout the basin through implementable solutions

- Think critically and creatively about stormwater resiliency in a built, urban environment

- Develop alternative concepts and solutions that integrate community interests and provide community benefits

- Increase public education and awareness of the community’s role in adapting to flood conditions in the built environment

Figure 1.4 Flooding near Mayfair Town Center, 2015

Flood waters overwhelmed the Montclair community as recently as 2015. This photo was taken near the corner of 14th Avenue & Krameria Street.
INTRODUCTION AND APPROACH

A NATIONAL PERSPECTIVE

Denver is not alone in attempts to curb urban flooding. Cities around the country are experiencing flooding with unprecedented impacts. Recently, catastrophic flooding in areas like Houston, Texas, and Hoboken, New Jersey, have prompted engineers, planners, and city and state leaders to wholly reevaluate stormwater management systems. In 2019, for example, Texas lawmakers passed Senate Bill 7, which redistributes state dollars to fund gray and green infrastructure improvements that reduce flood risk. Faced with aging infrastructure and increasingly less natural open spaces, communities are getting creative as they work to retrofit established neighborhoods with functional stormwater management facilities.

Image Credit: Gary Hershorn/Reuters via CityLab
THE UPPER MONTCLAIR BASIN

The Montclair watershed is Denver’s largest drainage basin without an open waterway and is divided into a lower portion, downstream of Ferril Lake, and an upper portion, upstream of City Park. The Upper Montclair Basin covers almost six square miles, extending from Fairmount Cemetery to City Park. Rain that falls in the drainage basin becomes storm runoff that flows in a northwesterly direction, ultimately draining into the South Platte River.

Land use within the basin is primarily low-density, single family residential with the 10,498 single family homes accounting for 85 percent of the total buildings in the basin. The basin boundary includes the neighborhoods of Congress Park, South City Park, parts of Park Hill, Hale, Montclair, Mayfair, Hilltop, and Crestmoor. Additionally, there are two commercial corridors along Colfax Ave and Colorado Blvd.

Much of the existing stormwater infrastructure in the area dates to the 1930s and is undersized to meet current demands. There is currently only one engineered detention facility within the basin at Crestmoor Park, which provides only a fraction of the detention needed in this area.
TOPOGRAPHY AND DRAINAGE

The Montclair watershed is largely defined by the historic Montclair Creek. Some of the earliest mapping efforts (1861) around Denver describe the Montclair Creek as a prominent drainageway in the region, extending from near modern-day Colfax Ave and eventually draining into the South Platte River. The above map (Figure 2.2) correlates the historic stream surveyed location, shown in blue, with the topography of the basin.

Geological evidence also indicates the historic presence of Montclair Creek. Located in a physiographic subregion known as Streams, the Montclair watershed primarily consists of alluvial sands and soils. This alluvial sand, silt, clay, and gravel commonly make up streambed material. Geologic mapping shows that today’s flooding risk, shown to the right in blue, correlates neatly with the historic stream location (Figure 2.3).

Historically, this watershed functioned with a natural network of open channels that drained rainwater into the South Platte River. The earliest developments in Denver, then known as Montana City, were concentrated to the west of Montclair Creek and centered around the discovery of gold in 1858 along the South Platte River at the modern-day location of Grant-Frontier Park. Quickly, development expanded east towards the Montclair basin. The natural open channels in this area were eventually replaced with roads, buildings, and man-made pipes as Denver blossomed into the regional destination it is today.

The catastrophic flood of 1912 forced government officials to take notice of the Montclair basin, creating the Park Hill Storm Sewer District to fund construction of a new storm sewer system. Actual construction of these facilities was not completed until 1933 and much of this infrastructure remains in place today.
Prior to 1934, development patterns had generally avoided the soil conditions and drainageways of the old Montclair Creek. The image below (Figure 2.4) highlights the parcels developed before 1934, showing large swaths of undeveloped land along the Montclair Creek natural drainageway.

Urbanization of the area continued throughout the 1940s and 1950s, accelerated by the development of the Park Hill Storm Sewer District and the atmosphere of rapid growth in the post-war era. Two major projects—the development of grocery stores at 14th Ave & Krameria St and the building of Hale Pkwy—were constructed directly over the low-lying areas of the historic drainage channel during this era.

Figure 2.4 Upper Montclair Development History
DENVER, 1930s

Looking southeast from above City Park, this image from the 1930s shows the undeveloped land that will eventually become urban neighborhoods of Hale, Montclair, and East Colfax. The land depressions of historic Montclair Creek are visible near the top of the photograph.

Image Credit: Denver Public Library
Today, after decades of growth has gradually filled in undeveloped lands, there are structures on nearly every parcel within the basin. The sidewalks, driveways, roadways, and other surfaces needed to support development make up the impervious surfaces within the basin. Typical of urban, residential neighborhoods, this basin is 49 percent impervious surfaces.

With only 19 acre-feet of existing detention (in Crestmoor Park) and no open channel conveyance system, this basin relies on underground pipe infrastructure and streets to carry stormwater runoff away from people and property. Despite the rapid urbanization of this area, the basin is still primarily served by the original storm system of the 1930s. This outdated system simply cannot carry all of the water during storm events, causing an overwhelmed system and urban flooding.
THE FLOODING PROBLEM

Denver’s semi-arid climate lends itself to flash-flood conditions during periodic, short bursts of intense rainfall. While Denver receives an average of only 17 inches of rain per year (the US average is 39 inches), extreme flooding can occur during summer rainstorms. Low-lying areas where rainwater collects are especially susceptible to flooding. In this basin, low-lying areas generally follow the path of the historic Montclair creek.

While homes and businesses have experienced flooding damage in this area for decades, the City and County of Denver Public Works began cataloging significant flooding locations in 2000. Since then, there have been over 50 distinct reports of flooding that has resulted in personal and/or property damages. The map above (Figure 2.7) illustrates these community reports with red stars.

The last major flood in this area occurred following torrential rainfall and hail on June 24, 2015. The storm produced 2.0 – 2.5 inches of rain, leading to power outages, floating vehicles, inundated basements, and significant damages in both Denver and Aurora.

WATER QUALITY IN THE BASIN

Denver’s lakes and streams receive runoff from all impervious surfaces across the City including streets, yards, parks, roofs, and sidewalks. Pollutants in these runoff waters can be detrimental to the quality of our waterways. The Montclair basin is one of Denver’s five priority basins and is tied for the lowest water quality score in the entire city.
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1 DEVELOPING A NEW APPROACH
2 UNDERSTANDING THE BASIN
3 COMMUNITY COLLABORATION
4 EXPLORING SOLUTIONS
5 CONCEPT DESIGN
6 APPENDIX
COMMUNITY COLLABORATION

Figure 3.1 Discussion at a Vision Implementation Team (VIT) meeting

COMMUNITY COLLABORATION

This study hosted eight distinct public meetings, each designed for the community to learn, investigate, and make decisions together. Genuine community collaboration was critical to ensuring a successful program. Community meetings were created as workshops – opportunities for the community to share tables with experienced planners, engineers, and urban designers and brainstorm ideas together.

The first three workshops, held in early 2017, focused on education, as well as gathering new data from the community about local problem areas. Through this process, the planning team and community cooperatively identified several key opportunity areas, known as Community-Driven Investigations.

Over the next five public meetings, and several stakeholder meetings, these Community-Driven Investigations were explored in greater detail, developing ideas around key areas of study such as Hale Pkwy or neighborhood green infrastructure. The project held a final Open House in April 2018 to showcase study results and final recommendations.

COMMUNITY MEETINGS

1. FEBRUARY 23, 2017
   - 20+ Attendees
   - Existing Conditions

2. MARCH 1, 2017
   - 30+ Attendees
   - Existing Conditions

3. MARCH 2, 2017
   - 20+ Attendees
   - Existing Conditions

4. JUNE 27, 2017
   - 60+ Attendees
   - Green Infrastructure

5. AUGUST 30, 2017
   - 50+ Attendees
   - Hale Pkwy

6. NOVEMBER 8, 2017
   - 20+ Attendees
   - Green Infrastructure

7. DECEMBER 6, 2017
   - 40+ Attendees
   - Hale Pkwy

8. APRIL 10, 2018
   - 70+ Attendees
   - Study Wrap-up and Next Steps
Over 70 residents and stakeholders attended the final community open house to review final study recommendations and discuss project next steps.
IMPLEMENTING THE VISION

The robust public planning process was supported by an active stakeholder group, comprised of leaders from local Registered Neighborhood Organizations (RNOs) and Business Improvement Districts (BID). This team helped develop the community vision and translate goals into specific Community-Driven Investigations. Known as the Vision Implementation Team (VIT), this team was an instrumental link between the planning team and the community. The VIT met formally seven times throughout the project and facilitated several smaller group meetings, including neighborhood walking tours and workshops with local business leaders.

In the late summer of 2017, Greater Park Hill RNO leader Tracey MacDermott invited VIT members and project staff to tour the 16th Ave and Batavia PI area. Engineers, planners, and community members analyzed conditions in the field and gained valuable insights into this investigation area.

The Colfax Mayfair Business Improvement District, led by Executive Director Hilarie Portell, hosted multiple working groups that focused on E Colfax Ave area improvements and the Mayfair Town Center.
COMMUNITY-DRIVEN INVESTIGATIONS

The four Community-Driven Investigations aim to address distinct areas of opportunity within the basin.

16th Ave Green Infrastructure Strategy (A). In the northern section of the basin, east of City Park, homes along a short stretch of 16th Ave have experienced significant flooding issues with water in streets and front yards as deep as four feet in recent summer rain events. With little open spaces or available land, the community desired an exploration of green streets - a redesign of our local roadway footprint to include elements that help to slow down, soak in, or spread out stormwater runoff. Green streets also provide water quality benefits.

Hale Pkwy & Severn System (B). Hale Pkwy was identified as a potential opportunity through several public meetings and stakeholder working groups. This investigation explores how to solve the ‘bathtub’ sump at Severn Pl & Jersey St while providing stormwater relief throughout the corridor with a natural conveyance channel.

E Colfax Corridor & Mayfair Town Center (C). At the eastern edge of the basin, Colfax Ave connects with the Mayfair Town Center, a community hub with two grocery stores and several smaller retail venues. The E Colfax corridor is preparing for major changes, including a Bus Rapid Transit facility. This investigation takes a closer look at potential development strategies and suggests policies to encourage stormwater and green infrastructure friendly development.

Community Education & Resources (D). Chief among suggestions from the community was for more resource and educational materials to be available for local residents. Learning about why our flooding happens and how we can make a meaningful difference is a priority.
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This chapter details the analyses and results of the Community Driven Investigations. Each investigation, labeled A - D, and pictured on the right, includes a section outlining key existing conditions findings, recommended improvements, and places to find more information.

**HOW TO READ THIS CHAPTER**

**Look For Icons.** Each investigation area includes several key pieces of information about the existing conditions, analysis and recommendations. Each section contains icons to help find information quickly.

**Investigation ID.** The investigations are labeled A - D, matching the designation in Chapter 2. Each area has distinct characteristics.

**Existing Condition Highlights.** Key existing conditions highlights from each investigation are featured under this icon.

**Recommendations and Next Steps.** Look for this icon to summarize each investigation area recommendation and next steps.

**More information.** This icon indicates there is more information on the topic available in the Appendix or on-line.
This area of the Upper Montclair Basin—generally bounded by 17th Ave to the north, Colfax Ave to the south, Colorado Blvd to the east and Glencoe St to the east—frequently experiences flooding during the summer and spring rain events. The impacts can be severe; recent storms have caused tens of thousands of dollars in property damages and left parts of this neighborhood under several feet of water.

This study area is primarily single-family homes with few open spaces or park areas. Residential streets in this neighborhood were planned in 1871, part of one of Denver’s earliest subdivisions, and maintain the detached sidewalks and a relatively narrow network of streets and alleyways today.

Due to these space constraints, the 16th Ave Green Infrastructure Strategy explored opportunities for stormwater management and water quality improvements within the streets, alleys, and adjacent public spaces. Often known as green streets, these interventions are built entirely with the existing right-of-way at streets or alleys and introduce more natural alternatives such as bioswales or permeable pavement.
Green infrastructure works to help alleviate pressure on the stormwater system by slowing down or soaking in some of the water before it reaches the underground pipe network. These types of interventions also provide much needed water quality improvements.

Green infrastructure comes in all shapes and sizes. From small, corner rain gardens to entire corridor redesigns, green infrastructure projects can be scaled to meet the needs of the neighborhood and demands of the local stormwater system. This study presented and explored a wide range of green infrastructure ideas with the community.

Intersection bulb-outs (1) and mid-block bulb-outs (5) are treatments that extend the existing curb line into the street, adding spaces for water capture and vegetation. Bulb-outs at intersections generally avoid any major impacts to parking, while mid-block bulb-outs are designed as larger facilities to capture and treat more volume. These landscaped areas are designed as rain gardens or vegetated swales that filter and capture stormwater. Bulb-outs can add green space, increase wildlife habitats and generally reduce impervious surfaces in the neighborhood.

Permeable Streets (2) and green alleys (6) replace existing asphalt or concrete with porous materials that can soak up water as it falls onto the streets before it enters the underground pipe system, relieving some pressure on the stormwater system. Commonly used materials include permeable interlocking concrete pavement, porous asphalt, and pervious concrete.

Tree lawn bioswales (3) are located behind curb in the existing tree lawns and designed to have minimal impact on existing parking or transportation facilities while providing water quality improvements by removing silt, pollution and other harmful chemicals from our water.

Corridor projects (4) may have larger impacts on stormwater conveyance and water quality and completely re-imagines a neighborhood street. Entire traffic lanes or corridors could be re-purposed for green infrastructure solutions, creating the opportunity for major impacts. This intervention may be most appropriate on low volume residential streets where automobiles are deemphasized.

**Community conversations and multiple public meetings identified several types of green streets applications that were favored by area residents. Three specific interventions received unanimous community support and will be recommended for further study during concept design phases:**

(1) Intersection Bulb-outs
(2) Permeable Streets
(6) Green Alleys

[denvergov.org/uppermontclairbasin](http://denvergov.org/uppermontclairbasin)
HALE PKWY & SEVERN SYSTEM

Hale Pkwy creates a diagonal connection between 8th Ave to Colorado Blvd. This four-lane divided Pkwy was originally built in 1941 by paving over the historic Montclair creek drainageway. Today, this corridor remains susceptible to flooding because of its natural topography and position within the basin. Just upstream of Hale Pkwy lies Severn Place & Jersey St. This intersection floods frequently during summer rains and causes consistent mobility and safety issues for neighbors.

During the first round of community meetings, in February and March of 2017, Hale Pkwy was identified by community members as a possible site for community improvements. The Pkwy’s 150-feet of right-of-way, and its history as a creek bed, present an uncommon opportunity to rethink and re-purpose public space within the basin to improve drainage and achieve complementary community goals.

INVESTIGATION AREA HIGHLIGHTS

Flooding Risk. The intersection of Severn Pl and Jersey St is a low-point in the basin, acting as a ‘bathtub’ that fills up during rain events. Eventually, this area drains northwest in pipes under Hale Pkwy, but storms can leave this intersection impassable.

Parkway. Designated as a parkway, but not listed on any historic registries, Hale Pkwy features an expansive right-of-way and curb-to-curb width. Strategically reconfiguring this space is the key to unlocking a comprehensive stormwater solution.
The Approach

The City’s goal is to design stormwater systems to a standard level of service where pipes, streets, and channels all work together to safely convey runoff during storm events. This goal is guided by technical criteria requiring new drainage systems to adequately convey runoff from the 100-year storm (1% annual chance). The conveyance of water can be handled by a combination of pipe, streets, and channels during the storm, but the flooding of property must be minimized.

Before embarking on any type of concept or detailed designs for Hale Pkwy, the Study focused on determining the right approach to managing stormwater in this system. The existing storm main, a 78-inch reinforced concrete pipe, underneath Hale Pkwy today is not capable of conveying enough water. To fix this problem, the study examined three distinct approaches to moving water: with pipes, with an open channel, or a combination of both pipes and channel.

Each approach has benefits and drawbacks. Community support coalesced around the hybrid approach, with many citizens citing the potential additional community benefits as primary reasons for supporting the hybrid approach.
A **hybrid approach** works to satisfy the local conveyance needs by dividing flows between an underground pipe and an open channel or greenway. The greenway aims to reestablish the natural conditions of the area, replacing roadway asphalt with open space and greenway. A greenway can also provide space for additional community amenities such as bikeways, jogging paths, natural habitats, or park space.

Achieving the hybrid approach is a complex planning, engineering and urban design challenge. It requires creative thinking and strategic trade-offs. The team explored a myriad of options that would both accomplish conveyance needs and address community goals.

Each option reduces vehicle travel lanes on Hale Pkwy by one in each direction, replacing the roadway surface with greenway elements to enhance water quality or provide significant conveyance. Options A, B, and C primarily serve as water quality improvements, while options D and E are designed to provide significant conveyance.

**Extend the medians (A)** is an option that adds bioswales or other types of green infrastructure to the existing parkway medians. **Extend the sidewalks (B)** is a similar option to A, but the bioswales or green infrastructure is added to the tree lawns, or sidewalk side of the parkway. The existing median does not change.

In option (C), **use northside for WQ**, the roadway moves to the southside of the parkway, adjacent to Rose Hospital. This concept focuses on re-purposing the northern portion of the existing road for water quality improvements but does not include significant enough conveyance to reduce gray infrastructure needs in this section of the basin.

Option (D), **northside conveyance**, was the community preferred option. This option moves the roadway to the southside, yet designs the remaining green space to convey a significant amount of water. The above ground conveyance, or open channel, strategy can provide enough water to convey a 100-year event in conjunction with a pipe improvement.

Finally, option (E), **linear park**, provides the most recreational green space opportunity along the corridor. The road moves to the southside and Hale Pkwy terminates at 11th Ave, leaving the remainder of the parkway (between Dahlia St. and Grape St.) open for detention, conveyance, and a large park space.

**RECOMMENDATIONS + NEXT STEPS**

The design team conducted an in-depth analysis of a hybrid greenway system along Hale Pkwy with CONCEPT D as the design starting point. The Concept Design process, outlined in Chapter 5, explores the technical realities of this concept in more detail and identifies a preferred hybrid design and associated implementation strategy.
INVESTIGATIONS

Understanding Hale Pkwy Traffic

As Denver continues to grow, managing traffic and connecting people to places is a critical challenge. ‘Right-sizing’ our city streets is crucial to maximizing the benefits of our public rights-of-way. A four-lane collector, Hale Pkwy serves as a diagonal shortcut to the surrounding arterials, Colorado Blvd and 8th Ave, and provides connections to local schools, churches and Lindsley Park. Hale Pkwy also serves as a secondary, back-door access to Rose Hospital, the Founder’s Building parking garage and the Wolf Building.

Recent traffic counts along the corridor reflect a current average daily traffic (ADT) count of just 6,050. To create sufficient room for greenway channel conveyance, the roadway can be ‘right-sized’ to better match current and anticipated future demand.

The investigation team performed an operational analysis of the roadway network and infrastructure, aiming to determine whether traffic conditions would be acceptable if the parkway were reduced to two lanes. The analysis projected future traffic conditions, given both current development activity (including the current 9CO development) and other planned improvements in the area to create a heavy traffic scenario. Trips were assigned to the local network based on land use patterns, common transportation routes, and local knowledge. Under this scenario, the ADT on Hale Pkwy balloons to 10,100 by 2035, a growth of 65 percent.

Based on Synchro analysis, the results from this study indicate that Hale Pkwy would perform to City operational standards as a two lane roadway facility. The callout box at the right presents the summary of roadway capacity and intersection analysis results.

The complete assessment, including detailed Level of Service analysis, is included in Appendix I.

TRAFFIC ASSESSMENT RESULTS

Capacity Analysis. After reviewing current and planned development in the area, the traffic impact assessment developed a heavy traffic scenario that includes a full build-out of the 9CO University of Colorado hospital redevelopment and a projected redevelopment of the VA hospital. Under this scenario, traffic on Hale Pkwy grows 65% by 2035 to reach an ADT of 10,100.

For planning-level analyses, a two-lane roadway can be assumed to comfortably handle 18,300 cars per day (ADT). From a capacity perspective a two-lane Hale Pkwy is anticipated maintain efficient performance.

Intersection Analysis. To further gauge future operational performance on Hale Pkwy under a heavy traffic scenario, the Study also analyzed key intersections between Colorado Blvd and 8th Ave. The Level of Service (LOS), using 2010 Highway Capacity Manual (HCM), indicates all intersections operate at acceptable performance thresholds.

Appendix I: Traffic Impacts Technical Memo
COLFAX CORRIDOR & MAYFAIR TOWN CENTER

E Colfax Ave is home to many local businesses and features an active Business Improvement District (BID). Business owners in this corridor have experienced serious damage from stormwater flooding over the years. This area also features one of the most flood prone locations in the entire basin - 14th & Krameria.

This investigation combines two critical focus areas--the E Colfax Corridor and the intersection of 14th Ave & Krameria St. While current city planning efforts are taking a more comprehensive look at land use and transportation in this area, the Upper Montclair investigation has focused on providing stormwater specific analyses and recommendations.

Just south of Colfax Ave, there is a low point in the basin topography that does not drain naturally without the use of pipe infrastructure. Storing or slowing water through this area is being investigated in the near term, while longer term solutions tied to future changes in Colfax Ave are planned to eventually provide more capacity and flood relief to the area.

Flooding Risk. 14th Ave & Krameria St, and the larger Mayfair Town Center area, sits at a low point in the basin. Stormwater pools in this area, reaching dangerous heights and causing frequent damages. A FLO2D analysis projects depths as much as 6 feet in a 100-year storm event, but even smaller storm events can cause significant floods. Storm event from June 2015 is pictured below.
Mayfair Town Center

A local destination for residents to run errands, meet for coffee, or shop for flowers, the Mayfair Town Center plays an important role in the community. The center of the site, however, is a low-point in the basin and floods frequently and significantly. Figure 4.9 above illustrates the potential flooding conditions under a 100-year design storm and the ten locations with significant flooding reports since 2010. With the current infrastructure, the low point, at 14th Ave & Krameria, is anticipated to flood to over 6 feet in depth.

Potential improvements to the Mayfair Town Center were identified as opportunities during initial community visioning meetings. New businesses and the redevelopment of existing businesses to better accommodate additional green space, detention, green streets and pedestrian improvements were important. Mitigating flooding and creating new public places were ideas echoed by many. Additional planning and outreach efforts from the Neighborhood Planning Initiative (NPI) East Area Plan are in alignment with the findings of this study.

Property within the town center is mostly held in private ownership and interventions in this area will require coordination and partnerships. As part of this study, several preliminary meetings with the local Business Improvement District (Colfax Mayfair BID) were held to explore a range of possible interventions that could help alleviate flooding and create neighborhood amenities. On the facing page, Figure 4.10 outlines the range of possible interventions supported by the community. Smaller interventions, such as bioswales or green streets, can provide incremental relief; while larger interventions, such as creating blocks of park space, could provide more significant detention and stormwater management in the area.
Range of Interventions

Through many stakeholder meetings and conversations, community support is clear for a greener Mayfair Town Center. A range of interventions were explored with local businesses and advocates, classified from small to large scale changes. The larger the scale of intervention pursued, the more impact it may have on stormwater management.

**RANGE OF INTERVENTIONS @ MAYFAIR**

**SMALL**

Potential small scale interventions in this district include re-purposing public ROW for bioswales, green streets or other small scale green infrastructure facilities. Community support was also voiced for green streets or green alley opportunities that provide community space in addition to permeable surfaces that enhance water infiltration.

**MEDIUM**

Medium scale opportunities here could build on small scale projects and make way for larger patches of green space and improvements to water quality. Redevelopment of some properties within the Mayfair Town Center could be enhanced by pocket parks or small plazas that are designed to be flooded during larger rain events.

**LARGE**

A larger, more comprehensive re-visioning of the Town Center could include consolidating retail spaces or creating room for stormwater detention. Interventions, such as block-sized parks or creative detention facilities could provide significant relief to business properties and residents in the area.

*Figure 4.10 Mayfair Town Center, Range of Interventions*
E Colfax Ave

Just downstream from Mayfair Town Center, the natural drainageway flows over a ½ mile stretch of Colfax Ave from approximately Forest St to Ivy St, putting dozens of businesses at risk. In the 100-year storm design flood, much of the street, sidewalks, and private lots are modeled to flood to as much as 3 feet. Even in smaller events, though, businesses are at risk for interior flooding damages. Since 2010, several businesses along Colfax Ave have reported significant damages (over $20,000) due to flooding in storm events smaller than the 100-year intensity.

Figure 4.11 above depicts the flood modeling depths under the 100-year design flow and locations of flooding reports. Approximately 30 parcels facing Colfax Ave, and dozens more along side streets, fall within the modeling extent and could be at risk. Adding more open space for stormwater management, reducing impervious surfaces, and up-sizing existing underground pipes could all help reduce flooding risk along the corridor.

Over the next decade, Colfax Ave is slated for a major renovation. From Broadway to I-225 in Aurora, CO, Bus Rapid Transit (BRT) is planned to transform mobility along one of Denver’s most iconic streets. As Colfax Ave and adjacent streets begin to redevelop, new regulations or incentives should be aimed at reducing this risk while meeting community goals.

Additionally, as part of the BRT design, Colfax is anticipated to undergo complete reconstruction, presenting a unique opportunity to create new places for open spaces, green infrastructure and larger underground pipes. The BRT design process is on-going, but designing the BRT without proper attention to the significant stormwater issues in the area would be missing out on a major opportunity. Recommendations are listed on the following page.
RECOMMENDATIONS + NEXT STEPS

Recommendations in this investigation area, including Mayfair Town Center and Colfax Ave, are designed to encourage more neighborhood green spaces, permeable surfaces, and smarter development.

1. Redevelop the Mayfair Town Center to minimize the footprint of new development and create space for significant stormwater interventions. Partner with local business owners, the Colfax Mayfair BID, and residents around the Mayfair Town Center to develop a specific long-term strategy that creates a plan forward for future development.

2. Special attention should be given to land development and redevelopment within the most vulnerable properties of the basin. Adopt special land use regulations and incentives around the “Inundation Zone” covering Colfax Ave and Mayfair Town Center. Regulations should encourage new development or redevelopments that support the design of green infrastructure and innovative stormwater management solutions onsite and within the Zone. The “Inundation Zone” should be generally defined by the 100-year flood modeling (see Figure 4.12).

3. Identify and secure land in or around the “Inundation Zone” to be used for future stormwater management.

4. Continue to coordinate with Denver Public Works and RTD to design and install infrastructure improvements as the Colfax Bus Rapid Transit becomes a reality.

5. Coordinate with concurrent Neighborhood Planning Initiatives (NPI) to ensure future stormwater management designs are consistent.

Figure 4.12 Potential Inundation Zone Regulations Overlay
COMMUNITY EDUCATION & RESOURCES

Everyone has a role to play in preventing neighborhood flood impacts; stormwater management is a team effort. The City and County of Denver is currently planning and constructing major infrastructure upgrades throughout the basin, but local residents and area business owners can be part of the solution, too. This Study concentrated significant resources on developing educational materials for the community.

These materials focused on providing residents with a background of the basin and the historic streams while providing valuable connections to resources, tips, and tools to help flood-proof individual properties.

A Community Resource Guide was developed and highlights are presented below and to the right in Figure 4.14. The full handout is available on denvergov.org/uppermontclairbasin.

Community Resource Guide. Designed in conjunction with Denver Public Works, the Community Resource guide is available for FREE to all residents. The guide includes tips and tools for becoming more resilient as a homeowner, business owner, and citizen. Available on-line and at a few local shops, this guide provides specific information on the unique characteristics of the Upper Montclair Basin.

TOP TIPS TO STAY DRY

STORE VALUABLES IN A SAFE PLACE.

Flood water in the basement can cause irreparable damage to treasured assets. Keep family photos and other valuables high and dry.

CONSIDER FEMA FLOOD INSURANCE.

The Upper Montclair Basin is not a designated FEMA Floodplain, but residents are still eligible to purchase flood insurance (and at a reduced rate!)

CHECK YOUR PROPERTY EACH SPRING.

Contact Denver Public Works Wastewater and speak with the experts. Staff are able to visit your home and help identify flood risks.

MOVE CARS TO HIGHER GROUND.

Under extreme conditions, vehicles can float through Streets. Plan ahead for extreme storms and park accordingly - this could save you thousands!

CALL 3-1-1 IF INLETS ARE CLOGGED.

Inlets can become clogged with mulch, leaves, and other debris in the spring and fall. When drains become seriously clogged, call 3-1-1.

IDENTIFY A FAMILY MEETING PLACE.

Connect with family members and friends; have a safe and dry place to meet after a big storm. Think safety first.
## Recommendations Summary

<table>
<thead>
<tr>
<th>ID</th>
<th>Investigation</th>
<th>Recommendations</th>
<th>Potential Partners</th>
</tr>
</thead>
</table>
| A  | 16th Ave Green Streets Strategy      | Explore green infrastructure solutions that maintain neighborhood character and  | • Area residents  
                                             |                                                                             | aesthetics. Specific interventions could include:  
                                             |                                                                             | • Intersection Bulb-outs  
                                             |                                                                             | • Permeable Streets  
                                             |                                                                             | • Green Alleys  
                                             |                                                                             |                                                                 |
| B  | Hale Pkwy and Severn System           | Develop conceptual design of Hale Pkwy that creates a hybrid solution to water  | • Area residents  
                                             |                                                                             | conveyance by reconfiguring the roadway  
                                             |                                                                             | to include a greenway, multi-use trail, and  
                                             |                                                                             | additional amenities.  
                                             |                                                                             | Concept design is presented in Chapter 5  
                                             |                                                                             |                                                                 |
| C  | Colfax Corridor and Mayfair Town Center | Continue to seek opportunities to incorporate green and grey infrastructure  | • Area residents  
                                             |                                                                             | improvements into Colfax Bus Rapid  
                                             |                                                                             | Transit final design.  
                                             |                                                                             | • Local business owners  
                                             |                                                                             | • Business Improvement District  
                                             |                                                                             | • Regional Transportation District (RTD)  
                                             |                                                                             | • Developers  
                                             |                                                                             |                                                                 |
| D  | Community Education and Resources     | Continue connecting residents with flood prevention resources. Partner with local  | • Area residents  
                                             |                                                                             | organizations and advocacy groups to  
                                             |                                                                             | distribute the Community Resource Guide.  
                                             |                                                                             | • Greater Park Hill RNO  
                                             |                                                                             | • Encourage and incentivize improvements  
                                             |                                                                             | • City Floral  
                                             |                                                                             | to individual properties like rain barrels,  
                                             |                                                                             | • Colfax Mayfair BID  
                                             |                                                                             | • rain garden, and removal of pervious  
                                             |                                                                             | • University of Colorado and  
                                             |                                                                             | • surfaces.  
                                             |                                                                             | other academic institutions  
                                             |                                                                             |                                                                 |
THE DESIGN

The concept design for Hale Parkway imagines a place in Denver where stormwater management, transportation, and placemaking work together to create an integrated facility and community benefit. The design was conceived and developed together with the community, seeking input at all phases of the process. Building off the results of the Stormwater Systems Study, as described in Chapters 1-4, the concept design provides a hybrid solution to managing stormwater throughout the corridor that meets the 100-year storm design goal, provides key multimodal connections, and provides new community green space.

To achieve this bold vision, collaboration and compromise is critical. Despite the expansive right-of-way, putting together the channel, pedestrian pathways, and roadway into a cohesive and functional corridor is not simple.

This chapter outlines the concept design in detail, starting with the community goals and explains the key choices and anticipated benefits of a new Hale Parkway.
To guide decision making, the community and project team developed specific goals that reflect community priorities for mobility, drainage, and the environment. Detailed on the right, these goals helped to prioritize community benefits and shape the design. The goals were established and affirmed through continued community engagement.

The project’s primary goals, in alignment with the study process, are to reduce flooding risk and improve area water quality. Complementary, neighborhood-driven goals are designed to build upon the existing neighborhood character by celebrating what makes this area great today. Goals include enhancing biking and walking opportunities, maintaining slow, local neighborhood streets, and ensuring a long-lasting, healthy tree canopy throughout the corridor.

In addition to community meetings held during the study phase, this concept design hosted two distinct public open houses and several smaller stakeholder meetings. At the first open house in December 2018, the design team confirmed the community goals and presented several options for greenway and multi-use path designs. The final open house, held in April 2019, presented the concept design and gathered additional input to be considered during final design in a joint meeting with the Neighborhood Planning Initiative (NPI) East Area Plan.

Additional key stakeholder meetings were held with Rose Medical Center to ensure consistency between the concept and Rose Medical Center parking, emergency vehicle and operational needs.

**COMMUNITY MEETINGS**

1. **DECEMBER 7, 2018**  
   Design Alternatives Workshop

2. **APRIL 9, 2019**  
   Concept Open House

**COMMUNITY DESIGN GOALS**

- In accordance with city-wide design goals, the conveyance system along Hale Parkway is designed to manage a 100-yr storm event.
- Improving water quality is an important city-wide goal, but a critical component for the Montclair basin. Improvements to Hale Parkway should provide sustainable, water quality enhancements.
- The concept should incorporate a comfortable bike facility for all ages and abilities, while also connecting to a robust local multimodal network.
- Walking paths should be a critical component of the redesign. From leisurely strolls to jogging, a path should accommodate the diverse needs of the community while celebrating nature.
- The concept should maintain, refresh, and cultivate a healthy tree canopy along Hale Parkway and the adjacent sidewalks.
- This design should enhance the existing uses at Lindsley Park while creating new opportunities for families and local schools to enjoy activities.
- Maintaining traffic flow on key streets, while protecting local neighborhoods from cut-through traffic and speeding is a primary community goal.

*Figure 5.2 Community Design Goals*

*Figure 5.3 Community Touchpoints*
COMMUNITY SUPPORT

Community reaction to this project has been overwhelmingly positive. Community support was developed through early, often and thoughtful engagement with the local residents, stakeholders, and elected officials. Each step of the process was carefully crafted to discover community preferences and address concerns. From on-line comments, phone calls, and in-person discussions at meetings, community members expressed excitement about the re-greening, flood relief, and new park amenities.

At the final open house, community members submitted comments about the approach, design, and process. Each comment was cataloged and sorted. The chart on the right reveals the breakdown in comments. All public comments are included in the document appendix, selected comments are shown below:

![Public Comments](image)

FUTURE COMMUNITY CONSIDERATIONS

Not all community members are eager for a change to Hale Parkway; some residents remain concerned about tree canopy, future traffic, and construction impacts.

As this project moves from concept design towards final design and construction, future design teams should continue to work with the community to alleviate concerns through design tweaks, city policies, or programs that work to ensure trees, traffic, and other concerns are addressed. Future considerations are outlined on the left.

While this concept is the result of significant community collaboration, it is critical the final design processes continue to engage the local communities in thoughtful and meaningful ways.

<table>
<thead>
<tr>
<th>CONSIDERATIONS</th>
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<tbody>
<tr>
<td>Final design process should include detailed tree inventory and assessment. Maintaining mature trees is critical to the community.</td>
</tr>
<tr>
<td>Ensure the resulting open spaces are safe for children and families.</td>
</tr>
<tr>
<td>Develop detailed traffic modeling and measure effects before and after parkway modifications.</td>
</tr>
</tbody>
</table>

![Comment Log](image)
Presented here and in more detail on pages 66 - 73, the Hale Parkway Concept design features walking trails, shared use bicycle paths, community spaces, and enhanced pedestrian crossings by concentrating the new roadway on the southside only. The design significantly reduces impervious surfaces in the neighborhood and alleviates some risk of major flooding damage.
CONCEPT DESIGN

New space for Tot Lot / Nature Play

Low volume, one-way service and access driveway

Additional mid-block crossings provide better access across Hale Parkway

Redesigned intersection increases traffic efficiency and creates improved pedestrian crossings

New mid-block crossing connects to Lindsley Park

New space for community garden and nature education

Community gathering point

STORMWATER SYSTEMS STUDY
HYDROLOGY & HYDRAULIC STRATEGY

The hybrid concept selected for Hale Parkway utilizes the combined stormwater conveyance capacity from both a new underground pipe and an open channel or greenway. Hale Parkway is situated along the historic drainageway in the central portion of the Upper Montclair Basin and it must convey a significant amount of stormwater through the area that originates further up in the basin. Rainwater that falls near Severn Place/Jersey Street, Crestmoor Park, and Fairmount Cemetery flows via pipes and overland flow, finding its way to Hale Parkway. Since the Parkway gains tributary drainage area as you move from upstream (southeast) to downstream (northwest), the amount of stormwater that must be conveyed increases along the Parkway.

Through the community outreach effort, the design team and resident input determined the desired balance, configuration, and sizing of the two parallel stormwater conveyance systems attempting to maximize the community goals while also meeting the City’s 100-year level of service stormwater goals. It is anticipated that the new storm pipe will be situated along the northern side of the parkway, with the center portion of the greenway depressed and designed to convey excess water during larger storm events.

Vehicular/transportation needs, stormwater flow rates, right-of-way widths, and green space goals along the Parkway were considerations used by the design team to balance the design. Generally, the stormwater conveyance concept attempts to provide an additional 1,000 cfs of pipe capacity in addition to the existing 78” capacity, with the remaining 100-year flood conveyance provided by the greenway on the surface. The 1,000 cfs additional underground capacity will be accommodated by the downstream Jackson Street Storm system currently being designed by the City. The concept design assumes that the existing 78” pipe will remain in place and functional; however, this will be further evaluated during future design. Details of the hydraulics are provided in the appendix; this will be further refined during the design process.

The City and County of Denver is employing a similar stormwater strategy in the 39th Avenue Greenway & Open Channel project in the Lower Montclair Basin. Construction on this project began in summer 2018 and is expected to be operational in 2020. An artist rendering of the open channel is shown below:

![Figure 5.6 39th Ave Open Channel Artist Rendering](image-url)
HYDROLOGY & HYDRAULIC STRATEGY

This general stormwater conveyance concept attempts to provide an additional 1,000 cfs of pipe capacity in addition to the existing 78” reinforced concrete pipe (RCP) capacity, with the remaining 100-year flood conveyance provided by the greenway on the surface. The 1,000 cfs additional underground conveyance will be accommodated by the downstream Jackson Street Storm system currently being designed by the City. The sizes presented in Figure 5.6 on the preceding page assume the existing 78” pipe remains in place and functional, and generally requires a 10’x9’ reinforced concrete box culvert (RCBC) to carry the additional 1,000 cfs. If it is determined during design that the existing 78” is to be removed, a new 12’x9’ RCBC will be needed instead.

During smaller storm events, it is envisioned that the underground pipe conveyance will accommodate off-site flows, while local runoff from inlets and properties adjacent to Hale Parkway will be directed into the greenway. This will provide water quality treatment opportunities to be incorporated within the corridor. See document appendix for detailed plan and profile of the corridor. The graphics below depict typical configurations.

TYPICAL SECTION | HYBRID APPROACH | GRAPE - CLERMONT

Looking Northwest

Trapezoidal Channel
(size varies)

New RCBC
(10’ x 9’)

Existing RCP Remains In Place
(54” - 78”)

Figure 5.7 Typical Stormwater Section, Hybrid Approach

TYPICAL SECTION | BELOW CLERMONT

Looking Northwest

New RCBC
(10’ x 9’)

Existing RCP Remains In Place
(54” - 78”)

Figure 5.8 Typical Stormwater Section, northwest of Clermont
TRANSPORTATION & MOBILITY STRATEGY

To achieve the desired goals, the concept design relies on a reconfigured roadway. In alignment with the preferred concept from the Study, Hale Parkway shifts from a median divided four-lane road to a two-lane facility on the south side of the existing median. A new open channel with pedestrian pathways and community spaces would be constructed where the northwestbound lanes of Hale Parkway exist today. The hybrid concept relies on both open channel and pipes carrying water at the same time. Figures 5.9 and 5.10 illustrates today’s existing condition along Hale Parkway and the concept design condition.
TRANSPORTATION & MOBILITY STRATEGY

The transportation and mobility strategy falls into two distinct categories: automobiles and active transportation. A redesigned Hale Parkway must work to accommodate all modes of transportation.

AUTOMOBILES

Relying on results from the traffic assessment conducted during the study phase, a new Hale Parkway was designed to minimize space dedicated to vehicles, while managing current and future traffic and satisfying the complicated access requirements along the corridor. Left turn lanes are maintained to facilitate access to north-south corridors. Turning radii are designed to accommodate emergency vehicles entering and leaving Rose Medical Center. Narrow, local access roadways are designed along residential properties. Managed curb lane space is selectively included at key locations, meeting the parking needs of local residents and Rose Medical Center and providing flexibility to accommodate transit and shared ride services in the future.

ACTIVE TRANSPORTATION

The active transportation strategy along Hale Parkway aligns seamlessly with current and planned multimodal facilities throughout the east side of Denver. Denver Moves, the city-wide bicycle plan, calls for a separated bike facility along the corridor, connecting to the 12th Ave bike facility, a major east-west multimodal connection. Additional north-south connections align with current and planned facilities and are coordinated with Neighborhood Planning Initiative (NPI) efforts. The diagram below illustrates the role of Hale Parkway in the surrounding multimodal network and the enhanced, new pedestrian connections.

Figure 5.11 Surrounding Mobility Connections and Crossings

New connections, supported by NPI East Planning efforts, are designed to better connect residents to amenities at 9+CO, Lindsley Park, and additional local places.
Today, the median within Hale Parkway features an assortment of tree species, varying in age and health. In full bloom, the existing trees offer an expansive tree canopy that contributes to cleaner air, cooler temperatures, and many other environmental benefits. Throughout the public process, the design team heard from the community about the importance of maintaining a healthy tree canopy for future generations to enjoy.

The stormwater improvements along Hale Parkway will cause some existing trees to be replaced. Because the needed improvements to this drainage system are so large in scope and scale, no stormwater intervention would be able to preserve all of the existing trees within Hale Parkway. The subgrade work required to install new pipes can pose threat to the root system of existing trees.

This concept design proposal, however, intends to protect trees wherever possible and replenish the tree canopy to an even greater extent than there today. Between Ash St and Clermont St, the concept design aims to protect existing trees, adding a narrow crusher fines jogging trail and building the new pipe to the northside of the existing median. Where the open channel is designed, between Clermont St and Glencoe St, the concept design calls for strategic preservation and protection of existing trees. Small trees will be saved and relocated while others will be replaced with healthy tree species that can thrive in the new environment. Tree lawns adjacent to Hale Parkway will also be in filled with new trees.

The graphic above and to the right showcases the tree strategy. Overall, the concept design anticipates a net gain of 62 trees.
CONCEPT DESIGN

from gray to green...

IMPERVIOUS SURFACE CALCULATIONS
Impervious surface, like common asphalt or concrete, does not allow stormwater to infiltrate underground and can add to stormwater runoff. In addition to increasing the overall tree canopy, the Hale Parkway concept design removes a significant amount of impervious surface, replacing it with landscaping and green space that absorbs stormwater. Converting the roadway from 4 lanes to 2 lanes results in a significant amount of surface conversion. Under the concept design, this neighborhood sees a decrease of more than 30% of impervious surface within Hale Parkway. Usable green space in this neighborhood also increases by 5 acres!

STORMWATER SYSTEMS STUDY

132 TREES TODAY
194 TREES IN CONCEPT DESIGN
+62 NET GAIN IN TREES
SURROUNDING LAND USES AND ACCESS STRATEGY

The surrounding land uses play a critical role in crafting a design for Hale Parkway. Though less than a mile long, Hale Parkway corridor passes through a diverse range of land uses and building types. The redesigned roadway must work to accommodate the access needs of all buildings. One of the major reasons the southside roadway option was selected was to enhance the connection between Lindsley Park and the proposed 5 acre of new green space, as well as maintain the interface with existing buildings, residential access points, and Rose Medical Center operations.

At the westernmost edge of the parkway, the land uses are generally more intense, with more multi-family buildings and commercial uses. As the parkway moves east, land uses become less dense and the neighborhood transitions to more single-family homes. Generally, single family homes are more prevalent on the north side of Hale Parkway, with multi-family units such as duplexes, triplexes, and low-rise apartment buildings on the south side. This area also features a significant institutional presence, with several elementary schools, medical centers, and churches in the area. Rose Medical Center sits along Hale Parkway between Clermont St and Dahlia St.

In total, over a dozen properties along the corridor have direct driveway access onto Hale Parkway, which must be preserved. As Figure 5.12 illustrates, a majority of these access drives are on the southside of the parkway. By developing the roadway on the south, these accesses do not change. On the northside, four residential properties require access. The design develops narrow access roads that maximize green space while providing access and parking to the local residents. These roadways will be very low volume and could serve as informal places for street hockey, jump rope, and block gatherings.

Figure 5.12 Existing Land Use and Hale Pkwy access points

LAND USE KEY

- Single Family
- Multi Family
- Office
- Commercial / Mixed Use
- Institutional
- Warehousing / Distribution
- Direct access point onto Hale Parkway
URBAN DESIGN STRATEGY

DESIGN WITH NATURE.

Long, contiguous areas of green space are best designed to convey water in the open channel. The urban design strategy mirrors the hydrological needs by using these spaces to create nodes while celebrating natural elements of the greenway.

CREATE PLACES.

Nodes at key places are designed to create unique experiences for each visitor. From a grand entrance gateway at the northwestern edge, to a Lindsley Park overlook and school garden spaces, nodes provide opportunity to engage with the natural environment.

CONNECT PLACES.

The primary link to the activity nodes is a multi-use trail that weaves throughout the greenway. Elevated at key points to provide experiences that range from competitive to playful, the pathway was designed in cooperation with the community to meet the needs and wants of the neighborhood.

The conversion of Hale Parkway, in general alignment with the historic Montclair stream, into a naturalized conveyance channel presents a unique urban design opportunity. Under the concept, Hale Parkway becomes a hybrid conveyance system, part open channel and part pipe system. The channel, pipe and new open spaces, are designed in tandem, allowing designers to design with nature.

By reconfiguring the street on the south side of the parkway into a two-way street, removing the traffic lanes to the north, utilizing the space in the existing median, and minimizing street crossings, the channel design captures significantly more contiguous green space than what is currently available in the parkway. Doing so creates places - park spaces and plazas that dot the full length of the corridor and act as a seam between the north and south sides of the parkway. These pearls not only connect neighborhoods across the parkway, but also pull energy into the parkway, creating unique and interesting nodes along the corridor.

Each node creates a unique experience for visitors, but are also designed to connect with each other, enhancing the experience along the entire corridor. Connecting places is the critical, final component of the urban design strategy.

The design strategy for the overall park space was to create a contiguous path that wove along the length of the channel, fluctuating between being situated on grade and being elevated above the channel and the proposed native plantings below. This would create a series of varying experiences for the park’s users, with the goal of producing a sense of familiarity with the processes of natural stormwater drainage and native Colorado riparian vegetation. The larger channel design would be accompanied by a series of smaller neighborhood plazas, play areas, and gardens, which could holistically provide a unique linear park experience and new identity for the entire neighborhood.
INSPRIRATION IMAGERY

DESIGN WITH NATURE.

CREATE PLACES.

CONNECT PLACES.

Figure 5.14 Urban Design Inspiration Imagery
ELEMENTS OF THE CORRIDOR DESIGN

The Hale Parkway Concept Design can best be described in three segments. Each segment features unique elements and presents unique challenges. Working from northwest to southeast, the following pages provide details on the mobility, drainage, and urban design elements of each segment.

Segment A, generally bounded by Albion St to the west and Clermont St to the east, is designed to maintain existing historic trees, and celebrate the intersection of 12th Ave and Albion St as a gateway focal point. This section also features a connection to 12th Ave neighborhood bikeway. There is no open channel in this segment.

In front of Lindsley Park, Segment B extends from Clermont St to Elm St. This segment is anchored by a dramatic, sweeping pathway at the southern edge of Lindsley Park and overlooking the nature and greenery of new Hale Parkway. This segment include three separate mid-block crossing installations that better connect residents to new amenities at Hale Parkway and the existing amenities and Lindsley Park.

Lastly, from Elm St to Grape St, Segment C marks the upstream edge of Hale Parkway. This section includes a key community gathering node and a redesigned 8th Ave & Hale Pkwy intersection to improve traffic efficiency and pedestrian movement.
Design rendering of Hale Parkway community gathering space, Albion St and 12th Ave.
SEGMENT A ALBION - CLERMONT

This segment of Hale Parkway, from Albion St to Clermont St, serves as the western gateway entrance. No open channel is designed in this section and a narrow access road is planned to serve adjacent buildings.

The downstream section of the parkway will be served by a new 10’ x 9’ Reinforced Concrete Box Culvert (RCBC) in addition to the existing 78” pipe. The new box culvert will be built underneath a new 25’-wide access road on the northside of the existing median. The access road, designed to serve as emergency and other vehicle access to the adjacent multi-family and office buildings, will also serve as a bicycle connection and may include permeable or special paving to indicate its role as a low-volume, shared access street. Due to access road needs, no open channel is planned in this portion of the parkway, also allowing existing trees in this section to be maintained and protected. Additional trees are planned to be planted in barren sections of the southside tree lawn, ultimately creating a larger tree canopy than today.

Between Ash St and Albion St, redesign of the existing parkway allows for the creation of a new entry plaza. On the facing page, Figure 5.18, depicts an illustrative rendering of the new community gathering point. Acting as a gateway into the neighborhood, this new plaza section can host picnics, provide respite during sunny days, and help announce to drivers they are entering a pedestrian friendly corridor. The existing plaque commemorating the parkway’s namesake, General Irving Hale, will be become more prominent and celebrated in this space, too.

Mid-block crossings are designed to facilitate pedestrian permeability to and across the parkway. With new retail and entertainment amenities at the 9+CO development, creating new and comfortable pedestrian pathways across Hale Parkway is paramount.
SEGMENT A  TYPICAL SECTION

Figure 5.17 Typical Section, Albion St - Clermont St

SEGMENT A  EXPERIENTIAL RENDERING

Figure 5.18 Illustrative rendering, near Albion St
CONCEPT DESIGN

SEGMENT B  CLERMONT - ELM

Between Clermont St and Elm St, the open channel is designed at its widest. The shared use path picks up here and sweeps into existing Lindsley Park. New midblock crossings provide more access to the park from the south.

The mid-stream portion of Hale Parkway features the widest section of the open channel. Together with a new 10’ x 9’ RCBC and the existing pipe, the entire system has the capacity to convey a 100-year storm. At Clermont St, the concrete shared use path picks up, connecting bicyclists and walkers alike from the jogging path and shared use street section in the downstream portion. Figures 5.20 and 5.21 on the facing page show images of the new design.

This concept design shows Dahlia St continuing across Hale Pkwy while Eudora St does not, creating additional community or recreational space opportunities and a longer, more contiguous open channel section to facilitate stormwater conveyance. However, supported through numerous community conversations, other options in this section may be pursued in final design. Some residents, for example, preferred restricting Dahlia St across Hale Pkwy while keeping Eudora St access across Hale Pkwy. Additional analysis and community engagement should guide the final design decision in this portion, but should be aligned with the community goals of increasing open space, calming traffic, limiting neighborhood cut-through traffic, and best facilitating open channel conveyance.

Key mid-block crossings here provide new, safe connections to Lindsley Park from Rose Medical Center on the southside. The shared use path here sweeps over the channel, offering an iconic gesture and celebration of nature.
SEGMENT B  TYPICAL SECTION

Figure 5.20 Typical Section, Clermont St - Elm St

SEGMENT B  EXPERIENTIAL RENDERING

Figure 5.21 Illustrative rendering, near Lindsley Park
The upstream section of Hale Parkway features the open channel and a small access road between Elm St and Forest St. The design reconfigures previous asphalt space for new community space and garden.

The upstream portion of Hale Pkwy relies on the open channel, existing pipe, and a new 108” pipe to convey the 100-year storm. Between Elm St and Forest St, a narrow 20’ access road provides connection to the existing driveways and residences in the area. Due to the redesign of Hale Pkwy, this short access roadway will be low-volume and could support shared uses and activities such as street hockey games, jump rope, and bicycling. At the intersection of 8th Ave and Hale Pkwy, the new alignment of Hale supports a redesigned intersection that functions more efficiently for motorists and offers a more direct, shorter crossing for pedestrians.

The intersection where 9th Ave crosses Hale Pkwy is also redesigned to eliminate higher-speed, wide vehicle turns from Hale Pkwy. The additional space created here provides not only a more direct pedestrian connection across Hale to adjacent schools and churches, but also offers an opportunity for community and school gardens or outdoor classroom space.

At the southern end of Fairfax St, a new community gathering point is created for local residents and families. Figure 5.24 on the facing page offers an illustrative rendering of this new area.
SEGMENT C  TYPICAL SECTION

Figure 5.23 Typical Section, Elm St - Grape St

SEGMENT C  EXPERIENTIAL RENDERING

Figure 5.24 Illustrative rendering, south end of Fairfax St
COMMUNITY BENEFITS VALUATION

The proposed Hale Parkway project is a multi-functional stormwater facility and community asset that mitigates flooding, generates significant community benefits, and improves water quality. Community benefits can be obvious, like providing a new recreation opportunity or community gathering space, or more subtle, such as improving air quality or providing habitat for birds. These benefits, also known as ecosystem services, enhance community resilience and well-being and increase the return on investment to the community.

Ecosystem services describe the benefits people receive from nature. The value of nature means many things to many people, but when it comes to considering nature in the decision-making process, an economic approach is key. The goods and services provided by an ecosystem can be valued as a dollar figure. Working together, economists and ecologists employ a range of valuation techniques to assess ecosystem service value dependent on the specific study context.

Converting existing pavement along Hale Parkway to vegetated green space generates significant environmental benefits. While an acre of pavement along the parkway currently provides no benefits, converting that same acre to grass or trees will generate hundreds of dollars of value each year for the local community, from improving air quality to providing valuable habitat for birds and pollinators.

See appendix for detailed analysis of benefit valuation.

ECOSYSTEM SERVICES OF HALE PARKWAY

Eco Valuation

Hale Parkway improvements will generate significant community benefits. Using benefit-transfer methods, it is anticipated the project will generate over $500,000 in community benefits each year.

$515K ANNUAL BENEFIT

- $228,791 RECREATIONAL BENEFITS
- $207,583 HEALTH SAVINGS
- $68,016 AVOIDED FLOOD DAMAGE
- $1,437 ENVIRONMENTAL BENEFITS

Figure 5.25 Benefits Evaluation

Economic benefits valuation lead by Earth Economics

Figure 5.26 Ecosystem Services of Hale Parkway