United States Environmental Protection Agency

GREENING AMERICA'S COMMUNITIES:
OKLAHOMA CITY

CENTRAL NEIGHBORHOODS: PASEO, CENTRAL PARK, JEFFERSON PARK, AND EDGEMERE PARK HISTORIC DISTRICT

OKLAHOMA CITY, OKLAHOMA

Office of Sustainable Communities
Smart Growth Program

Greening America's Communities

Greening America's Communities is an EPA program to help cities and towns develop an implementable vision of environmentally friendly neighborhoods that incorporate innovative green infrastructure and other sustainable design strategies. EPA provides design assistance to help support sustainable communities that protect the environment, economy, and public health and to inspire local and state leaders to expand this work elsewhere.

Greening America's Communities will help communities consider ways to incorporate sustainable design strategies into their planning and development policies in order to create and enhance interesting and distinctive neighborhoods that have multiple social, economic, and environmental benefits.

Oklahoma City was chosen in 2016 as one of six communities to receive this assistance along with Brownsville, Texas; Columbia, South Carolina; Honolulu, Hawaii; Multnomah County, Oregon; and Muscatine, Iowa.

More information is available at
https://www.epa.gov/smartgrowth/greening-americas-communities

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GREENING AMERICA'S COMMUNITIES OKLAHOMA CITY

Central Neighborhoods:
Paseo, Central Park, Jefferson Park, and Edgemere Park Historic District

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Executive Summary

In 2016, Oklahoma City applied to the U.S. Environmental Protection Agency (EPA) for technical assistance under its Greening America's Communities program to address flooding and connectivity issues for five key locations within the Paseo Arts District, Central Park, Jefferson Park, and Edgemere Park neighborhoods. The city also wanted to pilot new opportunities for integrating stormwater management with street and public space improvements. EPA brought together a team of federal agency staff and design professionals to help the city create community-supported design solutions.

This report outlines the public engagement process, conditions analysis, and design tasks undertaken to prioritize and address key neighborhood challenges using a sustainable approach to flood mitigation and safe passage. The report includes a set of recommendations specific to each of the five locations with detailed illustrations to help community members, city staff and potential developers envision the functional, aesthetic and experiential qualities of the proposed designs. The design options propose improved amenities for pedestrians and cyclists and provide a range of green infrastructure approaches to address stormwater and floodwater issues including an infiltration roundabout, increased tree canopy, a detention amphitheater, stream restoration and a multipurpose trail with infiltration. The report concludes with next steps and potential partnerships to support and fund implementation.

Figures 1 and 2. Images provided by Oklahoma City show flooding in project area neighborhoods.

Figure 3. Wide streets and large corner storm drains on Walker Avenue.

Introduction

Oklahoma City, settled in 1889, grew along a similar timeline to that of the automobile industry. This parallel growth is evident in the city's auto-centric infrastructure, which favors wide streets and spread-out neighborhoods. The development pattern led to two key issues that this project seeks to address: flooding caused by excessive pavement, and poor connectivity for walking and biking (see Figures 1-3).

PlanOKC, Oklahoma City's first comprehensive plan since 1977, proposes maximizing green infrastructure and on-site stormwater management to address flooding and water quality issues. Additionally, the plan outlines the goal of incorporating multi-modal corridors and improving connectivity between neighborhoods.

The project area is two miles north of downtown Oklahoma City (see Figure 4) and includes four historic neighborhoods: Jefferson Park, Edgemere Park, Central Park and the Paseo Arts District. The area is bordered by three arterial streets and an Interstate Highway. The study area includes two schools, a large park, and a historic commercial/arts district, all of which experience widespread flooding during rain events. Within this study area are the five project areas identified by the city: Paseo, Harding School, Guy James Creek, Shartel Avenue and Walker Avenue (see Figure 5).

Between 2010 and 2016, two historic floods highlighted the inability of the existing storm sewers to handle stormwater in these neighborhoods. Flooding causes repeated damage to vehicles, homes, schools and parks across these neighborhoods, as well as safety risks and inconvenience traveling by car, foot or bike. Additionally, infrastructure for walking and biking throughout the neighborhoods, particularly along school routes and through the arts district, is discontinuous and poses significant risks for pedestrians and bicyclists. Sidewalks are in disrepair or non-existent in some areas; large storm drains and curb drains present accessibility issues and significant fall hazards; and wide streets encourage high speed traffic through the neighborhoods. Continued erosion along the creek in Edgemere Park poses significant danger for visitors walking along the steep banks.

The project team reviewed existing documents and plans[1], conducted an initial site visit with community stakeholders, documented baseline conditions, and developed initial design ideas for each site location. The designs explored a range of green infrastructure strategies to absorb the rain, reduce flooding and filter the runoff of pollutants. Strategies include: pervious pavers, bioretention planters, riparian restoration and bioswales that can be integrated into attractive neighborhood features such as traffic-calming circles, bike paths and even an outdoor classroom for the Harding Schools. (Note: there are two schools in one building: Harding Fine Arts Academy and Harding Center Preparatory School).

The team then held a charrette (a design workshop) to gather input from the community members on the initial designs, and met directly with stakeholders, including business owners, city staff, and administrators from the Harding Fine Arts Academy and Harding Charter Preparatory High School.

Following the charrette, the design team refined the design options to incorporate feedback and developed illustrations and the final report to support the city's efforts to identify funding sources for implementation.

[1] Information from the following resources contributed to the planning and design options developed for Greening Central Neighborhoods: Historic Edgemere Park Appeal for a Comprehensive Master Park Plan; OKC Water Survey Drainage Basin 1348 Assessment; Paseo Accessibility and Walkability Blueprint, University of Oklahoma Institute for Quality Communities, 2014; and PlanOKC, Comprehensive Plan for Oklahoma City, 2015.

Figure 4. Location of project area in context of Oklahoma City.

Figure 5. Greening Central Neighborhoods' five key project sites.

Workshop Summary

The team facilitated a three-day community charrette starting September 26, 2017 to gather input from residents on initial design options, and prioritize strategies and goals for the options at a more detailed scale. Members of all four neighborhoods and area business owners were invited to attend. Approximately 50 residents participated in the charrette, which included an overview of the baseline conditions and a presentation of the initial designs. An open house session fostered one-on-one discussions to gather feedback and capture additional information about challenges and ideas for each specific project location. Input was also gathered using an online survey and through individual stakeholder meetings.

Community members identified the following goals for the project area:

- Repair and install continuous and consistent sidewalks.
- Create safe, accessible street crossings and intersections.
- Reduce vehicular speed on Shartel and Walker, the arterial streets that connect the neighborhoods.
- Use roundabouts and school drop-off zones to allow both traffic and cyclist to keep moving, but also to be safe.
- Add bike lanes.
- Consider proposed park connections that extend through the project area.
- Develop green infrastructure solutions that reduce the load on existing gray infrastructure by increasing infiltration areas and temporarily holding water to prevent flooding, overflow and erosion.
- Improve appearance of streetscapes while reinforcing existing historic character.
- Use low-maintenance, drought-resistant, and attractive plantings.
- Sensitively incorporate any new parking in the Paseo neighborhood.

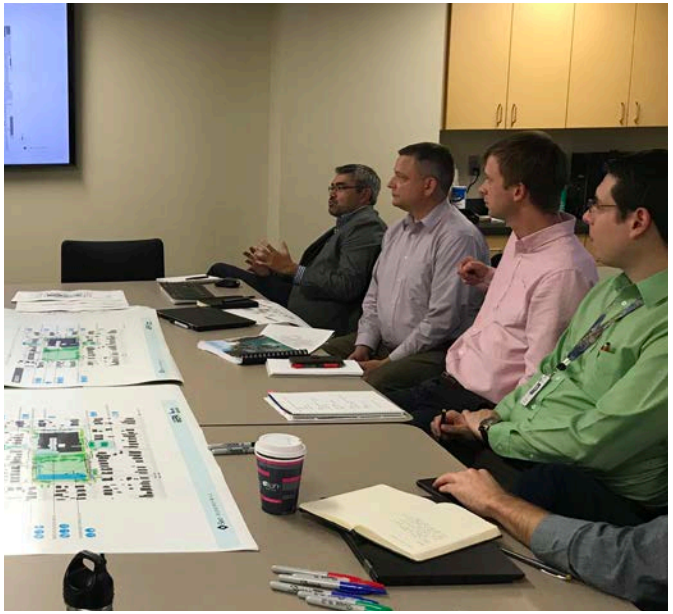


Figure 6. During stakeholder meetings, groups with specific interests in the project areas provided input on the designs.

Figure 7. A community charrette provided an overview of design concepts followed by one-on-one discussions for community members to share input on designs.

Existing Conditions

Community members, city staff and the consultant team identified the following existing conditions in the study area as needing to be addressed:

- Sidewalks across the neighborhoods are broken or end abruptly. Many are impassable due to obstacles (cars, dumpsters, overgrowth).
- There are no dedicated bike lanes.
- Many intersections have steep, unsafe curb drops created by large street inlets and drainage channels. Some lack crosswalks and signs.
- Major streets like Shartel and Walker are wide with little or no traffic-calming elements.

Flooding was identified by the community as a significant concern. Understanding the factors that contribute to flooding is critical for developing designs that can mitigate flooding and increase flood resilience. Identifying the volume and flow of stormwater across the project neighborhoods revealed key locations where stormwater can be intercepted to reduce the amount and slow the flow toward areas that flood regularly.

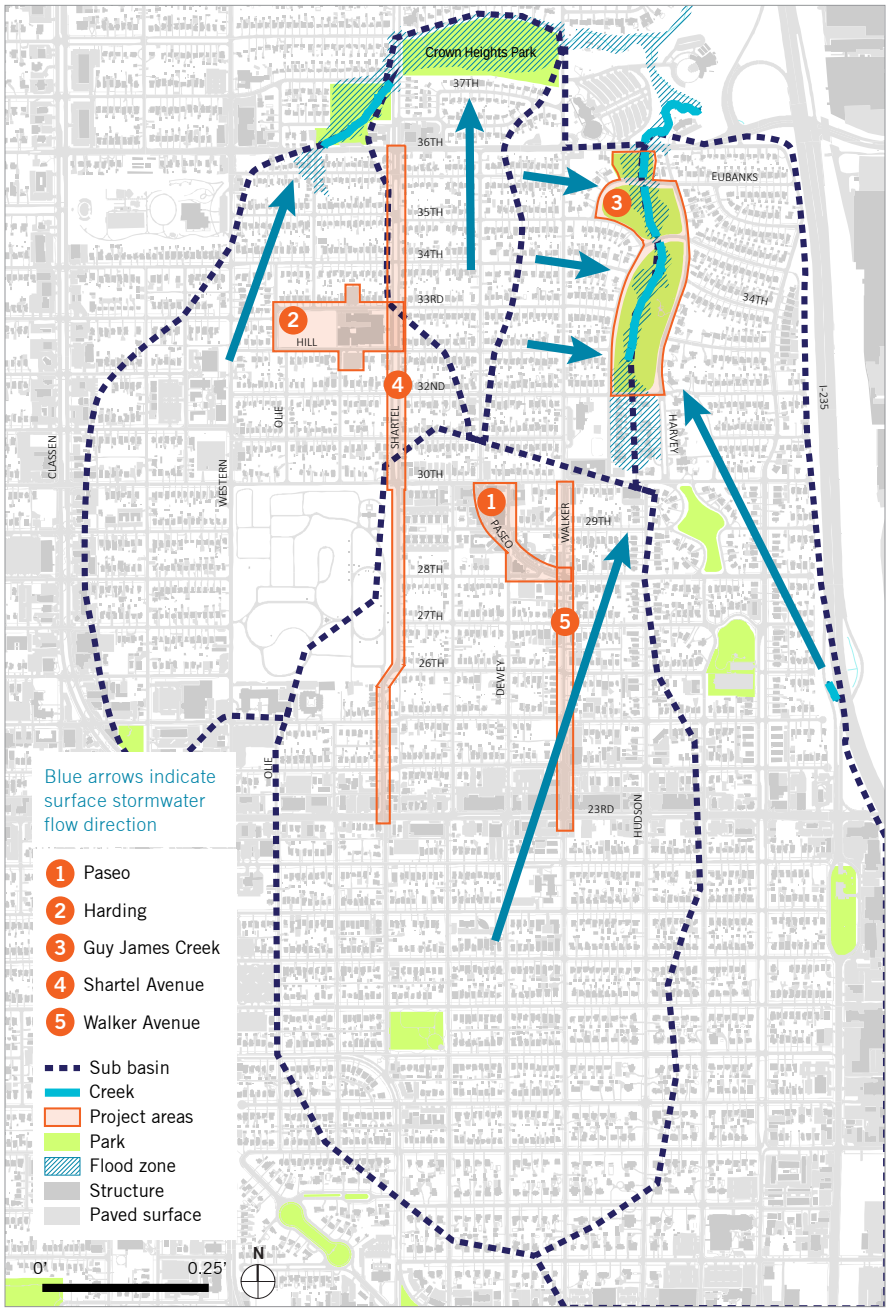


Figure 8. This map approximates the drainage sub-basins in the project area using a recent study, *OKC Water Survey Drainage Basin 1348 Assessment,* and contours. Most stormwater from the project area and a large area south of the project area flows into Guy James Creek, where severe flooding and erosion occurs during rain events.

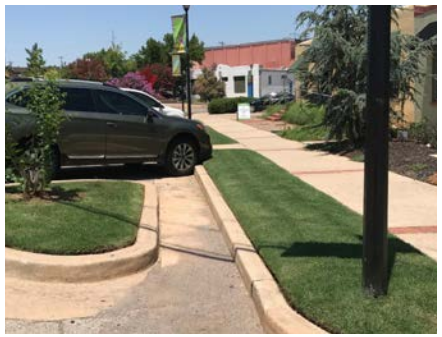


Figure 9. Large drainage channels increase the speed of water along Paseo and create trip hazards for pedestrians.

Existing Conditions

1/Paseo

The historic Paseo Arts District, situated along the two-block Paseo Drive, includes galleries, restaurants and small boutiques with local flavor. The district is also host to an annual outdoor arts festival during the Memorial Day weekend. Sizeable development is underway along Paseo, most notably, an increase of restaurant and retail businesses.

On-street parking along Paseo is limited during events and weekends, and parking is likely to become more difficult with increased commercial and mixed-use development.

Pedestrian access from surrounding neighborhoods and through Paseo is challenged by a lack of sidewalks and crosswalks, as well as deep curb channels. The *Paseo Accessibility and Walkability Blueprint* documents the obstacles to accessibility and walkability in the Paseo District.

During rain events, significant flooding occurs, particularly at these major intersections in the district: Paseo Drive, Dewey Avenue and NW 29th Street.

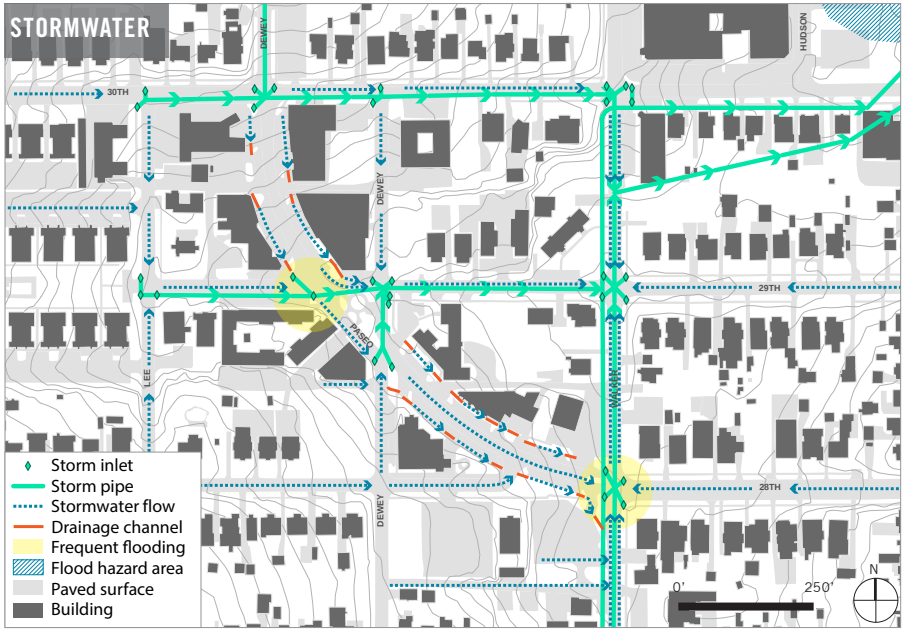


Figure 10. Arrows show the direction of stormwater flow in the Paseo area.

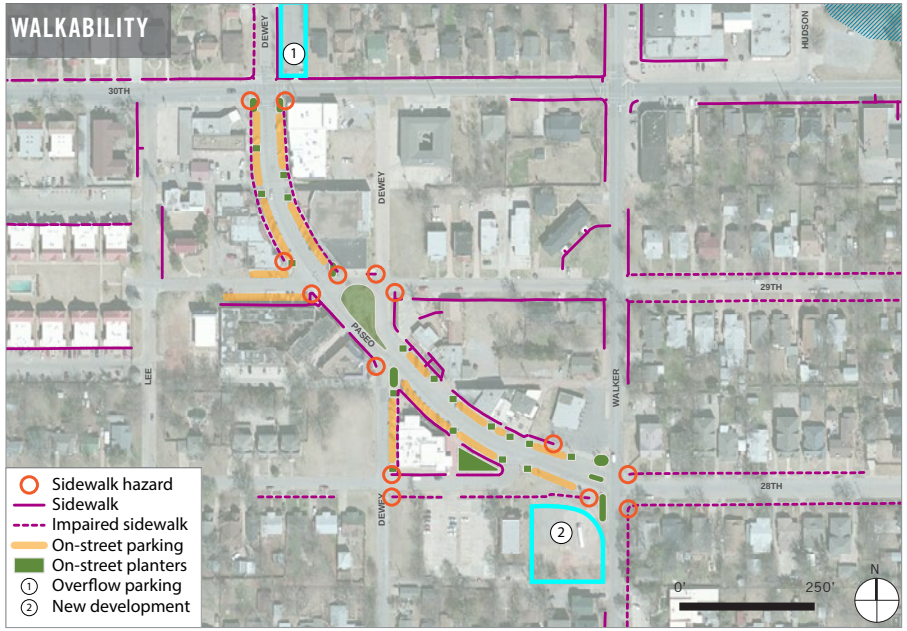


Figure 11. Map highlighting features that affect walkability through Paseo district.

Figure 12. Rainwater from the school roof flows into the paved courtyard and contributes to flooding inside and outside the building.

Existing Conditions

2/Harding

Two schools, Harding Fine Arts Academy and Harding Charter Preparatory High School, with students in grades 9-12, operate on the property bordered by Shartel Avenue, Olie Avenue, Hill Street and NW 33rd Street. All students are either dropped off or drive to school. Oklahoma City Public Schools owns the school property and leases it to the two non-profit schools operating on site.

Flooding is the most significant issue for the schools, followed by a lack of parking. Parking lots on the north and south sides of the school exacerbate heat island effects and increase stormwater runoff. In severe storms, runoff extends from the intersection of Hill and Olie toward the school and residential streets, damaging homes and forcing vehicles out of street parking spaces. Runoff from the south parking lot and the rooftop cause regular flooding in the school cafeteria. On the north side of the school, runoff flows down NW 33rd Street and into classrooms on the lower level of the school through windows and crevices in the brick. During school hours, parking is scarce. Students occupy much of the on-street parking in the adjacent residential streets, which causes conflict with the neighbors.

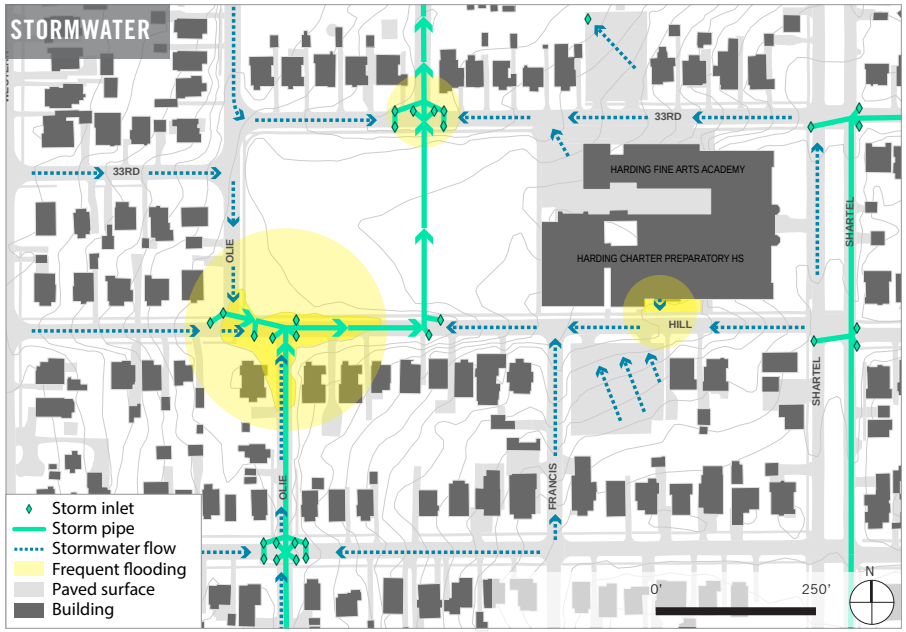


Figure 13. Arrows show direction of stormwater flow around Harding.

Figure 14. Map highlighting pedestrian, parking and bike infrastructure.

Existing Conditions

3/Guy James Creek

Edgemere Park Historic District, one of the first planned communities west of the Mississippi River, is characterized by mid-sized to large, well-maintained homes looking out toward Edgemere Park and Guy James Creek, a tributary of the Deep Fork River.

The grass is mowed close to the banks of the creek, reducing the water filtration benefits of riparian vegetation. Several culverts carrying runoff from surrounding streets empty into the creek. In other areas, shallow drainage swales move across the grass toward the tributary. A large sub-basin that includes the project area and additional neighborhoods extending south to NW 10th Street, empties into the creek.

Stream banks are highly eroded in some areas and the stream is deeply incised, creating steep drops from the surrounding park lawn. According to the *Historic Edgemere Park Appeal for a Comprehensive Master Park Plan*, ice storms have thinned the canopy of trees that once shaded the park.

The design challenge is to modify and repair the stream channel to handle runoff from heavy storm events to prevent erosion and improve water quality, while restoring the aesthetic character of the stream in this historic neighborhood.

Figure 15. The sides of Guy James Creek have eroded, forming steep banks.

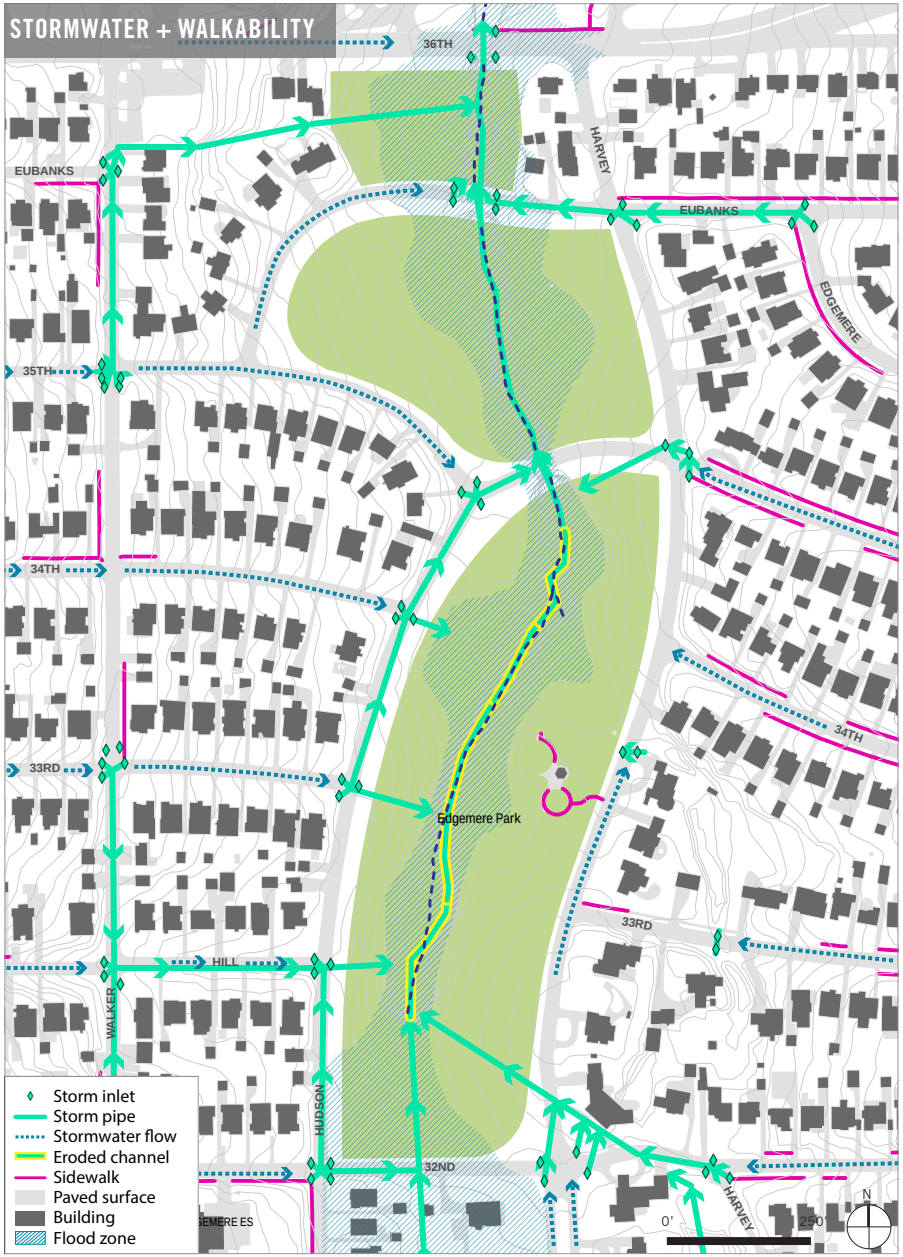


Figure 16. Map highlighting stormwater flow and sidewalks.

Figure 17. View of Shartel Avenue along Fairlawn Cemetery. Bike lane markings and sidewalks on Shartel Avenue are intermittent.

Existing Conditions

4/Shartel Avenue

This busy corridor extends north from the commercial area at NW 23rd Street along a cemetery and residences to NW 36th Street. The road expands at Harding School properties to include a center median from NW 30th Street to NW 36th Street.

The center median is considered park property, but the Central Park Neighborhood Association has an agreement with the city's Parks and Recreation Department to maintain the six-block planted median, which ranges from wildflowers and small tree plantings to a mowed lawn at NW 36th Street. Shartel Avenue extends along a ridge, and both the north and south lanes slope away from the planted median between the lanes.

Bicyclists would like to use Shartel for commuting, but the stopped traffic at the school during peak hours, the high speed of moving traffic, and the lack of bike lanes present significant safety issues.

Pedestrian activity is limited along Shartel because of discontinuous sidewalks. Shartel Avenue narrows along Fairlawn Cemetery and an intermittent sidewalk runs only on the east side of the street.

Additionally, many area residents complain about the lack of maintenance of the median plantings, and suggest alternative uses for the medians as a walk/bike path, or for low-maintenance plantings with more aesthetic appeal.

The wide street provides opportunities for considering green infrastructure strategies that separate lanes and/or integrate active transportation infrastructure along the median.

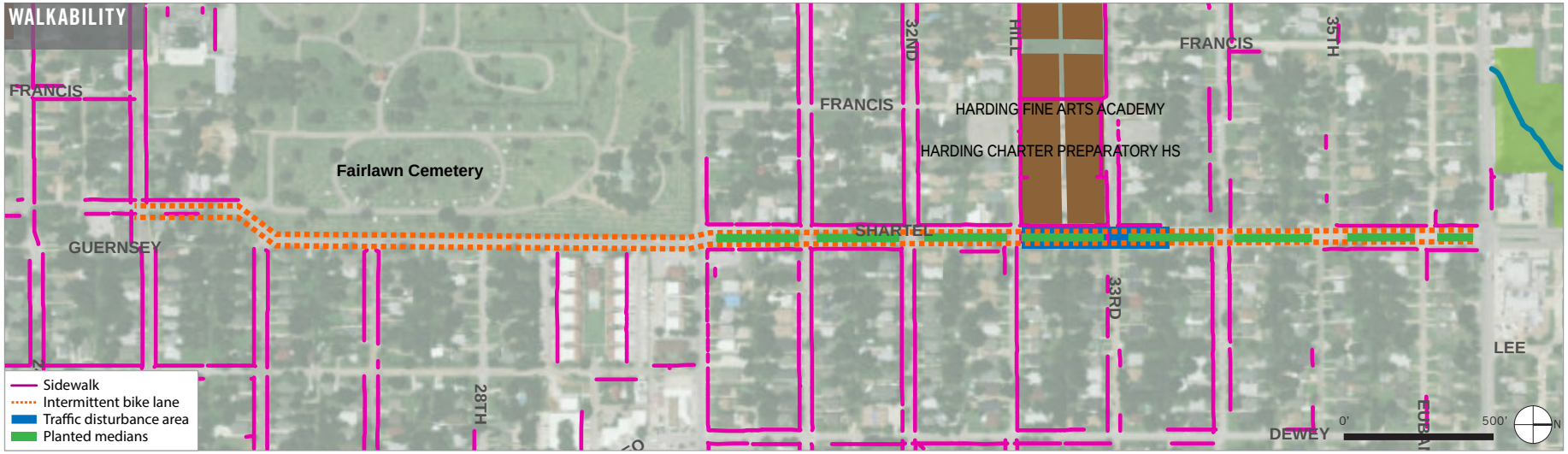


Figure 18. Sidewalk and bike infrastructure on Shartel Avenue.

Figure 19. Large storm drains on Walker Avenue create safety hazards.

Existing Conditions

5/Walker Avenue

The Walker Avenue study area extends north from a commercial intersection at NW 23rd Street through Paseo Drive to the busy NW 36th Street corridor, passing through a neighborhood, an elementary school and Edgemere Park. Walker Avenue is a key route to the park, school and commercial district, so pedestrian and bicycle safety is very important.

Severe flooding occurs at the intersection of Walker and NW 28th near the Paseo district entrance and the drainage system is not large enough to handle heavy rains. Sidewalks are intermittent or uneven, and curbs at some intersections present up to a one-foot drop or more for pedestrians due to large street drains at each corner.

Addressing walkability issues, creating safe intersections and street crossings, and reducing flooding are the primary goals for green infrastructure strategies along Walker Avenue.

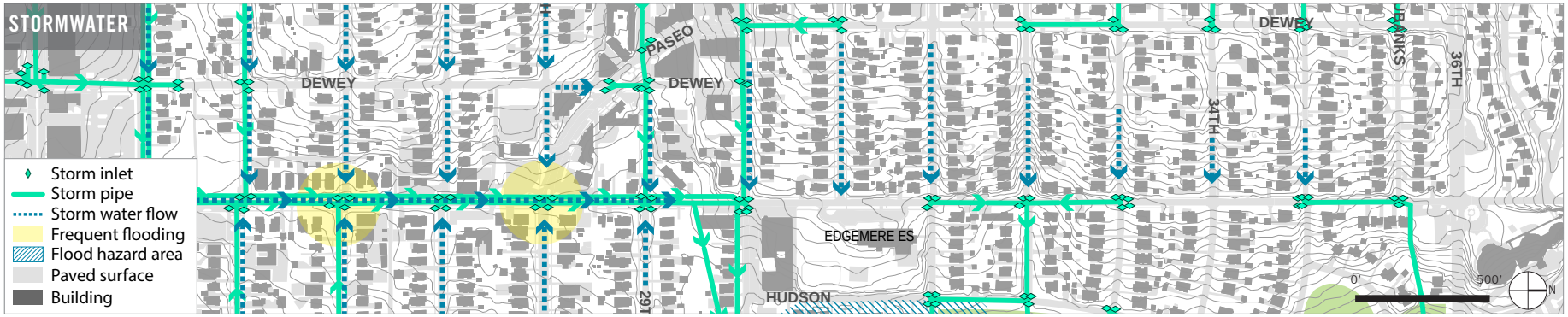


Figure 20. Stormwater flow on Walker Avenue. A large volume of runoff from outside the project area enters the drainage network south of Edgemere Elementary School.

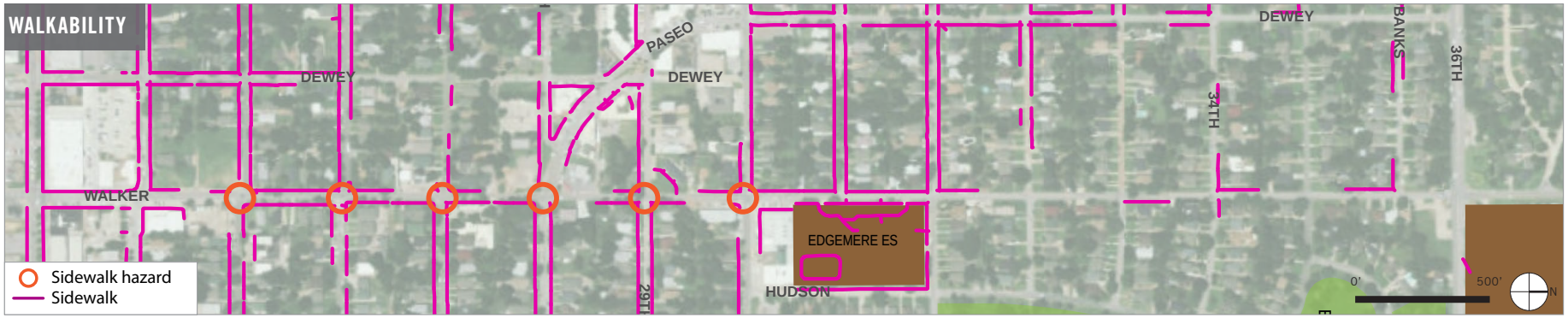


Figure 21. Intermittent sidewalks and large storm drains at intersections create hazards for pedestrians along Walker Avenue.

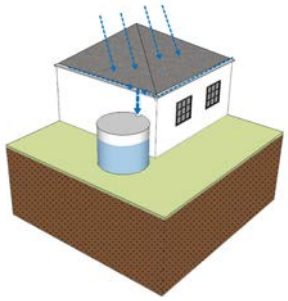
Design Options

GREEN INFRASTRUCTURE TOOLKIT

The design options presented in this section address challenges specific to each project area by integrating green infrastructure tools to address stormwater runoff with amenities to improve public spaces and biking and walking safety.

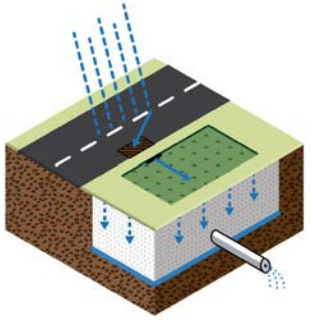
Each design option integrates one or more of the green infrastructure tools described on this page to help manage the volume, flow and/or treatment of stormwater.

01. CAPTURE



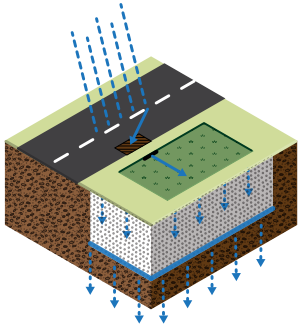
Capture systems collect and store stormwater for specific purposes, such as irrigation, and often can hold water for a significant period of time.

02. DETENTION



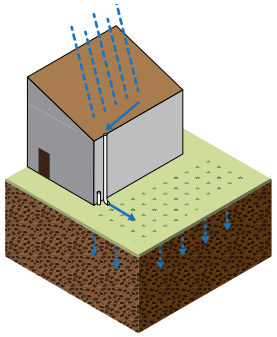
Detention/slow-release systems are designed to capture, detain, and treat stormwater and slowly release it at a controlled rate.

03. INFILTRATION



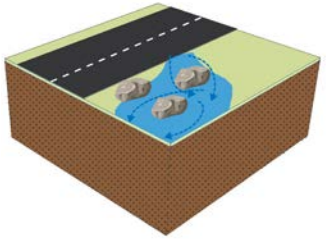
Infiltration systems are designed to infiltrate stormwater into the existing subgrade at a controlled rate.

04. DISCONNECTION



Disconnection is designed to divert (or remove) impervious areas from the stormwater collection system.

05. FLOW CONTROL



Flow control systems slow, divert, or otherwise control the movement of the water to mitigate erosion or standing water conditions.

Design Options

1/Paseo

This design option reduces stormwater flooding and improves pedestrian infrastructure along the corridor while maintaining the historic character and vehicular capacity of the historic district that residents said they wanted.

To reduce flooding potential, the design increases areas for infiltration by adding rain gardens, tree canopy and permeable pavements in parking areas. Additional bump-out planting areas will control, slow and detain stormwater along the street.

Reorganization of the public right-of-way allows for the development of a continuous, wide sidewalk on both sides of the street. Protected pedestrian crossings that also act as infiltration areas are integrated at highly trafficked intersections to create safe and pleasant crossings. Dedicated bike lanes address cyclist safety concerns.

A central recessed planting roundabout at the intersection of Walker Avenue and Paseo Drive/NW 29th Street acts as a gateway to the district and creates a large area for detention and infiltration.

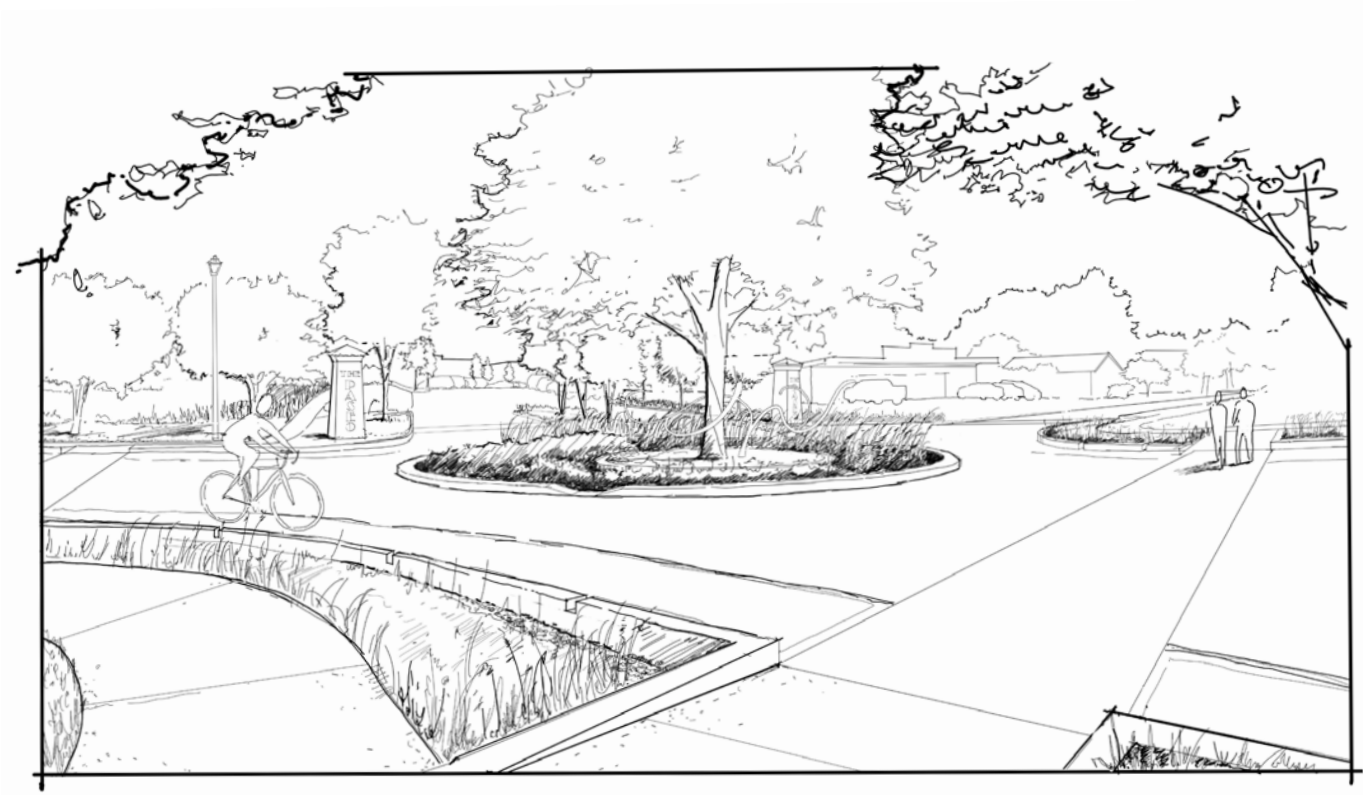


Figure 22. Sketch of Paseo design option.

Design Options

1/Paseo

Figure 23. Design option for increasing infiltration and adding pedestrian crosswalks along Paseo and at the three key intersections in the district.

Design Options

1/Paseo (before)

Figure 24. Intersection of Paseo, Walker Avenue and NW 28th Street. This wide intersection, an important entry into the Paseo District, frequently floods, and facilitates speeding north-south on Walker Avenue. The intersection lacks pedestrian crossings, and the sidewalks are in disrepair.

Design Options

1/Paseo (after)

Figure 25. A recessed roundabout slows vehicles moving through the intersection and captures stormwater during rain events. New sidewalks and street markings improve pedestrian safety, dedicated bike lane address cyclist safety, and planted bump-outs collect and infiltrate additional street runoff.

Design Options

2/Harding

This design reduces stormwater flooding, improves vehicular circulation, and supports school programming — goals that school staff, students and parents raised concerns about.

In this design, stormwater flows from the adjacent neighborhood are directed into two high capacity infiltration areas on the school grounds: underground storage cells on the western edge and a constructed wetland area adjacent to the school building.

The flow of water along the streets is controlled through the selective placement of bump-out rain gardens. Additional street parking along the western edge of the campus and front drop-off plaza area alleviate vehicular congestion during school hours. Permeable pavements in these areas allow for infiltration.

A recessed amphitheater acts as a detention basin to capture the flow of water from the building and serves as an outdoor classroom and performance space. A similar amphitheater built at Manassas Park Elementary School has been successful in detaining stormwater and providing a unique learning environment (see page 33 for more information).

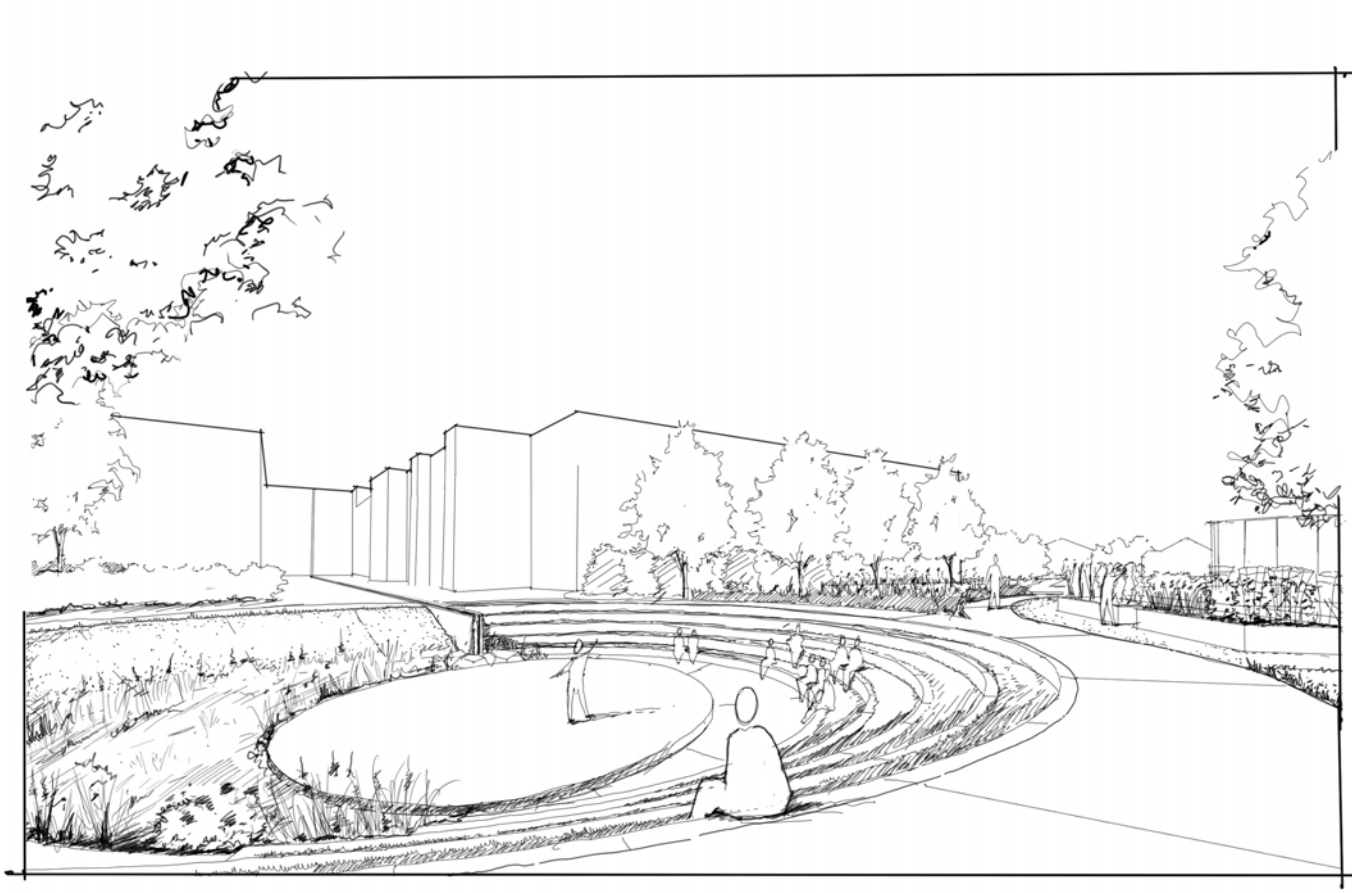


Figure 26. Sketch of proposed amphitheater in Harding design option.

Design Options

2/Harding

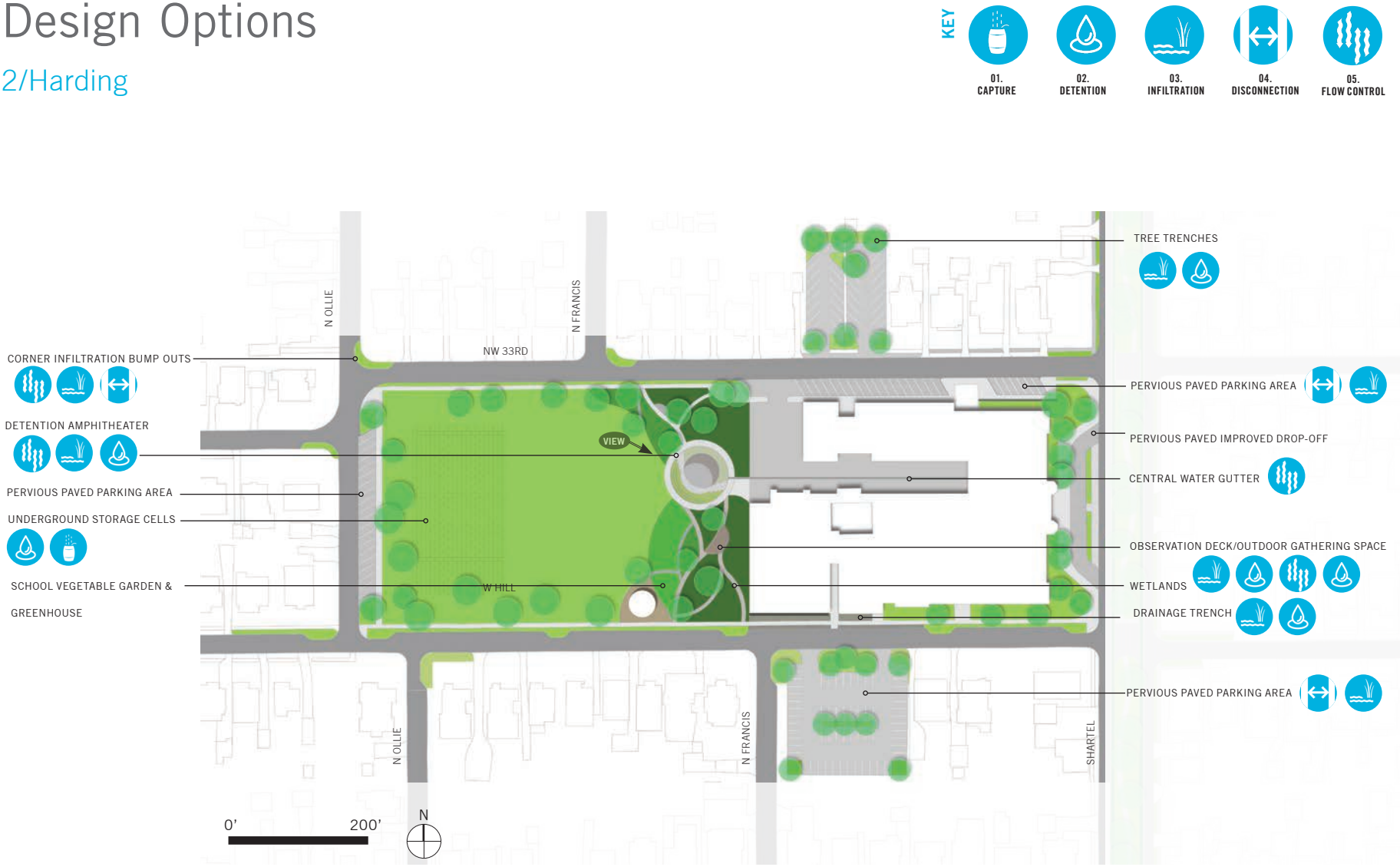


Figure 27. The design option for Harding integrates outdoor learning areas with stormwater management infrastructure, and introduces pervious paving to parking areas. The Edison Green Campus pervious parking lot image on page 33 illustrates a similar green infrastructure design for student and faculty parking lots.

Design Options

2/Harding

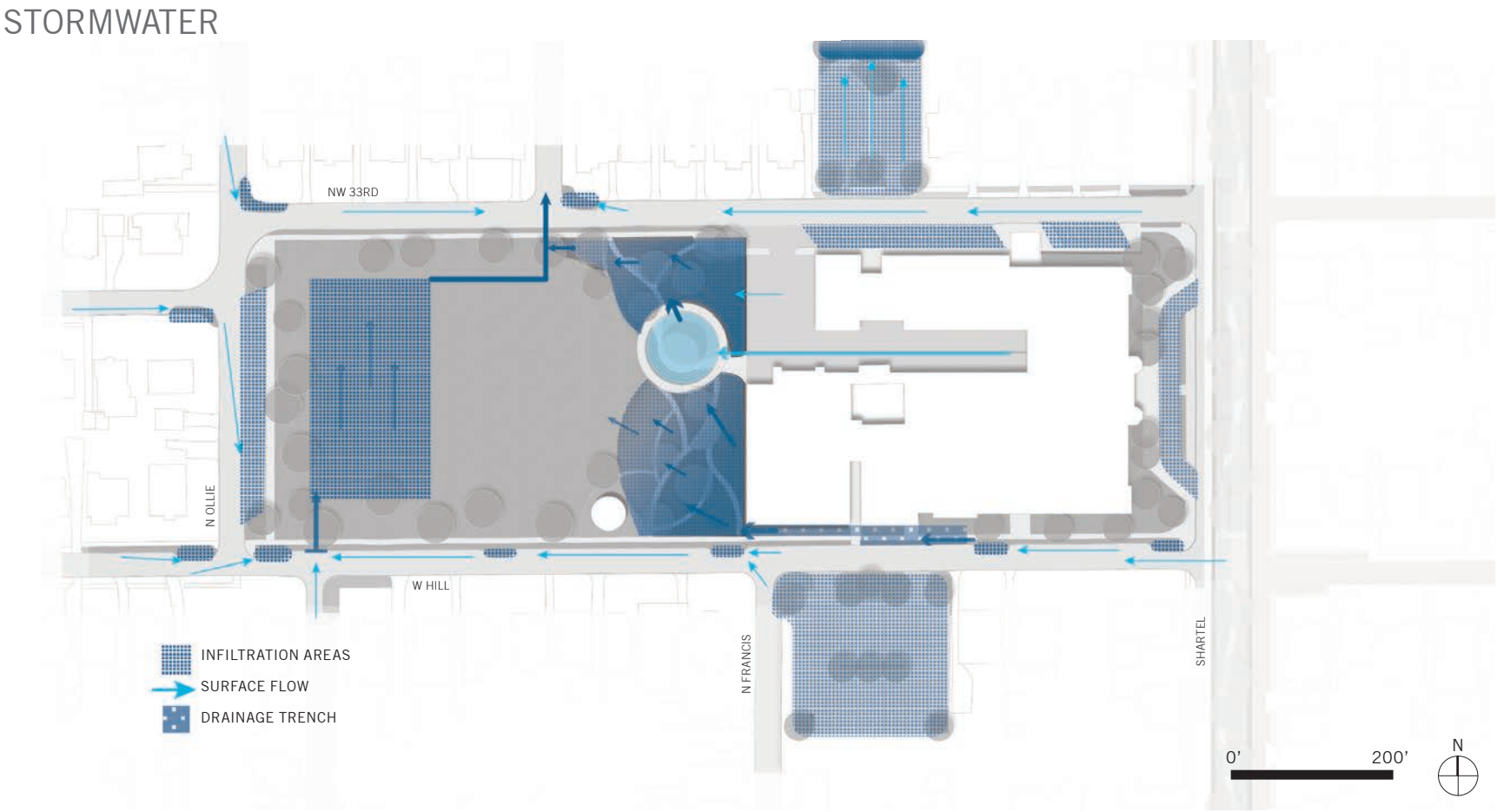


Figure 28. Diagram of how the Harding design option addresses stormwater flow and provides infiltration areas.

Design Options

2/Harding (before)

Figure 29. A view of Harding from the athletic field. The large impervious footprint of the school and adjacent parking structures, as well as the steep grade changes of surrounding blocks, creates more stormwater runoff than the current drainage infrastructure can handle. The volume causes flooding inside the school and on surrounding streets.

Design Options

2/Harding (after)

Figure 30. The design option includes a recessed amphitheater to capture and detain water from the building and parking areas, and constructed wetlands to collect and infiltrate stormwater from adjacent streets.

Design Options

3/Guy James Creek

This design develops the park as a functional floodplain and stormwater collector to reduce flooding in adjacent neighborhood areas while expanding the recreational and opportunities of the park that neighborhood residents said they wanted.

Widening the creek channel increases the overall stormwater holding capacity, and along with adding plants to the banks, reduces erosion. Outfalls control the flow of water and act as a beautiful feature of the park. New pathways allow increased access to the creek and create a beautiful trail loop.

Figure 31. Sketch of outfall and enlarged creek footprint in Guy James Creek design option.

Design Options

3/Guy James Creek

Figure 32. The design option for Guy James Creek extends and widens the creek channel to increase water holding capacity.

Design Options

3/Guy James Creek (before)

Figure 33. This image of Guy James Creek shows the severe erosion caused by high flow during rain events. The steep banks create safety hazards for park visitors.

Design Options

3/Guy James Creek (after)

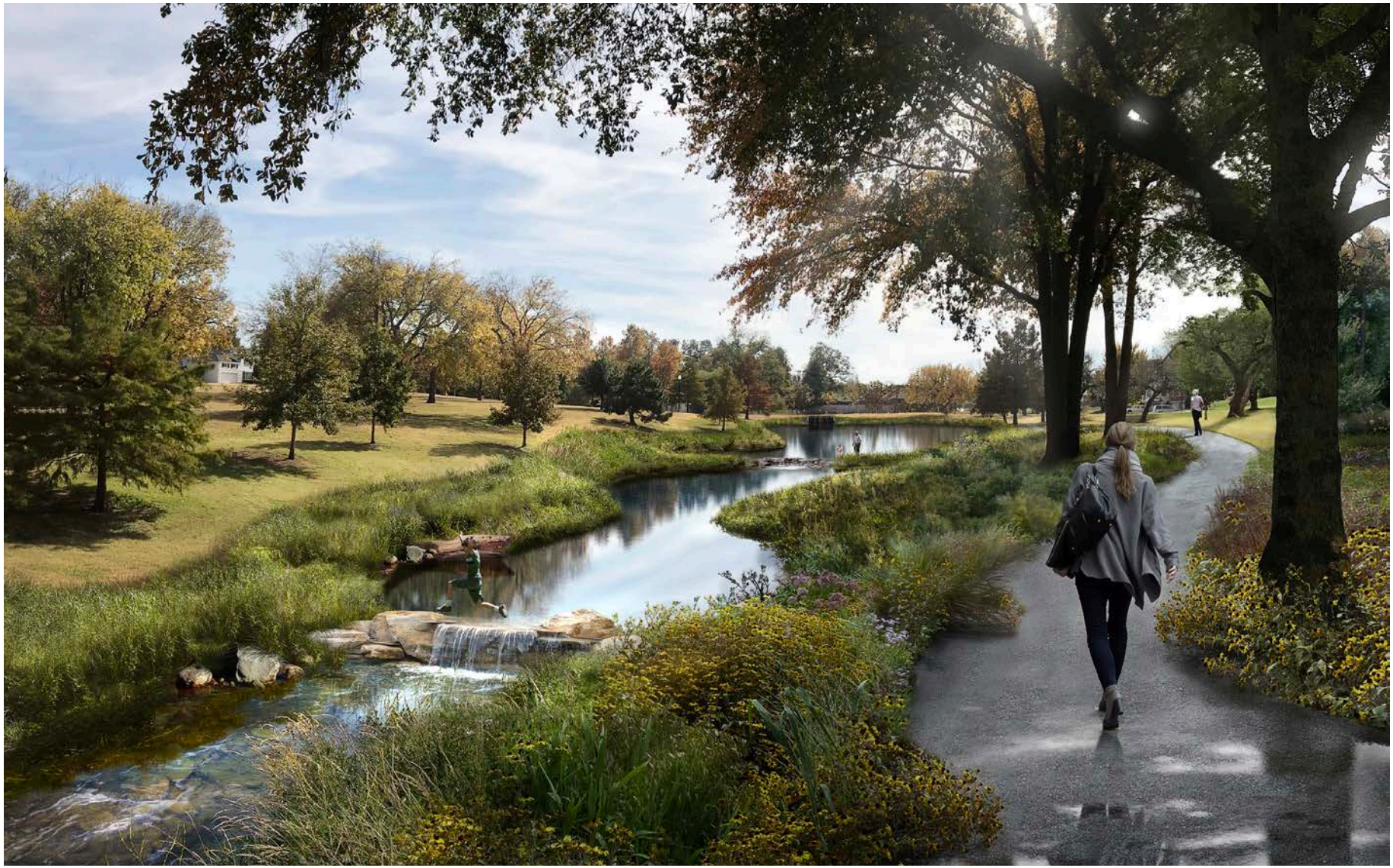


Figure 34. The design option for Guy James Creek increases the size of the creek to hold more stormwater, and stabilizes the banks with plantings to reduce erosion; two outfalls shown in this illustration control water flow and a path connects visitors to the creek edge.

Design Options

4/Shartel Avenue

This design captures the ideas of residents wanted to see more use made of the existing central median. .

The design includes a multipurpose trail for pedestrians; planted bioswales to increase infiltration within the median; and protected bike lanes added to both sides of the median. Locating the bike lanes adjacent to the median rather than along the outside curbs reduces conflicts between cyclists and parked cars in front of the school which was brought up several times by workshop participants as a hazard.

Speed tables (wider, flat-topped speed bumps) along the median at intersections slows the traffic and provides a safer crossing for pedestrians and cyclists using the path and bike lanes. The long, flat design of speed tables allows cars to pass more smoothly than traditional speed bumps.

The use of planted linear swales as streetscape improvements and green infrastructure is highlighted in the Indianapolis Cultural Trail example on page 33.

Figure 35. Sketch of Shartel Avenue design option highlighting new walk and bike paths.

Design Options

4/Shartel Avenue

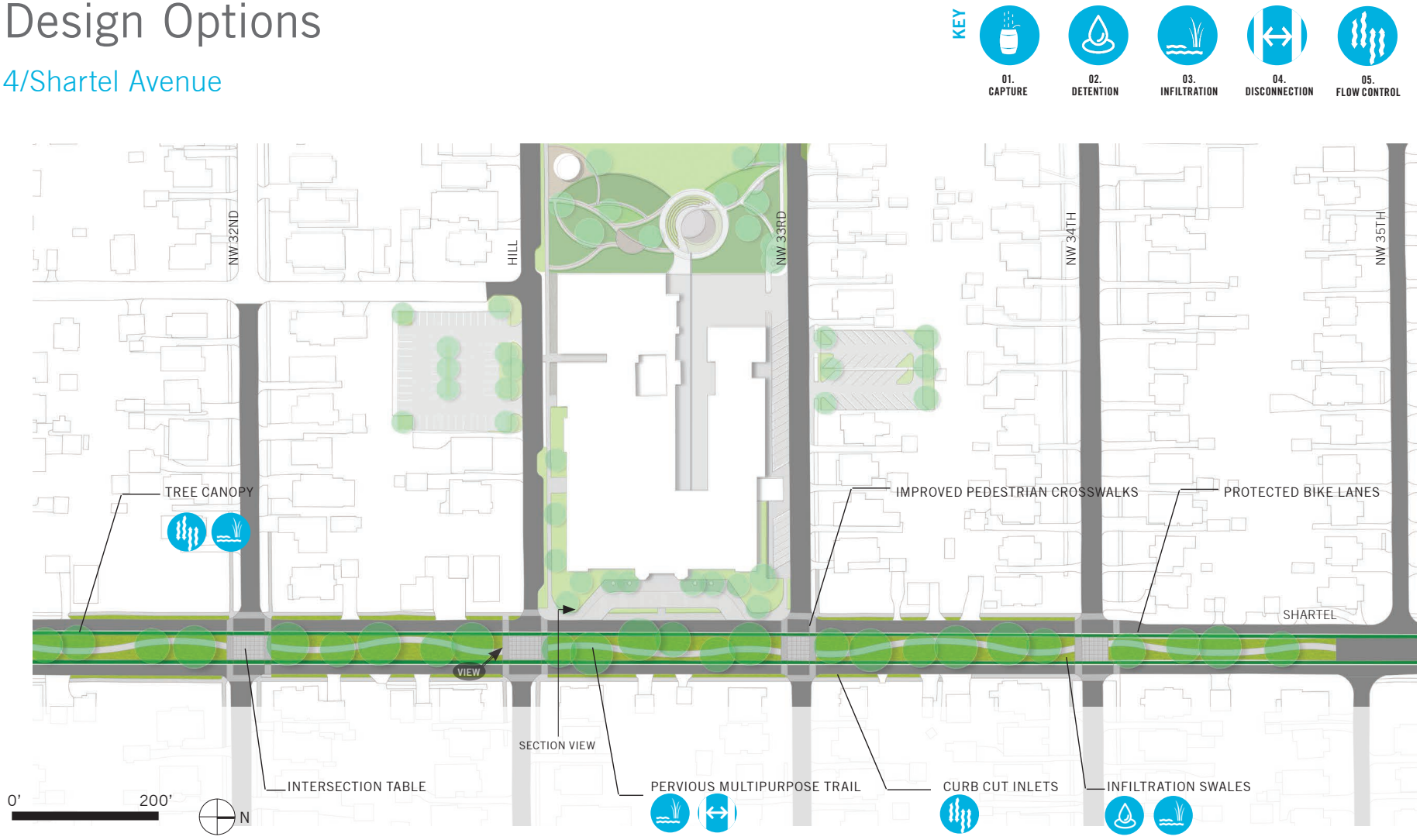
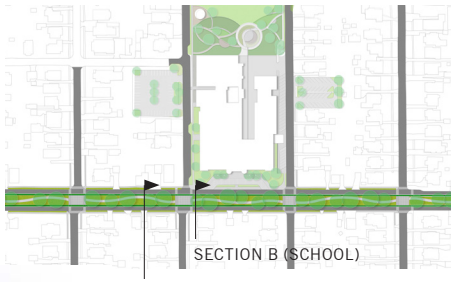
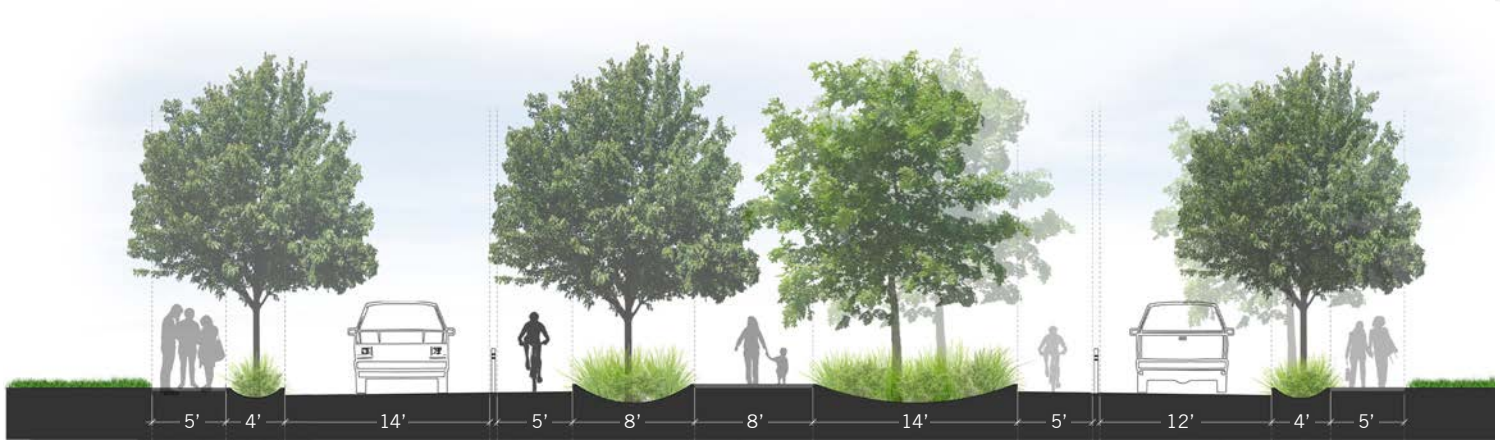


Figure 36. The design option for Shartel Avenue focuses on using the central median to create safe sidewalks and bike lanes.

Design Options

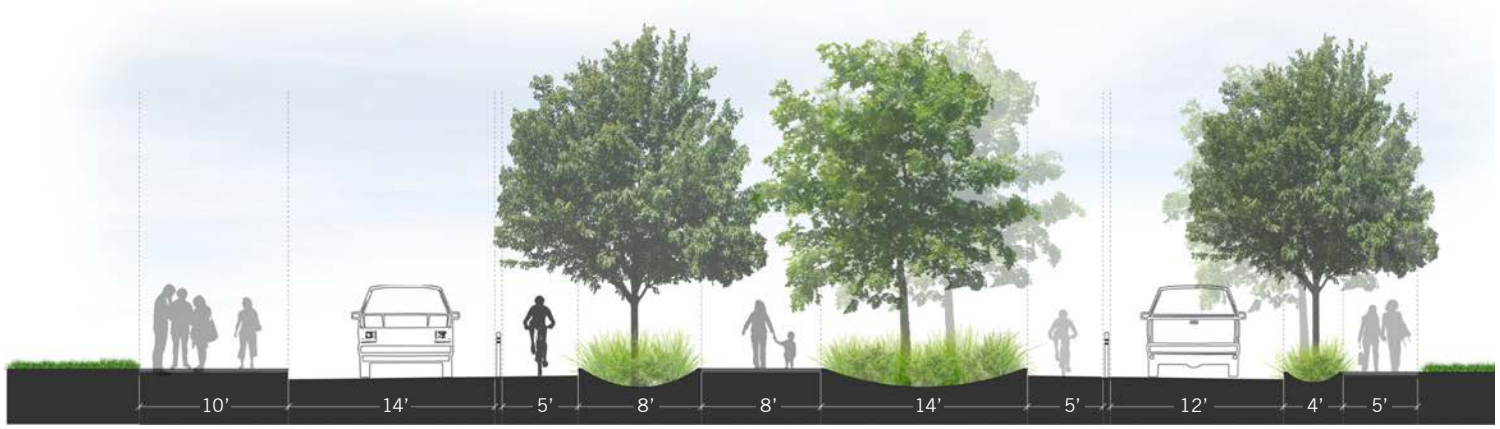
4/Shartel Avenue





SECTION VIEW A (TYPICAL STREET)

Figure 37. Section A illustrates sidewalk, bike path, street and median treatments for most blocks between NW 30th Street and NW 36th Street.



SECTION VIEW B (SCHOOL)

Figure 38. Section B illustrates the conditions for the block of Shartel Avenue in front of Harding Fine Arts Academy and Harding Charter Preparatory High School and provides a wider sidewalk in front of the schools.

Design Options

4/Shartel Avenue (before)

Figure 39. View of Shartel Avenue and the two Harding schools. Improved street markings and designated lanes for bicyclists and pedestrians are needed to improve safety. Cars blocking the bike lane in front of the school during drop off hours make the morning commute difficult for bicyclists.

Design Options

4/Shartel Avenue (after)

Figure 40. A speed table and well-marked crosswalks slow traffic at the intersection of Hill and Shartel Avenue. A path through the medians provides a continuous route for pedestrians, and separated bike lanes improve safety for bicyclists.

Design Options

5/Walker Avenue

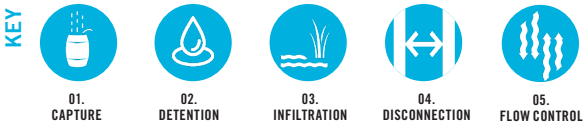
This design reimagines the intersection at Walker Avenue and NW 28th Street to improve stormwater drainage and walkability.

Residents complained that curbs were too high, which makes crossing the streets difficult especially for those with mobility impairments. Rain garden bump-outs allow for increased stormwater detention and infiltration while also allowing ADA accessible ramps to be incorporated.

Figure 41. Sketch of rain garden bump-outs integrated into new street design at Walker Avenue intersection.

Design Options

5/Walker Avenue



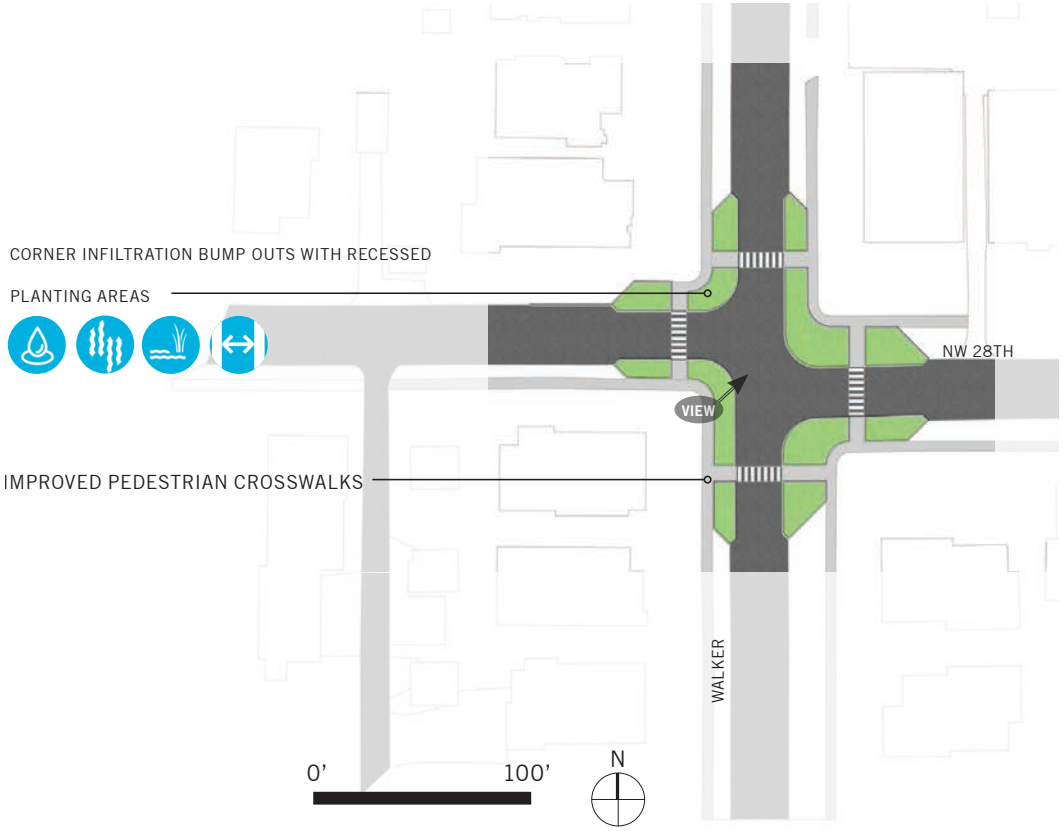


Figure 42. Design option for Walker Avenue showing infiltration areas and safe crosswalks.

Figure 43. This section illustrates how stormwater is infiltrated in vegetated bioswales between the street and sidewalk.

Design Options

5/Walker Avenue (before)

Figure 44. The large storm drains at the intersection of Walker Avenue and NW 28th Street create dangerous drops for pedestrians.

Design Options

5/Walker Avenue (after)

Figure 45. Rain garden bump-outs slow traffic and infiltrate stormwater. Continuous sidewalks and well-marked crosswalks improve walkability and pedestrian safety.

Design Options

Examples

Figure 46. Indianapolis Cultural Trail.

Indianapolis Cultural Trail

The Cultural Trail benefits the city of Indianapolis beyond providing a new transportation option. With an estimated 25,000 square feet of stormwater landscaping, the trail doubles as a streetscape beautification project. This network of green stormwater infrastructure helps divert approximately four million gallons of rainwater per year.

Source: Rundell Ernstberger Associates

Figure 47. Manassas Park Elementary School Amphitheater.

Manassas Park Elementary School Amphitheater

The stormwater amphitheater integrates natural drainage into an educational environment. Amphitheater seating surrounds a wooden stage sourced from local timber and is situated above a stormwater bioretention area planted with native plants. The outdoor learning environment is close to the school building for ease of access and to connect natural learning environments with the indoor classroom.

Source: SiteWorks
http://www.siteworks-studio.com/manassas-park/

Figure 48. Pervious parking lot at Edison Green Campus.

Edison Green Campus

The Edison Green Campus is a model for sustainable neighborhoods located in northeast Minneapolis. The area, made up of Jackson Square Park, Thomas A. Edison High School, adjacent single family homes and a flood mitigation basin, is managed by three different government entities with little collaboration. The overall scope of the project was to assist the city and neighborhood with the creation of a blueprint to incorporate sustainable design practices into the fabric of the neighborhood. This image highlights Phase One, which addresses stormwater capture and monitoring in a parking lot area that includes five best management practice features for managing stormwater.

Next Steps

Greening Central Neighborhoods provides a vision for enhancing the connectivity, beauty, sustainability and safety of five key areas in Oklahoma City's historic neighborhoods. The project also outlines a community engagement process and provides planning tools and techniques for managing stormwater and improving pedestrian and bicycle safety. While the five design strategies respond to challenges in specific locations, the benefits of this design approach can be extended to other areas of the city by adopting a systematic program of standards, policy and regulation, including:

- Street design standards that promote complete and green street principles to serve all modes of transportation safely and effectively, including vehicles, pedestrians, cyclists and public transportation.
- Stormwater management approaches that consider green infrastructure and natural drainage strategies in addition to gray infrastructure approaches.
- Park maintenance strategies that incorporate best management practices for stormwater management and water quality.
- Shared learning among city departments related to innovative and best management approaches for stormwater management, resiliency and sustainability.
- Integrated planning and cross-department coordination to ensure capital investments promote sustainable approaches while meeting multiple goals.

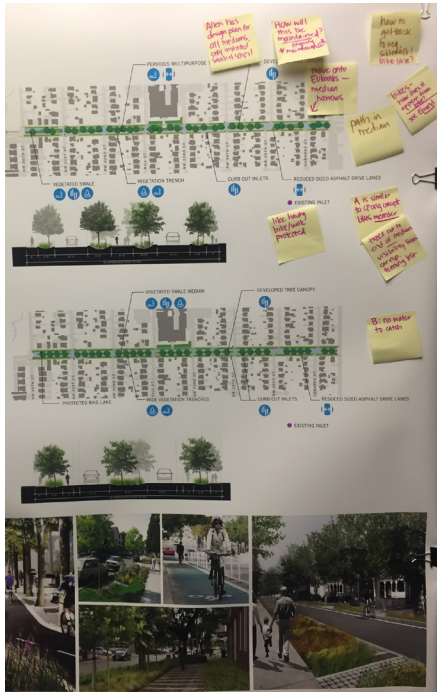


Figure 49. Community Charrette. Input captured during the charrette ensured the design strategies responded to community goals and preferences.

Next Steps

Moving Forward

Implementation planning for the proposed Greening Central Neighborhoods design strategies will likely include a combination of actions to help frame specific needs and requests for funding:

- Evaluate and prioritize which projects to initiate first.
- Identify project lead(s) and partners needed to implement and maintain the project.
- Conduct design and engineering studies.
- Continue to engage the public on design development design decisions.
- Assemble funding, which may come from a variety of sources.
- Remain flexible and creative to respond to new opportunities as they arise.

Building Partnerships and Support

During the charrette, the project team discussed a range of potential funding sources, programs and partnerships that may be able to support the Greening Central Neighborhoods design strategies. The city staff will continue to cross-departmental collaboration with external partners to identify funding sources and near-term actions.

Addressing Water Quality and Environmental Issues

EPA offers a range of funding sources that could be pursued depending on local watershed needs.

- EPA's Clean Water Act Section 319 Grants are directed to projects that reduce nonpoint source pollution, can only be used for items not required under a stormwater program, and are subject to state priorities. Green infrastructure elements may be eligible for funding through this program. See https://www.epa.gov/nps/319-grant-program-states-and-territories
- EPA's Office of Water has grants and other funding programs, including the Section 106 Water Pollution Control (to establish ongoing water pollution control programs). See https://www.epa.gov/water-pollution-control-section-106-grants
- EPA's Clean Water State Revolving Fund is a water quality financing source that helps communities meet the goals of the Clean Water Act. Nonpoint source pollution control and green infrastructure may be eligible for funding through this program. See https://www.epa.gov/cwsrf

The city may also consider pursuing targeted brownfields funding for the former gas station at the intersection of Paseo and Walker.

- EPA's brownfields grants and technical assistance provides resources to communities to assess and clean up properties where actual or potential presence of a hazardous substance could complicate reuse. Grants can also be used for green infrastructure planning. See http://www.epa.gov/brownfields

Next Steps

Promoting Community and Cultural Benefits

- The National Park Service Rivers, Trails, and Conservation Assistance (RTCA) program provides technical assistance to design trails and parks, conserves and improves access to rivers, protect special places, and creates recreation opportunities. This may be best suited for Guy James Creek trail connections. See https://www.nps.gov/orgs/rtca/index.htm
- U.S. Economic Development Administration (EDA) provides grants to promote economic growth and may have programs that align with Paseo opportunities. See https://eda.gov
- National Endowment for the Arts "Our Town Program" supports creative place-making projects that help to transform communities into lively, beautiful and resilient places with the arts at their core. See https://www.arts.gov
- Trust for Public Land may have resources and technical assistance available related to creative placemaking and green stormwater infrastructure on public lands. See https://www.tpl.org
- National banks with offices in Oklahoma City may have programs and funding opportunities that can support specific strategies.
- Community Reinvestment Act is intended to encourage depository institutions to help meet the credit needs of the communities in which they operate. Some banks have an arts and education focus and may be a good fit for the Harding Schools, especially if the project can be tied to learning objectives. See https://www.ffiec.gov/cra/
- The Oklahoma City Community Foundation has a dedicated program for park space and a full-time landscape architect on staff. The Kirkpatrick Foundation may also have funding to support recreation, arts, culture and community health.

Leveraging Capital Investments

- Explore capital investment opportunities via the 2017 Bond Package and MAPS via the sales tax increase:
  - Bicycle infrastructure funding might support Shartel Avenue improvements.
  - Funding may also support trail connections to Guy James Creek Park, Paseo Street enhancements and school capital improvements.
- Monitor annual capital investment project budgets to leverage opportunities.
- Explore Oklahoma Department of Transportation funding opportunities for parking or road improvements around Harding Schools.
- Coordinate with Association of Central Oklahoma Governments on transportation funding opportunities.

Oklahoma City has demonstrated a commitment to implementing sustainable solutions that improve quality of life and enhance environmental health. By continuing to explore and leverage resources at local, state and federal levels, as well as identifying new partnerships and funding programs aligned with specific design strategies and challenges identified by *Greening Central Neighborhoods, Oklahoma City* will be able to move implementation forward and provide a strong model for cities across the United States.


EPA
United States
Environmental Protection
Agency