

US EPA ARCHIVE DOCUMENT

GREENING AMERICA'S CAPITALS

GREENING JEFFERSON AVENUE

Richmond, Virginia



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www.epa.gov/smartgrowth



OVERVIEW

Greening America's Capitals is a U.S. Environmental Protection Agency (EPA) program to help state capitals develop an implementable vision of distinctive, environmentally friendly neighborhoods that incorporate innovative green infrastructure strategies. In collaboration with the U.S. Department of Housing and Urban Development and the U.S. Department of Transportation through the Partnership for Sustainable Communities, EPA provides design assistance to help support sustainable communities that protect the environment, economy, and public health and to inspire state leaders to expand this work elsewhere.

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

Richmond, Virginia, was chosen in 2014 as one of five state capital cities to receive this assistance along with Austin, Texas; Carson City, Nevada; Columbus, Ohio; and Pierre, South Dakota.

More information is at: <http://www2.epa.gov/smartgrowth/greening-americas-capitals>.



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In 2014, the city of Richmond, Virginia, applied to the U.S. Environmental Protection Agency (EPA) for technical assistance under its Greening America's Capitals program to create a plan for Jefferson Avenue that would help remedy confusing and unsafe traffic patterns caused by the street's alignment. The primary goal is to improve the safety of pedestrians, bicyclists, and transit users, but the city also wants to improve stormwater management and spur economic revitalization.

EPA put together a team of federal agency staff and consultants to help the city create a new vision for Jefferson Avenue. The EPA team engaged city stakeholders and residents in developing design options that could help meet the city's goals. The design options include:

- Adding bicycle lanes and narrowing travel lanes.
- Incorporating roundabouts and traffic circles to calm traffic.
- Creating curb extensions and perpendicular crosswalks to shorten crosswalk length.

- Adding rain gardens throughout the corridor to reduce stormwater runoff.
- Reconfiguring some intersections to make pedestrian, bicycle, and vehicle traffic patterns more clear.
- Creating a new gateway to the neighborhood at Jefferson Park.
- Engaging the community and property owners in developing a vision for redevelopment of a vacant and underused parcel of land.
- Creating new green spaces for community use.
- Providing porous pavements in parking lanes and some minor streets.

These strategies are part of an overall design concept that could improve safety, convenience, and comfort for pedestrians, bicyclists, transit users, and drivers in the neighborhood. These improvements, along with additional green space and redevelopment of vacant land, could prime the neighborhood for new investment and economic growth.

I. INTRODUCTION

Richmond was founded at the fall line of the James River, where the coastal plain of Virginia gives way to the hilly terrain of the Piedmont. Two of those hills—Church Hill and Union Hill—have become historic neighborhoods of the same names. A natural ravine bisected these neighborhoods until the late 1800s when the ravine was filled in and became Jefferson Avenue. The street’s alignment followed the terrain, cutting a diagonal line across the city grid and forming a series of acute intersections as three streets merged together at each block of Jefferson Avenue. This unique facet of urban design has become a challenge for walkers, bicyclists, and drivers seeking to navigate these intersections safely. The street’s width exacerbates the safety issues because it encourages drivers going to and from downtown to speed through the neighborhood.

The area surrounding Jefferson Avenue is listed on the National Register of Historic Places, and both the Church Hill neighborhood to the south and the Union Hill neighborhood to the north are designated historic districts. Church Hill is visited by thousands of tourists each year, as it is home to St. John’s Church, the site of Patrick Henry’s famous outcry in 1775, “Give me liberty or give me death;” carefully preserved examples of 19th century architecture; and Richmond National Battlefield Park, the former site of the largest Civil War Hospital. Church Hill and Union Hill experienced more than a half century of economic decline, increased poverty, and elevated crime rates among a primarily African-American population as a result of post-World War II suburban expansion,

racial discrimination, and disinvestment. In recent decades, however, renewed interest in the historic charm and economic prospects of this area led to an influx of diverse residents, increased property renovation and home ownership, and a vibrant assortment of restaurants, shops, and community organizations.

The city of Richmond, Virginia, applied for technical assistance in 2014 from the U.S. Environmental Protection Agency (EPA) under its Greening America’s Capitals program. The city requested assistance to develop design options for Jefferson Avenue between 21st and 25th Streets, including adjacent properties and adjacent, connecting blocks that tie this street to the surrounding neighborhoods. The city’s goals included:

- Improving pedestrian and bicyclist mobility and safety along the corridor.
- Improving pedestrian and bicyclist connections between the corridor and adjacent neighborhoods, the James River, and regional amenities such as the Shockoe Bottom commercial district, the central business district, Virginia Commonwealth University’s medical campus, the Virginia Capital Trail, and the Cannon Creek Greenway.
- Encouraging investment in the vacant and underused parcels immediately surrounding and near the project area.
- Using green infrastructure to reduce stormwater pollution and downstream flooding.

- Improving the corridor’s appearance, including through public art and community green space that reflects the history and character of the Church Hill and Union Hill neighborhoods.
- Coordinating this effort with ongoing projects in the area, including a streetscape concept plan developed by the Union Hill Civic Association, planned traffic-calming measures, and a design competition for the pocket park bounded by Jefferson Avenue, 23rd Street, and Clay Street.
- Defining a gateway to the community and incorporating placemaking elements that give the avenue a distinctive character and reduce the perception of the street as merely a cut-through route.

These goals are supported by the city’s RVAgreen Sustainability Plan, Bicycle Master Plan, and Strategic Multi-modal Transportation Plan. To help the city achieve these goals, EPA put together a team of federal agency staff and hired landscape architects and engineers from Parker Rodriguez and The Timmons Group. This team began its work by touring the corridor and meeting with city staff and community members in April 2015. The team helped develop a vision for the corridor that can be implemented incrementally over time to improve the health and well-being of neighborhood residents and visitors while protecting the environment. This report illustrates that vision.



FIGURE I. Overall Site Aerial

0 150' 300' 600'





FIGURE 2. Design Team Work Session - Day 2

On June 9-11, 2015, the city of Richmond hosted a three-day design forum to gather community input and feedback on potential design options for the Jefferson Avenue corridor. Attendees included representatives from the city of Richmond and neighborhood business owners, property owners, and residents.

The input at these discussions is organized below according to the original city goals:

Goal 1 - Improving pedestrian and bicyclist mobility and safety along the corridor.

- *Improve sidewalks and street crossings.*
Participants were concerned about the long crosswalks shaped by acute angles at intersections. Participants discussed feeling unsafe crossing the street.
- *Improve conditions for bicyclists.*
Most participants wanted continuous, protected bicycle lanes along Jefferson Avenue because it is one of the most direct routes to downtown that avoids the steepest hills.
- *Reduce and manage traffic speed.*
People were not concerned about current traffic volumes; however, the wide traffic lanes encourage fast speeds along the corridor, especially going downhill on Jefferson Avenue. People noted that the ongoing traffic-calming measures are reducing speeds and would like to see more improvement.
- *Reduce conflicts at intersections.*
Participants wanted safer conditions at intersections, noting that near misses between vehicles and pedestrians along Jefferson Avenue are routine. Everyone agreed that all users, including drivers, are frequently unsure of where they should be looking to avoid collisions and that the behavior of others is hard to anticipate.

Goal 2 - Improving pedestrian and bicyclist connections between the corridor and adjacent neighborhoods, the James River, and regional amenities such as the Shockoe Bottom commercial district, the central business district, Virginia Commonwealth University's medical campus, the Virginia Capital Trail, and the Cannon Creek Greenway.

- *Provide continuous streetscape treatment.*
Participants noted that Jefferson Avenue is an important link for getting around the city efficiently, and improving the street would make walking and biking more appealing. People advocated for improved sidewalks throughout the corridor that are safe and pleasant for pedestrians and have a more continuous tree canopy that provides shade. People also wanted protected bicycle lanes that connect to the rest of Richmond's bicycle routes.



FIGURE 3. Public Open House - Day 3

Goal 3 - Encouraging investment in the vacant and underused parcels immediately surrounding and near the project area.

- *Encourage redevelopment and investment.*
People strongly desired new development in the neighborhood to eliminate vacant lots and stimulate economic revitalization. Some residents wanted to ensure that new development is environmentally friendly to help brand the neighborhood as sustainable. In addition, many people were concerned about housing affordability in the neighborhood. Residents said they would like to see some smaller units added to the predominantly single-family housing stock to provide more affordable options for young people and seniors.
- *Maintain on-street parking.*
Participants wanted to maintain on-street parking spaces along Jefferson Avenue to make sure customers for local businesses have convenient parking.
- *Encourage pedestrian activity.*
Many residents noted that they walk to the businesses on Jefferson Avenue, and having many people out on the streets helps support a lively commercial district, which they would like to see expand.

Goal 4 - Using green infrastructure to reduce stormwater pollution and flooding.

- *Implement green infrastructure strategies.*
Participants were concerned about excessive stormwater runoff flowing down Jefferson Avenue, which can cause flooding in Shockoe Bottom. People advocated for green infrastructure and innovative technology along the corridor. They embraced the idea of using stormwater management as a focal point in defining Jefferson Park as a gateway to the neighborhood.

Goal 5 - Improving the corridor's appearance, including through public art and community green space that reflects neighborhood history and character.

- *Incorporate open, green space.*
Participants emphasized the need for more open space and pocket parks for social gatherings. Community members emphasized the strong desire to incorporate public art in these places.

II. DESIGN FORUM

Goal 6 - Coordinating this effort with ongoing projects in the area, including a streetscape concept plan developed by the Union Hill Civic Association, planned traffic-calming measures, and a design competition for the pocket park bounded by Jefferson Avenue, 23rd Street, and Clay Street.

- *Integrate ongoing traffic calming measures into future plans.*
Participants acknowledged the importance of the already planned traffic-calming measures and did not want to see them uprooted shortly after installation.

Throughout the second day of the design forum, the design team revised the preliminary plans and sketches to reflect the community input. The team created an overall site plan, further defining the streetscape treatment along Jefferson Avenue. On the third day of the forum, the team presented the revised design options in an open house attended by elected officials; federal, state, and local government agency staff; and members of the public. The attendees generally agreed that the revised design options met the city's goals.



EPA

FIGURE 4. Entrance to Jefferson Park

EPA

FIGURE 5. Union Market

EPA

FIGURE 6. Church Hill Residences

The design team assessed the project area to better understand its opportunities and constraints, looking at:

- Topography.
- Hydrology and drainage.
- Impervious surfaces.
- Development history.
- Pedestrian safety.
- Bicycle master plan.
- Bus routes.
- Tree canopy.
- Land use.
- Zoning.
- Land ownership.
- Buildings.

TOPOGRAPHY

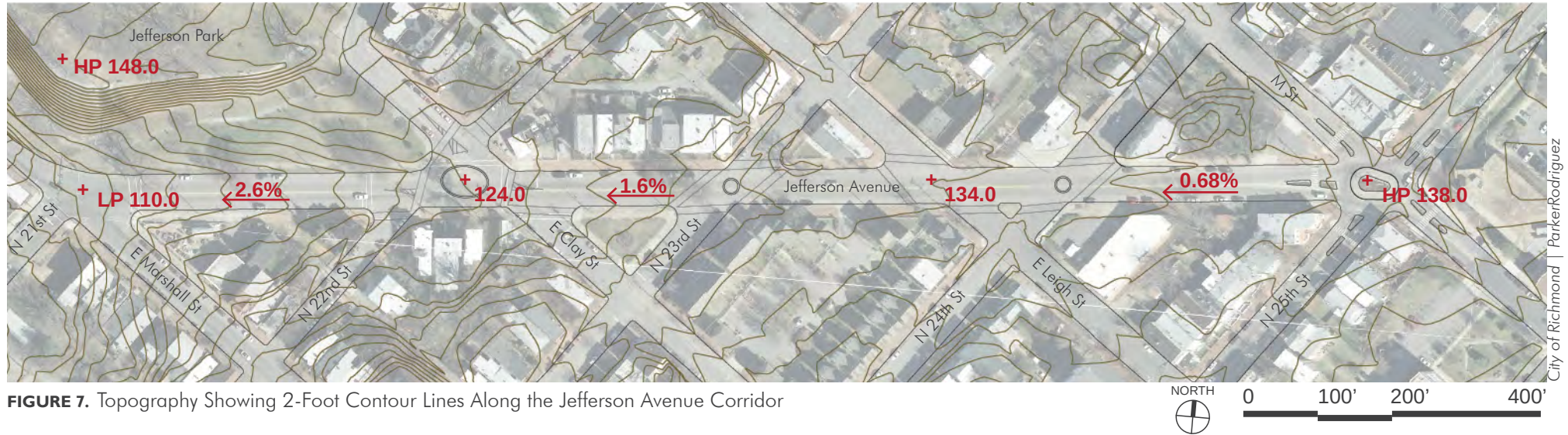


FIGURE 7. Topography Showing 2-Foot Contour Lines Along the Jefferson Avenue Corridor

Jefferson Avenue lies in a natural depression between Church Hill and Union Hill. This ravine remained undeveloped as the city rose around it until the late 1800s, when it was filled to create a new street, Jefferson Avenue. The avenue followed the topography of the ravine and was diagonal to the city's street grid. Its alignment not only created a series of acute intersections, but also makes Jefferson Avenue the natural course for stormwater runoff due to its slope.

The western edge of the project area is defined by Jefferson Park, which is 38 feet above the street level. The degree of slope gradient accelerates along Jefferson Avenue from east to west, increasing stormwater velocity and scouring.

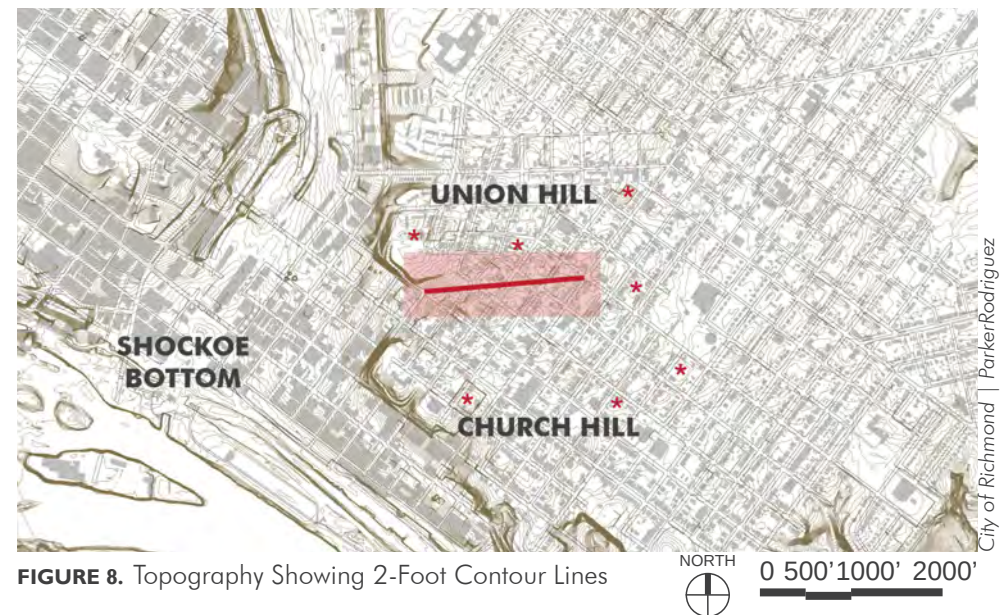


FIGURE 8. Topography Showing 2-Foot Contour Lines

- Jefferson Avenue
- HP High point
- ★ Topographical high point
- Project area
- LP Low point
- ← Percent slope along road

HYDROLOGY AND DRAINAGE

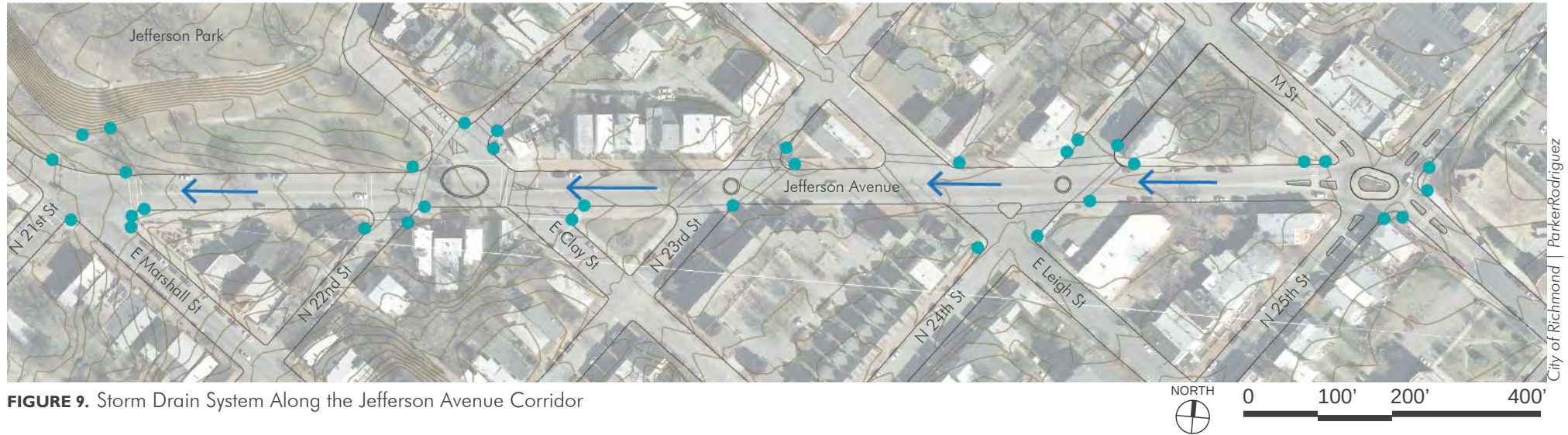


FIGURE 9. Storm Drain System Along the Jefferson Avenue Corridor

Jefferson Avenue conveys stormwater to Shockoe Bottom, a neighborhood that has a history of flooding. Flood walls on the James River protect the city from river floods but also trap runoff on the leeward side, flooding Shockoe Bottom with stormwater.

Stormwater is currently captured in a series of storm drains along the curb lines of Jefferson Avenue that flow to Shockoe Bottom. Storm drains feed into a combined sewer system of both storm and sanitary lines that flows to a wastewater treatment plant. However, during major rain events, the amount of polluted runoff and raw sewage can exceed the system's capacity and overflow from the combined sewer system into the James River. Measures to reduce stormwater runoff along Jefferson Avenue would reduce downstream flooding in Shockoe Bottom, reduce combined sewer overflows, and improve water quality.

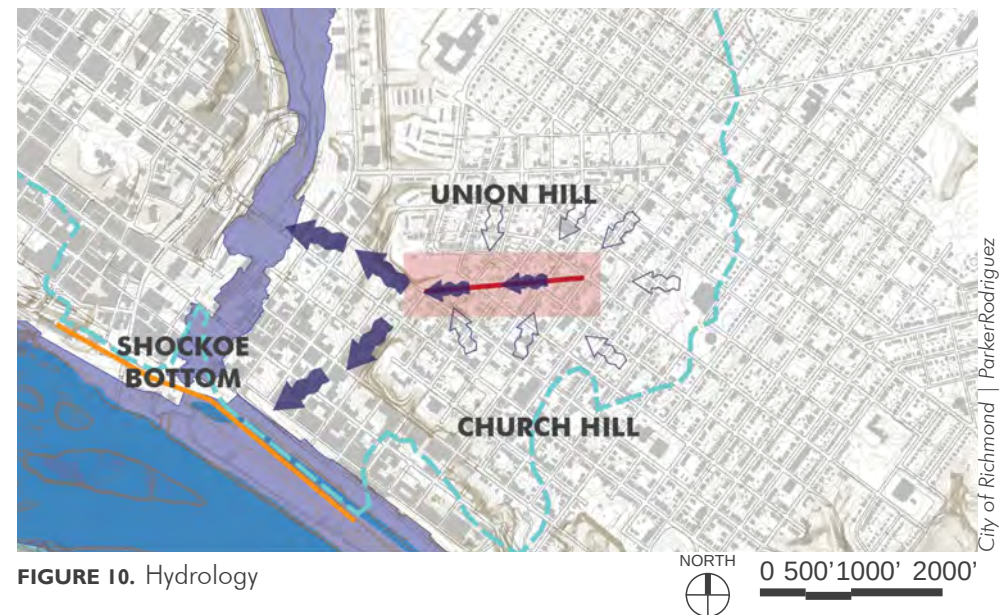


FIGURE 10. Hydrology



IMPERVIOUS SURFACES

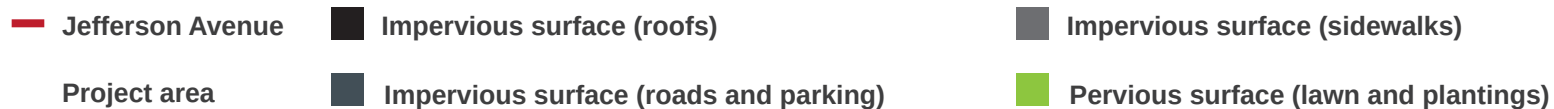


FIGURE 11. Impervious Surfaces Along the Jefferson Avenue Corridor

Impervious surfaces are roads, parking, sidewalks, and buildings—elements that shed stormwater rather than absorb it. The Jefferson Avenue corridor is 58 percent impervious: 30 percent from roads and parking, 16 percent from roofs, and 12 percent from sidewalks. However, this percentage is skewed by the presence of Jefferson Park, which creates a large pervious area at the corridor's western end.



FIGURE 12. Impervious Surfaces



DEVELOPMENT HISTORY

In the 1700s, the site where Jefferson Avenue now sits was north of the original town grid, hidden in a wooded ravine. In the years to follow, the city of Richmond grew significantly, with extensions of the city grid. In the mid-1800s, both Union Hill and Church Hill emerged as neighborhoods shaped by the ravine's steep topography, creating unique architecture tucked in the hillsides. The 1901 map shows the transformation of the ravine into a city street. The ravine was filled, creating Jefferson Avenue that joined Union Hill and Church Hill and their respective neighborhoods.

**FIGURE 13.** Map Circa 1700s**FIGURE 14.** Map Circa 1865**FIGURE 15.** Map Circa 1901**FIGURE 16.** Map 2015

ParkerRodriguez

III. PROJECT AREA ASSESSMENT

PEDESTRIAN SAFETY

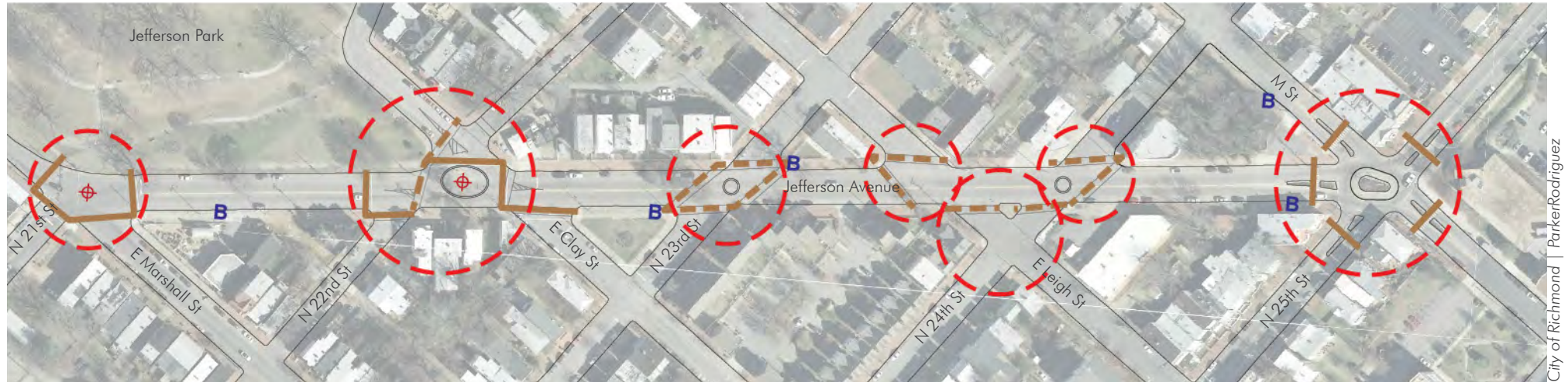


FIGURE 17. Pedestrian Safety Along the Jefferson Avenue Corridor

Jefferson Avenue is one of the few diagonal streets in the city grid, creating acute intersections that are confusing for drivers, pedestrians, and cyclists. Acute angles at intersections also make people walk longer distances to cross the street, putting them at more risk. The city of Richmond is implementing a traffic-calming plan for the corridor that includes a roundabout at 22nd Street and two smaller neighborhood traffic circles at 23rd and 24th streets. Residential traffic circles reduce traffic speeds, collisions, and crash severity at intersections, especially when installed in a series along the entire street or corridor. Minor streets entering an intersection with a residential circle have a stop sign or a yield depending on the road conditions. Modern roundabouts are larger than residential circles and are typically used at locations in place of a traffic signal. At modern roundabouts, vehicles slow on their approach and must yield to any vehicles already circulating in the roundabout. Roundabouts and residential circles rely on landscaping to reinforce their presence, calm traffic, and better incorporate them into an attractive streetscape while providing air- and water-quality benefits. These changes will improve pedestrian safety, but additional measures could make pedestrians and bicyclists feel safer and more comfortable.



FIGURE 18. Street Grid

- Jefferson Avenue
- Existing crosswalk
- B Bus stop location
- () Potential pedestrian safety issues
- Planned crosswalk (Construction scheduled for 2015)
- ⊕ Signalized intersection

Project area

BICYCLE MASTER PLAN

The city completed its Bicycle Master Plan in May 2015. The plan envisions Jefferson Avenue with buffered bicycle lanes that would connect to the shared lanes at Clay and 23rd streets where the city plans a bike-walk street, which is modified to enhance pedestrian and bicyclist comfort while discouraging through-trips by non-local motorized traffic.

- Existing shared lane — Existing shared use path
- Existing greenway — Existing buffered bike lane
- Proposed cycle track — Proposed buffered bike lane
- Proposed bike lane — Proposed bike-walk street
- Proposed future bike facility

BUS ROUTES

Jefferson Avenue is served by four bus routes with five stops in the corridor. Only one bus stop has a shelter, near 25th Street.

- Route 7 - Seven Pines — Route 43-44 Whitcomb/Fairfield
- Route 45 - Jefferson — Route 56 - South Laburnum
- Bus stop



FIGURE 19. Bicycle Master Plan

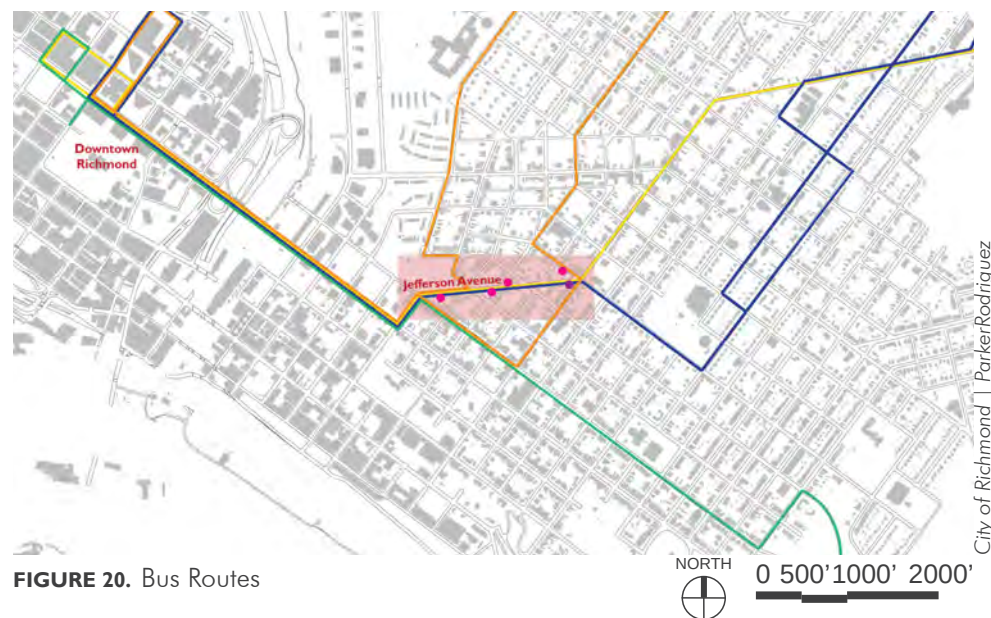


FIGURE 20. Bus Routes

TREE CANOPY



FIGURE 21. Tree Canopy Along the Jefferson Avenue Corridor

The corridor benefits from Jefferson Park's extensive tree canopy. Along Jefferson Avenue, however, the tree canopy is irregular. It provides limited shade and discourages pedestrians, especially on hot days. Power lines on both sides of the street require severe pruning of tall canopy trees to ensure consistent electrical service to the neighborhood, which further reduces shade.

- Tree canopy
- Telephone pole

LAND USE

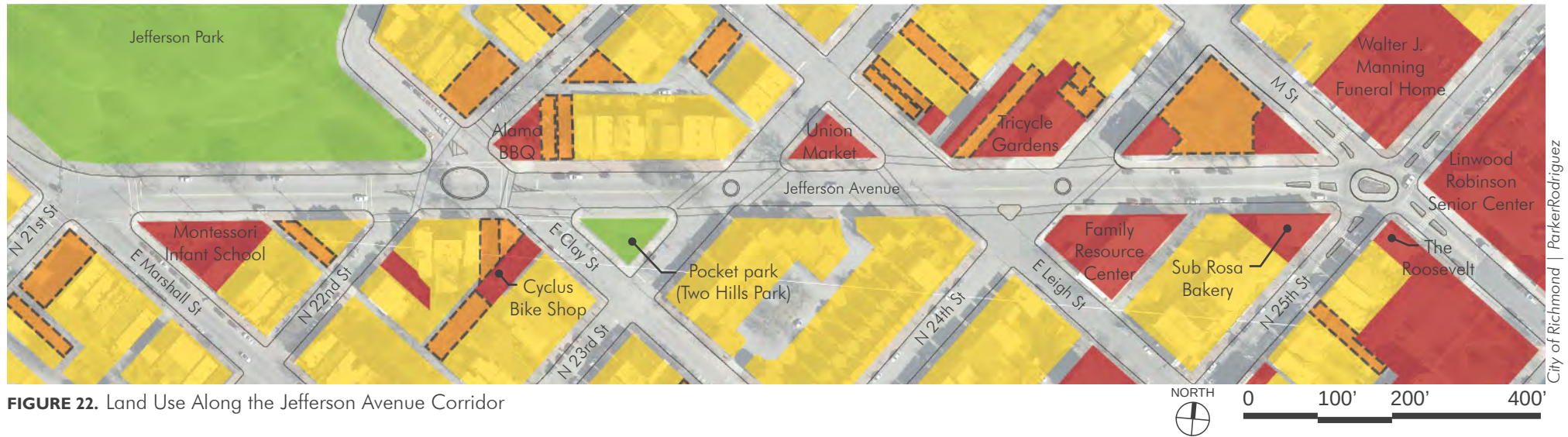


FIGURE 22. Land Use Along the Jefferson Avenue Corridor

Jefferson Avenue has a mix of residential and neighborhood commercial land uses in a neighborhood undergoing revitalization. Though it is primarily residential, several popular neighborhood businesses have created a vibrant center in which walkability is critical. The residents' desire for more neighborhood businesses increases the need to address pedestrian and bicycle safety. As the neighborhood's population, median income, and property values rise, a number of vacant lots or vacant buildings create development opportunities for future residential and business uses.

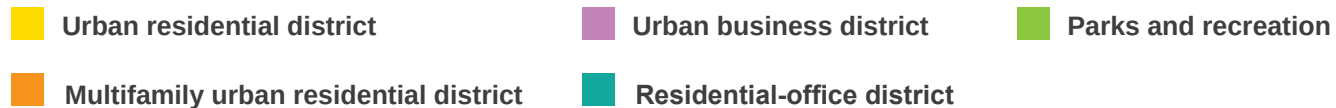


ZONING



FIGURE 23. Zoning Along the Jefferson Avenue Corridor

The majority of Jefferson Avenue is zoned as urban business, while the adjacent blocks in the immediate vicinity are zoned as residential. Current zoning allows more neighborhood businesses than are currently in place.



LAND OWNERSHIP

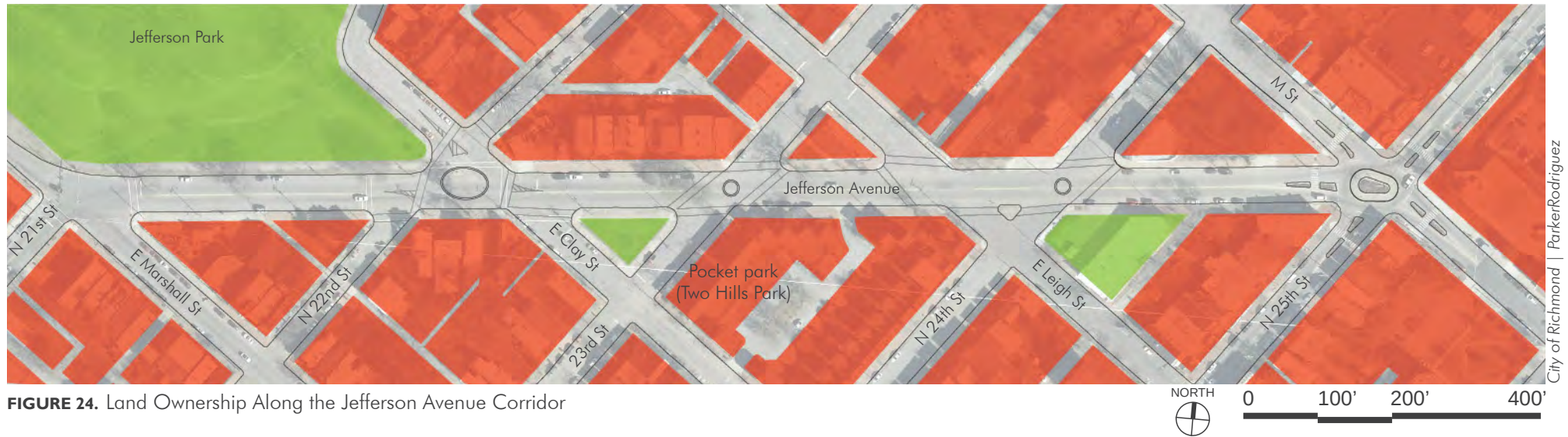


FIGURE 24. Land Ownership Along the Jefferson Avenue Corridor

The majority of parcels in the project area are privately owned. Jefferson Park is the neighborhood's major public open space. A small pocket park between East Clay and North 23rd streets will be another space for recreation and social gatherings after construction of "Two Hills Park," the winning design in a 2014 design competition sponsored by a group of nonprofit organizations. It is currently in the fundraising stage. The east end of the project area has no public open space. The publicly owned parcel on Leigh Street is occupied by the Family Resource Center, its parking lot, and a small playground accessible only through the building.

■ Public land

■ Private land

BUILDINGS



FIGURE 25. Buildings Along the Jefferson Avenue Corridor

The building pattern highlights Jefferson Avenue's fragmented street wall; few buildings actually front the avenue. A strong, consistent streetscape helps create a sense of enclosure that improves the pedestrian experience and is an important part of unifying the appearance and function of Jefferson Avenue as the center of neighborhood life.

■ Building footprint

— Street wall edge

OVERALL DESIGN CONCEPT



FIGURE 26. Overall Design Concept for the Jefferson Avenue Corridor

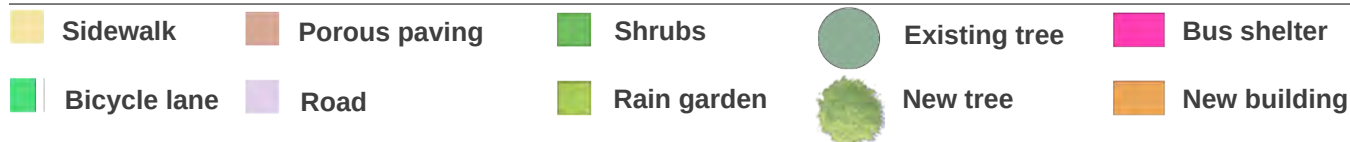
The Jefferson Avenue corridor has a large green space, Jefferson Park, at its west end and a modest pocket park at 23rd Street, but it otherwise lacks public green space. Figure 26 shows the overall design concept, which creates a series of small green spaces along the avenue that could be visually and physically linked so that, in their aggregate, they would become a linear park, meeting the city's goals of:

- Reducing stormwater pollution through green infrastructure.
- Enhancing pedestrian and bicycle mobility and safety.
- Improving the neighborhood's appearance.

- Changing the perception of the street from a vehicle thoroughfare to a neighborhood-serving commercial district.
- Catalyzing neighborhood revitalization.

Typical improvements throughout the corridor include buffered bicycle lanes on both sides of the avenue, porous paving in on-street parking spaces, shelters at bus stops, rain gardens, and street trees. These improvements, in conjunction with the improvements specific to each study area, can make the corridor safer, more comfortable, and more convenient for pedestrians, bicyclists, bus riders, and drivers. In addition, the trees and rain gardens would improve both water and air quality.

By creating new parkland and introducing porous paving; rain gardens; and planted traffic circles, a roundabout, medians, and curb extensions, the design concept decreases the amount of impervious surface in the project area by approximately 15 to 20 percent.



JEFFERSON AVENUE TYPICAL STREET SECTION

Figure 27 shows a typical cross-section of Jefferson Avenue and provides the current dimensions of parking and traffic lanes. The street is 48 feet from curb to curb, with two travel lanes and on-street parking on both sides of the street. Both the travel lanes and the parking lanes are wider than necessary for the travel speed on the road. The street is served by overhead power lines, with street lights attached. Given the expense of placing the power lines underground, the design options assume they will remain. Scattered street trees provide some shade, but because of the power lines, many of these trees have been pruned severely. Sections on the following pages depict Jefferson Avenue at intersections where the dimensions vary from this typical section.

Figure 28 illustrates the design option and the proposed dimensions for new road elements along Jefferson Avenue, showing that by narrowing the travel lanes and parking lanes, a buffered bicycle lane can be introduced on both sides of the street without any realignment of the existing curb. It also shows new, smaller shade trees along the curb line that can grow to 25 feet underneath the power lines, providing some shade without requiring extensive pruning.

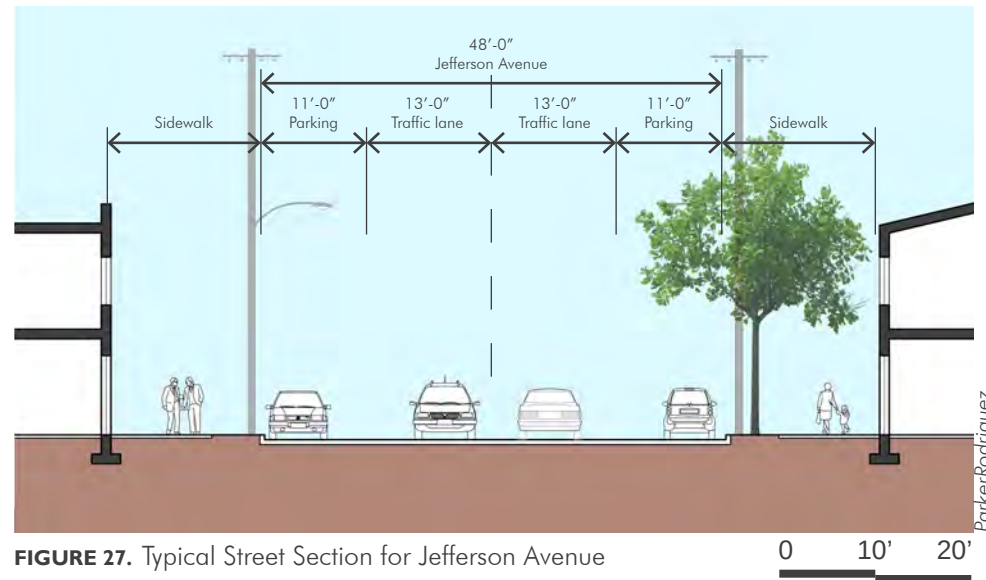


FIGURE 27. Typical Street Section for Jefferson Avenue

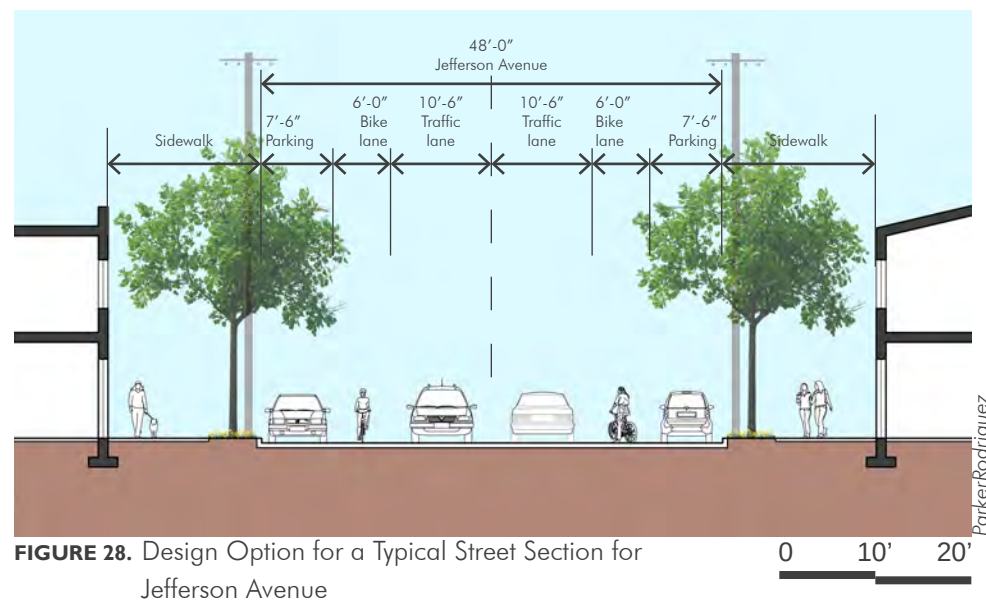


FIGURE 28. Design Option for a Typical Street Section for Jefferson Avenue

STUDY AREAS

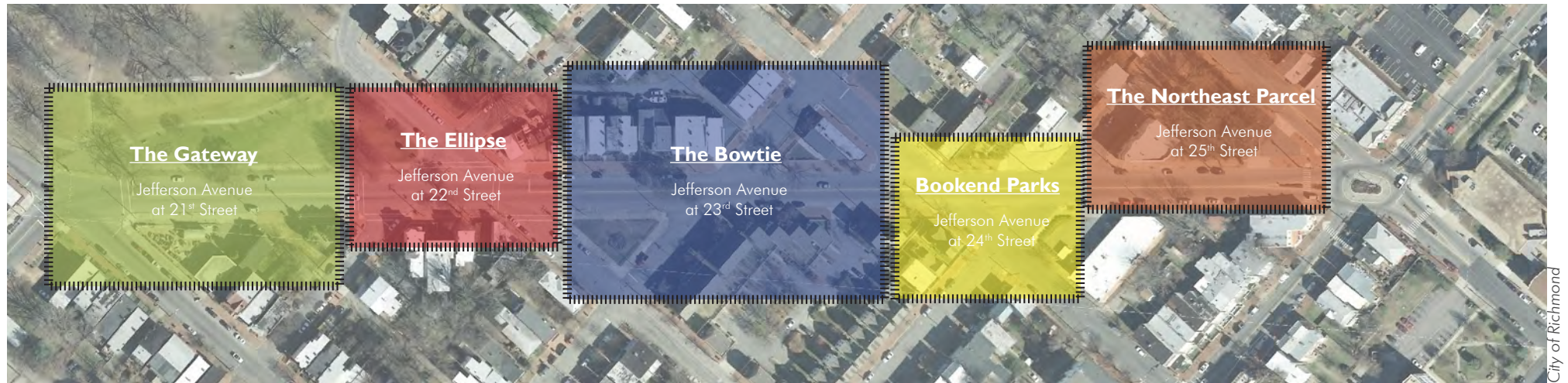


FIGURE 29. Study Areas

The design team and the city selected five study areas along Jefferson Avenue from 21st Street to 25th Street for more detailed design options.

The study areas are:

The Gateway

This area is a major arrival point to the Jefferson Avenue corridor for pedestrians, cyclists, and drivers coming from downtown. It also is a main entry point to Jefferson Park, the largest green space in the neighborhood. The intersection of Jefferson Avenue and 21st Street has acute angles with long crosswalks. The park entry is unremarkable in its character and has a little-used expanse of pavement. The design option includes reconfiguring the crosswalks to shorten them, replacing impervious pavement with a rain garden, and creating a grand entry to dignify the park.

The Ellipse

This area includes a six-way intersection with acute angles, unclear vehicular movement patterns, and long crosswalks. The city of Richmond will install an elliptical roundabout to clarify how vehicles should move through the intersection. The design option includes additional green spaces, pedestrian refuges, curb extensions, and new crosswalk configurations to make pedestrians and cyclists safer as they move through the intersection.

The Bowtie

This area includes the intersection of Jefferson Avenue and 23rd Street and the two triangular blocks that flank the avenue, forming a shape that resembles a bowtie. The avenue here has long crosswalks that are angled such that drivers do not have clear sight lines. The design option includes a small, planned traffic circle to slow vehicular traffic and perpendicular

crosswalks for pedestrian safety.

Bookend Parks

This area is an expansive, six-way intersection with acute angles, long crosswalks, and extensive pavement for vehicular traffic. The design option reconfigures the intersection into a simple "T," removing segments of Leigh Street and 24th Street and converting these areas to pocket parks flanking the new intersection.

Northeast Parcel

This triangular block at 25th Street has a one-story office building, an empty building, and a vacant lot. The design option explores how these properties could be redeveloped if they were combined into one parcel, potentially as a three-story apartment building with ground-floor retail that could help neighborhood revitalization.

THE GATEWAY

Jefferson Avenue at 21st Street

Figure 30 shows the acute angles of the four-way intersection, resulting in a long crosswalk from the south side of Jefferson Avenue to 21st Street. At the entrance to the park, several park pathways converge at a large, underused area of impervious pavement that contributes to stormwater runoff. The park entry has no marker that conveys the park's significance to the neighborhood.

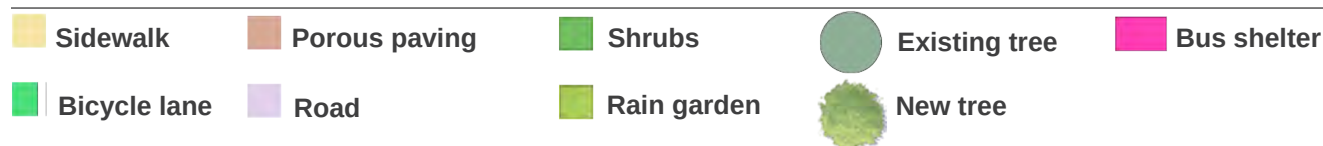
The design option illustrated in Figure 31 shows improvements that advance the city's goals of safer streets and better stormwater management. The crosswalk along the south side of Jefferson Avenue is replaced by one across Marshall Street, reducing crosswalk length and adding a green curb extension on both sides of Marshall Street. The design option includes new, buffered bicycle lanes on each side of Jefferson Avenue and porous paving in the on-street parking spaces. Finally, additional street trees complete the shade canopy on the sidewalks for pedestrian comfort.



FIGURE 30. Existing Plan



FIGURE 31. Design Option for the Gateway

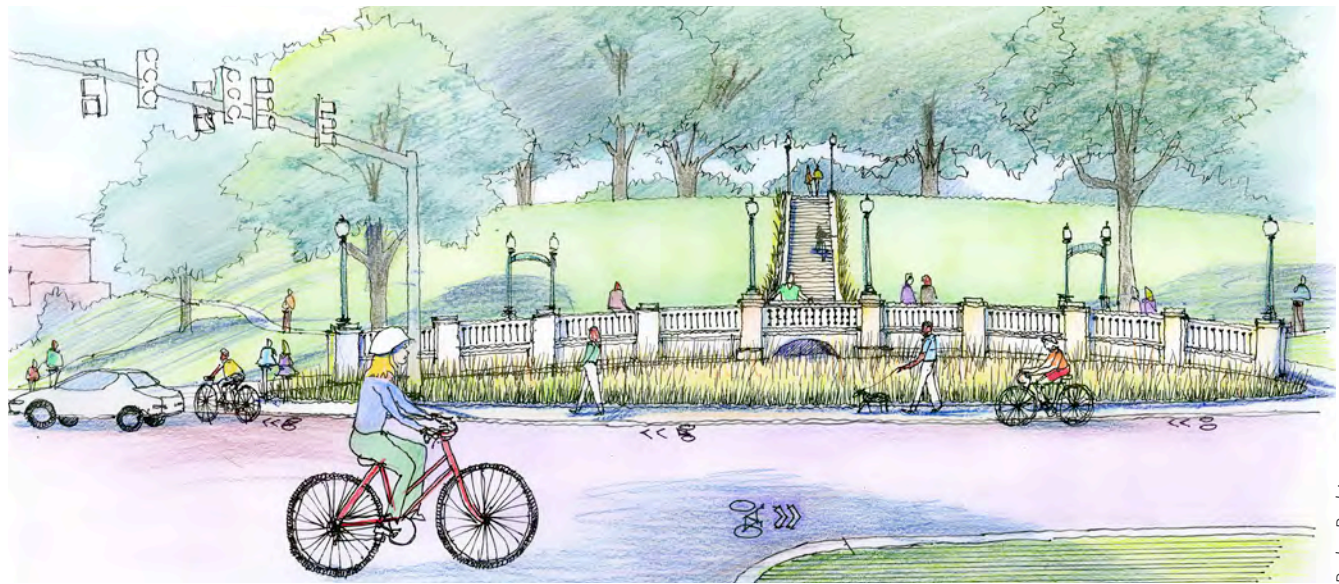


THE GATEWAY**Jefferson Avenue at 21st Street**

Figure 32 shows the broad expanse of paving at the intersection of Jefferson Avenue and 21st Street. The steps that lead up to the park's plateau are 38 feet above street grade, and the elevation change makes most of the park invisible to people on Jefferson Avenue. The underused paved area at the base of the steps is flanked by a pair of standard storm drains. This area presents an unremarkable entry to the park and does not indicate its value to the neighborhood.

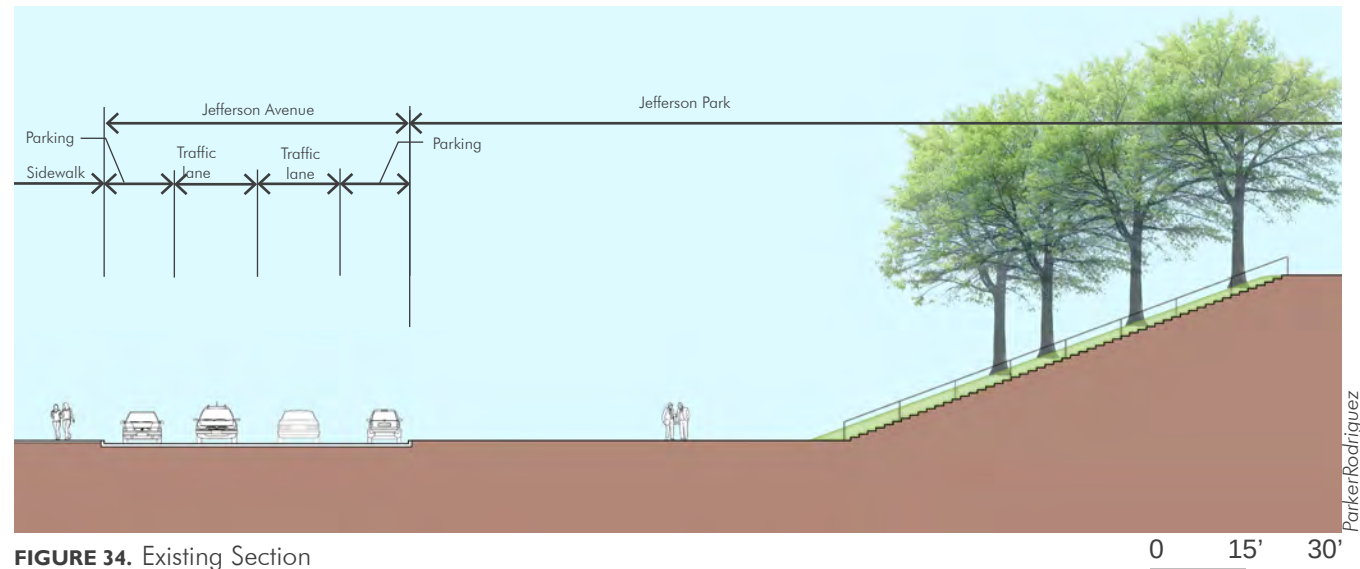
**FIGURE 32.** Existing View Looking North

Figure 33 shows the edge of a green pedestrian curb extension to provide a buffer between vehicles and pedestrians in the area of the realigned crosswalk. The paved area at the foot of the steps in the park is replaced with an elliptical rain garden, framed by a pair of sloping walkways that lead to the steps. This ramp rises 4 feet, reducing the visual and physical length of the steps by 10 percent. These improvements build on the character of the park and transform stormwater management into civic art, with a single new drain structure beneath a vantage point where the ramps meet the steps. This design option would reduce stormwater runoff while creating a new, elegant entry to both the park and the neighborhood.

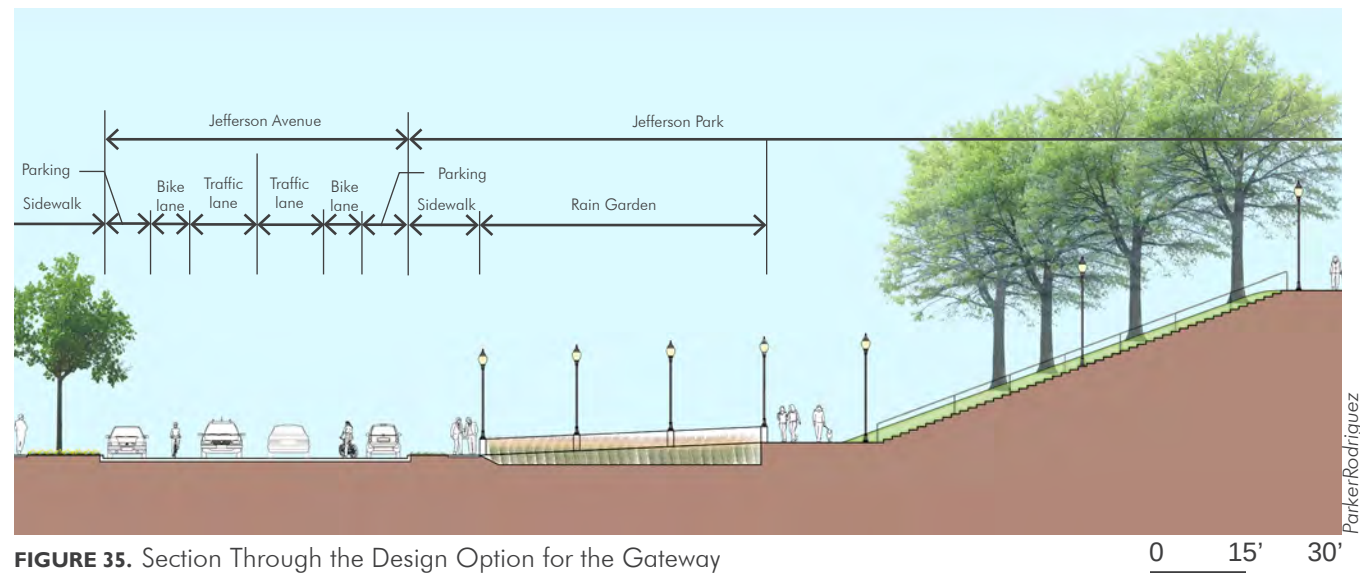
**FIGURE 33.** View of Design Option for the Gateway

THE GATEWAY**Jefferson Avenue at 21st Street**

Figure 34 shows the existing condition of the avenue at the entrance to the park. Both travel lanes and parking lanes are wider than necessary, and the street has no bicycle lanes. The area at the base of the park steps is paved and barren. The steps climb 38 feet to the plateau area that is the main part of the park.

**FIGURE 34.** Existing Section

The design option shown in Figure 35 adds buffered bicycle lanes on both sides of the street. At the park entrance, ramps sweep up from street grade, framing a generous elliptical rain garden carved into the ground. This basin will store stormwater briefly before releasing it, thereby reducing downstream flooding. In addition, plants and soil in the basin will filter and absorb pollutants in stormwater, improving water quality in the James River.

**FIGURE 35.** Section Through the Design Option for the Gateway

THE ELLIPSE

Jefferson Avenue at 22nd Street

Figure 36 shows the intersection of Jefferson Avenue with 22nd Street and Clay Street. This six-way intersection is confusing to drivers, pedestrians, and cyclists, who come upon acute angles, blocked sight lines, and long crosswalks. The green oval in the center of the photo is a planned roundabout that will help direct traffic and reduce the confusion among all users.

The design option illustrated in Figure 37 shows additional changes that could further advance the city's goals for a safer pedestrian realm, improved stormwater management, and a more attractive appearance. Crosswalks perpendicular to each road provide the shortest and safest pedestrian crossings. Landscaped pedestrian refuges and curb extensions allow pedestrians to carefully look before crossing a travel lane. Converting part of Clay Street east of the roundabout from an angled intersection to a perpendicular one would shorten the crosswalk along Jefferson Avenue and widen the sidewalk to create space that might be used for street vending, a farmers market, or social gatherings.



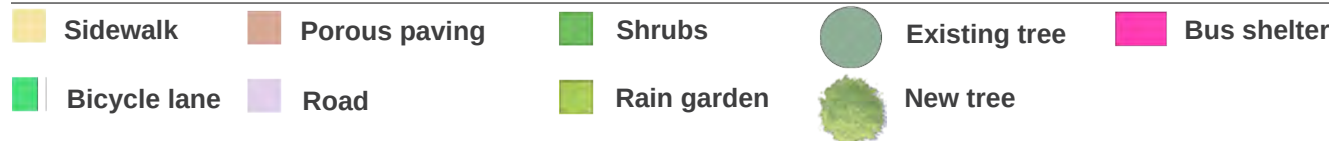
FIGURE 36. Existing Plan

NORTH 0 50' 100'



FIGURE 37. Design Option for the Ellipse

NORTH 0 50' 100'



NORTH 0 50' 100'

THE ELLIPSE**Jefferson Avenue at 22nd Street**

Figure 38 shows the existing conditions at the intersection of Jefferson Avenue and Clay Street. The unmarked asphalt does little to direct drivers, pedestrians, and cyclists. The crosswalk at the intersection of Clay and 22nd streets is long and uncomfortable for pedestrians because it is hard to predict the movement of traffic. Notably, due to the signals and road geometry, pedestrians crossing Jefferson Avenue at Clay Street are always potentially in the path of a moving vehicle whose driver might not have a clear line of vision or expect to encounter pedestrians in the street.



City of Richmond

FIGURE 38. Existing View Looking Northeast toward Alamo BBQ

Figure 39 illustrates the design option, including the planned roundabout that will make traffic patterns more orderly and predictable. New crosswalks, refuges, and curb extensions give pedestrians shorter and safer routes to traverse the intersections. These improvements also reduce impervious area and, therefore, stormwater runoff.

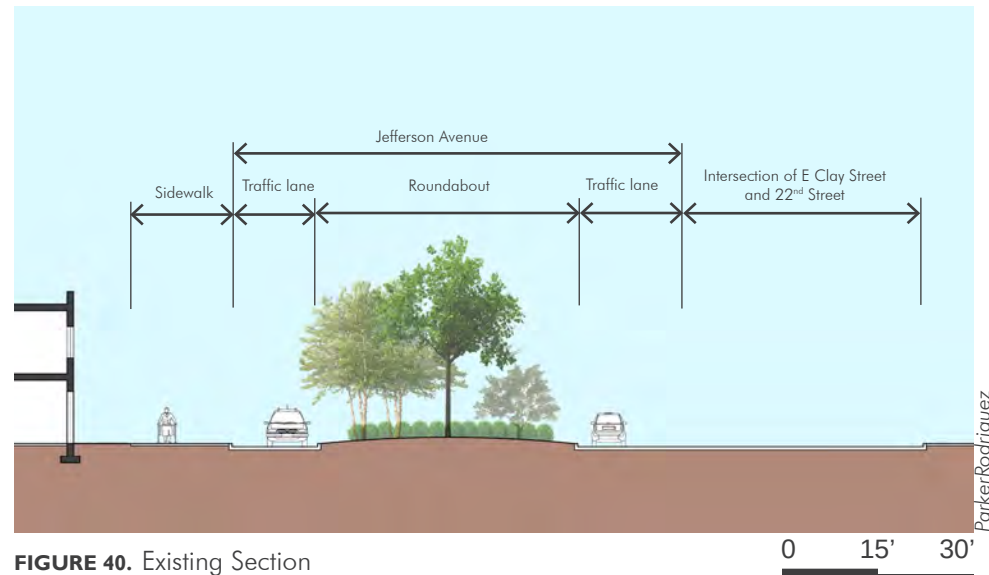


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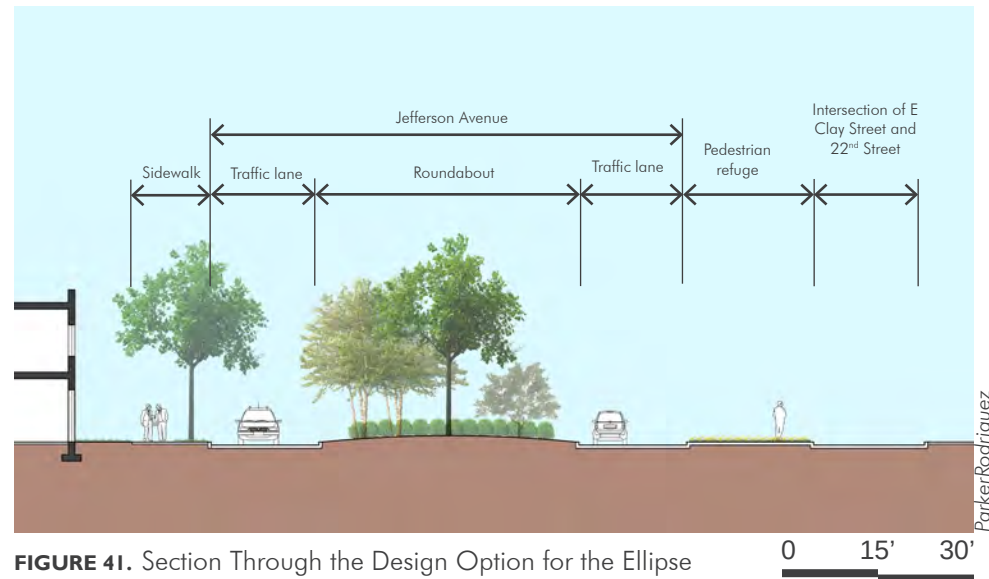
FIGURE 39. View of the Design Option for the Ellipse

THE ELLIPSE**Jefferson Avenue at 22nd Street**

Figure 40 shows the planned roundabout in the center of the intersection. It also shows new tree and shrub plantings that will provide a strong visual cue for drivers to slow down as they approach the intersection.

**FIGURE 40.** Existing Section

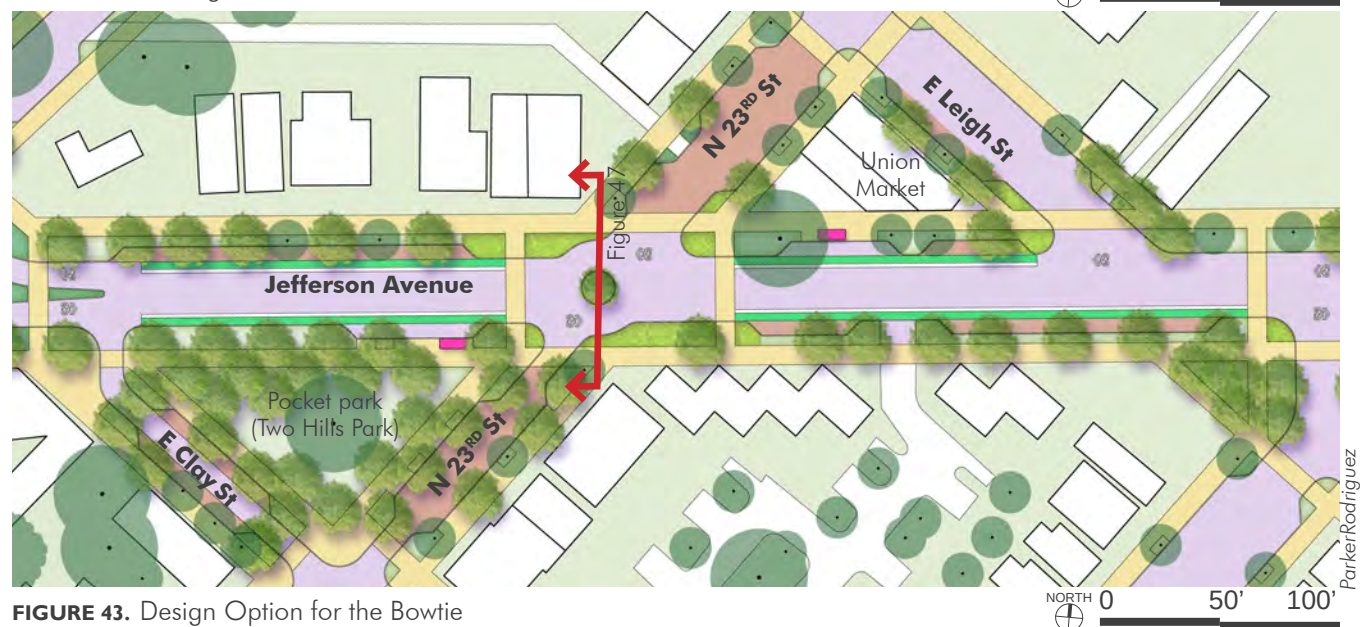
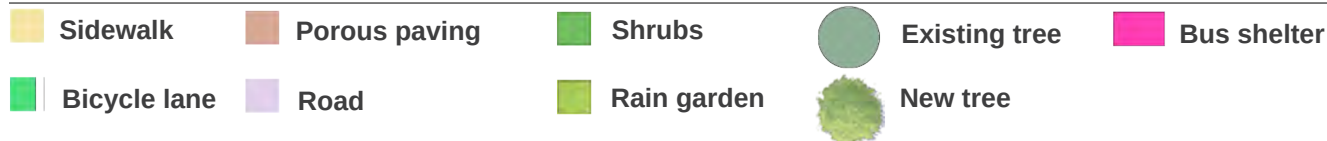
The design option illustrated in Figure 41 adds pedestrian curb extensions to the crosswalks. These elements give pedestrians an extra layer of safety and comfort.

**FIGURE 41.** Section Through the Design Option for the Ellipse

THE BOWTIE**Jefferson Avenue at 23rd Street**

Figure 42 shows the existing condition at 23rd Street, with intersections at acute angles and long crosswalks. This area has two attractions on opposite sides of the avenue: the pocket park and Union Market. Pedestrians want to move easily from one to the other. The city of Richmond has committed to building a traffic circle at this intersection to calm traffic (marked on Figure 42 as a circle), which will help make pedestrians safer. However, both streets have more pavement than needed for both travel lanes and parking lanes. If reconfigured, both streets could become safer and more inviting for cyclists and pedestrians while reducing confusion for drivers.

The design option illustrated in Figure 43 adds buffered bicycle lanes on each side of Jefferson Avenue and creates perpendicular crosswalks. Narrowing the travel and parking lanes on 23rd Street and replacing the asphalt paving with porous pavers would reduce stormwater runoff. The pavers can also help delineate these street segments as plaza-like areas that could be occasionally closed off for street fairs and festivals. These improvements would advance the city's goals of improving pedestrian safety, better managing stormwater, and encouraging private investment in the neighborhood.

**FIGURE 42. Existing Plan****FIGURE 43. Design Option for the Bowtie**

THE BOWTIE**Jefferson Avenue at 23rd Street**

Figure 44 shows the intersection's existing expanse of asphalt paving with no marked crosswalks, creating confusion for pedestrians about where to safely cross Jefferson Avenue. The street tree on the right has been sheared to protect the integrity of the overhead power lines.



FIGURE 44. Existing View Looking East

Figure 45 shows how the planned small traffic circle could calm traffic. A shade tree in the circle provides a visual cue for drivers to slow down and adds greenery to the street. The design option adds buffered bicycle lanes on the avenue, although cyclists and drivers would share the road around the circle. Crosswalks perpendicular to Jefferson Avenue are shorter and thus safer. Small rain gardens at the corners could discourage people from crossing outside of the marked crosswalks while also capturing and filtering stormwater runoff.



FIGURE 45. View of the Design Option for the Bowtie

THE BOWTIE**Jefferson Avenue at 23rd Street**

Figure 46 shows the planned traffic circle in the center of the intersection.

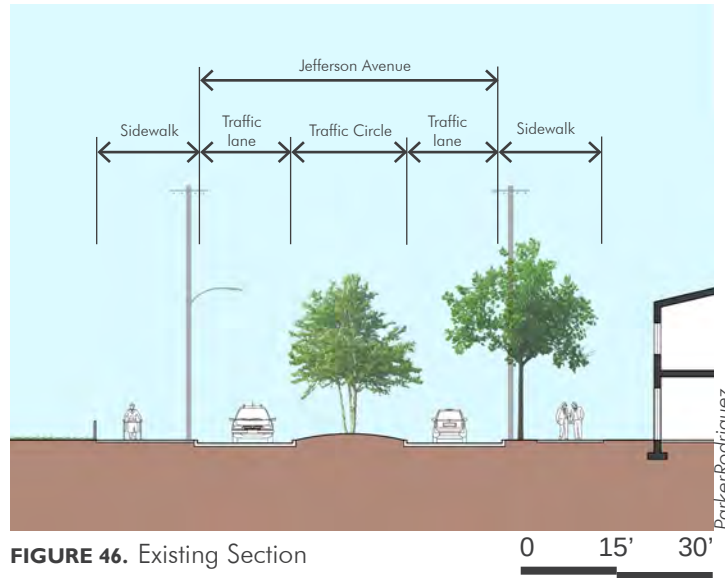


FIGURE 46. Existing Section

The design option illustrated in Figure 47 shows how additional street trees could provide a continuous canopy that makes pedestrians more comfortable, while helping to improve air quality.

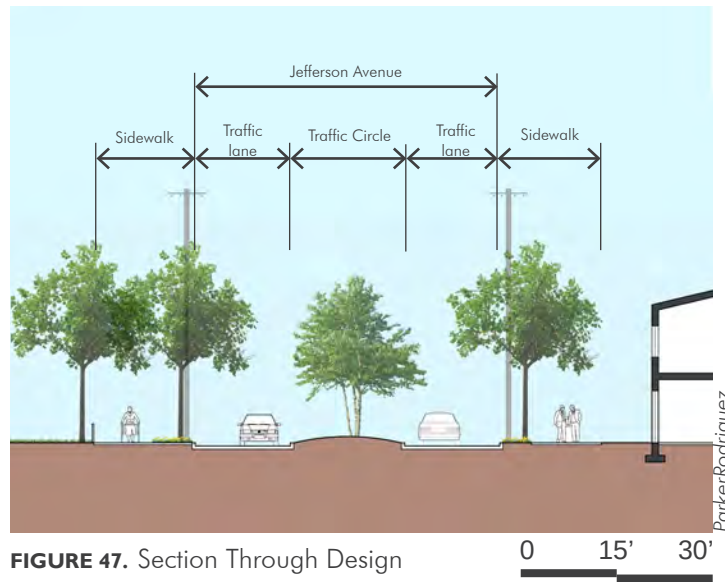
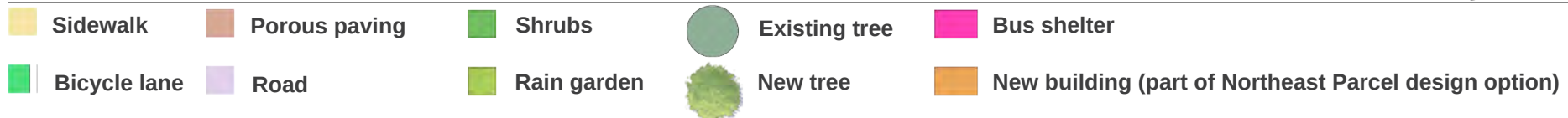


FIGURE 47. Section Through Design Option for the Bowtie

BOOKEND PARKS**Jefferson Avenue at 24th Street**

Figure 48 shows the intersection of Jefferson Avenue, Leigh Street, and 24th Street, a six-way intersection with a large expanse of unmarked asphalt pavement, unmarked crosswalks, and no bicycle lanes. Users face ambiguity about how to move through the intersection safely. A small concrete pedestrian refuge along the south side of Jefferson Avenue offers little comfort or safety for pedestrians as they stand surrounded by moving vehicles. South of Jefferson Avenue, both Leigh Street and 24th Street have short stacking distances for cars approaching the avenue; sometimes traffic on one of these streets blocks the other, making the intersection more confusing for users.

The design option illustrated in Figure 49 reconfigures the intersection to eliminate the stub ends of both Leigh and 24th streets south of Jefferson Avenue, replacing them with green space. A new road, perpendicular to Jefferson, creates a “Y” intersection of Leigh and 24th Streets. This creates shorter crosswalks that are perpendicular to the street. Two new, small pocket parks create places for people to gather. Buffered bicycle lanes are on both sides of Jefferson Avenue. Next to the intersection is the Family Resource Center, a public facility managed by the city of Richmond. The design option reconfigures its parking area to enlarge its playground while keeping the same number of spaces. The asphalt parking lot surface could be replaced by porous pavement to help reduce stormwater runoff.

**FIGURE 48.** Existing Plan**FIGURE 49.** Design Option for Bookend Parks

BOOKEND PARKS**Jefferson Avenue at 24th Street**

Figure 50 shows the unmarked expanse of asphalt at the intersection of Jefferson Avenue and 24th Street. The overly wide side streets create longer crossing distances and more impervious area. Crosswalks are unmarked.



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FIGURE 50. Existing View Looking Southwest

Figure 51 shows the design option, which converts the stub ends of Leigh Street and 24th Street into park space, transforming them into an oasis for the neighborhood that meets multiple city goals. The new street section perpendicular to Jefferson Avenue has a short crosswalk marked with a pair of brick piers and lights. The new park spaces would create a sense of place for this intersection, while the reconfigured streets would make pedestrian and bicyclists safer. Rain gardens along the curb would prevent jaywalking outside the crosswalks and capture and filter stormwater runoff.



ParkerRodriguez

FIGURE 51. View of the Design Options for Bookend Parks

IV. DESIGN OPTIONS

BOOKEND PARKS

Jefferson Avenue at 24th Street

Figure 52 shows the existing condition of the intersection at the location of the small, concrete pedestrian refuge. The intersection of Leigh and 24th Streets creates a wide expanse of pavement.

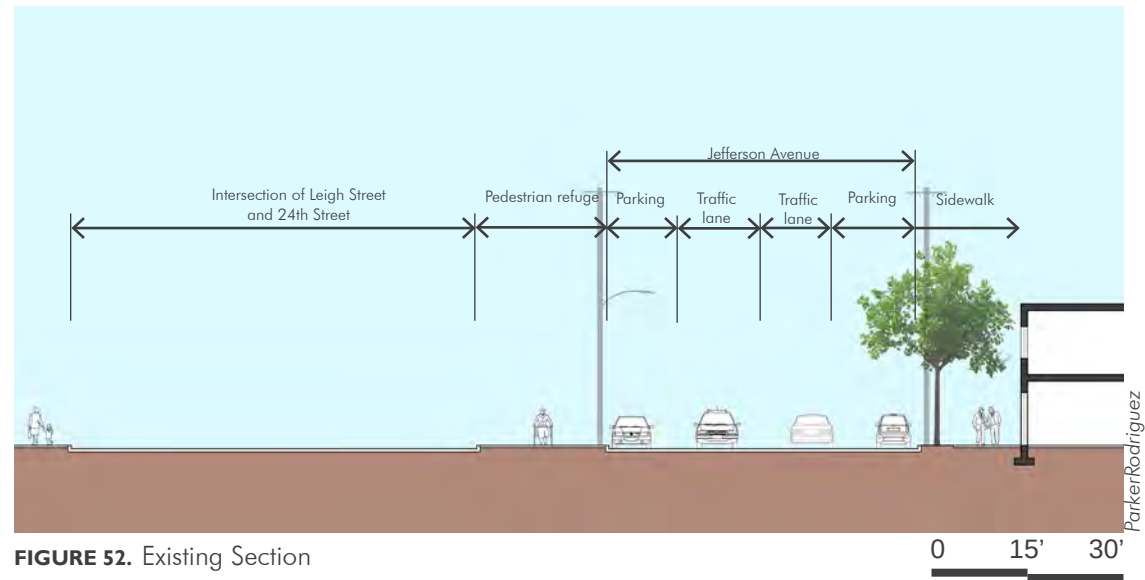


FIGURE 52. Existing Section

The design option shown in Figure 53 reconfigures the intersection to create a park in the vacated stub end of Leigh Street. It also adds bicycle lanes on both sides of Jefferson Avenue.

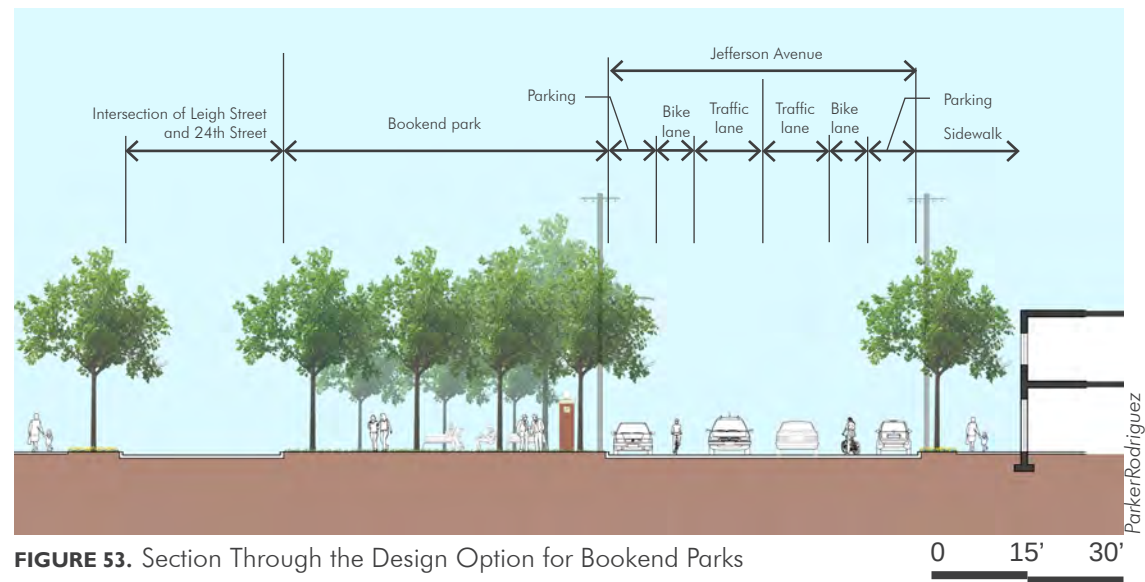


FIGURE 53. Section Through the Design Option for Bookend Parks

THE NORTHEAST PARCEL

Jefferson Avenue at 25th Street

Figure 54 shows a triangular area of private property that lies between Jefferson Avenue, 24th Street, and M Street. It includes a small, one-story office building and its parking lot and an abandoned two-story building that the city has condemned. The majority of the parcel is vacant and does not contribute to neighborhood vitality. The owner of the office building is interested in selling his property, creating an opportunity to transform the entire parcel in a way that meets the city's goals of revitalizing the neighborhood and creating new businesses.

The design option illustrated in Figure 55 envisions redeveloping the parcel with an apartment building with ground-floor shops along Jefferson Avenue. Such buildings are typically 60 feet wide, which would create two triangular spaces at either end of the parcel that could be used for outdoor retail or cafe space. Parking would be tucked under and behind the building and could be constructed from porous pavement.

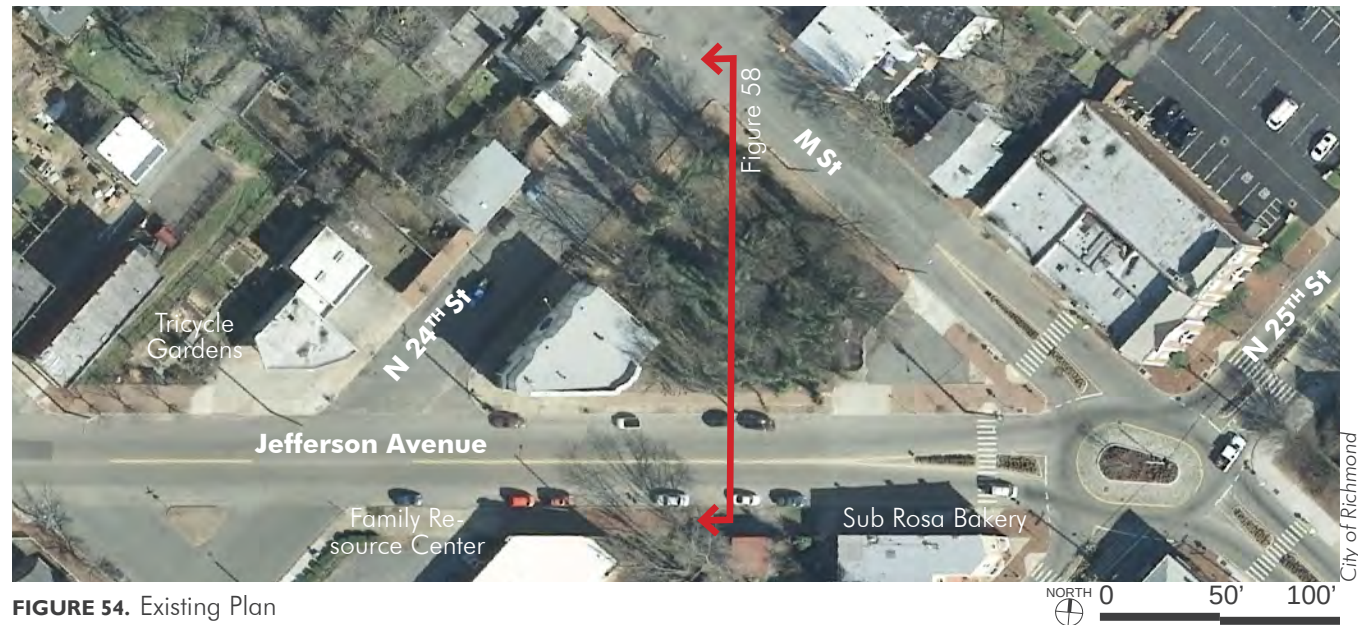


FIGURE 54. Existing Plan



FIGURE 55. Design Option for the Northeast Parcel

Sidewalk	Porous paving	Shrubs	Existing tree	Bus shelter
Bicycle lane	Road	Rain garden	New tree	New building

THE NORTHEAST PARCEL**Jefferson Avenue at 25th Street**

Figure 56 shows the existing condition of the parcel, with the small office building and its parking in the foreground. The abandoned building is in the background, with vacant land in between.



FIGURE 56. Existing View Looking Northwest

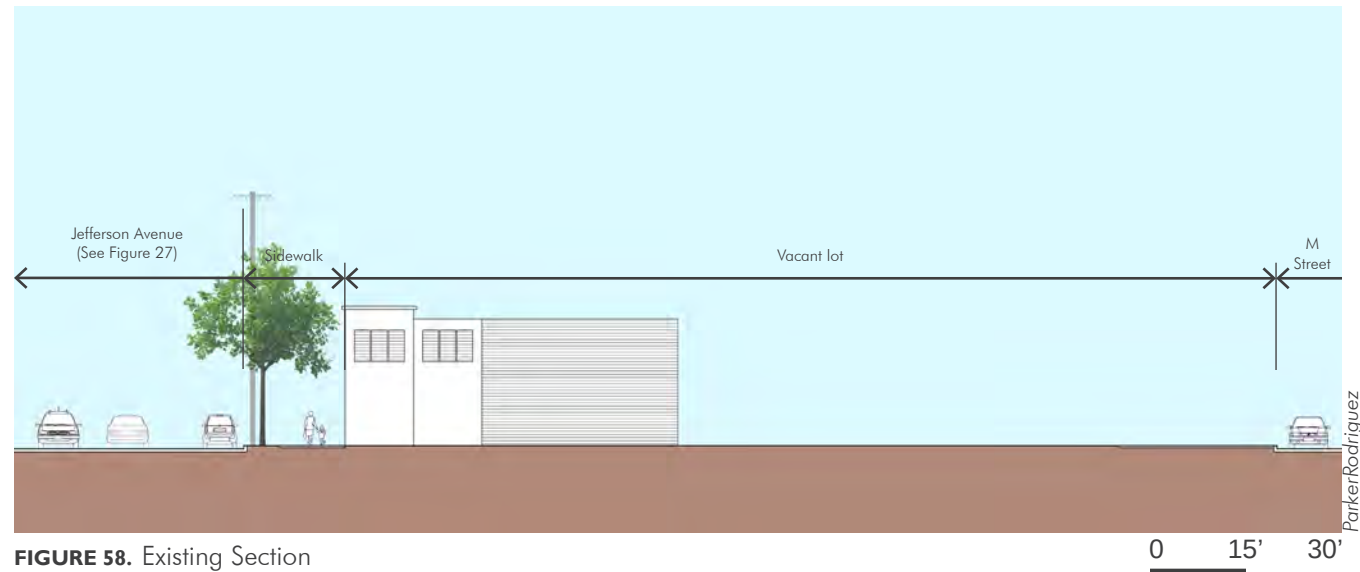
The design option illustrated in Figure 57 shows how a three-story apartment building might appear on the site. It would have its lobby entry on Jefferson Avenue and small retail stores or services along the street. At either end of the building, triangular spaces could be used for outdoor retail functions like sidewalk cafes. On-street parking on Jefferson Avenue could be provided to support those businesses. A green roof and rooftop garden could serve the building residents and reduce stormwater runoff from the site. The building could be constructed as a green building to save water and energy resources, reduce waste, and protect occupant health. Such a building could also help brand the Jefferson Avenue corridor as a sustainable neighborhood.



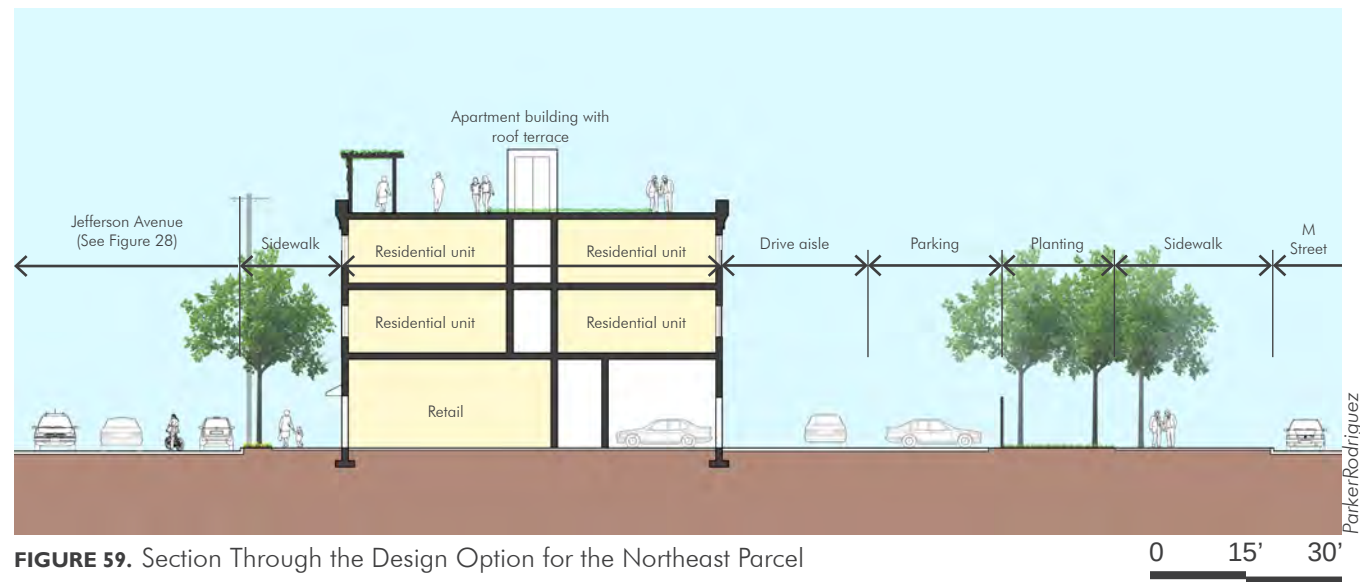
FIGURE 57. View of the Design Option for the Northeast Parcel

THE NORTHEAST PARCEL**Jefferson Avenue at 25th Street**

Figure 58 shows the existing condition of the parcel, with the abandoned building in the background.

**FIGURE 58.** Existing Section

The design option in Figure 59 shows a three-story building with ground-floor retail, two floors of residential units, and resident parking that slips under part of the building. On-street retail parking would be provided nearby. Service for the retail stores would use the same driveways as the residents and would be behind the building, away from view on Jefferson Avenue.

**FIGURE 59.** Section Through the Design Option for the Northeast Parcel

IMPLEMENTATION

The design options for Jefferson Avenue are a menu of improvements that the city could implement incrementally over time. These improvements can be grouped into two main categories:

- Mobility options include bicycle lanes, intersection reconfiguration, a roundabout, traffic circles, crosswalks, and bus shelters.
- Stormwater management options include rain gardens, porous pavement in parking spaces and roadways, increased planted areas, and street tree plantings.

Typically, public funding for mobility improvements is dispersed through city, state, or federal departments of transportation. Funding for stormwater management typically comes through natural resources and environment public agencies. The city of Richmond could pursue any and all applicable funding sources, as many communities compete for these funds. Some potential funding sources are listed beginning on page 37.

The city could consider the following steps to advance elements of the design options that it chooses to implement:

Near-term steps (2016 to 2017)

- Complete current planned improvements for traffic-calming measures on Jefferson Avenue, including the major roundabout at 22nd Street and minor traffic circles at 23rd Street and 24th Street.

- Paint crosswalks and other markings at these intersections to show the intended path for pedestrian and vehicular travel. For example, the city could paint the outlines of curb extensions that define the area for vehicle travel in the design options, notably at the Ellipse. The paint striping would be an inexpensive, visible improvement that could improve pedestrian safety immediately.
- Add bicycle lanes along both sides of Jefferson Avenue, which would not require any curb realignment or utility work. In many cities, the full width of the bicycle lanes are painted green color, which makes the lanes more visible, but even painting a simple white line pattern as a buffer zone between the car travel lanes and the bicycle lanes would help separate bicyclists from traffic. This low-cost project could be done by city employees and funded as a maintenance cost, not a capital cost.
- Meet with the city parks staff to discuss improvements to Jefferson Park at the Gateway study area. The Department of Public Works is most likely to implement the improvements, but as the owner of the property, the parks department must approve and embrace the concept. Once engaged, the parks department might be motivated to lead the effort.
- Continue fundraising efforts to implement the design for Two Hills Park that was chosen through a competition in 2014.

- Study the feasibility of replacing the asphalt pavement on 23rd Street in the blocks on either side of Jefferson Avenue with porous pavers. This change would reduce stormwater runoff and define an area that would be well suited for periodic closure for festivals, markets, and street fairs.
- Meet with the land owners of the Northeast Parcel and gauge their interest in a development strategy of assembling the entire triangle and planning it as one development opportunity. This strategy could yield a higher and better use than if each parcel were developed individually over time. This conversation would include a discussion on land use and zoning, with the city providing guidance on the approval process so the land owners fully understand their rights and options.

Mid-term steps (2018 to 2020)

- Reconfigure the intersection of Jefferson at 22nd and Marshall streets, including curb realignment at corners to create curb extensions with rain gardens and new crosswalks.
- Construct permanent curb planters and crosswalks at the Ellipse, including the curb extensions at East Clay Street.
- Place new bus shelters at each of the four bus stops in the study areas.

- Construct Two Hills Park and institute changes along East Clay and North 23rd streets to create a new social and civic heart at the center of the study area.
- As a first step toward building the Gateway to the corridor, create detailed plans for the new entry to Jefferson Park, including the rain garden, entry ramps, and landscaping.
- Conduct a feasibility study for the Bookend Parks, including intersection reconfiguration, curb realignments, and street closures, to demonstrate that it would not significantly affect traffic flow and would improve pedestrian safety.

Long-term steps (2020 and beyond)

As final steps to complete the vision for the Jefferson Avenue corridor, the city could:

- Construct the Gateway to Jefferson Park.
- Construct the Bookend Parks and the associated improvements to the Family Resource Center playground and parking lot.
- Replace asphalt parking lanes along both sides of Jefferson Avenue with porous pavers.
- Complete curb extensions and rain gardens along Jefferson Avenue and its intersections with side streets.

FUNDING SOURCES

Federal

The Green Streets, Green Jobs, Green Towns Initiative is a collaboration among EPA

Region 3, the Chesapeake Bay Trust, the Maryland Department of Natural Resources, and other partners. It offers grants to communities in the Chesapeake Bay Watershed for engineered designs and construction of green infrastructure projects, especially green streets, to improve water quality and encourage economic growth. The rain gardens, porous pavements, and street tree planting are eligible for funding from this initiative. More information is available at: http://www.cbtrust.org/site/c.miJPKXPCJnH/b.7735695/k.5E92/Green_Streets_Green_Jobs_Green_Towns.htm.

The EPA Clean Water State Revolving Fund provides low-cost loans for green infrastructure. This program is managed by the Virginia Department of Environmental Quality. These loans can be paid back through municipal stormwater fees or other revenue. Loans from this fund could pay for the rain gardens. More information is available at: <http://www.deq.state.va.us/Programs/Water/CleanWaterFinancingAssistance/StormwaterFundingPrograms/StormwaterLoans.aspx>.

EPA Clean Water Act Section 319 grants provide money for demonstration projects that reduce stormwater pollution. This program is managed by the Virginia Department of Environmental Quality. These grants could fund the rain gardens. More information is available at: <http://www.deq.virginia.gov/Programs/Water/CleanWaterFinancingAssistance/NonpointSourceFunding.aspx>.

EPA Urban Waters Small Grants fund research,

training, and demonstrations to advance restoration of urban water quality and support community revitalization. Typical grants range from \$30,000 to \$60,000 and have been used for planning to address chronic flooding, job-training programs for green infrastructure installation and maintenance, homeowner workshops for residential green infrastructure installation, and education programs to teach youth about sources of and solutions to water quality impairment. More information is available at: <http://www.epa.gov/urbanwaters/urban-waters-small-grants>.

The Federal Emergency Management Agency Pre-Disaster Mitigation Grant Program offers funding to communities for projects that reduce or prevent flooding. The rain gardens would be eligible for this funding. More information is available at: <http://www.fema.gov/pre-disaster-mitigation-grant-program>.

The Federal Highway Administration offers grants to states for a variety of green infrastructure transportation projects. These funds are managed by the Virginia Department of Transportation. Two programs are particularly appropriate for Jefferson Avenue:

- The Congestion Mitigation and Air Quality program provides grants for pedestrian, bicycle, and transit projects under the Title 23 federal-aid highway funding. The bicycle lanes, pedestrian sidewalk, curb extensions, and transit shelters would be eligible for this funding. More information is available at: http://www.fhwa.dot.gov/environment/air_quality/cmaq.

- The Transportation Alternatives program provides funding for pedestrian and bicycle paths, safe routes to school, access to transit, and community improvements. The bicycle lanes, pedestrian sidewalks, crosswalks, curb extensions, transit shelters, and intersection reconfigurations would be eligible for this funding. More information is available at:
<http://www.fhwa.dot.gov/map21/guidance>.

The U.S. Department of Housing and Urban Development administers Community Development Block Grants for affordable housing in urban areas. The Northeast Parcel development site might be eligible for this funding. More information is available at:
http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs.

The National Endowment for the Arts' Our Town program offers grants for placemaking projects that "help to transform communities into lively, beautiful, and resilient places." The program considers design projects that represent the community's distinctive character of the community and provides matching funds from \$25,000 to \$200,000. Local governments must have a nonprofit organization partner to be eligible. The Gateway in Jefferson Park and Two Hills Park would be eligible for these grants. More information is available at: <http://arts.gov/grants-organizations/our-town/introduction>.

State Sources

The Virginia Department of Transportation (VDOT) administers federal highway or transportation funds, including the programs mentioned above. VDOT might be a source for the local match for federal funds, so the city might want to work with VDOT to procure those funds. VDOT also has an annual budget for capital improvements and maintenance that could fund some projects. Typically, VDOT creates its budgets years in advance, so the city might want to start talking to VDOT about projects now, understanding that they might not be funded for several years. More information is available at: <http://www.virginiadot.org>.

The Virginia Department of Environmental Quality is responsible for stormwater management and can provide matching funds for federal monies for elements such as rain gardens and porous pavements. The department administers the Clean Water Revolving Loan Fund Stormwater Loan program. More information is available at: <http://www.deq.virginia.gov/programs/water/cleanwaterfinancingassistance.aspx>.

City Sources

The city of Richmond's Department of Public Works builds and maintains the public realm. The department creates annual budgets for capital improvements, repairs, and maintenance of public streets. It manages roadways, curbs, sidewalks, and street trees, so it would have to fund improvements and repairs

to any of those facilities through its budget process. More information is available at:
<http://www.richmondgov.com/publicworks>.

The city of Richmond Department of Parks, Recreation, and Community Facilities owns Jefferson Park. It would have to approve and likely fund improvements in the Gateway area, so engaging the department as a partner is necessary if the city chooses to implement the Gateway design option. More information is available at: <http://www.richmondgov.com/parks>.

The Richmond Regional Transportation Planning Organization (TPO) provides funds for bicycle and pedestrian improvements, which could be used for intersection improvements as well as bicycle lanes. More information is available at: <http://www.richmondregional.org/TPO/bikeped.htm>.

Private Sources

Global ReLeaf is an American Forests program that provides grants to communities to plant trees. More information is available at: <http://www.americanforests.org/our-programs/global-releaf-projects>. Community ReLeaf, another American Forests program, selects cities for help with urban forest assessment, restoration, and outreach and education. More information is available at: <http://www.americanforests.org/our-programs/urbanforests/community-releaf/>.

The Alliance for Community Trees offers grants to communities to plant trees. More information is available at: <http://actrees.org/what-we-do/grants-and-awards/planting-trees/>.

The Conservation Fund's Parks with Purpose program promotes the design, preservation, and enhancement of urban parks. This program could help with Two Hills Park. More information is available at: <http://www.conservationfund.org/type-of-place/parks-with-purpose>.

The National Association of Realtors funds a program called Placemaking to enhance public spaces for the betterment of the entire community. It typically partners with a local sponsor and provides some matching funds. Two Hills Park is a candidate for such a partnership. More information is available at: <http://www.realtor.org/topics/smart-growth/smart-growth-programs/placemaking>.

Artplace America has a national grant program that funds creative placemaking projects where the arts play a central role in a community's planning and development strategies. Two Hills Park would be a candidate for these funds. More information is available at: <http://www.artplaceamerica.org/our-work/national-grants-program/introduction>.

GREENING JEFFERSON AVENUE

