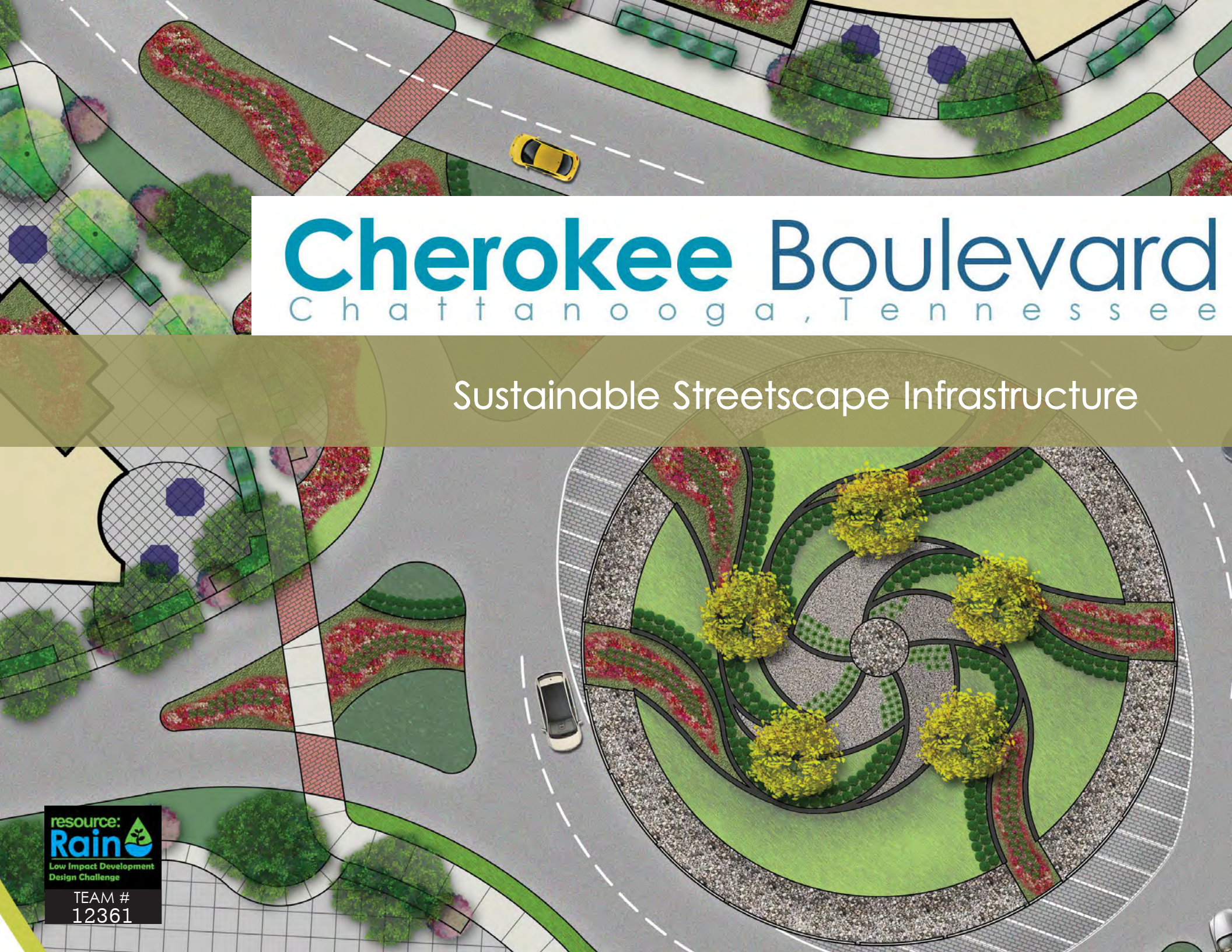


Cherokee Boulevard

Chattanooga, Tennessee

Sustainable Streetscape Infrastructure

resource: Rain
Low Impact Development Design Challenge

TEAM # 12361

CHEROKEE BOULEVARD - SUSTAINABLE STREETSCAPE INFRASTRUCTURE

Cherokee Boulevard is a busy urban arterial street connecting the Hill City / Northside Neighborhood to the active economy and cultural excitement of the North Shore business district. The North Shore Land Use Plan and the Northside Neighborhood Plan envision this route to act as a transect between mixed commercial use and the surrounding residential neighborhood. By using a model of sustainable infrastructure for Cherokee Boulevard we create a beautiful streetscape that achieves multiple functions including:

Management of storm water

- 431,072 Gallons of rainwater cleaned
- treatment of entire street and 50% of adjacent building / parking.

Green infrastructure on Cherokee Boulevard moves stormwater through a series of tools, like porous pavers, swales, infiltration trenches and bioretention planters and basins. These water quality tools slow water down and filter it into pockets of soil, plants and stone. In the process water temperature is cooled and water is cleaned of sediment and contaminants and the impact of downstream flooding is reduced. Linking these tools together allows water to slowly move along a seamless path of biological systems. This greatly reduces the need for large inlets, pipes and concrete gutters and channels.

Enhanced environmental quality

- 100% on site treatment 1” rainfall
additional treatment of half of adjacent buildings and parking lots along streets

Integrating natural swales, rain gardens (bioretention) and rooftop gardens into the Cherokee Boulevard streetscape provides multiple benefits to the environment. Water and air are cleaned with biological systems. Temperature increases typically found in large urban settings (the urban heat island effect) are reduced because of shade and retained moisture. Biodiversity is greatly increased with habitat that provides a home for beneficial birds, insects and soil micro-organisms.

CHEROKEE BOULEVARD - SUSTAINABLE STREETSCAPE INFRASTRUCTURE

Improved multimodal transportation

- 10,530 linear ft. of bike lane and pedestrian way
- bus stops and bike stations added

The multimodal transportation design for Cherokee Boulevard creates a comfortable and functional space for pedestrians, bicycles and mass transit connections as well as automobiles. Center medians and crosswalks add comfortable islands for pedestrians and opportunities for canopy trees and vegetative swales. Dedicated bike lanes encourage safe travel for bicycles. On street parking slows traffic and promotes a sense of commerce on the street. The roundabout at the Manning Street intersection provides a transition from two to four lanes of automobile traffic and creates a strong focal point for the community. Extension of bus routes with bus shelters and bicycle transit stations along Cherokee Blvd further connects the Hill City neighborhood with the North Shore and Downtown communities.

Promoting a sense of community and public education

- 6 new ways to learn about rain gardens
- artistic water sculpture, terraced rain garden

Green infrastructure along Cherokee Boulevard creates comfort and beauty for the surrounding Hill City / Northside neighborhoods. Streetscapes that are designed to a human scale invite people to walk and bike in their neighborhoods adding health and recreational benefits. Green space and pocket parks also become opportunities for places of public art and environmental education.

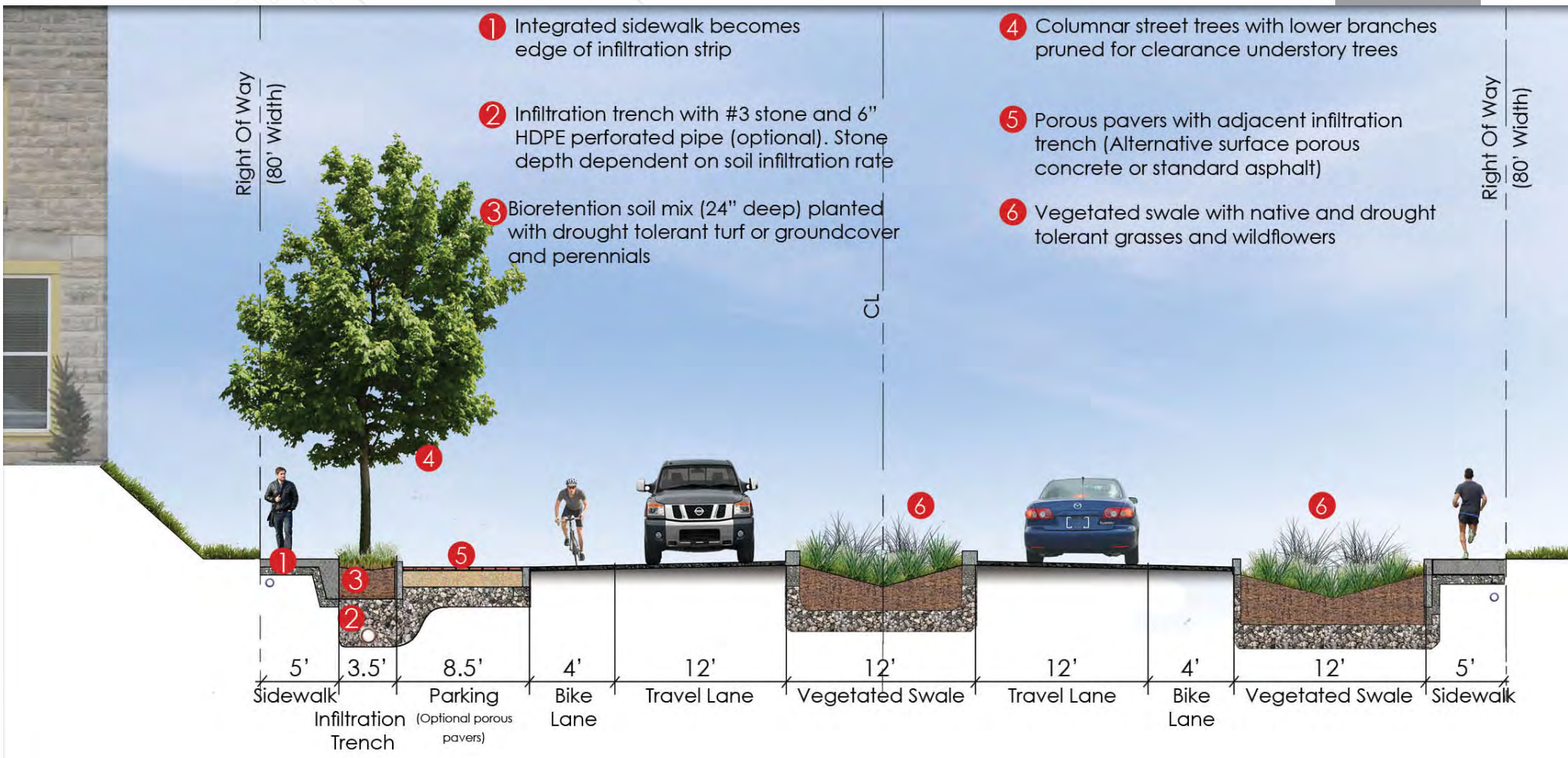
Provides economic return

- Approximately 650,000 S.F. of new and revitalized buildings along street frontages

Investment in public sustainable infrastructure sets the stage for investment in private development and the renovation of existing neighborhoods. These investments in the private market in turn generate tax revenue for public benefit. Sustainable improvements along Cherokee Boulevard act as an artery of commerce to the surrounding community promoting a mixture of commercial and residential uses at a higher density along the arterial corridor. Residents from surrounding neighborhoods are provided opportunities to dine at restaurants and shop at local markets and retail establishments within walking distance of their homes.

PROJECT AREA

Cherokee Boulevard presents a wide variety of streetscape situations along its length. Incorporating green infrastructure into the fabric of the street and surrounding neighborhoods requires multiple varying practices. This plan serves as a key to where different designs are applied. The designs shown dealt with varying situations, and opportunities which when examined carefully, lead us to appropriate solutions.



TYPE 3
STREET DESIGN

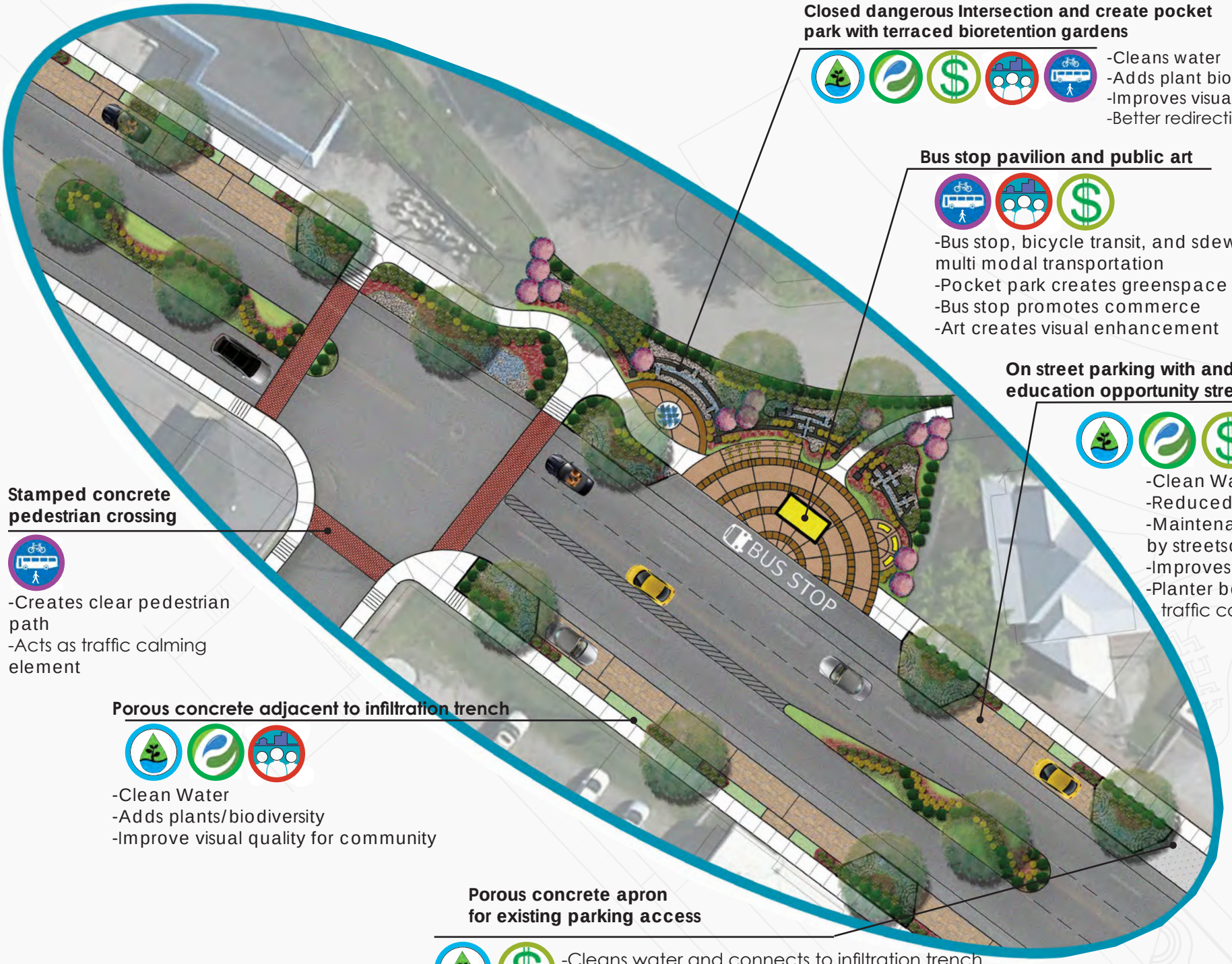
7 Breaks in curb allow for sheet flow from street

8 Natural rock check dams on steep grades

9 Increased biodiversity created with habitat for beneficial birds, insects and wildflowers

10 Bioretention soil mix (24" deep)

VEGETATED SWALE



Closed dangerous Intersection and create pocket park with terraced bioretention gardens

-Cleans water
-Adds plant bio diversity
-Improves visual quality
-Better redirection of traffic flow

Bus stop pavilion and public art

-Bus stop, bicycle transit, and sdewalks promotes multi modal transportation
-Pocket park creates greenspace for neighborhood
-Bus stop promotes commerce
-Art creates visual enhancement

On street parking with and public education opportunity street planter box

-Clean Water
-Reduced stormwater fee
-Maintenance covered by streetscape Association
-Improves visual quality
-Planter boxes help with traffic calming

Stamped concrete pedestrian crossing

-Creates clear pedestrian path
-Acts as traffic calming element

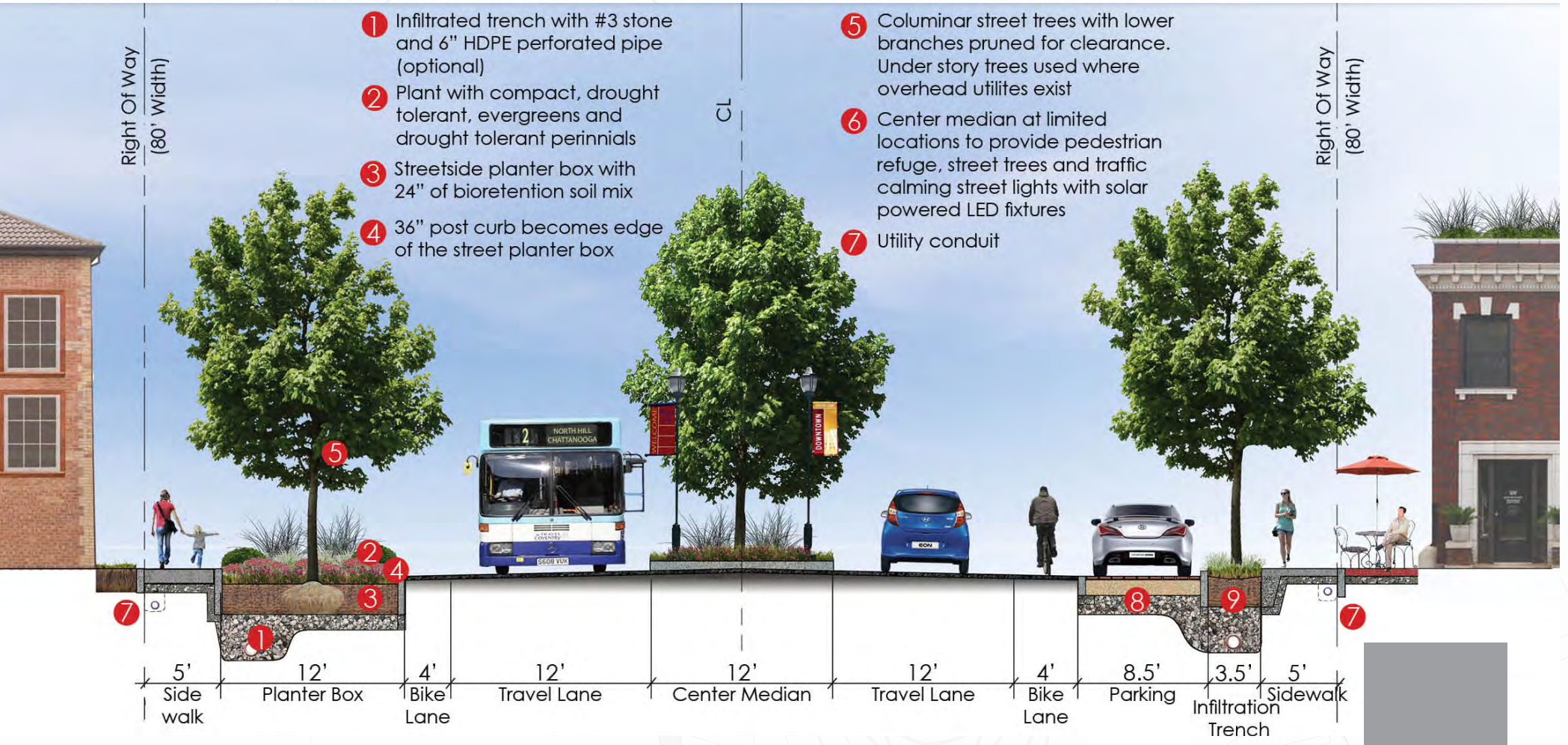
Porous concrete adjacent to infiltration trench

-Clean Water
-Adds plants/biodiversity
-Improve visual quality for community

Porous concrete apron for existing parking access

-Cleans water and connects to infiltration trench
-Pourous concrete is poured for access to existing parking allowing business owners to continue using for commerce
-When redevelopment occurs the porous paver, infiltration, planter box design pattern is applied

W BELL AVE POCKET PARK



TYPE 2 STREET DESIGN

8. Porous pavers with adjacent infiltration trench (Alternative surface porous concrete or standard asphalt)

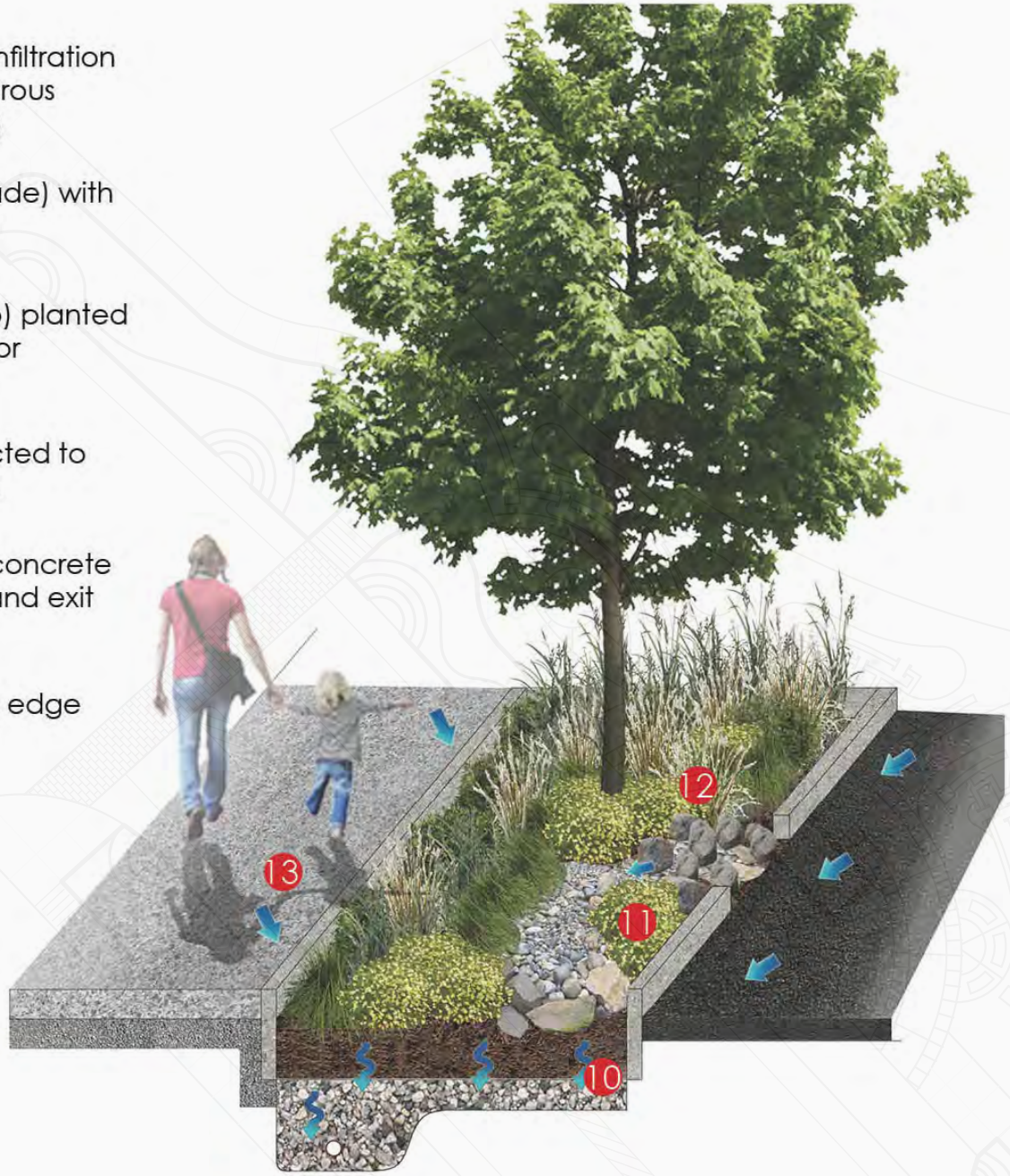
9. Infiltration trench (at street grade) with tree planter every 3-4 spaces)

10. Bioretention soil mix (24" deep) planted with low drought tolerant turf or groundcover

11. Streetside planter box connected to downstream infiltration trench

12. Concentric vertical stones in concrete apron to slow water at entry and exit points of planter box

13. Integrated sidewalk becomes edge of infiltration strip



CHEROKEE BOULEVARD - BEFORE AFTER VIEW OF CAFE COURTYARD

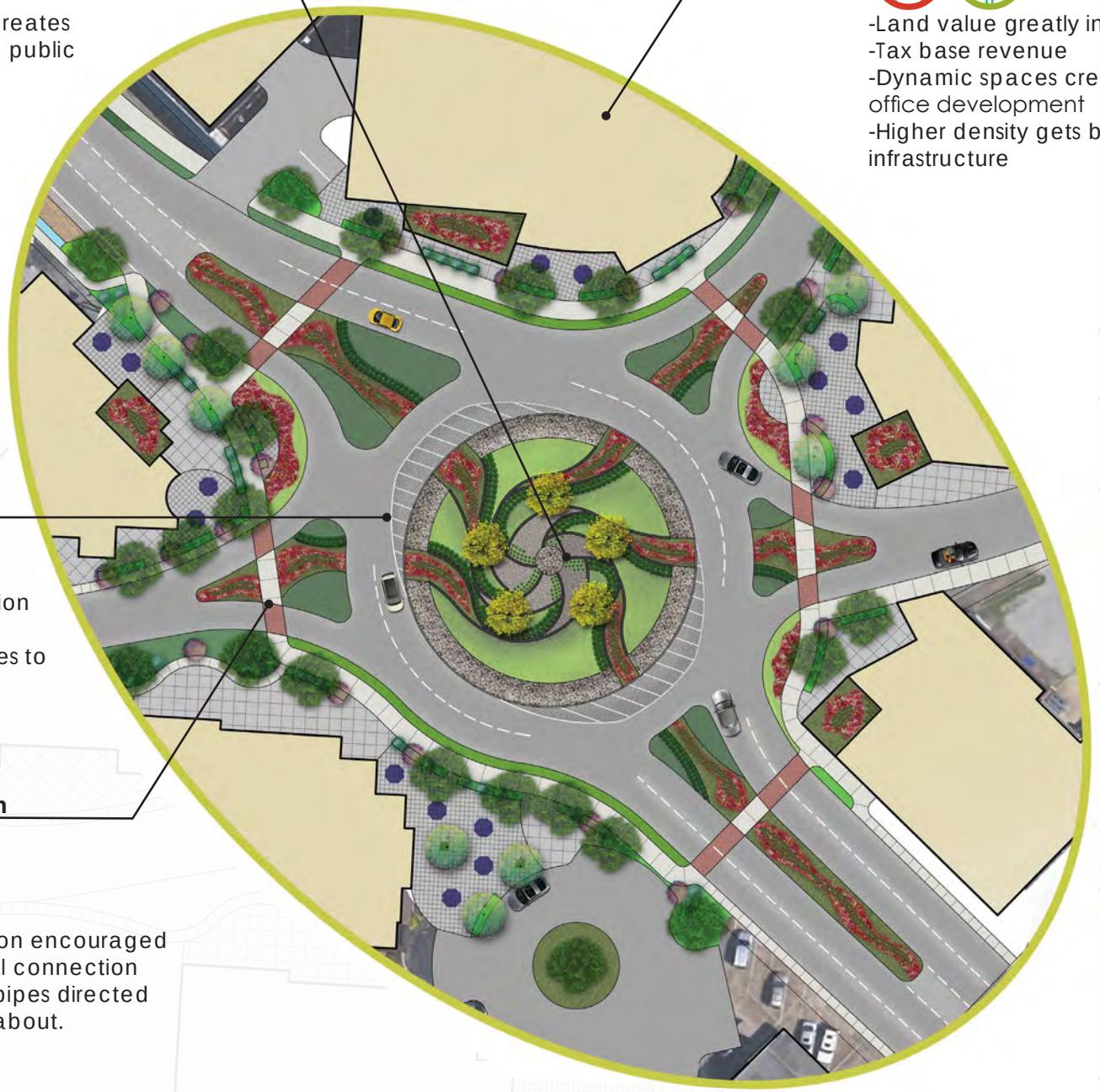
CHEROKEE BOULEVARD - W BELL AVE POCKET PARK

Terraced bioretention and artistic water sculpture

-Large central bioretention creates a dynamic tool to educated public with water levels depicting different storm events
-Public art becomes focal point for hill city northside neighborhood with solar power rainbow mister integrated into sculpture

Mixed use redevelopment opportunities with parking garage on lower levels

-Land value greatly increased
-Tax base revenue
-Dynamic spaces created for local retail and office development
-Higher density gets better return on infrastructure



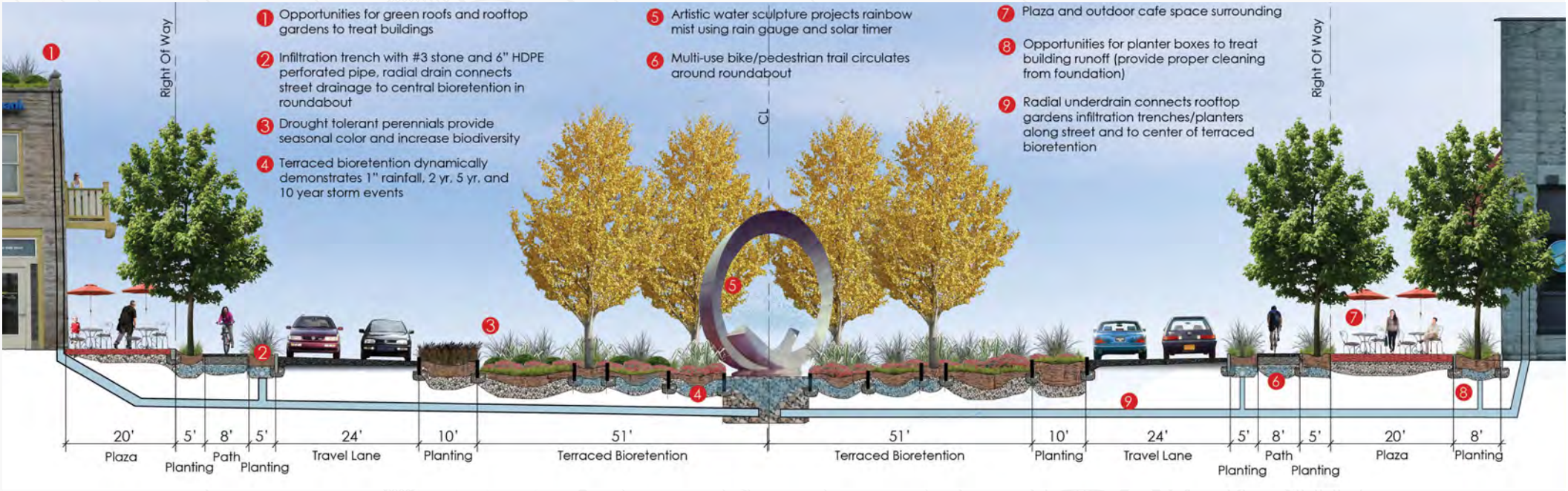
Roundabout
(Redesign of 5 way intersection)

-Promotes clear and safe redirection of traffic
-Arts as transition from 4 travel lanes to 2 travel lanes

Bike/pedestrian path in median and bioretention

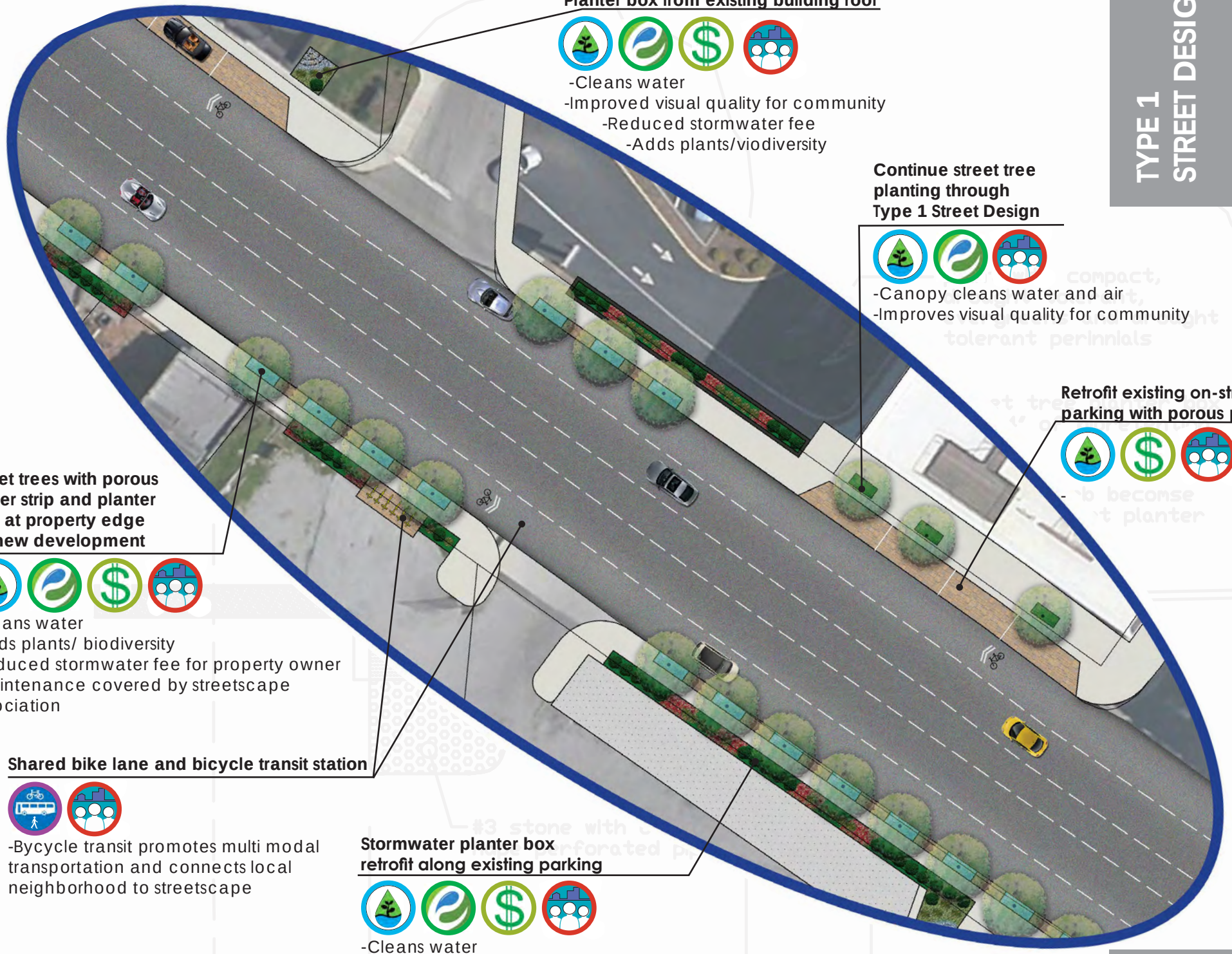
-Traffic calming
-Multimodel transportation encouraged
-Medians become radial connection points for underground pipes directed toward center of roundabout.

ROUNDABOUT WITH TERRACED BIORETENTION AND ARTISTIC WATER SCULPTURE



ROUNDABOUT BIORETENTION SECTION

TYPE 1 STREET DESIGN



Planter box from existing building roof

-Cleans water
-Improved visual quality for community
-Reduced stormwater fee
-Adds plants/viodiversity

Continue street tree planting through Type 1 Street Design

-Canopy cleans water and air
-Improves visual quality for community

Retrofit existing on-street parking with porous pavers

-

Street trees with porous paver strip and planter box at property edge for new development

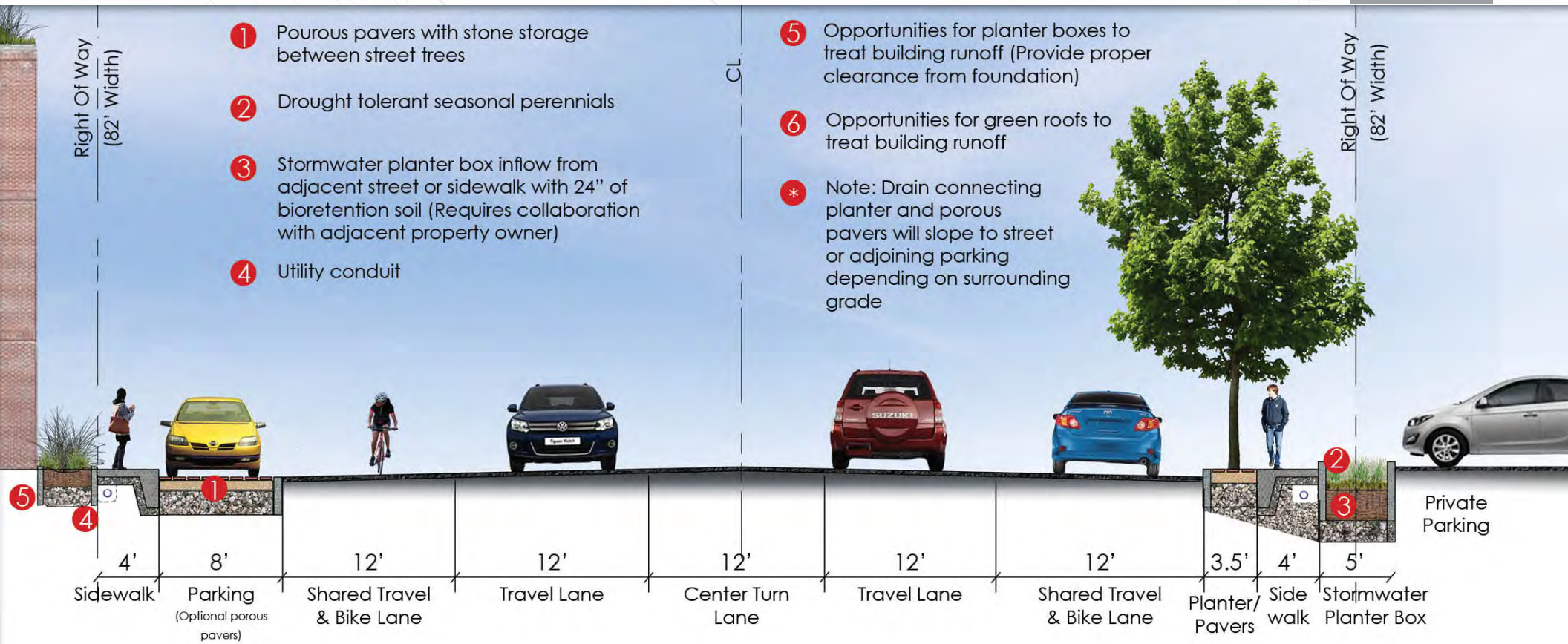
-Cleans water
-Adds plants/ biodiversity
-Reduced stormwater fee for property owner
-Maintenance covered by streetscape association

Shared bike lane and bicycle transit station

-Bycycle transit promotes multi modal transportation and connects local neighborhood to streetscape

Stormwater planter box retrofit along existing parking

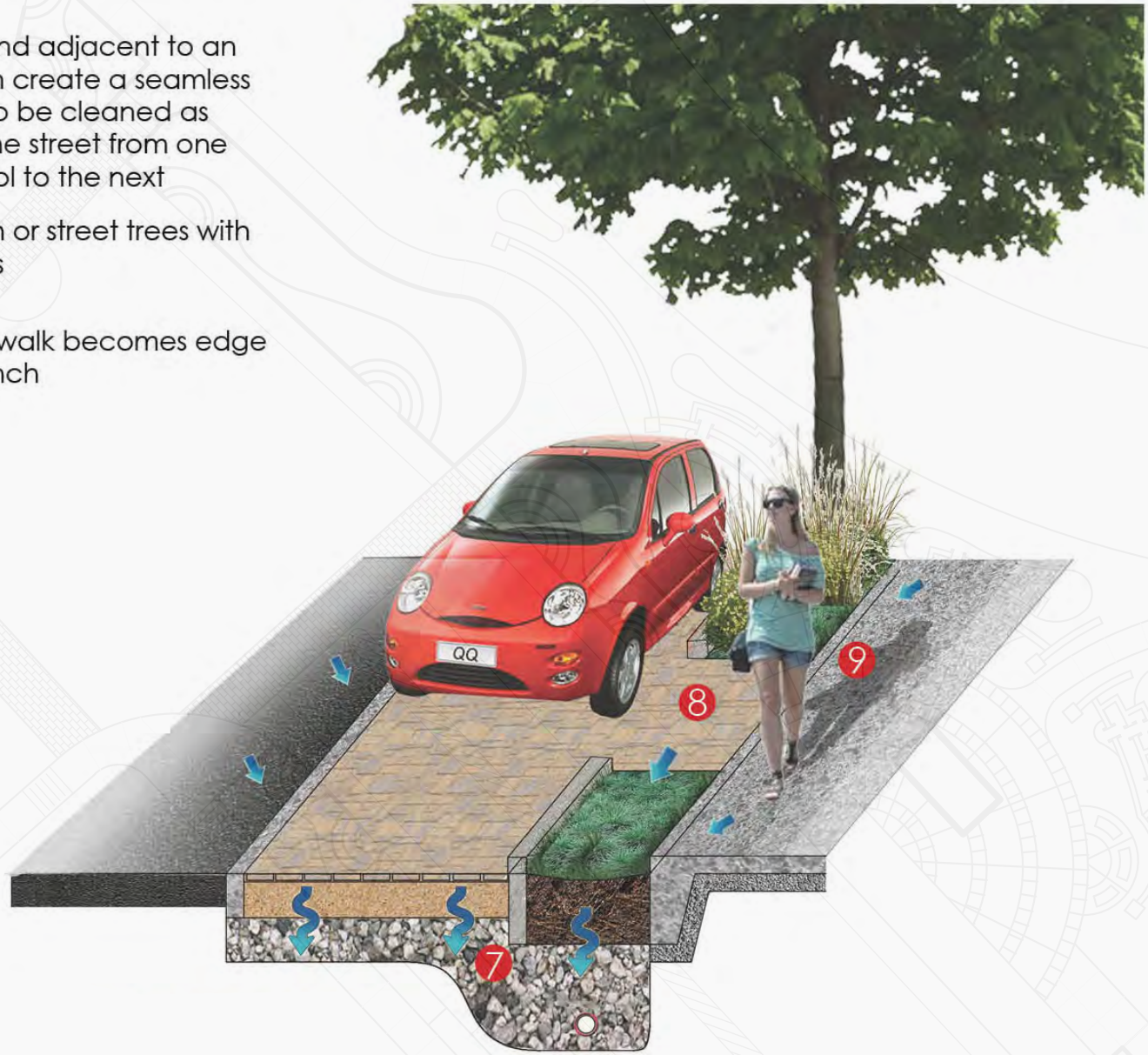
-Cleans water
-Adds plants/biodiversity
-Reduced stormwater fee for property



TYPE 1 STREET DESIGN

POROUS PAVERS WITH INFILTRATION TRENCH

7. Porous pavers and adjacent to an infiltration trench create a seamless path for water to be cleaned as it moves downthe street from one water quality tool to the next
8. Infiltration trench or street trees with adjacent pavers
9. Intergrated sidewalk becomes edge of infiltration trench



CHEROKEE BOULEVARD - STORMWATER REPORT

This report provides a summary of the stormwater management approach for the Cherokee Boulevard site.

General Description

This project consists of Cherokee Boulevard from North Market Street north west to the tunnel. We have designed the project to manage stormwater runoff not only from the right-of-way, but from about half of the adjoining properties, as well. The maintenance of the green infrastructure could be a public-private partnership with some of the local businesses or a local neighborhood association in exchange for the project managing a portion of their stormwater runoff.

The proposed project consists of four main themes that are described below. The attached stormwater drainage area map depicts the drainage areas for the right-of-way only (Disturbance Areas) and for the right-of-way and adjoining properties (Sub-Drainage ID).

The following descriptions present each of the drainage areas and how stormwater will be managed.

- Sub-Drainage ID 1: This area is the northern portion of the Type 1 street design. Stormwater runoff is managed through tree plantings and stormwater planter boxes.

- Sub-Drainage ID 2: This area is the southern portion of the Type 1 street design. Stormwater runoff from this area is managed through permeable pavement in the parallel parking areas.

- Sub-Drainage ID 3: This area is the northern portion of the Type 2 street design. The stormwater runoff from this drainage area is managed by tree plantings, permeable pavement in the parallel parking areas, and an infiltration trench.

- Sub-drainage ID 4: This area is the southern portion of the Type 2 street design. Stormwater runoff is managed through stormwater planter boxes.

- Sub-Drainage Area 5: This is the southern and western portion of the Type 3 street design. The stormwater runoff from this area is managed through permeable pavement in the parallel parking areas and an infiltration trench with tree plantings.

- Sub-Drainage ID 6: This area is the northern and eastern portion of the Type 3 street design. The stormwater runoff from this drainage area is managed by a bioretention area in the median and an infiltration trench along the eastern road edge.

- Sub-Drainage ID7: This area is the roundabout between the Type 1 and Type 2 street design at Manning Street. The stormwater runoff from this area is managed by the bioretention area in the roundabout.

Runoff Reduction Strategy

The main runoff reduction strategy utilized was minimization of impervious areas and disconnection of impervious areas.

Infiltration on the site was limited due to the poor soils. An infiltration rate of 0.1”/ hour was assumed.

Managing Stay-on-Volume (SOV)

This project site requires management of 1.0” of rain. The LID Tool worksheets for this project, including the adjoining properties, are attached. The worksheets indicate that the SOV for each of the Sub-Drainage IDs is met. The SOV of 56,668 cubic feet for the right-of-way and portion of adjoining properties has been met, and even exceeded (57,630 cubic feet), by the green infrastructure.

Since the SOV has been met, no water quality improvements are needed.

Peak Flows

A narrative of the peak flow calculation methodology, software used, and results is provided below.

<u>NRCS Unit Hydrograph Method for Peak Rate Calculation</u>

NRCS developed a system to estimate peak runoff rates and runoff hydrographs using a dimensionless unit hydrograph derived from many natural unit hydrographs from diverse watersheds throughout the country (NRCS Chapter 16, 1972). The NRCS methodologies are available in several public domain computer models.

PCSWMM was the software package used for the peak rate calculation of the Bonny Oaks project. PCSWMM was selected to perform the calculation because it is “a fully featured urban drainage system modeling package, with no limitations on model size or complexity. PCSWMM contains a complete GIS system (no third party software required) tailored to urban drainage modeling which supports most projections, datums, and ellipsoids, provides interaction with a large number of GIS formats, as well as topological operations and querying. PCSWMM provides advanced versions of all of the standard urban drainage modeling visualization techniques, including animated hydraulic grade line and energy grade line profiles, plan-view static and animated thematic rendering, powerful plotting tools, as well as on-the-fly statistical, calibration and error analysis” (Computational Hydraulics International, 2014).

Runoff is calculated using the NRCS method with only a curve number (based on land cover type and the hydrologic soil group) and rainfall depth. Curve numbers (CN) and additional information on the development of the method may be found in “Urban Hydrology for Small Watersheds” published by the Soil Conservation Service, now NRCS, in 1986. Recommended CN values for use in Chattanooga are provided in Table 7-5 of the Chattanooga Rainwater Management Guide.

Based on the cover type and hydrologic soil group (gathered from the NRCS Web Soil Survey) of the site’s drainage area, the composite CN was determined to be 82.

Discharge Location

The Cherokee Boulevard project contains multiple subareas and discharge points. This project has been evaluated for peak rate control “as a whole” such that the combined discharge rate at all discharge locations from the project site is not greater than the combined discharge rate before development. Thus, one “ultimate” discharge location was placed at the lowest elevation of the site at Spears Avenue.

CN Adjustment to Reflect SOV Capture

To account for the impacts on peak rate reduction through the application of LID measures on a project site, an adjustment was made to the CN assigned to disturbed areas managed by a BMP. The CN value is adjusted to reflect both the volume captured in various BMPs (SOV) as well as any infiltration that occurs over a defined time period during a large storm. The CN adjustment was calculated in “Worksheet 4” of the “LID Tool” provided in the Chattanooga Rainwater Management Guide. As a result, the adjusted CN values for the 10, 25, and 100-year, 24-hour storm events are 75, 76, and 76, respectively.

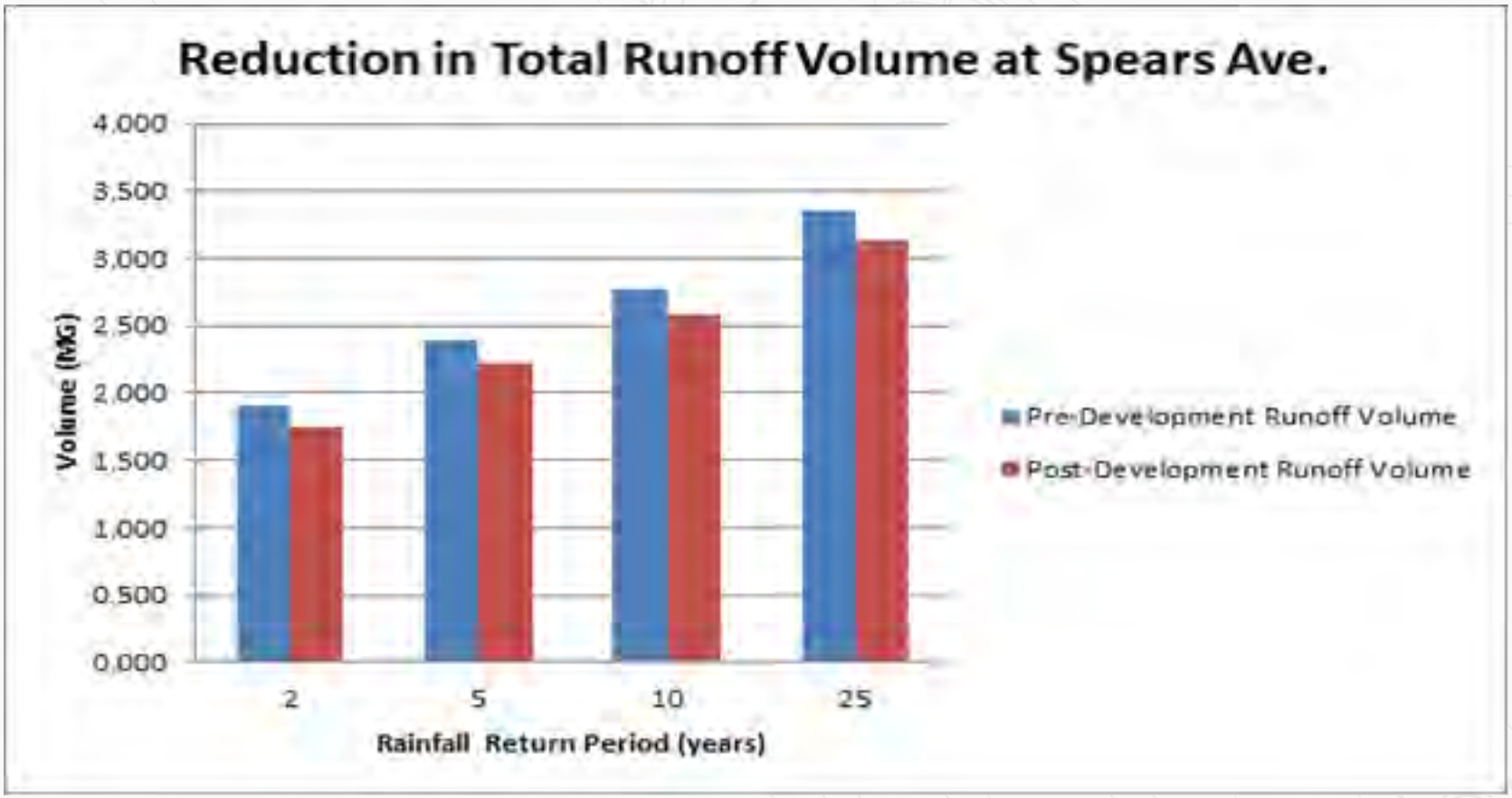
CHEROKEE BOULEVARD - STORMWATER REPORT

Peak Flows

Using the Curve Number Method within PCSWMM, the Cherokee Boulevard project's post-development peak rate is less than the pre-development peak rate of discharge for all rainfall return periods.

Rainfall Return Period (yr)	Peak Flow (cfs)		% Reduction
	Pre-Development	Post-Development	
2	59.4	53.5	9.9%
5	75.3	68.8	8.6%
10	87.6	80.8	7.8%
25	106.5	99.4	6.7%

In addition, the total stormwater runoff from the site has been reduced by about 8%.



Cost Comparison

The cost for the green infrastructure as compared to traditional stormwater management for just the portion of the project within the right-of-way is about 11% less, as shown in the cost tables below.

Green Infrastructure Cost				
GI Description	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**
Bioretention	16,200	Sq. ft.	$16.00	$259,200.00
Stormwater Planter Bo	13,200	Sq. ft.	$18.00	$237,600.00
Pervious Pavement	22,300	Sq. ft.	$10.00	$223,000.00
				$0.00
				$0.00
TOTAL CONSTRUCTION COST				$719,800.00

Traditional Stormwater Infrastructure Cost				
GI Description	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**
Curb and Gutter	8,600	Linear ft.	$16.00	$137,600.00
24" Dia. RCP	5,500	Linear ft.	$95.00	$522,500.00
Catch Basins	28	Each	$4,000.00	$112,000.00
Detention Basin	0.4	Acre	NA	$35,000.00
				$0.00
TOTAL CONSTRUCTION COST				$807,100.00

However, the proposed green infrastructure can have some additional storage depth added to it and provide the required SOV for the additional 15.34 acres of property outside of the right-of-way for only an additional $103,000, or $823,200, placing it just above the cost for the traditional stormwater management for just the right-of-way.

CHEROKEE BOULEVARD - STORMWATER REPORT

Summary								
Sub-Drainage ID	Total Disturbed Area (ft^2)	Total Disturbed Impervious Area (ft^2)	Sub-Drainage Area SOV (ft^3)	Volume Credit (ft^3)	Net Sub-Drainage Area SOV (ft^3)	Loading Ratio	BMP Capture Volume (ft^3)	Capture > SOV?
1	66,650	66,650	5,443	72	5,371	13	5,460	YES
2	74,050	74,050	6,047	0	6,047	15	6,120	YES
3	137,650	137,650	11,241	0	11,241	14	11,400	YES
4	103,240	103,240	8,431	120	8,311	13	8,400	YES
5	465,655	24,390	9,145	0	9,145	3	9,240	YES
6	120,225	95,830	8,070	96	7,974	12	8,400	YES
7	200,200	80,200	8,650	72	8,578	10	8,610	YES
8	0	0	0	0	0	N/A	0	N/A
9	0	0	0	0	0	N/A	0	N/A
10	0	0	0	0	0	N/A	0	N/A
11	0	0	0	0	0	N/A	0	N/A
12	0	0	0	0	0	N/A	0	N/A
13	0	0	0	0	0	N/A	0	N/A
14	0	0	0	0	0	N/A	0	N/A
15	0	0	0	0	0	N/A	0	N/A
16	0	0	0	0	0	N/A	0	N/A
17	0	0	0	0	0	N/A	0	N/A
18	0	0	0	0	0	N/A	0	N/A
19	0	0	0	0	0	N/A	0	N/A
20	0	0	0	0	0	N/A	0	N/A
Totals	1,167,670	582,010	57,028	360	56,668		57,630	

SPREADSHEET TOOL 1: SOV, BMP AREA AND PEAK FLOW RATE ESTIMATES

Project Name: Cherokee Blvd
Date Prepared: 6/20/2014
Prepared by: 12361

=> Denotes input by user

WORKSHEET 1: SOV and BMP AREA

Stormwater Management Area = 26.80 ac
Stormwater Management Area = 1167408 ft^2
CAPTURE AREA (Sum of Disturbed Land Areas below) = 1167670 ft^2

Total Parcel Area	26.80	ac
Protected Areas		
5.2.1 Area of Protected Undisturbed and Healthy Soils	0.00	ac
5.2.1.1 Area of Minimized Land Disturbance	0.00	ac
5.2.1.2 Area of Protected Soils/Steep Slopes	0.00	ac
5.2.2 Area of Protected Natural Flow Paths	0.00	ac
5.2.3 Area of Protected/Enhanced Riparian Corridors	0.00	ac
5.2.4 Area of Protected/Preserved Vegetation	0.00	ac
Total Proteced Area	0.00	ac

Runoff Coefficients, Rv for Design Rainfall

Land Use Type	Surface Condition		1.0	1.6	2.1
-	-	-	-	-	-
Clayey Soils	Pervious		0.21	0.24	0.27
Flat Roof	Impervious		0.85	0.88	0.90
Large Impervious	Impervious		0.98	0.99	0.99
Pitched Roof	Impervious		0.97	0.99	0.99
Sandy Soils	Pervious		0.03	0.05	0.08
Small Impervious	Impervious		0.70	0.79	0.85
Typical Urban Soils	Pervious		0.12	0.15	0.18

- Large impervious includes parking lots with curbs, roads with curbs, highways, etc.
- Small impervious includes roads without curbs, small parking lots without curbs, and sidewalks.

SOV DESIGN RAINFALL (in) = 1
TARGET LOADING RATIO 10 (See Ch. 5 for details)

INITIAL TARGET BMP AREA = 58,201 ft^2

Sub-Drainage ID per BMP	Land Use Type	Surface Condition	Disturbed Land Area (ft^2)	Disturbed Land Area (ac)	Rv Value, from Table	Stay on Volume (ft^3)
1	Large Impervious	Impervious	66,650	1.53	0.98	5,443
2	Large Impervious	Impervious	74,050	1.70	0.98	6,047
3	Large Impervious	Impervious	137,650	3.16	0.98	11,241
4	Large Impervious	Impervious	103,240	2.37	0.98	8,431
5a	Small Impervious	Impervious	24,390	0.56	0.70	1,423
5b	Clayey Soils	Pervious	441,265	10.13	0.21	7,722
6a	Large Impervious	Impervious	95,830	2.20	0.98	7,826
6b	Typical Urban Soils	Pervious	24,395	0.56	0.12	244
7a	Large Impervious	Impervious	80,200	1.84	0.98	6,550
7b	Clayey Soils	Pervious	120,000	2.75	0.21	2,100

SPREADSHEET TOOL 1: SOV, BMP AREA AND PEAK FLOW RATE ESTIMATES

Project Name: Cherokee Blvd
Date Prepared: 6/20/2014
Prepared by: 12361

WORKSHEET 2: Restorative Credits

=> Denotes input by user

Restorative Volume Credit Worksheet

Sub-Drainage ID	Sub-Drainage SOV (ft^3)	Restorative Practice Credit Type	Area (ft^2)	# of Trees	Volume Credit (ft^3)	Total Volume Credit (limit to maximum of 25% of SOV) (ft^3)	Net Drainage Area SOV (ft^3)
1	5,443	Tree Planting - Deciduous	7,500	12	72	72	5,371
		None			0		
		None			0		
2	6,047	None			0	0	6,047
		None			0		
		None			0		
3	11,241	None			0	0	11,241
		None			0		
		None			0		
4	8,431	Tree Planting - Deciduous	12,000	20	120	120	8,311
		None			0		
		None			0		
5	9,145	None			0	0	9,145
		None			0		
		None			0		
6	8,070	Tree Planting - Deciduous	19,200	16	96	96	7,974
		None			0		
		None			0		
7	8,650	Tree Planting - Deciduous	17,670	12	72	72	8,578
		None			0		
		None			0		
8	0	None			0	0	0
		None			0		
		None			0		

CHEROKEE BOULEVARD - STORMWATER REPORT

SPREADSHEET TOOL 1: SOV, BMP AREA AND PEAK FLOW RATE ESTIMATES

Project Name: Cherokee Blvd
Date Prepared: 6/20/2014
Prepared by: 12361

WORKSHEET 3: BMP SIZING

=> Denotes input by user

Sub-Drainage ID	BMP Type	Runoff Storage Type	Mid-height Area (ft^2)	Depth of Storage (ft)	Storage Capacity (%)	Storage Volume (ft^3)	BMP Surface Area (ft^2)	BMP Capture Volume (ft^3)	Net Drainage Area SOV (ft^3)	Loading Ratio
1	**Stormwater Planter Box**	Surface	5,200	0.25	100%	1,300	5,200	5,460	5371	13
		Soil	5,200	1.5	20%	1,560				
		Stone	5,200	1.25	40%	2,600				
2	**Pervious Pavement**	Surface			0%	0	5,100	6,120	6047	15
		Soil			0%	0				
		Stone	5,100	3	40%	6,120				
3	**Pervious Pavement**	Surface			0%	0	9,500	11,400	11241	14
		Soil			0%	0				
		Stone	9,500	3	40%	11,400				
4	**Stormwater Planter Box**	Surface	8,000	0.25	100%	2,000	8,000	8,400	8311	13
		Soil	8,000	1.5	20%	2,400				
		Stone	8,000	1.25	40%	4,000				
5	**Pervious Pavement**	Surface			0%	0	7,700	9,240	9145	3
		Soil			0%	0				
		Stone	7,700	3	40%	9,240				
6	**Bioretention**	Surface	8,000	0.25	100%	2,000	8,000	8,400	7974	12
		Soil	8,000	1.5	20%	2,400				
		Stone	8,000	1.25	40%	4,000				
7	**Bioretention**	Surface	8,200	0.25	100%	2,050	8,200	8,610	8578	10
		Soil	8,200	1.5	20%	2,460				
		Stone	8,200	1.25	40%	4,100				

SPREADSHEET TOOL 1: SOV, BMP AREA AND PEAK FLOW RATE ESTIMATES

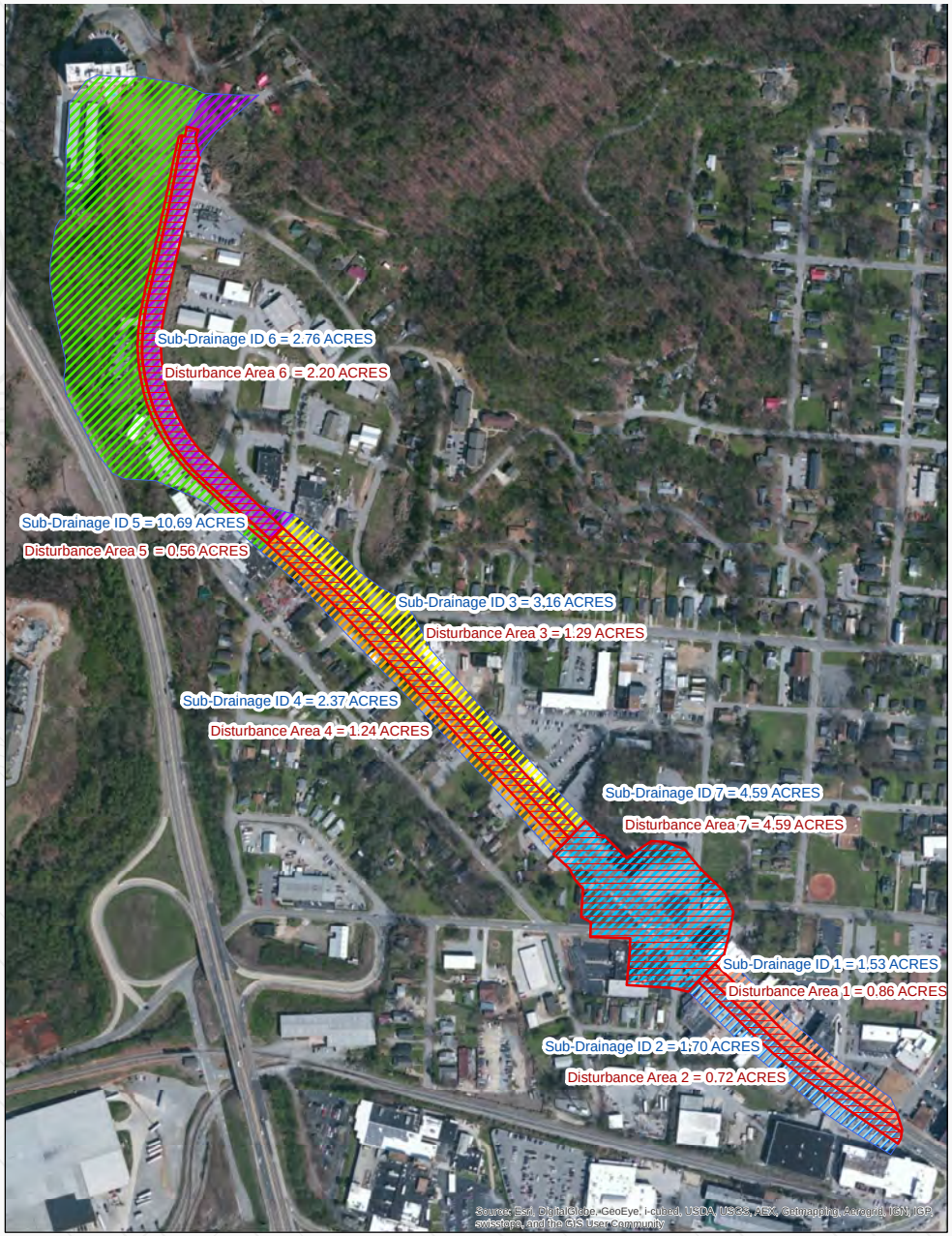
Project Name: Cherokee Blvd
Date Prepared: 6/20/2014
Prepared by: 12361

WORKSHEET 4: CN Adjustment

=> Denotes input by user

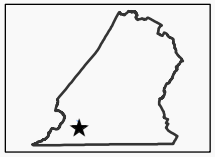
Point of Interest	Area (ft^2)	Weighted CN	Storm Frequency	Rainfall (in)	S	Q (in)	BMP Capture Volume (ft^3)	Infiltration Volume (ft^3)	Total BMP Volume Reduction (ft^3)	Q minus Total Volume Reduction (in)	Adjusted CN
1	1,167,670	82.00	10	5.10	2.20	3.17	57,630	5,170	62800	2.52	75
			25	6.00		3.99				3.34	76
			100	7.40		5.29				4.65	76
2			10		0.00	0.00			0	0.00	100
			25			0.00				0.00	100
			100			0.00				0.00	100
3			10		0.00	0.00			0	0.00	100
			25			0.00				0.00	100
			100			0.00				0.00	100
4			10		0.00	0.00			0	0.00	100
			25			0.00				0.00	100
			100			0.00				0.00	100
			10		0.00	0.00			0	0.00	100
			25			0.00				0.00	100
			100			0.00				0.00	100

CHEROKEE BOULEVARD - STORMWATER REPORT



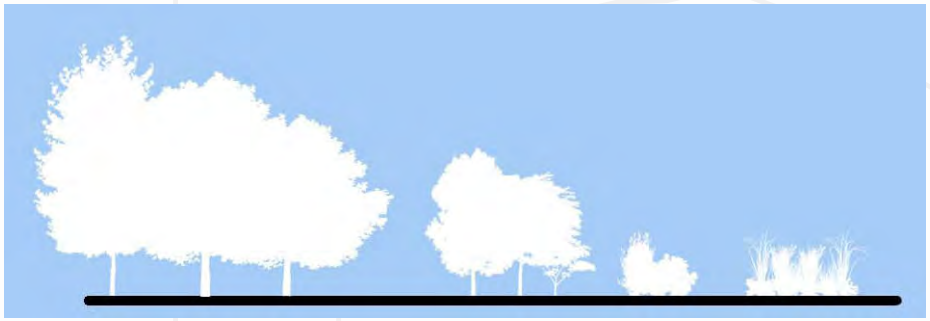
0 0.05 0.1 0.2 0.3 0.4 0.5 Miles

N



Explanation

- Disturbance Area
- Sub-Drainage ID 1
- Sub-Drainage ID 2
- Sub-Drainage ID 3
- Sub-Drainage ID 4
- Sub-Drainage ID 5
- Sub-Drainage ID 6
- Sub-Drainage ID 7



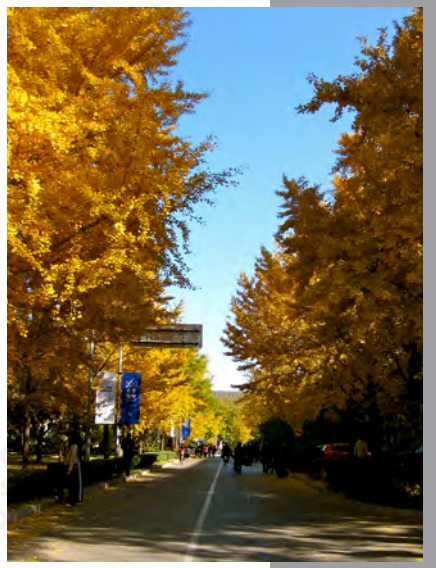
Cherokee Blvd. Streetscape – Proposed Plant Palette

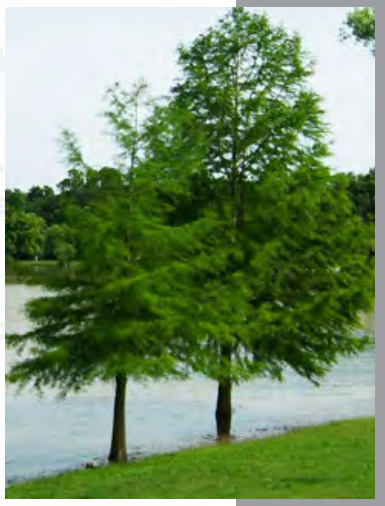
- The plant palette for Cherokee Blvd. is derived from predominantly native and drought tolerant species with a tolerance for urban conditions. This promotes lower landscape maintenance requirements and conserves water through efficient use of irrigation
- Placing the right plant in the right place relative to soil, water and sunlight creates sustainable landscape patterns.
- The landscape style for the Cherokee Streetscape is compact using columnar trees that will not require heavy pruning or shaping and will fit into tight urban spaces layered with low spreading evergreens, native perennials and ground covers for seasonal color and texture.

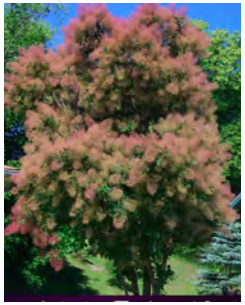
Canopy Street Trees:
Carpanus betulus 'Fastigiata' - Pyramidal European Hornbeam
Ginko biloba – Ginko Tree
Liquidambar styraciflua 'Slender Silhouette' – Sweetgum
Quercus Nattalli – Nuttall Oak
Quercus robur 'Fastigiata' – Columnar English Oak
Ulmus parvifolia – Lacebark Elm

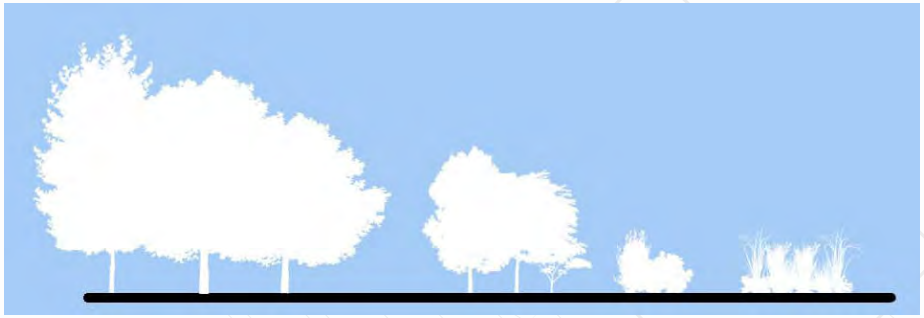
Rain Garden / Bioretention Trees
Acer Rubrum "Summer Red" - Red Maple
Taxodium distichum - Bald Cypress
Nyssa sylvatica - Black Tupelo

Street Trees Under Utility Lines:
Cercis Canadensis - Redbud
Koelreuteria paniculata - Golden Rain Tree
Cotinus obovatus - American Smoke Tree









Cherokee Blvd. Streetscape – Proposed Plant Palette

Native and Drought tolerant Plants for an Urban Setting

<u>Shrubs and evergreen:</u>
Abelia grandiflora 'Little Richard' - Dwarf Abelia
Ilex vomitoria "Nana"- Dwarf Yaupon Holly
Itea virginica 'Little Henry' - Dwarf Virginia Sweetspire
Juniperus horizontalis 'Plumosa Compacta' - Andorra Juniper
Lagerstroemia indica 'Gamad' - Dwarf Crape Myrtle
Spiraea x bumalda 'Limemound' - Limemound Spirea

<u>Rain Garden / Shrubs/ Perennials</u>
Ilex Glabra 'Shamrock' – Shamrock Inkberry Holly
Ilex verticillata 'Red Sprite' - Red Sprite Winterberry Holly
Iris virginica - Southern Blue Flag Iris
Hemerocallis species - Pardon Me Daylily
Panicum virgatum 'Northwind' - Northwind Switchgrass

<u>Perennials and Ornamental Grasses</u>
Artemisia species - Silver Mound
Coreopsis verticillata - Moonbeam Coreopsis
Dianthus species - Pinks
Liriope - Big blue Lillyturf
Panicum virgatum 'Heavy Metal' - Heavy Metal Switchgrass
Phlox subulata - Creeping Phlox
Rosmarinus officinalis 'Tuscan Blue' - Rosemary