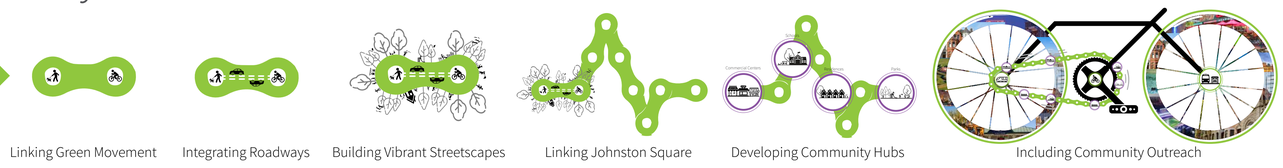
Tori Frydrych | LARCH 414: Baltimore | Spring 2018 | Penn State University

TRANSPORTATION REDESIGN

BRINGING LIFE TO THE STREETS OF JOHNSTON SQUARE

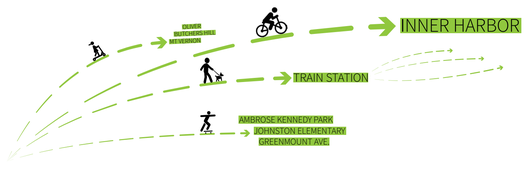


PROJECT GOALS

GOAL 1:

AN INTEGRATED COMMUNITY.

Native plantings will liven the streetscape, bringing seasonal interest and educational opportunities for residents and create habitats for insects, small mammals, and birds.



GOAL 2:

CREATING CONNECTIONS.

A livened streetscape will result in more pedestrian and cyclist traffic in Johnston Square which will allow for further green transportation and connections to other areas of Baltimore.

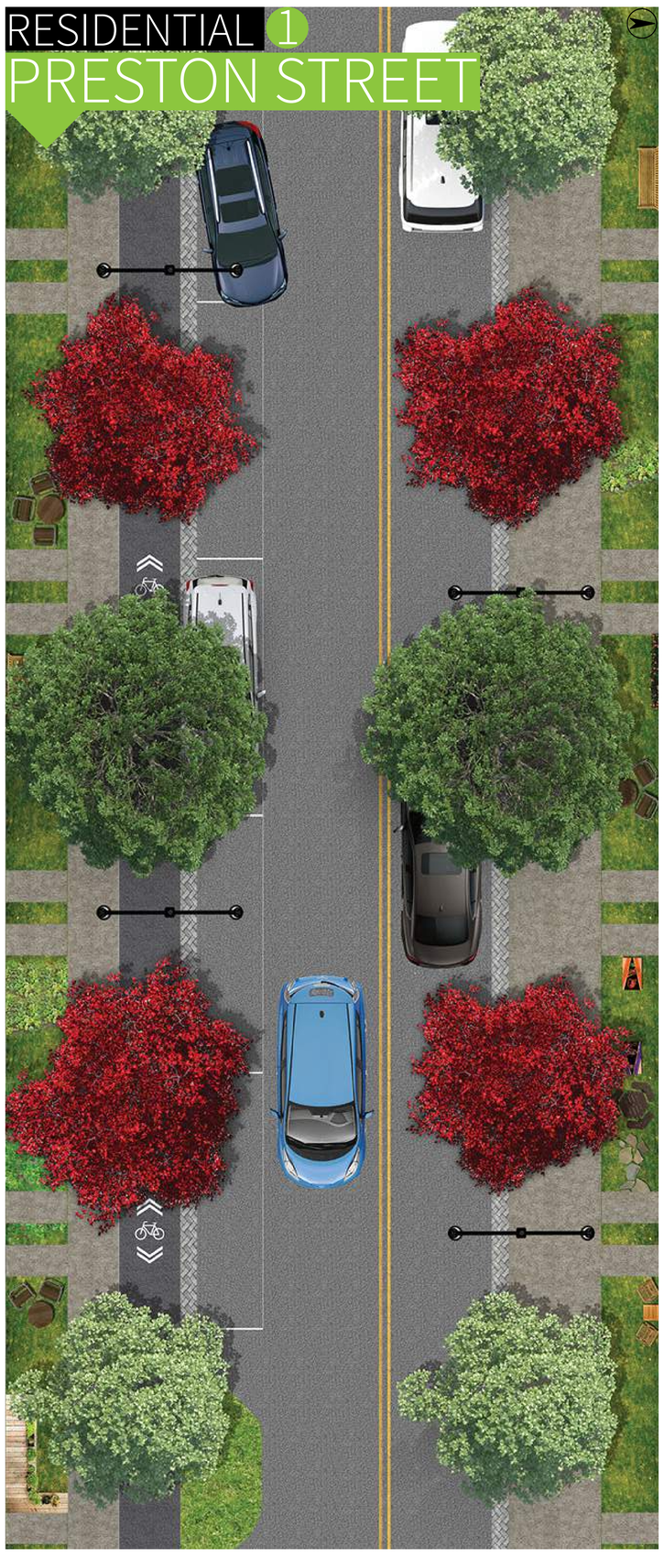
PROJECT SITES

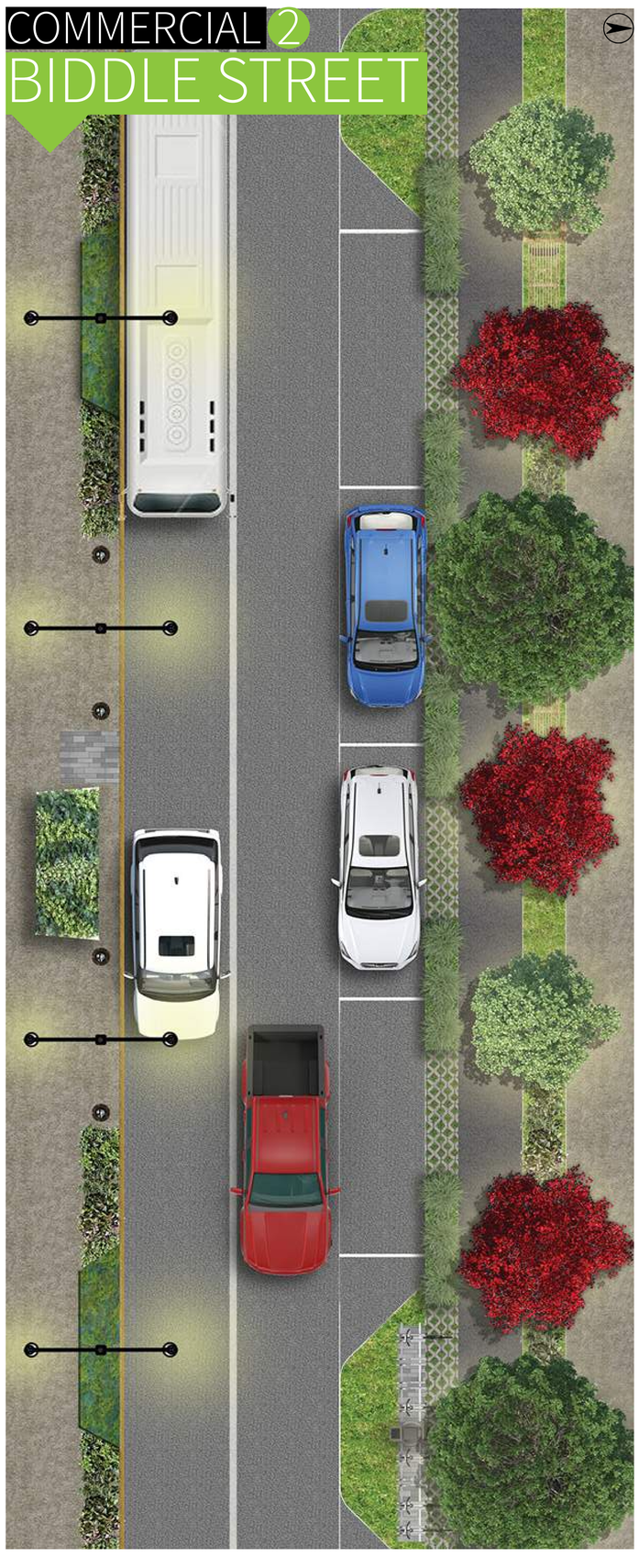
Within Johnston Square, there are three areas of focus for the transit redesign. These models can then be repeated in other like areas within the community. First, a residential street with lower traffic volumes and row homes on both sides of the street was reconfigured. On Preston Street, this scheme can be repeated in areas with dense housing, even if it is occurring on just one side of the roadway. The second area of focus is a main street with higher traffic volumes and more of a commercial presence. This module can continue the length of Biddle Street as well as portions of Greenmount Ave. and Chase Street. Lastly, an intersection was redesigned to show how these two scheme could meet together. This intersection design can be implemented in all other intersections throughout the neighborhood.

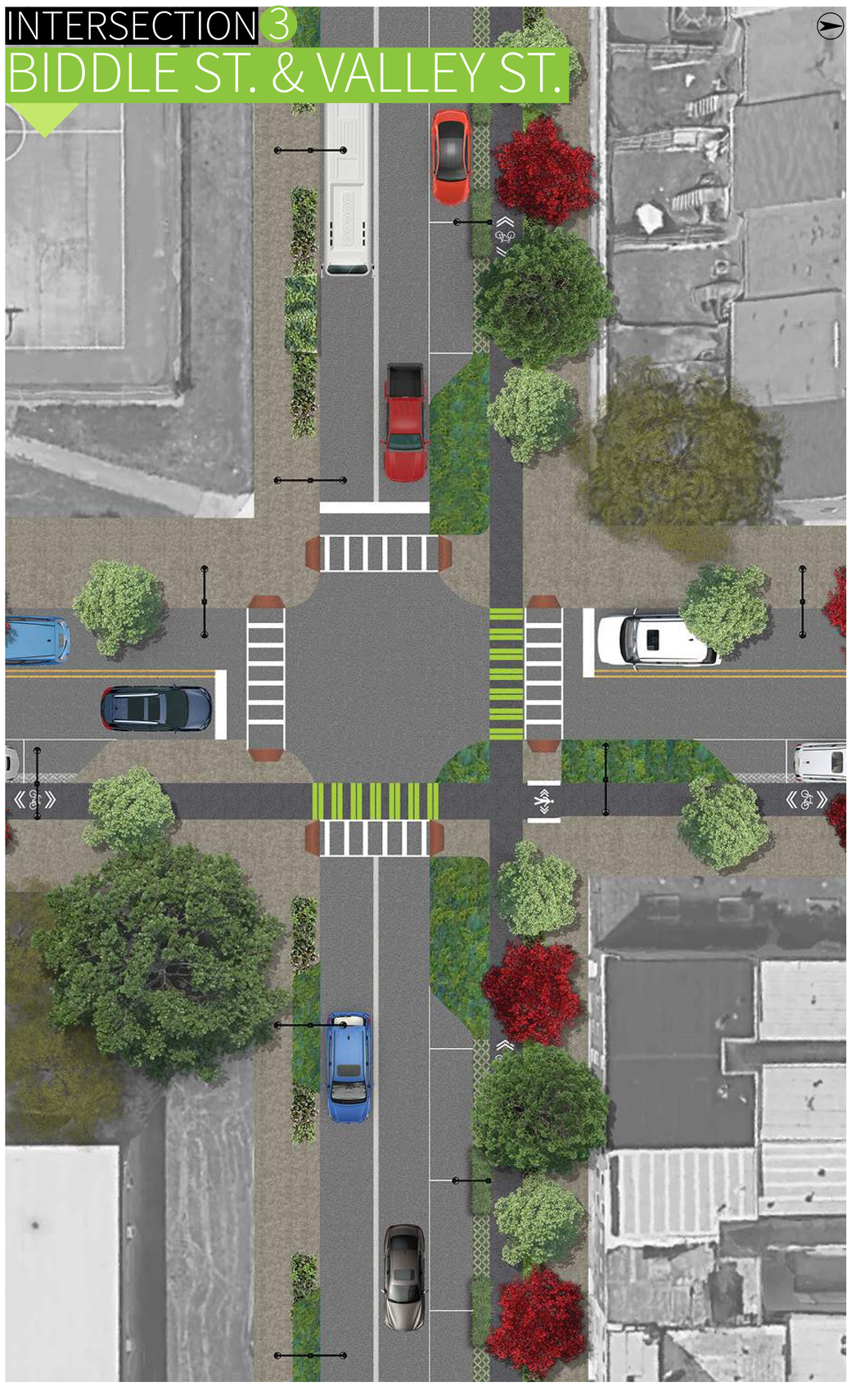
The residential redesign involves the addition of personal, outdoor spaces for each residence. Although small, these areas can be personalized by each resident to create small gardens, outdoor seating areas, or areas of activity and interaction. These spaces can then connect, increasing the permeable surface and opportunities for residences to connect to nature and each other. Pedestrian walkways and cycle lanes are slightly smaller than on the main roadway design but are still within acceptable national standards.

On Biddle Street, the higher traffic roadway design, there were some adjustments made to both the sidewalk zone and driving lanes. The proposed pedestrian and cyclist zone on the left side of the roadway now extends about 10' further into the roadway than the existing condition. Parallel parking was eliminated on this side of the street to allow this to happen and was moved to secondary roadways. The drive lanes were tightened but are still within acceptable national standards. The Urban Street Design Guide was utilize to determine the widths of the different zones across the streetscape with particular attention reducing traffic speed and increasing pedestrian and cyclist safety. Here, it was the focus to better facilitate community interaction.

The intersection of Biddle and Valley Street demonstrates how to connect the two street models together. Safety is enhanced through divided pedestrian and cyclist crosswalks and the addition of bioretention areas allows for stormwater to be cleansed and infiltrated instead of entering existing storm inlets. These intersection modules can be altered depending on the roadway modules being joined however the major elements and configuration will remain consistent.







RESIDENTIAL STREETSCAPE

AN INTEGRATED COMMUNITY.

- EDUCATIONAL OPPORTUNITIES
- INCREASED PHYSIOLOGICAL BENEFITS
- REDUCE HEAT ISLAND EFFECT
- INCREASED CONNECTION TO NATURE
- REDUCE GREENHOUSE GAS EMISSIONS
- INCREASED BIODIVERSITY
- REDUCE EXPOSURE TO UV RAYS

CONNECTING TO EACH OTHER.

FRONT YARDS

Row homes being rehabilitated will find new life with outdoor furnishings and life brought to the sidewalks of Johnston Square.

Looking at the transformation of Preston Street, the distinction of the frontage zone with yards, pedestrian walkway, buffer zones, and bike lanes create a dynamic area for movement and engagement of the community. Complete with planting and site furnishings, this enhanced sidewalk will encourage more people to walk and bike rather than drive a car around the neighborhood of Johnston Square.

CONNECTING TO NATURE.

PLANTING

TREES

Freeman Maple
Acer freemanii

Ideal for street trees and rain gardens
40-50' height, 20-40' spread
Full to part shade
Fall bloom, greenish yellow to vibrant red
Tolerant to range to soil conditions
Low maintenance
Great habitat for insect pollinators

Maackia
Maackia amurensis

Ideal for street trees, provide shade
20-30' height, 20-30' spread
Full to partial shade
June bloom, showy white flower, fragrant
Tolerant to acidic and alkaline soils
Low maintenance
Great provider for pollinator species

Common Hackberry
Celtis occidentalis

Ideal for street planting, residential
40-60' height, 40-50' spread
Full to partial shade
Tolerant to variety of soil conditions
Berries ripen, persists through winter
Attracts bird species for berries/nesting

GROUNDCOVER

Bush Honeysuckle
Diervilla lonicera

Ideal for street planting, residential
40-60' height, 40-50' spread
Full to partial shade
Tolerant to variety of soil conditions
Berries ripen, persists through winter
Attracts bird species for berries/nesting

St. John's Wort
Hypericum calycinum

Suggested use: Groundcover
1-1.5' height, 1.5-2' spread
Full sun to partial shade
July to August bloom, yellow flower
Drought and erosion tolerant
Low maintenance

Meadowsweet
Spiraea alba

Suggested use: Hedge or Rain Garden
3-4' height, 3-4' spread
Full sun to partial shade
June to August bloom, showy flower
Thrives in wet soils
Low maintenance
Attracts butterflies and pollinators

GRASSES

Feather Reed Grass
Calamagrostis × acutiflora 'Karl Foerster'

3-5'' height, 1.5-2.5' spread
Full sun
May to February bloom, pink/purple
Dry to moderately wet soils
Low maintenance
Attracts birds

Eulalia
Miscanthus sinensis 'Gracillimus'

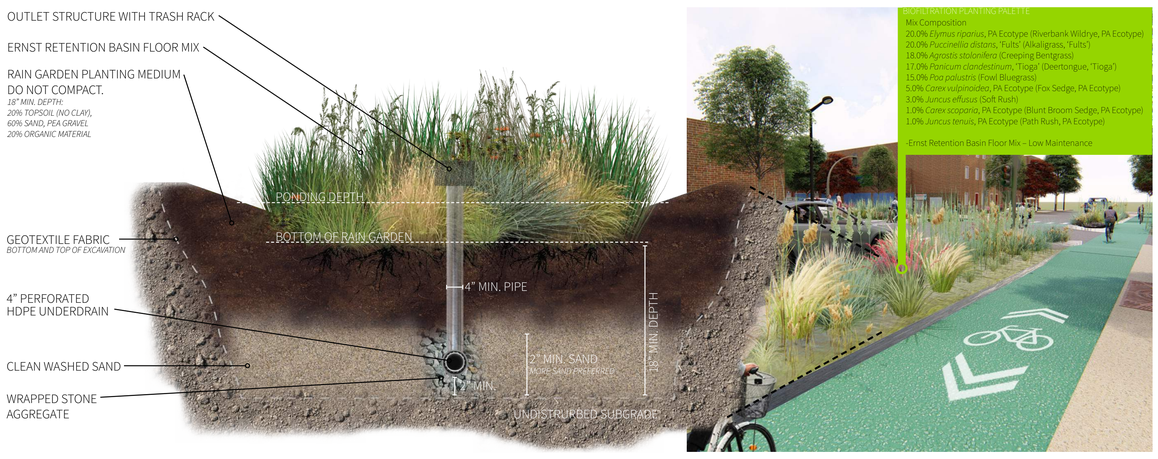
4-7' height, 3-6' spread
Full sun to partial shade
August to February bloom, silver
High winter interest
Low maintenance
Attracts birds

Fountain Grass
Pennisetum alopecuroides

2.5-5' height, 2.5-5' spread
Full sun to partial shade
July to February bloom, silver/pink
High Fall Interest
Low maintenance
Attracts birds

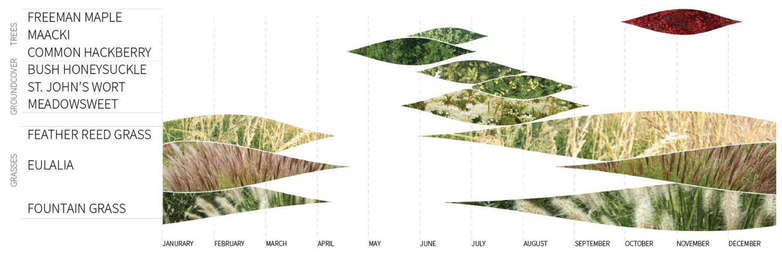
EDUCATION

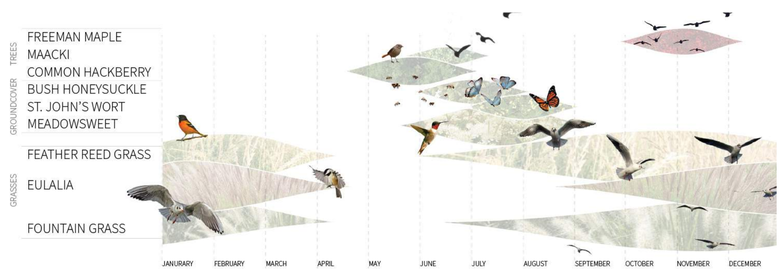
BIORETENTION CONSTRUCITON



Bioretention areas within the intersections have a detention volume of the first two inches of rainfall that will fall in the intersection. This equals roughly 710 cubic feet of rainfall that would have otherwise gone into storm drains unfiltered. Using the recommended wetland planting palette, the stormwater runoff will be cleansed before it is naturally infiltrated into the ground or over flows into storm drains during large storm events. At these intersection locations, education signage will be located to display how the rain garden functions, the benefits they provide, what species are growing, and how people could mimic some of these actions on their own property.

BLOOM SCHEDULE





The three planting zones will create a layered effect that will bring life, both ecological and human, as the different species bloom at varying times of the year. This will create a changing landscape year round, meaning the appearance and ecological function of the living complete street will change as well. Birds will find habitat and berries in the winter while pollinator species will thrive through the summer months.

PLANTING DETAIL

Street trees along high-traffic roadways should be planted using Silva Cells due to increased compaction from heavy vehicular traffic. Silva Cells could then be implemented on secondary roadways in additional construction phases.

	STANDARD TREE PLANTING	SILVA CELL PLANTING
INSTALLATION COSTS:	~$4,000/TREE	~$14,000/TREE
MAINTENANCE COSTS:	~$1,200/TREE	~$2,300/TREE
LIFECYCLE COSTS:	~$-2,000/TREE	~$+25,000/TREE

Because traditional planting of street trees have a life span of 10 years, they must be replanted which over a 50 year time span, equates to a loss of money. Silva Cell trees have a life span of 50 years so there is a total of almost $25,000 saved from replanting costs.

MARRITZ, LEDA, and James Urban. "Silva Cell Research Part 1: Study Design and Raw Growth Results." Green Infrastructure, DeepRoot, 27 Mar. 2017, www.deeproot.com/blog/blog-entries/silva-cell-research-part-1-study-design-and-raw-growth-results.

EDUCATIONAL SIGNAGE

There are three major layers to the overall planting schemes of the roadway designs. Three trees were chosen, specifically for their size differences, their summer bloom times and fall interest, and the ecological benefits they provide. All three will provide nesting areas for birds and will attract pollinators in the summer. Through the winter, the Hackberry will provide berries for any birds still remaining in the area. The groundcover species were chosen for their varying height and spread and their peak bloom times, which will bring seasonal interest for both people as well as different pollinator species. The planters will occur between the trees and groundcover and will attract mainly birds throughout the year with the varying bloom times. The whispy nature of the grasses will also create a strong barrier that is still visually permeable to increase safety for bikers and drivers. The overall additions of these species will increase tree canopy coverage by 60,000 square feet and add to the positive environmental and social impacts to the neighborhood. Education in these areas can occur via signage highlighting species growing and organisms creating their habitats. Ideas can also spread through the community via word of mouth as residents interact along the new streetscape.

COMMERCIAL STREETSCAPE

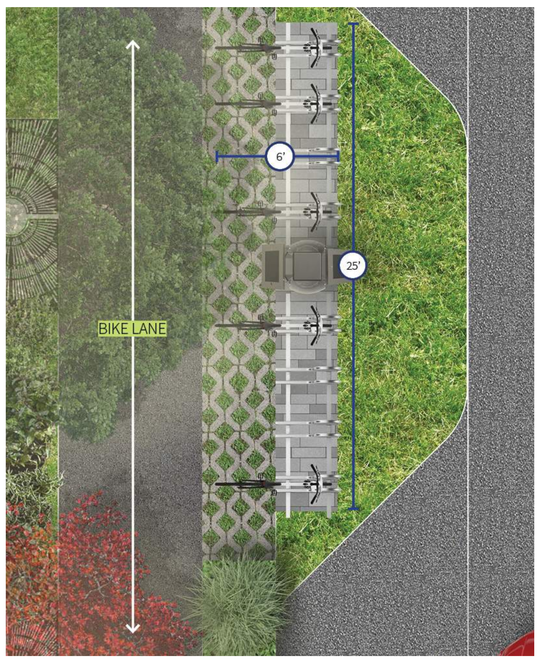
AN OUTWARD FOCUS.

- EDUCATIONAL OPPORTUNITIES
- INCREASED PHYSIOLOGICAL BENEFITS
- REDUCE HEAT ISLAND EFFECT
- INCREASED CONNECTION TO NATURE
- REDUCE GREENHOUSE GAS EMISSIONS
- INCREASED BIODIVERSITY
- REDUCE EXPOSURE TO UV RAYS
- IMPROVED APPEAL OF RETAIL
- INCREASED PROPERTY VALUE
- AID IN STORMWATER MANAGEMENT

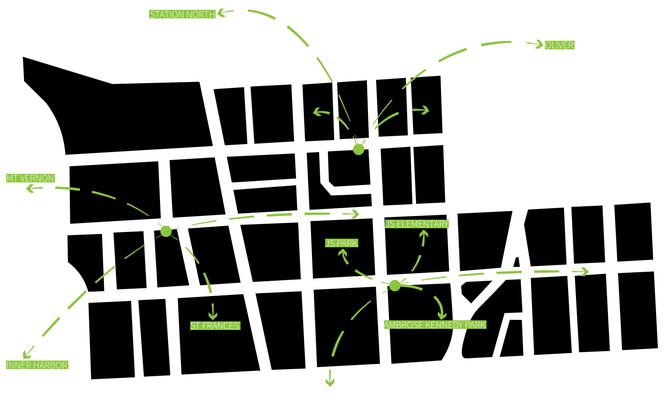
CONNECTING TO BALTIMORE.

BIKE SHARE LOCATIONS

BUS STOPS



PROPOSED BIKE SHARE LOCATIONS



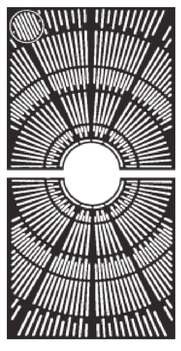
Bike share locations are solar powered and compacted, making them perfect to place on the bump out areas into the parallel parking zones. People can pick up these bikes, ride them to other stations, and return them along their next trip. This will encourage those who do not own a bike to utilize green transportation. The green energy use will increase the positive environmental aspects and also increase the educational opportunities within the neighborhood. Additional planting strategies can be investigated and implemented to better serve the ecology of the community.

A layered design was adapted for the bus stop, similar to the layered design of the vegetation. The inner layer is covered in moss, which is a major sequester of carbon. It is in the inner layer because it prefers a moist, shaded habitat to grow. This amount of moss would be similar to the effect of 275 trees and their ability to reduce air pollution and the effects of carbon. The outer layer includes both a green roof and green wall with different plant species in both. These areas will also provide similar positive environmental mitigations and will attract a wide variety of species. A glass interpretive panel with information on the three planting types and the species you might see while you wait for the bus is also included in the design. Rainwater will be captured to aid the plants however additional water sources may be needed. At night, the inner panel of the top of the bus stop will illuminate, creating a safe place for those waiting for a ride.

HARDSCAPE AND PAVEMENT DETAILS.

CHASE PARK LITTER RECEPTACLE
LANDSCAPE FORMS

These trash and recycle receptacles have a sleek and timeless design. It is a product from a large manufacturer so it will decrease the cost over a custom design. They will be spaced evenly down roadways and be easy to access at intersections to eliminate litter in Johnston Square.



STAR BURST TREE GRATE
IRON SMITH

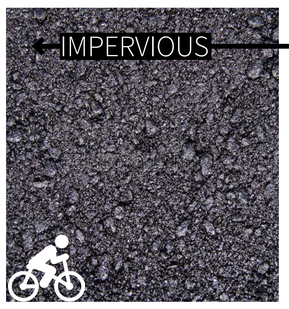
This tree grate was chosen for its larger size that will accommodate the growing area required for all three tree species. It is easy to install and maintain. It is a product from a large manufacturer so it will decrease the cost over a custom design.

PALISADE BENCH
LANDSCAPE FORMS

These benches will be found in the buffer zone on main roads and are accessible from both sides. It is easy to install and maintain. It is a product from a large manufacturer so it will decrease the cost over a custom design.

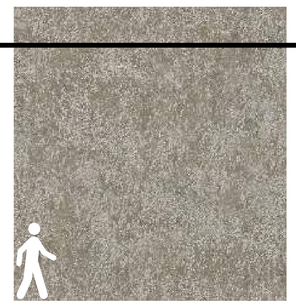
GUIDE BOLLARD | FROG
LANDSCAPE FORMS

These bollards will be located on secondary roadways where the bike lane is not strongly separated from the parallel parking lane. They will help to provide visual ques and physical separation to both those parking and those riding along side parked cars as to the limits they are both confined to.



ASPHALT

Asphalt will be used for bike lanes to provide a smooth and safe surface for cyclists. Permeable pavements could be used but may not be as durable as traditional asphalt. Maintenance will be less than that of roadways because of less heavy volume usage.

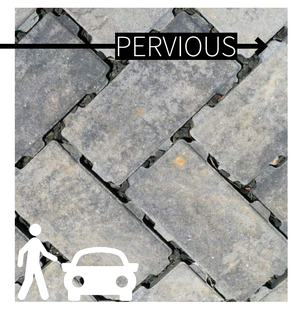


CONCRETE

Permeable pavement will be used for pedestrian walkways. This will provide environmental benefits and will be one of the first locations in Baltimore that this pavement type can be found within neighborhoods.

PERMEABLE PAVERS

Permeable pavers will be used in buffer zones. Here, there will be little foot traffic and no vehicular or cyclist traffic moving over them. They will require maintenance but with little wear and tear on them, it will be easily manageable.



PERMEABLE PAVERS

These permeable pavers will be used on the side of roadways to help collect and direct stormwater, allowing it to infiltrate into the ground instead of entering a storm drain. They will be found in the buffer zones of roadways and will receive some traffic on them, meaning they have to be more durable than the other permeable pavers and may require more maintenance.

INTERSECTION STREETSCAPE

CREATING SAFE LINKS.

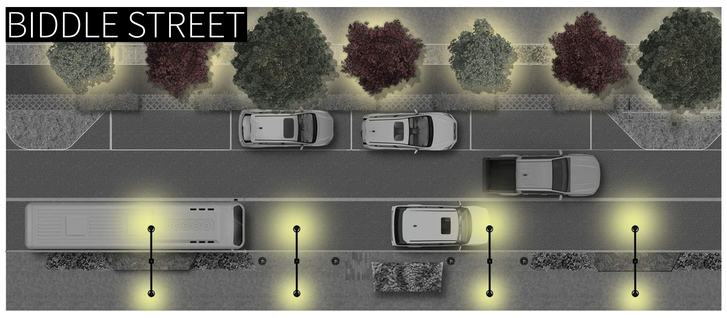
- EDUCATIONAL OPPORTUNITIES
- INCREASED PHYSIOLOGICAL BENEFITS
- REDUCE HEAT ISLAND EFFECT
- INCREASED CONNECTION TO NATURE
- REDUCE GREENHOUSE GAS EMISSIONS
- INCREASED BIODIVERSITY
- REDUCE EXPOSURE TO UV RAYS
- IMPROVED APPEAL OF RETAIL
- INCREASED PROPERTY VALUE
- AID IN STORMWATER MANAGEMENT

BIDDLE & VALLEY MODULE

SAFETY

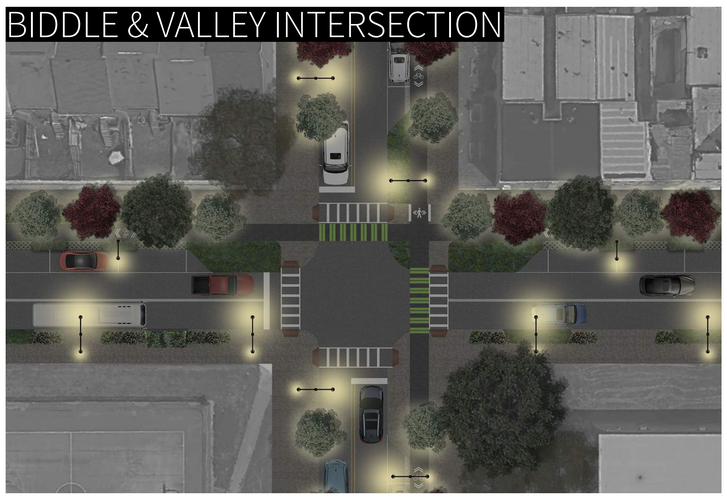
LIGHTING

BIDDLE STREET



PRESTON STREET

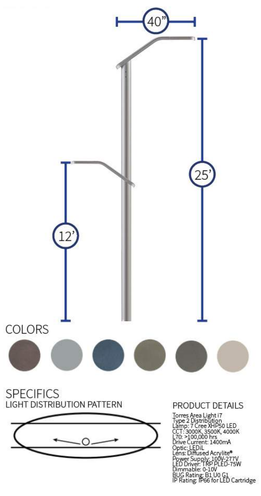
BIDDLE & VALLEY INTERSECTION



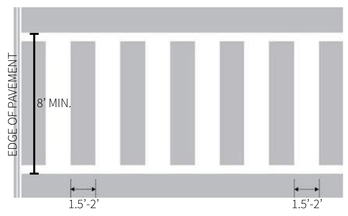
INTERSECTION SPECIFICS

TORRES AREA LIGHT I7

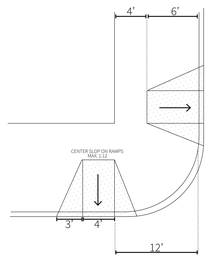
The type II distribution is used for wide walkways, on ramps and entrance roadways, as well as other long, narrow lighting. This type is meant for lighting larger areas and usually is located near the roadside. You'll find this type of lighting mostly on smaller side streets or jogging paths.
Type II light distributions have a preferred lateral width of 25 degrees. They are generally applicable to luminaires located at or near the side of relatively narrow roadways, where the width of the roadway does not exceed 1.75 times the designed mounting height.



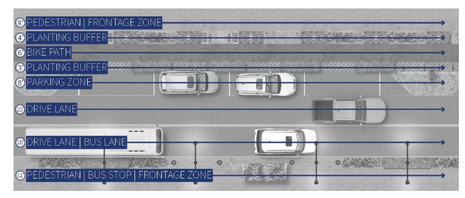
CROSSWALK



ACCESSIBLE RAMP



ROADWAY



SIGNS & SYMBOLS

TWO WAY BIKE SYMBOL

Printed on pavement in bike lane every 50-100 feet for every strech of the bike line that is 250' or longer.

CONFIRMATIONAL SIGN

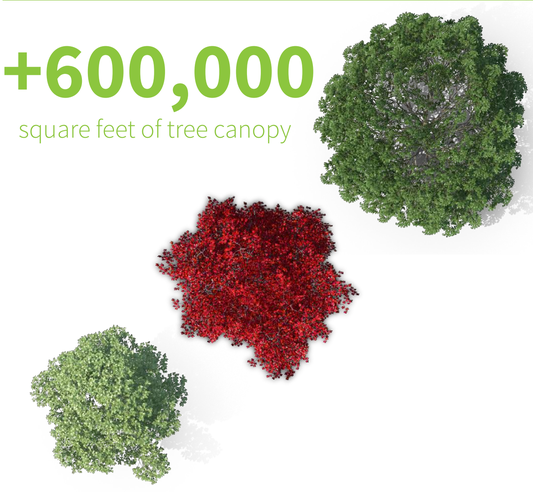
Every ¼ to ½ mile on off-street facilities and every 2 to 3 blocks along bicycle facilities, unless another type of sign is used (e.g., within 150 ft of a turn or decision sign). Should be placed soon after turns to confirm destination(s). Pavement markings can also act as confirmation that a bicyclist is on a preferred route.

TURN SIGN

Near-side of intersections where bike routes turn (e.g., where the street ceases to be a bicycle route or does not go through). Pavement markings can also indicate the need to turn to the bicyclist.

BENEFITS OF TRANSPORTATION REDESIGN

+600,000
square feet of tree canopy



+10
new native species being added to the streetscape

+24
bikes for residents to share
= 0 EMISSIONS TO ENVIRONMENT

x11
= **2,640 metric tons**
of CO_2 removed per year

INCREASES IN

- EDUCATIONAL OPPORTUNITIES
- INCREASED PHYSIOLOGICAL BENEFITS
- INCREASED CONNECTION TO NATURE
- INCREASED BIODIVERSITY
- IMPROVED APPEAL OF RETAIL
- INCREASED PROPERTY VALUE
- AID IN STORMWATER MANAGEMENT

DECREASES IN

- REDUCE EXPOSURE TO UV RAYS
- REDUCE HEAT ISLAND EFFECT
- REDUCE GREENHOUSE GAS EMISSIONS

+710
cubic feet detention volum per intersection