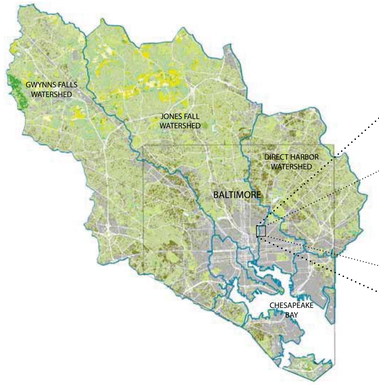
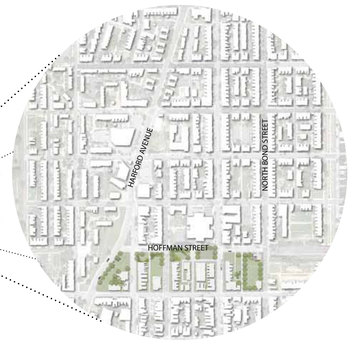
Rethinking Our Waterways: Reclaiming Baltimore's Oliver Neighborhood

CONTEXT

CONCEPT

Approximately seventy percent of water pollution in the United States comes from non-point sources of urban runoff. Specifically within the Chesapeake Bay Watershed, in which the city of Baltimore, Maryland is located, nitrogen, phosphorus, and sediment are the largest sources of pollutants affecting its waterways. When rain falls on impervious surfaces large volumes of water quickly carry these pollutants off paved areas and compacted soils. This polluted stormwater then enters our waterways and returns to the hydrologic cycle resulting in acid rain and contamination of water sources. The proposed design for the Oliver Neighborhood utilizes the BES Education Research Agenda, Longterm Ecological Research Study, Biodiversity and Pollinators within Baltimore, as well as the BES Public Health Working Group as a platform for the implementation of an ecological corridor within the Oliver Neighborhood. This proposal aims to transform vacant lots within the Oliver Neighborhood in order to improve local water quantity and quality issues, enhance quality of life, and encourage environmental awareness. By creating a visible and legible water trail through the implementation of low-impact stormwater solutions, water can be celebrated as a site amenity and used as a tool for education. The proposed design also aims to amend soil conditions and improve ecological function along the corridor by using a variety of native plant types suitable for urban conditions. By creating awareness about our waterways within the Oliver Neighborhood it will help inform, provide assistance, and inspire development strategies for enhancing and communicating the values of the Chesapeake Bay and it's watershed.





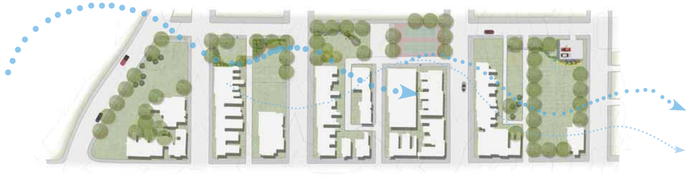
OLIVER NEIGHBORHOOD

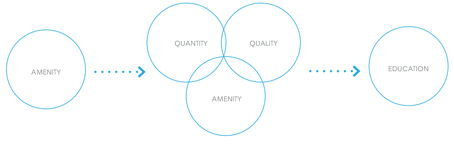
SITE DRAINAGE

PROPOSED MASTERPLAN

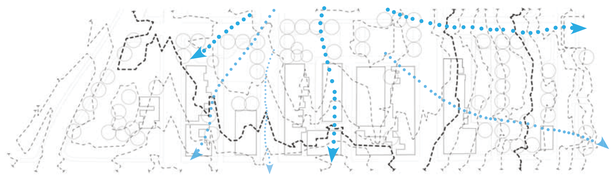
5 10 15 30

CONCEPT | VISIBLE STORMWATER TRAIL ALONG CORRIDOR





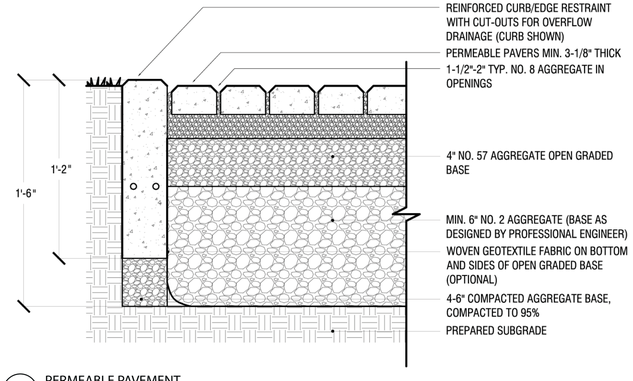
EXISTING SITE DRAINAGE



Water naturally drains to from higher elevations to those of lower elevation. Specifically within the Oliver Neighborhood water drains into its southeast corner, making the Hoffman Corridor an ideal location for the implementation of a variety of low-impact stormwater solutions. Rain gardens, bioswales, permeable pavement, and infiltration trenches will be incorporated onto vacant lots along East Hoffman Street in an effort to reduce storm drain loads during heavy storms, naturally filter polluted runoff, recharge groundwater supplies, and protect nearby waterways from further pollution. Furthermore these capture areas will create a visible water trail along the corridor, creating opportunities for community members to develop an understanding of the metropolis as an ecological system.

PROPOSED STORMWATER CALCULATIONS

Proposed Lot	Existing Conditions	Proposed Conditions	Total Reduction
Site One - Rain Garden			
Lot Discharge (cf)	215	139	35.30%
Lot Peak Discharge (cfs)	0.07	0.04	38.50%
Total Peak Discharge (cfs)	0.08	0.07	17.30%
Total Detention Required (ft3)	148	0.05	23.00%
Average Annual Discharge (acre ft)	0.05	0.04	Recharge increase by 0.01%
Site Two - Caroline and Hoffman Park			
Lot Discharge (cf)	298	179	39.9%
Lot Peak Discharge (cfs)	0.09	0.05	43.10%
Total Peak Discharge (cfs)	0.13	0.11	15.50%
Total Detention Required (ft3)	225	180	20.00%
Average Annual Discharge (acre ft)	0.08	0.07	Recharge increase by 0.01%
Site Three - Permeable Parking Lot			
Lot Discharge (cf)	547	332	39.20%
Lot Peak Discharge (cfs)	0.16	0.09	42.80%
Total Peak Discharge (cfs)	9.63	7.3	24.10%
Total Detention Required (ft3)	24,090	16,858	30.00%
Average Annual Discharge (acre ft)	6.46	4.90	Recharge increase by 0.97%



1 PERMEABLE PAVEMENT
SCALE: 1-1/2" = 1'-0" DETAIL

1 acre

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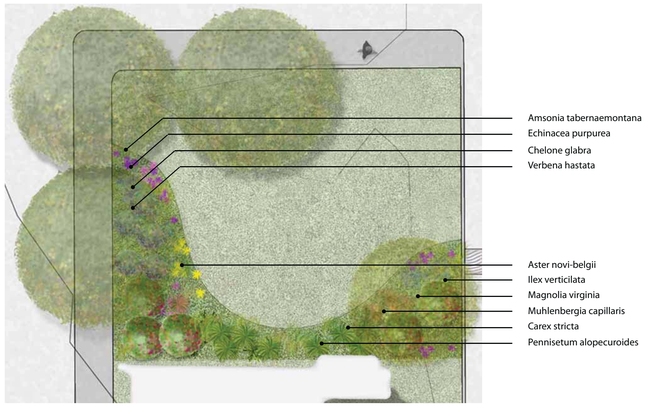
SECTION A:A' - COMMUNITY RAIN GARDEN

RAIN GARDEN NEAR HOUSE OF GOD IN CHRIST FOR ALL

Water flowing from the roof of the church, as well as stormwater running onto the site, flows into the rain garden located on this particular vacant lot. Since the soils within the Oliver Neighborhood have a low-infiltration rate, a layer of gravel and a perforated pipe are included to convey excess water off of the site. Excess water may also follow the visible trail by flowing across Hubbard Alley underneath a metal grate and into another rain garden located on the adjacent lot.

1 acre

SUGGESTED PLANTING PLAN FOR COMMUNITY RAIN GARDEN

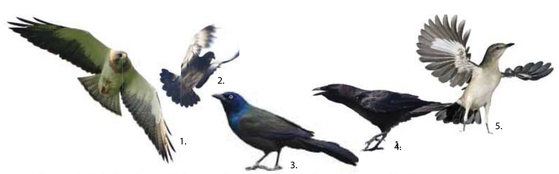


NATIVE PLANT SCHEDULE AND MATRIX

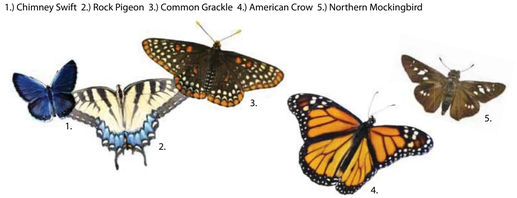
Scientific Name Common Name	Light	Height	Spread	Effective Season	Wildlife Value	Characteristics
Herbaceous Perennials						
Amsonia hubrechtii Narrow-Leaf Blue-Star Flower	Partial Sun-Shade	2'-3'	2'-3'	April-May	Butterflies, Beneficial Insect	Attracts butterflies, Showy powder-blue flowers
Amsonia tabernaemontana Blue-Star Flower	Full Sun-Partial Shade	1'-2'	.5'-1'	April-May	Butterflies, Beneficial Insect	Year-round interest, Showy power-blue flowers
Aster novi-belgii New York Aster	Full Sun	1'-1.5'	1'-1.5'	April-September	Butterflies, Beneficial Insects, Birds	Butterfly attractant, Rabbit resistant
Chelone glabra White Turtlehead	Full Sun-Partial Shade	2'-3'	1'-2'	July-October	Butterflies, Beneficial Insects, Song Birds	Host for Baltimore Checkerspot Butterfly
Echinacea purpurea Purple Coneflower	Full Sun	2.5'-3.5'	2'-3'	May-June	Butterflies, Birds	Butterfly attractant, Winter interest
Verbena hastata Blue Vervain	Full Sun-Partial Shade	1.5'-5'	1.5'-5'	June-October	Butterflies, Beneficial Insects, Song Birds	Bright flowers, Herbal uses
Shrubs						
Ilex verticilata Winterberry	Full Sun-Partial Shade	6'-8'	6'-8'	June-February	Song Birds, Small Mammals	Long-lasting clusters of bright red fruit
Grasses						
Carex stricta Tussock Sedge	Full Sun-Partial Shade	2'-3'	3'-5'	May-August	Butterflies, Beneficial Insects, Birds	Provides habitat and cover for birds, Larval food source
Muhlenbergia capillaris Pink Muhly Grass	Full Sun-Partial Shade	3'-4'	1'-3'	September-November	Butterflies, Beneficial Insects	Year-round interest, Showy flowers and foliage
Pennisetum alopecuroides Fountain Grass	Full Sun-Partial Shade	2.5'-5'	2.5'-5'	July-February	Birds	Good fall color, Drought tolerant
Trees						
Magnolia Virginia Sweet Bay Magnolia	Full Sun-Shade	12'-30'	12'-30'	May-October	Butterflies, Beneficial Insects, Birds	Semi-evergreen, Tolerates occasional flooding

ESTABLISHMENT OF HABITAT CONNECTIONS

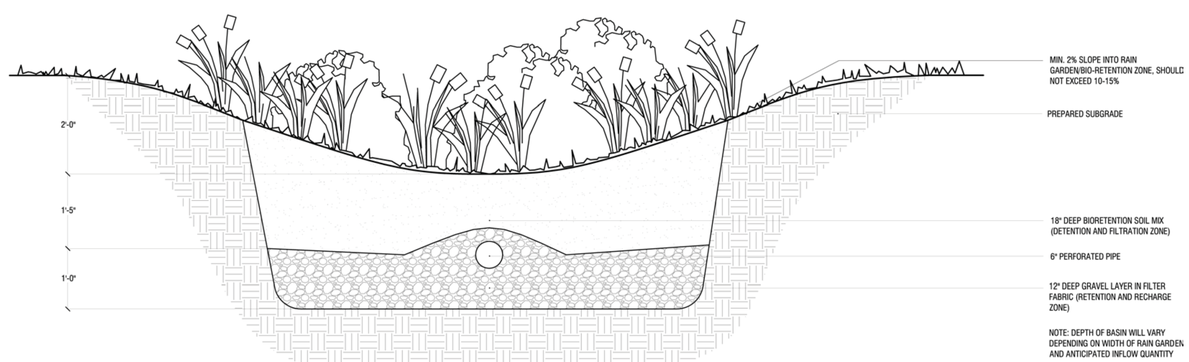
The Baltimore Ecosystem Study's (BES) focus on soil fauna, bird habitat, and conservation of insects and pollinators within Baltimore directly influenced this project because soil, habitat, and vegetation are impacted by the longterm effects of water quantity and quality. Existing soils within Baltimore include clay soils with low-infiltration rates and high amounts of pollutants. Since these soils do not capture water naturally, the soil will be amended with a rain garden mix (50-60% sand, 20-30% topsoil, and 20-30% organic matter). By amending this soil native trees and perennials suitable for urban and/or riparian conditions can be included on site, therefore fostering the inclusion of fauna back into the soil. By planting native trees, shrubs, perennials, and grasses, insects and birds will be attracted back into the neighborhood (see list of native butterflies and birds). Diversity of these species will increase as green space, floral abundance, floral diversity, shade, and sunlight increase. These spaces can then serve this study as an outdoor laboratory, providing the opportunity to provide awareness about how developed landscapes can provide a variety of ecosystem services.



1.) Chimney Swift 2.) Rock Pigeon 3.) Common Grackle 4.) American Crow 5.) Northern Mockingbird



1.) Eastern Tailed Blue Butterfly 2.) Giant Swallowtail Butterfly 3.) Baltimore Checkerspot Butterfly 4.) Monarch Butterfly 5.) Brazilian Skipper Butterfly



2 COMMUNITY RAIN GARDEN
SCALE: 1/3" = 1'-0" DETAIL

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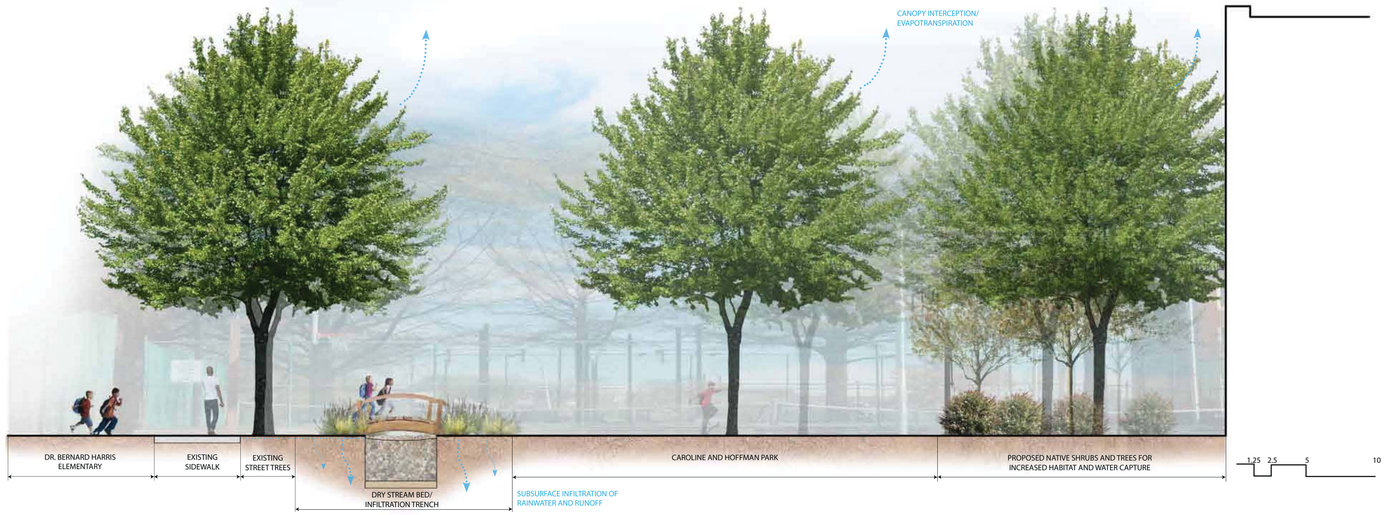
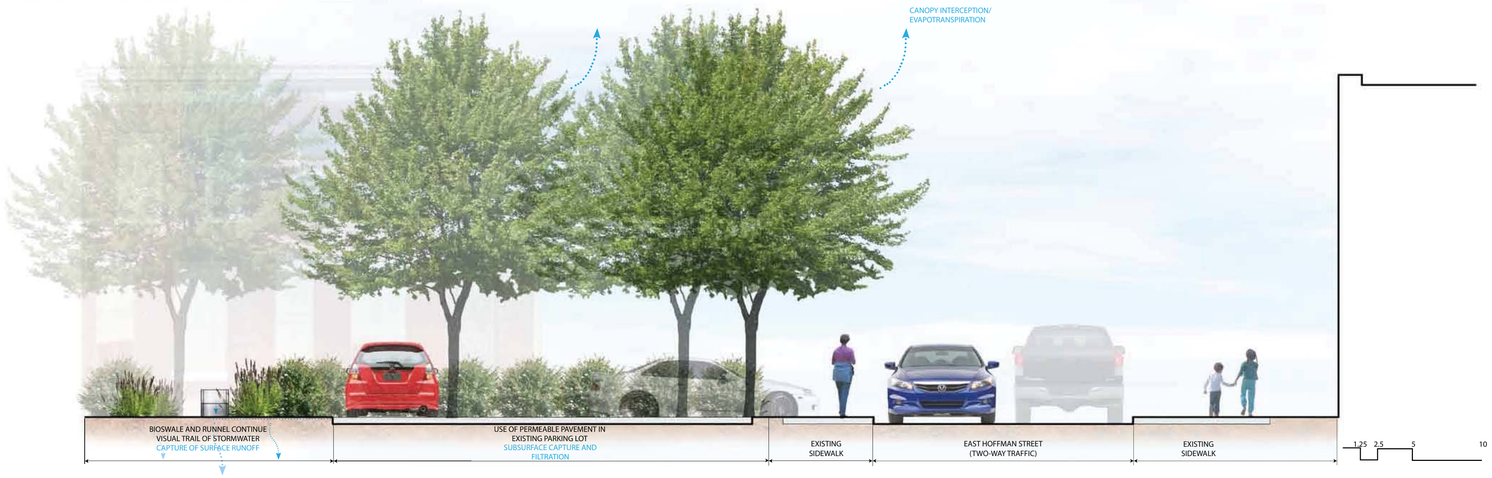
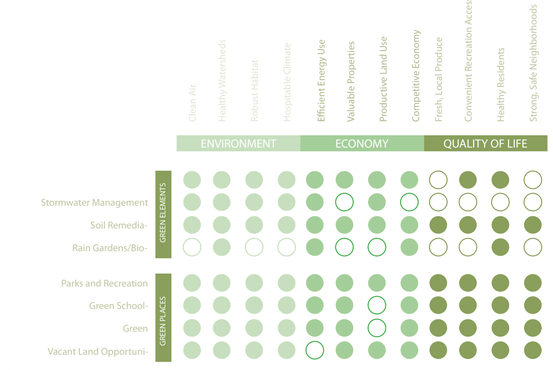
SECTION B:B' - CAROLINE AND HOFFMAN PARK

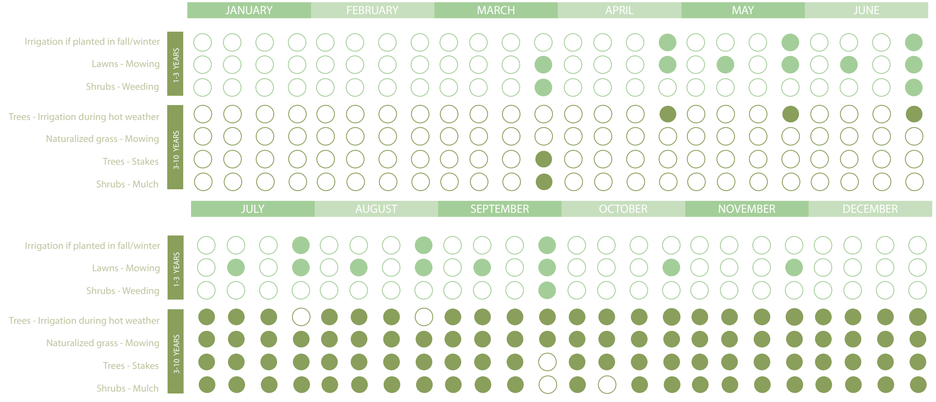


SECTION C:C' - PERMEABLE PARKING LOT AND BIOSWALE



BENEFITS, MAINTENANCE SCHEDULE, AND CONSTRUCTION PHASING





The dry stream bed will be incorporated into Oliver's Neighborhood park to continue the visible stormwater trail, act as an educational tool for schools adjacent to the site, and cleanse stormwater running into the park from East Hoffman Street.

A stainless steel linear runnel allows water to flow across one vacant lot, underneath a drainage trench, and into a bioswale near the existing parking lot located on site. Permeable pavement will replace the existing pavement to help infiltrate stormwater runoff that runs along east hoffman avenue before entering the bioswale.

CONSTRUCTION PHASING

Phasing of the design provides the opportunity to implement some aspects of the proposed design as financial means become available. This phasing schedule will ensure that the fundamental goal of this design, capture and purification of stormwater, will be completed first. By adhering to this sequence project management, time management, cost management, maintenance programs, and reporting can be scheduled in order to provide the best results for the community.

1. Construction of Low-Impact Stormwater Solutions (Bioswale, Rain Garden, Infiltration Trench)
2. Implementation of Runnel, Metal Grates, Curb Curts, and Permeable Pavement
3. Installation of Complementary Signage in Each Location
4. Planting of Urban Street Trees

1 acre