GREEN SCAN REPORT
CORAOPOLIS BOROUGH • 2015

Prepared for Coraopolis Borough
by WESTERN PENNSYLVANIA CONSERVANCY

ACKNOWLEDGEMENTS

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SECTION ONE: INTRODUCTION

THE VALUE OF GREEN

Research, data and technology are all pointing toward "green" as a crucial strategy for local, national and global prosperity and security. Green buildings, energy-saving technologies and sources of new energy production are important components. Just as important, however, are the very landscapes of our cities, towns, and all the spaces in between.

Mounting evidence underscores the tremendous value of greenery—whether street trees, parks, open spaces and even civic landscapes such as the grounds surrounding public schools, libraries, hospitals and other such institutions. We are learning that softening or even replacing hard surfaces, whether paving, fencing, parking lots or roofs, with living plants can make a tremendous difference in such diverse factors as ambient temperatures, energy consumption for heating and cooling, air quality, mental health and mood, asthma rates, rate of healing for hospital patients and attention spans of children. Furthermore, there is evidence that greener landscapes actually strengthen social interactions, building cohesion, stability and civility within communities.

Green resources almost always provide multiple benefits—health, economic, aesthetic, social and environmental. Few investments by communities offer so many dimensions of value.

Green has the power to transform spaces, communities and people.

North Shore Heritage Trail, Pittsburgh, PA.
Photo: WPC.

A well-treed main street in Greenville, SC.
Photo: Eric Fleischauer, Decatur Daily News.
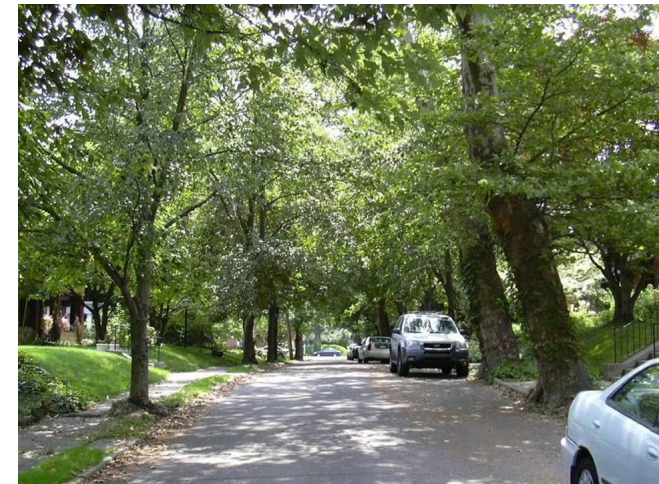
A well-shaded residential street, Pittsburgh, PA.
Photo: WPC.

Green can work on a small scale or large, and best of all, the parts can be assembled to create an ever larger and more coherent green system that offers benefits across many dimensions of community life.

Greening can take myriad forms: a tree planted in front of a home; a row of street trees arching across a busy thoroughfare; a large park with ball fields and exercise trails; stream-side or hill-side walking paths; hanging baskets or window boxes on Main Street; a "welcome" garden at a community's entrance; a butterfly garden at an elementary school; a community garden producing veggies, herbs and flowers to share with neighbors and family; green hedges camouflaging unattractive chain link; plantings to cool overheated asphalt parking areas; large nature preserves; tiny pocket parks with a bench under a tree for respite and contemplation; rain gardens reducing runoff and storm water overflows that pollute rivers and streams; green walls and roofs transforming standard surfaces to create energy savings and even new habitat; temporary "clean and green" grass and trees or shrubs to stabilize vacant land until desirable development is feasible; specially engineered greenspaces that are designed to absorb storm water from streets, roofs, parking lots and other hard surfaces; to reduce pots of flowers on a high-rise balcony; magnificent maples on the courthouse lawn; bike trails edged by native flowers, grasses and trees. Each and every one of these types of greening has an impact. All are valuable. But how do you know what are your best choices? And which approaches are your best investments?

Chicago green roof, atop City Hall.
Photo: Water Environment Research Foundation.

Neighbors pose after planting a tree in the Hill District, Pittsburgh. Photo: WPC.

Sprout market and community gardens, Melbourne, Australia. Photo: Sustainable Melbourne.

Looking to models provided by a few U.S. cities and numerous other communities around the world, the best greening is that which is well-integrated into a community's practices and supported by personal and public commitments. Each component of community life can be surveyed for ways to soften and enhance daily experience with green. It is the cumulative impact over time that will produce the greatest benefit to a community. Building your green infrastructure piece by piece can help your community develop a sustainable, thriving, greener environment that enhances all elements of a community's character.

More and more information is being assembled to document the ways that green can improve our communities. From mental health and physical benefits, to actual financial payback, greenery can add value to your efforts to enhance your community's livability. Surprisingly, many green strategies offer cumulative and compounding benefits. The decision to green a roof for instance, or add tree cover to a streetscape, can offer not only benefits in energy use and temperature comfort but also significant reduction in storm water runoff and related pollution or erosion.

SPECIFIC BENEFITS

Once hard to quantify, the benefits of greenspace are increasingly well documented. Some highlights of five primary benefits are presented here, with references to help you explore even more in depth information on those areas that seem most valuable to your community.

Hanging baskets along East Ohio Street, Pittsburgh PA. Photo: WPC.

Health and Mental Health

Information is accumulating about the importance of a green environment to human health. Ranging from the role of green plants to mitigate +pollution harmful to humans, to the healing effects of beautiful green spaces and natural shapes and textures to the evidence that exposure to greenspace directly relates to concentration and cognitive development, these studies and observations are changing the way people understand the built environment and the importance of keeping "nature" fully integrated in our lives. Here are some specific examples of information about the benefits of green to human health:

- Plants cleanse the air of pollutants, absorb carbon dioxide and generate oxygen.
- Children in neighborhoods with more trees have lower rates of asthma. (Lovasi, et al., Journal of Epidemiology & Community Health, May 2008)
- Observing greenery appears to reduce heart rate and blood pressure, reduce stress and even illness-related absenteeism (Stuttgart study, www.livingroofs.org)
- Patients with a view of greenery tend to heal faster with reduced use of pain medication (Texas study, www.livingroofs.org)
- Plants cleanse particulates from rainwater and the ground by absorbing ground-level ozone, carbon monoxide, sulfur dioxide and other GHG, reducing pollution reaching rivers and streams (Capital Regional District, http://www.crd.bc.ca/watersheds/lid/walls.htm)
- 30 minutes in green natural surroundings has been shown to be an effective treatment for children with Attention Deficit Disorder (Louv, Last Child in the Woods. pp. 98-111)
- Community flower gardens have been reported to reduce road rage (WPC survey, 2005, unpublished)
- Working with plants and flowers can create serenity and calm even in difficult environments (Kuo and Sullivan. Environment and Behavior, Aggression and Violence in the Inner City. Vol. 33 No. 4, July 2001 543-571).

Children at Crescent Early Learning Center explore their newly implemented greenspace. Photo: WPC.

Treed business area in Biddy Mason Park, Los Angeles. Photo: Georgia Silvera Seamans | localecology.org.

Community Cohesion

Research indicates a positive correlation between human interaction and the condition of the local environment. Numerous programs across the country have documented the attraction of community greening projects—from vegetable gardens to tree planting to beautification efforts—to many types of people. Greening a neighborhood offers an effective way to bring people together, learn cooperative skills and generate a new attention to the community's quality. Community cohesion then translates into better care-taking, more watchfulness and deterrence of crime or anti-social behavior and energy for more ambitious efforts to improve community facilities and conditions. Here are a few specific examples of the impact of green on community cohesion:

- People in housing projects with more trees know more of their neighbors and interact more frequently and positively with their neighbors (Kuo, University of Illinois at Champagne Urbana)
- People who volunteer in community gardens tend to be more connected to their communities, volunteer for other causes and have a strong affinity with their neighbors (WPC survey, 2005, unpublished)
- Community gardens, pocket parks, shared courtyards, well-tended open space all are strategies which have been documented to support development of safe, crime-free neighborhoods. (Local Government Commission Center for Livable Communities, "Focus on Livable Communities: Land Use Planning for Safe, Crime-free Neighborhoods," Sacramento, CA www.lgc.org)
- Buildings with high levels of greenery had 52% fewer property and violent crimes than those with little vegetation. (University of Chicago Public Housing)

Wilkinsburg community vegetable garden. Photo: WPC.

Neighbors finish up a garden cleanup, Clairton, PA. Photo: WPC.

Water

Management of storm water has emerged as one of the most costly needs of many communities under orders to separate storm drains from sewer systems to reduce overflow of untreated sewage into rivers and streams. As more land is paved, more rain or snowmelt runs off the landscape rather than soaking into the groundwater system. The runoff tends to cause erosion, increase pollution from sediments and destabilize slopes or fragile lands. The runoff often winds up in storm drains that overtax the existing sewer system and lead to pollution of rivers and streams by sewage contaminated storm water.

Greenery is a key strategy for capturing rainwater and holding it for slow release through the groundwater system. Some cities, such as Philadelphia and Chicago, are embarking on aggressive and systemic strategies for adding greenery for this purpose, and they anticipate enormous savings by reducing the required changes to their sewage and storm water infrastructure. Here are a few specific examples of how greenspace can assist with water management:

• In addition to cleansing rainwater of pollutants, plants hold water. Green roofs can reduce runoff by 70-80% in summer and 25-40% in winter. (Germany study, www.livingroofs.org)
• Large trees can intercept upwards of 2,000 gallons of rainfall annually. (Midwest Community Tree Guide)
• Toronto estimated the potential impact of green roofs as saving millions of dollars in infrastructure construction, tens of millions in erosion control, millions in pollution control, and nearly a million in added beach availability due to lower storm water flows. (City of Toronto Green Roofs Study www.toronto.ca/greenroofs/findings)

Bioswale implemented in 2013 along Hawthorn Road in Millvale.
Photo: WPC.

Gardens on green roof of Allegheny County Building.
Photo: Eisler Nurseries.

Energy

For decades we have known that it is possible to reduce energy consumption by planting trees that shade from hot sun in the summer, let in sun during the winter, or shelter a structure from prevailing winds. Now more and more techniques for using greenery to achieve energy savings are being devised. From rooftops to walls, from sheltering trees that cool asphalt parking lots or streets to green fencing that serves both an environmental and a boundary purpose, opportunities to take advantage of the cooling or protective character of green plants abound. Here are a few examples of impacts on temperature and therefore energy consumption:

• Plants provide insulation during winter. Winter temperatures that were 32°F under a standard roof are 40°F under a green roof (Trent University study, www.livingroofs.org)
• Turf grass can be upwards of 30°F cooler than paving on hot days (University of Arkansas study).
• 25% to 50% tree cover lowers ambient temp by 4°-8° F (in hot climates); 2-4 degrees estimated for Chicago
• Green roofs can reduce temperature beneath a roof from 90°F to 63°F in the summer. Chicago estimated it could save $100,000,000 each year if all its roof surfaces were greened. (DC Nottingham Trent University study www.livingroofs.org)
• Shaded cars lose less fuel in evaporation from gas tanks, reducing volatile organic compounds by more than a pound a day (Final Parking Lot Shading Study, April, 2001, Chicago)

Green wall panels separating busy road from office park/ construction. Photo: uncredited.

Farmers Market in Market Square, Downtown Pittsburgh. Photo: WPC.

Economic Benefits

It is becoming possible to put a price tag on the economic benefit of greening. From property values near parks, to rises in value when vacant lots are greened, to the return on investing in management and maintenance of greenspaces, to the influence on consumer spending, evidence is being accumulated. Here is a sample of information on the economic benefits:

- Homes in Indiana sold for higher prices if located near greenways (Center for Urban Policy & the Environment, 2003.)
- In Dallas, homes facing parks were found to be worth 22 percent more than homes half-a-mile or more away from such amenities. (Miller, Andrew. "Valuing Open Space: Land Economics and Neighborhood Parks" thesis. MIT Real Estate Development 2001.)
- The availability of green spaces has been shown to be one of the strongest factors predicting residential satisfaction. (Fried, M. "Residential attachment: sources of residential and community satisfaction." Journal of Social Issues 38, 1982. pp. 107-120.)
- The Wharton School, University of Penn., found that a $1 million investment of tree plantings in a stressed community translated to a $4 million gain in property values. (Wachter, S. "The Determinants of Neighborhood Transformation in Philadelphia, The New Kensington Pilot Study." 2005)
- A citywide study in Philadelphia showed that derelict land decreased the value of neighboring homes by 20 percent while green and well-maintained formerly vacant land recaptured the initial loss and added another 17 percent in value, for a total gain of 37 percent. (Wachter, S., Gillen, K.C. "Public Investment Strategies: How They Matter for Neighborhoods in Philadelphia—Identification and Analysis." 2006)
- $750,000 = the increase in tax revenue over a 20-year period following the creation of a community garden. (Been & Voicu, "The Effect of Community Gardens on Neighboring Property Values," New York University, 2006)
- People will travel farther to visit "forested" urban shopping districts and pay 9 to 12% more for parking and goods and services. (Kathleen Wolf, Journal of Forestry, "Business District Streetscapes, Trees and Consumer Response," December 2005.)

Recently implemented gateway plantings in transitional community, Larimer Avenue, Pittsburgh, PA. Photo: WPC.

GREEN SCAN PROCESS

The Green Scan process includes a number of steps to help the community discover its best options for using greening to support community revitalization.

Step One: *Create a community committee.* In Coraopolis, WPC worked directly with the Borough Manager and initially met with a Downtown Business group formed by Town Center Associates through the Allegheny Together program to help move the green scan forward. After several meetings with this group and discussions with the Manager, Coraopolis formed a Shade Tree Commission. This became the key group WPC engaged. The committee consists of five engaged residents and the Borough manager, all engaged with local civic, business and government endeavors. Representatives from the Coraopolis Water and Sewer Authority and Coraopolis Memorial Library Board also participated on the community committee.

Early spring tree pit planting in Bloomfield neighborhood, Pittsburgh. Photo: WPC.

The Community Committee included the following individuals:
• Raymond McCutcheon, Coraopolis Borough Manager
• Gene Batdorf, Shade Tree Commission member
• Ed Pitassi, Borough Council member, Shade Tree Commission member, Coraopolis Memorial Library Board member
• Jeffrey Simonetti, Chair, Shade Tree Commission
• Ian Whitefield, Shade Tree Commission member
• Angela Yuele. Shade Tree Commission member
• John Schombert, President, Coraopolis Water and Sewer Authority
• Richard Deems, Superintendent, Coraopolis Water and Sewer Authority

Step Two: *Background Analysis of Coraopolis*. WPC staff developed background analysis of Coraopolis to guide discussion and focus. Specific data sets that were reviewed and in most cases mapped, include:
• Population demographics (age, income and race)
• Population distribution
• Existing parks, trails, greenspace and recreational facilities

Welcome garden, Indiana, PA. Photo: WPC.

- Open land and vacant parcels
- Parcel ownership
- Home ownership
- Income
- Cultural, historical or geological assets of note
- Steep slopes, flood plains and other geographic features as needed
- Transportation routes and traffic patterns.

Step Three: _Convene Several Meetings of Community Committee._ To make sure the Green Scan had broad community support, WPC made efforts to provide as many opportunities for input as possible. This included 12 meetings with members of the community committee, including a final public meeting where the final report was presented at a Borough Council meeting. Community Committee meetings were held to introduce the Green Scan process, discuss the benefits of community greening and green infrastructure, to get community feedback on maps and information collected, identify key assets, assess practicality of ideas, obtain missing information and set priorities. In addition to the Shade Tree Commission, WPC staff also reported to and heard from the Coraopolis Library Board of Directors, the Coraopolis Water Authority Board of Directors and the Coraopolis Borough Council working group.

As needed the WPC staff and community committee interviewed key leaders, made numerous site visits and completed additional GIS analyses in preparation for meetings.

Open green lawn, Western Pennsylvania Conservancy main office. Photo: WPC.

Slippery Rock Memorial Park. Slippery Rock, PA. Photo: WPC.

Step Four: *Complete Final Report.* This final report and action plan summarizes background and findings; best opportunities; related cost estimates and suggestions for implementation strategies.

The overall purpose of the Green Scan is to provide Coraopolis with an action plan that outlines effective options for utilizing green infrastructure throughout the Borough. The scan identifies best options, proposes prioritization of options, offers estimates of costs and suggests potential partners and sources of funding.

DEFINITION OF TERMS

To avoid confusion, we will define a few terms at the outset to clarify meanings. ***Green Infrastructure*** includes systems and practices that use or mimic natural processes to infiltrate, temporarily store, reuse or return water to the atmosphere through evaporation or transpiration. Examples include green roofs, street trees, rain gardens, bioswales, pocket parks, wetlands, and permeable pavement. The direct result of these approaches is to reduce the amount of runoff discharging to surface waters and to reduce storm water flowing into sewer systems to avoid combined sewer overflows into surface waters. Additional environmental and economic benefits include cleaner air, reduction of the urban "heat island" effect and increased energy efficiency. Green Infrastructure can be supplemented or augmented by such structures as cisterns or engineered tree pits that include water storage and engineered soils.

Ghost Town trail in Ebensburg, PA, a rails-to-trail project that runs 36 miles in Indiana County and Cambria County. Photo: WPC.

There is sometimes some confusion about the meaning of the term "greenspace" as opposed to open space. For the purposes of this report, ***greenspace*** is defined as any space intentionally used for formal or informal outdoor recreation or enjoyment including parks, parklets, ball fields, trails, paths, woods, river edges, public event or gathering spaces. Open space is land that may be green or natural, tended or untended, but not built upon. Some open spaces are vacant land, some are just unused.

Active greenspace includes formal playgrounds with play equipment, ball fields, hiking and bicycling trails, and the like. ***Passive*** greenspace includes parks and parklets that support sitting, walking, informal gatherings, views, bird watching and other less physical outdoor activities.

SECTION TWO: CORAOPOLIS COMMUNITY PROFILE

HISTORY AND BACKGROUND

In 1769, Andrew Montour, an interpreter for English settlers during the French and Indian War, was given land in what is now Coraopolis and Neville Island. The first permanent white settler in the vicinity was Captain Robert Vance of Virginia, who settled around 1773, just before the American Revolutionary War. Vance built a stockade and blockhouse built to protect the area, known as Fort Vance. The community grew and became known as Middletown in the 1800s because of its equidistant location between Pittsburgh and Beaver.

Initially incorporated in August 1861 as the Village of Middletown, with a post office name Vancefort, Coraopolis was incorporated as a borough on June 7, 1886; its name was changed a few months prior. It is likely that the Borough's name is derived from the Greek word for maiden city, though there is also legend that the name came from the Watson family, early English immigrants to the area that established important early industries in Coraopolis– a sawmill and grist mill. One of the daughters of the family was named Cora.

Mill Street, Downtown Coraopolis, 1948. Photo: Pittsburgh Post-Gazette.

Coraopolis Borough clock in the plaza/parking lot in front of the current municipal building/police department.

The community grew gradually, especially with the building of the Pittsburgh and Lake Erie Railroad in 1877 that ran through town. Oil was discovered at both ends of the Borough in 1890, leading to a brief population surge. This didn't last too long as the oil levels were quite low. In 1892, Coraopolis developed more rapidly with the construction of the first high-speed electric street railway in the United States. The railway was scheduled to run up to 40 mph. The railway went from Coraopolis over Neville Island to McKees Rocks. Some manufacturers moved into Coraopolis at this time, and additional residents from Coraopolis worked at new industries located on Neville Island. (The island was an important regional agricultural area prior to the electric railway.) With its industrial development, the Borough constructed an electrical power plant in 1897 and a municipal water plant in 1898.

With an oil boom in the Ohio Valley, several oil companies operated in Coraopolis and

Borough of Coraopolis
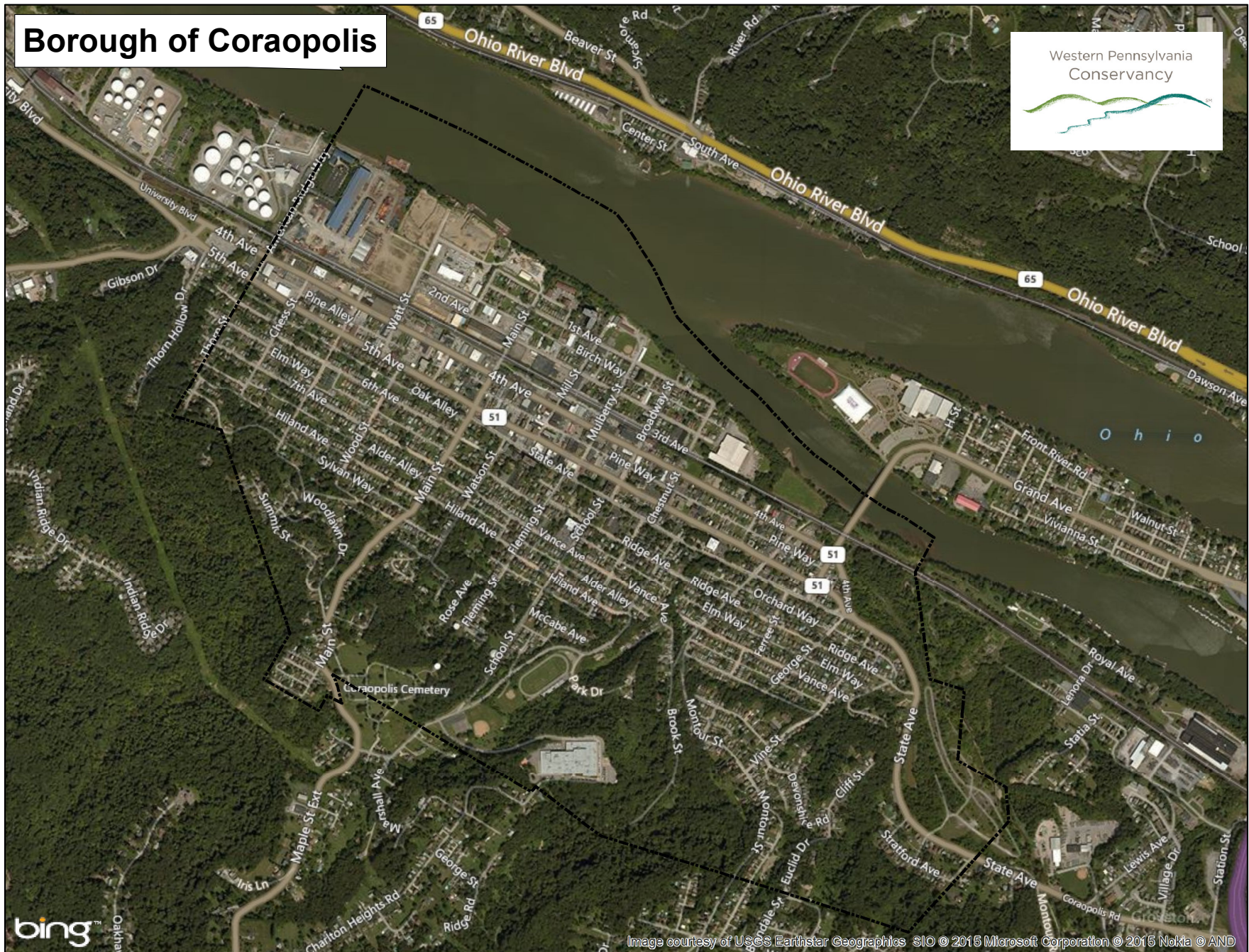
Western Pennsylvania Conservancy

Neville Island in the 1920s and 1930s. As a result of increasing industrial growth, the electric railway became inadequate and the Coraopolis Bridge, which had been the 6th Street Bridge in Pittsburgh, was disassembled and reassembled in 1927. The bridge was again replaced in 1995.

Like so many river towns in the Ohio Valley, Coraopolis saw its population peak in the 1940s and then decline dramatically in the subsequent decades. Some industry remains in Coraopolis. The American Bridge Company has its headquarters in Coraopolis. The company is known for building or helping to build many bridges as well as some of the tallest, best known buildings in the world such as Willis Tower in Chicago, the Empire State Building in New York City, the Chrysler Building in New York City, the John Hancock Centers in Chicago and in Boston, and the U.S. Steel Tower in Pittsburgh.

The P&LE passenger train station at Mill Street and Neville Way is on the National Register of Historic Places but has suffered decades of neglect. Photo: WPC.

GOVERNMENT AND CIVIC INSTITUTIONS

The Borough of Coraopolis is governed by the mayor and an eight-person Borough council. Day to day operations are administered by the Borough manager. Borough government also includes the a police and fire department, and its own water and sewer authority.

As noted earlier, the Borough Manager has served as the main point of contact for this Green Scan with input from the Coraopolis Water Authority, the Coraopolis Business District Advisory Committee, Allegheny Together/Town Center Associates and Coraopolis Borough Council. The newly formed Coraopolis Shade Tree Commission became an important meeting group in the concluding months of this report.

The Coraopolis Community Development Foundation (CCDF) works toward renewal in Coraopolis in three specific areas. 1) Emergency Relief: providing aid to individuals and families experiencing a crisis situation. 2) Community Resourcing: Equipping members of the

Downtown Coraopolis. Photo: Center Town Associates.

community with tools to improve their living situations. 3) Community Redevelopment: Creating partnerships with organizations to enhance the common life of Coraopolis. CCDF and the Borough do not appear to do a lot of collaboration on projects.

Coraopolis Memorial Library, located a block from 5th Avenue on School Street, is a public library that is part of the Allegheny County Library Association/ Carnegie Library of Pittsburgh network. Cornell School District, located on one campus at 1099 Maple Street along the southern border of the Borough, serves the Coraopolis and Neville Island communities. Approximately 675 students attend Cornell. Both the primary and secondary schools are on campus. Robert Morris University's (RMU) campus is located in neighboring Moon Township to the west and their Island Sports Center in Neville Island is to the east. More than 600 students from RMU reside in the Borough.

Eastern side of Cornell School off of Maple Avenue Extension. Photo: WPC.

Coraopolis Cemetery. Photo: WPC.

Coraopolis also has local fraternal organizations including the Veterans of Foreign Wars (VFW) and the Loyal Order of Moose. The Borough has eight active protestant churches and one Roman Catholic Church.

Coraopolis Cemetery, located up the hill from the Route 51, straddles a portion of Moon Township and a part of the southern portion of Coraopolis. More will be discussed about the Cemetery in the following section.

GEOGRAPHY AND TOPOGRAPHY

The Borough of Coraopolis has an area of 1.5 square miles; 1.3 square miles is land and just over 0.1 square miles, or 9.46% of the area of the Borough is considered water (the Ohio River) and is five miles from Downtown Pittsburgh. It is situated along the southern bank of the Ohio River, approximately 11 miles from Downtown Pittsburgh. The Borough is bordered on the west and south by Moon Township and on the southeast by Robinson Township. Coraopolis is connected to Neville Island by way of Coraopolis Bridge. The Borough sits across the Ohio River from small residential boroughs Haysville and Glen Osborne. The Sewickley Bridge is less than a mile west of town, connecting Route 51 to Route 65 on the northern bank of the Ohio River.

Coraopolis has a centralized downtown area that runs east-west. Old industry and residential neighborhoods are between the downtown business district and the Ohio River on flat grounds. Another residential area spans up the hill to the south of the downtown business district. The elevation along the river bank is 700 feet and rises at its highest point on the southern edge of the Borough near Cornell Elementary School to approximately 1050 feet.

Almost all of the land within Borough limits have been developed aside from the wooded hillside surrounding Cornell Elementary, and other swaths of woods along the eastern edge of the Borough near Montour Run and Route 51.

TRANSPORTATION FEATURES

Pennsylvania State Route 51 splits along the entire stretch of Coraopolis, running along 4th Avenue heading west and along 5th Avenue heading east. It is a busy road connecting the river towns along the south shore of the Ohio River from Pittsburgh to Beaver County. The Borough is laid out in a grid with numbered streets running parallel to the river until 5th Avenue. The parallel names change in the residential neighborhood heading up the hill. Many of the perpendicular streets are named after trees or historic figures in Coraopolis' past. Montour Street and Main Street are the primary streets that run perpendicular to the river, heading south into Moon Township.

Coraopolis has a lot of daily traffic running through Downtown. 4th Avenue and 5th Avenue, both running one-way, are State Route 51. Photo: WPC.

Borough of Coraopolis Transportation Map
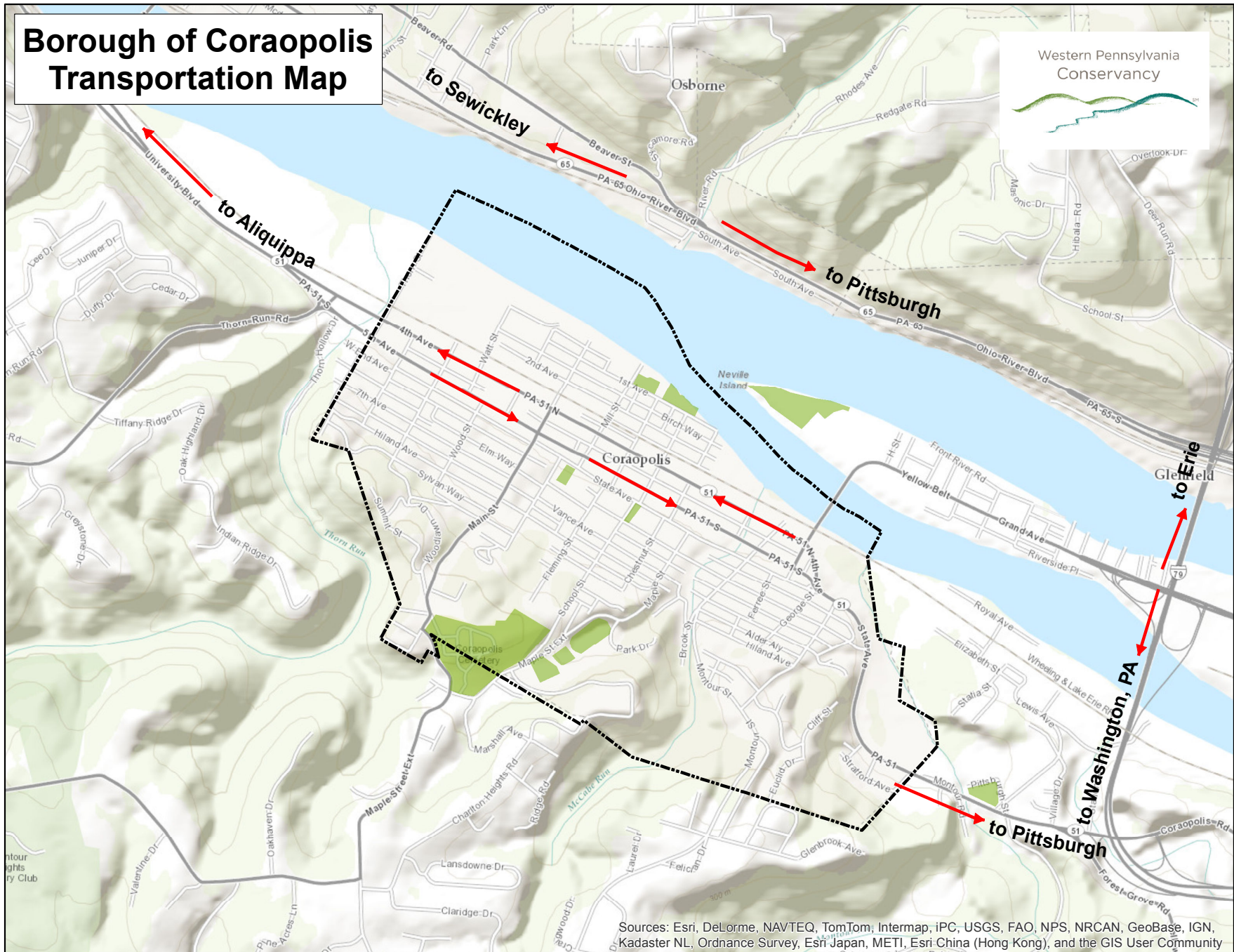
The Port Authority has one public bus route #21, that comes through Coraopolis and loops primarily along Route 51 out to Sewickley and Downtown Pittsburgh. The bus runs every hour Monday through Saturday from 9:30am to 10:30pm.

The Pittsburgh International Airport is a 10-mile car ride away in neighboring Moon Township. There is easy access to I-79 just outside of town from Route 51 or on Neville Island along the main road, Grand Avenue.

CSX owns the railroad that passes parallel to 3rd Avenue through the entire Borough. There was an active passenger train station situated at Mill Street next to the tracks in the Borough that was in use until the 1960s; it was completely abandoned in the 1980s. The building was placed on the National Register of Historic Places in 1978 and the Coraopolis Community Development Foundation purchased the building in 2006 in hopes of restoring it, though it is extremely dilapidated at this point. Preservation Pennsylvania listed it as one of nine historic locations in its 2013 Pennsylvania At Risk report; Young Preservationists Association of Pittsburgh named the Coraopolis station the number one preservation opportunity in the region in 2010.

The Montour Trail is a virtually uninterrupted 46 mile multi-use recreational trail with a trail head just outside of Coraopolis, along Route 51 (Coraopolis Road). The trail is a converted railway that running along Montour Run, a small tributary that empties into the Ohio River in Coraopolis. The trail is primarily crushed limestone, though the trail is on the road in some locations. The Montour Trail will soon run along 4th Avenue in Coraopolis and continue on to the Sewickley Bridge just outside the Borough.

The picturesque Ohio River, from Coraopolis, looking . Photo: WPC.

CSX-owned railroad tracks that run east-west through Coraopolis. Photo: WPC.

DOWNTOWN CORAOPOLIS

Coraopolis' downtown district stretches approximately four blocks and hosts diverse businesses along the whole stretch. There is a mix of local mom and pop businesses as well as places such as Rite Aid and McDonald's. According to the Borough of Coraopolis website, there are 165 businesses that reside in the Borough. The majority of these businesses lie on 4th Avenue and 5th Avenue between Broadway Street and Main Street. According to Town Centre Associates, 20% of the commercial buildings in the Downtown district are currently vacant.

The streets are metered in this main business district and street parking is readily accessible within a block's distance. There is a public metered parking lot in the center of the business district directly across from the Borough Building.

The buildings downtowns have a handsome, "Hometown USA" quality to them, and though the sidewalks are in fine condition and easily walkable, the streetscape is lacking. There is little in the way of beatification or street trees that add to the downtown experience. Although many of the buildings are in fine condition, there is some dilapidation of commercial buildings, and even more so of vacant residences along the Route 51 corridor, specifically beyond the primary downtown area.

Historic Coraopolis train station that closed in the 60s but is now owned by Coraopolis Community Development Foundation. Photo: WPC

Downtown Coraopolis at 5th Avenue and Mill Street. Photo: WPC.

Downtown Coraopolis along Mill Street. Photo: WPC.

POPULATION

The population of Coraopolis, like many surrounding boroughs and the city of Pittsburgh itself, has been diminished by changes in employment, suburbanization, and other economic trends. Since 2000, Coraopolis has lost about 7.4% of its population, somewhat higher than the loss of population in Allegheny County (4.6%). The population of the Borough has nearly halved (48.8%) since its census peak in 1940, compared to an overall reduction of 13.3% in the County over that same time. However, even with the population loss, Coraopolis continues to be relatively densely populated compared to the county as a whole. In 2010 the Borough had over 4,268 people per square mile of land compared to a ratio of 1,676 people per square mile of land for the County.

	Population				Population Change			Area	Density
	Pop. 2010	Pop. 2000	Pop. 1940 (peak)	Pop. 1910	Pop. Change % since 2000	Pop. Change % since 1940	Pop. Change % since 1910	Land Area (sq. miles)	Persons / sq. mile (2010)
Coraopolis	5,677	6,131	11,086	5,252	-7.4%	-48.8%	+8.1%	1.33	4,268.4
Allegheny County	1,223,348	1,281,666	1,411,539	1,018,463	-4.6%	-13.3%	+20.1%	730.1	1,675.6

The proportion of people in each age category has remained a close mirror to the county's distribution of ages, with a slightly larger cohort of persons over the age of 75 and a slightly smaller group under 20 years of age. In terms of green space needs, it is important to have a range of green spaces that cater to each age group—safe play spaces for small children, passive or low-exertion spaces for older residents and plenty of green places that support active enjoyment of the outdoors for the over 19 but under 75 age groups. At the same time, Coraopolis has a significantly lower median income than the county and a higher proportion of people in the low income category (21.1% compared to 12.4% for the county). This suggests that a significant number of residents may rely more heavily on local resources than on county or regional green assets that may be difficult to reach or more costly to access.

	Race %			Age %				
	African American	White	Other Affiliated	Under 20	20-34	35-59	60-74	75+
Coraopolis	12.0%	83.1%	4.9%	20.7%	20.1%	34.3%	14.4%	10.3%
Allegheny County	13.2%	81.5%	5.3%	22.6%	20.1%	34.4%	13.8%	9.0%

Coraopolis Population by Census Block Group
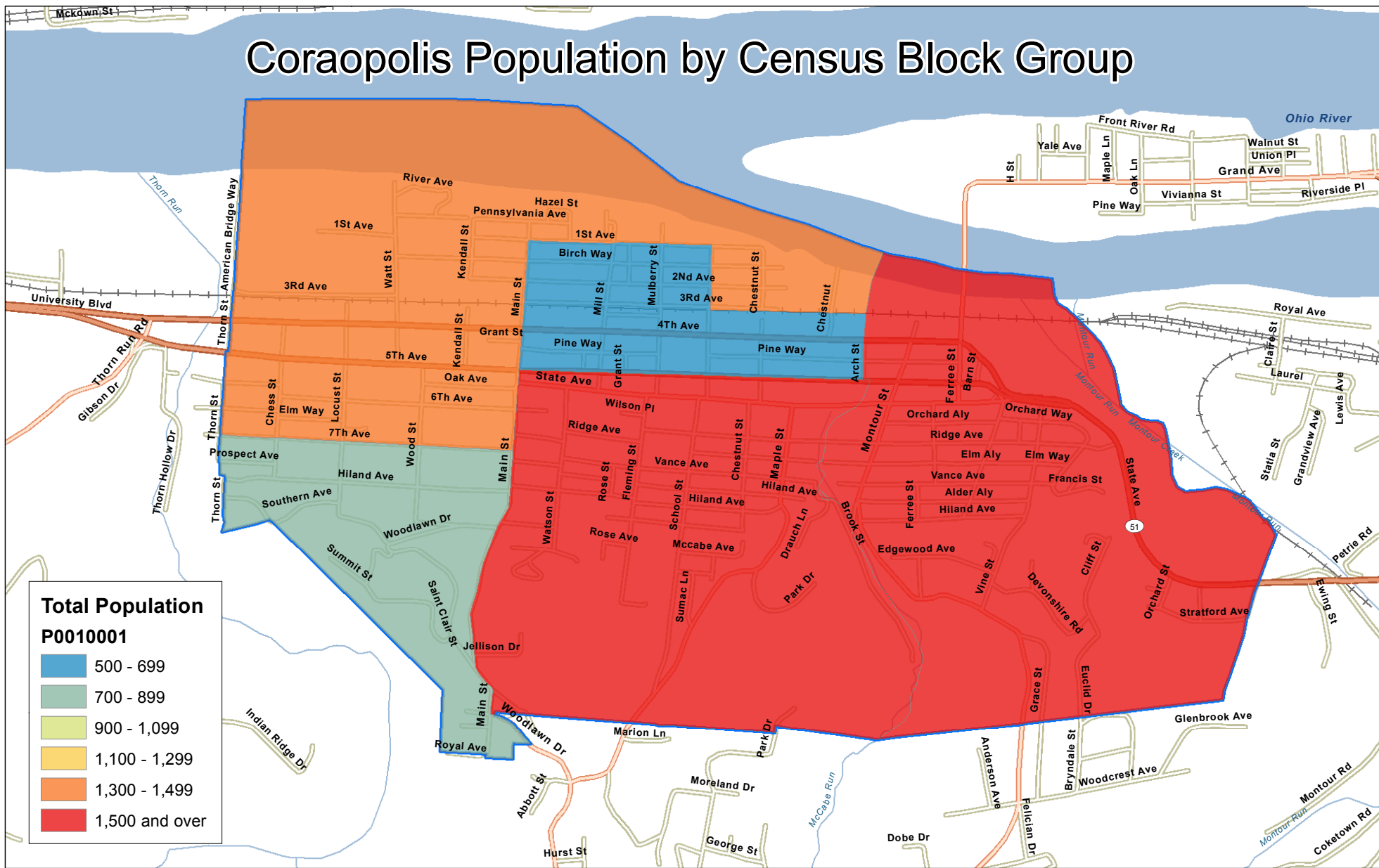
ECONOMIC FACTORS

The proportion of Coraopolis residents below the poverty level is considerably higher than Allegheny County as a whole. Lower levels of income tend to reduce options for access to outdoor recreation or enjoyment, and limit travel to more distant green resources. These factors make local assets all the more important. The income levels of Coraopolis's population also likely directly correlate to the higher than average percentage of renters and the lower level of owner-occupied units of housing. Overall vacancy rates for buildings in the Borough are only slightly higher than the county percentage. Relatively low vacancy rates is a good indicator of community stability.

	Income		Housing			
	Median Household Income	Est. % Under Poverty Level	% Occupied	% Vacant	% Owner Occupied	% Renter Occupied
Coraopolis	$32,366	21.1%	88.6%	11.4%	52.0%	48.0%
Allegheny County	$49,805	12.4%	90.6%	9.4%	64.7%	35.3%

ENVIRONMENTAL FACTORS

Coraopolis must take into account a variety of environmental factors in its quest for revitalization. Some factors are human-caused such as the brownfield pollution along this stretch of the Ohio River, especially from current industries such as Shanango, Inc. on Neville Island that must come under compliance, reducing emissions under the Clean Air Act. We recognize that little can be done from some of this residual pollution, but it makes employing green strategies in Borough decision-making all the more important.

 Some significant features are a result of the natural topography of the region. For example, the residential area of Coraopolis has a rise of 200 feet from the Borough building on 5th Avenue up the residential streets to the entrance of Cornell School. There is a rise of 325 feet from the Borough Building to the entrance to Coraopolis Cemetery at Woodlawn Drive and Main Street. This presents an issue for storm water flow. It is worth providing some background on this issue as context for recommendations provided later in this report.

Coraopolis Borough
Local Watersheds

Western Pennsylvania
Conservancy

Thorn Run
Watershed

McCabe Run Watershed

Montour Creek
Watershed

Legend

Local Watersheds

PA Municipalities selection 3

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, iPC, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

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Economic Argument for Investing in Green Infrastructure - Source Reduction Strategies

The Borough of Coraopolis is served by the Coraopolis Water and Sewer Authority. The wastewater treatment facility is located along the Ohio in Moon Township just west of the Borough boundary. Like many older communities in the region, the Borough's sewer infrastructure includes a combination of "combined sewers" and "separated sewers." In combined sewer systems, sanitary sewage from residential, commercial and industrial buildings run through the same pipes as stormwater. In these systems, rain events cause combined sewer overflows (CSOs) into local waterways when sewer pipes become overburdened by rainwater. CSOs are considered a significant environmental and human health concern by the US Environmental Protection Agency, Pennsylvania Department of Environmental Protection (DEP), and Allegheny County Health Department.

Coraopolis currently has six CSO control structures along the Ohio River where raw sewage is discharged into the river during rain events. The Borough and the Water and Sewer Authority have made efforts across the Borough to separate sanitary and storm sewer pipes to comply with the state regulations to reduce CSO events. However, large sections of the Borough are still served by combined sewers, resulting in CSOs.

While continued efforts to install separate sanitary and storm sewer pipes across the Borough will remain a priority, an alternative that can complement this strategy is to install green infrastructure in strategic locations to capture stormwater before it enters the sewer system. This can be an extremely cost effective alternative to traditional hard engineering approaches to stormwater mangement. There are now many examples from across the Allegheny County demonstrating how communities have invested in green infrastructure strategies to reduce the overall costs of compliance with local, state and federal clean water laws (see Appendix for literature).This Green Scan as well as the Water and Sewer Authority's Long Term Wet Weather Control Plan provide a variety of options for the Borough to consider for stormwater management.

Sources used to compile this profile:

Coraopolis Borough website: http://coraopolispa.com/
Coraopolis Community Development Foundation website: http://www.coryfoundation.org/
Wikipedia page on Coraopolis: http://en.wikipedia.org/wiki/Coraopolis,_Pennsylvania
United States Census Bureau: http://factfinder2.census.gov/faces/nav/jsf/pages/community_facts.xhtml
Town Center Associates http://www.towncenter.info/downtown/coraopolis/coraopolis_home.aspx
Tatone, Gia. Coraopolis. Charleston, SC : Arcadia Pub., 2007.
Personal interviews

How a Combined Sewer System Works

Rainstorm

Sources of sewer waste water:

HOMES

STORM DRAINS

BUSINESS & COMMERCE

SEWAGE TREATMENT PLANT

B

SEWER

OVERFLOW

STREAMS, RIVERS & LAKES

C

CONTROL DEVICE

A

OPEN DRAIN

D

OVERFLOW POLLUTION

A Normal flows from combined sewers are diverted by control devices…

B …into an interceptor drain and on to the sewage treatment plant.

C Storm water runoff can create excessive water flows that overwhelm the control device…

D …allowing untreated waste water into streams and rivers.

This is a combined sewer overflow diagram, demonstrating why it is important to reduce the amount of water that goes into these sewers, especially during a rain storm.

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SECTION THREE: EXISTING GREEN ASSETS

As a starting point for identifying the best opportunities for in greening in the Borough of Coraopolis, this Green Scan provides a review of Coraopolis's existing green assets, including parks and open spaces, streetscapes, the urban forest, and community gardens. This section includes a review of the condition of the existing green assets, an assessment of how well these assets meet the community's goals and needs, and a review of the location of existing green assets to determine which areas are lacking access. The map on the facing page shows current green assets in Coraopolis as identified through the Green Scan process.

PARKS AND PUBLIC GREEN SPACES

This Green Scan included an analysis of how well Coraopolis's existing parks and public green spaces serve the entire Coraopolis community. The applicable goal for providing adequate greenspace for a community is to provide between .25 and 1 acre of small park space per 1,000 people within a ¼ mile radius (10 minute walk) of populated areas. According to our findings, approximately 75% of Coraopolis's population does not live within a 10-minute walk of an existing playground in the Borough.

Small parks will typically offer seating, views, greenery, gathering space or contemplative green space for all ages, but particularly for those people who are less likely to use intensive sports facilities such as ball parks (small children or older citizens). In addition it is desirable to have neighborhood or community parks on the order of 1 to 2 acres per thousand people to offer a greater variety of recreational resources—play equipment, facilities for field games, skating, picnicking, wading pools, and the like. For its population of 5,664 people the Borough would ideally provide up to six acres of parks. Currently Coraopolis has one multiuse park/playground and two small playgrounds with equipment as well as Cornell School District grounds that contain athletic fields and a small playground.

Coraopolis Borough Existing Green Assets

Western Pennsylvania Conservancy

Western Pennsylvania Conservancy Community Flower Garden

Shelly Y. Jones Memorial Park

Playground at Broadway Street and First Avenue

Ridge Avenue Playground

Underground Railroad Bicycle Trial

Pittsburgh Spur

Coraopolis Community Garden

Coraopolis Memorial Library

Coraopolis Cemetery

TreeVitalize tree plantings

Cornell School District Grounds

Moon Township/Coraopolis Trailhead Montour Trail

Montour Trail

Legend

- ▲ Community Gardens
- 🏃 Hiking/Biking Trail
- ● Street Trees
- ● TreeVitalize Trees
- ◆ Playground
- ▆ Parks and Open Spaces

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

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Coraopolis Cemetery is on the southern border of the Borough. We will mention the Montour Trail since its trail head lies just outside the Borough border. We also note that there are larger parks nearby such as Moon Park in Moon Township, as well as Robin Hill Park (2.2 miles from Downtown Coraopolis), Montour Woods Conservation Area (2.7 miles from Downtown), Kenmawr Conservation Area (4 miles from Downtown), all natural areas managed by Hollow Oak Land Trust. These locations are accessible by vehicle, but this document will focus on the parks and greenspaces directly inside the boundaries of Coraopolis Borough .

Coraopolis Borough Nearby Public Parks

Western Pennsylvania Conservancy

Robin Hill Park

Montour Junction Park - under development

Moon Township Park

Kenmawr Conservation Area - Hollow Oak Land Trust

Montour Woods Conservation Area - Hollow Oak Land Trust

Legend
PA Municipalities selection 3
Nearby Public Parks

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, iPC, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

**Coraopolis Borough
Parks & Playground Walkability**

Western Pennsylvania Conservancy
Community Flower Garden

Shelly Y. Jones Memorial Park

Playground at Broadway Street and First Avenue

Coraopolis Community Garden

Ridge Avenue Playground

Coraopolis Memorial Library

Moon Township/Coraopolis Trailhead
Montour Trail

Coraopolis Cemetery

Cornell School District Grounds

Legend

△ Community Gardens

◆ Playground

Area within a 1/4 mile of playgrounds

Parks and Open Spaces

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

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Shelly Y. Jones Memorial Park

This park, approximately 1.4 acres large, is located at 1st Avenue and Mill Street. It contains playground equipment, a blacktop with basketball hoops, and a baseball diamond. The entryway contains an attractive perennial flower garden, tended to by Mr. Roosevelt Jones. The park is named after his beloved late wife. The park is entirely fenced in with chain-link fence. The Coraopolis Public Works facilities are on the back side of this public property, between the park and the Ohio River.

Playground equipment on the Shelly Y. Jones Memorial Park playground. Photo: WPC.

Basketball courts and pavilion as part of Shelly Y. Jones Memorial Park. Photo: WPC.

Shelly Y. Jones Memorial Park entrance at 1st Avenue and Mill Street. Photo: WPC.

Playground at Broadway Street and First Avenue and Riverfront Trail

On the Borough-owned property where Broadway dead ends at 1st Avenue is a small park with benches, a swing set and small jungle gym. In addition, there is a lookout over the Ohio River. There is also a walking path along the river on Borough-owned property that circles back when it gets to Mulberry Street, a block away. This property is approximately 1.2 acres. This path is on the backside of a vacant, well maintained, privately-owned property. The lot against 1st Avenue, owned by Trico Enterprises, was going to be a housing complex, but structures burned down and has been an open lawn since.

Riverfront trail on municipal property along the Ohio River near Broadway Street and First Avenue playground. Photo: WPC.

Small playground and deck outlook on municipal property at First Avenue and Broadway Street junction. Photo: WPC.

Fenced view from the walking trail of the baseball field that is part of Shelly Y. Jones memorial Park. Photo: WPC.

Ohio River outlook at First Avenue and Broadway Street. Photo: WPC.

Playground along Ridge Avenue near Watson Street

There is a large concrete parking lot owned by the Borough with access on Ridge Avenue near the corner of Watson Avenue. On the back of the parking lot is a fenced-in playground, well-maintained lawn and pavilion. There is also public stairway access to this playground from State Avenue. Along the eastern edge of the property from the sidewalk all the way to the back of the property is a lawn approximately 10 feet wide. The fenced in area is about 12,000 square feet.

Wide grassy strip between municipal -owned property and private parking lot next to Ridge Avenue playground. Photo: WPC.

Municipal-owned parking lot along Ridge Avenue in front of public playground. Photo: WPC.

Ridge Avenue playground near Watson Street. Photo: WPC.

Coraopolis Cemetery

Located along the southern edge of the community, Coraopolis Cemetery is bordered by Woodlawn Drive, Main Street, and Maple Street Extension on the south. The Cemetery is buffered by private wooded hillsides and Coraopolis Water and Sewer Authority property on its northern edge. In all it consists of 25 acres on six parcels with a rolling landscape and some large, stately trees. 18 acres, or 70% of the Cemetery, are located within the Coraopolis border. The Cemetery was established a few years prior to the incorporation of the Borough, in 1881.

Picturesque Coraopolis Cemetery in fall. Photos: WPC.

Coraopolis Community Garden

In 2013 Coraopolis Community Development Foundation/ Charis247 Church received a grant to help establish a community vegetable garden through the Allegheny Grows program along Pine Way at Broadway Street. Grow Pittsburgh, the Western Pennsylvania Conservancy and Allegheny County Community Economic Development partner with local community organizations to establish community vegetable gardens in Low and Moderate Income (LMI)-designated communities throughout Allegheny County. Volunteers grow food for the Coraopolis food pantry and served up to 150 families in 2014.

Coraopolis Community Garden Broadway Street and Pine Way. Photo: Coraopolis Community Development Foundation.

Coraopolis Community Garden in full bloom. Photo: Coraopolis Community Development Foundation.

CIVIC INSTITUTIONS

Cornell School Grounds

On the southern edge of Coraopolis sits Cornell School District. The school has an elementary school and high school, both located on the same campus. Along Maple Street Extension sits a baseball field, a softball field and football field/track. These amenities appear to be used primarily for school sports. There is also a large concrete plot with outdoor basketball courts and a tennis court. The School campus sits across four large properties owned by either the school or Coraopolis Borough comprising 56.4 acres. Besides the ballfields and school building, much of this land is wooded and has steep topography. The school sits on top of the hill, sloping down into a valley where McCabe Run flows. The school owns a large lawn across the street from its parking lot at its entrance at Park Drive and Maple Street Extension.
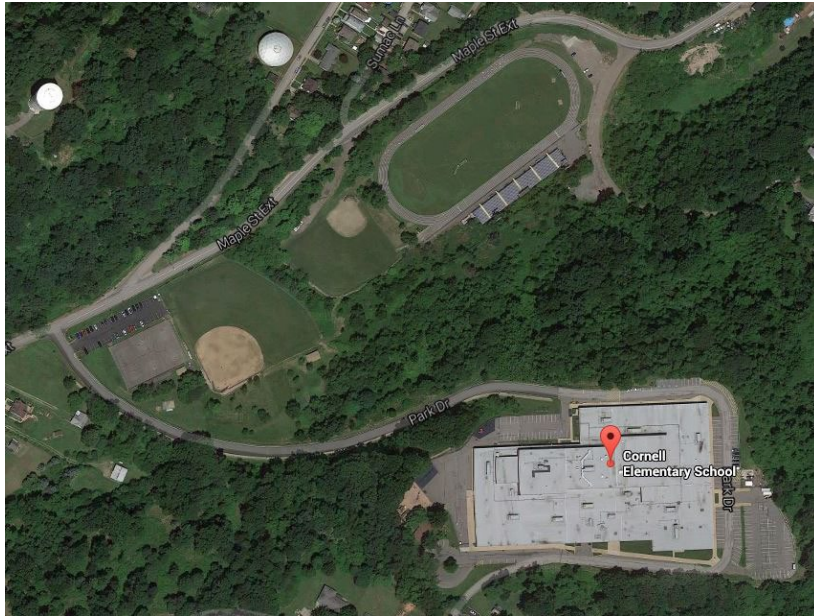

Northeast corner of Cornell School District drive. Photo: WPC.

Park Drive heading away from Cornell School toward Maple Street Extension. Photo: WPC.

Cornell School Drive heading up the hill to the main campus. Photo: WPC.

Overhead view of Cornell School District grounds. Photo: Google Maps.

View of municipal and school-owned property in the foreground and the banks of the Ohio River in the background. Photo: WPC.

Cornell School grounds at the campus entrance looking north along Maple Street Extension. Photo: WPC.

School property on the south side of Park Drive/Cornell School campus entrance toward Maple Street Extension. Photo: WPC.

Coraopolis Memorial Library

This Library, along School Street between Ridge Street and State Street, contains a nicely maintained yard, perennial garden beds around the building and plantings around historical industry memorials. The space around the building is about 15,450 square feet, or 0.35 acres. The Library is part of the Allegheny County library network and serves as a community center for the neighborhood.


Coraopolis Memorial Library grounds. Photos: WPC.

REGIONAL GREEN AMENITIES AND PROJECTS

Montour Trail head

The Montour Trail is a multi-use non-motorized recreational rails-to-trail project that extends just beyond Coraopolis to the east and stretches 46 miles to Clairton, through Washington and Allegheny Counties. Plans exist to extend the Montour Trail through Coraopolis north along the Ohio River into Monaca Borough in Beaver County as part of the Ohio River South Shore trail. More information can be found with the Ohio River Trail Council.
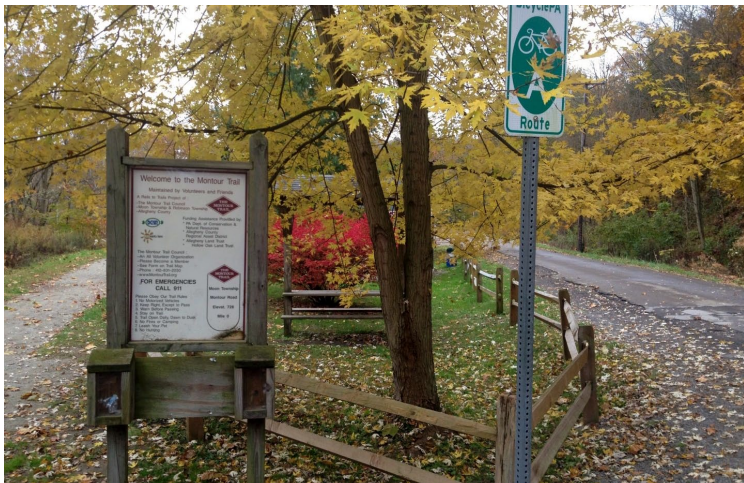
Photos of the trail head of the Montour Trail located just outside Coraopolis to the east near Coraopolis Road/Route 51. Photos: WPC.

Underground Railroad Bicycle Route

The Underground Railroad Bicycle Trail is a network of bike routes that memorializes the Underground Railroad. It is a collection of routes that extend from Mobile, Alabama to Owen Sound, Ontario, Canada. The Pittsburgh Spur stretches from Heinz History Center in Pittsburgh's Strip District along the Ohio River on the north side of the Ohio River in Pittsburgh, crossing to the south side of the Ohio River at the McKees Rocks Bridge. The route follows Route 51 through Coraopolis and crosses the Sewickley Bridge on the north until it crosses over the river again in Ambridge. The trail heads north along the Ohio River, then follows the road along the Beaver River and heads north to Ellwood City and then to Erie. More information regarding this route and others along the Underground Railroad Bicycle Route can be found with the Adventure Cycling Association.

Community Flower Gardens

One of the Western Pennsylvania Conservancy's community flower gardens rests just outside Coraopolis limits where Route 51 splits into 4th Avenue and 5th Avenue at Thorn Run Road heading into town. The garden provides an attractive bed of color to many thousands of people driving to and from Coraopolis, and has been maintained by nearby residents and corporate volunteers since 1998.

Western Pennsylvania Conservancy's community flower garden just outside of Coraopolis Borough limits along Route 51 at Thorn Run Road. Photo: WPC.

Corporate volunteers plant the Route 51 and Thorn Run Road garden in spring. Photo: WPC.

Tree Planting Project

Thanks to a special grant from Home Depot and partnership with the Allegheny County Housing Authority, 40 trees were planted in the Groveton Village neighborhood just outside of Coraopolis in spring 2011. This was a TreeVitalize Pittsburgh planting with volunteers and residents; WPC is the managing partner of the TreeVitalize partnership.

TreeVitalize neighbors and staff after a tree planting at Groveton Village. Photo: WPC.

TreeVitalize volunteers and staff plant trees at Groveton Village. Photo: WPC.

Trees at Groveton Village several years after volunteer planting. Photo: WPC.

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TREE ANALYSIS

The tree population in Coraopolis can be classified into two categories, public and private. The following analysis will focus largely on the tree population in the public right-of-way with minimal reference to trees on private property. Trees in the public domain include street, park and certain residential trees that fall in the public right of way. Trees growing in yards and on private developments or away from the street on vacant lots are not included in this analysis.

Public Trees

The public tree population of Coraopolis consists of 46 trees of 10 different species. The top five tree species are Callery pear, London plane tree and a few varieties of Maple that constitute 89% of the population. Two of the primary tree species – Callery pear and Norway maple – are invasive. Considering the large number of invasive trees, tree replacement strategies should incorporate the removal of invasive trees over time, and more importantly, since there are so few street trees to begin with, strategies for planting a diverse mix of non-invasive trees should be enacted. The tree population is on the young and small side; only one tree, a pin-oak, has large diameter between 36 and 42 inches. Half of the trees have a diameter of six inches or less, with the majority of trees falling in the 12 to 18-inch diameter class and few trees in diameter classes over 30 inches. The following graph represents the relative age distribution of the 10 recorded public tree species (%):
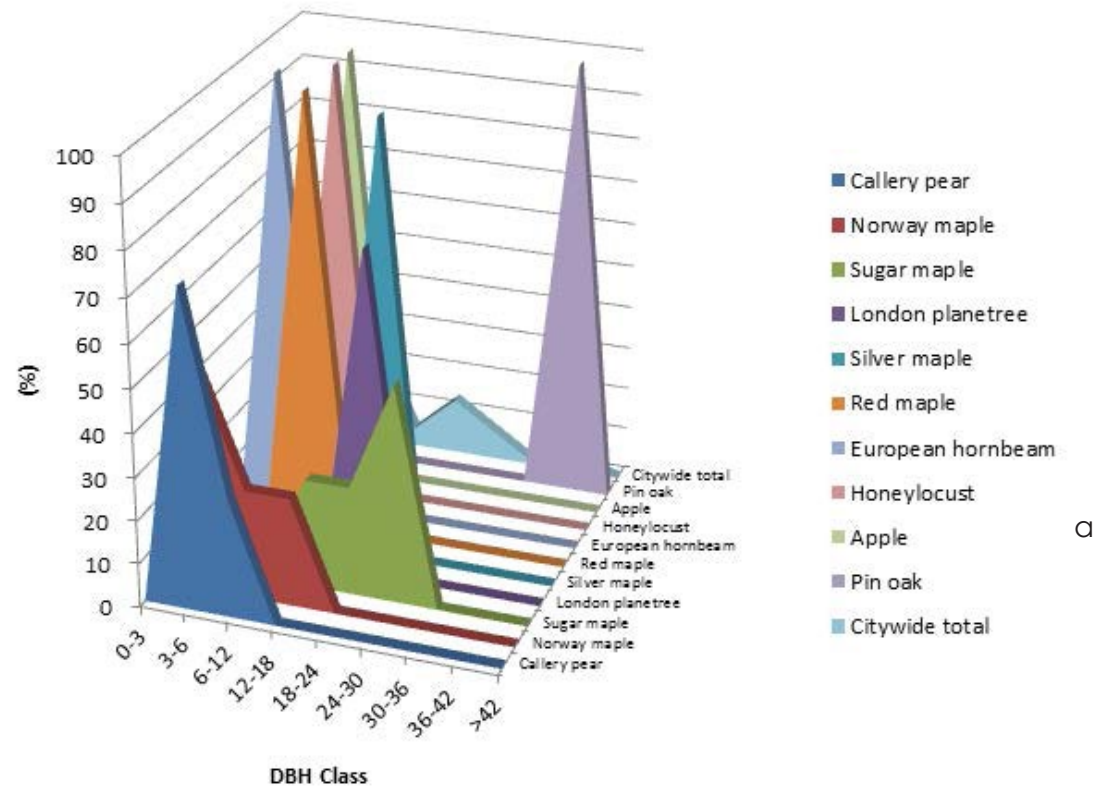
The few street trees in Coraopolis are in relatively good condition as presented in the following table:

Condition	Tree Count
Good	37
Fair	2
Poor	7
Dead	0
Total	46

Supplementing the i-Tree report, site reconnaissance during this study found that there is a tremendous opportunity for expanding Coraopolis's urban forest with additional tree plantings. Helping to inform future tree planting efforts, the i-Tree inventory in conjunction with the Canopy Cover Analysis that will be discussed in the next section provide a platform to assist urban forestry decision making. Examples of updated forestry goals might include improved species diversity, tree distribution across the neighborhoods, targeting areas of lowest canopy, and priorities important to the Borough such as the look of the business district's main streets.

Canopy Cover Analysis

Interpreting the Urban Tree Canopy Assessment, conducted by Allegheny County and including both public and private tree cover, it becomes apparent where existing tree canopy is deficient. Analysis of the tree canopy cover by census block can assist the municipality in prioritizing targeted tree plantings and focusing on areas of greatest need. Referring to the canopy map below, the census blocks in red have 0-20% canopy and are the areas of greatest tree need. The area with the greatest cover along the southern half of the Borough consists of a lot of undeveloped hillside that include the school properties and other private properties leading down to McCabe Run and the Cemetery property.

The national average for street trees in comparable cities is one street tree for every five persons. Pittsburgh's street tree population is one street tree for every eleven people. Coraopolis' street tree population is one tree for every 123 people.

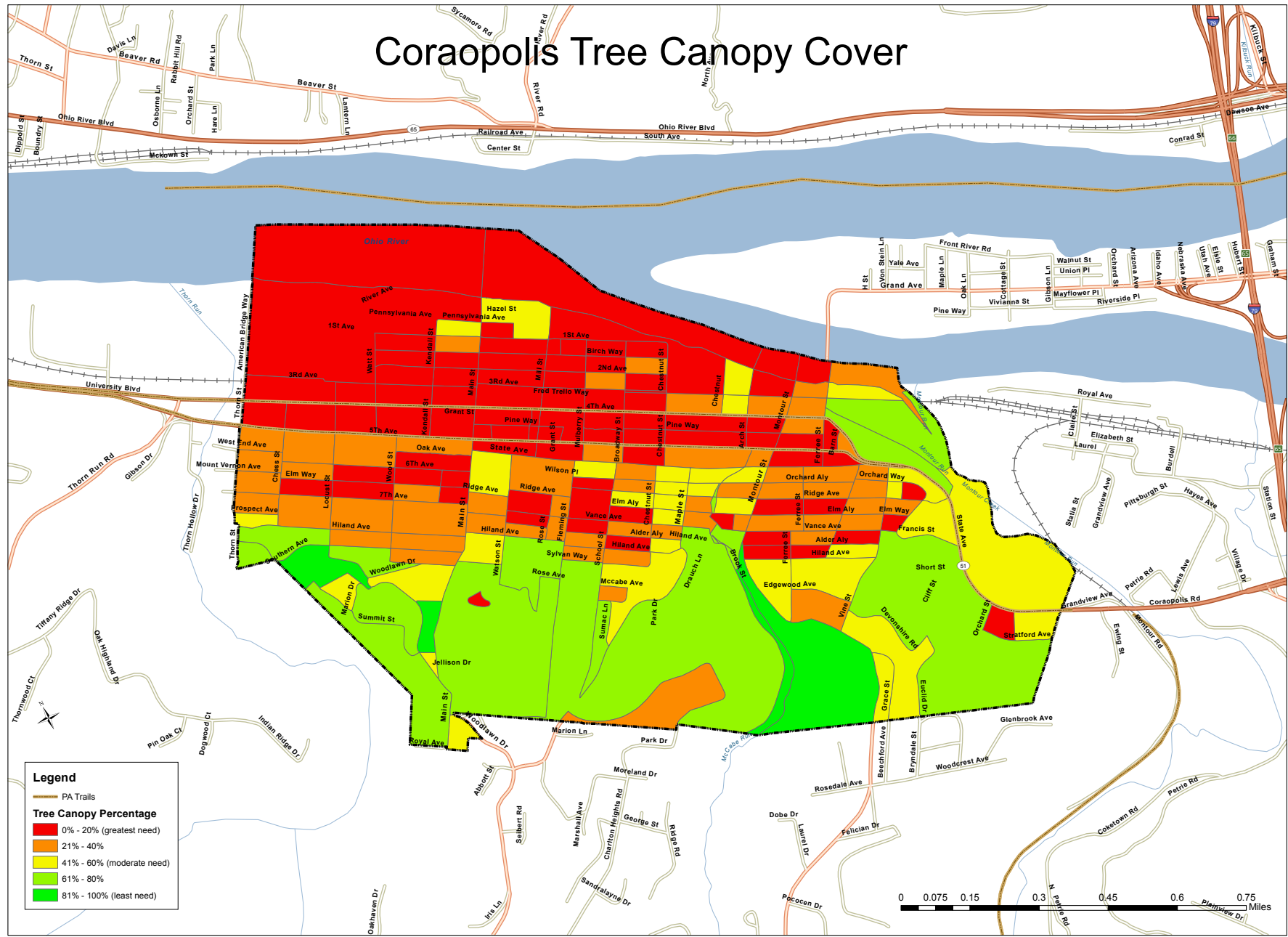Nearly treeless streets - Broadway Street at 1st Avenue looking south toward town. Photo: WPC.

Nearly treeless streets - Wood Street at 6th Avenue looking south up the hill. Photo: WPC.

Coraopolis Tree Canopy Cover

Legend

PA Trails

Tree Canopy Percentage

- 0% - 20% (greatest need)
- 21% - 40%
- 41% - 60% (moderate need)
- 61% - 80%
- 81% - 100% (least need)

0   0.075   0.15   0.3   0.45   0.6   0.75 Miles

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Environmental and Economic Benefits of Existing Trees

The environmental and economic benefits of Coraopolis's public trees were calculated using the i-Tree Streets program. Benefit inputs help to define the dollar value of tree-related environmental and economic services associated with trees. Default values based on the specific climatic zone are included for Coraopolis Borough. The inputs used to determine the environmental and economic benefits include:

- $/Kwh—dollar value of energy savings of electricity
- $/Therm—dollar value of energy savings from reduction of heating needs
- $/lb of CO2—dollar value of carbon dioxide (CO2) removed from the atmosphere
- $/lb of PM10—dollar value of particulate matter (PM10) with diameter 10 micrometers or less removed from the atmosphere
- $/lb of NO2—dollar value of nitrogen dioxide (NO2) sequestered from the atmosphere
- $/lb of SO2—dollar value of sulfur dioxide (SO2) sequestered from the atmosphere
- $/lb of VOC—dollar value of volatile organic compound (VOC) sequestered from the atmosphere
- $/gallon of storm water interception—dollar value of water intercepted, through fall and stem flow
- average home resale value—dollar value that trees add to the sales price of a home

Coraopolis's public trees provide $4,953 per year in environmental and economic benefits. Quantifying the annual benefits of trees can assist the shade tree commission and borough in making the case for more trees and better management of the existing tree resource. It is important to point out that as trees get bigger the annual value of their benefits increase.

Energy	CO2	Air Quality	Storm water	Aesthetic/Other	Total*
$1,658	$44	$300	$419	$2,532	$4,953

*Note the value of benefits will increase as trees grow.

SECTION FOUR: POTENTIAL GREEN ASSETS

## PUBLIC GREEN SPACES AND RECREATIONAL OPPORTUNITIES

Based on the GIS analysis of current community access to existing parks and green spaces, much of Coraopolis is not within desireable walking distance of Borough parks. The upcoming addition of the new Montour Junction Park along the Borough's eastern boundary will provide a significant number of households on the eastern portion of the Borough with acceptable walking access to a park. Beyond Montour Junction, there are limited options for adding new Borough parks due to space constraints (with one exception – See Section 5 regarding Borough and School District property).

The Borough could also benefit from cleanup and rehabilitation of existing parks, some re-design of existing park amenities and adding new types of park amenities, and long-term maintenance planning. There are a number of cost effective ways to improve quality and amenities to existing parks and playgrounds.

IN-TOWN CITY PARK

*click image to download hig resolution PD

City Park
Baseball
Tennis
Football/Soccer
Olympic Pool
Boating Pond
Fitness Trail
Nature Boardwalk
Amphitheater

GRAPHIC SCALE

Professor Ramsey   LAND 4050   Fall 2008   Birtice A. Garner

Children play in child-sized bird nest at Crescent Early Childhood Center, Homewood (left). Photo: WPC.
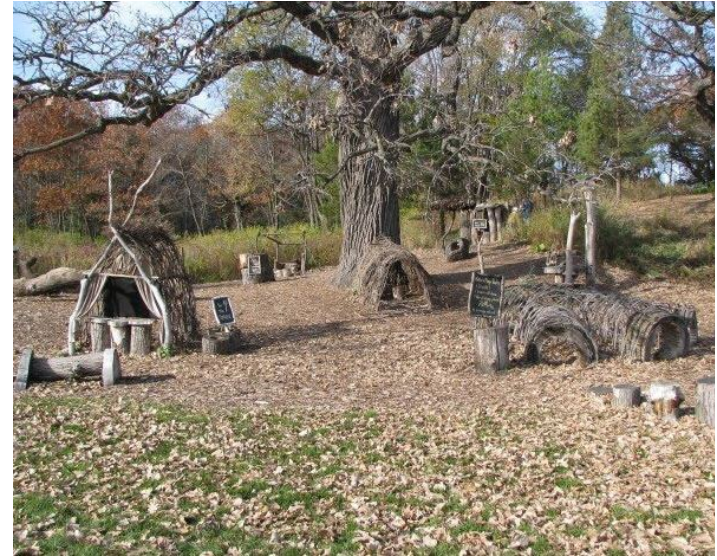
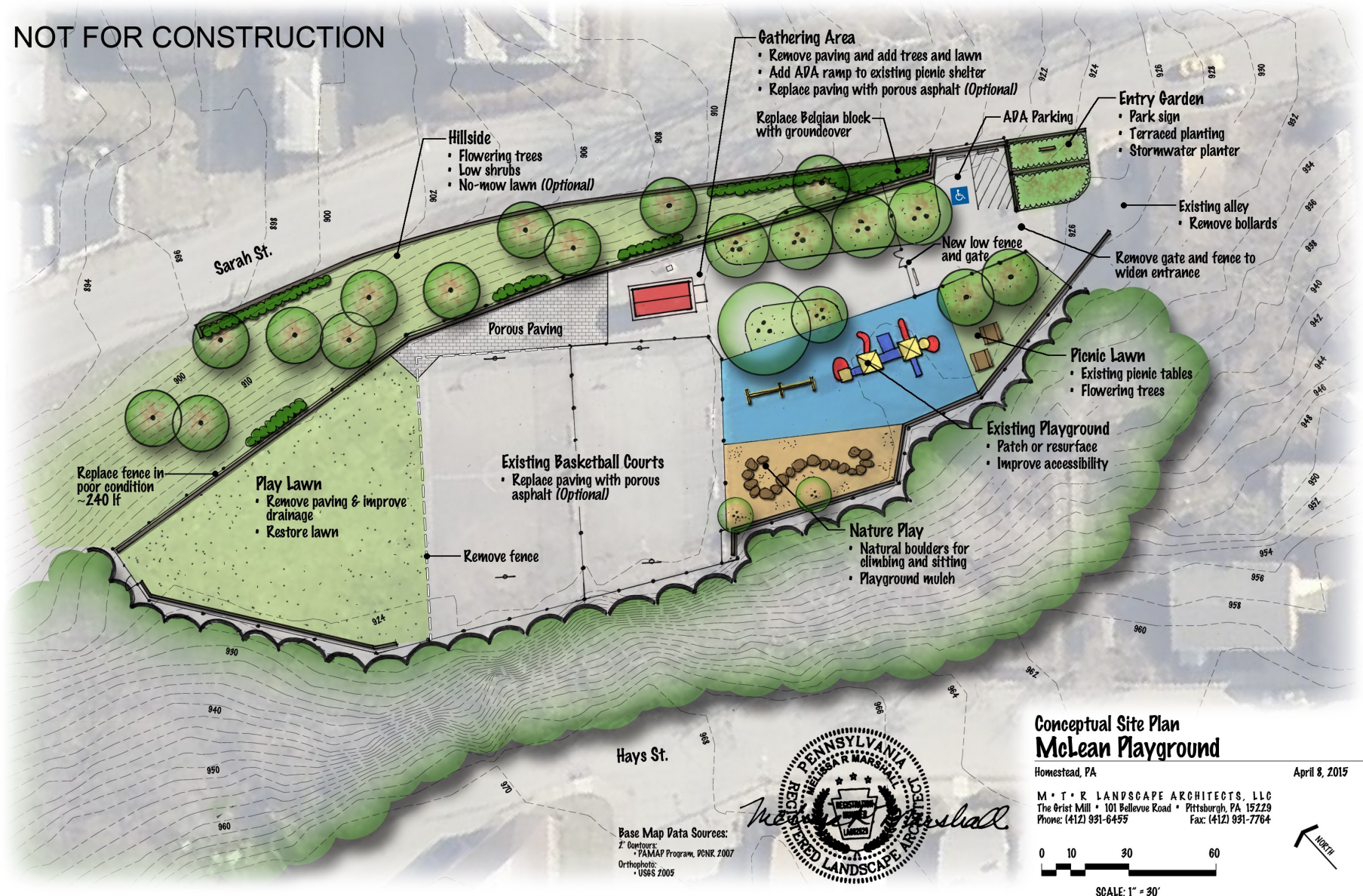Natural Playground. Photo: Unknown.

While several improvements to existing Borough parks could be made in the short term, in order to facilitate and support efforts to add assets to the Borough's green spaces and to plan for their long-term care, it would be advisable to create a Borough Parks Master Plan. Such a plan could detail the needs and specific opportunities that the Borough wishes to pursue over the next 5 years. Specific goals such as more shade, less pavement, additional storm water capture and assets that fill unmet needs, such as benches and quiet sitting spaces for older citizens or natural play spaces for smaller children, can be set. Such a plan can help a Borough become eligible for future funding through a state agency such as the Department of Conservation and Natural Resources.

It may be a cost-effective option to add simple green play spaces using natural materials that are readily available even through ordinary Borough maintenance practices. By repurposing materials, such as tree trunks, vines, stones and boulders, some innovative and readily replaceable play elements can be added to existing green spaces.

Childrens playground utilizing natural elements. There photos represent natural play spaces and materials that are relatively easy to find and maintain. Photo: Unknown.

NOT FOR CONSTRUCTION

Gathering Area
• Remove paving and add trees and lawn
• Add ADA ramp to existing picnic shelter
• Replace paving with porous asphalt (Optional)

Entry Garden
• Park sign
• Terraced planting
• Stormwater planter

Replace Belgian block with groundcover

ADA Parking

Hillside
• Flowering trees
• Low shrubs
• No-mow lawn (Optional)

Existing alley
• Remove bollards

New low fence and gate

Sarah St.

Remove gate and fence to widen entrance

Porous Paving

Picnic Lawn
• Existing picnic tables
• Flowering trees

Replace fence in poor condition ~240 lf

Play Lawn
• Remove paving & improve drainage
• Restore lawn

Existing Basketball Courts
• Replace paving with porous asphalt (Optional)

Existing Playground
• Patch or resurface
• Improve accessibility

Remove fence

Nature Play
• Natural boulders for climbing and sitting
• Playground mulch

Hays St.

Base Map Data Sources:
1' Contours:
• PAMAP Program, DCNR 2007
Orthophoto:
• USGS 2005

PENNSYLVANIA
REGISTERED LANDSCAPE ARCHITECT
MELISSA R MARSHALL
REGISTRATION

Conceptual Site Plan
McLean Playground

Homestead, PA   April 8, 2015

M · T · R LANDSCAPE ARCHITECTS, LLC
The Grist Mill • 101 Bellevue Road • Pittsburgh, PA 15229
Phone: (412) 931-6455   Fax: (412) 931-7764

0   10   30   60

SCALE: 1" = 30'

NORTH

Park improvement plan for McLean Park in Homestead as part of that Borough's Green Scan.

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GREEN SOLUTIONS TO STORMWATER MANAGEMENT

Coraopolis Wet Weather Long Term Control Plan Recommendations for CSO Areas

According to the pending Coraopolis Wet Weather Long Term Control Plan, there are 13 areas in Coraopolis where stormwater runoff from streets, sidewalks, driveways, rooftops and any other impervious surfaces drains into combined sewer pipes. Wet weather events that occur in these areas, even minor ones, cause a combination of stormwater and raw sewage to overflow into the Ohio River at one of six CSO control structures within the Borough.

In response to Pennsylvania DEP requirements, there are ongoing efforts to install separate storm and sanitary sewer in Coraopolis in order to reduce combined sewer overflow events. While this will result in preventing stormwater from streets, sidewalks, driveways, and other impervious surfaces at ground level, many downspouts drain stormwater from rooftops directly into the combined sewer. County regulations are in place requiring downspouts to be disconnected from the combined sewer at the time of a sale of a property. However, more proactive efforts to work with property owners on practical solutions to disconnect downspouts are needed, even if separate storm and sanitary sewers are installed. Employing green infrastructure approaches to capturing stormwater could help to solve some of these issues. Green infrastructure can work in conjunction with efforts to replace the combined sewer pipes and catch basins with separate storm and sanitary sewers.

Rain barrel collecting water from a disconnected downspout as a community effort to divert rain water in the Nine Mile Run watershed. Photo: Katy Frey.

Disconnected downspout into a residential rain garden from downspout_Champaign, IL. Photo: prairierivers.org.

Permeable parking lot and bioswale at Hof Airport, Hof, Germany. Photo: Unknown.

Coraopolis combined sewersheds overflows. Source: Coraopolis Water Authority.

STREETSCAPES

Currently, the Borough has a variety of streetscapes. Along 5th Avenue, which is the main commercial corridor in Coraopolis, there are currently several planters concentrated around the Borough building at the gazebo across from the Borough building, and around the VFW Post 402 at 5th Avenue and Mulberry Street, and several other nodes in the commercial corridor. Members of the Coraopolis Shade Tree Commission and Borough Public Works staff are partnering to plant and care for the existing planters. It could be possible to add more planters or take steps to take the existing planters more manageable and higher impact. However, adding any new planters, or even slowly replacing some planters over time, entails some costs as outlined below.

Summer displays of Western Pennsylvania Conservancy's flower planters in Downtown Pittsburgh. Photo: WPC.

In addition to the cost of each planter, which can be considerable, a summer display with annual flowers and a perennial center will cost at minimum $40 and up to $100 each. A year-round display that includes bulbs, mums and winter evergreens will costs between $150 and $400 per planter depending on plant type, quality and amount. It is also important to assess the amount of time and energy required to keep the planters looking at their best.

Flower Planter Costs

Set up Cost	35" to 42" wide	Annual plant cost Summer only//year round	Annual care taking (watering, weeding trimming) contracted	Weekly volunteer care taking per 4 blocks
Plastic	$400 - $600 each	$40 to $100 // $150-$400	$150 to $200	Up to 2 hours per visit for a four block area.
Concrete	$400 - $800 each	$40 to $100 // $150-$400	$150 to $200	Planters need to be watered every other day

In terms of maintenance, planters will need to be watered every other day in the growing season (about 24 to 28 weeks) and fertilized and weeded once a week depending on temperature. The average cost for contracting this work out is $150 to $200 per planter per season. If this maintenance can be provided by Borough staff or volunteers, the costs would need to be calculated differently and would likely be greatly reduced.

Hanging Baskets

An additional strategy for enlivening business district streets can be hanging baskets. However, the capital costs of baskets, added to higher maintenance costs and more difficult care taking due to height and stress for plants in baskets, may not make this a feasible approach to further enhancement of the downtown streets. (Hanging baskets must be watered every day in the season and fertilized once a week for approximately 16 to 18 weeks. Watering is crucial to keeping the baskets looking their best.)

For reference basic costs for a typical hanging basket program are outlined below:

Hanging Basket Costs

Set up cost	Annual plant cost	Annual care taking costs (contracted)
$150 - $200 per basket, including bracket, basket and any signage.	$65 per basket	$125 to $200 per basket per season

Western Pennsylvania Conservancy's hanging flower baskets in Market Square, Downtown Pittsburgh. Photo: WPC.

It is unlikely that it would be feasible to handle basket assembly, hanging and care-taking using volunteer help. Therefore a basket program would have a significant cash cost even if the Borough staff were able to do some amount of the watering and care-taking.

However, in the future, should the Borough decide to undertake a full-scale reset of its main east-west streets, particularly through the business district, it would be to the Borough's advantage to adopt best practices, add striking design and include storm water capture. Several more general options are described below and one specific recommendation is presented In Section 5.

Planted Tree Pits

There are currently no street trees within the commercial corridor on 5th Avenue. Due to the width of the sidewalk and due to existing underground utility conflicts, adding street trees to the commercial corridor would require a re-configuration of the existing sidewalk. Alternatively, bump-outs could be added in strategic locations to provide space for trees to be planted – see recommendations in Section 5. A huge variety of tree pit designs offers a number of additional benefits—perennial plantings for color and texture, curb cuts or inlets to capture storm water, underground storage for storm water, and so on. With some additional design and construction elements tree pits can capture even more water and begin to make a significant contribution to reducing storm water before it reaches the combined sewer overflows. Examples of these options include:

New stormwater capture grates in Etna.
Photo: Larry Roberts, Post-Gazette.

Stormwater tree pits with inlets at Autumn and Stanley Avenues, East New York, Brooklyn. Photo: City of New York.


Example of stormwater inlets on a tree pit at Atlantic Avenue and Dean Street. Photo: NYC Water.

Enhanced Storm Water Tree Pits: Runoff from the street is diverted by curb cut and routed into this enhanced tree pit, where specially engineered soils and native plant species are used to absorb water and filter associated pollutants. In some enhanced tree pits, storage chambers hold additional runoff, available for plant uptake or groundwater recharge.

Tree Trenches: A storm water tree trench is a system of tree pits that are connected by an underground infiltration structure. On the surface, a storm water tree trench can just look like a series of tree pits. But, under the sidewalk, there is an engineered system to manage the incoming runoff. These systems are composed of a trench dug along the sidewalk, lined with a permeable geotextile fabric, filled with stone or gravel, and topped off with soil and trees. Storm water runoff flows through a special inlet (storm drain) leading to the storm water tree trench. The runoff is stored in the empty spaces between the stones, watering the trees and slowly infiltrating through the bottom. If the capacity of this system is exceeded, storm water runoff can bypass it entirely and flow into an existing street inlet.

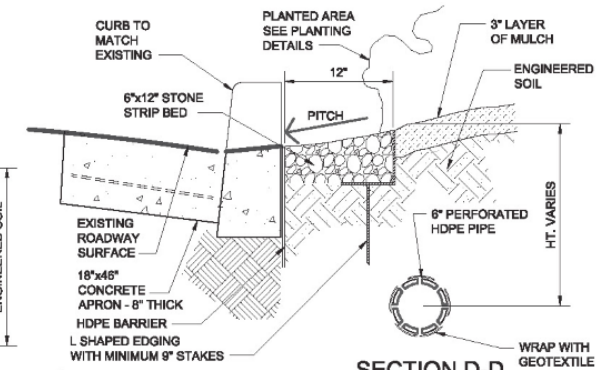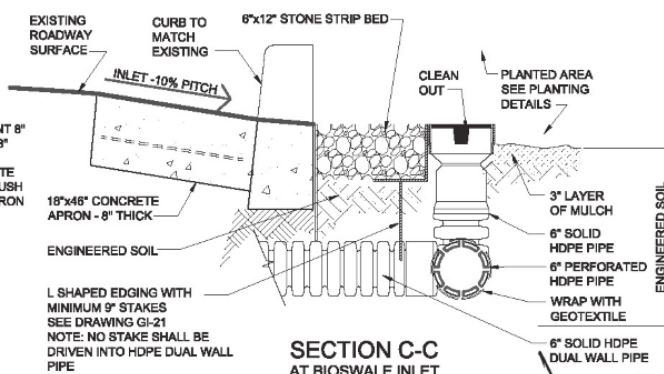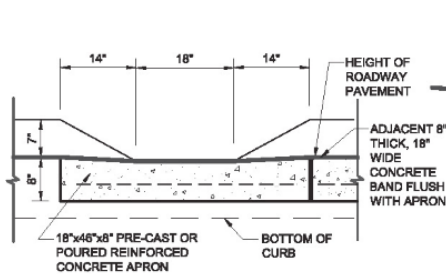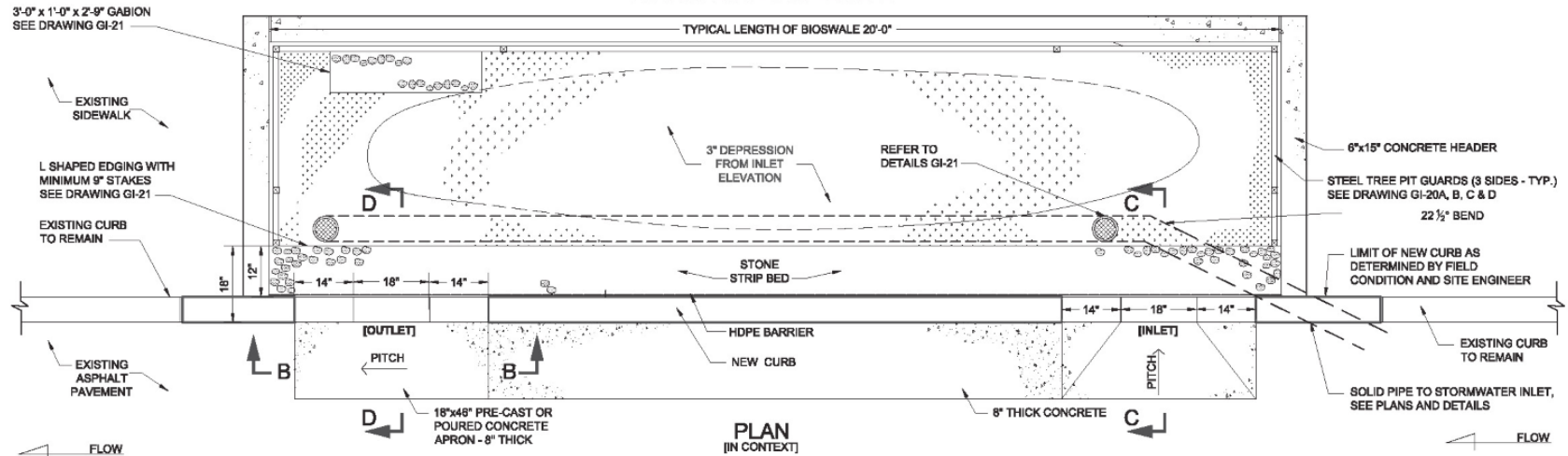GREEN STREETS: STORMWATER TREE TRENCH
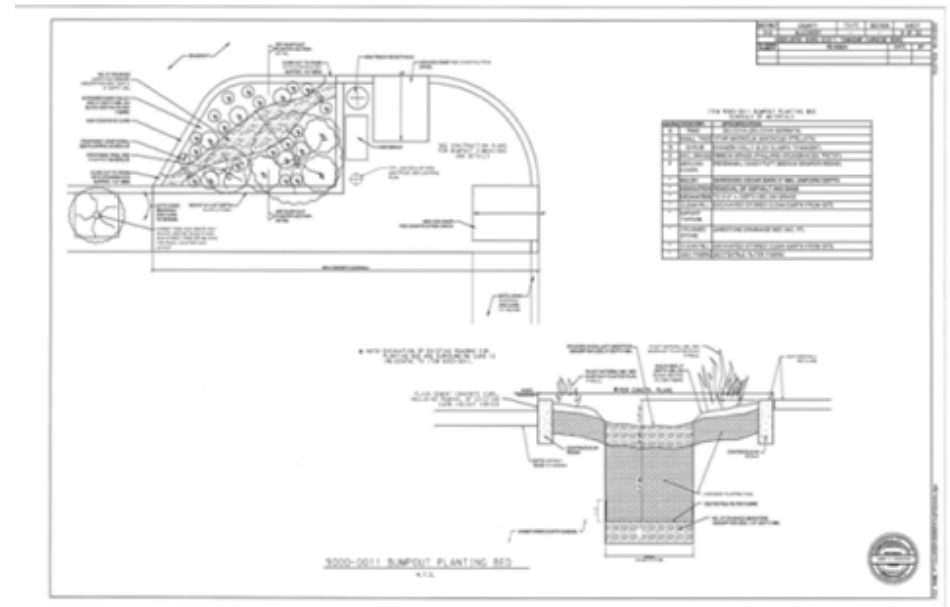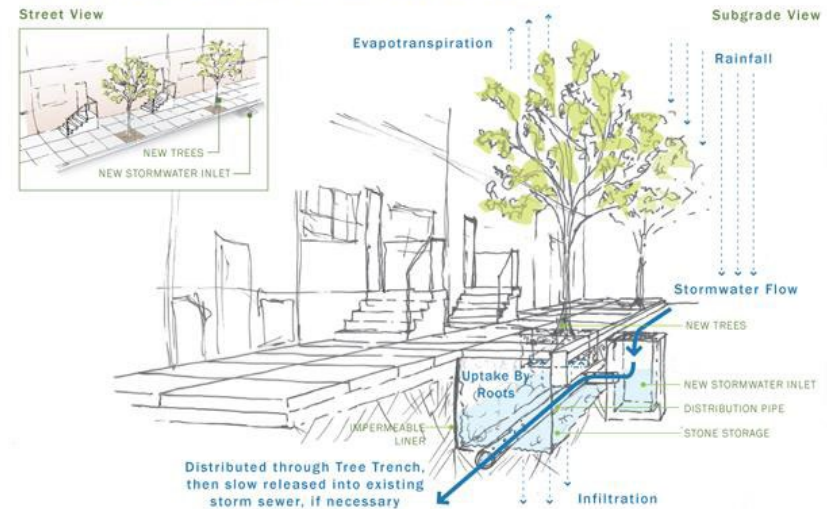
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF GREEN INFRASTRUCTURE

STANDARD FOR 20'X5' R.O.W. BIOSWALE TYPE 1B - WITH STORMWATER INLET
- NO CONNECTION TO SEWERS

3'-0" x 1'-0" x 2'-9" GABION
SEE DRAWING GI-21

TYPICAL LENGTH OF BIOSWALE 20'-0"

EXISTING
SIDEWALK

3" DEPRESSION
FROM INLET
ELEVATION

REFER TO
DETAILS GI-21

6"x15" CONCRETE HEADER

L SHAPED EDGING WITH
MINIMUM 9" STAKES
SEE DRAWING GI-21

STEEL TREE PIT GUARDS (3 SIDES - TYP.)
SEE DRAWING GI-20A, B, C & D

22 ½" BEND

EXISTING CURB
TO REMAIN

D

C

STONE
STRIP BED

LIMIT OF NEW CURB AS
DETERMINED BY FIELD
CONDITION AND SITE ENGINEER

18" 12"

14"   18"   14"

HDPE BARRIER

14"   18"   14"

EXISTING CURB
TO REMAIN

[OUTLET]

B

PITCH

B

[INLET]

PITCH

NEW CURB

EXISTING
ASPHALT
PAVEMENT

D

18"x46" PRE-CAST OR
POURED CONCRETE
APRON - 8" THICK

PLAN
[IN CONTEXT]

8" THICK CONCRETE

C

SOLID PIPE TO STORMWATER INLET,
SEE PLANS AND DETAILS

FLOW

FLOW

14"   18"   14"

HEIGHT OF
ROADWAY
PAVEMENT

EXISTING
ROADWAY
SURFACE

CURB TO
MATCH
EXISTING

6"x12" STONE STRIP BED

CLEAN
OUT

PLANTED AREA
SEE PLANTING
DETAILS

CURB TO
MATCH
EXISTING

PLANTED AREA
SEE PLANTING
DETAILS

12"

3" LAYER
OF MULCH

7"

ADJACENT 8"
THICK, 18"
WIDE
CONCRETE
BAND FLUSH
WITH APRON

INLET -10% PITCH

6"x12" STONE
STRIP BED

PITCH

ENGINEERED
SOIL

8"

18"x46" CONCRETE
APRON - 8" THICK

3" LAYER
OF MULCH

EXISTING
ROADWAY
SURFACE

6" PERFORATED
HDPE PIPE

18"x46"x8" PRE-CAST OR
POURED REINFORCED
CONCRETE APRON

BOTTOM OF
CURB

ENGINEERED SOIL

6" SOLID
HDPE PIPE

18"x46"
CONCRETE
APRON - 8" THICK

HT. VARIES

SECTION B-B

L SHAPED EDGING WITH
MINIMUM 9" STAKES
SEE DRAWING GI-21
NOTE: NO STAKE SHALL BE
DRIVEN INTO HDPE DUAL WALL
PIPE

6" PERFORATED
HDPE PIPE

WRAP WITH
GEOTEXTILE

6" SOLID HDPE
DUAL WALL PIPE

SECTION C-C
AT BIOSWALE INLET

HDPE BARRIER

L SHAPED EDGING
WITH MINIMUM 9" STAKES

WRAP WITH
GEOTEXTILE

SECTION D-D
AT BIOSWALE OUTLET

7/25/2012
DATE

P.E.

ASSISTANT COMMISSIONER, OFFICE OF GREEN INFRASTRUCTURE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bump-outs with Bio-retention: Streets and sidewalks can be configured to slow water, direct traffic and capture water through planted areas. Bump-outs provide sidewalks extensions that can serve as planting or tree pit areas.

Stormwater infrastructure can be highly engineered. Photo: unknown.

Green bumpout at 42nd Avenue and Belmont Street, Portland, OR. Photo: Portland's Bureau of Environmental Strategy


A planted bumpout with a water inlet in Silver Spring, MD. Sandbags are placed at the inlet during winter months to reduce salt intake. Photo: Ed Murtagh, Friends of Sligo Creek.

TREE CANOPY

There is considerable room for adding tree cover to the Borough, particularly within residential areas and Borough parks. A forester's assessment identified potential locations for more than 500 additional street trees in the Borough. Depending on the specific location, slope, arrangement of storm drains and other factors, some of these locations could be suitable for the types of enhanced or engineered tree pits described above. However, tree canopy in general can be improved using conventional planting techniques in sidewalks, open spaces, parks and institutional spaces such as a school.

Planted Tree Pit Costs

Basic annual planting	$25 to 50 per pit / year
Perennial pit planting	$50 one time first year cost
Special curbed pits	$5,000 to $10,000 per pit
Maintenance including watering (contracted)	$50 to $150 per pit per season depending on size
Maintenance (volunteer)	$25 per season for tools, gloves, brown bags
Water	$2.71 per pit / year

A well shaded street provides more than just aesthetic value. Photo: Great Streets San Diego.
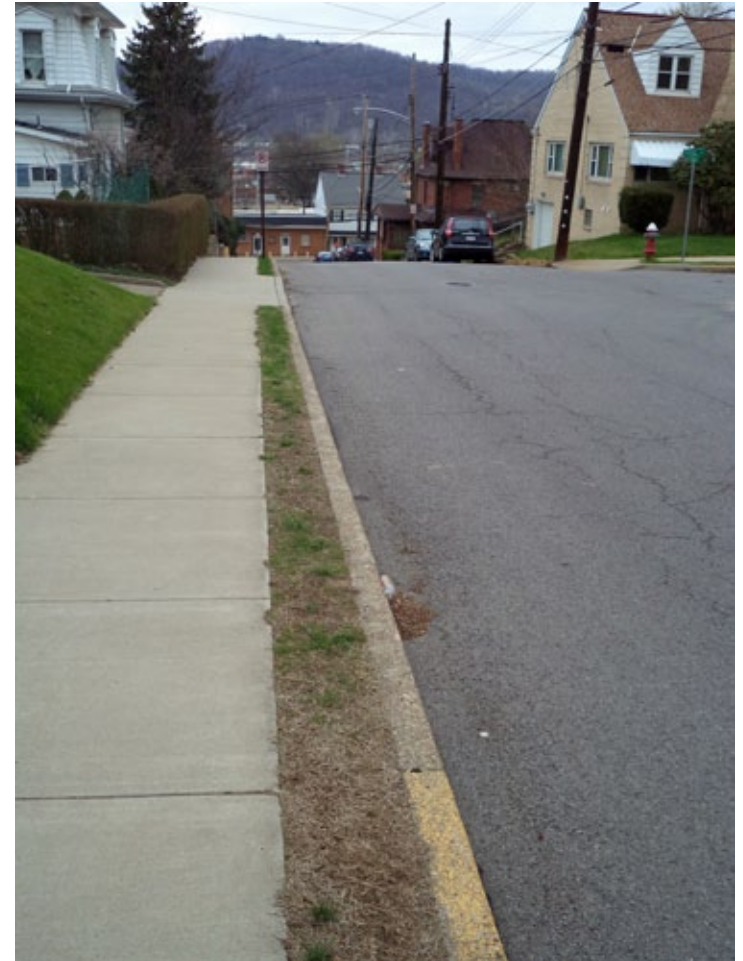
Ridge Avenue and Fleming Street tree lawn and sidewalk - great opportunity for trees. Photo: WPC.

Coraopolis Street Tree Analysis

Legend

● Potential Street Trees (506)

● Existing Street Trees (46)

Western Pennsylvania Conservancy

0   0.1   0.2   0.4 Miles

Image courtesy of USGS Earthstar Geographics SIO © 2014 Microsoft Corporation © 2014 Nokia © AND

PUBLIC AND PRIVATE VACANT LAND

There are a variety of ways to enhance existing vacant land. Some of this land may eventually be repurposed for new housing, commercial or business purposes. In limited cases, some of the properties may be earmarked for long-term use as intentional green space. Various approaches to greening can improve vacant land including the three methods noted below.

Tree planting: Adding trees to existing open spaces, such as parks, playgrounds, and vacant land that will not be re-developed is easy, attractive, and provides many natural benefits. A single mature tree with a 30 foot crown can intercept over 700 gallons of rainfall annually. Public open spaces are often high value places to plant trees because multiple benefits are gained.

Vegetated swales: Swales are gently sloping depressions planted with dense vegetation or grass that can capture, store, and infiltrate storm water runoff from rooftops, streets, parking lots, and other impermeable surfaces. As the runoff flows along the length of the swale, vegetation slows and filters it and allows it to infiltrate into the ground, thereby avoiding runoff into underground sewerage infrastructure. There are a range of options for designing and planting swales depending on the conditions at the site location and on the desired size of the investment. Swales can be planted with a variety of trees, shrubs, grasses, and ground covers. Swales do require regular maintenance, including regular inspection, especially after storm events. Often this involves removing trash and excess sediment.

Rain Gardens: Rain gardens are areas contoured to hold water for short periods of time and planted with a variety of plants that can tolerate both times of excess and scarce water. Rain gardens, if properly maintained, can add color, texture and ecological richness to a location to which water can be direction perhaps from a downspout, roof gutter or curb cut.   They are general smaller and more decoratively planted than bioswales.

TreeVitalize volunteer planting on vacant land in Wilkinsburg. Photo: WPC.

Coraopolis Borough
Vacant Property

Western Pennsylvania
Conservancy

Legend

Parks and Open Spaces

Vacant land by type

Agricultural

Commercial

Government

Industrial

Residential

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

It should be noted that tree planting is preferred on public land that is intended for mid to long term green space use. The value of trees increases each year in terms of the environmental services provided; longevity increases the return on investment for planting trees. Simple bioswales could offer some useful water retention at a low cost even if the duration of use is fairly short. Rain gardens, by virtue of their more decorative and designed character, are best located where they will receive care and provide mid to long term benefits. Both public and private vacant land can be used in these ways, but the Borough may have to provide public education and encouragement to invite private landowners to utilize these techniques.

Overall care taking of open and vacant land is an investment that can provide multiple benefits. Sometimes adding green enhancements such as these can enlist public and private care taking. While the costs of care taking can be a concern to municipal budgets, there are also significant benefits to keeping grass cut and performing other minimal care on vacant sites. In some other communities, a simple fence has served to delineate cared for public spaces and proves to reduce litter and trash simply by indicating that the site is being monitored.

Simple "Clean & Green" vacant lot strategy in Philadelphia. Photo: Pennsylvania Horticultural Society.

Simple bioswale design, Chicago. Photo: Marina R. Post.

400-foot long bioswale along Hawthorne Drive in Millvale. Photo: WPC

PARKING LOTS

The Borough of Coraopolis currently owns seven parking lots including the police and fire department lot next to the current Borough building, totaling approximately 2.1 acres, There are also three additional parking lots on Cornell School property totalling 3.6 acres. In all, these lots comprise 5.7 acres of impervious surface in addition to the commercial lots affiliated with local businesses. Paved surfaces such as these send rain water directly into storm water systems. Adding greenery of various types, from simple plantings around a perimeter to full scale bioswales or engineered water retention systems, can greatly reduce the runoff from such sites.

Greening the Borough's surface parking lots can add a polished look to the streetscapes and improve nearby property values as well as helping demarcate parking areas. The additional benefits of greening the lots, such as cooling and increasing water capture, accrue both to property owners and users of the lot.

Permeable paving is an additional possibility for parking lots, but is often not visibly "green" and frequently is more costly to install and to care for. However, in certain locations this can be a beneficial investment.

Permeable parking spots at Fallingwater. Photo: WPC.

Parking lot bioswale at Premera Blue Cross in Mountainlake Terrace, WA
Photo: TheWatershedCompany.

An example of porous paving. Photo: Unknown.

Coraopolis Borough Parking Lots

Western Pennsylvania Conservancy

Legend

Borough-owned Parking lots
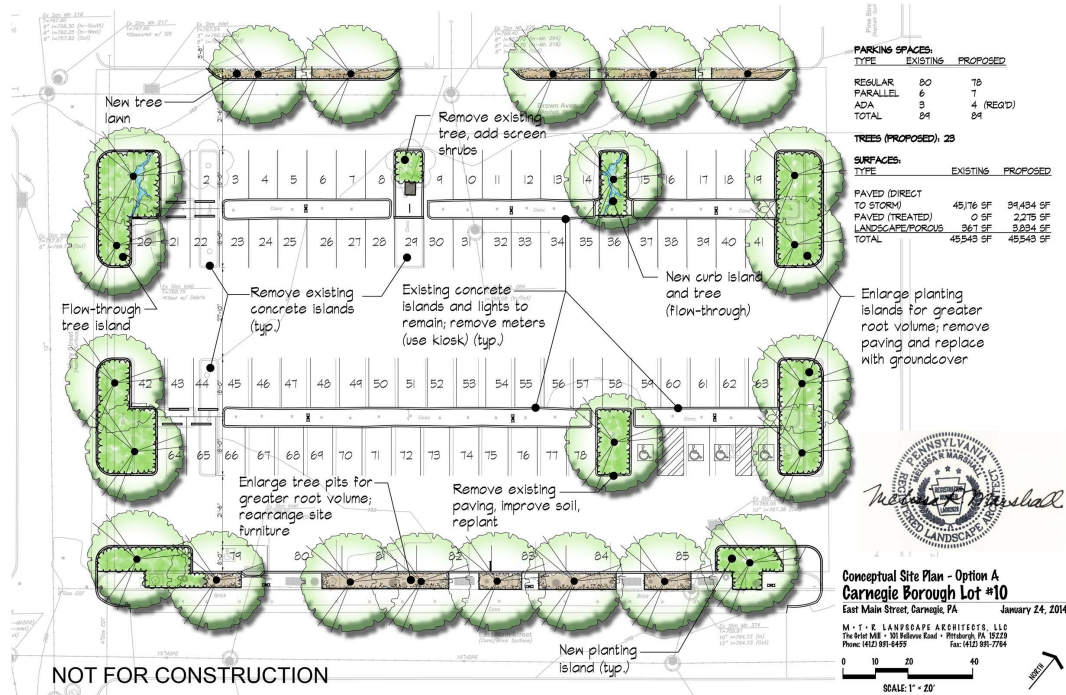
Plan for greening a sample parking lot in Carnegie, PA. WPC, 2014.
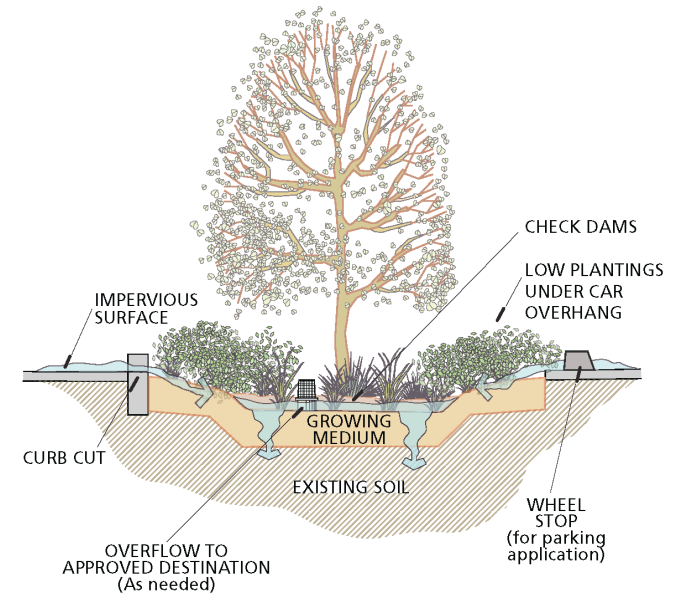
Municipal-owned lot at the entrance to the Ridge Avenue playground. Photo: WPC.

Municipal-owned parking lot along 5th Avenue in front of the current Borough building. Photo: Google Streetview.

MUNICIPAL AND CIVIC PROPERTIES AND BUILDINGS

There are several current and future opportunities to add green assets to municipal and civic properties. One opportunity, which is discussed in more detail in Section 5, is Coraopolis Memorial Library. Another upcoming opportunity to enhance Borough-owned properties is the new Borough administration building which is slated to be built starting in late 2015.
As part of a comprehensive greening and storm water capture effort, communities can selectively institute downspout disconnection and runoff capture. Such a program can allow water from roof downspouts to reach open green space where it can soak in, help water existing plants and grass and generally ease the load on storm water systems. However, it is crucial to be sure that such a project is carefully planned to assure that redirected runoff does not wind up in basements or other troublesome locations. Some techniques that can be employed on municipal properties include the following:

o   Rain barrels
o   Cysterns
o   Rain gardens
o   Soakage trenches.

A more elaborate way to add both green and storm water capture is to install green roofs in selected locations. Green roofs can double the life of conventional roof coverings, and if properly designed require very little care taking over time. Green roofs can be costly in the initial installation, but often quickly pay for themselves in related benefits such as reduce cooling and heating costs due to insulated properties.

Many of these same techniques can be used for privately-owned properties and buildings, although the Borough would have to enlist partners to provide the information, technical assistance and persuasion needed to create a successful effort.

Example of a residential green roof over a porch. Photo: Marcus de la fleur, 2008.

Green roof on a residential property in Washington, DC.
Photo: Metropolitan Regional Information Systems, Inc.

SECTION FIVE: BEST OPPORTUNITIES AND RECOMMENDATIONS

ACTION OPTIONS SUMMARY

The Green Scan has identified a number of ways that the Borough of Coraopolis could initiate greening projects that will offer creative and effective ways to address issues of environmental quality that affect overall quality of life in Coraopolis. The Scan summarizes possible actions, ranked by cost, difficulty and time that it may take to launch the various types of project. This ranking will be helpful to the Borough as it chooses among options, both short and long-term, and adopts a plan of action for implementation of its preferred choices for action.

The various types of projects include:
- Expanding and improving public green spaces
- Increasing the urban tree canopy
- Adding green stormwater management projects

The various potential project locations include:
- Coraopolis Memorial Library
- Shelly Jones Memorial Park
- Ridge Avenue playground
- Business District streetscape (5th Avenue corridor)
- Mill Street, Mulberry Street, and Broadway Street between 5th Ave and 1st Ave
- Cornell School grounds

Each project will be annotated with symbols that summarize cost , effort , good potential partners , possible funding sources , and what is needed for sustainability . These factors will help Coraopolis residents and officials determine what projects may be most do-able and effective to undertake.

A note on compliance with 1990 Americans with Disabilities Act (ADA): Many projects, especially those funded by public funding sources or that are on public property, will require compliance with the 1990 Americans with Disabilities Act (ADA) and the 2010 ADA Standards for Accessible Design. It is important that any design or engineering drawings and all cost estimates factor in design components to ensure ADA compliance. This Green Scan provides some basic information and rough cost estimates for design components that may be required for each green enhancement to ensure ADA compliance. Project managers, engineers, and landscape architects working on project implementation should refer to the 2010 ADA Standards for Accessible Design (http://www.ada.gov/2010ADAstandards_index.htm) to ensure compliance.

A note on contingency costs: When estimating the cost for a project, there is always uncertainty as to the precise content of the materials in the estimate, how the work will be performed, or existing conditions that may be hidden from plain view. To compensate for these potential unknowns, it is important to factor a cost contingency into any major project budget to ensure that adequate resources are available to cover the unexpected. Some examples of unknown factors that may add to project costs are unknown subsurface utility issues, scheduling delays, lack of bidding competition or unanticipated market conditions. To be safe, it is recommended that between a contingency cost of between 10% and 25% be added to any project budget. More complicated project or projects that are in early conceptual phases should be assigned a higher contingency cost.

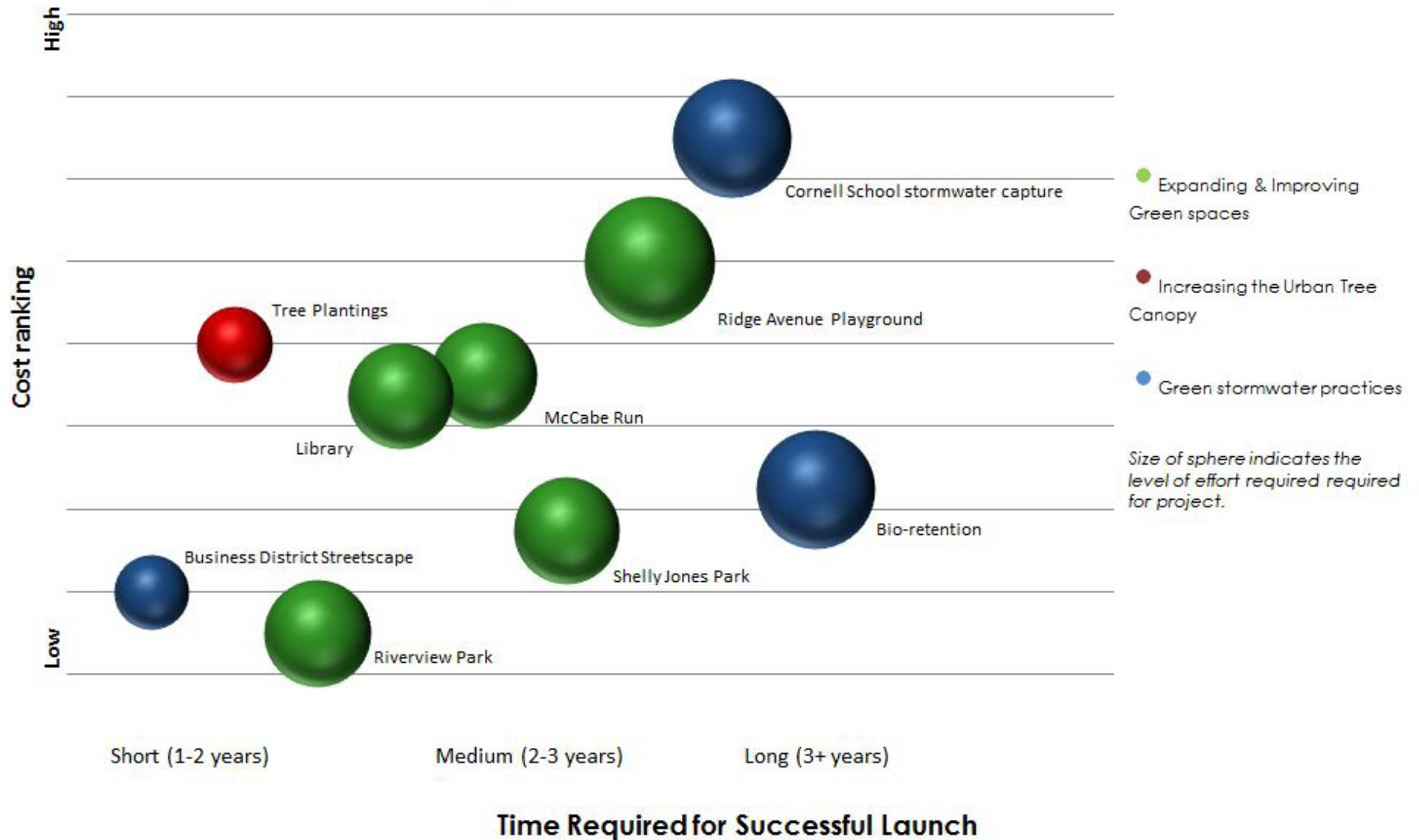Community members plant a gateway garden in Oil City. Photo: WPC.

Penn Hills residents build raised beds for a community vegetable garden. Photo: WPC.

Students add greenery to their school at Pittsburgh SciTech. Photo: WPC.

Coraopolis Recommendations Chart

Cornell School stormwater capture

Ridge Avenue Playground

Tree Plantings

McCabe Run

Library

Bio-retention

Business District Streetscape

Shelly Jones Park

Riverview Park

High

Cost ranking

Low

Short (1-2 years)   Medium (2-3 years)   Long (3+ years)

Time Required for Successful Launch

- Expanding & Improving Green spaces
- Increasing the Urban Tree Canopy
- Green stormwater practices

Size of sphere indicates the level of effort required required for project.

Coraopolis Greening Recommendations

	Cost	Level of Effort	Time Required for Successful Launch
		1 = Low 2= Medium 3= Med. High 4 = High	Years
EXPANDING & IMPROVING PARKS AND PUBLIC GREEN SPACES			
Coraopolis Memorial Library	$10-$175K	2	2
Shelly Jones Memorial Park	$10-$100K	2	2
Riverfront Park	$10-$50K	2	1-2
Ridge Avenue Playground	$10-$230K	3	2-3
New Public green space along McCabe Run	$25-$150K	2	2
INCREASING THE URBAN TREE CANOPY			
Planting trees along main streets	$50 - $200K	1	1-2
ADDING STORMWATER PRACTICES			
Business District Streetscape Greening	$30K	1	1
Stormwater capture at Cornell School	$200K	2 to 3	3
Bio-retention in Borough Parking Lot	$30K - $100K	2 to 3	3

EXPANDING AND IMPROVING PARKS AND PUBLIC GREEN SPACES

Action 1: Coraopolis Memorial Library Landscape and Building Improvements

Enhancing its grounds and adding elements that would allow the Library landscape to offer community members several types of green assets. Among these might be quiet sitting and reading areas outdoors, and a children's natural play space. The space could also accommodate several green infrastructure practices to capture stormwater runoff from the Library roof, and potentially from Ridge Avenue and School Street.

Coraopolis Library. Photo: Google Streetview.

Rain Barrels: $10-$250 each

Metal Benches: $1,000 to $1,400 each

Stone Benches: $200 each

Permeable surfaces: $3 to $15 per sq. ft.

Trees: $150 - $500 depending on tree size and planting location

Rain Garden: $5 - $25 per sq. ft.

Green Roof: $15-$35 per sq. ft. (plus any necessary roof support work)

Natural play space: $10,000-$40,000 depending on size and components

$ **Costs:** The potential cost of the project depends on what range of elements are included – see estimated prices for each component in the chart. This project could also be implemented in several phases in order to begin with lower cost components and allow time to build support and fundraise for higher cost components.

Effort: The effort and expertise required for this project also depends on the range of elements that are included. Rain barrels and benches can be installed by the library or Borough maintenance laborers. Installing landscape features such as a rain garden, porous paving, or a natural play space should involve a landscape architect with construction by skilled professional contractors. Installing a green roof requires engagement of a structural engineer, an architect with experience designing green roofs and skilled professional contractors. Trees could be planted by Borough or library staff and volunteers with technical assistance from an arborist or Western PA Conservancy.

Good Partners:

• Borough of Coraopolis - The project would take place on Borough-owned public land, which makes the Borough the key partner for this project. The Borough would likely be the applicant for any public dollars that are available for the project. The project will require the support of Borough council, close collaboration among the Borough council president, Borough manager, Borough solicitor, and the project managers.

• Coraopolis Memorial Library Board – Because they oversee the library building and its programing, the library board will be an essential project partner.

• Coraopolis Shade Tree Commission – The shade tree commission could assist with issues related to tree planting, care and maintenance and could help with overall landscape management issues.

Possible Funding Sources:

• **DCNR Community Conservation Partnership Program (C2P2) Grants:**

Because the library property is owned by the Borough of Coraopolis, the Borough would be eligible to apply for grant funding from Pennsylvania Department of Conservation and Natural Resources (DCNR) through their Community Conservation Partnership Program (C2P2).

This program requires a 1:1 match from other funding sources. In kind good and services, such as volunteers and Borough public works resources can be included as match. Up to 15% of the awarded funds can be used for engineering and landscape design. Grants are made on a reimbursement basis, where the applicant is reimbursed for project expenses after certain phases of work have been completed. DCNR retains 10% of the total awarded amount until the project is closed and the grantee is reimbursed up to 50% of the total accrued project costs, including cash and in-kind match.

Applications for this funding are due in April of each year, with awards being announced each year in November or December. If awarded, the Borough would then enter into a grant agreement with DCNR, which would include the detailed scope of work. Funding is not available until after the grant agreement is signed, which is usually during spring of the following year.

- **Allegheny County Conservation District (ACCD):** Link to the Application Package: http://www.accdpa.org/wp-content/uploads/2014/08/ACCD-Grant-Application.pdf

The Borough of Coraopolis, other government entities, or 501(c)(3)s are eligible to apply for ACCD Grant Program funds. ACCD funds projects that focus on abatement of pollution in rivers, streams, and other waters of the Commonwealth, including green infrastructure approaches to storm water management.

The ACCD hopes to provide 10 grants per year at a level of approximately $10,000 per grant. A 20% match is required, but can be cash, in-kind goods or services and salaries.

- **TreeVitalize Pittsburgh:** Link to website: http://waterlandlife.org/216/treevitalize

For adding trees to the library grounds, the library board or shade tree commission can submit an application to the TreeVitalize program via the Western Pennsylvania Conservancy to be considered for future TreeVitalize plantings. A forester will conduct official tree site assessments to determine the suitability for trees at a given site. If a site is determined suitable for a tree, the forester will select a tree species. The suitable sites will be forwarded to Coraopolis Borough for final approval. Upon final approval, tree site preparation will commence and volunteers will be organized for planting the trees. Tree plantings take place in the spring and fall.

- **Private Foundations or Donors:** Private foundations or donors interested in green infrastructure projects, improving libraries and public spaces, or environmental education could be good sources for implementation funds or cash match to supplement other grant funds and in-kind goods and services.

Sustainability: Depending on the specific elements, this project would need to have routine and periodic maintenance. For the landscape elements, these tasks include cleaning the rain barrels seasonally, annual mulching and pruning of plant material, minor weeding two to three times a year, watering of new plants and trees for the first three years after planting, and annual cleaning out of drains, filters or other structures. The green roof could require regular professional maintenance and monitoring of the library building for any structural issues.

Natural wood benches installed at Pittsburgh Sunnyside PreK-8 School by WPC through the School Grounds Greening project. Photo: WPC.

Action 2: Green Enhancements to Shelley Y. Jones Park

This plays pace has several appealing features but could be considerably enhanced by adding **nature play features.** There is ample space for additional play spots of different sizes. A natural play space can be made with components that are potentially available to the Borough (such as tree stumps or logs or boulders) at low cost.

Shade Trees would be an excellent enhancement to the existing park. The current play equipment is completely exposed to full sun and would be more attractive, safer and more enjoyable to both children and adults with some tree cover for shade and bloom.

Permeable paving for basketball court could add an entirely new "green" aspect to the existing court area. While this would be a more costly revision to the current court area, if the surface needs to be replaced in the near future, adding permeable paving would cost about $10 to $15 per square foot, using pavers or bricks which will allow permeability and still offer decent athletic play. Plain asphalt would be about $6 to $7 per square foot of surface. There is a lively debate about the experience of ball players on alternative surfaces, but a surface made with pavers offers the potential for using the space for multiple purposes, not just for ball play.

$ Costs: The costs of these improvements will vary depending on the selected elements added to the space. Benches can be stone or metal; permeable spaces range between $3 and $15 per square foot depending on the type of surfacing selected. Trees will be slightly less if they are planted directly in the ground as

Brick pavers and porous design for basketball court. Photo: Home Court Hoops.

Metal Benches: $1,000 to $1,400 each

Stone Benches: $200 each

Permeable surfaces: $3 to $15 per sq. ft.

Trees: $150 - $500 depending on tree size and planting location

Rain Garden: $5 - $25 per sq. ft.

Natural play space: $10,000-$40,000 depending on size and components

opposed to locations where cement or asphalt needs to be cut—between $100 and $150 each tree. A rain garden can be simple or engineered in structure. In this location, a somewhat more engineered installation might be warranted to increase potential storm water capture. Depending on size, a rain garden could cost between $5 and $25 per square foot. A natural play space could be done for as little as $10,000 and possibly even less if the Borough located recycled materials and assisted with installation.
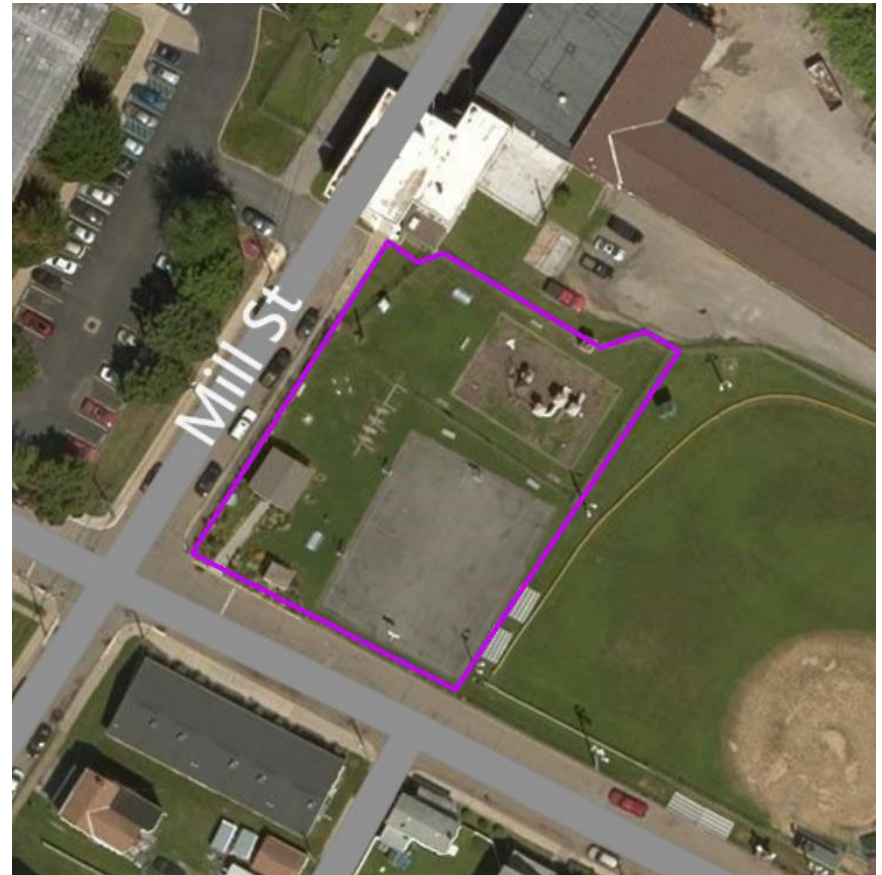
Effort: This project will require the Borough to apply for funding from government and private foundation sources; to participate in and lead a public involvement design process; and contribute as it is able to construction through its public works department.

Good Partners:
• Borough of Coraopolis – This project would take place on Borough-owned public land, which makes the Borough the key partner for this project. The Borough would likely be the applicant for any public dollars that are available for the project. The project will require the support of Borough council, close collaboration among the Borough council president, Borough manager, Borough solicitor, and the project managers.
• Western Pennsylvania Conservancy – The Conservancy is available to participate as a project manager or partner. This role could include managing applications for public grant or loan funds on behalf of the Borough of Coraopolis, assisting the Borough with identifying and securing private donor funds if available, grant and contract administration, design development,

Overhead view of Shelly Y. Jones Park. Photo: Google Maps.

construction oversight, development of a maintenance plan and assistance with maintenance, and organizing the work of community volunteers.
• Community volunteers—This project would benefit greatly from a group of committed volunteers willing to support the Borough staff in general care taking and monitoring of the space.

Possible Funding Sources:

- **DCNR Community Conservation Partnership Program (C2P2) Grants:**

Because this project is in a public park, Coraopolis would be eligible to apply for grant funding from Pennsylvania Department of Conservation and Natural Resources (DCNR) through their Community Conservation Partnership Program (C2P2).

This program requires a 1:1 match from other funding sources. In kind good and services, such as volunteers and Borough public works resources can be included as match. Up to 15% of the awarded funds can be used for engineering and landscape design. Grants are made on a reimbursement basis, where the applicant is reimbursed for project expenses after certain phases of work have been completed. DCNR retains 10% of the total awarded amount until the project is closed and the grantee is reimbursed up to 50% of the total accrued project costs, including cash and in-kind match.

Applications for this funding are due in April 2015, with awards being announced in late 2015 to early 2016. If awarded, grant funds could begin to be spent in spring 2016 at the earliest.

- **Private Foundations or Donors**

Private foundations or donors interested in establishing natural play areas in public green spaces could be good sources for funding elements of the new space, or for cash match to supplement other grant funds and in-kind goods and services. Some private funders are also interested in the issue of storm water management and might consider proposals for rain gardens or bioswales in public places.

Sustainability: This project would require a long-term investment by the Borough in general oversight and maintenance of the space. However, if well-designed, the space would require minimal time (weekly schedule) and no additional equipment or skills. Community partners using the space could take an important role in care taking if union rules allow.

Playground and equipment at Shelly Y. Jones Memorial Park. Photo: WPC.

Playground and equipment at Shelly Y. Jones Memorial Park. Photo: WPC.

Action 3: Add Green Enhancements to Riverfront Park

This location is another opportunity for enhancing existing green and recreational space . It would be an especially appropriate site for both a nature play space and some green infrastructure designed to reduce runoff to the river.

Nature-play features could be added in one or more sites, particularly to accommodate very small children. Features using stumps, logs, boulders, plantings and stepping stones could all provide a fun and easy to care for alternative to other play structures.

Add **shade trees** around the perimeter, near seating areas and play equipment. Shade trees will offer health, aesthetic and recreational value to the site as well as storm water capture.

Overhead view of municipal-owned riverfront park. Photo: Google Maps.

Municipal-owned riverfront park with path, nice shade and benches. Invasive knot-weed has growth blocks the view of the Ohio River. Photo: WPC.

Control of invasive plants along the river bank is best done quickly and routinely to prevent these plants from degrading the available park space. Knot weed needs to be mowed very frequently for eventual control. More costly chemical sprays can be useful, but need to be handled carefully to prevent damage to other plants. They certainly cannot be used while park users are present. Physical means such as mowing may be preferable. In addition carefully planted shade trees can help with reduction of such plants as knotweed. However, the weeds need to be continually treated while trees establish and grow large enough to cast significant shade.

$ Cost:

Metal Benches: $1,000 to $1,400 each

Stone Benches: $200 each

Permeable surfaces: $3 to $15 per sq. ft.

Trees: $150 - $500 depending on tree size and planting location

Rain Garden: $5 - $25 per sq. ft.

Invasive plant removal: varies widely with method and size of area

Natural play space: $10,000-$40,000 depending on size and components

Effort: This project will require the Borough to apply for funding from government and private foundation sources; to participate in and lead a public involvement design process; and contribute as it is able to construction through its public works department. There are some improvements that can be undertaken without grant funds if the Borough public works or parks departments can provide assistance along with community volunteers. Invasive plant removal is one such effort. Tree planting is another. Larger changes such as additional play spaces will take design and planning that will likely require grant funding.

The small playground and overlook at the end of Broadway Street at 1st Avenue. Photo: WPC.

![Good Partners icon] **Good Partners:**

•   Borough of Coraopolis – This project would take place on Borough-owned public land, which makes the Borough the key partner for this project. The Borough would likely be the applicant for any public dollars that are available for the project. The project will require the support of Borough council, close collaboration among the Borough council president, Borough manager, Borough solicitor, and the project managers.

•   Western Pennsylvania Conservancy – The Conservancy is available to participate as a project manager or partner. This role could include managing applications for public grant or loan funds on behalf of the Borough of Coraopolis, assisting the Borough with identifying and securing private donor funds if available, grant and contract administration, design development, construction oversight, development of a maintenance plan and assistance with maintenance, and organizing the work of community volunteers.

•   Community volunteers—This project would benefit greatly from a group of committed volunteers willing to support the Borough staff in general care taking and monitoring of the space. Volunteers could also begin certain elements of a park improvement plan with little outside funding.

Children play on natural table at the natural play space installed by WPC. Photo: WPC.

![Possible Funding Sources icon] **Possible Funding Sources:**

•   **DCNR Community Conservation Partnership Program (C2P2) Grants:**

Because this project is in a public park, Coraopolis would be eligible to apply for grant funding from Pennsylvania Department of Conservation and Natural Resources (DCNR) through their Community Conservation Partnership Program (C2P2).

This program requires a 1:1 match from other funding sources. In kind good and services, such as volunteers and Borough public works resources can be included as match. Up to 15% of the awarded funds can be used for engineering and landscape design. Grants are made on a reimbursement basis, where the applicant is reimbursed for project expenses after certain phases of work have been completed. DCNR retains 10% of the total awarded amount until the project is closed and the grantee is reimbursed up to 50% of the total accrued project costs, including cash and in-kind match.

Applications for this funding are due in April 2015, with awards being announced in late 2015 to early 2016. If awarded, grant funds could begin to be spent in spring 2016 at the earliest.

- **Private Foundations or Donors**

Private foundations or donors interested in establishing natural play areas in public green spaces could be good sources for funding elements of the new space, or for cash match to supplement other grant funds and in-kind goods and services.

Sustainability: This project would require a long-term investment by the Borough in general oversight and maintenance of the space. However, if well-designed, the space would require minimal time (weekly schedule) and no additional equipment or skills. Community partners using the space could take an important role in care taking if union rules allow.
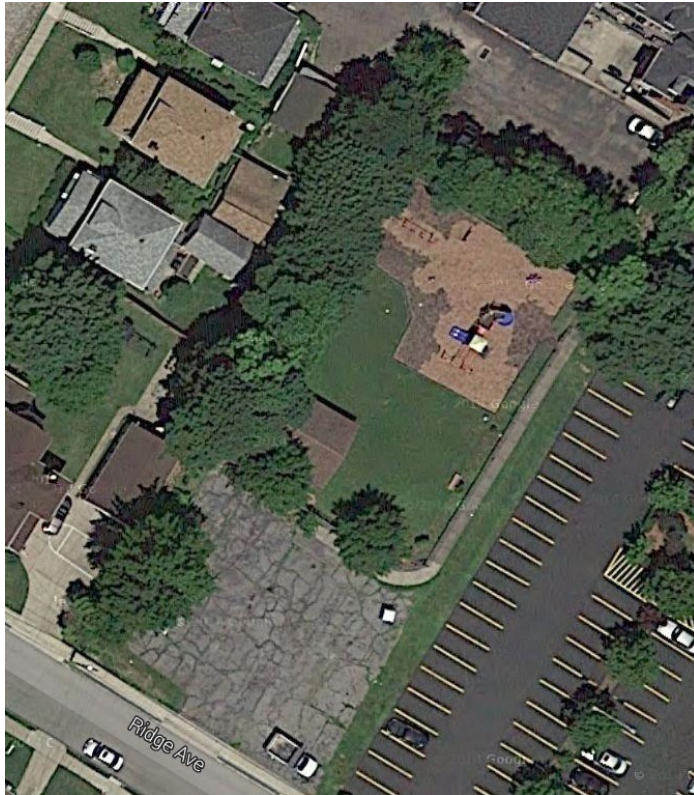

Playground using natural materials in Prospect Park, Brooklyn, New York City. Photo: WPC.

Matthaei Botanical Gardens at University of Michigan; natural play house in the children's garden. Photo: WPC.

Action 4: Green Enhancements to Ridge Avenue Playground

Overhead of Ridge Avenue playground property.
Photo: Google Maps.

The Borough-owned playground on Ridge Avenue between Fleming Street and Watson Street consists of existing play equipment, play yard, and shelter surrounded by a chain-link fence. The site also includes a blacktop parking lot, which has been observed to be underutilized and is in general disrepair.

This park is important to the Borough's capacity to serve its families and youth and as currently configured it is lacking some elements that could help reach its potential and make it an even more valuable asset to the community.

Recommendations for this space include:
• Install natural play space features;
• Re-configure and re-surface the existing parking area, add trees and/or rain gardens around perimeter;
• Transition some of the parking area into expanded play area.
• Include some storm water capture in parking lot area (rain garden or bioswale)

$ **Costs:** The potential cost of this project depends on the specific design and types of added elements desired. Given the square footage of this park (12,000 sq. feet) a good estimate will be $12,000 to $15,000 exclusive of fencing or repaving of parking area.

Natural play space: $10,000-$40,000

Parking reconfiguration: $7,000 (design); $6 to $15 per square foot depending on whether asphalt, permeable asphalt, or pavers are used.

Permeable surfaces: $3 to $15 per sq. ft.

Additional tree planting: $125 - $200 per tree

Rain garden or bioswale installation: $1,000 to $6,000 depending on size and design

Effort: This project will require the Borough to apply for funding from government and private foundation sources; to participate in and lead a public involvement design process; and contribute as it is able to construction through its public works department.

Good Partners:
- Borough of Coraopolis – This project would take place on Borough-owned public land, which makes the Borough the key partner for this project. The Borough would likely be the applicant for any public dollars that are available for the project. The project will require the support of Borough council, close collaboration among the Borough council president, Borough manager, Borough solicitor, and the project managers.
- Western Pennsylvania Conservancy – The Conservancy is available to participate as a project manager or partner. This role could include managing applications for public grant or loan funds on behalf of the Borough of Coraopolis, assisting the Borough with identifying and securing private donor funds if available, grant and contract administration, design development, construction oversight, development of a maintenance plan and assistance with maintenance, and organizing the work of community volunteers.
- Community volunteers—This project would benefit greatly from a group of committed volunteers willing to support the Borough staff in general care taking and monitoring of the space.

Students reading in their outdoor quiet space at Pittsburgh Morrow Elementary. Photo: WPC.

Possible Funding Sources:
- **DCNR Community Conservation Partnership Program (C2P2) Grants:**
Because this project is in a public park, Coraopolis would be eligible to apply for grant funding from Pennsylvania Department of Conservation and Natural Resources (DCNR) through their Community Conservation Partnership Program (C2P2).

This program requires a 1:1 match from other funding sources. In kind good and services, such as volunteers and Borough public works resources can be included as match. Up to 15% of the awarded funds can be used for engineering and landscape design. Grants are made on a reimbursement basis, where the applicant is reimbursed for project expenses after

certain phases of work have been completed. DCNR retains 10% of the total awarded amount until the project is closed and the grantee is reimbursed up to 50% of the total accrued project costs, including cash and in-kind match.
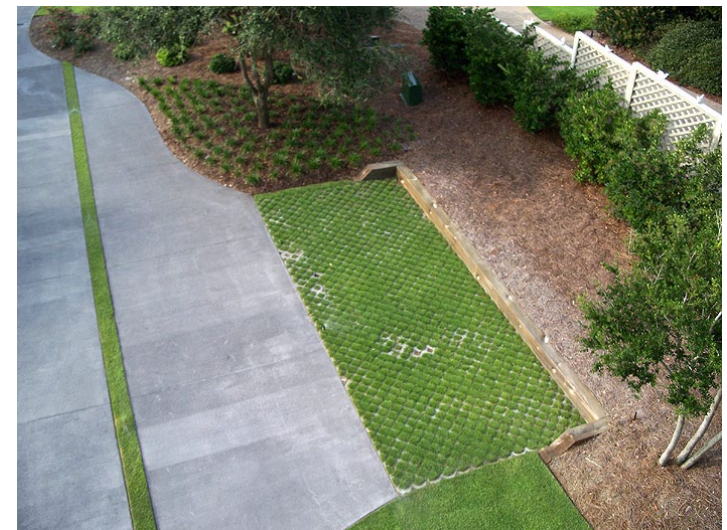
Applications for this funding are due in April 2015, with awards being announced in late 2015 to early 2016. If awarded, grant funds could begin to be spent in spring 2016 at the earliest.

- **Private Foundations or Donors**

Private foundations or donors interested in establishing natural play areas in public green spaces could be good sources for funding elements of the new space, or for cash match to supplement other grant funds and in-kind goods and services.

 Sustainability: This project would require a long-term investment by the Borough in general oversight and maintenance of the space. However, if well-designed, the space would require minimal time (weekly schedule) and no additional equipment or skills. Community partners using the space could take an important role in care taking if union rules allow.

Examples of porous paver parking spaces along asphalt road. Photos: Unknown.

Action 5: Establish New Public Green Space in Forested Properties along McCabe Run

The Borough has approximately 30 contiguous acres of woods that are owned by Cornell School District and the Borough. The woods appear to be in good shape and could offer a tremendous recreational resource to community members with minimal investment. One key investment, though, should include adding a gate along Brook Street to keep vehicles out of the properties. Illegal dumping and poaching are common practives in this beautiful space that ought to be curbed. An official gate will go a long way to keeping illiegal activity out of this space.

Suggestion for a gate to keep illegal dumping and vehicles out of the properties, and a proposed parking location for persons who wish to use the space for walking and recreation. Photo: Google Streetview.

A basic forest stewardship plan would provide information on the existing tree stock and best approaches to insuring a healthy forest into the future. Such a plan would also address any need for management of invasive species, stormwater capture, trails, and other possible improvements. Simple walking paths would provide a wonderful woodland experience for citizens with minimal investment or care taking. This type of project would likely be of interest to area non-profits such as Hollow Oak Land Trust and to neighboring landowners.

 Open gate at the turn around at the end of Brook Street along McCabe Run. Photo: WPC.

Overhead view of Cornell School District and properties around McCabe Run in Coraopolis. Photo: Google Maps.

$ **Costs:** Actual dedication of the properties as public open space may not involve any hard costs. The cost for a forester or resource professional to develop a property management plan would range from $2,500 to $7,500, depending on the depth of the plan. Implementation costs would need to be incurred to add amenities, such as trails and interpretive signage, and to conduct forest management activities (invasive plant control, trimming/removing unsafe trees, etc.). However, these costs could be phased to spread costs out over time while steadily improving the accessibility and value of the space to the Borough. Full costs could range between $12,000 and $30,500.

Management Plan: $2,500 - $7,500

Trails: $5,000 - $15,000

Tree care: $5,000 - $7,000

Benches: $2,000 to $3000

Effort: This would involve leadership of the school board and the Borough council to develop and implement a plan to designate the school and Borough properties as public open space. This may not require a formal designation, but leadership will be important to solidify a vision for the site. Once the site is designated as public open space, there are many options for programming or amenities on the property.

Properties along McCabe Run. Photo: WPC.

Brook Street along McCabe Run. Photo: WPC.

Good Partners: Cornell School District, Borough of Coraopolis, Coraopolis Parks and Recreation Board, Hollow Oak Land Trust. WPC's community forestry staff could provide the forest assessment and care taking plan.

Possible Funding Sources: Actual dedication of the properties as public open space may not require funding, however, adding programming and amenities to the site could.

- **DCNR Community Conservation Partnership Program (C2P2) Grants:**

Because part of the land is owned by the Borough of Coraopolis, the Borough would be eligible to apply for grant funding from Pennsylvania Department of Conservation and Natural Resources (DCNR) through their Community Conservation Partnership Program (C2P2) to support any amenity development projects on the property owned by the Borough (trails, interpretive signage, etc.). The Borough could also apply for C2P2 funding to support adding amenities to the land owned by the school district, but a long-term lease agreement between the school district and the Borough allowing the amenities to be installed would be required.

This program requires a 1:1 match from other funding sources. In kind good and services, such as volunteers and Borough public works resources can be included as match. Up to 15% of the awarded funds can be used for engineering and landscape design. Grants are made on a reimbursement basis, where the applicant is reimbursed for project expenses after certain phases of work have been completed. DCNR retains 10% of the total awarded amount until the project is closed and the grantee is reimbursed up to 50% of the total accrued project costs, including cash and in-kind match.

Applications for this funding are due in April of each year, with awards being announced each year in November or December. If awarded, the Borough would then enter into a grant agreement with DCNR, which would include the detailed scope of work. Funding is not available until after the grant agreement is signed, which is usually during spring of the following year.

Sustainability: As with any green space, there will be an ongoing need for care taking to insure safety, health and value of the natural spaces. Much of this work could be undertaken by citizen groups such as simple walking path care, modest invasive plant removal (annual spring pulling), visual inspection for potential tree care needs, and so forth. The Borough would have to commit to a modest level of long-term care to make sure that the space was well maintained.

INCREASING THE URBAN TREE CANOPY

PLANTING TREES ALONG MAIN STREETS

There is considerable potential for adding greenery to the streets and open areas of Coraopolis. A street by street inventory completed by the Western Pennsylvania Conservancy helped identify the best locations and highest need locations for specific trees. Upon review of this analysis, the project forester believes that more than 500 new trees could be sited along Coraopolis streets and in open spaces. Both residential and business district streets have potential.

Carnegie volunteers plant trees with TreeVitalize program. Photo: WPC.

$ **Costs:** $150 to 200 per tree, $475 per tree pit cut in a sidewalk, $105 per tree for 3 years of maintenance. For long-term care, a cost of $35 per tree per year is a good estimate of annual maintenance costs per tree. It is important that these costs can be spread over years as Coraopolis works to increase the urban forest in the most beneficial and high-impact areas. A good cyclical tree care plan will also spread out the costs of short and long-term tree care for the Borough. A full complement of 500 trees would be costly — on the order of $100,000 — but can be done incrementally.

Effort: The Borough or the Borough's Shade Tree Commission will need to take the lead for this strategy in cooperation with Borough residents because trees will be in the public right of way but remain the responsibility of the property owner. The Borough will need to organize volunteers to help plant and care for trees as well as anticipate the effort of caring for trees for the long term. The Borough or the newly formed shade tree commission would likely be the applicant for the Treevitalize program, and for alternative sources of funding.

Trees: $150 to $200 each

Tree pits: $150 to $200 per tree

Tree pit cuts: $475 per pit cut

Total: Up to $100,000 plus annual care

The Borough has already taken steps to set up a shade tree commission and to add appropriate new ordinances. The major effort will be coordinating volunteer care for the first few years and explaining the important value of trees to Borough residents and property owners in terms of benefits--economic, environmental and health. Best care will annual mulching, minor pruning to shape trees over the first three years and annual inspection for disease or pests. Eventually additional pruning will be needed to maintain the health of the trees (on average every 5 years).

**Good Partners:** WPC, Tree Pittsburgh for tree tender training, DCNR, Coraopolis Shade Tree Commission

Possible Funding Sources:
• The sites identified during this Green Scan can be submitted to the TreeVitalize program via the Western Pennsylvania Conservancy to be considered for future TreeVitalize plantings. A forester will conduct official tree site assessments to determine the suitability for trees at a given site. If a site is determined suitable for a tree, the forester will select a tree species. The suitable sites will be forwarded to Coraopolis Borough for final approval. Upon final approval, tree site preparation will commence and volunteers will be organized for planting the trees.
• Private foundation sources could also be interested in investing in shade tree cover for Borough streets in various locations.

Sustainability: Maintenance is a crucial element to the successful establishment and long-term survival of trees. Initially, a 3 year maintenance plan includes watering (25 gallons per week
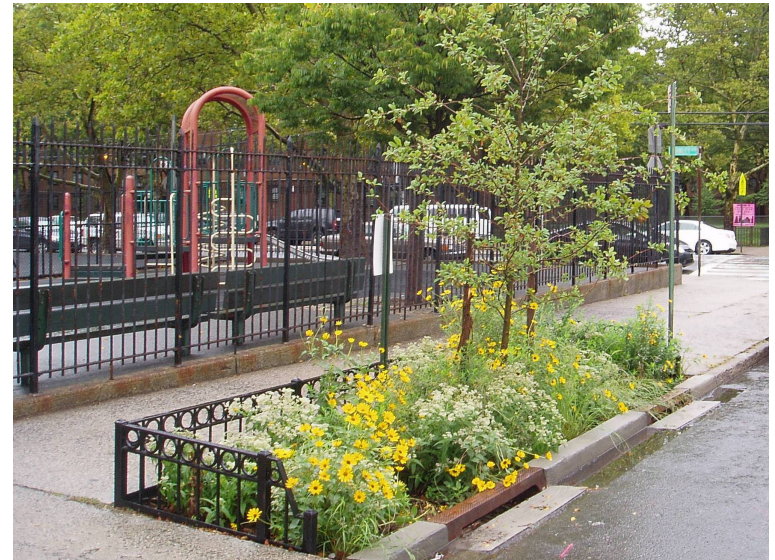
Tree pit with stormwater inlet and outlet outside of playground in New York City. Photo: Unknown.
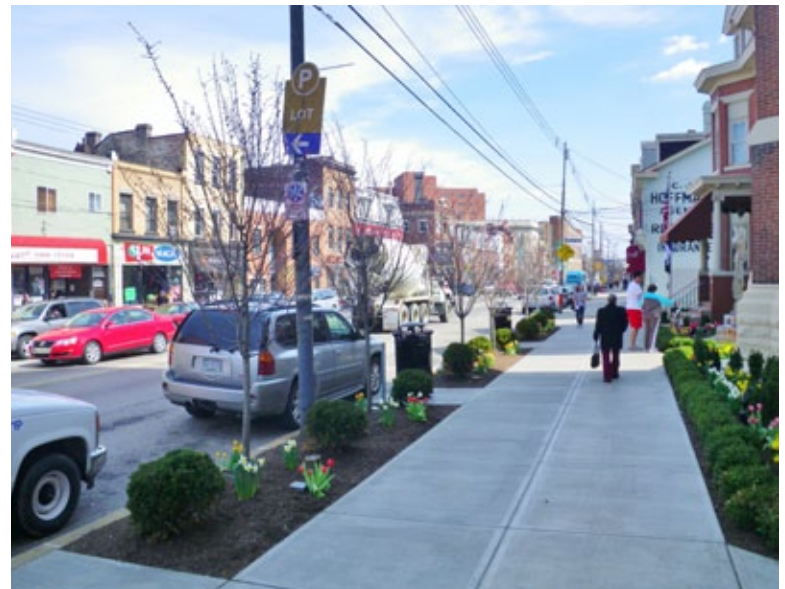
Main street TreeVitalize planting along Penn Avenue in Pittsburgh's Bloomfield neighborhood in spring. Photo: WPC.

through the growing season), mulching, minor pruning at year two to train the tree into the best shape for its location, and weeding the tree pits. These tasks are crucial for the trees to become well established. After year three, the trees should be better able to survive on their own and will require less maintenance. The key need will be for occasional watering in times of heavy drought, and routine maintenance pruning. In addition, there are events that can't be controlled and trees might need to be replaced. Examples of this include branches being torn by people, trees being struck by vehicles, over-salting, insect or disease damage. As trees are replaced it is important to remember the three year maintenance period. The cost of this routine tree care (about $35 per year per tree) needs to be factored into the Borough's plans for the long term.

Volunteers plant trees through the TreeVitalize proogram in spring 2015 in Wilkinsburg (left) and Shadyside (right). Photos: WPC.

ADD GREEN STORMWATER PRACTICES AT KEY LOCATIONS

Action 1: Business District Streetscape Greening

The business district, indeed the Borough as a whole, is very low on shade trees. In several locations it would be feasible to add bumpouts with bio-retention along 5th Ave between Mill St. and Broadway St. In addition, retrofits of existing bumpouts could be accomplished along Mill St. to add bio-retention. Because of sidewalk width and utility conflicts, bumpouts may be the best solution to add trees and other green streetscape features to the business district streetscape along 5th Ave. Depending on location and feasibility, bumpouts could be designed to accept runoff from rooftops in the business district, water that otherwise is connected directly to the combined sewer.

Current Mill Street tree pits. Photo: Google Streetview.

$ **Costs:** Overall cost for retrofitting the existing bumpouts on Mill Avenue could range from $15-$30 per cubic foot. Overall costs to install new bumpouts on 5th Avenue could range from $45-$65 per cubic foot. Trees will cost about $150 to $200 each and about $35 per year for care taking.

Existing bumpout retrofits: $15 - $30 per cubit foot

New bumpouts: $45- $65 per cubic foot

Trees: $150 to $200 each

Total number of retrofits: up to 6

Total number of new bumpouts: up to 6

Total number of new trees: up to 12

Street bumpouts with stormwater inlets in Portland, OR. Photo: Kevin Robert Perry.

Streetscape Green Infrastructure in Business District

Western Pennsylvania Conservancy

Retro-fit existing bumpouts with bio-retention

Add bumputs with bio-retantion to 5th Ave

Appalachian Mountains

0   37.5   75   150 Feet

Effort: Professional engineers and skilled contractors are required to be engaged for all phases. Retro-fit of Mill Street bumpouts could be much less effort-intensive than adding new bumpouts to 5th Avenue for several reasons. For the 5th Avenue component, integration into PennDOT's long term transportation improvement plans would be required.

Good Partners: Borough of Coraopolis, Coraopolis Water and Sewer Authority, PennDOT (due to Rt. 51), downtown building owners

Example of green bumpouts in Plymouth, MA. Photo: Unknown.

Possible Funding Sources:

•   PennVest Grant or Loan: These improvements could be included in an application by the Borough or the Coraopolis Water and Sewer Authority for PennVest funding and/or loans in conjunction with other projects recommended in this Green Scan.

PennVest grants and loans are awarded five times per year, with applications due approximately two months before the award date. If the project is selected, the PennVest board offers a grant, a low-interest loan, or a combination of grants and loans. Grants are made on a reimbursement basis, where the applicant is reimbursed for project expenses after certain phases of work have been completed. The Borough is not required to accept PennVest's offer.

Applications must include construction drawings, any applicable permits, full cost estimates, the Borough's audited financial statements for the past several years, resolution of Borough Council, and other applicable approvals.
If the Borough accepts the PennVest board's financing offer, a settlement process takes place during which the grant and/or loan agreement is finalized and executed, the project scope is finalized, and contracts are bid and approved. This can take to six months or more from the time the grant and/or loan is offered. After settlement is complete, notice would be given to proceed with implementation.

•   Allegheny County Conservation District (ACCD): Link to the Application Package:
http://www.accdpa.org/wp-content/uploads/2014/08/ACCD-Grant-Application.pdf

The Borough of Coraopolis, other government entities, or 501(c)(3)s are eligible to apply for ACCD Grant Program funds. ACCD funds projects that focus on abatement of pollution in rivers, streams, and other waters of the Commonwealth, including green infrastructure approaches to storm water management.
The ACCD hopes to provide 10 grants per year at a level of approximately $10,000 per grant. A 20% match is required, but can be cash, in-kind goods or services and salaries.

Sustainability: Trees along these main corridors will require some care taking annually. Annual pruning to train the tree to desirable shape will be needed the first few years. In addition there should be an annual mulching to assure water retention and reduce weeds. If there are high temperatures during the first few summers after tree planting, some supplemental watering might be needed (about 25 gallons per tree per week).   Occasional trash pickup might be needed from tree pits. Depending on type of tree some leaf collection might be needed in the fall of the year. Over winters, care should be taken to use ice melters that are compatible with plants. With good care the first few years, trees should be a very sustainable asset, gaining in value each year of life. Pruning of dead or broken branches may be necessary on an annual basis, but this need should be minimal from year 5 to year 15.

5th Avenue at the current Borough Building and municipal parking lot.
Photo: Google Streeview.

Action 2: Add Stormwater Capture at Entrance to Cornell School District Campus

Add additional trees and stormwater capture using green infrastructure on the school district property at the intersection of Maple St. Extension and Park Drive. The grass swales with storm drains at the bottom of Park Drive could be retrofitted to add retention and infiltration capacity. The strip of grass between the parking lot and Maple St. Extension could have trees and/or additional stormwater capture added. Storm drains in this area connect to storm sewer pipes that carry a headwater tributary to McCabe Run. Green infrastructure in this area could reduce potential flooding of properties and improve water quality downhill from the site where the storm sewer pipes enter McCabe Run.
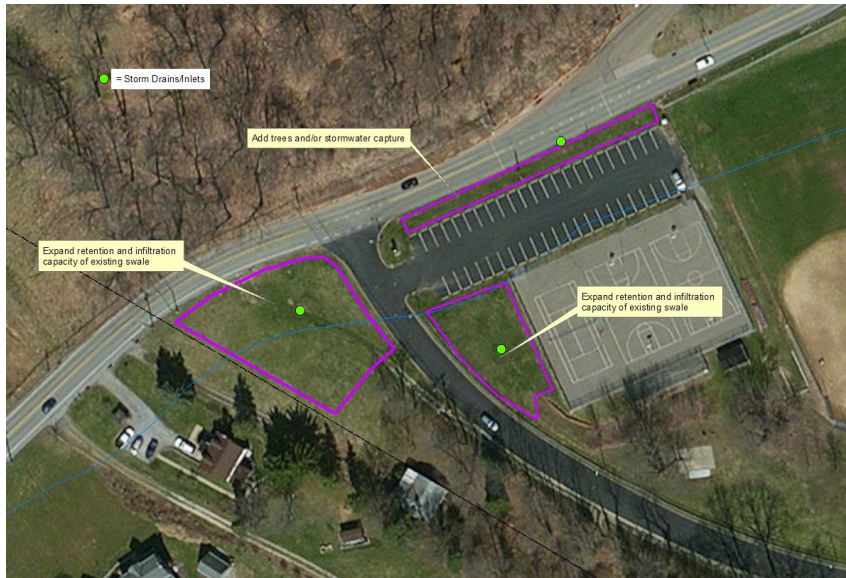
Overhead map of Cornell School entrance properties. Map created by WPC.

Entrance to Cornell School District from Maple Avenue Extension, heading north. Photo: Google Streetview.

Costs: The costs of green infrastructure to capture storm water vary tremendously by type and design. A tree pit designed to catch extra rain water can be in the area of $3,000 to $5,000 each including engineering and design. Simple bioswales can be as little as $5,000 each for contouring and seeding. More elaborate systems with excavated pits and drain diversions can be several times that.

Effort: The level of effort will vary with two factors: land ownership and level of design. If the site would best be served

with a more complex design, the Borough will need to take leadership in assuring a complete and inclusive design process. Additional grant writing or technical support may be needed for more complex designs. If the land is owned by the school district or other entity, the Borough may need to work closely with partners to assure a sustainable outcome.

Good Partners: The Borough of Coraopolis, landowners such as the school district, neighboring property owners, Coraopolis Water and sewer Authority, and possible state agencies or authorities.

Possible Funding Sources:
- **PennVest Grant or Loan:** These improvements could be included in an application by the Borough or the Coraopolis Water and Sewer Authority for PennVest funding and/or loans in conjunction with other projects recommended in this Green Scan.

PennVest grants and loans are awarded five times per year, with applications due approximately two months before the award date. If the project is selected, the PennVest board offers a grant, a low-interest loan, or a combination of grants and loans. Grants are made on a reimbursement basis, where the applicant is reimbursed for project expenses after certain phases of work have been completed. The Borough is not required to accept PennVest's offer.

Applications must include construction drawings, any applicable permits, full cost estimates, the Borough's audited financial statements for the past several years, resolution of Borough Council, and other applicable approvals. If the Borough accepts the PennVest board's financing offer, a settlement process takes place during which the grant and/ or loan agreement is finalized and executed, the project scope is finalized, and contracts are bid and approved. This can take to six months or more from the time the grant and/or loan is offered. After settlement is complete, notice would be given to proceed with implementation.

Examples of vegetated bioswales. Iowa Association of Municipalities (left), and Nebraska State-wide Arboretum (right).

- **Allegheny County Conservation District (ACCD):** Link to the Application Package:
http://www.accdpa.org/wp-content/uploads/2014/08/ACCD-Grant-Application.pdf
The Borough of Coraopolis, other government entities, or 501(c)(3)s are eligible to apply for ACCD Grant Program funds. ACCD funds projects that focus on abatement of pollution in rivers, streams, and other waters of the Commonwealth, including green infrastructure approaches to storm water management.
The ACCD hopes to provide 10 grants per year at a level of approximately $10,000 per grant. A 20% match is required, but can be cash, in-kind goods or services and salaries.

- **Pennsylvania Department of Environmental Protection (DEP) Growing Greener Plus Watershed Protection Grants**
Link to Application Package: http://www.portal.state.pa.us/portal/server.pt/community/growing_greener/13958
DEP's Growing Greener Watershed Protection grants provide nearly $547 million in funding to clean up non-point sources of pollution to Pennsylvania's waterways. The Borough of Coraopolis, the Coraopolis Water and Sewer Authority, Allegheny County Conservation District, or a 501(c)(3) organization are eligible to apply for these grants. One applicable area that DEP funds through Growing Greener is projects that will result in measurable reductions to urban runoff, including installation of green infrastructure.

Growing Greener grants are available annually, with the next round of applications due on July 10, 2015. Average grant awards through Growing Greener are $95,000, and the grants require a 15% match, which can be made up of already secured cash or in-kind contributions. Potential applicants must contact appropriate DEP staff prior to preparing grant applications to discuss the concept and conduct site visits. DEP's Southwest Regional Watershed Manager is Jeff Fliss, who can be reached at 412-442-4207. Applicants are also strongly encouraged to contact their county conservation districts when developing projects and preparing grant applications.

Sustainability: Each type of green infrastructure, whether engineered tree pit, permeable paving, bioswales or other design will require a baseline amount of care taking. Most such installations have the same life span as regular infrastructure, sometimes even longer, but require a bit different care. In particular any facility with living plants will need some care including basic weeding, watering if required, occasional cleaning or removal of silt, refreshing of soils or mulches and so forth. While not as familiar as other types of Borough facility care, green infrastructure can be quickly integrated into public work routines, and many times care taking can be handled by trained volunteers if union workers are amenable.

Bioswale example between a parking lot and street.
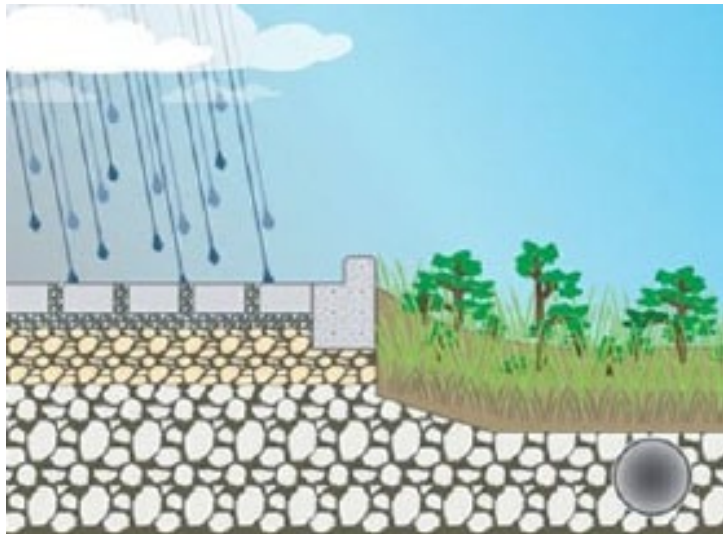Photo: Jennifer English, Defiance (OH), Storm Water Conservation District.

Action 3: Bio-retention in borough parking lot

Directly across from the Borough offices building, a relatively new paved parking lot accommodates visitors to the municipal offices and to nearby businesses. The lot contains a handsome gazebo and several planters; however, the area is devoid of trees or shade for the users of the lot and presents a very hard surface "face" to the Borough's main location of business with its citizens. With some revisions, this lot could add some bio-retention that could help reduce storm water runoff from the paved surface, while presenting a more inviting area to this civic hub. In addition to bio-retention, eventual plans into the future might include additional trees, permeable paving and plantings that could help soften the space and add to the potential storm water capture. When paved with permeable pavers, spaces of this type can often serve multiple functions as gathering places and open space for community functions such as farmer's markets, music, or cookouts.
 Just beyond this space is a vacant lot which contains a major combined sewer inlet for the area at Pine Way. If this lot were contoured to capture some water, or if bio-retention was added at the perimeter, the Borough could achieve a reduction of water pouring into the storm water system.

$ **Costs:** Permeable paving can cost in the range of $6 to 10 per square foot (a maximum of $150,000 for this size lot). Bioswales are on

Trees Only:	**$12,480**
Add Tree Pits:	**$8,950 to $12,800**
Reconfigure:	**$32,000 to $55,000**
Add Permeable Paving:	**$17,000 - $150,000**
Total:	**$12,480 to $250,000**

Detail of porous pavement and bioswale design example.

Example of open cell porous paving. Photo: Unknown.

Combined Sewer Inlet

Borough Parking Lot/
Pine Way CS Inlet Shed

Dinardo property - vacant

Borough Parking Lot

the order of $5,000 to $20,000 depending on size and design. Additional trees and plants would be up to $1,000. There is a related location nearby that could also take storm water features, but that cost would be wholly decided by design.

Effort: Because this is a Borough owned lot the major effort will be the fundraising involved for design and implementation. If Borough public works staff are able to contribute to construction, costs and contracting effort could be reduced.

Good Partners: WPC could provide technical assistance during design and implementation and can help to identify funding sources; the Borough is the key partner as site owner; the Shade Tree Commission, TreeVitalize program through WPC, PennVest and the Water and Sewer Authority could all be good additional partners.
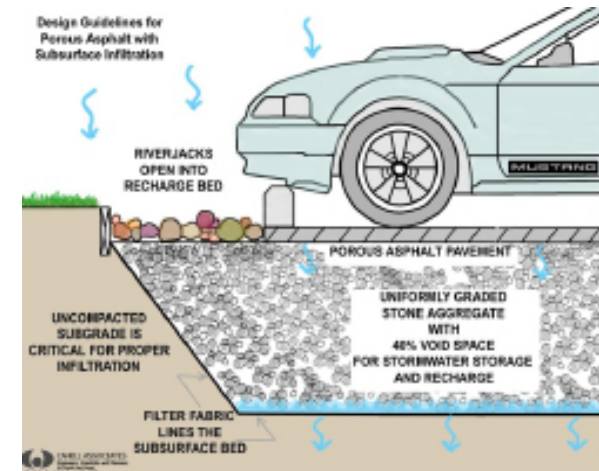

Model of permeable pavement for a parking lot.

Possible Funding Sources:
- **PennVest Grant or Loan:** These improvements could be included in an application by the Borough or the Coraopolis Water and Sewer Authority for PennVest funding and/or loans in conjunction with other projects recommended in this Green Scan.

PennVest grants and loans are awarded five times per year, with applications due approximately two months before the award date. If the project is selected, the PennVest board offers a grant, a low-interest loan, or a combination of grants and loans. Grants are made on a reimbursement basis, where the applicant is reimbursed for project expenses after certain phases of work have been completed. The Borough is not required to accept PennVest's offer.

Applications must include construction drawings, any applicable permits, full cost estimates, the Borough's audited financial statements for the past several years, resolution of Borough Council, and other applicable approvals. If the Borough accepts the PennVest board's financing offer, a settlement process takes place during which the grant and/or loan agreement is finalized and executed, the project scope is finalized, and contracts are bid and approved. This can take to six months or more from the time the grant and/or loan is offered. After settlement is complete, notice would be given to proceed with implementation.

- **Allegheny County Conservation District (ACCD):** Link to the Application Package:
http://www.accdpa.org/wp-content/uploads/2014/08/ACCD-Grant-Application.pdf
The Borough of Coraopolis, other government entities, or 501(c)(3)s are eligible to apply for ACCD Grant Program funds. ACCD funds projects that focus on abatement of pollution in rivers, streams, and other waters of the Commonwealth, including green infrastructure approaches to storm water management.
The ACCD hopes to provide 10 grants per year at a level of approximately $10,000 per grant. A 20% match is required, but can be cash, in-kind goods or services and salaries.

- **Pennsylvania Department of Environmental Protection (DEP) Growing Greener Plus Watershed Protection Grants**
Link to Application Package: http://www.portal.state.pa.us/portal/server.pt/community/growing_greener/13958
DEP's Growing Greener Watershed Protection grants provide nearly $547 million in funding to clean up non-point sources of pollution to Pennsylvania's waterways. The Borough of Coraopolis, the Coraopolis Water and Sewer Authority, Allegheny County Conservation District, or a 501(c)(3) organization are eligible to apply for these grants. One applicable area that DEP funds through Growing Greener is projects that will result in measurable reductions to urban runoff, including installation of green infrastructure.

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Sustainability:
A site that includes green infrastructure will always require some care taking in the form of watering in early years and weeding each season. Trees will require early watering (first three years), early pruning (year two), and occasional pruning thereafter (about every 5 years). Permeable paving may also require cleaning depending on the type used.

Bioswale with planted vegetation in parking lot median in North Hills. Photo: WPC.

FINAL WORDS

Phasing

Remember that by phasing selected actions, the costs and pressure of completing a greening strategy can be eased. Many of the recommendations of this green scan are in the lower tier of cost and the short to medium time frame. For instance, while the Borough can use hundreds of trees in its residential areas, they do not all have to be planted at once, and planting a number of trees each year will allow the Borough time to organize residents, build support and prepare for the eventual care taking of new trees.

Layers

Remember that some opportunities have many layers. For instance, one of the simplest starting places could be improvements on Borough property at the Library—an institution with a willing leadership group, interested neighbors, some relatively inexpensive possible improvements. Perhaps just plantings are done at first, and could provide high visibility and increased use by residents. Then, a natural playspace could be added with an outdoor reading area as confidence grows and people feel prepared to take on the necessary fundraising and planning.

Next, the Borough might move to storm water improvements along main streets in the business district—an effort that will take more funding development, design and input from businesses and elected officials. This effort could be started with the least cost approach of replacing trees in empty bump-outs on Mill Street; then replace aging or dangerous trees in existing bump-outs; then add new bump-outs along 4th and 5th Avenue as part of a long-term improvement with storm water capture for the major streets.

Alternatively, the Borough could work on adding significant access to public greenspace on school and Borough-owned land near the school campus. While relatively low cost, these changes would require considerable discussion and planning to be sure that access was safe, manageable and sustainable.

Green parking lot, Cultural District, Downtown Pittsburgh. Photo: WPC.

It might take some years to put all these components in place, but by breaking the enhancements and projects into segments, it will be easier to identify the most popular or most needed elements, and do the planning and fundraising for the projects that will complete the whole vision.

Models

Remember that sometimes an example can convince people to do more in the future. One transformed parking lot that vividly shows people how much more attractive and functional such a space can be may provide a convincing model that enlists more investment from new partners. Greening can be a "contagious" approach to community improvement that gains momentum with each new element that is implemented.

Costs

Remember that while there will be a significant cost for some types of greening, these investments will provide multiple types of benefits. Moreover, community greening has long been an area where local community investment in the form of volunteers and donations has created highly successful projects. Even in tough economic times, it is possible to scale green improvements to fit available volunteer capability and modest government investment. As times improve, communities that value their green assets can build such elements into new development.

The Power of Green

The Borough of Coraopolis is in a great position to use the power of green to enhance its immediate present and support its future.   With the engagement and leadership of the Borough, it has many of the elements that are necessary for successful greening projects. Greening has the potential to be a rallying point for community improvement that can involve citizens from school children to seniors, from business owners to cultural institutions, from novices to skilled members of the community. The power of green is found in the multifaceted benefits and the profoundly satisfying experience of improving the living landscape of the community. Coraopolis has a range of potential greening options that could serve as a rallying point for community members.

Volunteers helping plant the flower garden at nearby Route 51 & Thorn Run Road (left) and volunteers planting restoration trees with TreeVitalize along the Montour Run Trail (right). Photo: WPC.

APPENDICES & REFERENCES

The Economic Benefits of Green Infrastructure: A Case Study of Lancaster, PA (2014). US Environmental Protection Agency. http://water.epa.gov/infrastructure/greeninfrastructure/upload/CNT-Lancaster-Report-508.pdf

Case Studies Analyzing the Economic Benefits of Low Impact Development and Green Infrastructure Programs (2013). US Environmental Protection Agency. http://water.epa.gov/polwaste/green/upload/lid-gi-programs_report_8-6-13_combined.pdf

Banking on Green: A Look at How Green Infrastructure Can Save Municipalities Money and Provide Economic Benefits Community-wide (2012). American Rivers, American Society of Landscape Architects, ECONorthwest, Water Environment Federation. http://www.asla.org/uploadedFiles/CMS/Government_Affairs/Federal_Government_Affairs/Banking%20on%20Green%20HighRes.pdf

The Value of Green Infrastructure: A Guide to Recognizing Its Economic, Environmental, and Social Benefits (2010). Center for Neighborhood Technology, American Rivers. http://www.cnt.org/repository/gi-values-guide.pdf

Oak Grove
- Plant next generation of shade trees
- Add picnic tables for outdoor programs
- Remove failing trees

CORAOPOLIS MEMORIAL LIBRARY &
CORAOPOLIS HISTORICAL SOCIETY

Reading Garden
- Add seating area
- Remove yews
- Add native shrub buffer

Butterfly Entry Garden
- Remove barberry and azaleas
- Add butterfly-friendly trees, shrubs, and perennials
- Monarch Waystation

NOT FOR CONSTRUCTION

Conceptual Site Plan - Growing Strategies
Coraopolis Memorial Library