

Trail Prioritization Plan

**New Garden Township
Chester County, PA**

DECEMBER 2019



1 EXECUTIVE SUMMARY

New Garden Township has been working vigorously to protect open space and develop trails.

An online survey was distributed in 2018 as part of an update to the Comprehensive Plan and the public identified the improvement and expansion of trails as a top priority for New Garden Township. The resulting 2018 Comprehensive Plan Update emphasizes the development of trails to connect residents to adjacent neighborhoods, natural areas, schools, commercial districts, and cultural and recreational facilities.

In 2009, the Township developed a Greenways Plan. This ambitious Plan identified over 20 potential trails. Ideally, all the proposed trails and bike paths should be realized; however, the Township and Open Space Review Board (OSRB) need to prioritize 1-3 trails in order to advance implementation and secure the necessary easements. Natural Lands worked with the Friends of the Trails, the OSRB and the Stakeholder Committee to evaluate the practicality of the proposed trails and collect public feedback to determine which trails to prioritize.

The three trails recommended for implementation are the Homeowners Association (HOAK) trail connections to The Land Conservancy for Southern Chester County (TLC) lands and Kennett Township; the St. Anthonys/Township/Schools (STATS) trail system; and the White Clay Creek trail system. These recommendations are based on analysis of trail attributes, stakeholder feedback, and questionnaire results that identify the public's preferences.

The Trail Prioritization Report can be used in several ways.

- The Planning Commission can reference these priorities when reviewing development applications and request that trails be included in new developments;
- The OSRB can target trail outreach efforts and reference priorities when considering a trail or land protection project and how it could connect to a larger system;
- The Township could consider including priority trails on the official map.

Priorities should not be set in stone. The Township's ability to prioritize trails will ultimately depend on funding opportunities, landowner willingness, and trends in recreation. The Township and OSRB should remain nimble and consider opportunities to advance other sections of trail should opportunities arise.

2 INTRODUCTION

Three existing studies were referenced as part of this Trail Prioritization Report to ensure past analysis was considered when discussing priorities.

2009 GREENWAYS AND PHELPS PROPERTY PLANS

The 2009 Greenways Plan provides a map of trail alternatives that was used as a starting point for this Trail Prioritization Report. The Greenways Plan provides overall guidance and specifications for various trail types, as well as a trail master plan. A feasibility study and master plan for the Phelps Property near the White Clay Creek in the southeastern section of the Township is also part of the Greenways Plan. The 2009 Greenways and Phelps Property Plans was prepared by Simone Collins.

2009 WHITE CLAY CREEK CORRIDOR INTER-MUNICIPAL TRAIL LINK STUDY

The White Clay Creek Corridor Inter-Municipal Trail Link Study was completed in 2009 and focuses on the east and middle branches of the White Clay Creek. This feasibility study was developed through a collaboration between the townships of London Grove, Franklin, and New Garden. The Trail Link Study outlines the necessary steps for future implementation of a functional, sustainable, and easily maintainable trail system. The 2009 White Clay Creek Corridor Inter-Municipal Trail Link Study was prepared by Simone Collins.

2018 TOWNSHIP COMPREHENSIVE PLAN

New Garden's 2018 Township Comprehensive Plan includes a chapter on greenways and trails. This project works to advance several of the initiatives described in the Comprehensive Plan, which recommends exploring opportunities to collaborate with neighboring communities on regional trails. The Comprehensive Plan also provides recommendations that can be incorporated into the official map. Certain trail connections identified in this plan were considered during the trail prioritization planning process, including the Baltimore Pike Area, the Mason Dixon Trail, and the Colonial Pipeline.

The Comprehensive Plan also includes a chapter on greenways that lists goals and initiatives that the Township is pursuing concurrent to development of this Trails Prioritization Report, including the Baltimore Pike for Everyone Plan¹ and the Toughkenamon Improvement Plan. These initiatives were considered while trail priorities were being discussed.

New Garden's 2018 Township Comprehensive Plan was prepared by Thomas Comitta Associates, Inc with McMahon Transportation Engineers and Planners and Brandywine Conservancy.

3 Methods & Analysis

The process that resulted in these recommendations included geospatial data analysis and review of trail attributes that were reviewed during a kickoff meeting. Feedback from the kickoff meeting was used to inform the development of a questionnaire that was administered at a public meeting. Subsequently, a meeting of regional stakeholders took place and feedback was gathered and incorporated into this Trail Prioritization Report as well. Data was gathered on existing and proposed trail alignments during field visits. Recommendations were presented at a final public meeting where staff collected feedback from the public on the recommendations.

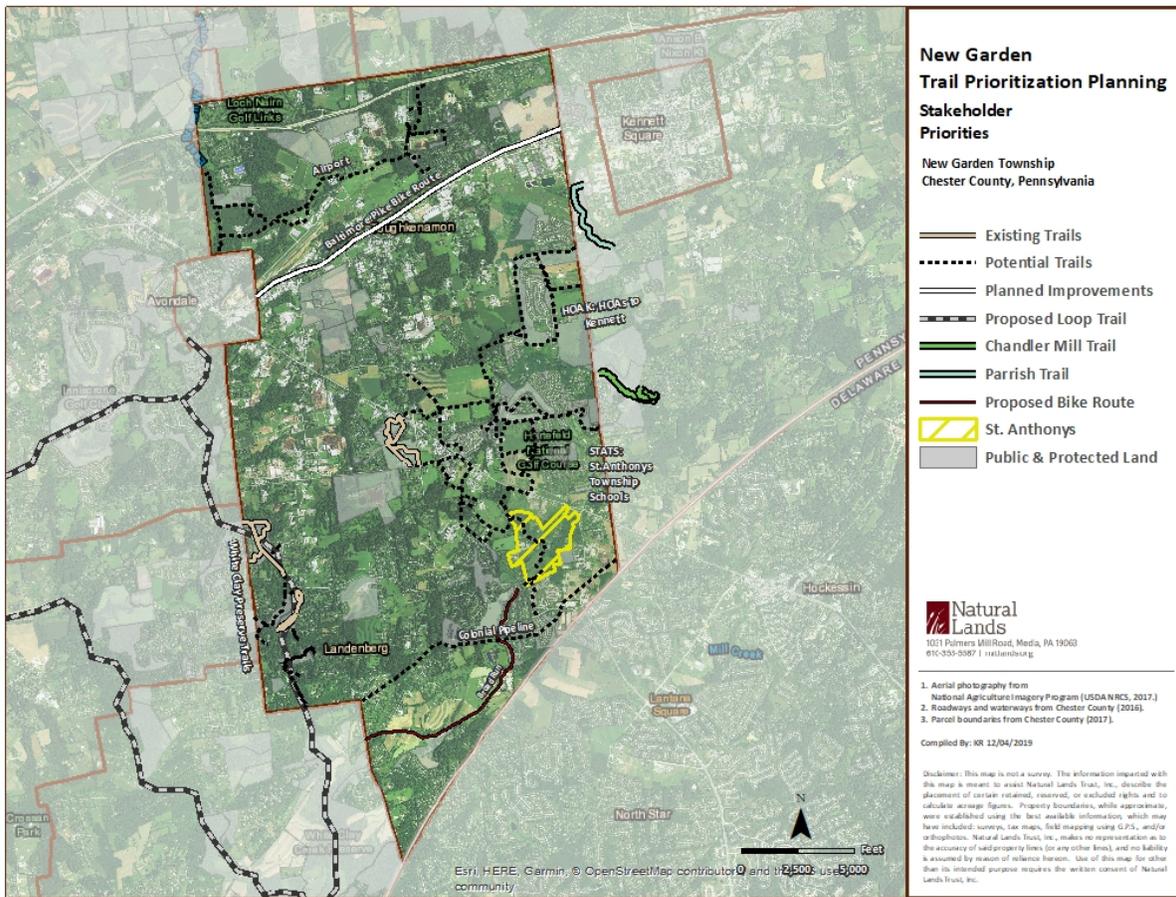
Geospatial analysis was used to identify distinct trail systems and segments from the 2008 Map of Preliminary Trail Alternatives that is included in the 2009 Greenways Plan. Analysis was completed on these trail systems and segments to determine trail length in miles, existing trail sections, the number of hours it would take to traverse each trail on foot, the number of water and road crossings, the number of parcels that the proposed trail would pass through, and whether or not the proposed trail was proposed within a right-of-way.

¹ This vision includes an off-road, paved, multi-use trail from the Kennett Township boundary to Chambers Road.

| Alignment | Length [Miles] | Hours | Minutes | Type | Water Crossings | Road Crossings | Properties Crossed |
|-------------------------------------|----------------|-------|---------|-----------------|-----------------|----------------|--------------------|
| Mason Dixon On Road | 3.30 | 1.65 | 99.00 | Multi-use Trail | 0 | 0 | 0 |
| Airport Proposed | 3.05 | 1.52 | 91.50 | Hiking Trail | 7 | 6 | 22 |
| Airport Existing | 1.66 | 0.83 | 49.85 | Hiking Trail | 0 | 0 | 22 |
| Candlewyck | 3.23 | 1.62 | 96.96 | Hiking Trail | 3 | 5 | 6 |
| Colonial Pipeline | 2.82 | 1.41 | 84.46 | Hiking Trail | 4 | 10 | 28 |
| Neighborhood Trail | 0.35 | 0.18 | 10.51 | Hiking Trail | 3 | 2 | 1 |
| Starr to Egypt Run | 2.89 | 1.45 | 86.75 | Hiking Trail | 6 | 2 | 10 |
| White Clay Preserve Trails Proposed | 1.47 | 0.73 | 44.00 | Hiking Trail | 2 | 5 | 16 |
| White Clay Preserve Trails Existing | 1.91 | 0.95 | 57.23 | Hiking Trail | 0 | 0 | 16 |
| Octoraro Railroad | 2.87 | 1.44 | 86.12 | Multi-use Trail | 2 | 5 | 0 |
| STATS Proposed | 10.32 | 5.16 | 309.74 | Multi-use Trail | 18 | 17 | 43 |
| STATS Existing | 1.33 | 0.66 | 39.89 | Multi-use Trail | 0 | 0 | 21 |

| Bikeway Alignments | Length [Miles] | Minutes |
|--------------------------------|----------------|---------|
| Baltimore Pike Bike Route | 3.99 | 13.97 |
| Laurel Heights Bike Route | 3.89 | 13.61 |
| Bucktoe Road Bike Route | 3.49 | 12.22 |
| Mason Dixon On Road | 3.30 | 11.54 |
| Broad Run Road Bike Route | 2.28 | 7.98 |
| Buttonwood Road Bike Route | 2.08 | 7.27 |
| Penn Green Road Bike Route | 1.67 | 5.85 |
| White Clay Preserve Bike Route | 1.33 | 4.67 |
| Limestone Road Bike Route | 1.20 | 4.19 |
| Watson Mill Rd Bike Route | 0.90 | 3.15 |
| W Cypress Street Bike Route | 0.89 | 3.10 |
| Train Tracks Bike Route | 0.80 | 2.81 |
| Sharp Road Bike Route | 0.40 | 1.41 |
| Auburn Road Bike Route | 0.37 | 1.28 |
| Newark Road Bike Route | 0.21 | 0.72 |

This information was developed for 10 proposed trail systems and 14 proposed bike routes and was presented during a kickoff meeting with the project leadership, including the OSRB, Friends of the New Garden Trails, and several Township supervisors. Trail attributes, strengths, and weaknesses were discussed. Project leadership determined that trails near the airport, township buildings/lands, schools, the St. Anthony's in the Hills Property, the White Clay Creek, the Mason Dixon Trail, the Colonial Pipeline, and Candlewyck Homeowners Association lands should be prioritized. Some previously proposed trails were not prioritized because similar paths would be established through other ongoing initiatives. For example, many participants noted that pedestrians are walking along the Octoraro Railroad and a trail was proposed there previously. The pedestrian plans for Baltimore Pike pose a similar, parallel route and would more safely accommodate pedestrians and cyclists along Baltimore Pike.



On June 5, 2019, staff made a field visit to review the condition of the Township’s existing trails, public access to the trails (including parking), and the potential to extend alignments. On August 5, 2019, Natural Lands staff and Chester County staff reviewed the proposed alignments near the Colonial Pipeline, St. Anthony’s in the Hills, and Baltimore Pike.

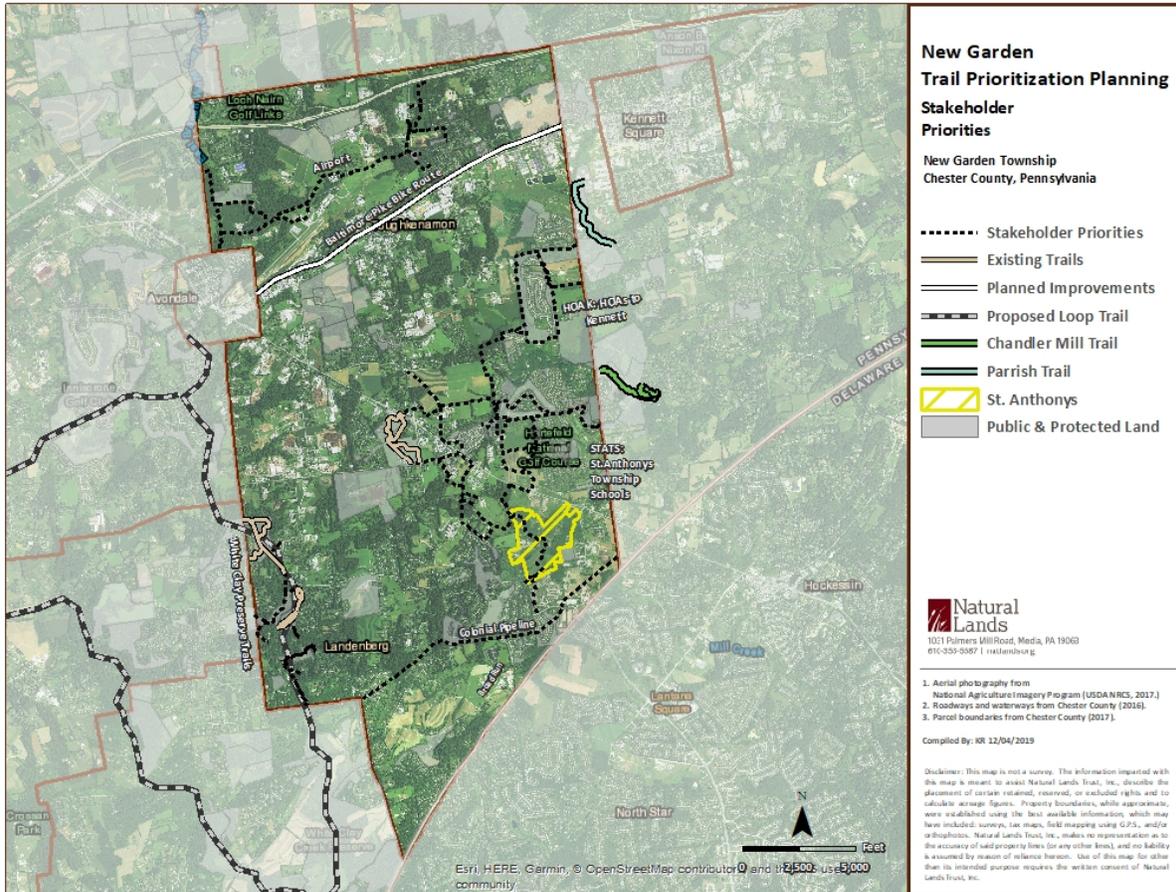
4 PUBLIC PARTICIPATION

STAKEHOLDERS

Natural Lands conducted a regional stakeholder meeting on August 20, 2019. Participants included representatives from the Pennsylvania Department of Conservation and Natural Resources (DCNR), Chester County, Kennett Township, London Britain Township, New Garden Township’s Open Space Review Board, Colonial Pipeline, Friends of the New Garden Trails, White Clay Creek Wild and Scenic River, Bike Kennett, and New Garden’s Township Manager and Assistant Township Manager. Staff described the project and objectives and participants were asked to describe their organization’s goals and potential for collaboration. The stakeholders discussed the potential to work together on regional trails based on funding opportunities.

Participants expressed interest in the Mason Dixon Trail and the Colonial Pipeline. Pennsylvania DCNR works with partners to identify and map trail gaps along Pennsylvania’s major and regionally significant greenway and trail systems. The Mason Dixon Trail is a regionally significant trail with a gap in New

Garden. Many stakeholders expressed interest in shifting the Mason Dixon Trail off road. The group agreed that the Colonial Pipeline would provide a safe alternative route. Representatives from Colonial Pipeline described the necessary steps to take to ensure that trails could be safely established along the Pipeline.



INITIAL PUBLIC MEETING

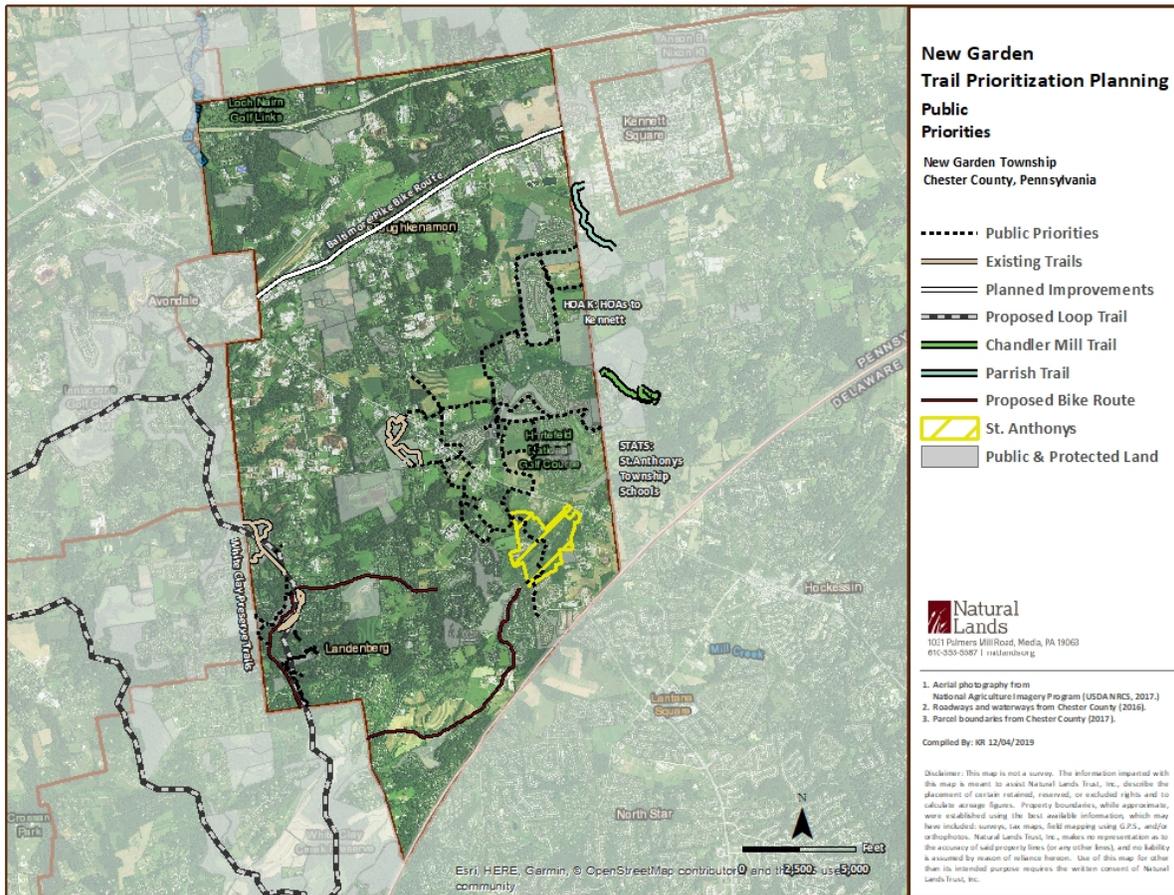
Natural Lands conducted a public meeting on August 22, 2019. As they entered, attendees were given a short questionnaire, asking about their favorite trail and what they liked about it. Natural Lands opened the meeting and described the purpose of the project. Chris Robinson and Don Peters from The Friends of the New Garden Trails gave a brief presentation on trail work to date.

A questionnaire was administered to determine which area of the Township residents would like to access via trail and to gain an understanding of what types of trail experiences residents value. The kickoff meeting participants had identified 7 of the 20 proposed trails to prioritize. The questionnaire was used to help determine which of these 7 trails the residents would prioritize. The questionnaire and results are in the appendix.

SECOND PUBLIC MEETING

On October 12, 2019, Natural Lands conducted a second public meeting to present the findings from the initial survey, explain recommendations, and hear feedback from the residents. The questionnaire provided feedback on what is important to residents. Key takeaways include:

- The majority of survey respondents live in New Garden Township and would like to access locations on the eastern side of the municipality. Most of the housing subdivisions are on the eastern side of the Township so it is understandable that people would like trails near their homes.
- People would like to access amenities in the northeast quadrant of the Township. Kennett Square and Victory Brewing Company are popular destinations in this area. Further south, on the eastern side of the Township, TLC has preserved land that residents would like to be able to explore and pass through on their way to Kennett Square.
- People would like to be able to walk to the trails without getting into their cars. Ideally the trails would be accessible from residential streets.
- Walking and spending time outside were the most important outdoor activities to respondents. Cycling and outdoor sports were less important.
- Residents currently enjoy using trails near the White Clay Creek. Laurel Woods is one of the most loved trails.
- Many residents were unaware of the Township's existing trails and the Township should enhance communication to increase awareness of the existing trails. Several respondents said that the existing trails are too short. Respondents suggested that the Township trails should connect to each other or regional trails in neighboring townships.



5 RECOMMENDATIONS

The three trail networks recommended for implementation are the Central East Homeowners Association (HOAK) trail connections to The Land Conservancy for Southern Chester County (TLC) lands and Kennett Township; the St. Anthonys/Township/Schools (STATS) trail system; and the White Clay Creek trail system. These recommendations are based on analysis of trail attributes, stakeholder feedback, and questionnaire results that identify the public's preferences. Priorities should not be set in stone. The Township's ability to prioritize trails will ultimately depend on funding opportunities, landowner willingness, and trends in recreation. The Township and OSRB should remain nimble and consider opportunities to advance other sections of trail should opportunities arise.

5.1 STATS TRAILS: ST. ANTHONYS, TOWNSHIP AND SCHOOLS

These trails will provide connections from Somerset Lake, Brittany Hills, Laurel Crossing and Hartefeld to the St. Anthonys in the Hills Property, New Garden Elementary School and Kennett Middle School, the Township building, and the Township park and sports fields. These connections would allow residents to walk to local destinations, thereby reducing car trips.

The Township owns the St. Anthonys Property and can implement trails in conjunction with the St. Anthonys Master Plan, which is being developed in 2020. As the Township owns St. Anthonys and controls many of the surrounding rights of way, they should be able to some of these trail segments without acquiring additional land.

The existing Township trail in this system is 1.3 miles long. An additional 10.3 miles of trail are proposed. The trails would comprise 11.6 miles total and would take almost 6 hours to walk. The proposed trails would have 18 water crossings and 17 road crossings. The trails would require at least 12 easements on the following parcels: 60-4-59, 60-3-267, 60-5-36, 60-6-39, 60-6-36, 60-4-48.2, 60-3-149.1, 60-3-157, 60-4-41.4, 60-4-426, 60-4-417 and 60-30-116.

Nine of the trail segments are proposed along roadways and should be developed within the rights of way. Four segments under a half mile proposed on portions of Brittany Drive, Hyde Park Road, Pyles Mountain Lane and Starr Road. Six trail segments greater than one half mile in length are proposed on Egypt Run Road, Sunnyside Road, Gap Newport Pike, Portmamock Drive, New Garden Road and Sharp Road. Gap Newport Pike is a State Road and PennDOT collaboration and permitting will be required. Portmamock Drive and sections of Starr Road contain sidewalks already.

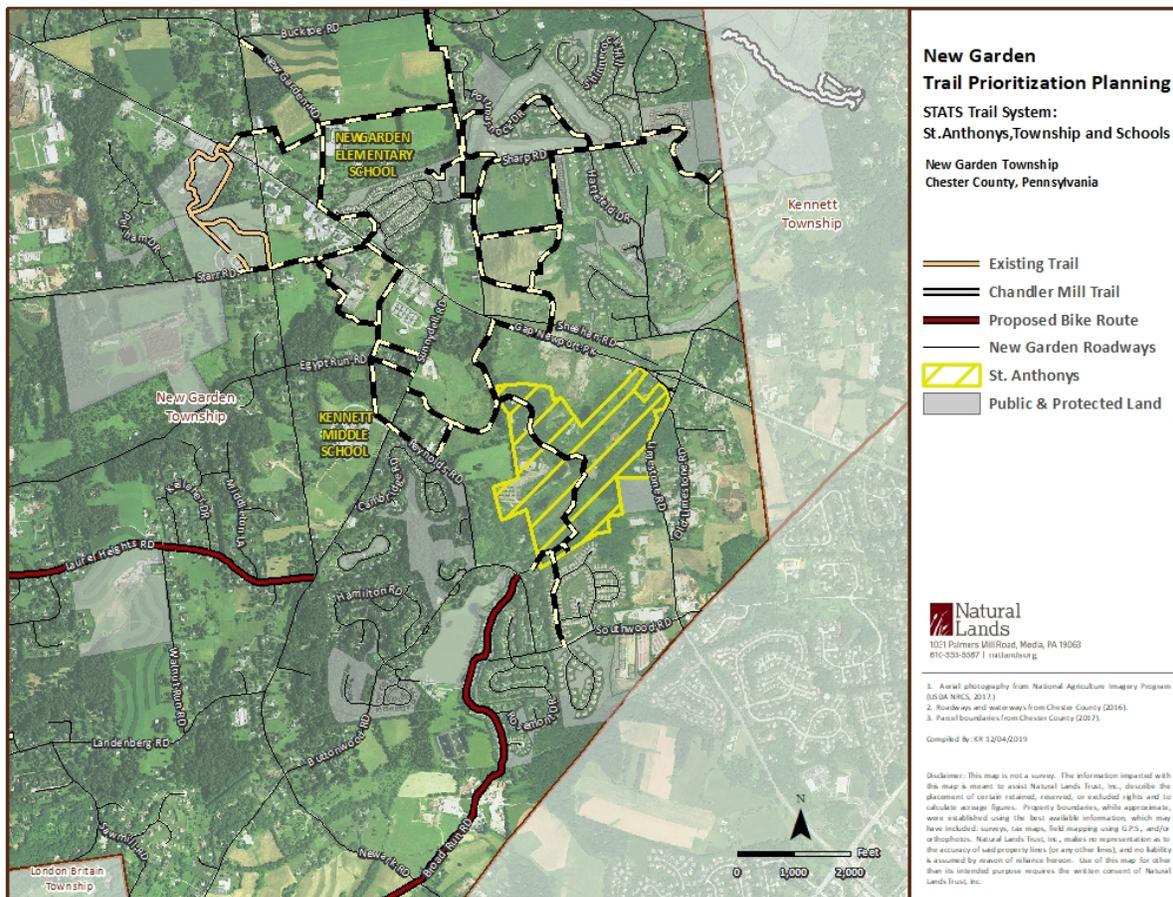
These proposed trails would connect key locations with a circuitous system of multi-use and hiking trails. Wayfinding signage should be installed along these trails to provide direction to pedestrians. Signage is especially important at locations where the trail transitions from the roadway right of way to natural areas where there are fewer landmarks.

The most efficient way for Townships to create trails is to require developers to build trails. There are several parcels adjacent to the STATS proposed system, including the site directly across Route 41 from St. Anthonys that could be developed in the future. As development applications move forward, every effort should be made to ensure developers include trails in their designs and construct the trails, advancing the network. New Garden Township's Subdivision and Land Development Ordinance, Section 170-49.1A2 Common Open Space, states that existing or proposed trails connecting the tract to other

locations in the Township shall be included in common open space to the fullest extent practicable. Section B of Common Open space provides Design Standards for common open space, and states that the public shall have access to these trail areas if they do connect to other areas of the Township. If a neighboring parcel is developed, care should be taken to ensure that connections are made between the trails of subdivisions. A new development can be an efficient way to extend and build the trail system.

A significant portion of the STATS trail system is proposed in the rights of way or on Township property. The municipality is in the best position to lead the implementation of the STATS trail system because the Township has the authority to develop trails in the right of way on local roads. The 2009 Greenways Plan provides specifications for multi-use paths on pages 13-15.

The OSRB should begin landowner outreach to determine if landowners are interested in providing trail easements. This phase of implementation will take longer and minor adjustments to the proposed trails may be necessary.



5.2 HOAK: HOMEOWNERS ASSOCIATIONS TO KENNETT SQUARE TRAIL CONNECTIONS

These trails provide access from two subdivisions, Candlewyck and The Preserve at New Garden, to natural areas managed by The Land Conservancy for Southern Chester County. There is potential to connect to the Parrish Trail, the Chandler Mill Trail, and Kennett Square. The map below shows lands protected by land trusts, including the Brandywine Conservancy and the Land Conservancy for Southern Chester County, as well as homeowners associations.

The portion of the trail proposed within New Garden is over three miles. It would take more than an hour and a half to walk the trail. The proposed trail would have three water crossings and five road crossings. The trail would require at least 4 easements. A half mile segment of the proposed trail would be in or along the Sharp Road right of way, which New Garden controls.

The New Garden Friends of the Trails are leading the implementation effort on the HOAK trail by working with the Homeowners associations. Homeowners association Representatives of Candlewyck and The Preserve at New Garden HOA's have met to discuss the potential alignment and next steps. We recommend that the Friends of the Trails continue to work with the Homeowners Associations as their membership is eager to create connections to Kennett Square.

Collaboration with Kennett Township, Kennett Square and The Land Conservancy of Southern Chester County will be necessary to ensure the advancement of this system. Their land can provide vital links to Kennett Square and other nearby destinations. Wayfinding signage and lighting will be key to ensuring that pedestrians feel comfortable using the system.



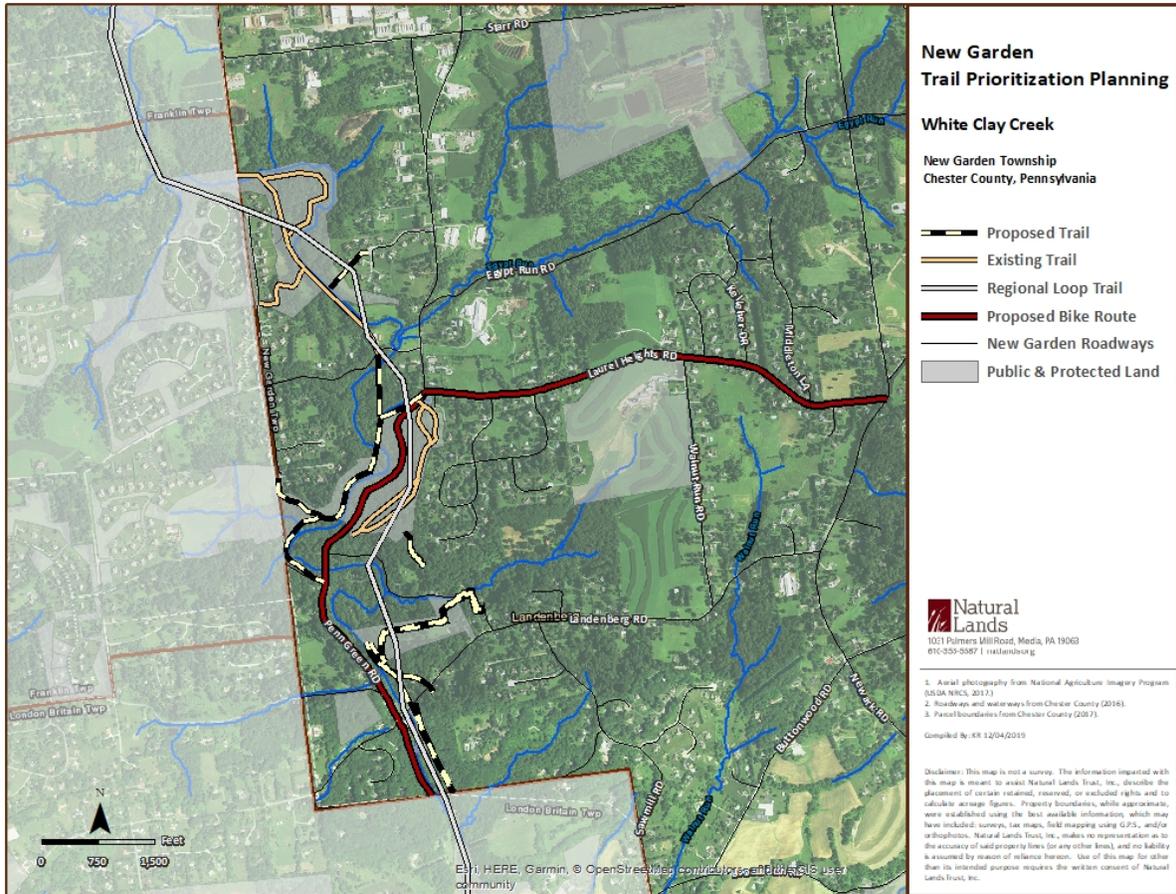
5.3 WHITE CLAY CREEK

The Southwestern corner of New Garden is a pristine natural area, with scenic views along Penn Green Road. The proposed trail system is part of a larger loop trail that connects the neighboring municipalities, of London Grove, Franklin, London Britain, Avondale and West Grove to the White Clay Creek Preserve. New Garden should coordinate with Franklin and London Britain Townships to connect trails across the Townships.

The existing trail is 1.9 miles long and an additional 1.5 miles are proposed. The completed trail system would total 3.4 miles and would take almost 2 hours to walk. The proposed trail would require 2 water crossings and 5 road crossings. The trail would require at least 16 easements. None of the additional trail sections are proposed in the right of way.

Landowner willingness is key to the success of this trail system. The Friends of the Trails should work with landowners along the alignments and determine who may be willing to provide easements. The public participation process revealed that these trails are used and appreciated by the hikers that know about them but there is an opportunity to increase awareness and use of these trails. A communications strategy could enhance visitation to this corner of the Township. The Friends of the Trails should provide additional information about locations and parking and consider holding events on the trail to orient residents to the area. The Township should consider closing Penn Green Road on Sundays. The White Clay Creek

section of Penn Green Road has fantastic scenery and cyclists could enjoy a car free Landenberg and explore the trails. The bike path could run along Laurel Heights Road from Newark Road to Penn Green Road and Southward on Penn Green Road.



5.4 SECONDARY RECOMENDATIONS

The recommendations in this report are based on analysis of trail attributes, stakeholder feedback, and survey results from the public that indicate which trails would receive the most use. During the process, stakeholders identified second tier priorities. The Mason Dixon Trail/Colonial Pipeline could potentially qualify for DCNR funding to close the regional trail gap. The pipeline area is currently clear of trees and mowed twice per year.

Other recommendations include:

- A bike lane or shared lane from Laurel Heights Road westward and south on Penn Green Road has the potential to enhance the number of visitors to the White Clay Creek area trail, especially if Penn Green Road south of Laurel Heights Road is closed on certain days. This quiet road has very few connections to homes or businesses and the scenic vistas along Penn Green Road would attract cyclists.
- A bike lane was suggested on Broad Run Road because it's scenic and relatively quiet.

- The pedestrian improvements being considered on Baltimore Pike will enhance east/west connections at the northern end of the Township.

The different trail networks require different implementation strategies and partners. The Friends of the Trails should lead the effort on the HOAK trail network. The Friends can work with the Township Engineer to ensure that the trail is consistent with the trail on the development plan for Candlewyck. The municipality should lead the implementation on the STATS system by advancing trails along rights of way while the OSRB conducts landowner outreach to determine which landowners would be willing to provide trails on their property. The White Clay Creek network requires a multi-faceted approach. The Friends of the Trails should enhance visitation with communications strategy and programming. The municipality should work to close Penn Green Road for cyclists south of Laurel Heights Road monthly to enhance visitation from cyclists and pedestrians. The OSRB should continue to work on landowner outreach to secure the remaining trail easements.

5. CONCLUSION

The Township, the New Garden Friends of the Trails and the OSRB can work together to advance these trail network in New Garden. This Trail Prioritization Report can be used as follows:

- The New Garden Township Planning Commission can reference these priorities when reviewing development applications and request that trails be included in new developments.
- The Open Space Review Board can target trail outreach efforts and can reference priorities when considering a trail or land protection project.
- The Township should consider including priority trails on the Official Map.
- The OSRB should have a process to establish trails on properties that are not protected by a conservation easement. This process should be similar to the 11-step process outline for conservation easements.
- Sustainable trails require careful planning and a comprehensive understanding of the site. Please see Appendix C for guidance on how to develop natural surface trails.

The hikers and cyclists that use the trails are a critical part of the system. The municipality should continue to engage with trail users to ensure that residents are aware of all the hiking opportunities available, that the current system meets their needs and that new trails will be used.

6. APPENDIX

Appendix 1: Implementing Sustainable Trails

Appendix 2: Trails Questionnaire

Appendix 3: Trails Questionnaire Results

6 APPENDIX 1: IMPLEMENTING SUSTAINABLE TRAILS

An Introduction to Sustainable Trail Design²

Good trails don't just appear on their own. They require careful planning and a comprehensive understanding of the site. Well planned trails will have considered not just potential uses, users, routes, and destinations, but also how those users will feel when they're on the trail. During the planning phase, designers should ask, "Is the trail in harmony with its surroundings? Does it fit in here?" In order to optimize the "fit" of the trail, designers consider edges, gateways, and anchors. The trail should incorporate edges and a variety of views, terrains, slopes, and segments, including straight, curved, and natural shapes that respect, reflect, and cross edges should be incorporated. Anchors should also be considered and these distinct vertical features should be used to add visual interest. Local communities may wish to engage a landscape architect or other trail professional when designing new, natural surface trails. If a community wishes to install paved trails, they should consult with design professionals, including an engineer.

NATURAL SURFACE TRAILS & WATER QUALITY

Poorly designed trails can degrade water quality. The natural features and materials should be carefully considered to prevent erosion and reduce maintenance requirements. Trails should not be located in wetlands and terrain should be used to limit the potential for runoff.

Natural Features and Physical Forces

The designer must consider the existing natural and man-made features on the site. Correct interpretation and design in response to existing slopes, soils, drainage patterns, and other existing conditions will determine whether a proposed trail will be sustainable or will face a lifetime of maintenance issues. Trail designers should ensure that trails avoid environmentally sensitive areas, rare species, and attractive nuisances. Trails which are well thought out and carefully constructed will be more sustainable and require less maintenance over time.

Material

The type of tread surface will ultimately be determined by the level of trail use, the terrain through which the trail passes, and the underlying soils. Once an area has been cleared for a trail it should be surveyed to determine where hardening, erosion control, or other measures are needed to stabilize the tread. Most problems occur where a trail traverses steep slopes or wet areas, or where surface water drainage flows across the trail during storms. Where trails are implemented on hard, stable, and flat soils, construction may not be necessary as vegetation can simply be cleared to create a trail. If, with time and use, initially stable areas begin to show signs of erosion, then some stabilizing type of material, such as crushed stone, should be integrated into the soil of the tread. Trail designers should account for the soil types existing on site. Loams are typically best suited to supporting natural surface trails. Where trails must pass through other soil types, they must be designed to deal with the issues associated with each of these soil types, including drainage difficulties with clay, erosion of silt, and the lack of compaction of sand.

² This information is informed by the book *Natural Surface Trails by Design* by Troy Scott Parker and *Trail Planning, Design, and Development Guidelines* by the Minnesota Department of Natural Resources.

Stabilization

Stabilizing treads requires consideration of the compaction, which is the downward force of a visitor's weight on the trail surface and displacement or the horizontal movement of trail tread material and erosion. Stabilizers, such as rock armoring, may be necessary to address smaller wet or erodible areas.

Slopes

Where a trail cuts across a slope, a slightly outsloped tread of 2–5% should be provided to move water off the tread quickly. This will help to prevent trail widening and erosion. An outslope greater than 5% can make trail users feel off balance. Switchbacks and climbing turns should be used where trails traverse steep slopes. A climbing turn is a reversal in direction that maintains the existing grade going through the turn without a constructed landing. A switchback is also a reversal in direction, but has a relatively level constructed landing. Switchbacks usually involve special treatment of the approaches, barriers, and drainage. Long sections of trail between these turns are usually better than short ones; fewer turns will need to be built and there will be less of a temptation to shortcut them. Both switchbacks and climbing turns take skill to locate, construct, and maintain; therefore, every effort should be made to minimize their use when designing a trail. If switchbacks or climbing turns are necessary, the landowner should consult with a professional trail designer, landscape architect, or similar professional.

Basic Rules for dealing with slopes:

- Follow the contour lines, rather than running perpendicular to them. Trails should never go straight up a steep slope.
- The Half Rule: the slope of a trail should not exceed half of the slope of the hillside it traverses.
- The 10% Rule: the average running slope for the length of a trail should not exceed 10%.
- Trails should be constructed with an outslope of 2–5%, facilitating drainage while providing a comfortable surface.
- Trails should be cut into a hillside with a full bench, meaning that the trail should be built into the excavated hillside, not built out from the hillside.
- Trails should employ switchbacks or climbing turns when traveling up a steep hillside.
- These techniques typically require careful design of grading, vegetation removal, and features such as anchors and visual goals. If switchbacks or climbing turns are necessary, consult with a professional trail designer.

Trails in Wet Areas

Trails should be designed to avoid wet areas wherever possible. Trail users should not be permitted to traverse wet areas without some sort of management practice. Seasonally wet trails should be closed during wet periods. Permanently wet trails should be improved with structures. Nearly every technique for fixing trails in wet areas is expensive, requires state or federal permits and needs to be repeated periodically. Therefore, trails through wet areas should be relocated if possible and avoided in the first place.

Tread Watershed

The tread watershed is the trail tread between a local high point (crest) and the next local low point (dip), plus the land area that drains into this tread segment. It is helpful to consider tread watersheds and incorporate them into the design of the trail because water can be managed in short sections between crests and dips.

Diverting surface water off each section of tread watershed is one of the first priorities in designing and maintaining trails. Running water erodes the tread and support structures and can even lead to loss of the trail itself. Each short section of tread watershed manages water. Shorter tread watersheds with shallower

slopes provide enhanced drainage and ensure that the trail shape is maintained. The best way to address surface water is to enhance the natural drainage by outsloping the tread and creating grade dips. An outslope of 2–5%, facilitates drainage while providing a comfortable surface.

A grade dip uses a reversal in grade to shed water from sub-watersheds along the trail segment. Grade dips should take advantage of the natural topography wherever possible, making sure water won't return to the tread. Drainage ditches or swales can be installed on the uphill side of a trail to collect water seeping or running down from a hillside before it enters a trail. If a grade dip cannot be installed where the water is entering the trail, the swales can be used to move water to a point where it can be allowed to drain across the trail with a grade dip or flow away at a point where the trail turns. Proper location and installation require careful planning and the ability to assess existing grades in the field or through the use of surveys or other plans.

Crossing Drainage Swales, Streams, and Wetlands

For minor crossings of small streams and drainage swales, there is no need for construction of elaborate bridges. Stepping stones are ideal where the stream flow is generally low and there are not significant fluctuations, except following major storm events. The stepping stones should be large and flat-topped, placed approximately two feet apart across the stream. Stepping stones work well in streams with a rocky bed, as the stepping stones can be stabilized within the existing rocky bed. Engineered stepping stones, made of concrete and anchored into the stream bed, may also be installed. However, these are extremely expensive, require state (and/or federal) permits, and are difficult to blend harmoniously with the surroundings as they are often made into perfect circles, hexagons or other shapes.

Where stepping stones are not practical, a bridge may be needed. A professional engineer should be employed to design stream crossings, including bridges, as well as boardwalks or other structures. Any new stream crossing that involves a structure requires a permit from the Pennsylvania Department of Environmental Protection (DEP), Bureau of Waterways Engineering and Wetlands. Permits from DEP may also be required for boardwalk construction. The US Army Corps of Engineers (for the Delaware River watershed: Philadelphia District, 215- 656- 6729) requires a permit for any discharge of fill within wetlands. Other local, state or federal permits may also be required, depending on the project. We recommend that landowners consult with a Professional Engineer (PE) to properly design stream crossings and obtain the necessary permits.

Dogs

Many publicly accessible properties are excellent places for dog walkers. However, it is important that visitors keep dogs on leashes to protect the dogs, other users, and wildlife. Keeping dogs on leashes can control interactions between users and dogs, ensuring everyone's safety. Off-leash dogs can disturb wildlife, including birds, interrupting feeding and nesting as well as increasing stress on wildlife. Dog owners should remove all waste from the site as it can degrade water quality by adding nutrients and pathogens to local water bodies.

Simple and relatively effective policies can be enacted to mitigate issues associated with dog use. Based on Leave No Trace principles, policies should rely on educating dog owners about the need to keep their pet leashed at all times and to pack out their waste. Signage, brochures, and loaner leashes can assist in informing property users about appropriate dog management.

Shared Use Paved Trails

The 2009 Greenways Plan provides overall guidance and specifications for bikeways and multi-use trails. Pennsylvania DCNR's [*Pennsylvania Trail Design and Development Principles: Guidelines for Sustainable, Non-motorized Trails*](#) provides guidance on multi-use trails, including grade, drainage, intersections, and intersection treatments.



Appendix 2: Trails Questionnaire

Natural Lands

New Garden Township Trails Questionnaire

1. Are you a resident or business owner in New Garden Township? (Please Circle)

Resident

Business Owner

Other: _____

2. If you live in New Garden Township, please flip the page and put the circle sticker in the square on the map where you live.

3. Please flip the page and place the star sticker in the square on the map that you would most like to access on foot or via bicycle.

4. Which places (in the star square) would you like to access on foot or via bicycle? (Write your answer in the space below.)

5. How important is it for you to be able to access trails without getting in your car? (Please fill in the bubble.)

Not Important

Slightly Important

Neutral

Important

Very Important

6. What kind of outdoor activities are most important to you? (Please fill in the bubble next to **TWO** activities that are the most important to you.)

- Walking
- Running
- Cycling
- Running errands or commuting without a car
- Spending time in natural areas
- Trips to playgrounds or sports fields
- Dog friendly activities
- Other: _____(write "other" activity in this space please)

7. Do you use the New Garden trail system now? If so, how often do you visit, and which trail(s) do you use? (Write your answer in the space below.)

8. What do you like about the existing trail system in New Garden? (Write your answer in the space below.)

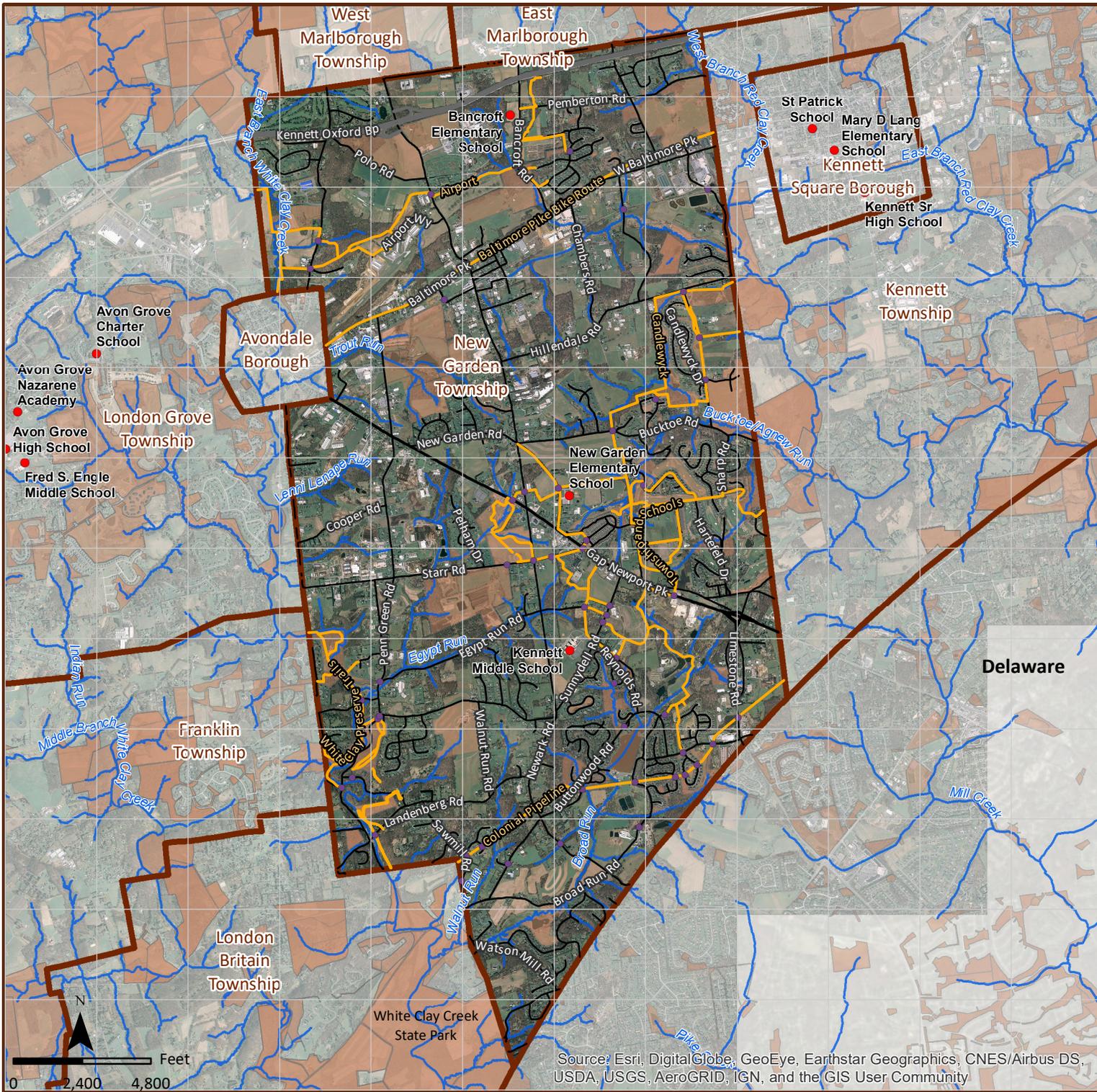
9. What could be improved about New Garden's existing trail system? (Write your answer in the space below.)

10. Do you own land along a proposed alignment? (Please fill in the bubble.)

- Yes
- No
- Not Sure

11. If yes, would you consider a trail on your property? (Write your answer in the space below.)

12. Please feel free to tell us anything else you'd like to share about existing or potential trails in New Garden Township in the space below.



New Garden Trail Prioritization Planning

New Garden Township,
Chester County, PA

- Existing and Proposed Trails
- School
- Road Crossing
- Local Road
- State Road
- US Highway
- Municipal Boundaries
- Protected Lands
- Waterways



1031 Palmers Mill Road, Media, PA 19063
610-353-5587 | natlands.org

1. Aerial imagery courtesy of DVRPC (2010).
2. Protected lands from Chester County (2018) and The Nature Conservancy (2015).
3. Waterways and roadways from Chester County (2016).

Compiled By: CMA 8/20/19

Disclaimer: This map is not a survey. The information imparted with this map is meant to assist Natural Lands Trust, Inc., describe the placement of certain retained, reserved, or excluded rights and to calculate acreage figures. Property boundaries, while approximate, were established using the best available information, which may have included: surveys, tax maps, field mapping using G.P.S., and/or orthophotos. Natural Lands Trust, Inc., makes no representation as to the accuracy of said property lines (or any other lines), and no liability is assumed by reason of reliance hereon. Use of this map for other than its intended purpose requires the written consent of Natural Lands Trust, Inc.

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Appendix 3: Trails Questionnaire Results Presentation



land for life. nature for all.

10/17: 2nd Public Meeting

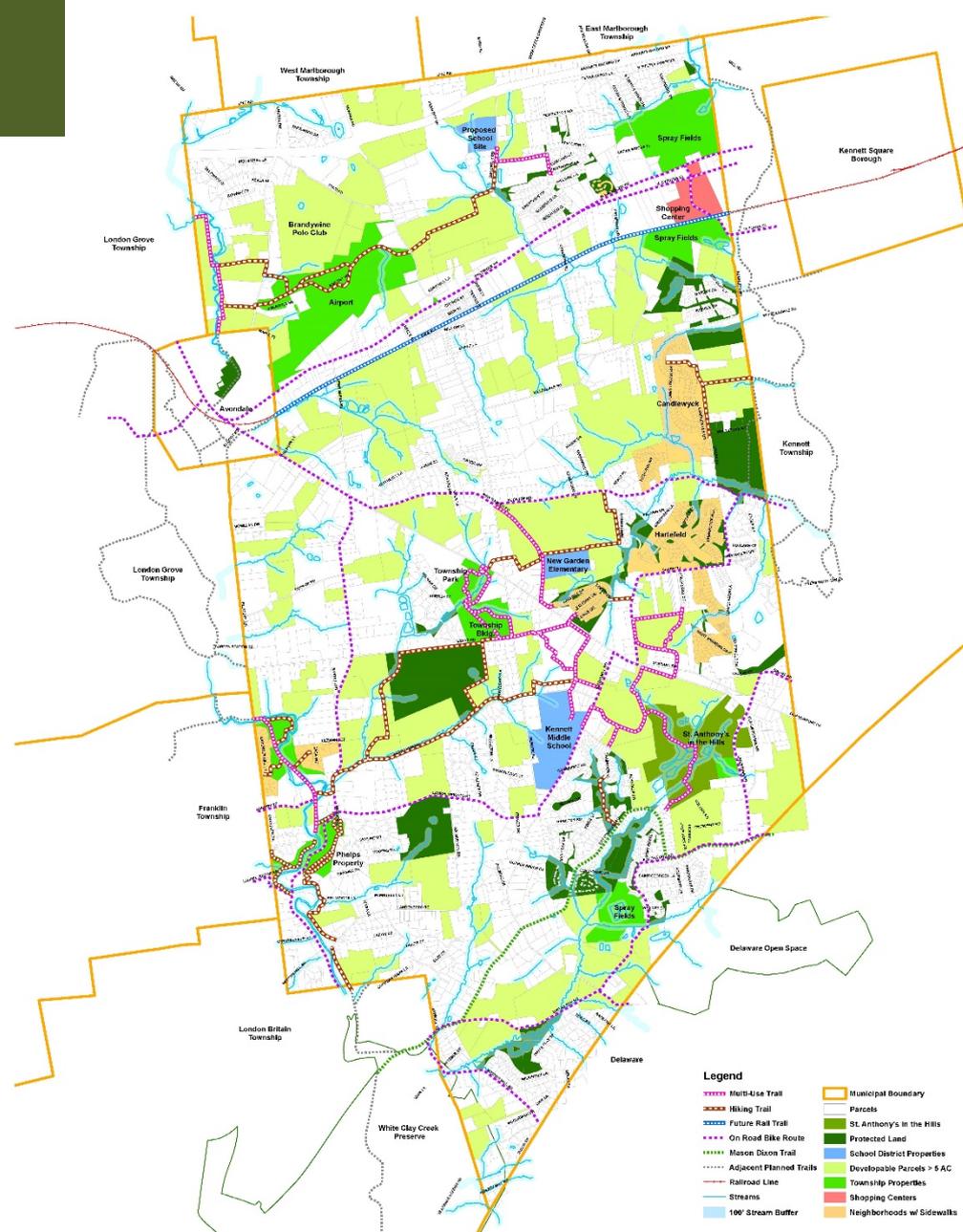
| | |
|------------------|--|
| Summarize | Feedback from initial meeting |
| Recommend | Trail(s) to prioritize |
| Discuss | How you can continue to be involved |

Introductions

- **Natural Lands**
- **Friends of the Trails**
- **Open Space Review Board**

This Evening's Objective

- The 2008 Trails plan proposed more than 20 trail alignments, GREAT!
- We have collected feedback from you to help determine where to start.



Door Question



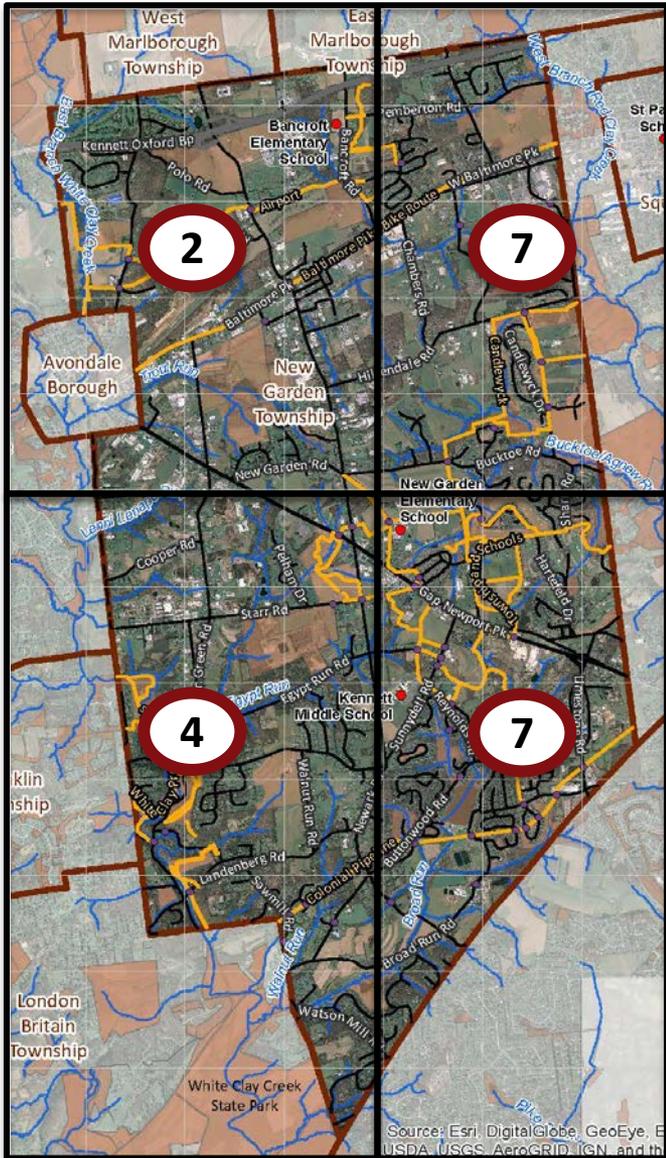
- **Favorite Trail and what you like about it**
 - **9 respondents named a trail or park in or near New Garden.**
 - **The most popular trails in New Garden are the Laurel Woods, the Mill Race Trail and the Parrish Trail.**
 - **7 respondents named a trail in another state or county**

Questionnaire: 1



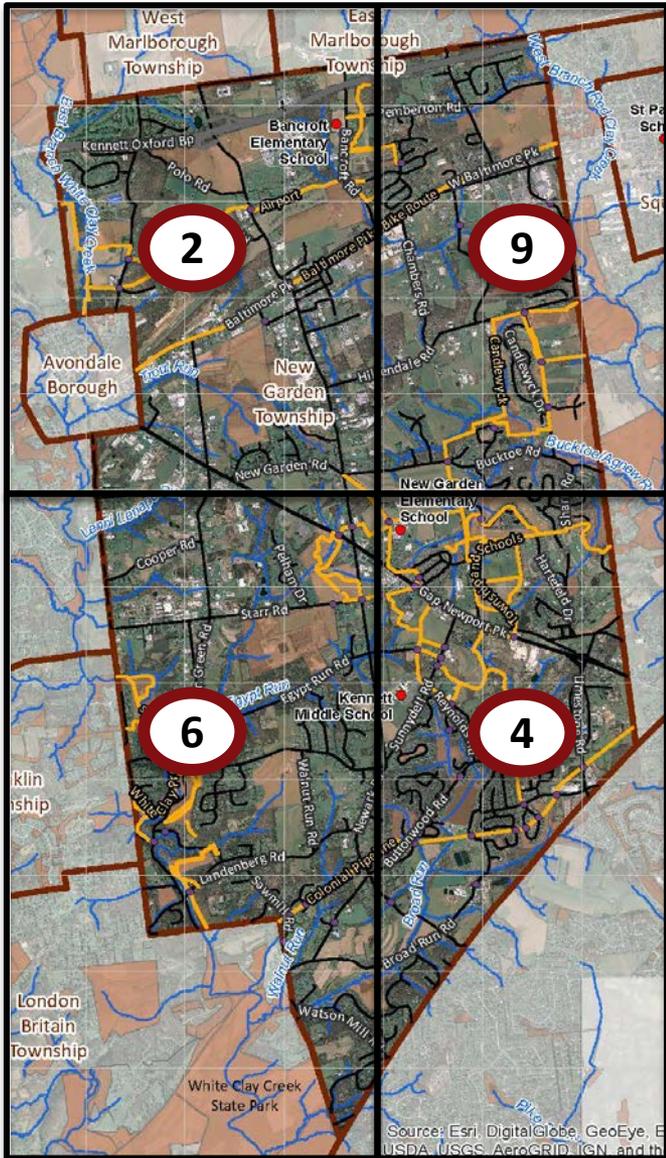
- **Are you a resident or business owner in New Garden Township?**
- **Residents: 17**
- **Other: 7**

Questionnaire: 2



- Please flip the page and put the circle sticker in the square where you live.
 - 14 of 20 respondents live on the Eastern Side of the Township
 - 6 respondents live in the Western side of the Township

Questionnaire: 3



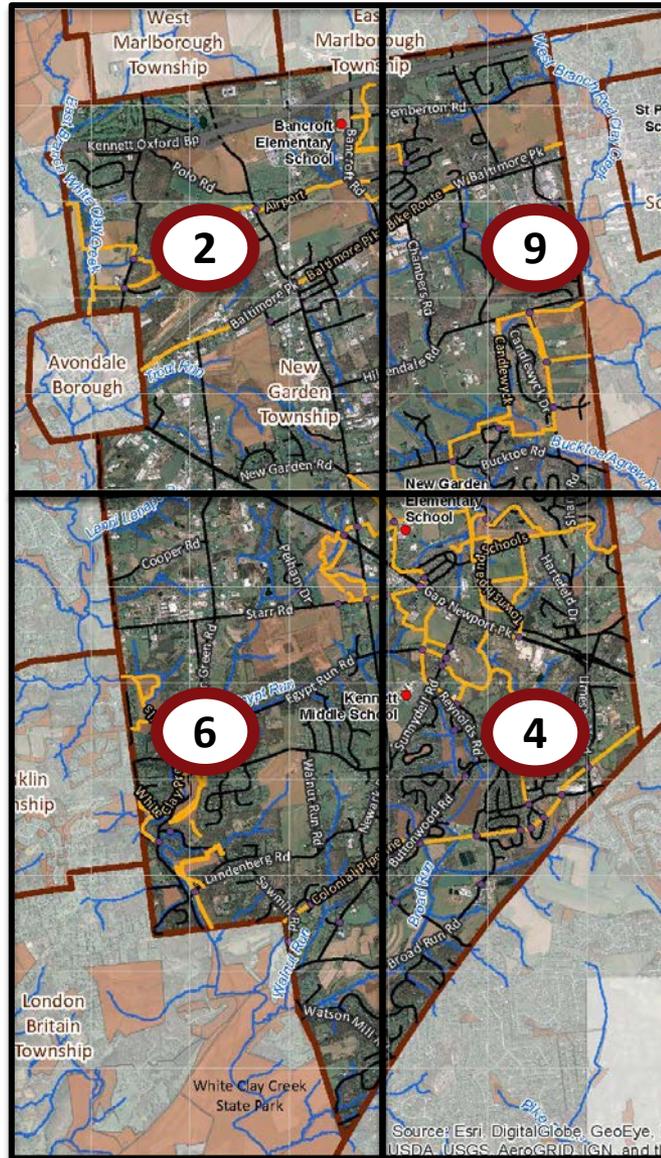
- Now place the star sticker in the square that you would most like to access on foot or via bicycle.
 - 13 of 21 respondents would like to access a location on the Eastern side of the Township
 - 8 respondents would like to access a location on the Western Side of the Township.

Questionnaire: 4

Which places (in the star square) would you like to access on foot or via bicycle?

- Airport Trail

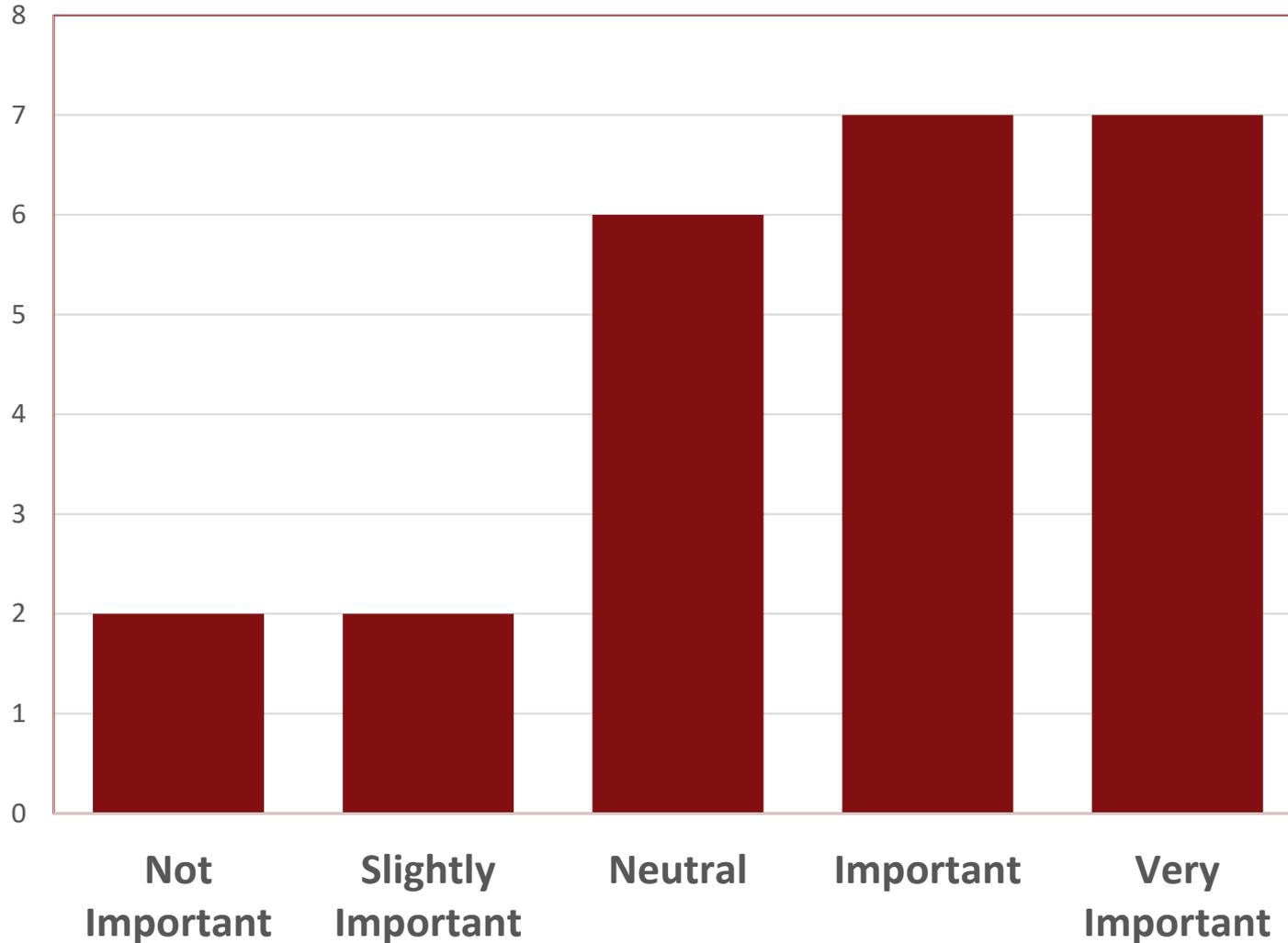
- White Clay Creek Preserve
- Tri-state Arc



- Victory Brewing
- Kennett Square
- Parrish Trail
- Schools
- Giant Grocery Store
- Chandler Mill Bridge
- Buck Toe Creek Preserve
- Walking Trails
- St. Anthonys

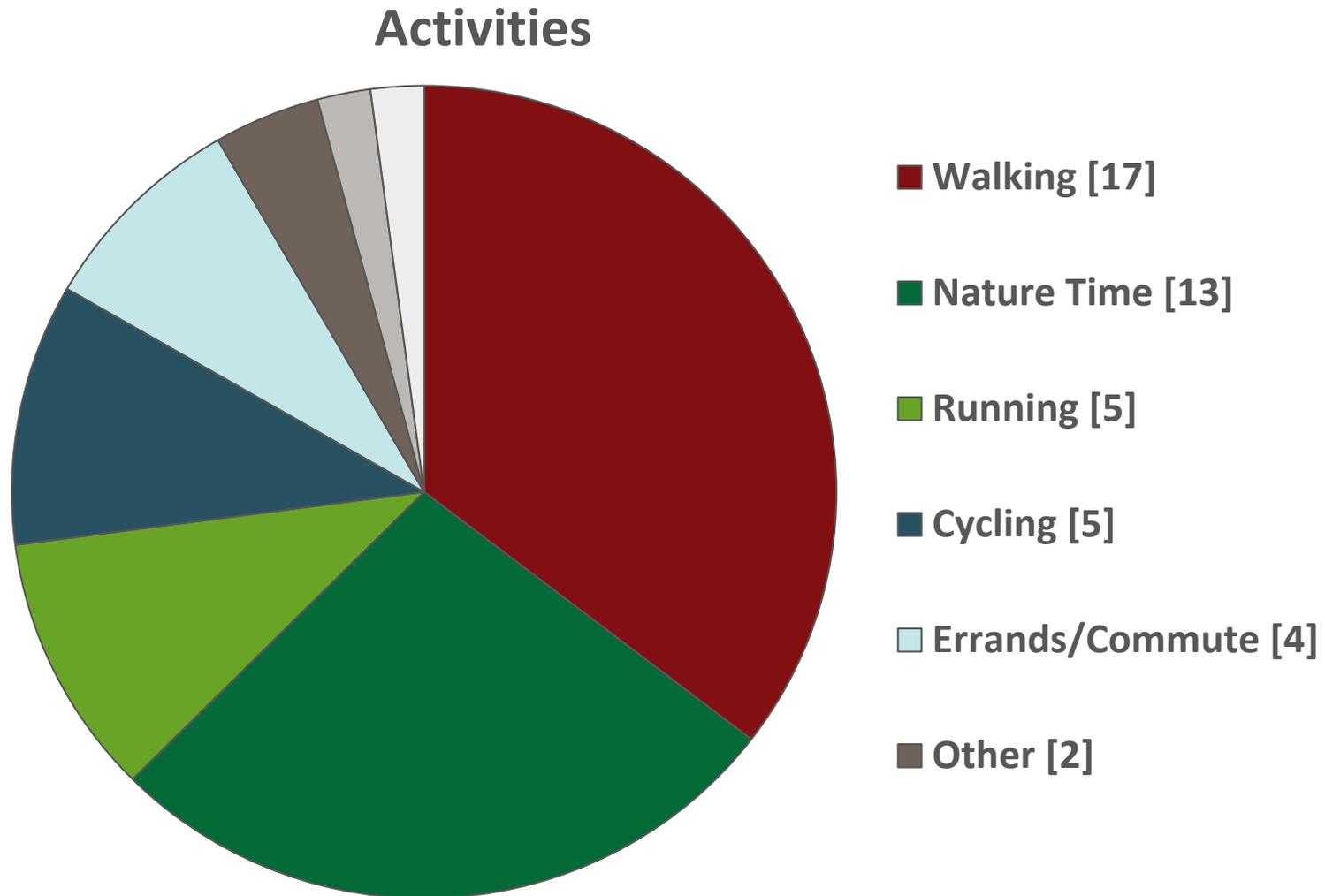
Questionnaire: 5

- **How important is it for you to access trails without getting in your car?**



Questionnaire: 6

- What kind of outdoor activities are most important to you?



Questionnaire: 7

- **Do you use the New Garden trail system now? If so, how often do you visit, and which trail(s) do you use?**
 - **9: Responded “No”**
 - **15: Responded “Yes”—Laurel Woods and Parrish Trail get the most visits**

Questionnaire: 8

- **What do you like about the existing trail system in New Garden?**
- **7: Didn't know about the system**
- **2: Natural Features**

Questionnaire: 9

- **What could be improved about New Garden's existing trail system?**
 - **7 respondents made comments about enhancing connectivity, with better linkages between schools and parks, the White Clay Preserve, and other Townships**
 - **5 respondents said better communication regarding the existing trails**

Questionnaire: 10 & 11

- **Do you own land along a proposed alignment?**
- **If yes, would you consider a trail on your property?**
- **We received responses to these questions and we're following up with respondents individually.**

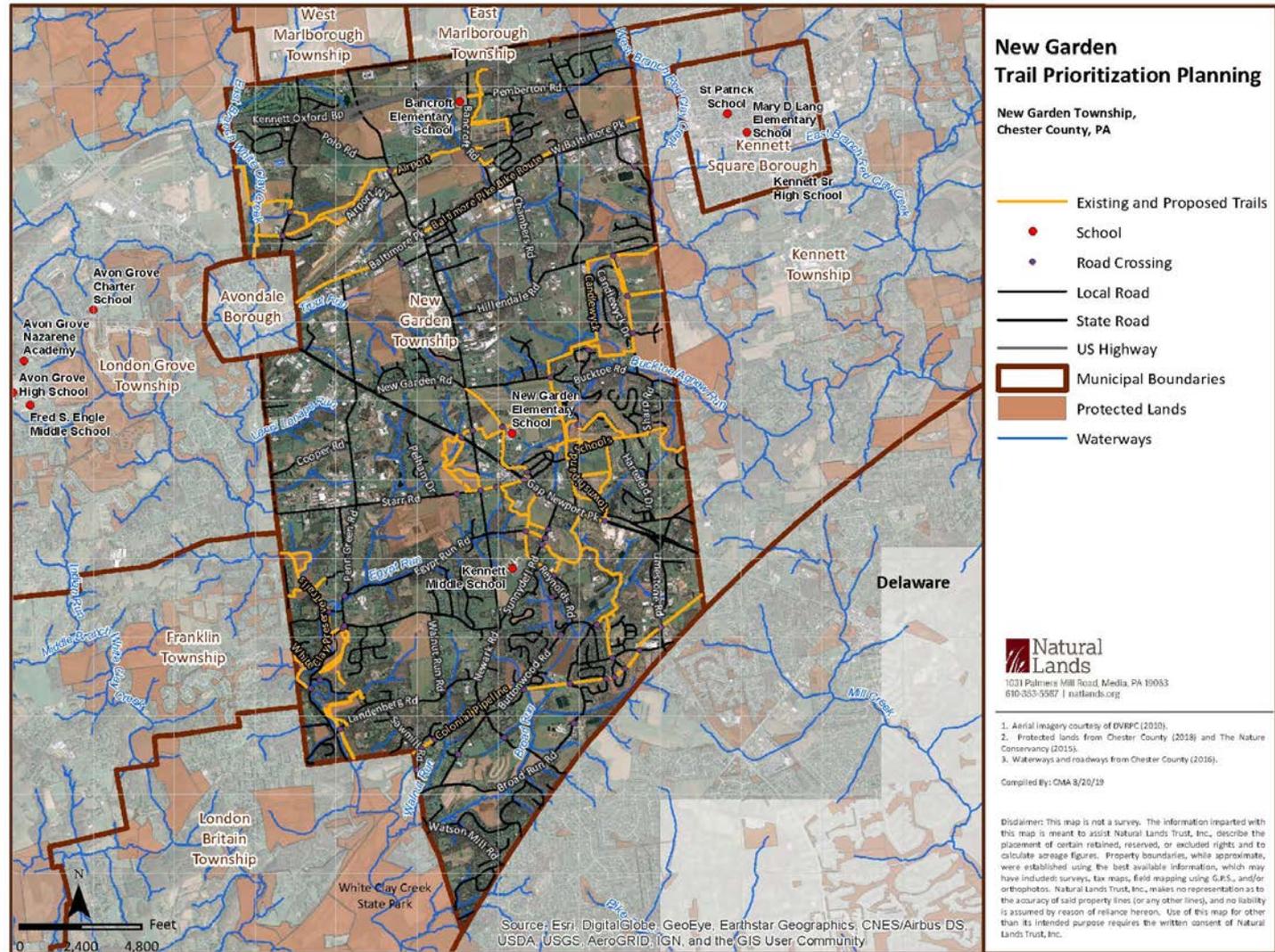
Questionnaire: 12

- **Please feel free to tell us anything else you'd like to share about existing or potential trails in New Garden Township in the space below.**
 - **Enhanced communication to let people know about the trails**
 - **Township should consider buffering, landscaping and security for trails**
 - **The existing trails are too short**
 - **Connect the trails**
 - **Trails need to be accessible from residential streets**

Where we started

7 TRAILS OF 20

- Airport
- White Clay
- Colonial Pipeline
- St. Anthonys
- Township and Schools
- Candlewyck
- Baltimore Pike



Recommendation Preparation

Priorities can shift based on:

- **Funding opportunities**
- **Landowner willingness**
- **Physical Feasibility Issues**

Please keep this in mind as we review recommendations.

Recommendations

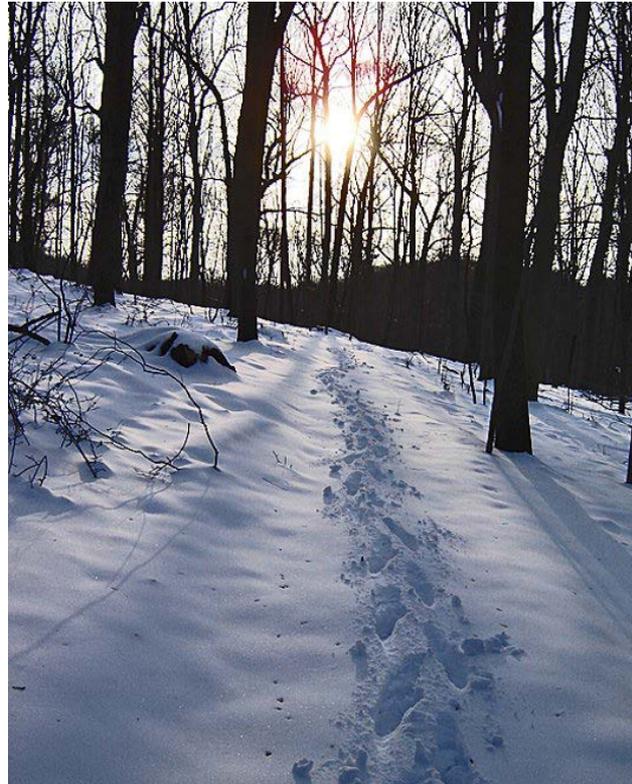
Connectivity:

**Township, Schools
& St Anthony's**



Nature:

**White Clay area and
Penn Green Road**



Eastern Access:

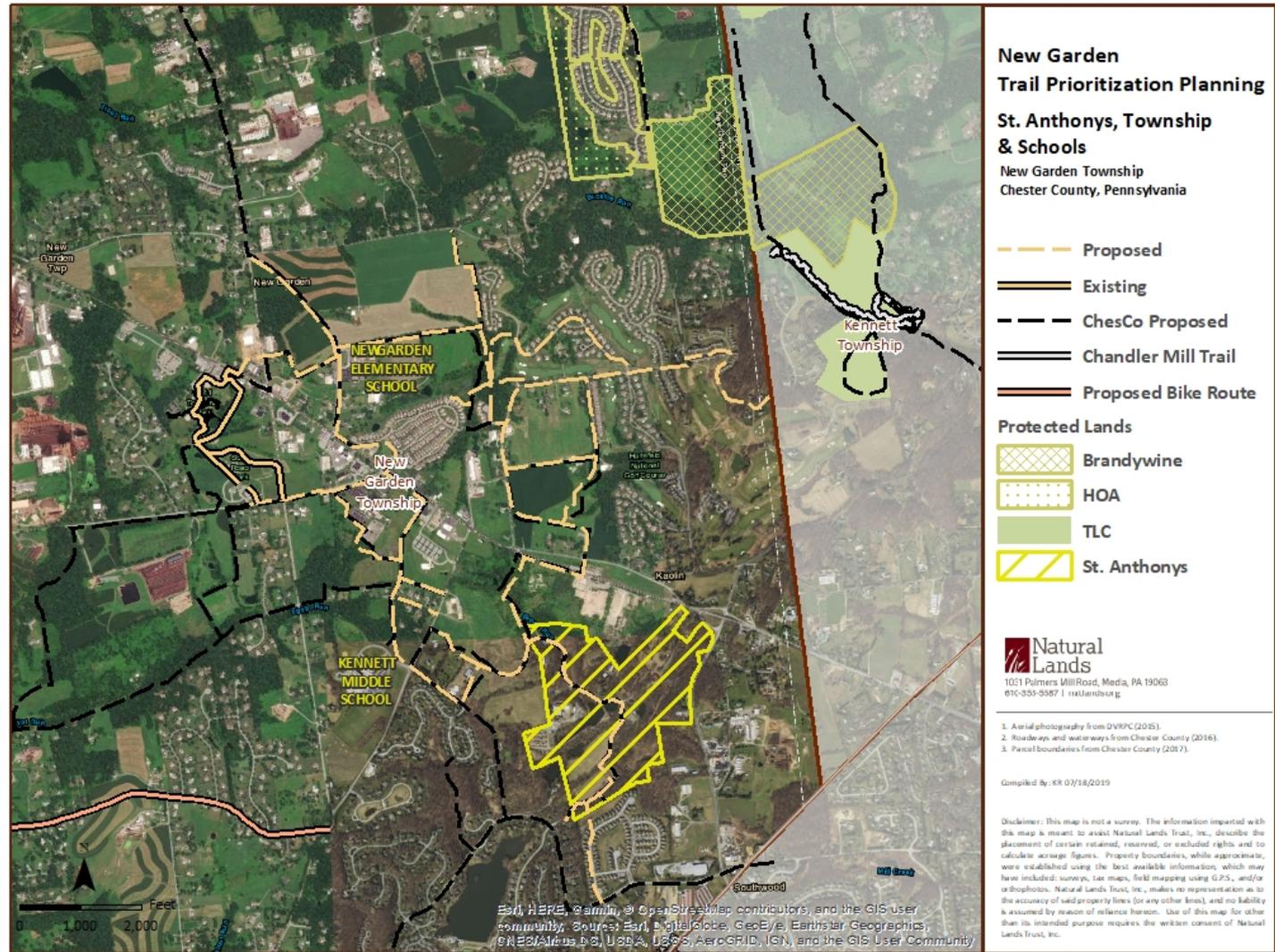
**Candlewyck and
Kennett**



St. Anthony's, Township & Schools

CONNECTIVITY

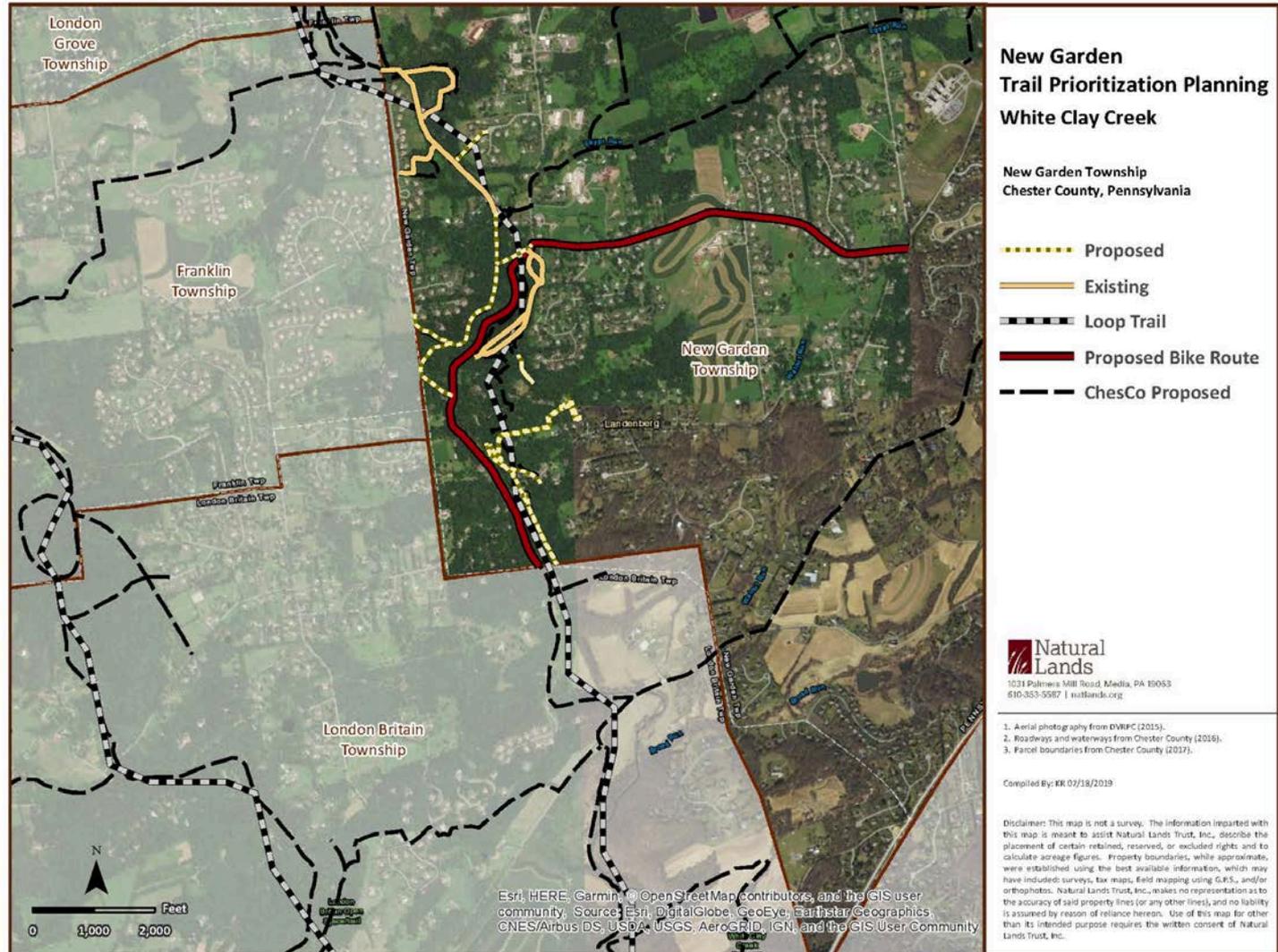
The Township should plan and enhance multiuse trail connections that connect St. Anthony's, the Township Parks, Schools and Developments.



White Clay Creek

NATURE

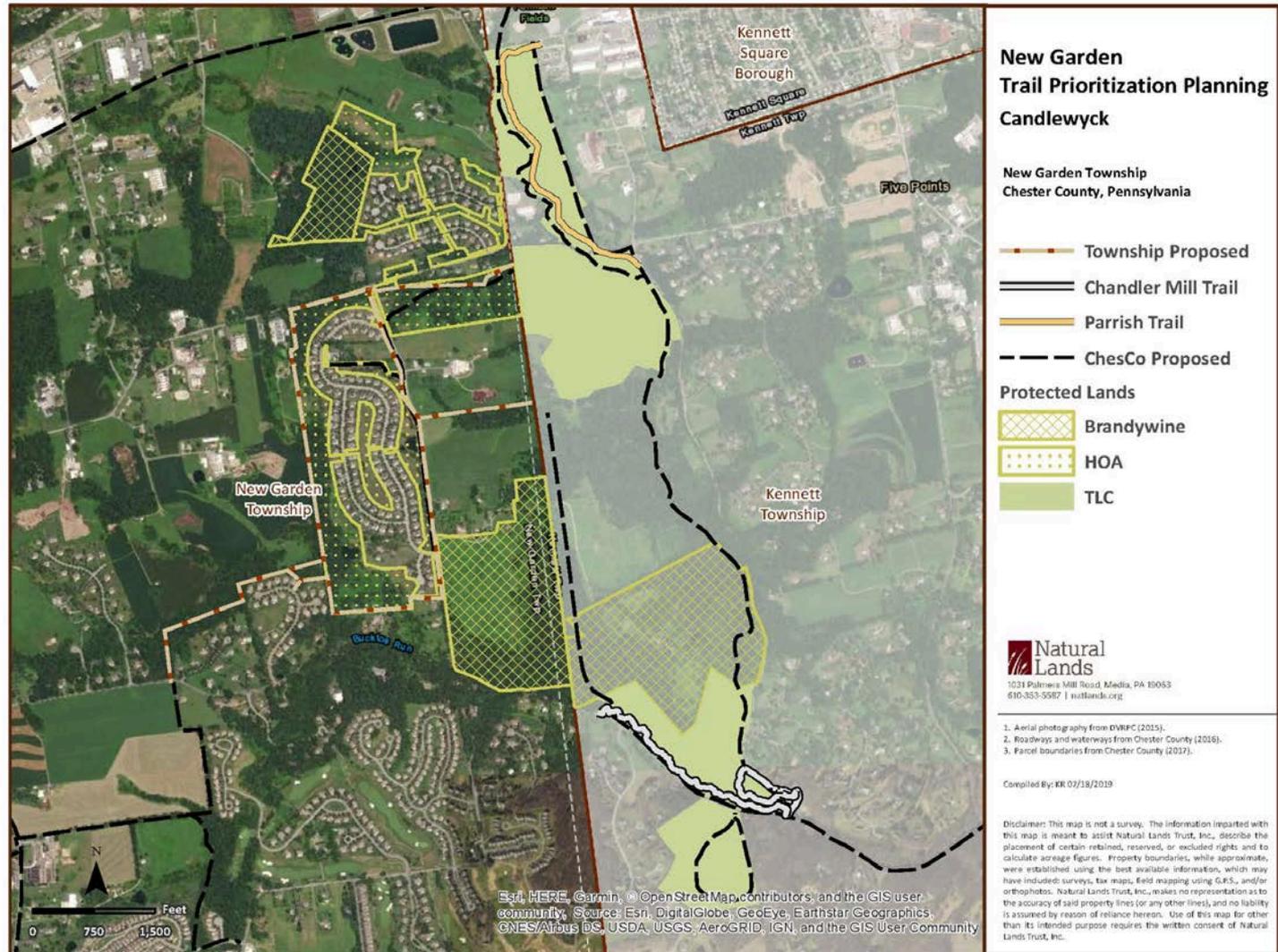
White Clay Creek is a bucolic corner of New Garden with scenic views along Penn Green Road. Visitation to this corner of New Garden could be enhanced with a communications strategy. The Township could consider closing Penn Green Road on Sundays. Hikers and Cyclists could enjoy a car free Landenberg and explore the trails.



Candlewyck

EASTERN ACCESS

The majority of residents would like to access the areas in the Northeast section of the Township. Kennett Square is the primary destination in this area.



Next Steps

A final report will be prepared.

The report can be used by the Township in several ways:

- **The Planning Commission can reference the priorities when reviewing development applications and request that trails be included in new developments.**
- **The Open Space Review Board can target trail outreach efforts.**
- **The Open Space Review Board can reference priorities when considering a trail or land protection project.**
- **The Township could consider including priority trails on the official map.**

Next Steps

There are maps of the priority trails in the back of the room.

Please feel free to stay and comment on the maps.

thank you.

