2016

BRICK STREETS PLAN

Mt. Lebanon, Allegheny County, PA

Prepared by:
Pennsylvania Department of Transportation
District 11-0

Prepared for:
Municipality of Mt. Lebanon, Allegheny County, PA

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EXECUTIVE SUMMARY

This Brick Streets Plan has been created for the purpose of preserving the most valued brick streets in Mt. Lebanon. This document will also serve as a planning tool for Mt. Lebanon and a guide to assist them in decision making for future projects that may impact the brick streets. Brick streets are an asset to the community and provide a feeling of historical significance in a residential neighborhood. The longevity of Mt. Lebanon's remaining brick streets attest to their durability and economic value. Though costly to install, these streets maintain a good structural condition for decades and add beauty and history to the area.

Background Information

Over 10 miles of brick streets currently exist within Mt. Lebanon. The majority of these brick streets were originally constructed in the 1930s. Many of the brick streets were restored during the 1980s; however, as time passed more and more brick streets were repaved with asphalt or cement concrete. State Route 3044, Section A01 (Castle Shannon Boulevard) is a major artery through Mt. Lebanon. In 2015 construction commenced to replace the brick pavers on Castle Shannon Boulevard with asphalt. Many residents fear this resurfacing has a negative effect on the aesthetic value of the municipality. It was determined that the SR 3044, A01 project would have an adverse effect on the Mt. Lebanon Historic District by replacing Castle Shannon Boulevard with asphalt. The Pennsylvania Department of Transportation (PennDOT) agreed to develop a brick streets planning tool for future roadway improvement projects to determine whether to restore a brick street or replace with other materials.

Methodology

The Brick Streets Plan was created utilizing supporting information and analysis provided by PennDOT, the Pennsylvania Historical and Museum Commission (PHMC), the Mt. Lebanon Historic Preservation Board, and the Historical Society of Mt. Lebanon. GIS mapping was provided by Mt. Lebanon, which gave general information (year constructed, roadway width, sidewalks, etc.) on each brick street. This information was used to supplement the data gathered through field investigations to prioritize the streets. The streets were evaluated based on the following criteria:

1.) Location relative to the historic district
2.) Structural Condition
3.) Architectural Integrity
4.) Presence of underground utilities

A street that resides within the historic district; that possesses good structural condition; has buildings adjacent to the street that have a high percentage of original construction material; and does not have many underground utilities was considered a good candidate for restoration.

There are qualitative characteristics, in addition to the measureable criteria described above, that should be taken into account when evaluating these streets. The National Register of Historic Places states: "The mature trees and retained streetscape elements of the residential plans (including many brick paved streets, grassy islands, parklets, and rolled curbs) add to the sense of the historic early automobile suburb" found within Mt. Lebanon. These features work together to create historic feel

adding value to residents and visitors alike. Therefore, one should weigh the potential negative effect any degree of repaving or reconstruction could have on these qualitative characteristics when evaluating which streets are good candidates for restoration or preservation.

Prioritization List

The prioritization list is the short-form of the Brick Streets Plan. This list includes all of Mt. Lebanon's brick streets, their prioritization for preservation in four categories (Restore, Preserve, Questionable, and Repave with Other Materials), and an explanation about the extent of preservation for each category.

Map of the Brick Streets

This map visually locates all of Mt. Lebanon's brick streets and color codes them based on what category they were assigned.

Recommendations to Preserve Mt. Lebanon's Brick Streets

Four categories of recommendations were created ranging from "restoration" to "appropriate for resurfacing". Fourteen streets were recommended for restoration; 24 streets were recommended for preservation (requiring more significant repairs, such as base repairs, than those being recommended for restoration); additional input from the Historic Preservation Board should be requested before a final decision is made for 20 streets; and 20 streets could be repaved with other materials. These recommendations serve only as a guide for future activities. Should the brick streets, in the future, be in an area where construction, including utility work, was to occur, then the recommendations provide a guide for how to consider the brick street in the construction plan. Those streets recommended as requiring additional input from the preservation board would require additional coordination prior to the start of any construction so that a decision can be made on whether the street must be restored, preserved, or can be repaved with another material. It is particularly important to consider the qualitative characteristics of these "questionable" streets to determine if the presence of brick is vital to maintaining a cohesive, historic neighborhood feel. The municipality may also benefit from soliciting public opinion when deciding how to treat a "questionable" street. Residents or road users may want to repave a street with other materials in an effort to improve rideability or traction. Many of Mt. Lebanon's brick streets traverse steep grades and brick pavers may provide reduced friction when compared to asphalt or cement concrete.

Construction and Maintenance Costs

Paving a road in brick is typically more costly than paving with asphalt or cement; however, the maintenance associated with brick streets is usually less expensive than other paving materials over the design life of the street. An estimated construction cost was provided for every street in the project area. The method of estimating the cost was dependent on the prioritization category for that street. The costs range from restoring the brick (Category 1) to full-depth reconstruction with other paving materials (Category 4).

Life cycle maintenance costs were only provided for streets falling under Categories 3 and 4 since materials other than brick are being considered for repaving / reconstruction on these streets. Category 3 streets were assigned a life cycle maintenance cost for brick, asphalt, and cement concrete while Category 4 streets were only assigned maintenance costs for asphalt and cement concrete.

METHODOLOGY

In February of 2015, a Letter of Understanding (LOU) was signed between the PennDOT and the PHMC regarding the State Route (S.R.) 3044, Section A01, Castle Shannon Boulevard project in Mt. Lebanon. The proposed reconstruction of Castle Shannon Boulevard would remove existing brick pavers and resurface the roadway with asphalt. It was concluded that the project would have an adverse effect on the Mt. Lebanon Historic District. Therefore, this Brick Streets Plan was prepared, as requirement in the LOU, to offset the adverse effect of the Castle Shannon Boulevard construction.

In accordance with the February 2015 LOU, this Brick Streets Plan is being prepared by PennDOT for use by the municipality of Mt. Lebanon. The purpose of the plan is to provide a guide to the management and preservation of Mt. Lebanon's brick streets. The plan contains a prioritization of the brick streets based on location, historic significance, and other factors as discussed in this methodology. Recommendations for preservation, along with draft repair and maintenance policies and a reconstruction policy, are provided for use and amendable by Mt. Lebanon's governmental board. The PHMC and Mt. Lebanon Historic Preservation Board have been afforded opportunities to review and provide input on this plan.

This Brick Streets Plan was developed using mapping provided by Mt. Lebanon, along with additional, available GIS information (existing brick streets, historic district boundaries, etc.). A brief history of Mt. Lebanon and its brick streets was developed based on available information, including the 2012 Mt. Lebanon Historic District National Register of Historic Places Registration Form, and coordination with the Historical Society of Mt. Lebanon. Brick Street Prioritization Categories were developed through coordination with PennDOT, Mt. Lebanon, and PHMC.

Existing GIS information was supplemented through a Structural Conditions assessment, an architectural integrity assessment, historic significance, and utility locations. The Structural Conditions assessment included a field review of the existing Mt. Lebanon brick streets by engineers knowledgeable in evaluation of crown conditions, drainage issues, assumed roadway base conditions (based on visual observation of settlement), rideability and the existence and extent of non-brick patches.

An Architectural Integrity assessment was conducted by qualified historic architectural professionals utilizing field information and photographs, along with coordination with the Mt. Lebanon Preservation Board and Historic Society. This assessment was limited to visual observation of the historic integrity of buildings that face existing brick streets. The visual assessment analyzed, in a qualitative fashion only, the amount of original exterior material remaining on the structures abutting the brick streets. Based on this assessment, professional judgment was used to ascertain the percentage of original materials that remain and this percentage was used to collectively rank the architectural integrity of the overall street.

This Historic Significance overlay consisted of mapping the Historic District boundary. Any streets that fell within the historic district boundary were given higher priority in the street prioritization, followed by streets that adjoin the historic district. Streets further removed from the historic district were given a

lower priority. When evaluating the historic significance of a street, one should also consider how any particular brick street contributes to the historic streetscape elements that give Mt. Lebanon its historic feel. As a result some streets may need to be considered as a unit to preserve the continuity. Examples include, but are not limited to:

- Lebanon Hills Drive / Connecting Road
- Navahoe Drive / Mohican Drive / Pueblo Drive
- Midway Road / Neulon Avenue / Parker Drive

A utilities overlay was developed based on information available from Mt. Lebanon and visual observation of any utilities / utility appurtenant structures during field views. The purpose of the utilities overlay was to assess whether the presence of underground utilities might be an issue in future preservation and restoration of Mt. Lebanon brick streets.

The street prioritization was developed based on the GIS mapping and overlays, along with coordination with PennDOT, PHMC, the Historical Society of Mt. Lebanon, and the Mt. Lebanon Historic Preservation Board. Following the prioritization, estimated sample restoration, rehabilitation, and paving (asphalt / concrete) costs were developed. Restoration costs were developed on the basis of brick material cost per square yard. Preservation costs were developed on the basis of brick and base material cost per square yard. Repaving costs include the cost to repave existing brick streets with asphalt or concrete. The purpose of these cost estimates is to assist Mt. Lebanon with planning efforts related to their brick streets.

There were several streets that had two or more sections of brick separated by stretches of asphalt pavement. If the sections of brick had the same cross-section (lane width, presence of sidewalk, utilities, etc.) and general structural condition, they were evaluated and categorized as one street. The following streets fit this description: Morrison Drive, Parker Drive, and Royce Avenue. Conversely, if the sections of roadway had a different cross-section or structural condition, they were evaluated and categorized separately. The following streets fit this description, and the names listed next to them are the nomenclature used to differentiate between the two sections as well as their general location.

Broadmoor Avenue:	Broadmoor Avenue – North: At Scott Rd intersection
	Broadmoor Avenue – South: At Kenilworth Drive intersection
Central Square:	Central Square – East: East of Roselawn Ave
	Central Square – West: West of Roselawn Ave
Park Entrance Drive:	Park Entrance Drive – East: East of Lebanon Hills Dr.
	Park Entrance Drive – West: West of Lebanon Hills Dr.
Pennsylvania Boulevard:	Pennsylvania Blvd – North: North of T-Line
	Pennsylvania Blvd – South: South of T-Line

Streets that only possessed a small amount of brick (< 20 feet) at the intersection with a more substantial brick street were categorized along with the more substantial street. Examples of these streets include:

Altoona Place – Categorized with Serpentine Drive
Racine Avenue – Categorized with Dixon Avenue
Shot Way – Categorized with Parker Drive
Summit Way – Categorized with Baywood Avenue
Whitmore Lane – Categorized with Rockwood Avenue

RECOMMENDATIONS TO PRESERVE MT. LEBANON'S BRICK STREETS

In forming the plan methodology and recommendations, a series of assumptions were made regarding the preservation of Mt. Lebanon's brick streets.

Assumption 1: Streets with few patches are stronger candidates for restoration or preservation.

Assumption 2: Streets with poor structural condition are poor candidates for restoration or preservation.

Assumption 3: Streets with large numbers of underground utilities are poorer candidates for restoration or preservation.

Assumption 4: Streets within the Mt. Lebanon Historic District, should be considered good candidates for restoration or preservation.

Assumption 5: Streets with higher percentages of structures with good architectural integrity are good candidates for restoration or preservation.

The GIS information was used in conjunction with the information gathered during the field views to give each street in the study area an aggregate score. Streets with a higher score were deemed better candidates for restoration or preservation. This score was developed in the following manner:

1.) *Relation to Historic District:* Streets residing within the Mt. Lebanon Historic District received 2 points; while streets residing outside the Historic District received 0 points.
2.) *Structural Condition:* Four sub-criteria were used to give each street a Structural Condition Rating. These criteria were used to give each street a quantitative rating of Excellent (7 points), Good (6 points), Above Average (5 points), Average (4 points), Below Average (3 points), Poor (2 points), and Failing (1 point). Photos showing streets representing each of these categories can be found in Appendix A.
    a. *Brick Condition:* Streets in good condition received 2 points; streets in average condition received 1 point; and streets in poor condition received 0 points.
    b. *Rideability:* Streets with a smooth driving surface received 2 points; streets with an average driving surface received 1 point; and streets with a rough driving surface received 0 points.
    c. *Drainage:* Streets that had no drainage issues received 1 point, while streets that showed signs of ponding water received 0 points.

d. *Percent Patching:* Streets with no patching received 2 points; streets with 0.1% to 5% of their pavement surface patched received 1 point; and streets with greater than 5% patching received 0 points.

3.) *Architectural Integrity:* The buildings adjacent to the brick streets in Mount Lebanon contain a high percentage of original building material. Those streets that have buildings containing more than 85% original building material were given 1 point while those containing less than 85% original building material were given 0 points. Photos showing streets with varying levels of architectural integrity can be found in Appendix B.

The following table shows how each street was ranked and what corresponding prioritization category that street was placed. These rankings should be considered along with input from the Mt. Lebanon Historic Preservation board to assess some of the qualitative characteristics each street contributes to the historic streetscape. These qualitative characteristics could change the prioritization of any given street, and potentially bump a street that is recommended for repaving with other materials into a higher preservation category.

Mt. Lebanon Brick Streets Plan
Street Categorization

		In Historic District	Structural Condition							Architectural Integrity				
Category			Excellent	Good	Above Average	Average	Below Average	Poor	Failing	Excellent	Good	Poor	Bad	
1	Dan Drive	X	X							X				Restore
1	Dixon Avenue (Incl. Racine Ave)	X	X							X				
1	McCann Place	X	X							X				
1	Navato Place	X	X							X				
1	Neulon Avenue	X	X							X				
1	Old Orchard Road	X	X							X				
1	Overlook Drive	X	X							X				
1	Ridgefield Avenue	X	X							X				
1	Royce Avenue	X	X							X				
1	Savannah Avenue	X	X							X				
1	Shadowlawn Avenue	X	X							X				
1	Virginia Way	X	X							X				
1	Wasson Place	X	X							X				
1	Wisteria Avenue	X	X							X				
2	Arden Road	X		X						X				Preserve
2	Baywood Avenue (Incl Summit Way)	X	X								X			
2	Beverly Road	X		X						X				
2	Buchanan Place	X	X								X			
2	Cherokee Place	X		X						X				
2	Iroquois Drive	X		X						X				
2	Lansdale Place	X		X						X				
2	Midway Road	X		X						X				
2	Morrison Drive	X		X						X				
2	Nakoma Drive	X		X						X				
2	North Meadowcroft Avenue	X		X						X				
2	Park Entrance Drive - West	X		X						X				
2	Roselawn Avenue	X	X								X			
2	South Meadowcroft Avenue	X		X						X				
2	Adeline Avenue		X							X				
2	Allendale Place	X			X					X				
2	Atlanta Drive	X			X					X				
2	Central Square - West	X		X							X			
2	Circle Drive	X			X					X				
2	Hoodridge Drive	X			X					X				
2	Jayson Avenue	X			X					X				
2	Lawncroft Avenue	X		X							X			
2	Parkway Drive	X			X					X				
2	Seminole Drive	X			X					X				
3	Academy Place			X						X				Questionable
3	Central Square - East	X			X						X			
3	Country Club Drive			X						X				
3	Duquesne Drive			X						X				
3	Hilf Street			X						X				
3	McCully Street	X			X						X			
3	Oak Way	X			X						X			
3	Outlook Drive	X				X				X				
3	Park Entrance Drive - East	X				X				X				
3	Parker Drive (Incl Shot Way)	X				X				X				
3	Sage Drive			X						X				
3	Carnegie Drive				X					X				
3	Connecting Road	X					X			X				
3	Highland Road	X					X			X				
3	Kewanna Avenue				X					X				
3	Lebanon Hills Drive	X					X			X				
3	Mohican Drive				X					X				
3	Poplar Drive				X					X				
3	Pueblo Drive				X					X				
3	Serpentine Drive (Incl Altoona Pl)				X					X				
4	Audubon Avenue					X				X				Repave with Other Materials
4	Birch Avenue					X				X				
4	Broadmoor Avenue - South					X				X				
4	Broadmoor Avenue - North					X				X				
4	Crystal Drive					X				X				
4	Jonquil Place					X				X				
4	Kenilworth Drive					X				X				
4	Main Entrance Drive	X						X		X				
4	Martha Avenue	X						X		X				
4	Navahoe Drive					X				X				
4	Richland Road					X				X				
4	Rockwood Avenue (Incl Whitmore Ln)					X				X				
4	Barth Avenue	X							X	X				
4	Craig Court						X			X				
4	Lincoln Way	X						X			X			
4	Earlswood Avenue							X		X				
4	Midway Way/Alley	X							X		X			
4	Pennsylvania Blvd - South	X							X		X			
4	Ross Way							X			X			
4	Pennsylvania Blvd - North								X		X			

BRICK STREETS PRIORITIZATION LIST

See the previous section for a description on how these prioritization lists were developed.

Category 1: These Mt. Lebanon Historic District brick streets hold significant value to Mt. Lebanon and would require ***restoration to their original appearance***. Replacement and/or restoration of damaged bricks to their original appearance should be considered for these streets.

Dan Drive	Dixon Avenue (includes Racine Ave)	
McCann Place	Navato Place	Neulon Avenue
Old Orchard Road	Overlook Drive	Ridgefield Avenue
Royce Avenue	Savannah Avenue	Shadowlawn Avenue
Virginia Way	Wasson Place	Wisteria Avenue

Category 2: These brick streets are important enough to merit ***preservation***, but do not have the structural condition rating to merit restoration. Visual inspection indicates that portions of these streets may require base repair. Consideration should be given to replacing any bricks removed from these streets during future activities (construction, utility work, etc.) and restoring the disturbed areas to their original appearance.

Arden Road	Baywood Avenue (includes Summit Way)	
Beverly Road	Buchanan Place	Cherokee Place
Iroquois Drive	Lansdale Place	Midway Road
Morrison Drive	Nakoma Drive	North Meadowcroft Avenue
Park Entrance Drive - West	Roselawn Avenue	South Meadowcroft Avenue
Adeline Avenue	Allendale Place	Atlanta Drive
Central Square - West	Circle Drive	Hoodridge Drive
Jayson Avenue	Lawncroft Avenue	Parkway Drive
Seminole Drive		

Category 3: The following streets require further review and consideration by the Mt. Lebanon Historic Preservation Board before resurfacing or repairs commence due to questionable potential for preservation.

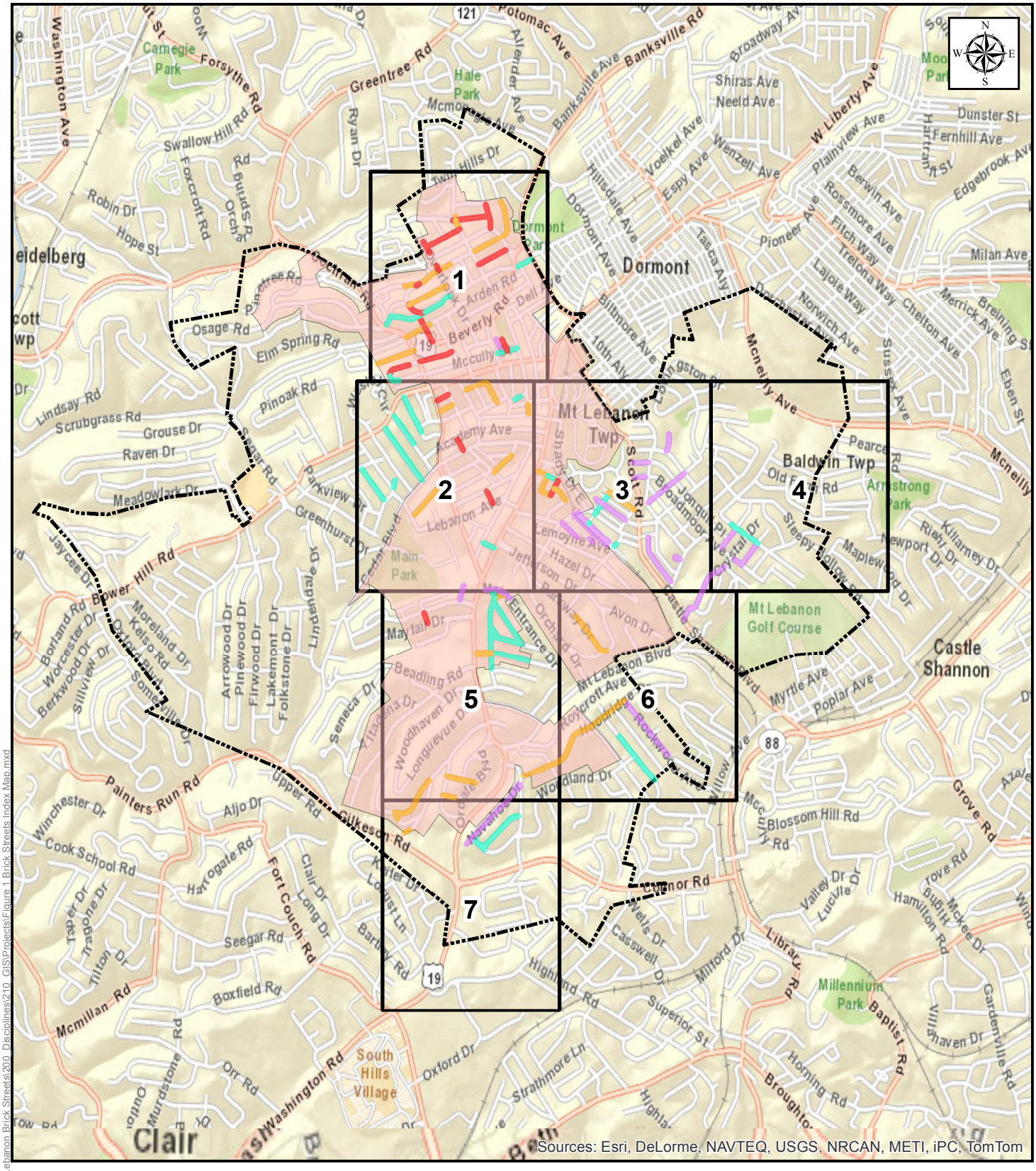
Academy Place	Central Square - East	Country Club Drive
Duquesne Drive	Hilf Street	McCully Street
Oak Way	Outlook Drive	Park Entrance Drive - East
Parker Drive (includes Shot Way)		Sage Drive
Carnegie Drive	Connecting Road	Highland Road
Kewanna Avenue	Labanon Hills Drive	Mohican Drive
Poplar Drive	Pueblo Drive	
Serpentine Drive (includes Altoona Place)		

Category 4: Resurfacing and patching with materials other than brick should be considered on these streets.

Audubon Avenue	Birch Avenue	Broadmoor Avenue - South
Broadmoor Avenue - North	Crystal Drive	Jonquil Place
Kenilworth Drive	Main Entrance Drive	Martha Avenue
Navahoe Drive	Richland Road	
Rockwood Avenue (includes Whitmore Lane)		Barth Avenue
Craig Court	Lincoln Way	Earlswood Avenue
Midway Way / Alley	Pennsylvania Blvd - South	Ross Way
Pennsylvania Blvd - North		

MAP OF THE BRICK STREETS

The following pages show the Mt. Lebanon Brick Streets project area. Figure 1 is an index showing the location and coverage area of the expanded maps contained in Figure 2. The municipal boundary and the historic district are shown in both figures.



BRICK STREETS INDEX MAP **FIGURE 1**

Mt. Lebanon Brick Streets Project
Mt. Lebanon Township
Allegheny County, Pennsylvania

LEGEND:

- Category 1
- Category 2
- Category 3
- Category 4
- Mount Lebanon Historic District
- Map Index
- Municipal Boundary

McCORMICK TAYLOR

Drawn By: DFS	Checked By: TDM
Source: Mt. Lebanon Township & ESRI	
Date: 10/12/2015	Scale 1 in : 3,000 ft

W45713_PA_PennDOT11_DesignSvcs\02_Mt Lebanon Brick Streets\200_Disciplines\210_GIS\Projects\Figure 1 Brick Streets Index Map.mxd

BRICK STREETS PRIORITIZATION MAP

Mt. Lebanon Brick Streets Project

Mt. Lebanon Township
Allegheny County, Pennsylvania

LEGEND:

- Category 1
- Category 2
- Category 3
- Category 4
- Mount Lebanon Historic District
- Municipal Boundary

FIGURE 2	Sheet 1 of 7
Drawn By: DFS	Checked By: TDM
Source: Mt. Lebanon Township & ESRI	
Date: 10/12/2015	Scale 1 in : 500 ft

McCORMICK TAYLOR

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BRICK STREETS PRIORITIZATION MAP

Mt. Lebanon Brick Streets Project

Mt. Lebanon Township
Allegheny County, Pennsylvania

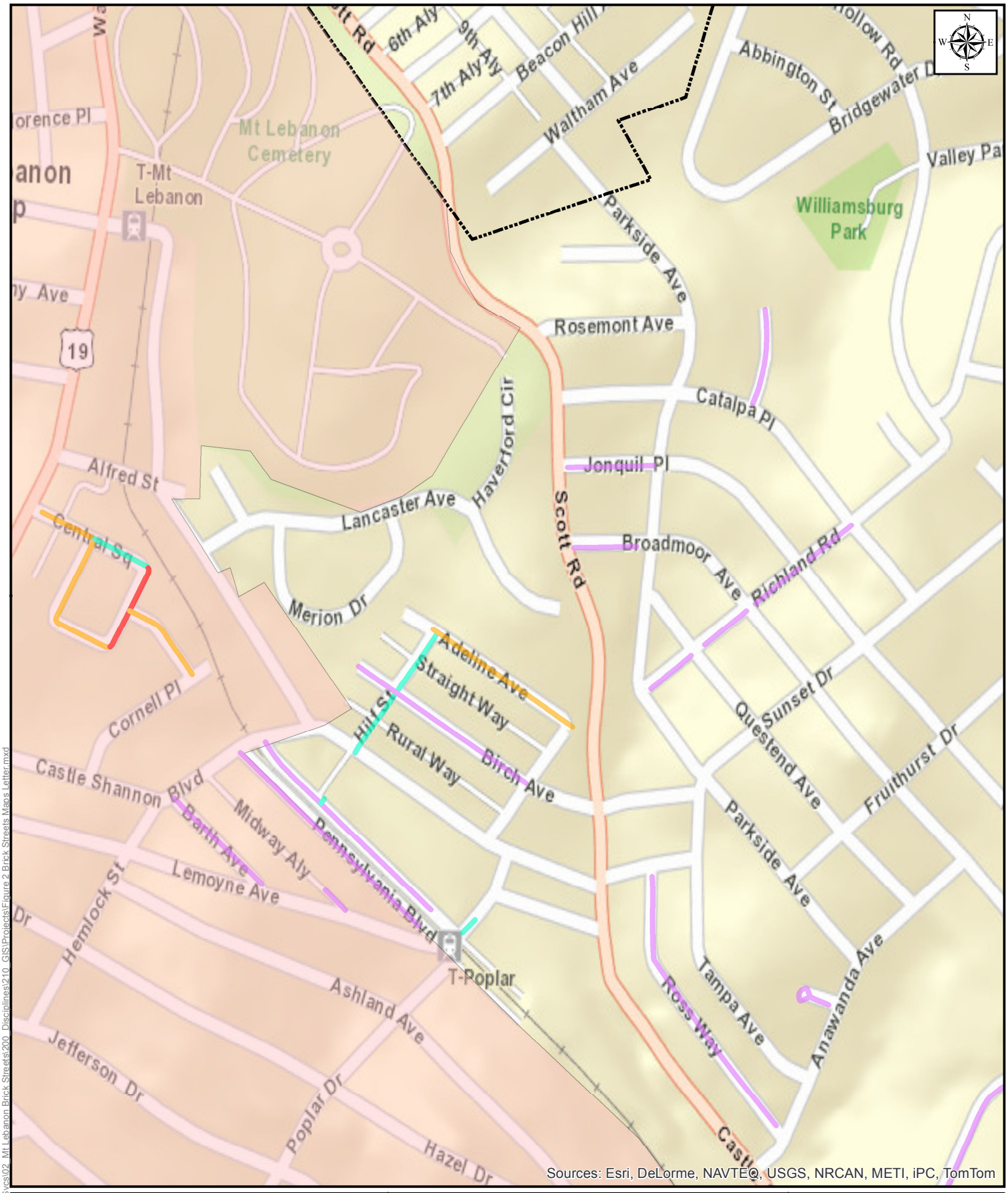
LEGEND:

- Category 1
- Category 2
- Category 3
- Category 4
- Mount Lebanon Historic District
- Municipal Boundary

FIGURE 2	Sheet 2 of 7
Drawn By: DFS	Checked By: TDM
Source: Mt. Lebanon Township & ESRI	
Date: 10/12/2015	Scale 1 in : 500 ft

McCORMICK TAYLOR

W:\5713_PA_PennDOT11_DesignSvcs\02_Mt Lebanon Brick Streets\200_Disciplines\210_GIS\Projects\Figure 2 Brick Streets Maps Letter.mxd



BRICK STREETS PRIORITIZATION MAP

Mt. Lebanon Brick Streets Project

Mt. Lebanon Township
Allegheny County, Pennsylvania

LEGEND:

- Category 1
- Category 2
- Category 3
- Category 4
- Mount Lebanon Historic District
- Municipal Boundary

FIGURE 2	Sheet 3 of 7
Drawn By: DFS	Checked By: TDM
Source: Mt. Lebanon Township & ESRI	
Date: 10/12/2015	Scale 1 in : 500 ft

McCORMICK TAYLOR

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BRICK STREETS PRIORITIZATION MAP

Mt. Lebanon Brick Streets Project

Mt. Lebanon Township
Allegheny County, Pennsylvania

LEGEND:

- Category 1
- Category 2
- Category 3
- Category 4
- Mount Lebanon Historic District
- Municipal Boundary

FIGURE 2	**Sheet 4 of 7**
Drawn By: DFS	Checked By: TDM
Source: Mt. Lebanon Township & ESRI	
Date: 10/12/2015	Scale 1 in : 500 ft

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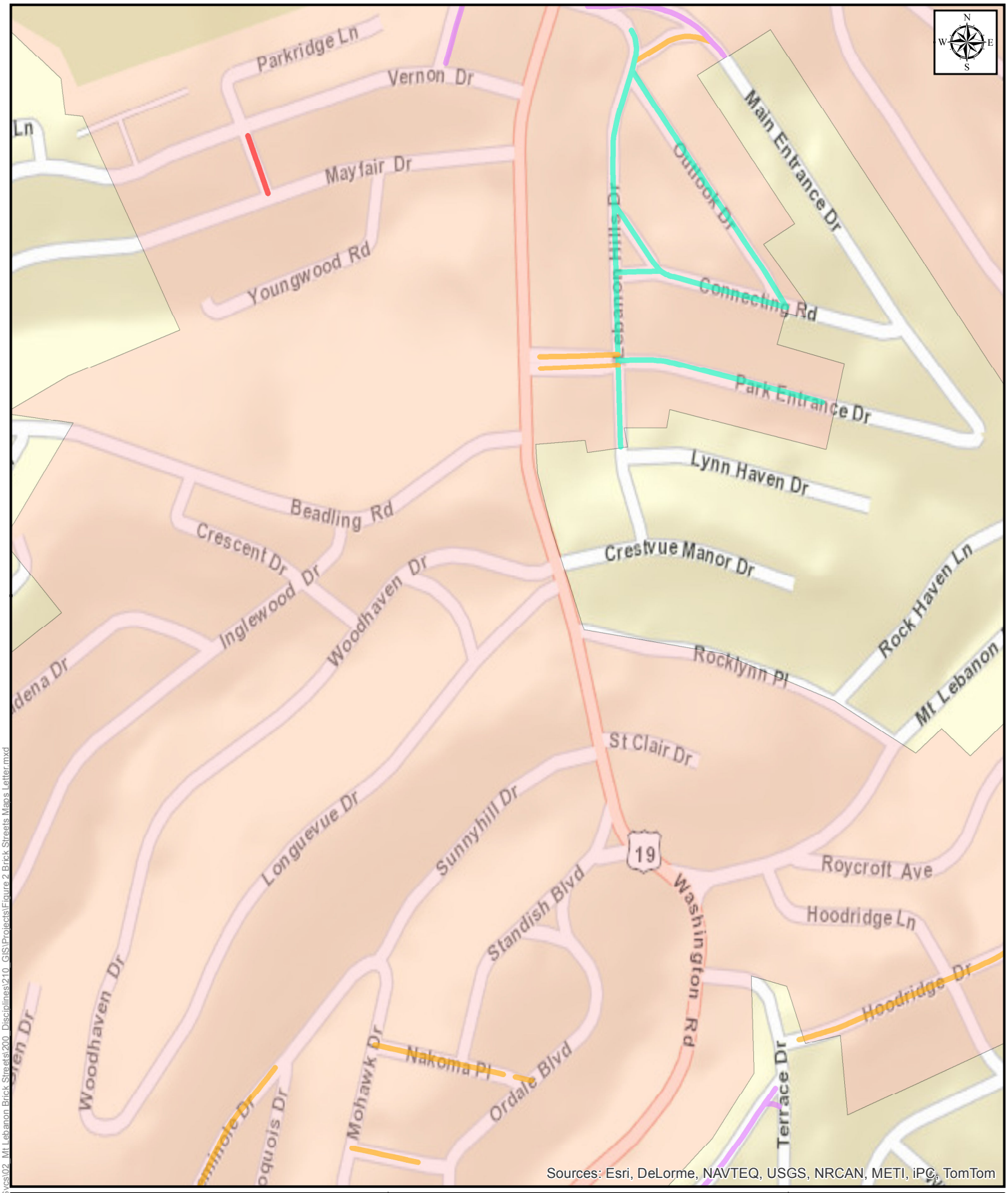

BRICK STREETS PRIORITIZATION MAP

Mt. Lebanon Brick Streets Project

Mt. Lebanon Township
Allegheny County, Pennsylvania

LEGEND:

- Category 1
- Category 2
- Category 3
- Category 4
- Mount Lebanon Historic District
- Municipal Boundary

FIGURE 2	Sheet 5 of 7
Drawn By: DFS	Checked By: TDM
Source: Mt. Lebanon Township & ESRI	
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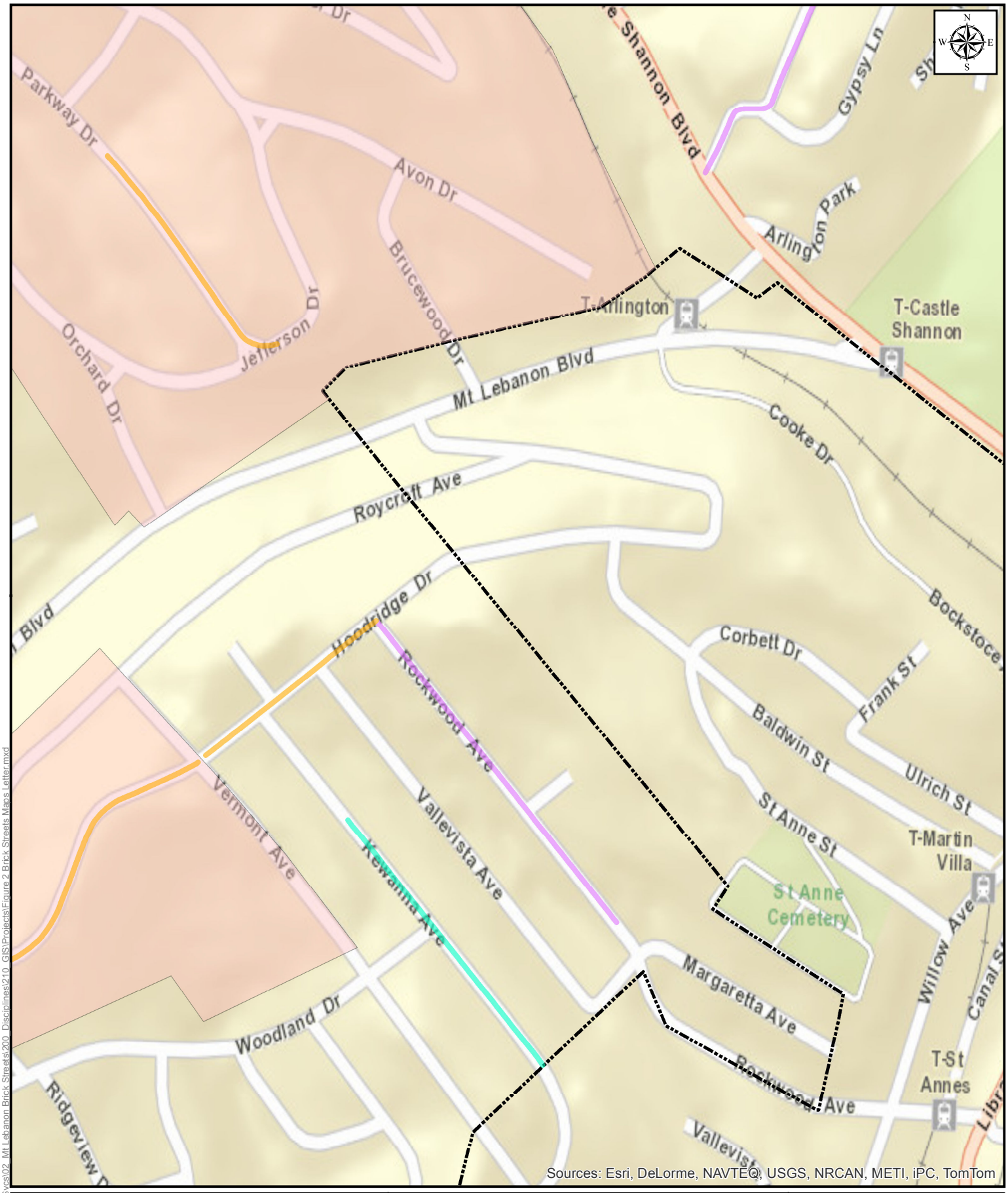

BRICK STREETS PRIORITIZATION MAP

Mt. Lebanon Brick Streets Project

Mt. Lebanon Township
Allegheny County, Pennsylvania

LEGEND:

- Category 1
- Category 2
- Category 3
- Category 4
- Mount Lebanon Historic District
- Municipal Boundary

FIGURE 2	Sheet 6 of 7
Drawn By: DFS	Checked By: TDM
Source: Mt. Lebanon Township & ESRI	
Date: 10/12/2015	Scale 1 in : 500 ft

McCORMICK TAYLOR

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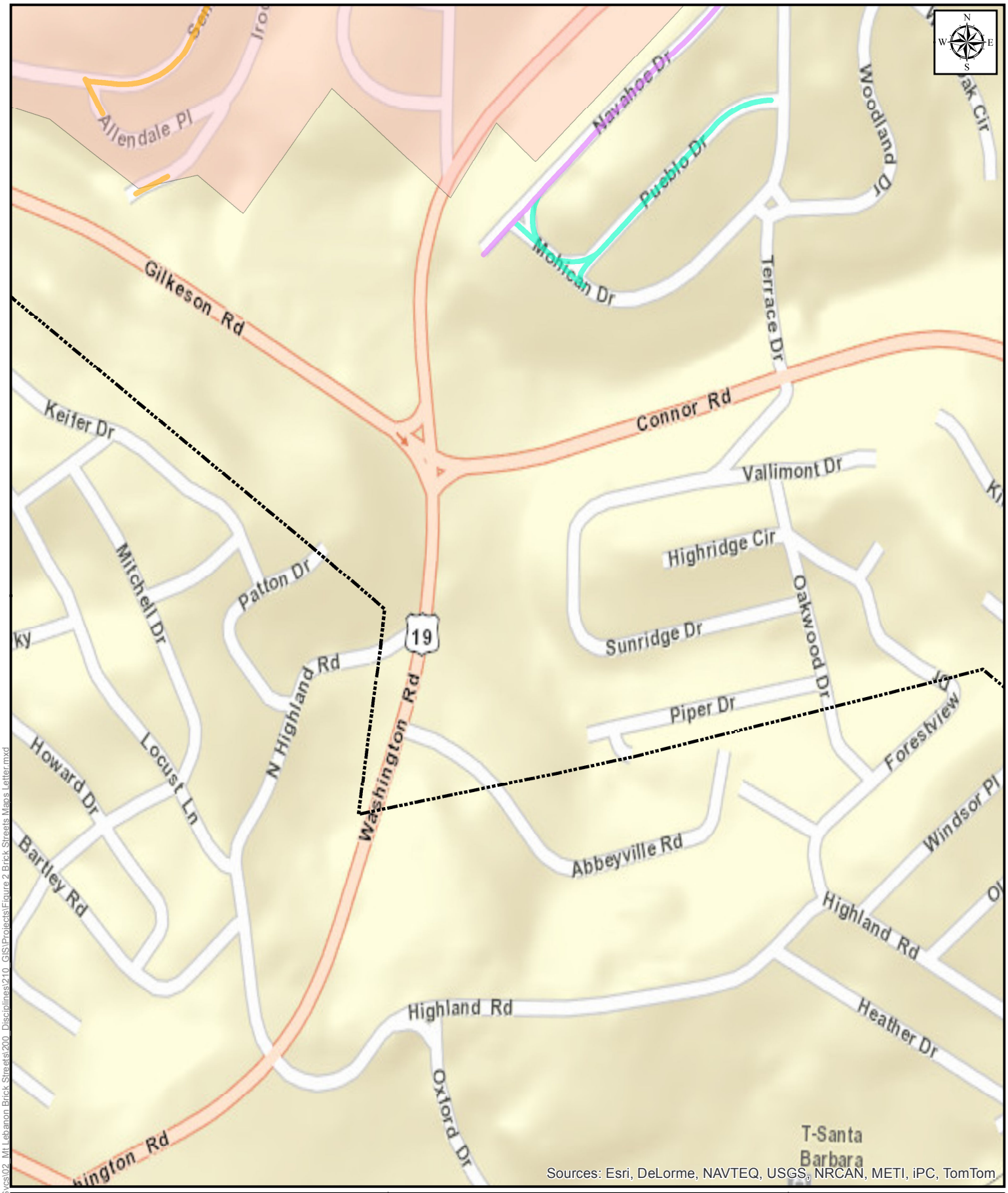

BRICK STREETS PRIORITIZATION MAP

Mt. Lebanon Brick Streets Project

Mt. Lebanon Township
Allegheny County, Pennsylvania

LEGEND:

- Category 1
- Category 2
- Category 3
- Category 4
- Mount Lebanon Historic District
- Municipal Boundary

FIGURE 2	**Sheet 7 of 7**
Drawn By: DFS	Checked By: TDM
Source: Mt. Lebanon Township & ESRI	
Date: 10/12/2015	Scale 1 in : 500 ft

McCORMICK TAYLOR

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HISTORY OF BRICK STREET CONSTRUCTION IN MT. LEBANON

The municipality of Mt. Lebanon is located approximately 4.5 miles southwest of Pittsburgh. Formerly a township, Mt. Lebanon is a home rule municipality spread across more than six square miles. The name "Mt. Lebanon" has been in official use since the first post office was established and a postmaster (Joseph T. McKnight) appointed in 1855. Mt. Lebanon's name came from two Cedar of Lebanon trees planted in the early 1850s in front of the Bower Hill Road home of the Rev. Joseph Clokey. Cedar of Lebanon trees[1] are native only to a particular mountain in the former Ottoman Empire, known today as the Republic of Lebanon; hence the name "Mt. Lebanon." Both "Mount Lebanon" and "Mt. Lebanon" are used today; however, in 1975, the local government officially adopted the abbreviation "Mt."

The first real estate subdivision, the Mt. Lebanon Plan, was laid out in 1901. Followed by the Clearview Plan in 1902, more than 11 subdivisions had been approved within the future boundaries of Mt. Lebanon Township by 1905. This was the beginning of the transformation from a rural countryside to a modern suburban community. Mt. Lebanon Township was formally created in 1912 and was one of Pittsburgh's first suburbs. The community is still a premier example of the modern American "automobile suburb."

During the late 1800s and early 1900s, America's small cities and suburbs were developing rapidly. In the 1870's, automobiles were still decades away from invention and widespread use; however, residents of these cities and towns were fed up with the quagmire of mud and ruts created by horse drawn carriages that their streets became each spring. Then in 1870, a man named Mordecai Levi, from Charleston, West Virginia, had an idea to use brick to pave streets instead of hard packed dirt. He paved Summer Street in Charleston that year, which is the first time in all of America that brick was used to pave a city street. Within about 25 years, this Charleston, WV experiment became the norm in cities and towns throughout the United States.

By the 1900s, Philadelphia had over 135 miles worth of brick streets[2]; the most extensive network of brick streets in the nation and many Pennsylvania municipalities followed suit, including Mt. Lebanon. Brick streets are durable and are not prone to potholes, which is why so many of Mt. Lebanon's brick streets have survived and are still intact since the early 1900s. Brick streets lend charm to their neighborhoods and have properties that make them worth preserving, beyond mere aesthetics. Use of brick allows water infiltration through the road bed, reducing runoff and in the winter the spacing between the bricks allows underground moisture to expand without being trapped under a layer of rigid paving material like asphalt or concrete. This expansion room provides brick streets with resilience against potholes. However, with age, brick streets will acquire a bit of an undulating surface, which does

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[1] Mt. Lebanon's Cedar of Lebanon trees stood until the 1950's or 1960's when a homeowner cut them down for fear of falling limbs. Wood from the trees was used to make three gavels; one each for Mt. Lebanon's Township Board of Commissioners, Mt. Lebanon United Presbyterian Church, and the Mt. Lebanon Women's Club (donated by the Woman's Club to the Historical Society of Mt. Lebanon).

[2] A 25-feet wide street that is one-mile long requires half a million bricks.

affect the ride quality and they tend to be less plowable than rigid pavement roads, because of the undulating, uneven surface. Other disadvantages of brick streets include:

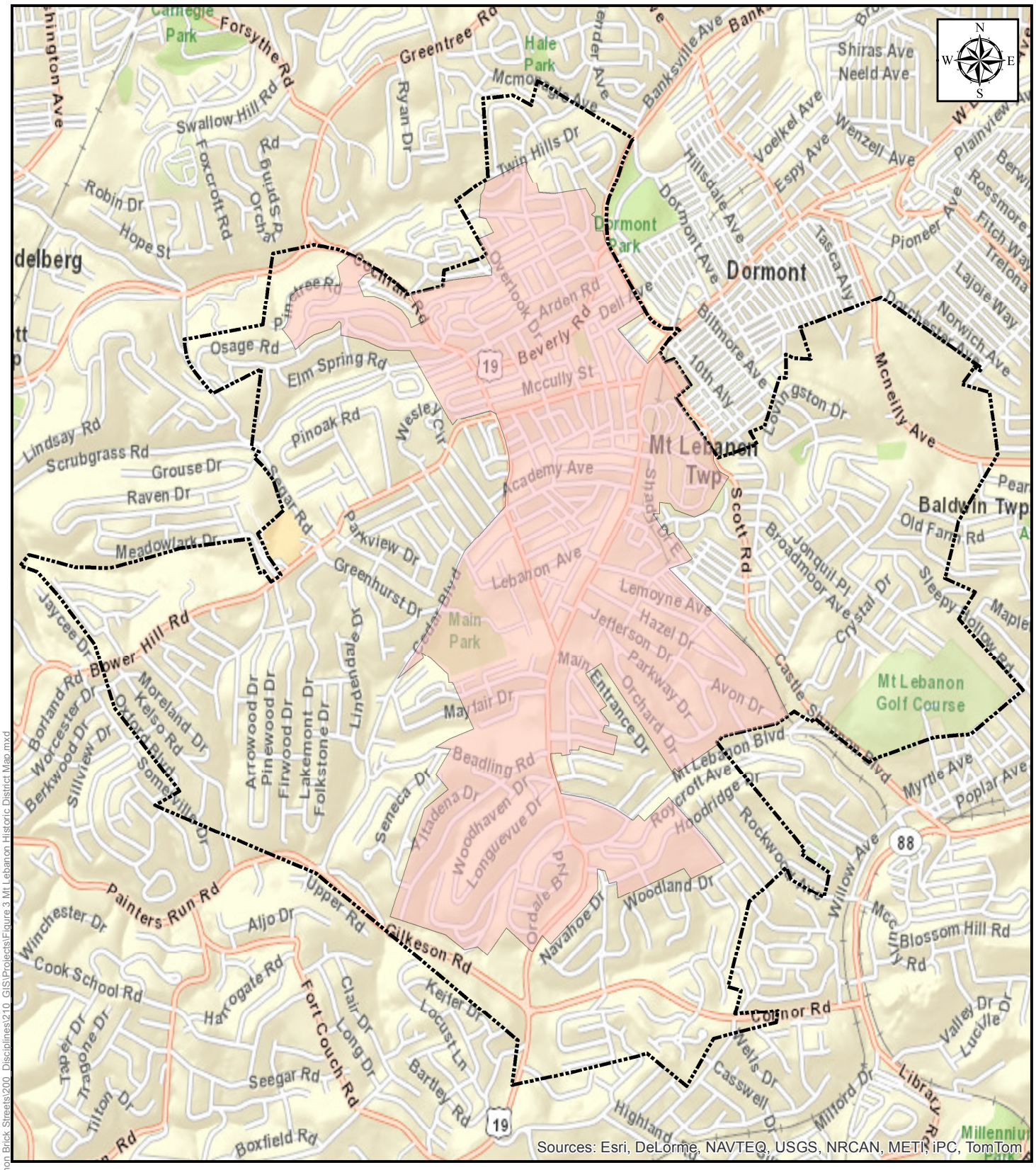
1.) The gaps in between the bricks slow down water as it runs off the street. This can lead to a greater accumulation of ice as compared to asphalt or cement concrete surfaces.
2.) The uneven surface associated with many brick streets can make it more difficult for people with disabilities to traverse.
3.) Brick construction and maintenance is more time consuming than asphalt or cement concrete. This results in longer durations of traffic control measures such as detours.

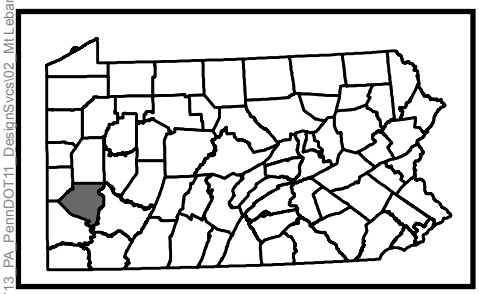
Not much is known specifically about the brick streets in Mt. Lebanon; however, based on the National Register of Historic Places Registration Form for the Mt. Lebanon Historic District it is evident that brick paved roads are important in the community's history. The Mt. Lebanon Historic District is a primarily residential, early automobile suburb occupying approximately 1,306 acres in the center of the municipality. The District includes 38 historic residential subdivisions, two commercial areas, nine churches, six public schools, two large parks, and a major cemetery. See Figure 3, Mt. Lebanon Historic District Map.

Centered mainly on Washington Road, the primary north-south road through Mt. Lebanon, the historic district demonstrates the municipality's transformation from a rural agricultural area to a trolley suburb (ca. 1901) to an automobile suburb (1920s and 1930s). Almost 97 percent of the historic district's resources are domestic buildings (single family homes, duplexes, and apartment buildings).

The most defining element of the historic district, and the typical early automobile suburb, is the planned residential subdivision common during the 1920s to early 1940s. The Mt. Lebanon Historic District is made up of 31 planned residential subdivisions and seven earlier grid-layout trolley-era neighborhoods. Most of the planned residential subdivisions included brick lined streets and driveways. Development that occurred post World War II, mid- to late-1940s and later, typically included asphalt streets.

Although many of Mt. Lebanon's brick streets, like those in other communities, have been paved over, a substantial number of brick streets remain. These remaining brick streets contribute to the character of the community and are an important element to the Historic District. The Mt. Lebanon Historic District is a great example of the historic early automobile suburb, which is characterized by the mature trees and retained streetscape elements of the early residential plans (including many brick paved streets, grassy islands, parklets, and rolled curbs). Preservation of brick streets within the historic district is vital to maintaining the historic nature of the district. Preservation of brick streets in other parts of Mt. Lebanon may also be important, to be determined by this plan, based on those streets' relationships to the Historic District and the character of the neighborhoods in which they are located. The municipality may want to solicit the input of local brick masons to provide training for Mt. Lebanon street crews on the methods for repair and replacement of brick streets.





MT. LEBANON HISTORIC DISTRICT MAP

FIGURE 3

Mt. Lebanon Brick Streets Project

Mt. Lebanon Township
Allegheny County, Pennsylvania

LEGEND:

Mount Lebanon Historic District

Municipal Boundary

McCORMICK TAYLOR

Drawn By: DFS	Checked By: TDM
Source: PASDA & ESRI	
Date: 10/12/2015	Scale 1 in : 2,500 ft

W:\5713_PA_PennDOT11_DesignSvcs\02_Mt Lebanon Brick Streets\200_Disciplines\210_GIS\Projects\Figure 3 Mt Lebanon Historic District Map.mxd

CONDITION OF BRICK STREETS

The structural condition of each brick street was analyzed, as discussed in the section of this report entitled, "Recommendations to Preserve Mt. Lebanon's Brick Streets."

A poor base condition indicates that repair will be needed in the near future and would be costly. Poor base conditions were identified in the field by noting areas where the brick surface undulates creating dips and mounds. This undulation has a negative effect on rideability, which was an additional criterion used to evaluate each street.

The overall condition of the individual bricks was also assessed on each street to get an assessment of the cost to replace the damaged bricks and restore the street to its original condition.

A street with drainage problems is not an optimal candidate for restoration or preservation due to:

1. Moisture on the street, whether in the form of ice or water, causes the brick to become slippery and hazardous. Poor drainage means moisture stays on the street for longer periods of time.
2. Moisture trapped on the street tends to seep into the street's base, where the freeze/thaw cycle can cause the street base to deteriorate.

Structurally competent curbs are critical to maintaining the integrity of the adjacent brick streets. In Mt. Lebanon rolled, or mountable, curbs line the vast majority of the brick streets. These curbs provide lateral support to the bricks and essentially hold the road together. Damaged or deteriorating curbs is an indication that a brick street is either in or entering a failing condition.

A poor crown is indicative of drainage problems.

The Mt. Lebanon engineer and street department reviewed the structural condition assessment. Their input assisted with the following lists and table.

Streets in Excellent Condition	*Streets in Good Condition*
Adeline Avenue	Academy Place
Baywood Avenue (includes Summit Way)	Arden Road
Buchanan Place	Beverly Road
Dan Drive	Central Square - West
Dixon Avenue (includes Racine Ave)	Cherokee Place
McCann Place	Country Club Drive
Navato Place	Duquesne Drive
Neulon Avenue	Hilf Street
Old Orchard Road	Iroquois Drive
Overlook Drive	Lansdale Place
Ridgefield Avenue	Lawncroft Avenue
Roselawn Avenue	Midway Road
Royce Avenue	Morrison Drive

Streets in Excellent Condition (cont.)
Savannah Avenue
Shadowlawn Avenue
Virginia Way
Wasson Place
Wisteria Avenue

Streets in Above Average Condition
Allendale Place
Atlanta Drive
Carnegie Drive
Central Square - East
Circle Drive
Hoodridge Drive
Jayson Avenue
Kewanna Avenue
McCully Street
Mohican Drive
Oak Way
Parkway Drive
Poplar Drive
Pueblo Drive
Seminole Drive
Serpentine Drive (includes Altoona Place)

Streets in Poor Condition
Earlswood Avenue
Lincoln Way
Main Entrance Drive
Martha Avenue
Ross Way

Streets in Good Condition (cont.)
Nakoma Drive
North Meadowcroft Avenue
Park Entrance Drive - West
Sage Drive
South Meadowcroft Avenue

Streets in Average Condition
Audubon Avenue
Birch Avenue
Broadmoor Avenue - South
Broadmoor Avenue - North
Crystal Drive
Jonquil Place
Kenilworth Drive
Navahoe Drive
Outlook Drive
Park Entrance Drive - East
Parker Drive (includes Shot Way)
Richland Road
Rockwood Avenue (includes Whitmore Lane)

Streets in Below Average Condition
Connecting Road
Craig Court
Highland Road
Lebanon Hills Drive

Streets in Failing Condition
Barth Avenue
Midway Way / Alley
Pennsylvania Boulevard - North
Pennsylvania Boulevard – South

Analysis of Brick Street Conditions				
Brick Street Name	**Brick Condition**	**Drainage Problems**	**Base Condition**	**Rideability**
Academy Place	Good	None	Adequate	Adequate
Adeline Ave.	Good	None	Good	Good
Allendale Place	Average	None	Fair	Adequate
Arden Rd.	Good	None	Adequate	Good
Atlanta Dr.	Average	None	Adequate	Fair
Audubon Ave.	Good	Y – Ponding Water	Fair	Fair
Barth Ave.	Poor	Y – Ponding Water Inadequate Crown	Poor	Poor
Baywood Ave. (Incl. Summit Way)	Good	None	Good	Good
Beverly Rd.	Good	None	Adequate	Good
Birch Ave.	Average	Y – Ponding Water	Fair	Fair
Broadmoor Ave. - South	Average	Y – Inadequate Crown	Fair	Fair
Broadmoor Ave. - North	Average	None	Fair	Fair
Buchanan Place	Good	None	Good	Good
Carnegie Dr.	Average	None	Fair	Adequate
Central Sq.	Good	None	Adequate	Good
Central Sq. - East	Good	None	Fair	Adequate
Cherokee Place	Good	None	Good	Adequate
Circle Dr.	Good	None	Fair	Adequate
Connecting Rd.	Average	None	Fair	Poor
Country Club Dr.	Good	Y – Ponding Water	Adequate	Good
Craig Court	Poor	None	Poor	Fair
Crystal Dr.	Good	Y – Ponding Water	Fair	Fair
Dan Dr.	Good	None	Good	Good
Dixon Ave. (Incl. Racine Ave.)	Good	None	Good	Good
Duquesne Dr.	Good	None	Good	Adequate
Earlswood Ave.	Poor	None	Poor	Poor
Highland Rd.	Average	Y – Ponding Water Inadequate Crown	Fair	Poor
Hilf St.	Average	None	Good	Good
Hoodridge Dr.	Good	None	Fair	Adequate
Iroquois Dr.	Good	None	Adequate	Good
Jayson Ave.	Average	Y – Ponding Water	Adequate	Good
Jonquil Place	Average	Y – Ponding Water	Fair	Fair
Kenilworth Dr.	Good	Y – Ponding Water Inadequate Crown	Poor	Fair
Kewanna Ave.	Good	Y – Ponding Water	Adequate	Adequate
Lansdale Place	Average	None	Good	Good

Analysis of Brick Street Conditions				
Brick Street Name	**Brick Condition**	**Drainage Problems**	**Base Condition**	**Rideability**
Lawncroft Ave.	Good	Y – Ponding Water	Adequate	Good
Lebanon Hills Dr.	Average	Y – Ponding Water Inadequate Crown	Poor	Fair
Lincoln Way	Poor	Y – Ponding Water Inadequate Crown	Fair	Poor
Main Entrance Dr.	Average	Y – Ponding Water Inadequate Crown	Poor	Fair
Martha Ave.	Poor	Y – Ponding Water Inadequate Crown	Poor	Fair
McCann Place	Good	None	Good	Good
McCully St.	Average	None	Adequate	Adequate
Midway Rd.	Good	None	Adequate	Good
Midway Way / Alley	Poor	None	Poor	Poor
Mohican Dr.	Good	None	Fair	Adequate
Morrison Dr.	Good	None	Adequate	Good
Nakoma Dr.	Good	None	Adequate	Good
Navahoe Dr.	Good	Y – Ponding Water	Fair	Fair
Navato Place	Good	None	Good	Good
Neulon Ave.	Good	None	Good	Good
N. Meadowcroft Ave.	Average	None	Good	Good
Oak Way	Average	None	Adequate	Adequate
Old Orchard Rd.	Good	None	Good	Good
Outlook Dr.	Good	Y – Ponding Water	Fair	Fair
Overlook Dr.	Good	None	Good	Good
Park Entrance Dr.	Good	Y – Ponding Water	Fair	Fair
Park Entrance Dr. - West	Good	None	Adequate	Good
Parker Dr. (Incl. Shot Way)	Average	Y – Ponding Water	Fair	Adequate
Parkway Dr.	Average	None	Adequate	Adequate
Pennsylvania Blvd-North	Poor	Y – Ponding Water Inadequate Crown	Poor	Poor
Pennsylvania Blvd-South	Poor	Y – Ponding Water Inadequate Crown	Poor	Poor
Poplar Dr.	Average	None	Fair	Adequate
Pueblo Dr.	Good	None	Fair	Adequate
Richland Rd.	Average	None	Fair	Fair
Ridgefield Ave.	Good	None	Good	Good
Rockwood Ave. (Incl. Whitmore Ln)	Good	Y – Ponding Water	Fair	Fair

Analysis of Brick Street Conditions				
Brick Street Name	**Brick Condition**	**Drainage Problems**	**Base Condition**	**Rideability**
Roselawn Ave.	Good	None	Good	Good
Ross Way	Average	Y – Ponding Water Inadequate Crown	Poor	Poor
Royce Ave.	Good	None	Good	Good
Sage Dr.	Good	Y – Ponding Water	Good	Good
Savannah Ave.	Good	None	Good	Good
Seminole Dr.	Good	Y – Ponding Water	Adequate	Adequate
Serpentine Dr. (Incl. Altoona Pl)	Good	Y – Ponding Water	Adequate	Adequate
Shadowlawn Ave.	Good	None	Good	Good
S. Meadowcroft Ave.	Good	None	Adequate	Adequate
Virginia Way	Good	None	Good	Good
Wasson Place	Good	None	Good	Good
Wisteria Ave.	Good	None	Good	Good

In addition to the structural conditions, surface conditions were also analyzed. Concrete or asphalt patching can impact rideability and appearance of the street. The following table provides information on the amount of patching that exists on Mt. Lebanon's brick streets.

Surface Conditions		
Brick Street Section	**Square Feet Area of Patches**	**Percent of Street Patched**
Academy Place	0	0.00%
Adeline Ave.	0	0.00%
Allendale Place	0	0.00%
Arden Rd.	30	0.21%
Atlanta Dr.	0	0.00%
Audubon Ave.	0	0.36%
Barth Ave.	613	5.23%
Baywood Ave (Incl .Summit Way)	0	0.00%
Beverly Rd.	24	0.12%
Birch Ave.	0	0.00%
Broadmoor Ave. – South	0	0.00%
Broadmoor Ave. – North	19	0.36%
Buchanan Place	0	0.00%
Carnegie Dr.	0	0.00%
Central Sq.	35	0.26%
Central Sq. - East	0	0.00%
Cherokee Place	0	0.00%
Circle Dr.	30	0.17%
Connecting Rd.	285	1.16%

Surface Conditions		
Brick Street Section	**Square Feet Area of Patches**	**Percent of Street Patched**
Country Club Dr.	0	0.00%
Craig Court	129	3.60%
Crystal Dr.	52	0.06%
Dan Dr.	0	0.00%
Dixon Ave. (Incl. Racine Ave)	0	0.00%
Duquesne Dr.	24	0.07%
Earlswood Ave.	1638	19.24%
Highland Rd.	8	0.14%
Hilf St.	0	0.00%
Hoodridge Dr.	133	0.20%
Iroquois Dr.	0	0.00%
Jayson Ave.	0	0.00%
Jonquil Place	0	0.00%
Kenilworth Dr.	24	0.17%
Kewanna Ave.	0	0.00%
Lansdale Place	0	0.00%
Lawncroft Ave.	0	0.00%
Lebanon Hills Dr.	1646	3.44%
Lincoln Way	0	0.00%
Main Entrance Dr.	336	18.20%
Martha Ave.	27	0.39%
McCann Place	0	0.00%
McCully St.	0	0.00%
Midway Rd.	24	0.11%
Midway Way / Alley	271	20.53%
Mohican Dr.	220	1.74%
Morrison Dr.	112	0.19%
Nakoma Dr.	48	0.34%
Navahoe Dr.	602	1.50%
Navato Place	0	0.00%
Neulon Ave.	0	0.00%
N. Meadowcroft Ave.	0	0.00%
Oak Way	0	0.00%
Old Orchard Rd.	0	0.00%
Outlook Dr.	87	0.32%
Overlook Dr.	0	0.00%
Park Entrance Dr.	90	0.26%
Park Entrance Dr. - West	0	0.00%
Parker Dr. (Incl. Shot Way)	5	0.01%
Parkway Dr.	0	0.00%
Pennsylvania Blvd – North	120	0.80%
Pennsylvania Blvd - South	635	4.31%
Poplar Dr.	0	0.00%

Surface Conditions		
Brick Street Section	**Square Feet Area of Patches**	**Percent of Street Patched**
Pueblo Dr.	206	0.72%
Richland Rd.	174	0.53%
Ridgefield Ave.	0	0.00%
Rockwood Ave. (Incl. Whitmore Ln)	310	0.82%
Roselawn Ave.	0	0.00%
Ross Way	150	0.69%
Royce Ave.	0	0.00%
Sage Dr.	0	0.00%
Savannah Ave.	0	0.00%
Seminole Dr.	0	0.00%
Serpentine Dr. (Incl. Altoona Pl)	0	0.00%
Shadowlawn Ave.	0	0.00%
S. Meadowcroft Ave.	20	0.83%
Virginia Way	0	0.00%
Wasson Place	0	0.00%
Wisteria Ave.	0	0.00%

UTILITIES AND BRICK STREETS

Brick streets with utilities running beneath them are less than optimal candidates for preservation; however, only eight of the 79 brick streets in Mt. Lebanon are free of underground utilities. More than 80% of the underground utilities either lie underneath the sidewalk or in the vegetated buffer between the brick street and the sidewalk. The following streets have utilities running longitudinally under the road surface:

Adeline Avenue	Barth Avenue	Birch Avenue
Carnegie Drive	Craig Court	Duquesne Avenue
Earlswood Avenue	Hilf Street	Pennsylvania Blvd - North
Pennsylvania Blvd - South	Poplar Drive	Rockwood Avenue
Royce Avenue	Serpentine Drive	South Meadowcroft Avenue

Additional utility coordination will be needed on these streets if any restoration or preservation measures are proposed in the future.

Utility Cuts

Utility cuts are the most common surface disturbance on local streets. Patching of utility cut holes are to be made in accordance with Mt. Lebanon ordinances and requirements. If the procedure for patching utility cut holes is not clear, coordination with Mt. Lebanon must be completed prior to the start of any utility work to ensure proper procedures are followed with regards to the brick street(s).

ARCHITECTURAL INTEGRITY ALONG BRICK STREETS

The visual appeal of brick streets often relates to the architectural integrity of the buildings that line the street. Much of the purpose of preserving a brick street is lost if there is nothing the street can relate to in its immediate surroundings.

For the purposes of this plan, the method to determine architectural integrity is being based on the following considerations:

100% to 85% original exterior material = Excellent integrity

84% to 70% original exterior material = Good integrity

69% to 50% original exterior material = Poor integrity

50% to 0% original exterior material = Bad integrity

This assessment is being based on a visual and photographic review of the buildings that line Mt. Lebanon's brick streets. The estimate of percent of original exterior material remaining is based on professional judgment. Pictures illustrating "Excellent" and "Good" architectural integrity can be found in Appendix B. The following table documents the results of this analysis. In addition, the table lists whether the street is "within," "adjacent to," or "removed from" the Mt. Lebanon Historic District.

Architectural Integrity Rank			
Overall Rank	**Brick Street Section**	**Estimated Percent of Original Exterior Material Remaining on Buildings lining street section**	**Relationship to Mt. Lebanon Historic District**
62	Academy Place	85	Removed From
61	Adeline Avenue	85.2	Removed From
39	Allendale Place	87	Within
1	Arden Road	92.5	Within
55	Atlanta Drive	85.6	Within
19	Audubon Avenue	88.6	Removed From
22	Barth Avenue	88	Within
70	Baywood Avenue (Incl. Summit Way)	82.5	Within
4	Beverly Road	91.3	Within
31	Birch Avenue	87.5	Removed From
48	Broadmoor Avenue – South	86.2	Removed From
49	Broadmoor Avenue – North	86.2	Removed From
75	Buchanan Place	81.5	Within
43	Carnegie Drive	86.9	Removed From
73	Central Square – West	81.9	Within

Architectural Integrity Rank			
Overall Rank	**Brick Street Section**	**Estimated Percent of Original Exterior Material Remaining on Buildings lining street section**	**Relationship to Mt. Lebanon Historic District**
74	Central Square - East	81.9	Within
15	Cherokee Place	89.2	Within
3	Circle Drive	91.6	Within
47	Connecting Road	86.4	Within
50	Country Club Drive	86.2	Removed From
45	Craig Court	86.7	Removed From
36	Crystal Drive	87.3	Removed From
5	Dan Drive	91.1	Within
20	Dixon Avenue (Incl. Racine Ave.)	88.5	Within
53	Duquesne Drive	85.8	Adjacent To
63	Earlswood Avenue	85	Removed From
2	Highland Road	92.5	Within
51	Hilf Street	86.2	Adjacent To
13	Hoodridge Drive	89.6	Within & Adjacent To
64	Iroquois Drive	85	Adjacent To
37	Jayson Avenue	87.3	Within
59	Jonquil Place	85.4	Removed From
38	Kenilworth Drive	87.3	Removed From
52	Kewanna Avenue	86.1	Adjacent To
40	Lansdale Place	87	Within
77	Lawncroft Avenue	80	Within
18	Lebanon Hills Drive	88.7	Within
72	Lincoln Way	82	Within
25	Main Entrance Drive	87.8	Within
6	Martha Avenue	91	Within
8	McCann Place	90	Within
71	McCully Street	82.2	Within
11	Midway Road	89.7	Within
78	Midway Way/Alley	77.5	Within
16	Mohican Drive	89.2	Removed From
44	Morrison Drive	86.8	Within
7	Nakoma Drive	90.5	Within
24	Navahoe Drive	87.9	Adjacent To
56	Navato Place	85.6	Within
9	Neulon Avenue	90	Within
17	North Meadowcroft Avenue	89.2	Within
68	Oak Way	83.8	Within
41	Old Orchard Road	87	Within

Architectural Integrity Rank			
Overall Rank	**Brick Street Section**	**Estimated Percent of Original Exterior Material Remaining on Buildings lining street section**	**Relationship to Mt. Lebanon Historic District**
26	Outlook Drive	87.8	Within
32	Overlook Drive	87.5	Within
28	Park Entrance Drive - East	87.6	Within
29	Park Entrance Drive - West	87.6	Within
14	Parker Drive (Incl. Shot Way)	89.4	Within
27	Parkway Drive	87.8	Within
66	Pennsylvania Blvd - North	84.7	Adjacent To
67	Pennsylvania Blvd - South	84.5	Adjacent To
65	Poplar Drive	85	Removed From
21	Pueblo Drive	88.4	Removed From
60	Richland Road	85.3	Removed From
12	Ridgefield Avenue	89.7	Within
58	Rockwood Avenue (Incl. Whitmore Ln.)	85.5	Removed From
69	Roselawn Avenue	83.8	Within
76	Ross Way	81.3	Removed From
33	Royce Avenue	87.5	Within
30	Sage Drive	87.6	Removed From
42	Savannah Avenue	87	Within
35	Seminole Drive	87.4	Within
23	Serpentine Drive (Incl Altoona Pl)	88	Removed From
34	Shadowlawn Avenue	87.5	Within
54	South Meadowcroft Avenue	85.8	Within
10	Virginia Way	90	Within
57	Wasson Place	85.6	Within
46	Wisteria Avenue	86.7	Within

BRICK STREETS REPAIR AND MAINTENANCE POLICIES

The recommendations outlined in this plan should be used as a guide for future construction and maintenance activities on Mt. Lebanon's brick streets. For Category 1 and Category 2 priority brick streets, any disturbances, such as utility cuts, should be repaired with brick. Asphalt or cement patches should only be considered on Category 4 brick streets and on Category 3 brick streets after a review and approval for asphalt / cement patches by the Mt. Lebanon Historic Preservation Board.

Any existing asphalt / cement patches on Category 1 and Category 2 brick streets should be repaired with brick if the patch is re-excavated for any reason and any portion of the newest excavation touches brick.

Following adoption of this plan, it is anticipated that Mt. Lebanon will set-aside a portion of the municipality's maintenance budget that will be targeted for brick street maintenance. This maintenance budget and policy is at the discretion of Mt. Lebanon. This maintenance budget would be aimed at removing non-brick patches on Category 1 and Category 2 brick streets and replacing said patch with brick. In addition, leveling of surfaces and other general surface improvements would be anticipated to improve rideability and the appearance of brick streets. Material acquisition has become increasingly challenging for brick street restoration. There are a few brick manufactures that produce the same type of brick that currently exists in Mt. Lebanon. This is particularly problematic for bricks that are paved with red bricks (the supply is minimal). Brick replacement costs will be considerably higher for these streets.

Other outside funding and grant sources could be pursued by Mt. Lebanon to assist with the repair, reconstruction, and maintenance of brick streets. One possible funding source could be the Keystone Historic Preservation Project Grants[3], which are intended to support projects that identify, preserve, promote and protect historic and archaeological resources of Pennsylvania for both the benefit of the public and the revitalization of communities.

[3] http://www.portal.state.pa.us/portal/server.pt/community/grants/3794/keystone_historic_preservation_project_grants/426654

BRICK STREETS RECONSTRUCTION POLICY

The reconstruction policy for Category 1 and Category 2 priority streets is clear: if the surface is disturbed, the street is to be repaved with brick.

Restoration (Category 1) is different from preservation (Category 2) due to the fact that streets being classified under Category 2 showed signs of base deterioration. More specifically the brick surface undulated, or had large depressions. Therefore, streets classified under Category 2 will require some base repair where Category 1 will not.

Category 3 brick streets should be reviewed with the Preservation Board before moving forward into construction. Factors to be considered for streets in this category include:

- Input from property owners along the street as to whether brick should be retained
- Input from the general public on whether the brick should be retained
- How the street fits into the existing character/streetscape of the area, including any greenspace, rolled curbs, etc. and the presence of brick contributes to the historic feel

Category 4 brick streets may be resurfaced with another material.

CONSTRUCTION COST

Construction costs were developed for each of the four category streets. Unit costs for each construction activity were estimated using PennDOT's Bid History. This online database was used to examine the bids that contractor's submitted to PennDOT for similar construction projects; more specifically: roadway reconstruction and resurfacing projects. Contractors who have recently performed brick construction or maintenance activities in the area were also contacted to get more accurate costs associated with brick. It should be noted that the costs given are merely estimates and may differ from actual bids depending on what contractor pursues the work. A breakdown of estimated construction costs for each brick street can be found in Appendix C.

LIFE CYCLE COST

The initial construction cost for any level of preservation should be weighed against the cost to maintain the roadway throughout its design life. The design life for each brick street within the project area was assumed to be 50 years. During this time there are different levels of maintenance that can be expected for various pavement material types. A breakdown of the estimated life cycle cost for each brick street can be found in Appendix D. It should be noted that the costs shown in Appendix D are for informational purposes only.

CONCLUSION

This plan has been prepared as a mitigation measure to address adverse effects resulting from PennDOT's Castle Shannon Boulevard project in Mt. Lebanon. The intent of this plan is to provide a guide for the municipality of Mt. Lebanon as construction projects and improvements potentially impact the municipality's brick streets in the future. As mentioned in the History section of this plan, brick streets are a vital component of the municipality's historic integrity and the overall character of the community. This plan should be followed as a guide during future projects and development efforts to help ensure that the look and feel of brick streets continue to contribute to the historic nature, charm, and beauty of Mt. Lebanon.

For comparison purposes the construction cost and 50-year maintenance cost were summed up for each paving type. These costs are reported in the table below as a cost per square yard of roadway. The cost of brick over the duration of the design life is 25% to 29% higher than asphalt and cement concrete pavement.

50 Year Construction and Maintenance Cost

Brick Cost $/SY	Asphalt Cost $/SY	Cement Concrete Cost $/SY
$308.20	$245.30	$239.40

Appendix A

Sample Street Categorization Photos

Photos Showing Various Structural Conditions

Excellent Condition

Good Condition

Above Average Condition

Average Condition

Below Average Condition

Poor Condition

Failing Condition

Appendix B

Photos Showing Architectural Integrity

Photos Showing Various Levels of Architectural Integrity

Excellent Architectural Integrity

Good Architectural Integrity

Appendix C

Photos Showing Qualitative Evaluation Criteria

Photos Showing Qualitative Evaluation Criteria

Mature Trees

Rolled (Mountable) Curbs

Green Space / Parklet


Lebanon Hills Drive

Appendix D

Construction Cost Estimate

Category 1 Construction Cost

The construction costs for streets being listed under Category 1 (restoration) were developed assuming the following:

- All damaged bricks will be replaced. On average streets falling under this category appeared to require 20% of their bricks replaced. Therefore, 20% of each street's surface area was applied to the brick replacement cost.
- All concrete mountable curb will be repaired where it is damaged. It was assumed that 20% of the curb would need to be reconstructed.

Brick Cost = $100/SY

Concrete Mountable Curb Cost = $35/LF

Street Name	Length (FT)	Width (FT)	Construction Cost
Dan Drive	679	24	$45,720.00
Dixon Avenue	837	24	$56,358.00
McCann Place	731	24	$49,221.00
Navato Place	272	24	$18,315.00
Neulon Avenue	529	24	$35,620.00
Old Orchard Road	262	24	$17,642.00
Overlook Drive	405	24	$27,270.00
Ridgefield Avenue	541	24	$36,428.00
Royce Avenue	1274	24	$85,783.00
Savannah Avenue	295	22	$18,553.00
Shadowlawn Avenue	813	24	$54,742.00
Virginia Way	239	22	$15,031.00
Wasson Place	256	24	$17,238.00
Wisteria Avenue	352	24	$23,702.00

Category 2 Construction Cost

The construction costs for streets being listed under Category 2 (preservation) were developed assuming the following:

- All damaged bricks will be replaced. On average streets falling under this category appeared to require 40% of their bricks replaced. Therefore, 40% of each street's surface area was applied to the brick replacement cost.
- Full depth reconstruction will be done in areas where significant rutting or potting is noticeable. This is an indicator of a compromised base course and/or subbase. On average streets falling under this category appeared to require full-depth reconstruction on approximately 20% of its surface area. Therefore, 20% of each street's surface area was applied to the full-depth reconstruction cost.
- All concrete mountable curb will be repaired where it is damaged. It was assumed that 40% of the curb would need to be reconstructed.

Brick Cost = $100/SY
Full Depth Reconstruction Cost = $230/SY
Concrete Mountable Curb Cost = $35/LF

Street Name	Length (FT)	Width (FT)	Construction Cost
Arden Road	602	24	$154,915.00
Baywood Avenue	532	24	$136,902.00
Beverly Road	856	24	$220,278.00
Buchanan Place	366	24	$94,184.00
Cherokee Place	269	24	$69,223.00
Iroquois Drive	146	24	$37,571.00
Lansdale Place	290	24	$74,627.00
Midway Road	919	24	$236,490.00
Morrison Drive	2552	24	$656,715.00
Nakoma Drive	595	24	$153,114.00
North Meadowcroft Avenue	238	24	$61,246.00
Park Entrance Drive - West	681	20	$149,215.00
Roselawn Avenue	362	24	$93,155.00
South Meadowcroft Avenue	120	19.5	$25,720.00
Adeline Avenue	669	24	$172,156.00
Allendale Place	152	24	$39,115.00
Atlanta Drive	948	24	$243,952.00
Central Square - West	250	29	$76,278.00
Circle Drive	862	20	$188,874.00
Hoodridge Drive	2768	24	$712,299.00
Jayson Avenue	847	24	$217,962.00
Lawncroft Avenue	238	23	$58,972.00
Parkway Drive	1073	22	$255,613.00
Seminole Drive	1131	24	$291,044.00

Category 3 Construction Cost

The construction costs for streets being listed under Category 3 (requiring further review) were developed to show three different restoration options: full-depth reconstruction using brick, asphalt or concrete. The following cross-sections were assumed for each reconstruction option:

Brick: 6-inches of stone (subbase)
8-inchest of reinforced concrete base
Bedding Sand
Brick

Asphalt: 6-inches of stone (subbase)
8-inches of bituminous concrete base
2.5-inches of bituminous binder
1.5-inches of bituminous wearing

Concrete: 6-inches of stone (subbase)
4-inches of cement treated permeable base course
8-inches of cement concrete pavement

The following is a summary of the associated construction cost:

Full Depth Brick Reconstruction Cost = $230/SY
with Concrete Mountable Curb = $35/LF
Full Depth Asphalt Reconstruction Cost = $90/SY
with 8-inch Concrete Curb Cost = $40/LF
Full Depth Concrete Reconstruction Cost =$119/SY
with 8-inch Concrete Curb Cost =$40/LF

Street Name	Length (FT)	Width (FT)	Brick Construction Cost	Asphalt Construction Cost	Cement Concrete Construction Cost
Academy Place	165	24	$112,750.00	$52,800.00	$65,560.00
Central Square - East	233	27	$177,080.00	$81,550.00	$101,821.00
Country Club Drive	725	24	$495,417.00	$232,000.00	$288,067.00
Duquesne Drive	1408	24	$962,134.00	$450,560.00	$559,446.00
Hilf Street	594	24	$405,900.00	$190,080.00	$236,016.00
McCully Street	690	24	$471,500.00	$220,800.00	$274,160.00
Oak Way	145	18	$76,850.00	$37,700.00	$46,110.00
Outlook Drive	1129	24	$771,484.00	$361,280.00	$448,590.00
Park Entrance Drive - East	772	24	$527,534.00	$247,040.00	$306,742.00
Parker Drive	1713	24	$1,170,550.00	$548,160.00	$680,632.00
Sage Drive	814	24	$556,234.00	$260,480.00	$323,430.00
Carnegie Drive	767	24	$524,117.00	$245,440.00	$304,755.00
Connecting Road	1021	24	$697,684.00	$326,720.00	$405,678.00
Highland Road	253	22	$159,953.00	$80,960.00	$100,526.00
Kewanna Avenue	1238	24	$845,967.00	$396,160.00	$491,899.00
Lebanon Hills Drive	1648	29	$1,336,712.00	$609,760.00	$763,757.00
Mohican Drive	575	22	$363,528.00	$172,500.00	$213,262.00
Poplar Drive	70	24	$47,834.00	$22,400.00	$27,814.00
Pueblo Drive	1301	22	$822,522.00	$390,300.00	$482,527.00
Serpentine Drive	865	24	$591,084.00	$276,800.00	$343,694.00

Category 4 Construction Costs

The construction costs associated with streets listed under Category 4 (Repave with other materials) were developed assuming the following cross-section:

Asphalt: 6-inches of stone (subbase)
8-inches of bituminous concrete base
2.5-inches of bituminous binder
1.5-inches of bituminous wearing

Concrete: 6-inches of stone (subbase)
4-inches of cement treated permeable base course
8-inches of cement concrete pavement

The following is a summary of the associated construction cost:

Full Depth Asphalt Reconstruction Cost = $90/SY
with 8-inch Concrete Curb Cost = $40/LF
Full Depth Concrete Reconstruction Cost =$119/SY
with 8-inch Concrete Curb Cost =$40/LF

Street Name	Length (FT)	Width (FT)	Asphalt Construction Cost	Cement Concrete Construction Cost
Audubon Avenue	552	24	$176,640.00	$219,328.00
Birch Avenue	820	24	$262,400.00	$325,814.00
Broadmoor Avenue - South	100	24	$32,000.00	$39,734.00
Broadmoor Avenue - North	110	24	$35,200.00	$43,707.00
Crystal Drive	1562	24	$499,840.00	$620,635.00
Jonquil Place	341	24	$109,120.00	$135,491.00
Kenilworth Drive	600	24	$192,000.00	$238,400.00
Main Entrance Drive	77	24	$24,640.00	$30,595.00
Martha Avenue	318	24	$101,760.00	$126,352.00
Navahoe Drive	1819	22	$545,700.00	$674,647.00
Richland Road	846	24	$270,720.00	$336,144.00
Rockwood Avenue	1579	24	$505,280.00	$627,390.00
Barth Avenue	488	24	$156,160.00	$193,899.00
Craig Court	229	16	$54,960.00	$66,767.00
Lincoln Way	308	15	$70,840.00	$85,727.00
Earlswood Avenue	387	24	$123,840.00	$153,768.00
Midway Way/Alley	110	12	$22,000.00	$26,254.00
Pennsylvania Blvd - South	983	15	$226,090.00	$273,602.00
Ross Way	1145	19	$309,150.00	$379,250.00
Pennsylvania Blvd - North	933	16	$223,920.00	$272,022.00

Appendix E

Life Cycle Cost Estimate

The following is a breakdown of the anticipated maintenance for brick, asphalt and cement concrete pavement over a 50 year period:

Brick:

Replace damaged brick	$55/SY
20th year – Base/Bedding	$5.75/SY
40th year – Base/Bedding	$8.00/SY
Additional deicing salt	$9.45/SY
Total:	***$78.20/SY***

Notes: Assume 15% of bricks will need replaced over the life of the roadway.
Assume 20% of roadway will require base and bedding repair during years 20 and 40.
It is estimated that brick streets require 25% more salt than an asphalt or concrete street.
Assume 3% inflation.

Asphalt:

15th year – Full Depth Patching	$6.50/SY
20th year – Mill and Overlay	$56.80/SY
30th year – Full Depth Patching	$8.50/SY
35th year – Mill and Overlay	$73/SY
45th year – Full Depth Patching	$10.50/SY
Total:	***$155.30/SY***

Notes: Assume 5% of pavement area will require patching during years 15, 30, and 45.
Assume 3% inflation.

Cement Concrete

15th year – Clean & Seal	$1.50/LF
15th year – Concrete Patching	$33.00/SY
25th year – Clean & Seal	$1.75/LF
25th year – Concrete Patching	$39.00/SY
35th year – Clean & Seal	$2.00/LF
35th year – Concrete Patching	$46.00/SY
Total:	***$118.00/SY***
	$5.25/LF

Notes: Assume 30% of joints will be cleaned and sealed during years 15, 25 and 35.
Assume 25% of pavement area will require patching during years 15, 25 and 35.
Assume 3% inflation.

The following tables list the anticipated life cycle cost for the two prioritization categories that recommend repaving with various materials: Category 3 (Questionable) and Category 4 (Repave with Other Materials). The initial construction cost is included in the life cycle cost displayed.

Category 3: Questionable

Street Name	Length (FT)	Width (FT)	Brick Life Cycle Cost	Asphalt Life Cycle Cost	Cement Concrete Life Cycle Cost
Academy Place	165	24	$147,158.00	$121,132.00	$118,866.00
Central Square - East	233	27	$231,742.00	$190,105.00	$186,505.00
Country Club Drive	725	24	$646,604.00	$532,247.00	$522,291.00
Duquesne Drive	1408	24	$1,255,749.00	$1,033,660.00	$1,014,324.00
Hilf Street	594	24	$529,769.00	$436,076.00	$427,918.00
McCully Street	690	24	$615,388.00	$506,552.00	$497,076.00
Oak Way	145	18	$99,528.00	$82,737.00	$81,244.00
Outlook Drive	1129	24	$1,006,919.00	$828,837.00	$813,333.00
Park Entrance Drive - East	772	24	$688,522.00	$566,751.00	$556,150.00
Parker Drive	1713	24	$1,527,768.00	$1,257,571.00	$1,234,046.00
Sage Drive	814	24	$725,981.00	$597,585.00	$586,407.00
Carnegie Drive	767	24	$684,063.00	$563,081.00	$552,548.00
Connecting Road	1021	24	$910,597.00	$749,551.00	$735,530.00
Highland Road	253	22	$208,316.00	$177,005.00	$175,451.00
Kewanna Avenue	1238	24	$1,104,132.00	$908,858.00	$891,856.00
Lebanon Hills Drive	1648	29	$1,751,972.00	$1,434,438.00	$1,407,091.00
Mohican Drive	575	22	$473,443.00	$390,783.00	$383,546.00
Poplar Drive	70	24	$62,432.00	$51,390.00	$50,429.00
Pueblo Drive	1301	22	$1,071,216.00	$884,189.00	$867,811.00
Serpentine Drive	865	24	$771,466.00	$635,026.00	$623,147.00

Category 4: Repave with Other Materials

Street Name	Length (FT)	Width (FT)	Asphalt Life Cycle Cost	Cement Concrete Life Cycle
Audubon Avenue	552	24	$405,242.00	$385,885.00
Birch Avenue	820	24	$601,990.00	$573,235.00
Broadmoor Avenue - South	100	24	$73,414.00	$69,907.00
Broadmoor Avenue - North	110	24	$80,755.00	$76,898.00
Crystal Drive	1562	24	$1,146,717.00	$1,091,943.00
Jonquil Place	341	24	$250,340.00	$238,382.00
Kenilworth Drive	600	24	$440,480.00	$419,440.00
Main Entrance Drive	77	24	$56,529.00	$53,829.00
Martha Avenue	318	24	$233,455.00	$222,304.00
Navahoe Drive	1819	22	$1,236,233.00	$1,177,763.00
Richland Road	846	24	$621,077.00	$591,411.00
Rockwood Avenue	1579	24	$1,159,197.00	$1,103,827.00
Barth Avenue	488	24	$358,258.00	$341,145.00
Craig Court	229	16	$118,185.00	$112,832.00
Lincoln Way	308	15	$150,561.00	$143,811.00
Earlswood Avenue	387	24	$284,110.00	$270,539.00
Midway Way/Alley	110	12	$44,778.00	$42,849.00
Pennsylvania Blvd - South	983	15	$480,524.00	$458,980.00
Ross Way	1145	19	$684,545.00	$652,759.00
Pennsylvania Blvd - North	933	16	$481,511.00	$459,700.00

Appendix F

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Appendix G

McCormick Taylor Staff

KEY MCCORMICK TAYLOR PERSONNEL

McCormick Taylor staff developed this Brick Streets Plan with oversight from PennDOT District 11-0 and input from the Pennsylvania Historical and Museum Commission (PHMC), the Mt. Lebanon Historic Preservation Board, and the Historical Society of Mt. Lebanon as described in the Executive Summary of this document (Page E-1). The following is a list of McCormick Taylor staff that helped research, author and develop this plan:

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