

Green Stormwater Infrastructure for a Sustainable Pennsylvania.
Daryl Yount, Stacey Lindsay
September 27, 2016

Stormwater runoff carries pollutants into streams and water supplies and has a significant effect on the environment through increased soil erosion. In spite of the damaging effects of stormwater runoff, municipalities continue to allow, and some require, off-street parking to be constructed using impervious rolled asphalt material, commonly known as “blacktop.” This policy is contrary to the objectives of stormwater infrastructure and is unsustainable in light of Pennsylvania’s growing infrastructure and changing environment.

Green stormwater infrastructure is an approach that addresses stormwater runoff in light of social, economic, and environment concerns. Impervious paving increases urban sprawl, which has significant social implications to a community. It also requires additional monies to be invested in stormwater infrastructure and land development. This has significant financial impact on the property owner and the community. Finally, increased impervious surfaces negatively impact water supplies and aquatic ecosystems. Every municipality in Pennsylvania has an affect on sustainability objectives pursuant to storm water infrastructure. Additionally, every municipality has the ability and the responsibility to take a new approach to policy and decision-making in light of sustainability concerns. As the environment changes and Pennsylvania’s infrastructure continues to expand as a result of social and economic pressures, the need for a more sustainable approach to storm water infrastructure becomes evident. Addressing the failed policy of large impervious paving requirements for off-street parking is a necessary place to begin.

This narrative explains in great detail why this is a failed policy. We begin by describing the major adverse impacts impervious surfaces have on the environment. We then address sustainability concerns in light of a developing society and changing climate. Next we describe the environmental, social, and economic benefits of adopting the model ordinance and some misconceptions that exist regarding stormwater infrastructure enforcement. Finally, we address the major components of the model ordinance that may be helpful to municipalities when adopting and implementing the ordinance.

I. Large Off-street Parking Areas and Impervious Paving is Bad Policy.

An ordinance that requires or allows large off-street parking lots to consist entirely of impervious paving material is wrong policy. One can visualize a new Super Walmart or chain grocery store with the sprawling asphalt parking lot with a number of cars parked closest to the store and the bottom half of the lot completely empty. This is bad policy because it runs contrary to the overall objectives of stormwater infrastructure and fuels sustainability concerns facing Pennsylvania. To fully appreciate why this is wrong policy, one must understand the negative effects of stormwater runoff.

A. Runoff and Erosion

Pennsylvania receives a mean average annual rainfall of forty-one inches per year.¹ This rainfall comes in different forms and at different rates.² It is not uncommon to have periods of heavy rain and areas of flash flooding. But even with an average rainfall event, water almost immediately collects and begins to run downhill. Eventually stormwater runoff ends up in the closest stream or river and we see waterways swelling during and after periods of heavy rain.

¹ U.S. Climate Data. <http://www.usclimatedata.com/climate/pennsylvania/united-states/3208>

² Id.

Trees and vegetation prevent soil erosion and absorb the impact of rain droplets. But when vegetation does not exist, “soil is as vulnerable to damage as a tortoise without its shell.”³ Traditional farming methods provide a perfect illustration of how stormwater erodes exposed soils. The very best time for a farmer to plant crops is before it rains. The farmer loosens the soil by tilling the ground and then plants the desired seed. The farmer then waits for the anticipated rain. It is understood intuitively that the greater the slope of a surface (farmer’s field), the faster the water will collect and run. An exposed field is the most vulnerable for soil erosion because the soil is loose and there are no trees or vegetation to hold the soil from being carried away with the current.⁴ The rainwater strips the dirt and soil particles away and deposits them into the nearest stream. Even in relatively flat fields, sheet erosion carries away an alarming volume of soil into the streams.⁵ If you picture a sheet of paper representing what appears to be an insignificant amount of soil, but multiply that across a small ten-acre field, it can amount to a ton and a half of nutrient rich topsoil being dumped directly into the stream.⁶ During a heavy rainstorm it can be up to ten tons of soil or more.⁷ The topsoil immediately turns to mud and the fish and aquatic life are now starving for oxygen. This sediment does not just eventually disappear, it settles into the streambeds and covers rocks that aquatic life need to hide under and survive.⁸ The aquatic life either dies or moves out and the fish and birds are forced to do the same. The result of sheet and soil erosion is the degradation of Pennsylvania’s streams, water supplies, and surrounding ecosystems. Impervious surfaces add to these erosion concerns.

³ Hubert W. Kelley, *Keeping the Land Alive: Soil Erosion—Its Causes and Cures* 4 (Issue 50, 1990).

⁴ Interview with Tim Hornberger, Resource Conservation Technician, In Selinsgrove, PA. (Sept. 21, 2016).

⁵ *Id.*

⁶ *Id.*

⁷ *Id.*

⁸ DEP, *Soil Erosion and Sedimentation Control Manual for Agriculture* (1996).

Runoff increases the volume of water downstream causing stream banks to erode at an unnatural rate.⁹ This erosion releases sediment and has the same net effect as sheet erosion.¹⁰

B. Runoff and Pollutants.

The problems associated with stormwater runoff are further compounded when one learns the farmer sprayed herbicides on the field before he tilled in an effort to kill unwanted plant growth. These herbicides are sitting on the soil's surface and are swept into the stream along with the eroding topsoil. The traditional farmer also applies fertilizers to promote crop growth. These fertilizers also find their way into the streams and rivers through stormwater runoff. In fairness to hardworking farmers, we should recognize that farming activity is only one of countless contributors to soil erosion and pollutants entering Pennsylvania streams and degrading the environment. Golf courses apply significant amounts of fertilizers to their greens and fairways. Homeowners and landscape contractors in every municipality are regularly applying lawn fertilizers and herbicides to maintain a "healthy" lawn. Vehicle owners apply soaps and chemicals when they wash their car. Oil and petroleum spills are prevalent at gas stations and vehicle repair centers. The list of pollutant sources is endless but the result is a growing volume of pollutants entering our streams and water supplies each year as impervious surfaces continue to increase. One major impact of impervious paving is the increase in pollutants being flushed from the paving surface and flowing directly into the local streams. One could argue that these pollutants are going to end up in the water supply anyway at some point, but this argument does not consider the filtering effects that occur during water infiltration.¹¹

⁹ Matthew C. Burnette and Carmen T. Agouridis, Streambank Erosion, Cooperative Extension Service (July, 2014) <http://www2.ca.uky.edu/agcomm/pubs/aen/aen124/aen124.pdf>

¹⁰ Id.

¹¹ Id. at 10.

C. Groundwater infiltration

Impervious surfaces prevent rain and stormwater from naturally absorbing into the ground. Groundwater infiltration is important for many reasons. Infiltration of groundwater naturally filters many pollutants out of the water allowing vegetation to feed on many pollutants before it reaches waterways.¹² Vegetation and ground water absorption also slows the velocity of surface water runoff and thus decreases the potential for eroding stream banks.¹³ Ground water infiltration also allows the water table to replenish which then feeds a constant supply of water to streams and waterways.¹⁴ All of the benefits of ground water infiltration are removed when impervious materials are used to construct parking areas.¹⁵

D. Thermal Impact of Increased Impervious Surfaces

The greater the increase in impervious asphalt surfaces the greater potential for thermal impact on cold water stream environments.¹⁶ Black asphalt absorbs the sun's rays and has been measured to reach temperatures in excess of 60 degrees Celsius.¹⁷ When rain falls on this superheated asphalt, it also becomes superheated. The superheated runoff water then enters the stormwater infrastructure [assuming this infrastructure exists] and is discharged into Pennsylvania's cold-water streams. The effect of changing the water temperature even slightly is known to degrade the health of Pennsylvania's streams by changing the aquatic environment.¹⁸ Pennsylvania is well known for its trout streams. Trout are particularly sensitive to increases in

¹² Soil Science Society of America. <https://www.soils.org/files/sssaiys/april-soils-overview.pdf>

¹³ New York State Stormwater Management Design Manual
http://www.dec.ny.gov/docs/water_pdf/swdm2015chptr02.pdf

¹⁴ NRDC, *After the Storm: How Green Infrastructure Can Effectively Manage Stormwater Runoff from Roads and Highways* (Sept. 2011).

¹⁵ M.P. Jones, *Effect of Urban Stormwater BMPs on Runoff Temperature in Trout Sensitive Regions* (2008).

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ *Id.*

temperature.¹⁹ They have a thermal threshold of 21 degrees Celsius and can be physically harmed through thermal stress or forced to leave their environment as a result of superheated stormwater runoff.²⁰ Thus the increased impervious asphalt surfaces have a degrading effect on the environment even in the absence of pollutants and erosion.

II. Impervious Surfaces, a Growing Sustainability Concern.

The need for green stormwater infrastructure is not limited to farming activity or Penndot spraying herbicides along our highways. Today we see massive parking lots, yearly expansion and widening of roads and infrastructure, increases in residential and commercial development, etc. The result of a continually expanding society is the increase of impervious surfaces. Off-street parking lots are a significant part of this increase.

A. Growing Societal Changes Drive the Sustainability Concern

Pennsylvania continues to evolve as a society and this is true for the rest of society as well. But as the population continues to grow and culture changes, so does the impacts of that culture on future generations. Pennsylvania's population continues to expand at a steady pace.²¹ A growing population pressures farming activity to expand and maximize production. As more vehicles are put on the roads each year the demand to create more highways and to widen existing highways increases. Not only have we seen an increase in infrastructure, but cultural and economic influences have led our society to demand bigger homes and larger facilities. Smaller schools, grocery stores, and church facilities for example are being abandoned and newer larger facilities are being constructed. This demand is driven equally by cultural influence

¹⁹ Id.

²⁰ Id. at 3, 9.

²¹ US Census Bureau, Quick Facts, Pennsylvania. 2015.

and economic factors. Local school districts are challenged with educating a growing population with increasing economic constraints. Many school districts have discovered it is more cost effective to close several outlying school facilities and build one large facility that will accommodate everyone. Church groups have experienced the same pressure to build bigger facilities to accommodate larger crowds and offer more to parishioners. Small community grocery stores have all but disappeared, giving way to huge grocery centers. Super Walmarts and Home Depots continue to replace local hardware stores and family businesses. All of these societal changes result in an increased amount of impervious surfaces. A significant part of this increase comes in the form of off-street parking lots within the boundaries of local municipalities.

B. Climate change drives the sustainability concern.

Increased soil erosion and pollutants being carried into our streams and water supplies is being compounded by climate change.²² Scientists and meteorologists have measured climate changes on a global scale.²³ Pennsylvania in particular has experienced a long-term warming trend over the past 110 years of 1.8 degrees Celsius.²⁴ Increases in precipitation and more frequent and harsher storm events are being attributed to the temperature increase.²⁵ Pennsylvania is already experiencing an overall wetting trend consistent with the increase in temperature.²⁶ It is estimated that Pennsylvania will experience increases in precipitation and stormwater runoff at an accelerated rate.²⁷ The concern for Pennsylvania's climate change and

²² Conservation Implications of Climate Change: Soil Erosion and Runoff From Cropland, Soil and Water Conservation Society, (Jan.2003).

²³ Id..

²⁴ Pa. Climate impacts Assessment Update, Environment and Natural Resources Institute, (May 2015).

²⁵ Climate Change Adaptation Planning Report: Risks and Practical Recommendations, Pennsylvania Department of Environmental Protection, (Dec. 2014).

²⁶ Id. at 1

²⁷ Michael Gerrard, Katrina Fischer Kuh, The Law of Adaptation to Climate Change, U.S. and International Aspects (2012).

warming trends has prompted a statewide initiative to mitigate and mandate action.²⁸ This action involves leadership from both state and local officials with goals to mitigate the effects and mandate solutions to match the growing concern.²⁹ Municipal leadership is needed in an effort to take active steps to address the growing sustainability concerns. As the threat of increased precipitation accelerates, municipalities must adapt and mitigate this threat by changing their enforcement controls. A changed policy toward impervious surfaces for off-street parking is one significant way to address climate change concerns.

III. Misconceptions of stormwater infrastructure

Municipal officers cannot effectively enforce and manage a stormwater ordinance if they do not fully understand the effects of stormwater runoff. Many officials believe stormwater management exists for the purpose of preventing property damage and warding off complaints amongst neighbors.³⁰ Tim Hornberger, Soil Conservation Officer for Snyder County, Pennsylvania, explains that it is not uncommon for his office to get a hundred or more complaints during and immediately following a significant storm event.³¹ Local municipalities, particularly those not employing a review engineer, are prone to take a misguided approach to stormwater management. This lack of understanding is of particular concern during land development approval processes and when subsequent review and enforcement measures are necessary.

So why do municipalities mandate off-street parking to be compacted rolled asphalt? Is it because impervious material is by nature clean and easier to maintain? Perhaps it is out of a

²⁸ Climate Change Adaptation Planning Report: Risks and Practical Recommendations, Pennsylvania Department of Environmental Protection, (Dec. 2014).

²⁹ Id.

³⁰ Interview with Tim Hornberger, Resource Conservation Technician, in Selinsgrove, PA. (Sept. 21, 2016).

³¹ Id.

safety concern that substitute materials could cause problems for handicap wheelchair access, or a tripping concern for pedestrians. Perhaps municipalities are simply borrowing ordinances from other municipalities and this requirement seemed like a good idea at the time it was adopted. This policy has become a common practice in a growing number of municipalities. Whatever the reasoning, the requirement that off street parking be entirely impervious rolled asphalt is wrong policy. To be clear, the policy problem is not the massive expanse of parking area that goes largely unused most of the time. [Although the argument can be made that parking requirements for the unforeseeable event or for holiday shopping a few weeks out of the year is questionable policy]. When one understands the effects of increased stormwater runoff and the important benefits of groundwater infiltration, one has to question how or why did this mandate ever come about.

Municipal officials may struggle to understand why this wrong policy in light of a fairly sophisticated stormwater management program that has been adopted and enforced over several decades. The rational method and the modified rational method are two main equations that are used to calculate peak runoff rates based on the size and capacity of stormwater infrastructure.³² A main factor in this calculation is impervious surfaces.³³ This is important because the greater the amount of impervious surfaces, the greater the size and design requirements of basins and stormwater infrastructure. But consistent engineering and application methods cannot account for the environment and social changes that are occurring. As a result, traditional methods of controlling stormwater runoff are insufficient to address the broader impacts of stormwater runoff and the growing sustainability concern.

³² Interview with Bryan Rohland, Rohland Engineering, In Selinsgrove, PA. (Sept. 23, 2016).

³³ Id.

IV. Benefits of adopting this Green Stormwater Ordinance.

A. Environmental benefits of the ordinance.

The environmental benefits of implementing this ordinance have the effect of decreasing soil erosion and filtering pollutants from the runoff before they enter the waterways. Pervious paving and grass covered parking areas allow pollutants to be naturally filtered into the ground and fed upon by trees and vegetation.³⁴ Utilizing pervious material also allows the superheated runoff water from impervious paving to infiltrate into the ground and cool this water before it has the opportunity to enter the waterways and harm aquatic environments.³⁵ Allowing the runoff water to infiltrate the ground naturally allows the water table to be maintained and promotes healthy streams.³⁶ Maintaining the quality of Pennsylvania's streams is primary goal of soil and conservation district throughout Pennsylvania.³⁷ Adopting this ordinance will have a significant impact on achieving this goal.

B. Social Benefits of the ordinance

The social benefit of a policy reducing impervious surfaces are realized by the decrease in urban sprawl. When impervious paving requirements are decreased and replaced with pervious surface area, the size of the retention pond and the remaining storm water infrastructure is reduced.³⁸ Reducing the size of storm water infrastructure significantly decreases the required building lot size. Reducing the size requirements of a particular lot encourages investment at a particular location in the municipality that would be otherwise forced to build outside the boundaries of the municipality where larger lot sizes are available, or where impervious paving

³⁴ Interview with Tim Hornberger, Resource Conservation Technician, in Selinsgrove, PA. (Sept. 21, 2016).

³⁵ M.P. Jones, *Effect of Urban Stormwater BMPs on Runoff Temperature in Trout Sensitive Regions* (2008).

³⁶ Interview with Tim Hornberger, Resource Conservation Technician, in Selinsgrove, PA. (Sept. 21, 2016).

³⁷ *Id.*

³⁸ *Id.*

requirements are not enforced. The result is business and commerce being closer together and the function of a particular parcel of land increased. Residents will be closer to grocery stores, hotels, restaurants, etc. Although this may be hard to measure initially, a change in this policy will have an impact on the ability of people to walk and ride bikes to reach their destinations. The result is a community that is closer and stronger.

C. The Economic Benefits of the ordinance

There are economic benefits in reducing impervious paving. We know that storm water infrastructure becomes smaller because it is receiving less runoff.³⁹ This equates to a decrease in design and engineering costs. Smaller infrastructure equals a decrease in material costs overall and decreases future maintenance and repair requirements. Not everything is less expensive. Pervious paving material is basically the same price as non-pervious material, but the underlying stone bed is what makes installation significantly more expensive.⁴⁰ The overall costs of installing permeable paving is still less however, because of the decrease in material cost of stormwater infrastructure.⁴¹ Reducing impervious parking area thus creates a financial benefit to the municipality and cost savings to property owners who may be encouraged to invest these savings back into the community.

³⁹ Thomas H. Cahill, The Right Choice for Porous Pavements, *Hot Mix Asphalt Technology* 27, (Sept. / Oct. 2003).

⁴⁰ *Id.*

⁴¹ *Id.*

V. Model Green Stormwater Ordinance

There is a better approach to meeting off-street parking lot requirements that allows pollutants to be filtered naturally, allows the water table to be replenished, and reduces erosion concerns. The enclosed green stormwater ordinance is designed to encourage the use of pervious paving material to prevent the harmful effects of large impervious paving surfaces, while realizing the benefits. Pervious parking materials are commercially available in today's market in the form of pervious asphalt, pervious pavers, reinforced meshing, and other commercially available materials. All of these viable options have been proven effective for use in overflow parking areas. The enclosed model ordinance may be used in combination with other stormwater infrastructure BMPs. Adopting this ordinance into a larger green stormwater infrastructure plan provides an opportunity for municipalities to balance environmental, social, and economic concerns.

A. Parking Lot Size

The model ordinance does not change the parking lot size requirements. We do not suggest that current formulas adopted by municipalities are correct, but sustainability concerns that are fueled by off-street parking can be offset by requiring permeable material that goes a long way towards mitigating effects of the impervious surfaces. It is understood that a given number of parking lot spaces must remain available for traffic safety concerns. For this reason, Municipalities should use their standard calculation to determine the number of spaces and overall size requirement. Municipalities are nonetheless encouraged to evaluate parking space requirements, as each unnecessary parking space creates an unnecessary social, financial, and environmental impact on the community.

B. Ordinance Applies to Parking Lots Five-Thousand Square Feet or Greater

The model ordinance does not apply to off-street parking areas that fall under 5000 square feet in total area. The purpose for not regulating small parking areas is two-fold. First, businesses that have smaller parking lots have a smaller impact. Although there may be a cumulative impact if there is a significant number of a small business in a given municipality, the model ordinance suggests regulating the biggest impervious surface contributors who have the greatest impact on runoff. The second reason is that businesses with smaller lot sizes will likely utilize a greater percentage of their lot on a regular basis. On the contrary, larger lots are less likely to utilize their parking area until those infrequent times where there is a spike in demand. Municipalities are encouraged to evaluate this number and consider increasing or decreasing this threshold depending on the needs and desires of the community. For example, if a significant number of business owners in a community have parking lots that are between five and six thousands square feet, it may be advantageous to increase the threshold slightly to accommodate those facilities. On the other hand, if a municipality is faced with a situation where stormwater is overwhelming a sewer processing facility, this threshold may be decreased to zero. In this way, every commercial property owner is subject to the ordinance without exception.

C. Pre-existing Parking Conditions

The model ordinance also addresses existing impervious paving areas within a given municipality. This is a topic of discussion that may vary by municipality. It may be determined that preexisting impervious parking areas should be “grandfathered in.” The model ordinance takes a balanced approach to handling preexisting conditions. It does not require preexisting conditions to immediately comply with the ordinance or begin immediately paying the impervious paving fee set forth in Article VI. Instead the ordinance applies a balanced approach,

making preexisting conditions only subject to the ordinance upon major repairs or additions to the parking area. A major repair exists when a portion or portions of the parking area are affected and the repair requires disturbing the stone base under the preexisting impervious material. The purpose behind this requirement is to encourage property and business owners to comply with the ordinance at a point in time when the preexisting parking area is moving past its useful life expectancy. Once again, a municipality may choose to deviate from the model ordinance depending on specific concerns it may have, but the model ordinance suggests a balanced approach based upon the average municipality.

D. Impervious Paving Fee

A key component to the ordinance is the implementation of an impervious paving fee. This fee is designed to encourage the use of pervious materials for those persons creating or adding additional impervious material to their existing lot. It is also designed to encourage persons whose existing lot is “grandfathered” in to utilize pervious paving material when they perform major repairs. The ordinance implements the impervious paving fee by requiring all persons who fall within the ordinance to submit an Impervious Paving Plan that provides sufficient details to calculate the total square foot area of impervious paving material. The total square footage will fall within one of four tiers provided in the ordinance, each tier having a percentage assigned to it that is used to calculate the impervious paving fee. That percentage is then multiplied by the base rate (established by the municipality) to determine the monthly impervious paving fee.

E. Appealing the Impervious Paving Fee

The applicant, to whom the ordinance applies and who has submitted an impervious paving plan as required by the ordinance, may appeal the assessed fee if done so in writing and

within thirty days of the assessment. The written appeal shall include a detailed description of why the calculation is incorrect and the basis for the applicant's reasoning. The municipality is required to provide a final decision in writing within twenty days. If the applicant wishes to appeal the final decision of the municipality, the applicant is required to make a written appeal to appeals board. The appeals board is appointed by the municipal council and includes up to five members who do not hold an office or position in the municipality. The appeals board is designed to be independent of the municipality and offer an independent review of the appeal. The decision of the appeals board is final and binding on the applicant and the municipality.

F. Impervious Paving Fee Collection

The ordinance suggests the collection of impervious paving fees be handled in like manner or in conjunction with municipal utility collection programs. If the municipality is already sending a property owner a municipal utility bill each month, impervious paving fees may be added to the same invoice. If property owners subject to the impervious paving fee are not currently billed on a monthly basis pursuant to a municipal utility bill, then a separate invoice must be created. The municipality is required to deposit all payments collected into the "Pervious Paving Management Fund".

G. Managing Fund Expenditures

Monies that accrue in the Pervious Paving Management Fund shall be processed and managed in the same fashion as other bills that are collected and paid by the municipality. The expenditure of these funds however is limited to demonstration projects, costs associated with inspection, planning, plan review, and other costs associated with enforcement of the ordinance.

H. Pervious Paving Permit

Any person required to pay an impervious paving fee may apply for a pervious paving permit. The permitting process is set forth in Article VII of the ordinance. This process requires the submittal of a pervious paving plan prepared by a civil engineer. The purpose of the engineer review is to establish whether the site is suitable for pervious paving and groundwater infiltration. For example, if the substrate on which the proposed pervious material covers is an impervious bed of shale, the permit will likely be denied because the shale would not allow for groundwater infiltration. For this reason, soil and infiltration testing is required and a civil engineer must create the proposed pervious paving plan.

I. Requirement of Soil and Infiltration Testing

Pervious materials are useless to the objectives of green stormwater infrastructure if the substrate beneath the pervious materials tends to be impervious. For this reason the model ordinance requires detailed soil evaluation and infiltration testing to determine the suitability of runoff infiltration. The model ordinance requires the underlying soil strata to have infiltration capacity of at least 0.3 inches per hour and be able to recapture the total volume of stormwater runoff within four days following the storm event. These requirements are all in an effort to use pervious materials only where the benefits can be realized. In the event infiltration of runoff does not meet these requirements, applicants will be subject to the Impervious Paving Fee set forth in Article VI of the ordinance.

J. Function of the Municipal Review Engineer

The municipality is required to respond to the pervious paving application within twenty days of the application. This response is required to be in writing and must have been reviewed by the municipal's review engineer. The review engineer is also required to perform onsite

inspections to ensure compliance with the proposed plan. Once the pervious paving plan is approved and the permit issued to the applicant, the pervious paving credits are valid for two years following the date of issuance. However, the pervious paving credits shall remain valid beyond the two-year limitation so long as the permit holder maintains the function of the pervious paving material.

K. Required Maintenance

Pervious material becomes impervious if it is not properly maintained. Foreign matter and debris accumulate in the pores and stormwater runoff may be prevented from infiltrating the pervious material. Placing the burden on municipalities to ensure permit holders are properly maintaining the pervious surfaces would be costly. For this reason the model ordinance incorporates a simple reporting program where permit holders submit an explanation of their maintenance procedures, any difficulties they are experiencing, and a photo of the pervious material at the time of the reporting. This report must be submitted on a quarterly basis and can be quickly and easily reviewed by the municipality. In the event the reporting process is not being followed or maintenance procedures are not being performed, the municipality shall notify the permit holder of the deficiency and the permit holder has thirty days to comply with corrective action. The municipality has the option of performing necessary maintenance procedures and pursuing civil penalties in the event that permit holders do not comply with the notice of deficiency.

L. Maintenance Concerns to the Applicant

A main concern with requiring overflow parking areas to utilize permeable material is that these surfaces will require continual maintenance. Any parking surface requires some degree of maintenance even if it is standard impervious asphalt. Impervious asphalt must be

sealed every three years and developing cracks must be filled with hot tar. Likewise, pervious paving and pervious parking pavers must be vacuumed regularly to maintain porosity.⁴²

Additionally, where reinforced grass mesh is utilized, the grass growing through the mesh must be mowed regularly.

M. Implementation and Enforcement

A main concern of every municipality when implementing a new program is how to implement and enforce the ordinance. We address these two concerns separately. Because the model ordinance does not apply retroactively, it will only affect applicants within the jurisdiction of the municipality that are creating new parking area, or conducting major repairs. Applying the ordinance prospectively provides an opportunity for municipalities to incorporate the model ordinance into their already existing stormwater ordinance. Notification of the ordinance should be conducted through the normal channels available to municipality. Many municipalities already publish a quarterly newsletter to every property owner. Notice of the proposed ordinance may be introduced in this publication along with notice of a scheduled public meeting where residents will have the opportunity to ask questions and provide public comment to municipal officials. This public meeting also provides an opportunity to discuss the environmental, social, and economic benefits of the ordinance

The second concern is how to proceed with enforcing the ordinance. The simplest way to enforce this ordinance is to designate an official who is responsible for all aspects of the ordinance including overseeing the application and approval process, issuing permits, conducting inspections, collecting impervious paving fees, managing the expenditures of the program, overseeing pilot projects, pursuing grants and additional funding sources, and promoting

⁴² Porous Pavement Operation and Maintenance Protocol,
http://www.sandiegocounty.gov/reusable_components/images/dgs/Documents/Grants_Prop40_AppendIII_.pdf

awareness of the ordinance throughout the community. Creating a position capable of accomplishing every aspect of the ordinance may not be feasible in every municipality. The model ordinance is catered to the average municipality working within the constraints of existing personnel and resources. For this reason, the model ordinance suggests enforcement measures that do not require adding positions to the payroll. Publication and promotion efforts may be accomplished by way of holding public meetings, or setting time aside from regularly scheduled monthly meetings to address implementation and enforcement concerns. The process of reviewing applications and issuing permits can be accomplished through the same procedures and processes required to review a land development plan or subdivision plan. Simply reviewing and processing applications in like manner to issuing a permit for an exterior storage will not suffice. Review of applications will require involvement of the municipal planning commission and the review engineer. This is necessary because applications require soil and infiltration testing, stormwater infrastructure calculations, field verification, and review in conjunction with land development and subdivision applications where applicable. Although compliance review can be complicated, it is insignificant to the review process of a land development or subdivision plan and should not deter municipalities. The issuing of permits is a simple procedural process that may be processed directly by the review engineer, or as the model ordinance suggests by the municipal secretary. Pre, post, and intermediate construction inspections are required to be performed by the municipal review engineer. Engineers are in the best position to conduct inspections because they have the training and licensing necessary to insure compliance with the ordinance and submitted plans.

N. How This Problem is Being Addressed in Other Jurisdictions

Most municipalities that are addressing the subject of green parking are focusing primarily on pervious paving options and overall design and layout.⁴³ This maximizes the amount of parking spaces in the lot in an effort to reduce the parking lot size. Part of the design practices include pervious asphalt, pervious pavers, and mesh reinforcement applications.⁴⁴ An owner of a mall in Connecticut was satisfied with its implementation of grass pavers and reinforced turf in its overflow parking lot that was only used during times of peak shopping.⁴⁵ King County municipality in the state of Washington is implementing green parking lot design into all aspects of planning projects including residential parking projects and bus transit projects.⁴⁶ However all of these municipalities would have even greater success in achieving the goals of green stormwater infrastructure if they would approach the problem through the lens of requiring pervious surface requirements in overflow parking areas.

⁴³ NSCEP, Green Parking Lot Resource Guide 45. *also see, San Mateo Sustainable Green Streets and Parking Lots Design Guidebook, (First Ed., 2009).*

⁴⁴ Id.

⁴⁵ MAPC, Massachusetts Low Impact Development Toolkit, Low Impact Site Design. <http://www.mapc.org/low-impact-dev-toolkit>

⁴⁶

http://www.kingcounty.gov/~media/depts/finance/procurement/Documents/Environmental/EP_Products_Pervious.aspx?la=en

VI. Conclusion

Adopting this green stormwater ordinance is a significant step towards achieving sustainability objectives. The ordinance has social, economic, and environmental benefits that are necessary in a growing society. Every municipality in Pennsylvania has an opportunity to affect sustainability objectives pursuant to storm water infrastructure. Additionally, every municipality has the ability and the responsibility to take a new approach to policy and decision-making in light of sustainability concerns. Addressing the failed policy of large impervious paving requirements for off-street parking is a necessary place to begin.

Impervious Paving Fee
By: Stacey Lindsay and Daryl Yount
Ordinance No.

ARTICLE I. Preliminary Provisions.

Section 101. Definitions.

“Applicant” Any person who has applied for the permission to continue in its construction of new or additional impervious paving, new impervious paving or replacing existing impervious surface with new impervious surface, or major repairs to a parking lot that requires disturbing the stone base of the parking lot.

“Adverse Impact” Any deleterious effect on the public welfare, safety, health or on the environment.⁴⁷

“Base rate” The dollar rate per base unit as determined by resolution of the municipality.⁴⁸

“Base unit” Five thousand square feet of impervious surface.

“Best management practice” or “BMP” Activities, facilities, designs, measures or procedures as defined within the DEP’s best practices manual which are used to:

- (1) manage stormwater impacts from regulated activities;
- (2) meet state water quality requirements;
- (3) promote groundwater recharge; and
- (4) otherwise meet the purposes of this ordinance.

“Contaminated” Any harmful quantity of any substance.⁴⁹

⁴⁷ LOREDO, TX, STORMWATER MANAGEMENT ORDINANCE, §25.59.1.3 (Aug. 6, 2012).

⁴⁸ LANCASTER CITY, PA, CITY OF LANCASTER, PENNSYLVANIA, STORMWATER MANAGEMENT FEE ORDINANCE, §261-3 (February 25, 2014).

⁴⁹ §25.59.1.3.

“DEP” The Pennsylvania Department of Environmental Protection. ⁵⁰

“Exemption” Impervious paving activities that are not subject to the pervious paving requirements contained in this code.

“Groundwater” Existing natural underground water supply.⁵¹

“Groundwater recharge” Replenishment of existing natural underground water supplies.⁵²

“Hydrologic soil group” Infiltration rates of soils vary widely and are affected by subsurface permeability as well as surface intake rates. Soils are classified into four HSG’s (A,B,C, and D) according to their minimum infiltration rate, which is obtained from bare soil after prolonged wetting. The NRCS defines the four groups and provides a list of most of the soils in the United States and their group classification. The soils in the area of the paving may be identified from a soil survey report that can be obtained from local NRCS offices or conservation district offices. Soils become less pervious as the HSTG varies from A to D (NRCS 3,4).⁵³

“Impervious pavement” An asphalt surface of a parking lot that prevents the infiltration of water into the ground. Impervious asphalt includes parking lots.

“Impervious paving fund” The fund which receives money from impervious paving fees, sanctions, and returns.

“Infiltration” The passage or movement of water into the soil surface.⁵⁴

⁵⁰ BOROUGH OF GREEN TREE, PA, GREEN TREE BOROUGH STORMWATER MANAGEMENT ORDINANCE, §289-8, (effective May 2, 2005).

⁵¹ *Id.*

⁵² *Id.*

⁵³ DILLSBURG, PA., DILLSBURG BOROUGH STORMWATER MANAGEMENT ORDINANCE art. II (Oct. 11, 2011).

⁵⁴ §25.59.1.3.

“Maintenance” Any action necessary to preserve the previous paving practices in prime working condition, in order to serve the intended purposes set for in this ordinance and to prevent structural failure of such facilities. Maintenance shall not include actions taken solely for the purpose of enhancing the aesthetic aspects associated with pervious paving practices.⁵⁵

“Pervious paving” pavement designed to allow for infiltration. Types of pervious paving are listed within the DEP’s Best Practices Manual.

“Post-development” Conditions which exist following the completion of the pavement in terms of rate, volume, and direction of stormwater runoff.⁵⁶

“Pre-Development” Land use conditions that existed prior to the initiation of the pavement in terms of rate, volume, and direction of stormwater runoff.⁵⁷

“Reasonable fee” Direct and indirect costs incurred by the municipality in returning the pervious paving to its original maximum infiltration capacity.

“Retrofitting” The implementation of pervious paving in a previously developed area to improve water quality over current conditions.⁵⁸

“Regulated activities” Any of the following:

- (1) Construction of new or additional impervious or semi-pervious pavement over 5,000 square feet, or
- (2) Replacement of existing impervious pavement with new impervious pavement more than 5,000 square feet.

⁵⁵ §25.59.1.3.

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ PRINCE GEORGE’S COUNTY, MD., STORMWATER MANAGEMENT ORDINANCE OF PRINCE GEORGE’S COUNTY, MARYLAND §32-171 (updated Nov. 8, 2016).

“Review engineer” Engineer appointed by the municipality to review and supervise the handling of the applications under this section.

“Sediment” Solid particulate matter both mineral and organic, that is located on the pervious paving obstructing proper infiltration of stormwater.

“Site” The area where any impervious paving or pervious paving is physically located or conducted.⁵⁹

“Stormwater” The surface runoff generated by precipitation reaching the ground surface.⁶⁰

“Stormwater management plan” The overall proposal for stormwater drainage including stormwater management structures, and supporting documentation, enacted by the municipality.⁶¹

“Stormwater runoff” The direct response of a watershed to precipitation and includes the surface and subsurface runoff that enters a ditch, stream, storm drain or other concentrated flow during and following the precipitation.⁶²

“Subdivision” The division of a lot, tract, or parcel of land by any means into two or more lots, tracts or parcels or other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, or lease, partition by the court for distribution to heirs or devisees, transfer of ownership or building or lot development; provided, however, that the subdivision by lease of land for agricultural purposes into

⁵⁹ LOREDO, TX, §25.59.1.3 (Aug. 6 2012).

⁶⁰ BOROUGH OF GREEN TREE, PA., §289-8 (effective May 2, 2005).

⁶¹ LOREDO, TX, §25.59.1.3 (Aug. 6 2012).

⁶² Id.

parcels of more than ten acres, not involving any new street or easement of access or any residential dwelling shall be exempted.⁶³

“**Watershed**” Region or area drained by a river, watercourse or other body of water, whether natural or artificial.⁶⁴

Section 102. Purpose.

The purpose of this ordinance is to promote the public welfare, safety, and health within the municipality through provisions designed to:

- (i) Encourage municipalities to supplement their zoning with sustainability practices.
- (ii) Minimize impervious pavement.
- (iii) Manage accelerated runoff due to impervious paving on parking lots.
- (iv) Increase infiltration of stormwater into the ground.
- (v) Utilize and preserve the existing natural drainage systems.
- (vi) Encourage recharge of groundwater.
- (vii) reduce pollutants altering streams and waterways.
- (viii) decrease superheated runoff temperatures from impervious surfaces.
- (ix) Ensure proper maintenance of all pervious paving constructed within the municipality.
- (x) Provide performance standards and design criteria for pervious paving.⁶⁵

Section 103. Applicability.

⁶³ DILLSBURG, PA. §103 (Oct. 11, 2011).

⁶⁴ BOROUGH OF GREEN TREE, PA, §289-8 (effective May 2, 2005).

⁶⁵ BOROUGH OF SEWICKLEY, PA., BOROUGH OF SEWICKLEY STORMWATER MANAGEMENT ORDINANCE §103 (Jan. 17. 2004).

This ordinance shall apply to the following:

- (i) Construction of new or additional impervious pavement 5,000 square feet or greater within the municipality. ⁶⁶
- (ii) Replacement of existing impervious pavement with impervious pavement 5,000 square feet or more within the municipality.⁶⁷
- (iii) Persons conducting major repairs to existing impervious pavement 5,000 square feet or greater located within the municipality.

Section 104. Authority.

This municipality is empowered to regulate land use activities that affect runoff through:

- (1) The act of October 4, 1978 (P.L. 864, Act 167), also known as the Storm Water Management Act; ⁶⁸ and
- (2) The act of July 31, 1968 (P.L. 805, No. 247) known as the Pennsylvania Municipalities Planning Code (MPC).⁶⁹

Section 105. Fund.

- (a) Create fund.

All sums collected from the payment of impervious paving fees shall be deposited into the municipality's pervious paving management fund ("fund").⁷⁰

- (b) Purposes.

⁶⁶ BOROUGH OF SEWICKLEY, PA., §103 (Jan. 17. 2004).

⁶⁷ *Id.*

⁶⁸ KENNETT SQUARE, PA., KENNETT SQUARE BOROUGH STORMWATER MANAGEMENT ORDINANCE §24-4 (updated Aug. 31, 2016).

⁶⁹ *Id.*

The fund shall be used by the municipality solely for the implementation and management of municipality-owned pervious paving demonstration projects; funding the credits received by the applicants; and payment for the administrative duties required for inspecting, planning, and reviewing the applications and enforcing the provisions of this chapter.⁷¹ The municipality shall have all reasonable and lawful authority to construct, operate, repair, relocate and maintain the demonstration projects and shall have the authority to enforce the provisions of this chapter.⁷²

(c) Sources.

(1) Fees. The fund shall include the impervious paving fees.

(2) Penalties. The fund shall include any monetary penalties paid by the owners for violations of this ordinance.

(3) Return. The fund shall include any returns on investments created by the municipal treasurer.

Article II. Fee.

Section 201. Imposition.

For the purposes set forth above, an impervious paving fee (“fee”) as described, defined, and calculated herein is hereby imposed upon persons creating new or additional impervious paving projects, persons replacing existing impervious surfaces with new impervious surfaces, or to persons conducting major repairs to existing impervious pavement located within the municipality.⁷³

⁷¹ LANCASTER CITY, PA, §261-8 (February 25, 2014).

⁷² Id; EDMOND, OK., TITLE 23-STORMWATER DRAINAGE §23.10.040 (April 25, 2016).

⁷³ LANCASTER CITY, PA, §261-8 (February 25, 2014).

Section 202. Calculation.

(a) Tiers of property.

For purposes of determining the appropriate assessment rate for the impervious paving fee, all properties that are subject to the impervious paving fee are assigned to one of the following tiers ("tier" or "tiers"):

(A) Tier 1: for properties where the total estimated impervious pavement area is 5,000 square feet and less than or equal to 10,000 square feet.

(B) Tier 2: for properties where the total estimated impervious pavement area is greater than 10,000 square feet and less than or equal to 15,000 square feet.

(C) Tier 3: for properties where the total estimated impervious pavement area is greater than 15,000 square feet and less than or equal to 20,000 square feet.

(D) Tier 4: for properties where the total estimated impervious pavement area is greater than 20,000 square feet.⁷⁴

(b) Calculation.

The impervious paving fee shall be based on a percentage of the base rate, as follows:

(A) Tier 1: The fee for each Tier 1 property is 50% of the applicable base rate.

⁷⁴ LANCASTER CITY, PA, §261-8 (February 25, 2014).

(B) Tier 2: The fee for each Tier 2 property is 150% of the applicable base rate.

(C) Tier 3: The fee for each Tier 3 property is 250% of the applicable base rate.

(D) Tier 4: The fee for each Tier 4 property is calculated as the number of base units assigned to the property in accordance with the following procedure.

(ii) The municipality determines the number of base units for a tier 4 property by dividing the property's actual impervious pavement area by the base unit.⁷⁵ The municipality computes the impervious paving fee by multiplying the number of base units assigned to the property by the base rate.⁷⁶ The base rate utilized by the municipality shall be the base rate as established from time to time by resolution of municipality.⁷⁷

Section 203. Implementation.

(b) Billing.

The following shall apply:

(i) The municipality shall include the impervious paving fee as a separate line item on the water or sewer utility bill for each property subject to the fee under this ordinance.⁷⁸ For those properties, without a water or sewer account with the municipality, the impervious paving fee will be charged and invoiced

⁷⁵ Id.

⁷⁶ Id.

⁷⁷ Id.

⁷⁸ Id.

on a separate impervious paving fee bill or invoice.⁷⁹ In both cases, the fee must be paid in the same manner and within the time frame required for payment of water or sewer bills.⁸⁰

(ii) The applicant subject to the fee may delegate responsibility for the payment of the fee to customers or property management companies in the same manner as payment responsibility for water or sewer bills is so delegated and as further set forth in the policies and procedures to be adopted from time to time by the municipality.⁸¹

(iii) Should the impervious paving fee not be paid when due, a finance charge shall accrue thereon monthly at the same rate as finance charges accrue on unpaid municipality water or sewer bills.⁸²

(iv) The municipality shall deposit all payments collected under this section into the fund.⁸³

(c) Payments.

Credits.

(i) The municipality shall provide a system of credits against impervious paving fees for pervious paving permit holders. The municipality shall develop written policies to implement the credit system.⁸⁴

⁷⁹ Id.

⁸⁰ LANCASTER CITY, PA, §261-8 (February 25, 2014).

⁸¹ Id.

⁸² Id.

⁸³ Id.

⁸⁴ Id.

(ii) Such system of credits may be set forth from time to time by the municipality in the policies and procedures promulgated under the authority of this ordinance.⁸⁵

(iii) To receive a credit, the builder, on behalf of the property owner, may apply to the municipality for a pervious paving permit.⁸⁶ Once approved, the credit will remain effective as long as the permit holder submits the required quarterly reports explained in section 205

(vi) The credit shall become effective on the first day of the property's monthly or quarterly billing cycle following the approval of the credit.⁸⁷

Section 204. Maintenance.

(i) All operation and maintenance of the pervious paving approved with a permit shall be conducted in accordance with the DEP's best practices manual which outlines specific requirements in addition to the following:

(A) Routinely ensure that pervious paved area is clear of sediments as needed.

(B) Mow upland and adjacent areas and seed bare areas monthly.

(C) Mow frequently as needed for grass reinforced meshing.

(D) Ensure that paved area dewateres between storms monthly and after storms with rainfall greater than 0.5 inches.

(E) Ensure that paved area is clear of debris monthly.

⁸⁵ Id.

⁸⁶ LANCASTER CITY, PA, §261-9 (February 25, 2014).

⁸⁷ Id.

- (F) Use a high pressure hose and then vacuum sweep routinely to keep surface free of sediments, if feasible, 3 to 4 times a year.
- (G) Clean inlets draining to the subsurface bed biannually.
- (H) Inspect the paved surface for deterioration annually.
- (I) Only use non-toxic, organic deicers on porous concrete.
- (J) Plant in areas adjacent to porous pavement to prevent soil washout onto the pavement.
- (K) Post signs around the pervious area to prevent resurfacing, use of abrasive materials, prohibits construction vehicles or hazardous material carriers from using the pervious paved area, and any other activities that may lead to contamination of the groundwater.
- (L) Ensure that the individual responsible for the maintenance of the pervious paved area has received adequate training and is prepared to handle the lot's maintenance needs.
- (M) Signs indicating that the pervious paving is a parking area.
- (N) Lift up snow plow blade higher than usual to avoid the blade catching the edge of a block or paving and damaging its surface.⁸⁸

Section 205. Quarterly reports.

⁸⁸ Green Parking Lot Resource Guide, EPA, (2008).
<https://nepis.epa.gov/Exe/ZyNET.exe/P100D97A.TXT?ZyActionD=ZyDocument&Client=EPA&Index=2006+Thru+2010&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C06thru10%5CTxt%5C00000031%5CP100D97A.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150p16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL>.

- (i) Persons with pervious paving permits shall submit a report to the municipality which indicates the maintenance performed upon the pervious pavement, when the maintenance was conducted, difficulties with infiltration, and a photo of the pervious paving taken at the time of the report.
- (ii) These reports shall be submitted on a quarterly basis beginning at the time of completion of the regulated activity.
- (iii) Each report will be reviewed by the municipal reviewing engineer.

Section 206. Inspection.

- (i) The municipal reviewing engineer shall conduct a pre-inspection, an intermediate inspection, and a post inspection at the site to ensure compliance with this regulation.
- (ii) The municipal reviewing engineer shall conduct periodic inspections after construction to ensure that applicant is complying with the proper maintenance of the pervious paving.

Section 207. Sanctions. (loss of credit)

Any credit issued by the municipality pursuant to this ordinance may be suspended or revoked for:

- (i) Non-compliance with or failure to implement any provision of the approved pervious paving plan.
- (ii) The municipality may reinstate a suspended credit if the municipality has inspected and approved the corrections to the violations that caused the

suspension and the municipality is satisfied that the violation has been corrected.⁸⁹

(iii) A credit that has been revoked by the municipality cannot be reinstated. The applicant may apply for a new credit under the provisions of this ordinance.⁹⁰

(iv) If a violation causes no immediate danger to life, public health, or property, at its sole discretion, the municipality may provide a limited time period for the owner to correct the violation. In these cases, the municipality will provide the owner, or the owner's designee, with a written notice of the violation and the time period allowed for the owner to correct the violation. If the owner does not correct the violation within the allowed time period, the municipality may revoke or suspend any, or all, applicable credits and permits pertaining to any provision of this ordinance.⁹¹

Article III. Plan.

Section 301. Submission.

Builder.

(1) Any builder who intends to implement pervious paving practices to achieve a credit towards the impervious paving fee shall submit a plan to and receive a permit from the municipality prior to the initiation of any regulated activities.

⁸⁹ Id.

⁹⁰ CITY OF FAYETTE STORMWATER MANAGEMENT PLAN ACT 167: MODEL STORMWATER ORDINANCE APPENDIX B (2010).

⁹¹ Id.

(2) The number of copies of the pervious paving plan shall be submitted as designated by the municipality.⁹²

(3) Additional copies shall be submitted as requested by the municipality.⁹³

(4) The municipality may establish a fee schedule for the review of pervious paving plans, the amount of which shall be set by resolution of the municipality's governing body.⁹⁴

Section 302. Contents.

(1) All pervious paving plans are to be prepared by a registered civil engineer approved by the municipality. Persons and professionals may assist in the preparation of the plan. The plan shall be drawn in a standard engineering scale not less than 1" = 50', and provided on a sheet of paper that does not exceed 24" x 36".⁹⁵

(2) Pervious paving plan contents shall include all of the following:⁹⁶

- (i) Type of pervious implementation to be used.
- (ii) Using a pervious paving method derived from the most recent publication of DEP's best practices manual.
- (iii) Subsurface designs derived from the most recent publication of DEP's best practices manual for the applicable pervious paving application.
- (iv) The existing topography of the site.⁹⁷

⁹² DILLSBURG, PA. §402 (Oct. 11, 2011).

⁹³ *Id.*

⁹⁴ *Id.*

⁹⁵ GREEN OAK, PA, CHARTER TOWNSHIP STORMWATER MANAGEMENT ORDINANCE §34-507(G) (Aug. 13, 2010).

⁹⁶ Plan contents are at the discretion of the municipality.

⁹⁷ LOREDO, TX., §25.59.2.9 (Aug. 6, 2012).

(v) Preliminary hydrologic/hydraulic calculations showing existing predevelopment flows and anticipated post-development flows.⁹⁸

(vi) An analysis of the hydrologic soil groups as well as natural and man-made features within the watershed shall be conducted by a certified geologist to determine if the area is suitable for pervious paving.⁹⁹

(vii) A copy of the certified geologists credentials to be established by the municipality.

(viii) Any additional paving plan requirements established by the municipality.

(ix) The underlying soil strata has an adequate infiltration capacity of at least 0.3 inches per hour.

(x) The bottom reservoir layer is four feet above the seasonably high water table.

(xi) The pervious pavement is no closer than 100 feet from drinking wells and 100 feet up gradient and 10 feet down gradient from building foundations.

(xii) Engineer must demonstrate that the parking lot will be sloped so that the stormwater drains towards the pervious area.

⁹⁸ *Id.*

⁹⁹ *The Tributaries to the Schuylkill River in Berks County, Act 167, Stormwater Management Plan, Final Revised Draft Plan, V-9, 31).*

http://www.co.berks.pa.us/Dept/Planning/Documents/stormh2o/schuylkill_act_167/final_doc/v-1_exec_sum.pdf.

(xiii) The runoff must be able to infiltrate the area under the pervious paving within four days.¹⁰⁰

(xv) Any fees required by the municipality for administration of this plan.

Section 303. Permit Approval.

(a) Determination by engineer.

The municipality's reviewing engineer shall determine whether to issue the pervious paving permit and calculate the number of credits.

(b) Possible revision.

A disapproved pervious paving plan must be resubmitted, with the revisions addressing the municipality's concerns, to the municipality within 45 days otherwise the application will be automatically denied. Applicant may apply for an extension stating the reasons for the extension with the municipality.¹⁰¹

An applicant shall resubmit a pervious paving plan including applicable fees, if:

(i) There is a change in the amount of paving.

(ii) There is a change in the infrastructure.¹⁰²

(c) Appeal.

(i) Any person aggrieved by an action of the municipality, relevant to the provisions of this ordinance, Within 30 days of the date of any assessment

¹⁰⁰ Berks County Planning Commission, *The Tributaries to the Schuylkill River in Berks County, Act 167, Stormwater Management Plan, Final Revised Draft Plan, V-31*
http://www.co.berks.pa.us/Dept/Planning/Documents/stormh2o/schuylkill_act_167/final_doc/v-1_exec_sum.pdf.

¹⁰¹ FAYETTE COUNTY, PA., MODEL STORMWATER MANAGEMENT ORDINANCE §§403-405 (June 2010).

¹⁰² §404.

under this ordinance, may file a petition for review of the assessment to the municipality.¹⁰³

(ii) When submitting an initial petition for review, any person must include a detailed statement of the basis for the review and documents supporting the person's allegation.¹⁰⁴

(iii) The municipality shall provide a written response to the person within 20 days.

(iv) If the municipality concludes that the petition for review should be granted, the municipality must submit an adjustment to the property owner's bill and refund any overpayment for the current levy year to the property owner or apply a credit on the subsequent bill equal to the adjustment amount.¹⁰⁵

(v) No appeals may be taken to the paving appeals board until a petition for review has been filed with and ruled upon by the municipality.¹⁰⁶

(vi) A person aggrieved by a decision of the paving appeals board, relevant to the provisions of this ordinance, may appeal to the County Court of Common Pleas in the county where the activity has taken place within 20 days of the municipality's decision.¹⁰⁷

(d) Municipality paving appeals board.¹⁰⁸

¹⁰³ LANCASTER CITY, PA, §261-9 (February 25, 2014).

¹⁰⁴ §260-10.

¹⁰⁵ §261-11.

¹⁰⁶ §261-10.

¹⁰⁷ §261-11.

(i) The municipal council shall appoint a paving appeals board consisting of five members.¹⁰⁹ The five members need not be residents of the municipality and shall hold no other office within the municipality.¹¹⁰

(ii) The paving appeals board shall elect from its own membership its officers, who shall serve annual terms as such and may succeed themselves.¹¹¹ For the conduct of any hearing and the taking of any action, a quorum shall be not less than a majority of all members of the paving appeals board, but the paving appeals board may appoint the hearing officer from its own membership to conduct any hearing on its behalf, and the parties may waive further action by the paving appeals board as provided hereinafter.¹¹²

(e) Appeals to the paving appeals board.¹¹³

(i) No appeals may be taken to the paving appeals board until a petition for review has been filed with and ruled upon by the municipality.¹¹⁴

(ii) A person aggrieved by an action of the municipality, relevant to the provisions of this ordinance may appeal to the appeals board in writing, not later than 30 days after receipt of the municipality's denial of the property owner's petition for adjustments.¹¹⁵

¹⁰⁹ Id.

¹¹⁰ Id.

¹¹¹ Id.

¹¹² Id.

¹¹³ Appeal hearings shall comply with 2 Pa. C.S.A. ch. 5 subch. B.

¹¹⁴ §261-10.

¹¹⁵ Id.

(iii) A person aggrieved by an action of the municipality, relevant to the provisions of this ordinance, may appeal to the paving appeals board within 30 days of that action.¹¹⁶

(iv) When submitting a petition for appeal, the person must include a detailed statement of the basis for the appeal and documents supporting the person's assertion and pay any fee established by resolution of municipality for the handling of appeals.¹¹⁷

(v) If the appeals board concludes that the appeal should be granted for an impervious paving fee adjustment, the municipality must submit an adjustment to the property owner's bill and refund any overpayment for the current levy year to the property owner or apply a credit on the subsequent bill equal to the adjustment amount.¹¹⁸

(e) Judicial review.¹¹⁹

(i) A person aggrieved by a decision of the paving appeals board, relevant to the provisions of this ordinance, may appeal to the County Court of Common Pleas in the county where the activity has taken place within 20 days of the municipality's decision.¹²⁰

Article IV. Penalties.

(i) In addition to any rights the municipality may have under law or this ordinance. If a municipality determines that the responsible party has failed

¹¹⁶ Id.

¹¹⁷ Id.

¹¹⁸ Id.

¹¹⁹ Compliance with 2 Pa. C.S.A. ch. 7 subch. B.

¹²⁰ §261-10.

to adequately maintain the pervious paving as determined by the municipality, the municipality shall notify the property owner in writing of any deficiencies. If property owner fails to take action to correct those deficiencies within thirty (30) business days of receipt of the notice, the municipality may, but are not required to, enter upon the property and take whatever steps reasonably necessary to correct the deficiencies identified and charge the reasonable costs including administrative costs to the property owner.¹²¹

(ii) Where deficiencies cause imminent threat to public health, safety or the environment, a municipality may take immediate steps necessary to protect public health, safety or the environment and charge the costs (including administrative costs) to the responsible party.¹²² When a municipality charges its costs to the property owner, these charges shall be due within 30 days of the date the bill is received.¹²³

(iii) Municipality may choose to impose civil action in the following manner:

(A) Assessment of the violator for the costs of any investigation, inspection, or monitoring survey which led to the establishment of the violation, and for the reasonable costs of preparing and bringing legal action under this subsection.¹²⁴

¹²¹ PWD & PIDC, *Stormwater Management Incentives Program Grant Manual*, http://www.phillywatersheds.org/doc/SMIP_Grant_Manual_FY14_rev.pdf.

¹²² *Id.*

¹²³ *Id.*

¹²⁴ *Id.*

(B) Costs incurred in removing, correcting, or terminating the adverse impacts resulting from the violation.¹²⁵

(C) Compensatory damages for loss or destruction to the environment.¹²⁶

Assessments under this subsection shall be paid to the municipality and deposited in the pervious paving fund to be used exclusively for costs associated with restoration, monitoring, and establishing pervious paving BMP's and or implementing or enforcing the provisions of this ordinance.¹²⁷

Section 401. Construction.

(a) Unless the person complies with this ordinance, a person may not construct impervious paving 5,000 square feet or more or any pervious paving.

(b) A person that violates subsection (a) is subject to a fine determined by resolution of the municipality.

Section 402. Utilization.

(a) Unless the person complies with this ordinance, a person may not construct any pervious paving or impervious paving at 5,000 square feet or greater.

Article V. Conclusion.

Section 501. Repealer.

(i) Any provision of the ordinance of the municipality inconsistent with any provision of this ordinance is repealed to the extent of the inconsistency. To the extent that this ordinance restates regulations contained in ordinances

¹²⁵ Id.; KENNETT SQUARE, PA., §24-50 (updated Aug. 31, 2016).

¹²⁶ Id.

¹²⁷ Id.

previously enacted by the municipality, this ordinance shall be considered a restatement and not a repeal of those provisions. It is the specific intent of the municipality that all provisions of this ordinance shall be considered in full force and effect as of the date such provisions were enacted.¹²⁸

(ii) Any plan pending at the time of the effective date of this ordinance shall be allowed to proceed with revisions, finalization and implementation in accordance with any ordinance in effect prior hereto. Any subdivision and land development plan filed pursuant to the provisions of the Pennsylvania MPC where there is not a prior stormwater management ordinance in effect may proceed with development in accordance with the filing at the time of the effective date of this ordinance.¹²⁹

Section 502. Effective date.

This Ordinance shall take effect and be in force five (5) days after its enactment by the municipality as provided by law.¹³⁰

¹²⁸ TOWNSHIP OF PENN, PA., PENN TOWNSHIP STORMWATER MANAGEMENT ORDINANCE §23-107 (April, 28, 2014).

¹²⁹ Id.

¹³⁰ TOWNSHIP OF PENN, PA., §23-706(4) (APRIL 28, 2014).