



November 7, 2015

Radnor Township Board of Commissioners  
301 Iven Avenue  
Wayne, PA 19087

Dear Commissioners,

I write to once again ask you to reject any plans to pursue the North Wayne detention basin and to instead pursue a stormwater plan for the North Wayne area that will provide effective flood damage reduction and ensure the best use of the stormwater fee that has been collected from the community and the \$1 million in tax dollars that the Township put into the stormwater fund when it was first started.

The Township's experts have made clear through their evaluations and presentations that a detention basin at North Wayne field will not provide the level of flood protection or flood damage reduction that is needed or warranted by the hundreds of thousands of dollars the project will cost (with cost figures for the project having ranged from \$600,000 and up.) Township-hired experts have repeatedly said the project would only provide "incremental improvement" and that is only in a very limited number of storms (the project is designed to handle only up to the 10 year storm) Additionally, township experts have never answered fundamental questions about the level of flooding or flood damage reduction the project will provide, nor has it ever done an earnest analysis of other options for effectively addressing the problem. Attached is a list of questions that the Delaware Riverkeeper Network has been asking for a year and a half that have never been answered.

The School Board, at its last meeting, did not vote in support of the subdivision option, it voted for more exploratory dialogue. Given this, it would be irresponsible for the Township to continue to invest more money in the detention basin strategy without any clear signal as to whether such a deal is palatable to the property owner, the School District. Surprisingly, the Township has already invested in pursuing permit approvals for this project, despite having no indication that it is a viable or acceptable solution to the School Board or community. Please see attached letters.

From all the documents on the record that the Delaware Riverkeeper Network has secured, the detention basin proposed for North Wayne is a standard, grass bottomed detention basin that will not address the true source of downstream flooding, pollution or erosion – i.e. it will not reduce the volume of stormwater runoff being dumped on downstream communities. In addition to the

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proposed project's inability to provide the improved stormwater management the community needs, detention basins such as the one proposed for North Wayne field is inviting a hazard, particularly given its location as part of a park where children play. The attached information sheet explains some of the dangers of detention basins, which do not exist for the other more effective stormwater strategies that could and should be implemented in Radnor.

It is time to stop advancing a controversial and divisive project that will not provide the level of protection wanted or needed by Radnor residents. Instead, it is time to use the hard earned tax dollars and stormwater fees collected from Radnor residents to pursue truly effective and safe stormwater strategies in the Township. If you have any questions or would like any further information, please do not hesitate to contact me.

Respectfully,



Maya K. van Rossum  
the Delaware Riverkeeper



To: Radnor Township Commissioners  
Date: June 30, 2014  
Re: North Wayne Park Detention Basin Proposal

The Delaware Riverkeeper Network would like to see the following questions answered regarding the North Wayne Park Detention Basin Proposal:

- ☞ The project is described as providing only “incremental improvement” to the frequency of flooding – what is “incremental improvement”?
- ☞ Did you use actual rainfall data in your calculations and modeling or did you simply use presumed rainfall curve numbers found in guidance?
- ☞ What kinds of flood damages are to be reduced or avoided with this project? First floor flooding? Basement flooding? Property erosion? Garden damage?
- ☞ What is the level of flood reduction that will be obtained from the proposed detention project – i.e. how many inches or feet will flood waters be lowered?
- ☞ What is the level of flood damage reduction that will result? Telling us how much the water level will lower is helpful but we also need to know what will be the reduction in damages – how much and what kind of damages will be reduced or avoided? What is the economic value of the damage avoidance?
- ☞ What is the full economic cost of the detention project being proposed?
- ☞ Why is the project only providing for a “small measure of water quality” benefit?
- ☞ Why is there no upstream or downstream compliment to this project to address volume and damages?
- ☞ How much of the field and space would be left for public use and play if this project were to move forward?
- ☞ Will the Township have to buy the field from the School District? If so at what cost?
- ☞ Chagrin Valley Associates, according to a 5/6/2014 presentation slide states that they were asked to answer “what is the most that can be done to control stormwater at that location” – North Wayne Park – why were they not asked the question: what is the best comprehensive strategy, or set of possible options, for reducing flood damages in North Wayne?
- ☞ According to the 5/6/2014 PowerPoint presentation, “Due to space limitation none of the options can meet current water quality regulations and will require partial waivers from infiltration, water quality and stream bank erosion permit requirements.” What permits will be required and from whom?
- ☞ If it is true that waivers of law would be required for the proposed project to proceed, what specifically are those waivers for and who would issue them?
- ☞ What are all of the permits and approvals required for this project to proceed?

- ☞ Why is the Township characterizing the Park property as theirs when it belongs to the school district? (CVE March 28, 2014 project summary)
- ☞ What alternatives have been considered and what level of flood reduction, flood damage reduction, and cost is associated with each individually and/or collectively?
- ☞ If \$623,599 is spent on this project what is the likelihood of this community benefitting from another project to take it beyond just the “incremental” benefits of this project?
- ☞ It has been said there will be incremental water quality benefits that may be received but with no quantification of what that means. What will be the quantity and value of the water quality benefit?

**Our Request:**

The Delaware Riverkeeper Network urges a comprehensive approach to resolving the flood damages issue in North Wayne that includes the following 4 elements:

- ☞ Projects/components that will reduce the volume of runoff before it reaches the North Wayne Park and downstream communities, thereby addressing the cause of the problem;
- ☞ Projects/components downstream of North Wayne Park that directly address flood damages to the degree possible and contribute further to reducing the volume and velocity of runoff that proceeds to downstream residents including things such as, addressing erosion issues by revegetating streamside lands, installing rain gardens or other onsite projects to further reduce runoff volume, considering voluntary buyouts and/or home elevation projects recognizing the reality that a number of the properties at issue were built in floodplains, wetlands and former water features;
- ☞ Committing to a strengthened township stormwater ordinance primarily focused on the reduction of runoff volume from both new development and redevelopment sites to be completed within a 6-month period to ensure every opportunity to avoid and reduce runoff volume in the future;
- ☞ Committing to undertake a complete and comprehensive plan for addressing the flooding problems in Radnor Township that is focused on volume reduction and restoring the natural effectiveness of streams and their floodplains to hold and carry floodwaters;
- ☞ If a project is to be implemented at the Park it must be one that does not interfere with the School District and public use of this important piece of community open space and that further reduces stormwater volume, thereby preventing it from being dumped on downstream residents.



## Memorandum

From: Maya K. van Rossum, the Delaware Riverkeeper

To: Delaware County Conservation District, Media, PA, Attn: Ed Magargee (MagargeeE@co.delaware.pa.us)

Re: Permit Application Documents for the North Wayne Park Improvements, Radnor Township, Delaware County, 6/1/2015

Date: July 1, 2015

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### Application Completeness Review by the Delaware Riverkeeper Network

1. *Regarding "Sequence of BMP installation and removal" and "Sequence of PCSM BMP implementation or installation"*

Comment: the submission is not complete because the construction sequence for the basin is not included.

2. *Regarding "Maintenance program"*

Comment: the submission is not complete because there is no maintenance program provided for the basin and plantings.

3. *Regarding "Net change in volume and rate of stormwater"*

Comment: the submission is not complete because there is no information/calculation for items listed below.

- a) Removal of existing infiltration and the impact that has on increasing runoff;
- b) Impact on time-of-concentration for storms larger than the 10-year storm (since a new and larger culvert is being installed flowing out of the basin, and the basin does not reduce impacts of storms larger than the 10-year storm);
- c) Impervious cover impact of "future shed";
- d) Increase in stormwater runoff due to tree removal;
- e) Increase in stormwater runoff due to sports field underdrainage, and the associated decrease in infiltration.
- f) Stormwater benefit (if any) provided by proposed vegetation in the basin (which is also not clearly defined)

4. *Regarding "Written description of PCSM BMP's, "Specifications for all permanent PCSM BMP's Provided"*

Comment: Planting and seeding is not completed.

- a) The sports field seed mixture is chosen, but by brand name only (not species names); the DCCD requirements on Drawing 13 of 16 clearly states: "show all seeding, mulching and soil amendment specifications on a detail sheet. References to a standard seed mixture are not acceptable."
- b) There is no specification for the basin plantings/seeding (other than generalized instructions).

5. *The drawings are all labeled "Preliminary."* Is this an acceptable format for obtaining a review of "completion"? When will "Final" drawings be available for review by the public, and how will the public be notified?

6. *The property is not owned by Radnor Township, the applicant.* It is owned by the Radnor Township School District. The District has not given permission yet for this work to be completed (upon request, DRN can provide a letter that was written by the School District on this subject).



## Memorandum

From: Maya K. van Rossum, the Delaware Riverkeeper, and John Nystedt, RLA, LEED AP BD+C

To: Delaware County Conservation District, Media, PA

Attn: Ed Magargee (MagargeeE@co.delaware.pa.us)

Re: Permit Application Documents for the North Wayne Park Improvements, Radnor Township, Delaware County, 6/1/2015

Date: September 14, 2015

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### Application Review by the Delaware Riverkeeper Network, identifying technical deficiencies

1. Regarding "Net change in volume and rate of stormwater," the documentation is inadequate because there is no information/calculation for items listed below.
  - a. Removal of existing infiltration and the impact that has on increasing runoff;
  - b. Impact on time-of-concentration for storms larger than the 10-year storm (since a new and larger culvert is being installed flowing out of the basin, and the basin does not reduce impacts of storms larger than the 10-year storm);
  - c. Impervious cover impact of "future shed";
  - d. Increase in stormwater runoff due to tree removal;
  - e. Increase in stormwater runoff due to sports field underdrainage, and the associated decrease in infiltration;
  - f. Stormwater benefit (if any) provided by proposed vegetation in the basin (which is also not clearly defined – while township officials have asserted there will be healthy native vegetation in the basin as opposed to simply mowed turf grass, the plans do not confirm such a plan.).
2. Regarding the Erosion and Sediment Control Plan and Details, Sheet 13 of 16, the permanent seed mix specified is typical lawn, using primarily perennial grass species. No accommodation for diverse native species for the wet areas and basin bottom is shown. The specified permanent seed mix specified will not survive well in the inundation and wet soil conditions. Native perennials, native cool season grasses and native warm season grasses adapted to each area of the proposed basin should be specified.
3. No planting design is included that is properly associated with the two water pooling areas in the basin that are shown on the drawings – the planting design documentation is inadequate.
4. Regarding "Written description of PCSM BMP's, "Specifications for all permanent PCSM BMP's Provided," the planting and seeding documentation is not adequate.
  - a. The sports field seed mixture is chosen, but by brand name only (not species names); the DCCD requirements on Drawing 13 of 16 clearly states: "show all seeding, mulching and soil amendment specifications on a detail sheet. References to a standard seed mixture are not acceptable."
  - b. There is no specification for the basin plantings/seeding (other than generalized instructions).
5. Regarding the Post Construction Stormwater Management Plan, Sheet 16 of 16, the text only covers pervious pavement. It should also address the stormwater basin. For instance, sediment cleaning and vegetative management needs to be specified. Documentation is inadequate.

6. No soil borings were done at the location of the pervious pavement. Were infiltration tests done there? In urbanized areas such as this park, infiltration rates can vary greatly within short distances, so the soil borings done at the ball fields are not necessarily indicative of the actual infiltration at the pervious pavement area. Infiltration rates need to be verified at the actual location of the pervious pavement, and the depth of stone storage (stormwater storage) may need to be adjusted accordingly.
7. There are no special construction requirements listed for limiting compaction at the bottom of the basin. This is necessary for maximizing infiltration, which is good for the stormwater management, even if not accounted for in the stormwater calculations. Documentation is inadequate.
8. Regarding "Sequence of BMP installation and removal" and "Sequence of PCSM BMP implementation or installation," the documentation is not adequate because the construction sequence for the basin is not included.
9. Regarding the "Maintenance program," the documentation is not adequate because there is no maintenance program provided for the basin and plantings.
10. The property is not owned by Radnor Township, the applicant. It is owned by the Radnor Township School District. The District has not given permission yet for this work to be completed (upon request, DRN can provide a letter that was written by the School District on this subject).
11. The application materials and review should consider the 303(d) water quality status of the receiving stream, potentially applicable TMDLs (now or in the future), and whether the proposed detention basin will adversely impact the receiving stream's water quality. Furthermore, the Pennsylvania Department of Environmental Protection (PADEP) has proposed changes to the PAG-13 NPDES General Permit for Discharges from Small MS4s and the new rules will have a large impact on regulatory requirements for stormwater management. Gulph Creek is impaired for metals and siltation. These new rules will require that MS4s discharging to impaired surface waters implement specific best management practices that will achieve pollutant reduction to existing pollutant loading. The Township and County would be better served by addressing stormwater using the most progressive management practices instead of the proposed standard detention basin.



## **Research Assessing the Safety Hazards Associated with Detention Basins**

**Safety Hazards:** Detention basins pose multiple potential safety hazards including drowning, exposure to contaminated water, and increased exposure of adjacent community to mosquito transmitted diseases. Standards for the design of stormwater basins are primarily based on improving water quality, and few standards address the safety of civilian populations. Furthermore, the location of stormwater basins near high traffic areas (i.e. parks) leads the public to think it is an amenity, rather than a device treating polluted water and heightens the potential for injury.

1. Jones, J. E., Ben Urbonas, P. E., & Pittinger, R. (2012). Essential Safety Considerations for Urban Stormwater Retention and Detention Ponds. Stormwater Magazine.
  - a. Detention ponds can be installed adjacent to incompatible land uses, and therefore the location of stormwater facilities leads to high potential for human injury. Stormwater facilities are typically located near high trafficked areas, in residential neighborhoods, near schools or trails or playgrounds. The public is effectively invited to spend time near these facilities, and little is typically done to minimize obvious risks associated with these facilities because public safety is not a specific design objective. When facilities are located where children congregate, multiple layers of safety are necessary.
  - b. Hydraulic structures are designed and constructed in a manner that makes them hazardous. For example, steel bars on grates are not beveled, rounded, or covered, but have sharp ends. Bolts have jagged, exposed ends. Gaps between steel bars and concrete walls are too wide. Railings are either not used where they should be or are improperly designed.
  - c. Inflow and outflow pipes are quickly inundated and then not visible making them a safety hazard. For example, a dry pond in an office park had a rapid rise, and a child playing in the pond was apparently knocked down by jet flows from an inlet pipe, tumbled by vortex flows, and ultimately, dragged into an unprotected outlet pipe by suction forces.
  - d. Furthermore, racks put on the opening of pipes pose a danger to the public because they can impinge a person against them during high velocity flow. If the racks are too close to the outlet, a person can be knocked over by impulse forces and then sucked into or pinned against outlet structure.
  - e. Designers typically fail to recognize that events larger than the design event can and do occur. This makes the facilities inadequate when larger storms occur.



2. American Society of Civil Engineers et al. (2013). Guidance for Protection of Public Safety at Urban Stormwater Management Facilities. May 2013
  - a. Physical risk is due to the sharp edges, confined spaces, unreliable footing, slippery surfaces, uneven ground, and abrasive surfaces associated with stormwater facilities.
  - b. Stormwater runoff often has pollutants that can adversely affect public health, including bacteria, viruses, trash, diapers, hypodermic needles, and hazardous needles.
  - c. High-velocity and rapidly rising flow can be overwhelming to even adults let alone children. This is particularly hazardous where there are areas that double as pedestrian access and are subject to inundation.
  - d. People swept into long pipes could be trapped and submerged for minutes if not longer.
  - e. Erosion can occur in areas where pedestrian traffic is anticipated.
  - f. Earthen embankments or pond sides can fail upon overtopping or erode away over time.
  - g. Threats to public safety include potential harm to maintenance workers. For example, steep slopes are hazardous when using heavy equipment such as lawn mowers.
  - h. There is a lack of understanding about the hazards that these facilities pose. Although News coverage does increase public awareness, this heightened awareness is usually limited to the local area and is typically short-lived.
  
3. Hansen, J.J. (undated ). Hazard Assessment for Water Retention and Detention Ponds. Available at: <http://www.usfa.fema.gov/pdf/efop/efo45799.pdf>
  - a. Detention basins are constructed based on standards that are written primarily for improving water quality and not for the safety of civilian populations.
  - b. Risks and hazards associated with detention basins include drowning, exposure to contaminated water, and increased abundance of mosquito populations and associated disease vectors.
  - c. Drowning is the second leading cause of unintentional death according to the Center for Disease Control.
  - d. Ponds attract people and children and can be mistaken for a recreational body of water.
  - e. Children can crawl into pipes resulting in no way of escape. Furthermore, racks which reduce this risk can result in a person or child being pinned against the rack by the force of flowing water.
  - f. Steep slopes on one or more sides and fences aimed at keeping people out can become a barrier to rescue crews in an emergency.
  - g. Exposure to contaminated water is associated with several common illnesses (Gastrointestinal, infectious hepatitis or aseptic meningitis, leptospirosis, intestinal bacteria such as E.Coli Salmonella, shiggella, Hepatitis A Virus, typhoid, paratyphoid, and tetanus).
  - h. Ponds increase the potential for mosquito habitat, and therefore, increase the potential for exposure of adjacent community to West Nile Virus.
  
4. Guo, J. C., Jones, J. E., & Earles, A. (2010). Method of superimposition for suction force on trash rack. *Journal of Irrigation and Drainage Engineering*, 136(11), 781-785.
  - a. Urban flood flows are quick, concentrated, and fast. Therefore safety around storm facilities is a concern for the public.
  - b. A trash rack at a stormwater facility's outfall entrance can prevent a human body from being washed into the pipe, but it also increases the flow velocity resulting in pinning force on a human body if trapped in the basin.

5. Guo, J. C., & Jones, J. (2009). Pinning Force during Closure Process at Blocked Pipe Entrance. *Journal of irrigation and drainage engineering*, 136(2), 141-144. of a
  - a. During a storm, a trapped person will flow with water towards the outfall entrance. The flow force acting on a person can be pinning at first but eventually deadly.
  - b. It is difficult to quantify and design for this flow force.
  
6. Metzger, M. E. (2004). Managing mosquitoes in stormwater treatment devices. *Univ. Calif ANR Publ*, 8125(11).
  - a. Stormwater facilities often provide aquatic habitats suitable for mosquitoes and other vector species as an unintended consequence.
  - b. Mosquito management is critical to prevent disease transmission but is often overlooked.
  - c. Most stormwater facilities remain unsupervised for extended periods and therefore, mosquito breeding could occur unobserved and uncontrolled.
  - d. If not designed properly, mosquito control requires the use of pesticides which has additional potential health hazards.
  
7. Chaplin, N. (2003). Personal Injury Litigation as a Barrier to the Adoption of Sustainable Drainage Ponds—A Proposal for Legislative Reform.
  - a. Where there are a significant number of visitors, there is an increased risk of injury from stormwater ponds and an increased liability of civil litigation which seeks damages.
  - b. In certain climates, ice becomes an additional danger.
  - c. Blue green algae blooms from fertilizer runoff can produce toxic chemicals which pose a threat to wild and domestic animals and humans. Furthermore, a pool covered in algae may make the presence of water less apparent to a child.
  - d. Operators or owners of stormwater basins can face civil action were a person to drown or be injured. Even where there are warnings communicating dangers and basins are designed in accordance with the law, litigation can still be pursued against the owner.
  
8. Shinde, P.S. (2002). Multi-use of Stormwater Detention Ponds in Parks and Open Spaces. *MLA Thesis*, University of Georgia.
  - a. The outlet of a detention basin is designed to slow down flow, and therefore, is either a constricted culvert or narrow pipe. Large volumes of water exert a lot of pressure on narrow outlets leading to faster flow. However, broad open outlets are much safer than narrow outlets.
  
9. Ferguson, B. K. (1998). *Introduction to stormwater: concept, purpose, design*. John Wiley & Sons.
  - a. Detention basins functionally become a trap for people to fall into and drown.
  - b. Even if sloped correctly, a child can be trapped against a trash rack when there is excess water entering the culvert. For example, a 4 year old girl in State College, PA, slid down wet slippery grass and became trapped. Even two men who tried to pull her away failed due to the force of water, and she drowned.

**Fencing:** Fencing around a basin can itself become a hindrance for rescue personnel, impede escape, and limit maintenance.

1. Jones, J.E., et al. (2013). Public Safety at Stormwater Management Facilities. Water Environment Federation Stormwater Report.
  - a. Fences cannot be relied on exclusively for safety, and fencing has not proven to be an effective deterrent.
  - b. Many children or youth view climbing a fence as an exciting challenge.
  - c. Ponds surrounded by fences are not as well maintained and therefore, a greater safety hazard.
  - d. Fences block vision and impede emergency access, rescue attempts, and escape.
  - e. Fences can create more danger than they are intending to mitigate.
  
2. Liebl, D.S. (2006) Stormwater Detention Ponds Site Safety and Design. Solid and Hazardous Waste Education Center, University of Wisconsin- Extension.
  - a. "Generally, fencing should not be necessary if other appropriate design practices are used."
  - b. Although fencing may discourage toddlers, it can be viewed as a worthy and exciting challenge to some children and older youth.
  - c. Fences can hinder mowing and collect debris.
  - d. Fences can hamper rescue efforts.
  
3. Chaplin, N. (2003). Personal Injury Litigation as a Barrier to the Adoption of Sustainable Drainage Ponds—A Proposal for Legislative Reform.
  - a. Fences simply act as a challenge to be overcome.
  - b. Fences reduce safety by acting as a visual and physical barrier.
  - c. Even the most substantial fence is still scaleable.
  
4. Shinde, P.S. (2002). Multi-use of Stormwater Detention Ponds in Parks and Open Spaces. MLA Thesis, University of Georgia.
  - a. Fences are expensive to install and maintain.
  - b. Fences produce edges which increases grounds maintenance needs.
  - c. "Fencing of detention ponds should be discouraged wherever possible"

### **Select Public Safety Incidents at Detention Basins: News Headlines**

1. Action News Jasonville, December 24, 2014, Body found in retention pond in Northwest Jacksonville. Jacksonville, Florida
2. 1011 now, October 13, 2014, Authorities identified body found in Grand Island Pond (a Detention pond). Grand Island, Nebraska.
3. Twin Cities Pioneer Press, November 29, 2013, St. Louis Park Drowning accident spurs questions about retention ponds. St. Louis Park, Minnesota.
  - a. Mothers car went off the roadway, dropped down an embankment and into pond sinking into 9 feet of water and trapping her and five children in the car.
  - b. 2 children drown and the other 3 children were hospitalized.
4. Renton Reporter, June 28, 2012: Five-year-old Renton girl nearly drowns in detention pond; is fence the answer? Renton, Washington.
5. Loudoun Times, May 22, 2012, Missing Leesburg man drowns in drainage pond, Loudoun County, Virginia.
6. The Columbus Dispatch, May 10, 2007, Vigilance only line of defense at retention ponds, Columbus, Ohio
  - a. In 2007, 4-year-old girl drown in pond.
  - b. In 2004, 2-year-old boy drown in pond.
  - c. In 2002, 2-year-old boy was hospitalized after falling into a pond despite fence.
7. News Star Bulletin, August 24, 2005, \$2 million settles drowning lawsuit: Charlotte Schaefer, 5, died last year on military housing. Pearl City, Hawaii.
  - a. Due to clogged drainage pipe, detention pond flooded regularly.
  - b. In only 3 to 4 feet of water, 5-year-old girl drown while neighbors frantically searched in murky water.
8. New York Times, July 21, 1989. Our Towns; Only a Dry Field, But Other Boys could Drown in it, East Brunswick, New Jersey.
  - a. Field that doubles as a drainage basin turned into a lake.
  - b. Two boys, 15-years-old, were drawn into water and swept into 3-mile-long drainage pipe where they drown.
  - c. Suction of the vortex and the enclosure of the pipes allowed them no escape once they slipped down steep-sided basin.