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Project Goals and Priorities

The Town of Townsend (Town) is planning to continue the Townsend Stormwater Management Study, which will provide a master stormwater and drainage plan for the Town and include a preliminary hydraulic engineering study and analysis to improve and/or retrofit existing stormwater infrastructure that is no longer adequate. The goal of this iteration of the Study is to analyze the stormwater networks of the Townsend Village I & II neighborhoods, as well as South Street.

This Townsend Stormwater Management Study will be divided into three phases:

1) Development and updating of the Geographic Information System (GIS) Stormwater Infrastructure Management Mapping Database for the Town of Townsend. And televised inspection of all existing stormwater pipe within the project scope.
2) Cleaning and repair of existing storm sewers that are found to be damage in Phase 1.
3) Hydraulic study and analysis of existing stormwater infrastructure.

Each phase of the Townsend Stormwater Management Study is explained in greater detail below.

Phase 1 - GIS Stormwater Infrastructure Management Mapping Database and Televised Inspection of Existing Stormwater Pipe

The goal of Phase 1 is to improve and revise the map of all the existing stormwater infrastructure including storm sewers, storm manholes, catch basins, and outfalls within current limits of the Town of Townsend using the latest Esri ArcGIS software applications.

In the past, the Town of Townsend received a waiver for the MS4 permit since the population was below the 1,000-resident threshold. The population of Townsend is approximately 2,7000 as reported by the Delaware Population Consortium. Based on the anticipated results of the 2020 census data, Townsend may be subject to Phase II MS4 permitting requirements as noted in the comprehensive plan. The Town continues to grow through the construction of new developments and acquiring land through annexation. Developing a comprehensive GIS map of all stormwater infrastructure will be necessary as Townsend inevitably becomes an MS4 municipality.

The development of a GIS Stormwater Infrastructure Management Database is necessary for MS4 purposes and will also prove to be very beneficial when developing engineering plans to replace and/or repair existing stormwater infrastructure. The next two phases of The Townsend Stormwater Management Study address these concerns.

Townsend Village I & II account for about three fourths of the Stormwater Investigation Area proposed for this project. Their stormwater networks have not been revisited since their initial construction in the late 2000's and early 2010's. The other quarter of the Stormwater Investigation Area is South Street, the southern portion being part of the 'Heart of Townsend", with the portion north of Gray Street being Constructed for Townsend Village II. There is existing stormwater infrastructure for all of the Stormwater Investigation Area.

In addition to the GIS stormwater management map, the goal of Phase 1 is to perform a televised inspection of existing storm sewers in the Stormwater Investigation Area. It would be in the Town's best interest to determine the current condition of the stormwater infrastructure through televised inspection before spending funds to address isolated problem areas.

The Town of Townsend is concerned that there are potential locations where the stormwater pipe could be deteriorated in Townsend Village I or II development. After deteriorated sections have been identified, a repair schedule can be created to address the restoration of the stormwater pipe. There is approximately 17,000 linear feet of stormwater pipe in Townsend Village I & II that require televised inspection. By addressing the existing condition of the stormwater pipes in

Townsend village I & II, the Town will be able to continue to provide a safe and dependable infrastructure to its residents.

Phase 2 – Cleaning and Repairing Existing Storm Sewers.

The goal of Phase 2 is to clean and repair existing storm sewers in the Stormwater Investigation Area. The extent of stormwater pipe that will require cleaning and/or repairing will be known after phase 1 is complete. While the cleaning and repairing of existing storm sewers in included in the Townsend Stormwater Management Study, grant funding is intended for fee and analysis purposes only. Grant money will not be spent on repairs or construction. Most of the cost of Phase 2 will be repairs and/or construction. A cost estimate for Phase 2 has been omitted from the detailed budget until there is a better understanding of the extent of stormwater pipe requiring cleaning and repairing.

Phase 3 - Hydraulic Study and Analysis of Existing Stormwater Infrastructure

The goal of Phase 3 is to conduct a comprehensive hydraulic engineering study and analysis for the Townend Village I, Townsend Village II, and South Street Stormwater Investigation Area. The Stormwater Investigation Areas are due for a routine inspection to ensure any issues or damage can be caught and repaired early as preventative costs will be significantly lower than the alternative. No inlets or pipes being investigated in the Phase 3 Area are located along Main Street, which is a state road and the responsibility of the Delaware Department of Transportation (DelDOT). Therefore, there are no stormwater pipes, inlets, or structures that DelDOT owns and maintains are part of this analysis.

The typical stormwater infrastructure in the Stormwater Investigation Area are curb gutters, combination curb inlets, and stormwater pipes. Townsend Village I & II networks collect stormwater before discharging into one of several detention ponds that in turn discharge into Wiggins Mill Pond or the Appoquinimink River. The portion of South Street that is south of Gray Street follows a network that converged at Commerce Street before Discharging into an unknown outfall adjacent to the railroad tracks.

Photo 1 – North Point of Townsend Village 1 Pump Station adjacent to the Detention Pond next to Wiggins Mill Pond.

Photo No. 2 – Townsend Village II Detention Pond that discharged into the Appoquinimink River

Climate change is expected to result in more frequent heavy precipitation events. This can lead to more frequent flooding, especially in areas with inadequately sized drainage infrastructure. This flooding can result in safety hazards, inaccessible roadways, travel delays, impacts to emergency response, and damage to buildings and other infrastructure. The Town of Townsend wants to ensure the current drainage networks are adequate for the expected increase in storm intensity, therefore it is in the Town's best interest to perform an engineering analysis and design stormwater infrastructure for the Phase 3 Area that will be able to effectively manage and carry increasingly intense rain events.

Geographic Scope

The Town of Townsend is located within the Appoquinimink River Watershed. The Appoquinimink River Watershed Plan, issued in January of 2012 by the Delaware Department of Natural Resources and Environmental Planning, calls for a 60% reduction in the Total Maximum Daily Loads (TMDLs) of nonpoint nitrogen and phosphorus loading. An implementation plan, or a Pollution Control Strategy, was developed to achieve this TMDL.

According to the watershed plan, all permanent sediment and stormwater management plans are required to be designed and implemented to include criteria that will reduce nutrient loading by the percentage required to meet the TMDL required nutrient load reduction of ground and surface waters to the maximum extent possible. It is advised that local governments should establish a community stormwater runoff education and stormwater management and maintenance program for the watershed to provide resources to educate homeowners that maintain stormwater resources. In addition, there is advisement to form a group composed of community representatives from the community and local, county, and state government to establish a stormwater retrofit process for the Appoquinimink watershed.

The Appoquinimink River watershed has historic water quality problems with respect to nutrient and low dissolved oxygen concentrations. As developments spreads south of the Delaware and Chesapeake Canal, continuing to implement best management practices (BMPs) for handling stormwater becomes more vital.

In June 1990, the Delaware Legislature passed the Sediment and Stormwater Law to help correct the State's water quality and quantity problems. The implementing program was initiated in July of 1991 and addresses sediment control during construction and post-construction, stormwater quantity and water quality control. Since this implementation, many BMPs for stormwater have been implemented and more are constructed each year. The Sediment and Stormwater Regulations are currently being revised to promote the use of stormwater management techniques that are more efficient at reducing nutrient loading and promote Green Technology BMPs or stormwater management practices based on low impact development and conservation design.

All sectors have taken steps to improve water quality through the implementation of laws, regulations, and voluntary BMPs. Analysis using a basic land use loading rate model shows that, to date, nonpoint sources of TN and TP have been reduced by 109% and 111%, respectively, from the TMDL baseline levels. While land use modeling based on current practices predicts reductions exceeding that required by the TMDL, there is still a need for further reductions in areas that are currently lacking in nonpoint source discharge control such as wastewater and stormwater. The Town of Townsend is currently lacking in stormwater infrastructure, especially in the Phase 3 Area. As stormwater is not properly and efficiently conveyed, it is given the opportunity to increase its percentage of nonpoint sources of TN and TP. If the Town is granted money, the hydraulic engineering analysis would incorporate local water surface strategies by incorporating BMPs into the design of upgraded stormwater infrastructure. Modern green technologies such as rain gardens and subsurface infiltration beds could be included in the proposed stormwater infrastructure upgrades to achieve pollutant reductions. Existing structural BMPs would be upgraded to ensure stormwater is properly and efficiently conveyed and does not pond through the Town.

As Townsend grows in population and becomes subject to MS4 permitting requirements, having modern stormwater infrastructure will essentially be necessary to comply with MS4 permitting. Therefore, the development and implementation of a stormwater education program will become required. As a result, the residents of Townsend will need to understand how to maintain stormwater infrastructure to ensure that the required TMDL levels are achieved.

Project Feasibility and Cost Effectiveness

Great consideration and deliberation were given when considering the feasibility of Townsend Stormwater Management Study. The Town of Townsend is no longer a town with a relatively small population of less than 1,000 residents, which places Townsend under the threshold that allows for exemption for the Phase 1 MS4 permit and associated requirements. Townsend has undergone significant development and increase in population size in the past 20 years, there are approximately 2,700 residents in the town. Townsend has already annexed several areas into the town and has laid out plans for additional annexation areas as proposed within the draft Townsend Comprehensive Plan. The Woods at Hidden Creek is another 220 single family homes community currently under construction, Townsend Cove will provide an additional 23 duplex buildings (totaling 46 dwelling units), and Townsend Cross will provide 55 town homes. Considering the recent, ongoing, and proposed development, Townsend can no longer rely on its existing stormwater infrastructure, nor can the Town passively maintain the existing infrastructure. As Townsend continues to develop with an increased impervious cover and population.

Investing in stormwater infrastructure upgrades, actively maintain and repair existing stormwater infrastructure will allow the Town to address the TMDL requirement of the Appoquinimink River Watershed plan. Passively maintaining the existing infrastructure is an inferior alternative that defers repair needs to future years. Reacting proactively to emerging problems is cost efficient while avoiding any fallout from a catastrophic failure. Preventative care save the municipality, county, and state money in the long run. Furthermore, the lack of a strategic stormwater plan will inhibit the Town with complying with the Pollution Control strategy set forth by The Appoquinimink River Watershed Plan.

Included in this section is a detailed budget for completing the Townsend Stormwater Management Study. The total estimated cost is $137,530, which is above the combined grant award and match requirement amount totaling $100,000. Townsend intends to apply for this grant multiple times over the course of a couple years to facilitate the stormwater management inventory for the potential MS4 requirements. The cost estimate is likely to increase once Phase 1 is complete and the extent of stormwater pipes requiring cleaning and/or repairs is known.

Insert cost estimate pdf

Once the Townsend receives funding for the Townsend Stormwater Management Study, the Town will schedule the various project phases over the duration of a year beginning in January 2026 and ending in November 2026. The project will proceed according to the anticipated timeline:

Phase 1:

January 2026 – February 2026: Identify, map, and update the existing stormwater management facilities within Townsend village I & II, and South Street utilizing AutoCAD and then convert into a GIS geodatabase using Esri software applications.

March 2026: Land Surveying and GPS Data Collection Support Services.

March 2026: Use televising to troubleshoot areas the existing stormwater sewer, monitoring sinkholes and investigate areas where water is collecting and not draining properly

Phase 2:

April 2026 – June 2026: Repair and reline existing pipe in the project area

Phase 3:

June 2026 – July 2026: Perform Hydraulic Engineering analysis.

August 2026 – November 2026: Development stormwater master plan and recommendations for Phase 3 Area.

Technical Merit

The scope of this project can certainly be executed and accomplished within the proposed cost estimate and time frame. RVE has previously produced a comprehensive proposal for mapping and maintaining the GIS database; (refer to Appendix D) and performed a stormwater analysis for the Heart of Townsend. The groundwork for the GIS Stormwater Infrastructure Management Mapping Database has already been laid. The timeline and budget for Phase 1 has already been establish and approved by Professional Engineers. The cost for televised inspection of existing stormwater pipe has already been established previously from discussions and cost estimations from a contractor who is experienced with televising stormwater pipes. The feasibility, timeline, and budget for Phase 2 of the Townsend Stormwater Management Study has already been established previously from discussions and cost estimations from a contractor who is very familiar with repairing stormwater pipes; (refer to Appendix B). The linear feet and size of all pipes to be televised are known from the GIS Stormwater Network Database

Accomplishing Phase 3 within the proposed timeline and proposed cost estimate is certainly feasible. The cost estimate and timeline were prepared by a Professional Engineer who has experience with hydraulic analysis and stormwater design. The proposed scope of work in Phase 3 is rather routine for an experienced hydraulic engineer. Software, such as AutoCAD Storm & Sanitary Analysis, will be utilized to perform a hydraulic analysis of the Phase 3 Area for multiple storm events. Once the analysis is complete, the design of updated stormwater infrastructure can be executed. The design work can be accomplished by a team of two to three engineers and one AutoCAD technician. The design team will deliver a complete set of plans along with comprehensive technical specifications. The plans and specifications will be checked for quality assurance and quality control by a Professional Engineer.

RVE is contracted by the Town of Townsend to be a consulting engineer of on their behalf. While RVE is the consulting engineer for Townsend, RVE is certainly capable of executing the proposed work for all three phases of the Townsend Stormwater Management Study. The company has been an established civil engineering firm in the Mid-Atlantic for over one hundred years. RVE has already established the basis for accomplishing the work in Phase 1, Phase 2, and Phase 3. RVE has completed and delivered plan sets and technical specifications similar to the scope of work for Phase 3. RVE has multiple Professional Engineers licensed in the State of Delaware that can perform the work laid out in this grant proposal. RVE will work with the Town of Townsend to assure the final delivered product checks all the quality assurance boxes.

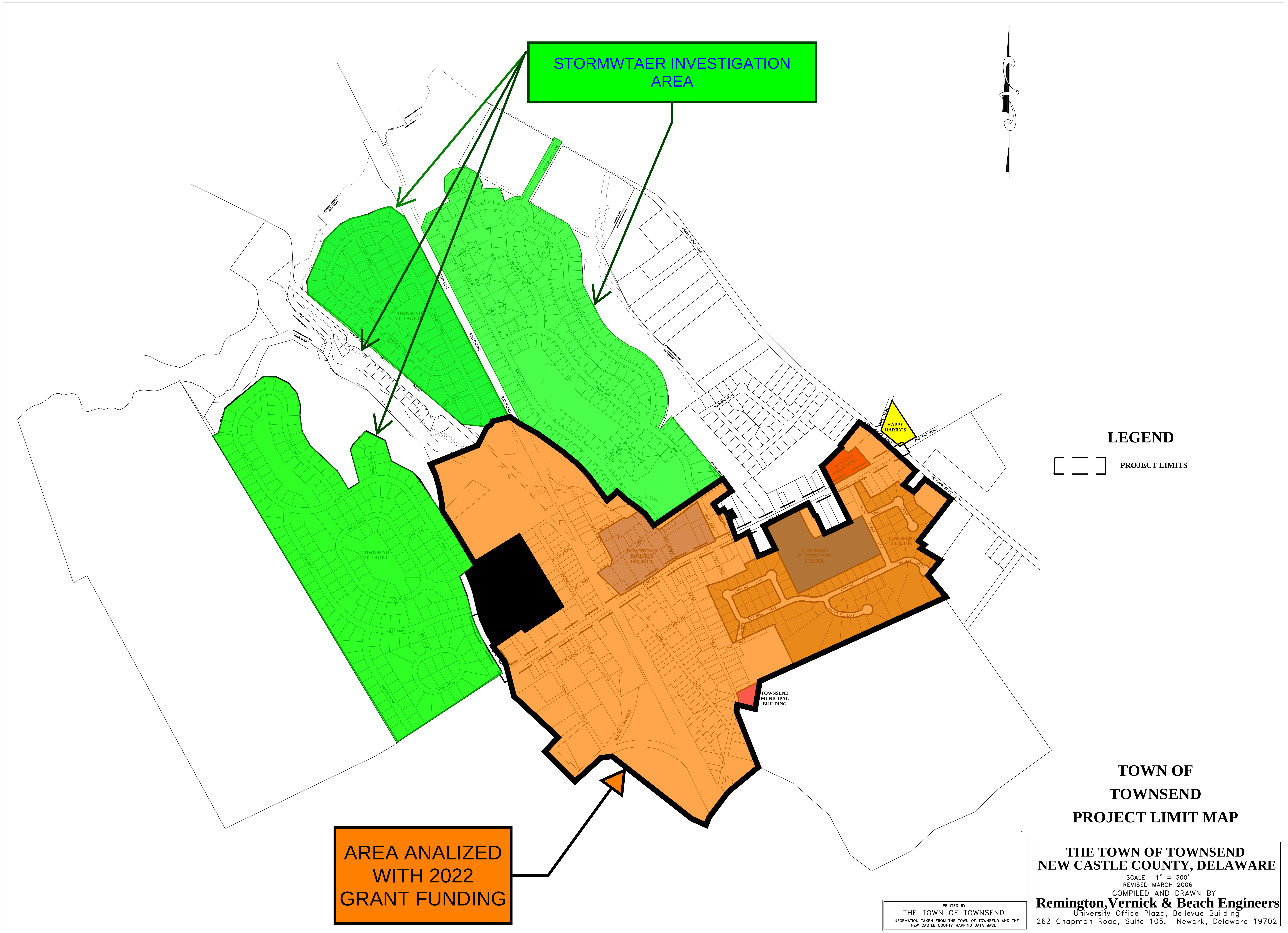
Programmatic Capability

The Town of Townsend has recently been awarded grants from both DNREC & the Outdoor Recreation Parks and Trails Program (ORPT) successfully. The DNREC grant received was for the Wastewater Matching Planning grant in the amount of $22,050.00 dedicated to conducting the Townsend Wastewater Treatment Plant Feasibility Study. The ORPT grant received in the amount of $87,400.00 was for the design and construction of the Townsend Municipal Park Tennis and Pickleball Court. In addition, New Castle County provided matching funds in the amount of $87,400.00 to complete the project. To date the Townsend Municipal Park Tennis and Pickleball Court has been constructed and the residents of the Town are utilizing and enjoying the facility. The project was completed in accordance with the project schedule and within the planned budget. Currently, the Townsend Wastewater Treatment Plant Feasibility Study is in the early stages of the assessment with a project status of approximately 20% complete.

Based upon the Townsend record of acquiring and using the appropriated funds effectively and in a timely manner, the funding requested for the Surface Water Matching Planning Grant will assist the Town of Townsend in meeting the anticipated MS4 requirement. The plan for timely and successful achievement of the project objectives begins with implementing a strategic plan as noted in the designated three phases: Phase 1 - create a GIS map system, Phase 2 - televise existing pipe system and Phase 3 - engineer and design upgrades to inadequate stormwater infrastructure. RVE will monitor the progress of each of the designated phases and provide status updates to the Town of Townsend. In addition, periodic project meetings will be held to facilitate the progress of the objectives of the project.

Insurance

Certificate of Liability Insurance form; (refer to Appendix F).


STORMWTAER INVESTIGATION AREA
AREA ANALIZED WITH 2022 GRANT FUNDING
HAPPY HARRY'S
TOWNSEND MUNICIPAL BUILDING
LEGEND
PROJECT LIMITS
TOWN OF TOWNSEND PROJECT LIMIT MAP
THE TOWN OF TOWNSEND
NEW CASTLE COUNTY, DELAWARE
SCALE: 1" = 300'
REVISED MARCH 2006
COMPILED AND DRAWN BY
Remington,Vernick & Beach Engineers
University Office Plaza, Bellevue Building
262 Chapman Road, Suite 105, Newark, Delaware 19702
PRINTED BY
THE TOWN OF TOWNSEND
INFORMATION TAKEN FROM THE TOWN OF TOWNSEND AND THE NEW CASTLE COUNTY MAPPING DATA BASE

Appendix B

Cost Estimates to Repair/Reline and Televising/Cleaning Existing Pipe in Townsend Station

Appendix C

Town of Townsend 2020 Comprehensive Plan

Appendix D

Town of Townsend Stormwater Management Study

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(609) 298-8257 (fax)

February 22, 2010

Town of Townsend
661 South Street
P.O. Box 223
Townsend, DE 19734

Attn: Mayor David Raughley
Town of Townsend Council Members

Re: Town of Townsend
Stormwater Management Study
Our File # DNTET053

Dear Mayor Raughley:

This letter report presents our findings of the stormwater management study we conducted for the Town of Townsend in 2009. As you know, effective stormwater management can alleviate the potential for flooding in developed areas and consequential property damage and/or loss. Working with Mike Jester, we evaluated and inspected areas of known potential risk and/or past flooding, had the areas surveyed, and created a map of the Town's existing stormwater management features to help identify broader trouble spots. The survey work included locating storm inlets, culverts, pipes (location, size and inverts), and obvious eroded or flooded channels/areas. The main problem areas were identified as follows:

- Cannery Avenue
- Rear yards of Commerce Street, east of the railroad tracks.
- The Wiggins Mill Road Bridge culvert and tributary that receives the bulk of Town drainage.

Problem Areas

1. Cannery Avenue

Cannery Avenue is extremely flat. Stormwater drainage in this part of Town generally flows to the south toward a drainage swale on property owned by the Railroad. A stormwater basin also exists at the end of Cannery Avenue (east side). A series of storm pipes convey water under the road and driveways in this area. Although some of the storm pipes along Cannery Avenue are improperly pitched, improvements aren't recommended for this part of Town as the overall conditions aren't likely to change. Resources would be better utilized elsewhere.

Rear yards of Commerce Street, east of the railroad tracks

Flooding in the rear yards of Commerce Street is reportedly a common occurrence. Stormwater inlets exist in the backyards; however, the top of the inlet grate is too high to allow for positive drainage. The associated storm piping conveys storm water underneath the tracks toward the Peavey Grain Company property. It is recommended that the grates be adjusted in this area and a swale cut to create positive drainage toward the inlets to alleviate the flooding and standing water. A localized topographic survey should be performed to determine the correct inlet elevation and swale grading/contours.

Budgetary Cost Estimate for Engineering/Survey and Construction to cut in swale and reset storm water inlets: $15,000.

3. The Wiggins Mill Road Bridge Culvert

The existing storm water system for the old part of Town outfalls north of Gray Street to a stream system of open ditches. Stormwater from Town is discharged through a 21-inch diameter reinforced concrete pipe, serving as the origin of the stream. This pipe is usually standing two-thirds full of water. The stream flows west-northwest under the railroad tracks and Wiggins Mill Road and ultimately outlets to Wiggins Mill Pond on the northern edge of Town. In addition, it is most likely fed with shallow groundwater at least seasonally as well. This crucial drainage feature needs improvement. It is overgrown with trees and vegetation, overly silted in some locations, and has severe scour in other areas all of which are contributing to improper drainage and temporary flooding during rain events. We recommend that the Town focus its resources on improving this stream system. The area needing improvement covers approximately one acre (1,700 linear feet by 25' wide) of forested property, all of which is owned by private entities. As such, easements and/or access agreements will be required prior to performing any work. In addition, an erosion and sediment control permit and wetlands disturbance permit will most likely be required.

Furthermore, DNREC performed a study of the Appoquinimink River Watershed and noted that the Wiggins Mill box culvert is considered an "Obstruction" because it was determined that it is only able to pass a five year storm.

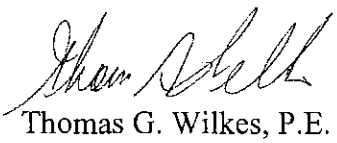
Budgetary Cost Estimate to clear obstructions, restore stream capacity, and armor eroded embankments (if necessary) including engineering design plans and bid document preparation: $100,000.

Recommendations

We recommend the Town include funding for items #2 and #3 above in next year's budget, if feasible. In the meantime, we recommend meeting with you to discuss available funding, possible grant opportunities, and other sources of financing for this project. We can identify which funding opportunities are applicable to this type of work and the application requirements and deadlines. A separate meeting or work shop would be worthwhile.

Should you have any questions please feel free to contact me at (302) 266-0212, extension 2020.

Very truly yours,
Remington, Vernick & Beach Engineers



Thomas G. Wilkes, P.E.

cc: Thomas F. Beach, P.E.
Christopher J. Fazio, P.E.

Appendix D.1

Town of Townsend Stormwater Management Study Update Memorandum

REMINGTON & VERNICK ENGINEERS

University Office Plaza, Bellevue Building
262 Chapman Road, Suite 105
Newark, DE 19702
O: (302) 266-0212
F: (302) 266-6208

To: Mayor Rudy Sutton and Town Council

From: June Andres

Date: March 9, 2018

Re: Townsend Stormwater Management Study Update

Purpose

The purpose of this memorandum is to update the 2010 Stormwater Management Study conducted by RVE for the Town of Townsend.

Background

During the February 21, 2018 Town Council Meeting, Councilman Jermaine Hatton gave an update on his recent attendance at a conference for municipalities. During the conference, Councilman Hatton mentioned that he came across a funding program designed primarily to address stormwater and drainage issues in small municipalities like the Town of Townsend. A discussion ensued between members of Town Council regarding what areas within the town are having drainage issues that can be potentially addressed by this funding program. Councilman Hatton mentioned that RVE conducted a stormwater management study back in 2010 and requested RVE to revisit and update the costs associated in implementing the findings of the study.

2010 Stormwater Management Study

As stated previously, RVE conducted a stormwater management study for the Town of Townsend in 2010. In a letter addressed to then Mayor David Raughley dated February 22, 2010, RVE identified the three (3) areas within the town where drainage issues have been identified. The study included limited survey work to ascertain the location of storm inlets, pipes, culverts, and obvious erosion or evidence of flooding. In addition, the report included the possible remedial action to address the issues and approximate associated costs for engineering design and construction.

Cannery Avenue – As stated in the 2010 report, due to the extremely flat profile of Cannery Avenue, it is unlikely that any improvement within the existing drainage infrastructure will address the drainage issue. In order to properly address the drainage issues, remedial work will have to extend far beyond the limits of Cannery Avenue and the costs can be extremely high. RVE therefore does not recommend that the observed drainage issues on Cannery Avenue be addressed at this time.

Rear Yards of Commerce Street, East of the Railroad Tracks- Flooding in the rear yards of Commerce Street is reportedly a common occurrence despite the presence of inlets in the backyards. Based on RVE's observation, the flooding can be alleviated by resetting the inlet grates to promote positive drainage into the inlets. In addition to resetting the inlet grates, a swale should be constructed to intercept surface runoff for conveyance towards the inlets. A localized topographic survey should be performed to determine the existing grades to properly design the swale and top of inlet grates.

The Wiggins Mill Road Bridge Culvert - The existing storm water system for the old part of Town outfalls north of Gray Street to a stream system of open ditches. Stormwater from the town discharges through a 21-inch diameter reinforced concrete pipe, serving as the origin of the stream. This pipe is usually standing two-thirds full of water. The stream flows west-northwest under the railroad tracks and Wiggins Mill Road and ultimately outlets to Wiggins Mill Pond on the northern edge of Town. In addition, it

is most likely fed with shallow groundwater at least seasonally as well. This crucial drainage feature needs improvement. It is overgrown with trees and vegetation, overly silted in some locations, and has severe scour in other areas all of which are contributing to improper drainage and temporary flooding during rain events. We recommend that the Town focus its resources on improving this stream system. The area needing improvement covers approximately one acre (1,700 linear feet by 25' wide) of forested property, all of which is owned by private entities. As such, easements and/or access agreements will be required prior to performing any work. In addition, an erosion and sediment control permit and wetlands disturbance permit will most likely be required.

Implementation Costs Update

As stated previously, the 2010 report included the approximate costs associated to implement the remedial actions for 2 out of the 3 areas identified within the town having drainage issues. Adjusting for inflation and based on what RVE has observed as far as bids received for recent projects of similar scope and nature, the following updates are presented:

AREA	Remedial Action	2010 Cost Estimate *	2018 Cost Estimate *	% Increase
Rear Yards of Commerce Street, East of the Railroad Tracks	Reset top of inlet grates and construct swale to intercept surface runoff for conveyance towards inlets.	$15,000	$20,000	30%
The Wiggins Mill Road Bridge Culvert	Extensive clearing of overgrown trees and vegetation, removal of debris and heavy siltation. This will include installation of soil stabilization measures to prevent erosion.	$100,000	$125,000	25%

* - Includes both soft (surveying/engineering/construction inspection) and hard (construction) costs. Excludes permit fees and potential easement and/or agreement acquisition from private entities that may become necessary to perform the remedial work.

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Appendix E

Town of Townsend Fiscal Year 2025 Budget

Appendix F

Certificate of Liability Insurance Form