JAMES J. HAHN ENGINEERING, P.C.

Putnam Business Park
1689 Route 22
Brewster, NY 10509

Tel: 845-279-2220
Fax: 845-279-8909
jhahn@hahn-eng.com

MEMORANDUM

To : Greg Nilsson
Superintendent of Public Works
Village of Irvington

From : Douglas Hahn, P.E.
Project Engineer

Dated : January 14, 2015

Subject : Capital Drainage Improvement Projects

As requested, we are providing a list of the drainage projects discussed with you that the Department of Public Works (DPW) would like to address. The projects range from minor projects, that Village personnel may be able to construct, to larger projects that may require obtaining a bond and an outside contractor.

Each project has been given a Drainage Project Number (DP#), name, and location. The existing and proposed conditions have been described along with a preliminary estimate for budget purposes. While the projects are site specific, the estimates are conceptual and based on our discussions. Following the list of projects are our recommendations for phasing and sequencing the projects.

If you would like to clarify any of the items or add to the list, please do not hesitate to contact me at your earliest convenience.

The following projects, DP#01 to DP#08, are the projects we discussed that are within the scope of work that the Village DPW would perform. Based on our discussions, we concur that performing the work with the Village work force and in-house contractor would greatly reduce the cost of the projects.

DP#01

West Sunnyside Lane Drainage Improvements

Location:

The project is located on West Sunnyside Lane between Fargo Lane and North Broadway.

Existing Condition(s):

Water channels on the south side of the roadway, overtops the existing curb, and erodes the soil in the right-of-way. The existing curb has lost its 6 or 8 inch reveal over the years from paving, and is easily overtopped.

Proposed Condition(s):

Remove and replace the existing curb along the entire south side of the roadway. As described to us, the existing curb is "L" shaped in a section view, which will require additional excavation to remove and some additional backfill to replace. Catch basins and drainage pipes are proposed to convey stormwater into the Sunnyside Brook.

A portion of the project is located in the Village of Tarrytown; therefore, approval from Tarrytown may be required.

The cost for five (5) drainage structures, 350 feet pipe, and four (4) outlets, and approximately 1,600 feet of curb is estimated at $145,000, which includes a 10 percent contingency.

DP#02

Hudson Road West Drainage Improvement Project Phase I

Location:

The project is located on Hudson Road West, from the Mercy College's walkway entrance to include the intersection of Cliffton Place.

Existing Condition(s):

The reveal on the existing curb at the south side of the roadway has been reduced from years of paving. Water flows over the curb and erodes the adjacent lawn area. The existing 8 inch corrugated metal pipe is corroding and has collapsed in two separate areas over the past few years. The drainage pipe leading to the railroad tracks is 12 inches.

Proposed Condition(s):

Install catch basins, 12 inch drainage pipe (HDPE), and concrete curbs. Mill and pave after completion of the drainage improvements. The total cost of drainage and curbs is $115,000. The total cost to mill and pave is $40,000, with a project total of $155,000. The total with a 20 percent contingency is approximately $185,000.

DP#03

Hudson Road West Drainage Improvement Project Phase II

Location:

The project is located on Hudson Road West, west of Cliffton Place to Handcock Place.

Existing Condition(s):

The reveal on the existing curb at the south side of the roadway has been reduced from years of paving. Water flows over the curb and erodes the adjacent lawn area. The existing 8 inch corrugated metal pipe is corroding and has collapsed in two separate areas over the past few years. In addition, water ponds at the south side of Hudson Road West, across from Handcock Place. The pipe from Handcock Place may be connected to a drywell, however the outlet is unknown at this time.

Proposed Condition(s):

Install catch basins, 12 inch drainage pipe (HDPE), and concrete curbs. Mill and pave after completion of the drainage improvements. The total cost of drainage and curbs is $85,000. The total cost to mill and pave is $20,000, with a project total of $105,000. The total with a 20 percent contingency is approximately $125,000. This project would be completed after DP#02.

DP#04

Park Avenue Drainage Replacement Project

Location:

The project is located within Park Avenue, with some work on Hudson Avenue.

Existing Condition(s):

Stormwater bypasses the existing basins and causes erosion and washout of the grassy area adjacent Hudson View Park. The existing corrugated pipe is corroded and deteriorating. The existing curbs are broken or do not have enough reveal to direct water into the catch basins. The roadway is cracked and has potholes.

Proposed Condition(s):

Replace existing curbs, drainage pipes, and catch basins along 1,100 feet of roadway. This includes adding additional drainage structures and pipe along Park Ave. New structures and pipe

are proposed to connect the existing structures to the Sunnyside Brook, which currently pass through a resident's property. Milling and paving should be completed after the work is completed which is described in DP#06.

The cost for drainage improvements and curb installation is approximately $100,000 and $75,000, respectively. Therefore the total estimated cost is $175,000, or $210,000 with a 20 percent contingency.

DP#05

Hudson Avenue Drainage Replacement Project

Location:

The project is located within Hudson Avenue.

Existing Condition(s):

The existing corrugated pipe is corroded and deteriorating. The existing curbs are broken or do not have enough reveal to direct water into the catch basins. The roadway is cracked and has potholes.

Proposed Condition(s):

Replace existing curbs, drainage pipes, and catch basins along 640 feet of roadway. This includes the existing drainage basins at the east side of Center Street. No flooding or catch basin surcharging is known, therefore no additional drainage has been added to the project, only replacement of the existing drainage. Milling and paving should be completed after the work is completed which is described in DP#06.

The cost for drainage improvements and curb installation is approximately $115,000 and $45,000, respectively. Therefore the total estimated cost is $160,000, or $190,000 with a 20 percent contingency.

The condition of the pipe that connects the road drainage to the Sunnyside Brook should be evaluated once uncovered. It may be necessary to replace this section of pipe, however that cannot be determined at this time.

DP#06

Park, Center, and Hudson Avenue Milling and Paving Project

Location:

The project is located within Park Avenue, Center Street, and Hudson Avenue.

Existing Condition(s):

The roadway, drainage, and curbs are deteriorating and in poor condition. Once the drainage and curbs are repaired, the roadway should be restored.

Proposed Condition(s):

Mill and pave for the entire roadway which is approximately 2,600 feet in length. The cost to mill and pave 1½ inches of asphalt is approximately $105,000, or $125,000 with a 20 percent contingency.

DP#07

Harriman Road Drainage Project

Location:

The project is located along Harriman Road and Meadoway.

Existing Condition(s):

Sections of the stream throughout these areas are narrow, shallow and unable to convey flow for the smaller storm events. The channel from the north end of Dunham Place has 2 back-pitched pipes and minimal slope. A 36 inch Corrugated Metal Pipe directs the stream down Meadow Way, and across Harriman Road, where it runs through a resident's yard and across Park Road. The control structure does not function adequately and flooding occurs in this area. The culvert under Harriman Road has less than 2 percent slope (based on FEMA Flood Study) and sediment has deposited at the outlet. The channel through the residential property is undersized and has low spots adding to sediment deposition.

Proposed Condition(s):

The anticipated cost of construction, based on a preliminary estimate from the 2010 Flood Study, is $1,500,000. Due to the limited amount of known information and extensive amount of construction work, it is necessary to obtain an underground survey (and cleaning out of the structures) and a topographical survey.

Since the existing brook is undersized and on private property, drainage pipe is proposed to convey stormwater under Meadow Way and Harriman Road. To maintain flow in the brook, two control structures will be required.

Therefore we recommend this project be completed in phases described below:

I. Investigation and mapping
II. Design
III. Construction

Phase I would require an underground surveying company and land surveyor. The anticipated cost of this work is between $15,000 and $25,000. The work may vary based on the underground data obtained. It would also require coordination between the two surveying companies.

Phase II would also depend on the surveyed information, however it is anticipated that it would cost between $15,000 and $25,000. This cost would depend whether the project needs to be bid or could be completed by the Village work force. We believe the Village could complete this project if done in phases.

Phase III would be re-evaluated once a design is complete.

DP#08

Meadow Way Drainage Pipe Replacement Project

Location:

The project is located on Meadow Way,

Existing Condition(s):

The existing pipe is believed to be 36 inches in diameter, made of corrugated metal, and installed in the late 1970's, or early 1980's. The lifespan of corrugated metal pipe may range from 20 to 40 years. Based on other corrugated pipe in this area, we anticipate the pipe will need to be replaced. This should be evaluated subsequent to the investigation of DP#07.

Proposed Condition(s):

We anticipate the pipe system will need to be replaced along the entire length of Meadow Way. Catch basins are not all exposed, so they may need to be installed/replaced. If the catch basins ae in good condition they may be raised to meet the surrounding grade, which would reduce costs. The work includes the replacement of 700 feet of 36 inch pipe with plastic pipe (HDPE), 7 catch

basins, asphalt and restorations. The pipe capacity should be verified, however no flooding due to capacity is known at this time. The approximate cost of work is $175,000.00, which includes a 20 percent contingency.

The following projects, DP#09 to DP#12, are the projects we discussed that are large and not within the scope of work that the Village DPW would perform.

DP#09

South Buckout Cleanout

Location:

The project is located within the Barney Brook, to the east of South Buckout Street.

Existing Condition(s):

Sediment and debris accumulate at the existing bar screen located directly upstream of South Buckout Street. If the bar screen is not cleaned regularly, the debris overtops the bar screen and can clog the culvert entrance or within the culvert, which can lead to overtopping of the South Buckout Street. As we have been informed, this condition has happened in the past, and the water flooded the Highway Garage. The Village DPW cleans the bar screen frequently and before large storms, however large storms have been known to carry enough debris to clog and overtop the bar screen.

The bar screen is located in a difficult and potentially dangerous section of the Barney Brook to clean out. The side slopes of the brook are steep and the bar screen is approximately 15 feet from the surrounding banks. Access to the bar screen by foot is inefficient, and multiple machines are needed to clean the bar screen.

Proposed Condition(s):

The proposed improvements include a large sump and bar screen, located approximately 250 to 350 feet upstream of the existing bar screen. The sump and bar screen should be constructed below the existing bottom of the channel so prevent a reduction of the channel capacity. The location of the new bar screen will allow maintenance access for small machines. The goal is to remove large debris from the brook, at a location where access is more manageable with equipment.

The "clean out" must be designed for ease of maintenance access. Therefore, the make and model of equipment that will be used should be known before the design is completed.

The proposed improvements will not eliminate all of the debris from the existing bar screen, however it should reduce the frequency of required maintenance. The slope east of the brook, between the existing and proposed bar screens, is very steep with woods and may add to the debris that clogs the bar screen. Therefore if the project is constructed, it may be necessary to install a fence or barrier along the edge of the eastern side of the brook to collect debris prior to entering the brook.

The estimated cost of the project is $215,000. The cost may be less upon determination of grades and the size of the required structure.

DP#10

Station Road Culvert

Location:

The project is located along the Barney Brook and Station Road, approximately 1,700 feet east of the intersection of Station Road and Woodbine Road.

Existing Condition(s):

The upstream end of the existing culvert is a 4 foot diameter culvert which transitions beneath Station Road to a 5' deep by 10' wide rectangular culvert. The existing culvert does not have adequate capacity during storms causing the water to rise and flood Station Road and the Private Road, known as Brook Place, before it re-enters the Barney Brook.

Proposed Condition(s):

The proposed culvert is 5 ft deep by 10 ft wide, and includes headwalls, wingwalls, and footing blocks. The total estimated cost is about $240,000, which includes the items listed above and also includes rip-rap, demolition and removal, grading, utility relocation, and drainage facilities.

DP#11

Hudson View Park Culvert Replacement Project

Location:

The project is located at the intersection of East Sunnyside Lane and Hudson View Park. The existing culvert runs perpendicular beneath Hudson View Park and travels through three residential properties. The culvert is located in the Sunnyside Brook.

Existing Condition(s):

The existing culvert is undersized and cannot carry the existing flows of the Sunnyside Brook. The undersized culvert causes a backwater effect and the brook overtops the roadway. The stormwater then flows into Sunnyside Lane and eventually discharges back into the Sunnyside Brook.

Proposed Condition(s):

The proposed work includes replacing the two existing 24 inch pipes with a box culvert. The culverts beneath the two residential driveways will also need to be replaced. Easements will be required for work through the residential lots. This project is estimated to cost $350,000.

Before any design, we recommend test pits be performed to verify depths of the utilities beneath the roadway.

DP#12

Irvington Reservoir Outlet Restoration Project

Location:

The project is located at the north side of the Irvington Reservoir, along Fieldpoint Drive.

Existing Condition(s):

The existing reservoir outlet shows signs of settlement and erosion. In addition, the outlet is weathered and in need of some maintenance. The outlet does not appear to be in need of immediate repair.

Proposed Condition(s):

Reconstruct approximately 30 feet of the dam bank. Regrout and reface areas at the outlet. The estimated cost for this rehab work is $35,000.

Phasing and Sequencing

The projects should be phased so the construction of the projects do not impact on another. In general drainage projects start from the low point and work upstream. The projects have been grouped below and placed in order of importance from top to bottom in each group. The projects in each group may impact each other. Work in different groups will not impact each other and therefore can start when funds are available.

Group	Project Number	Location	Work Force*	Estimated Cost
1	DP#01	West Sunnyside Lane	Village	$145,000
	DP#11	Hudson View Park	Bid	$350,000
	DP#04	Park Avenue**	Village	$210,000
	DP#05	Hudson Avenue**	Village	$190,000
	DP#06	Park, Center, and Hudson Avenue**	Village	$125,000
2	DP#02	Hudson Road West (Lower)	Village	$185,000
	DP#03	Hudson Road West (Upper)	Village	$125,000
3	DP#10	Station Road	Bid	$240,000
	DP#07	Harriman Road	Village	$50,000***
	DP#08	Meadow Way	Village	$175,000
4	DP#09	South Buckout	Bid	$250,000
5	DP#12	Reservoir Outlet	Bid	$35,000

* Estimated costs are based on outside contractors, not the Village work force. Therefore cost totals would be less if completed by the Village.

** This project may be able to be constructed prior to DP#11.

*** DP#7 estimated cost is for surveying, utility locations, analysis, and design. It does include construction which would be evaluated after the project has been designed.

Group 1 makes up the proposed improvements along Sunnyside Brook starting with West Sunnyside Lane, which can be completed when funds are available. The culvert beneath Hudson View Park (DP#11) should be completed before the projects upstream of DP#11. However, if funding is available for the projects upstream DP#11, the Village may consider completing these upstream projects.

Group 2 projects are located on Hudson Road West and can be completed as soon as funds are available.

Group 3 projects are located along the Barney Brook, starting with the Station Road culvert (DP#10) which can be started when funds are available. Upon the completion of DP#10, the drainage along Harriman Road (DP#7) and Meadow Way (DP#8) can be completed. The evaluation and design of DP#7 and DP#8 can be completed prior to the completion of the Station Road culvert.

Groups 4 and 5 can be completed when funding is available. These projects are not as critical as discussed.

Based on our discussions, phasing requirements, and logistics, we recommend the projects be constructed in the following sequence.

Rank Order	Project Number	Location	Work Force*	Estimated Cost
1	DP#01	West Sunnyside Lane	Village	$145,000
2	DP#02	Hudson Road West (Lower)	Village	$185,000
3	DP#03	Hudson Road West (Upper)	Village	$125,000
4	DP#10	Station Road	Bid	$240,000
5	DP#07	Harriman Road	Village	$50,000***
6	DP#08	Meadow Way	Village	$175,000
7	DP#11	Hudson View Park	Bid	$350,000
8	DP#04	Park Avenue**	Village	$210,000
9	DP#05	Hudson Avenue**	Village	$190,000
10	DP#06	Park, Center, and Hudson Avenue**	Village	$125,000
11	DP#12	Reservoir Outlet	Bid	$35,000
12	DP#09	South Buckout	Bid	$250,000

* Estimated costs are based on outside contractors, not the Village work force. Therefore cost totals would be less if completed by the Village.

** This project may be able to be constructed prior to DP#11.

*** DP#7 estimated cost is for surveying, utility locations, analysis, and design. It does include construction which would be evaluated after the project has been designed.

As previously mentioned, projects within different groups can start at any time. The order listed above should be evaluated periodically.

If you have any questions or concerns please do not hesitate to contact me at your earliest convenience.

DH:ay
P:\Village of Irvington\Highway Department\Capital Improvement Projects\Project list 2015-01-06.docx