
Village Board of Trustees Work Session Agenda

July 15, 2025
6:00 PM

Meeting Information

A Work Session of the Scarsdale Village Board of Trustees is scheduled for 6:00 PM on Tuesday, July 15, 2025. The meeting will be held in the 3rd Floor Meeting Room in Village Hall. Members of the public wishing to attend the meeting remotely can do so via online link at https://zoom.us/j/93183703358, or call into the meeting using 1-929-436-2866 and entering the Meeting ID 931 8370 3358.*

Agenda

- Updates on various stormwater projects
- Discussion on sidewalks and pathways

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Date: Tuesday, July 15, 2025
Re: Updates on various stormwater projects

COVER PAGE
Village Manager's Office

ATTACHMENT(S):

- Mott MacDonald - Stormwater Presentation
- H2M - Stormwater Presentation
- 07.11.25 Memo from E. Giovanni Re Drainage Reports
- Villagewide Stormwater Studies Funding and Project Status Summary

MOTT MACDONALD

Village of Scarsdale Flood Mitigation Projects

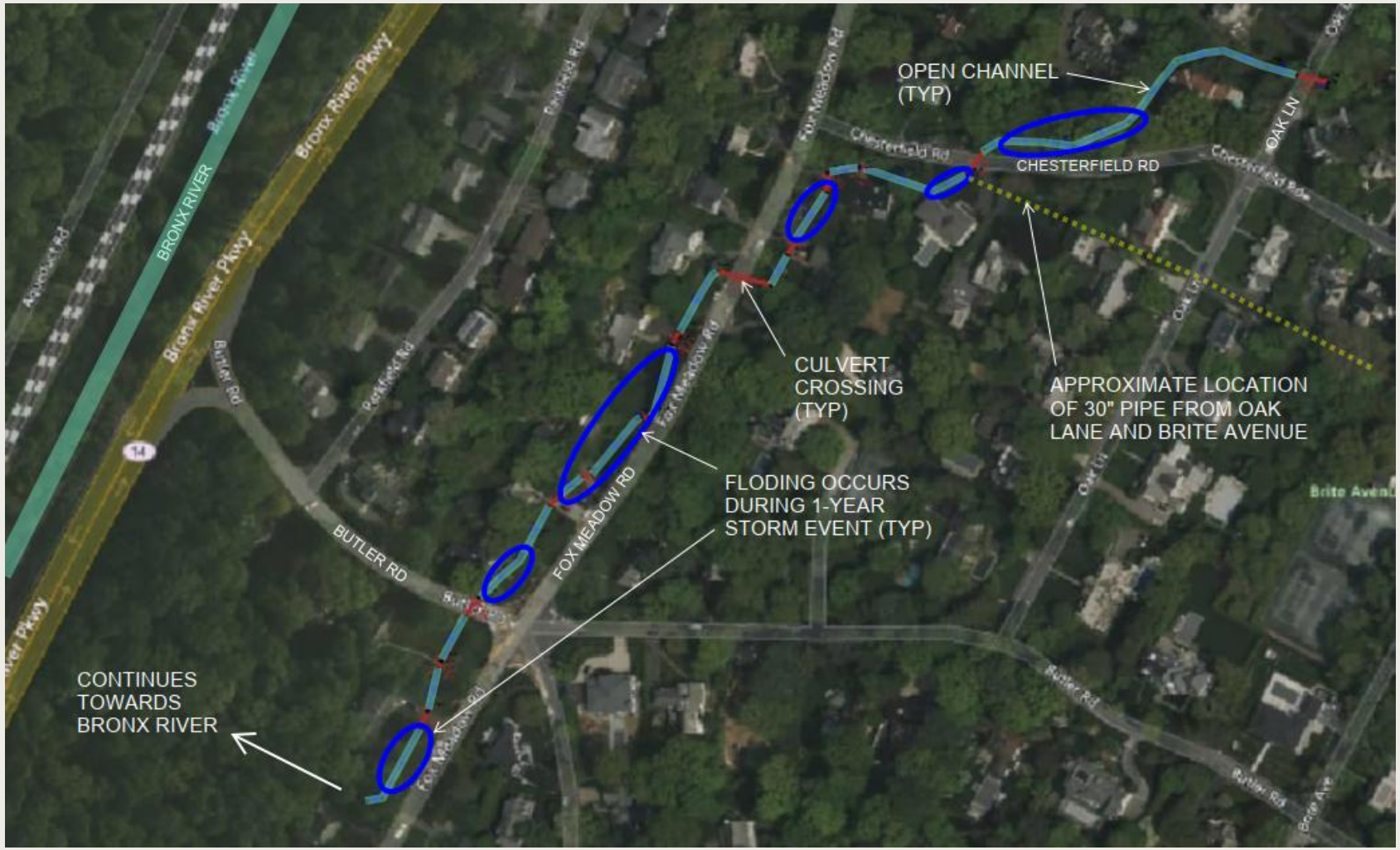
By: John Ruschke, PE

July 9, 2025

Brite Avenue/Fox Meadow Road Project Area

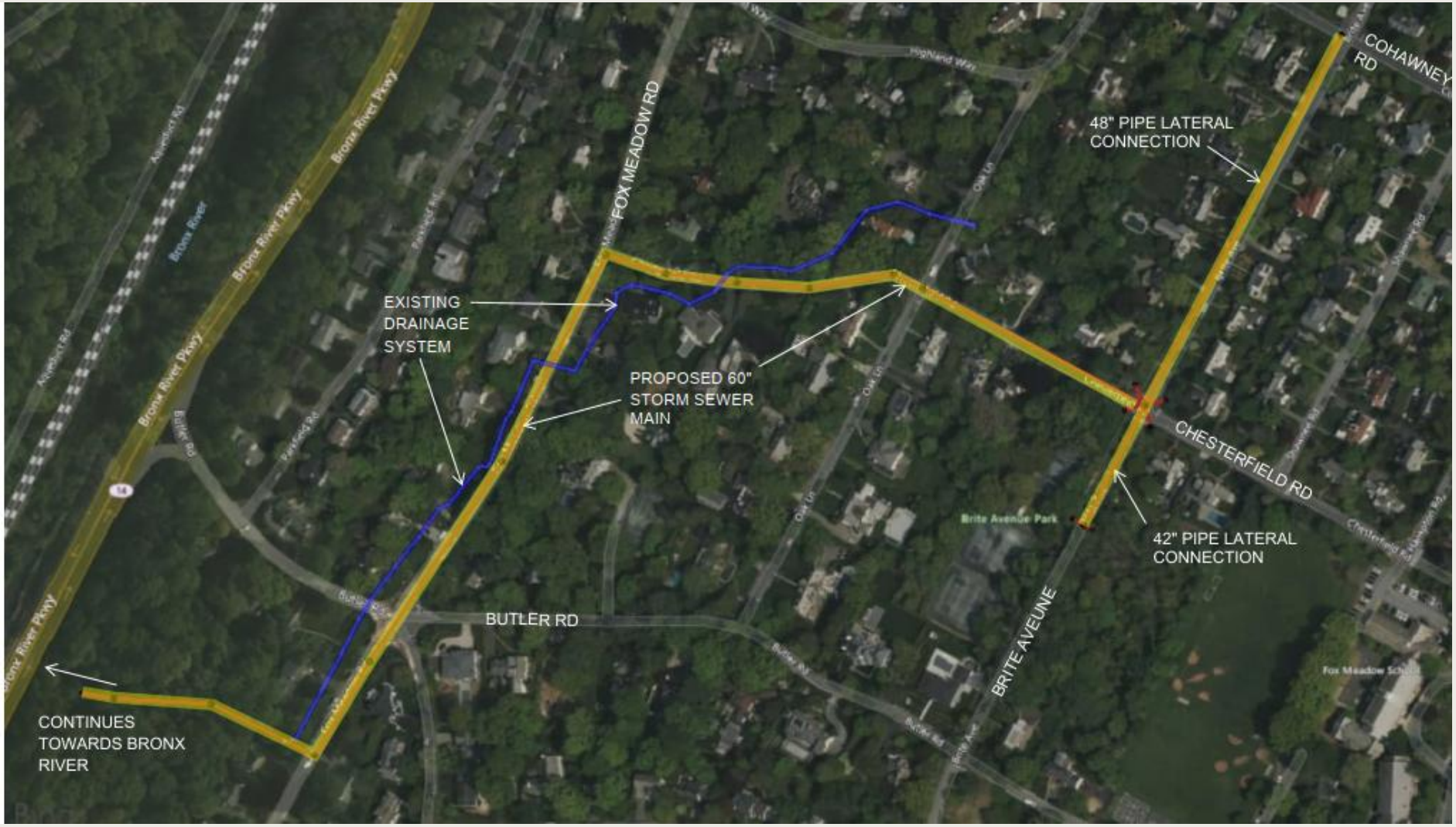
- Total drainage basin for the project site is approximately 155 acres.
- Existing drainage system has less than a 2-year storm capacity.

Brite Avenue/Fox Meadow Road Project Area



- Existing drainage system consists of a combination of open channel and culverts that meander through residential properties.
- Existing drainage system has less than a 2-year storm capacity with flooding occurring at several locations diring the 1-year storm event.
- Existing drainage system has less than a 2-year storm capacity.

Brite Avenue/Fox Meadow Road Project Area



Improvements:

- Construct new supplemental storm drainage system along Fox Meadow Road, Chesterfield Road and Brite Avenue.
- New drainage system will consist of pipes ranging in size from 42-inch to 60-inch diameter.
- New drainage system will have 100-year storm capacity.
- Existing open channel will remain active.

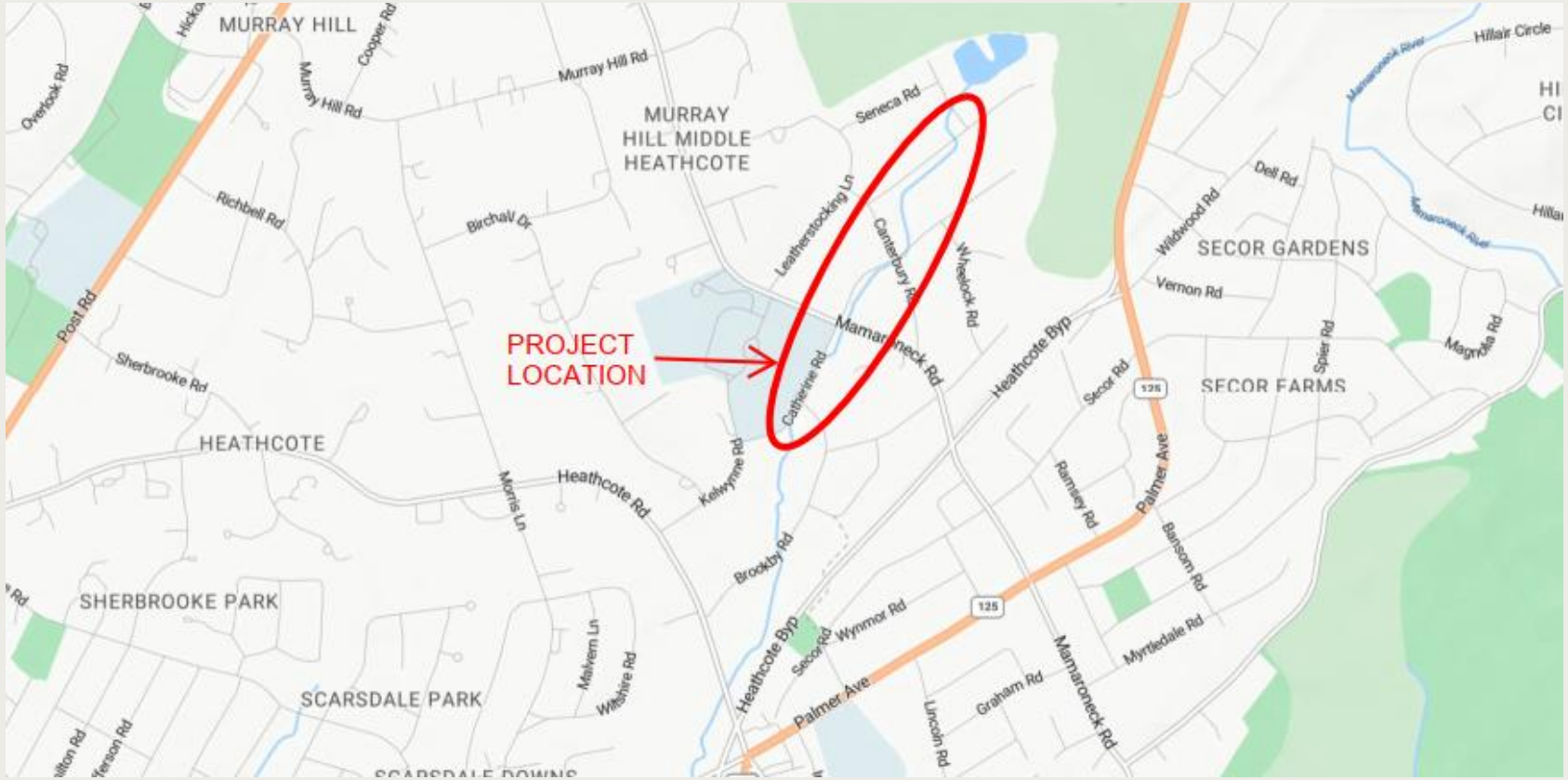
Brite Avenue/Fox Meadow Road Project Area

Positive Impacts	Negative Impacts
• **Provides flood protection to portions of Brite Avenue, Fox Meadow Road, and surrounding areas up to and including the 100-year storm.** • **Reduces the volume of water that discharges to the existing open channel within private properties.** • **The majority of the proposed improvements are within the right-a-way of Brite Avenue, Chesterfield Road and Fox Meadow Road.**	• Easements may be required for the last 500 feet of pipe downstream of Fox Meadow Road. • Some sections of the 60” main may require deep excavations for installation. Potential utility impacts. • Possible concerns associated with increased flow rates downstream to the Bronx River. • Backflow Preventor required on portion of Brite Avenue (near Tennis Courts). Reduced capacity to 25-year storm.

Approximate Cost Estimate: $2,600,000

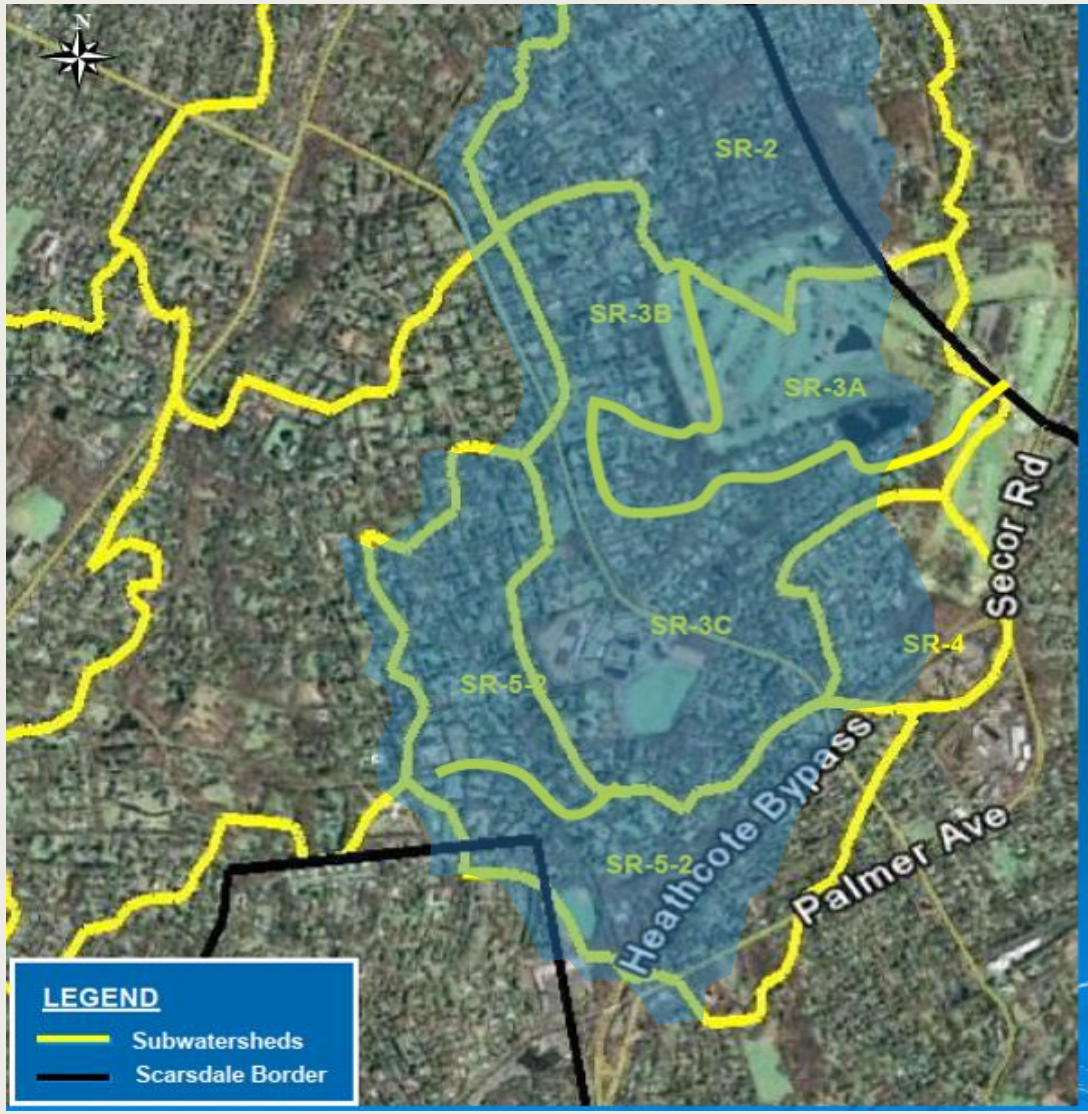
Benefit Cost Ratio: BCR of 1.1

Sheldrake River Flood Mitigation Project



Mitigation Area: Oneida Road to Middle School/Catherine Road

Sheldrake River Drainage Area



Watershed Metrics

SR- 2 – 199 acre watershed

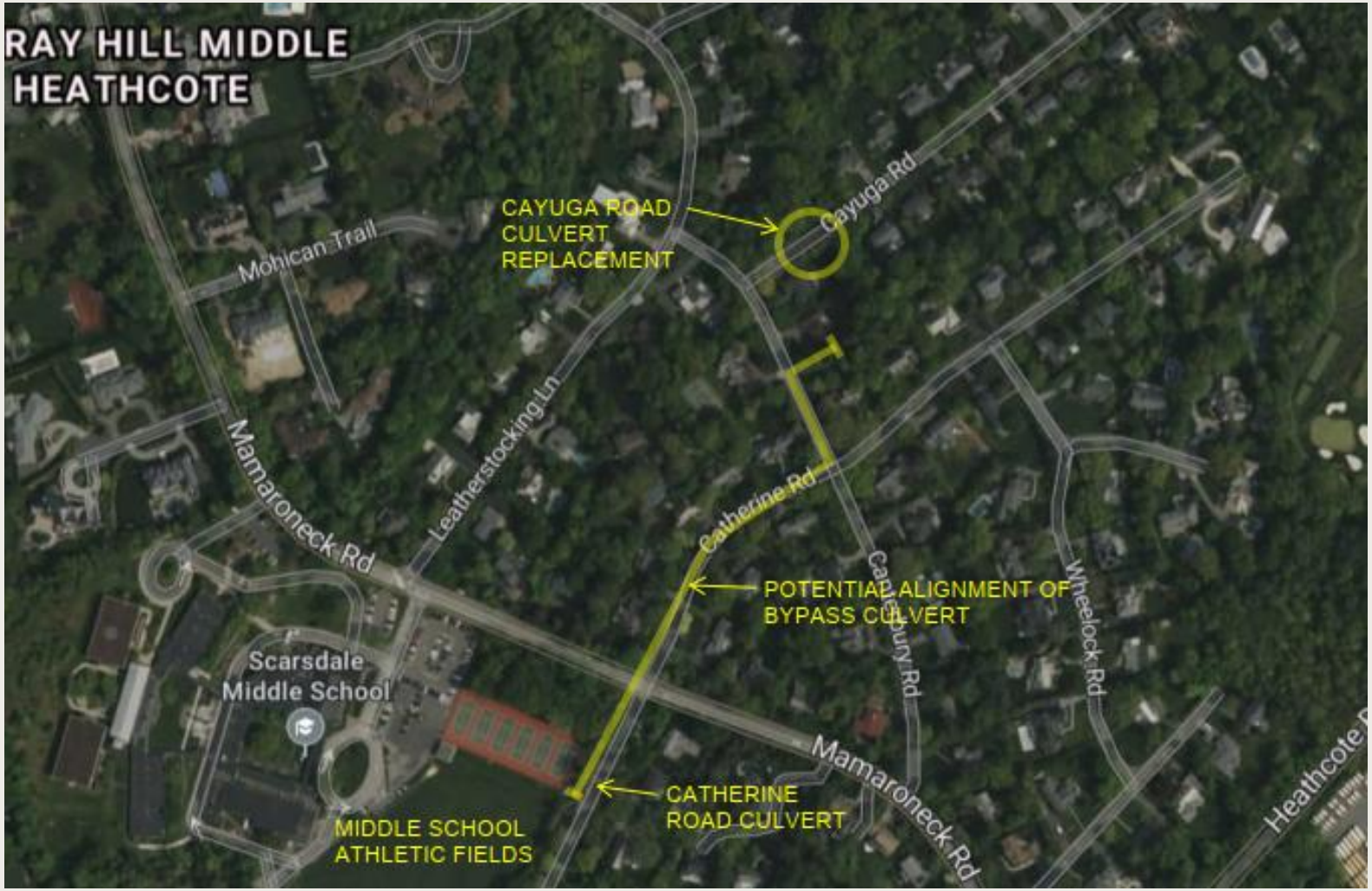
SR-3 – 271 acre watershed

SR-4 – 50 acre watershed

SR-5 – 173 acre watershed

Total - about 700 acres

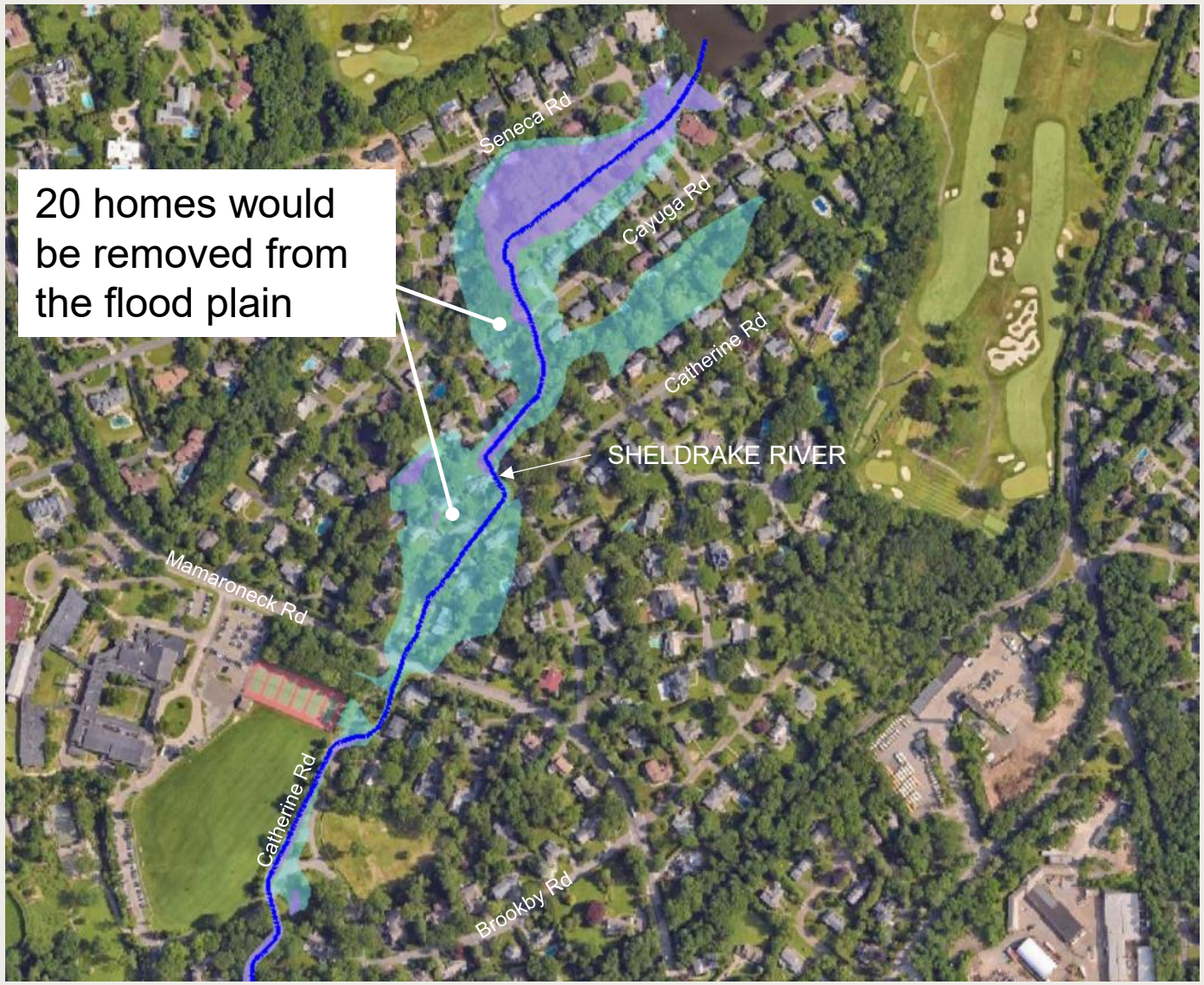
Sheldrake River Flood Mitigation Project



Proposed Improvements:

- Catherine Road Culvert Replacement: Replacement of the two Catherine Road culverts adjacent to the Scarsdale Middle School athletic fields.
- Cayuga Road Culvert Replacement: Enlarge Cayuga Road culvert to increase flow capacity.
- Bypass Culvert: Installation of approximately 1,400 feet of 10’x 4’ box culvert to bypass flows from Cayuga Road area downstream to the Scarsdale Middle School athletic fields area.
- Middle School Detention Facility: Large underground detention structure below athletic field. Diversion structure in channel to control flow into detention structure and pumps required to regulate flow from detention structure.

Sheldrake River - Bypass Culvert and Cayuga Road Culvert



Storm Event	Existing Conditions WSEL (ft)	Proposed Improvements WSEL (ft)	Diff (ft)
Oneida Road			
100-Year	241.08	240.92	-0.16
Cayuga Road			
100-Year	240.9	238.37	-2.53
Canterbury Road			
100-Year	240.83	237.54	-3.29
Catherine Road			
100-Year	240	236.41	-3.59
Mamaroneck Road			
100-Year	239.95	234.06	-5.89
Catherine Road			
100-Year	234.54	232.74	-1.8
Catherine Road			
100-Year	231.86	230.78	-1.08

- Similar benefits for all storm events

Existing 100-Year Flood

Proposed 100-Year Flood

Questions?

MOTT MACDONALD

Thank you

George Field Park/Rugby Road - Background

A Village-wide flood study from May 2022, highlighted flood-prone areas, including the **George Field Park bio-retention pond and downstream drainage infrastructure** on Rugby Lane and Cambridge Road.

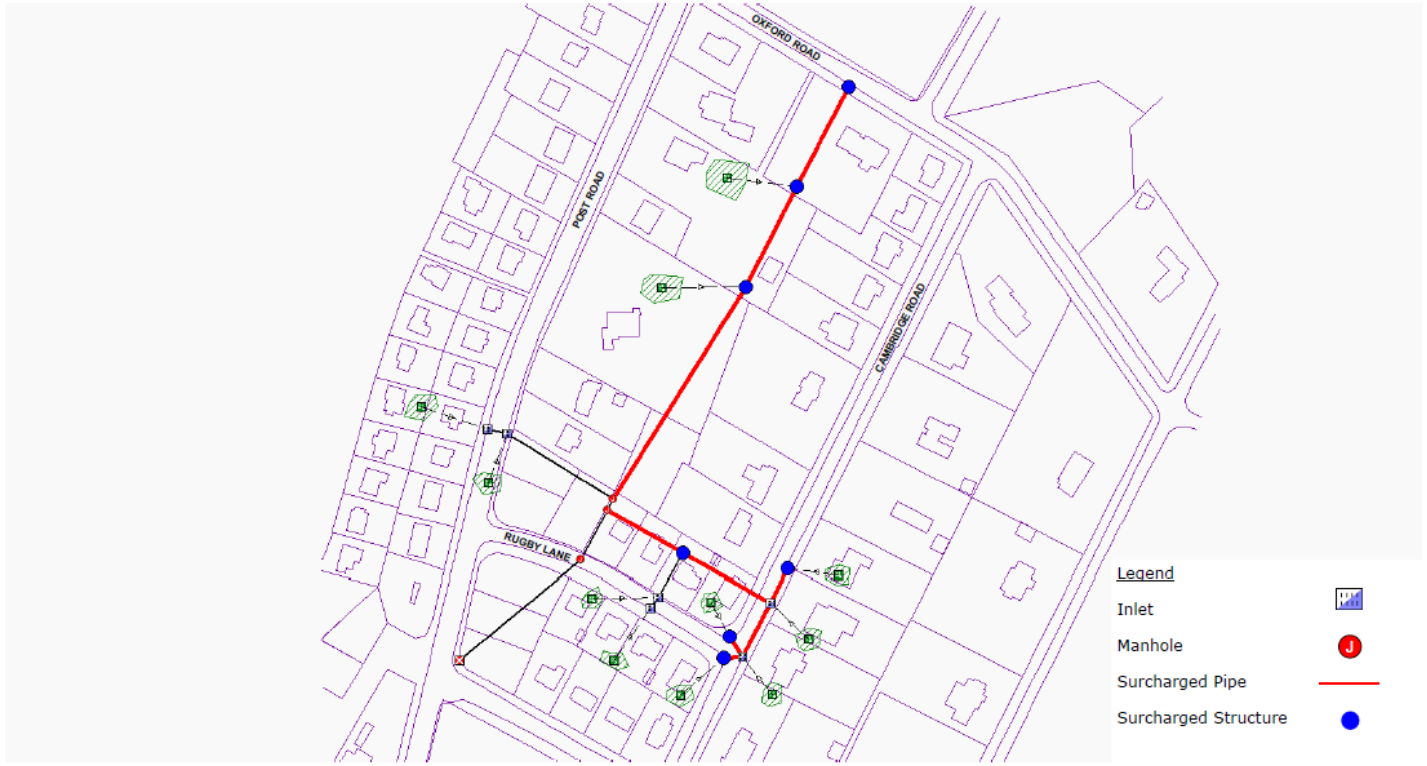
Benefit Cost Analysis (BCA)

Federal Emergency Management Agency (FEMA), BCA is a method that determines the future risk reduction benefits of a hazard mitigation project and compares those benefits to its costs.

The BCA was based on data the village was able to collect from previous storm events. This included village direct costs such as storm and sanitary sewer heavy cleaning, system backups, roadway cleanings, repairs and information received from private property owners' damages.

10 YEAR Storm Plan Plot
Cambridge Rd, Rugby Lane, Post Rd & Oxford Rd

10 Year Storm Plan Plot
Cambridge Road, Rugby Lane, Post Road & Oxford Road



Autodesk Storm and Sanitary Analysis

EXISTING CONDITION

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George Field Park /Rugby Road – Proposed Downstream Piping Improvements

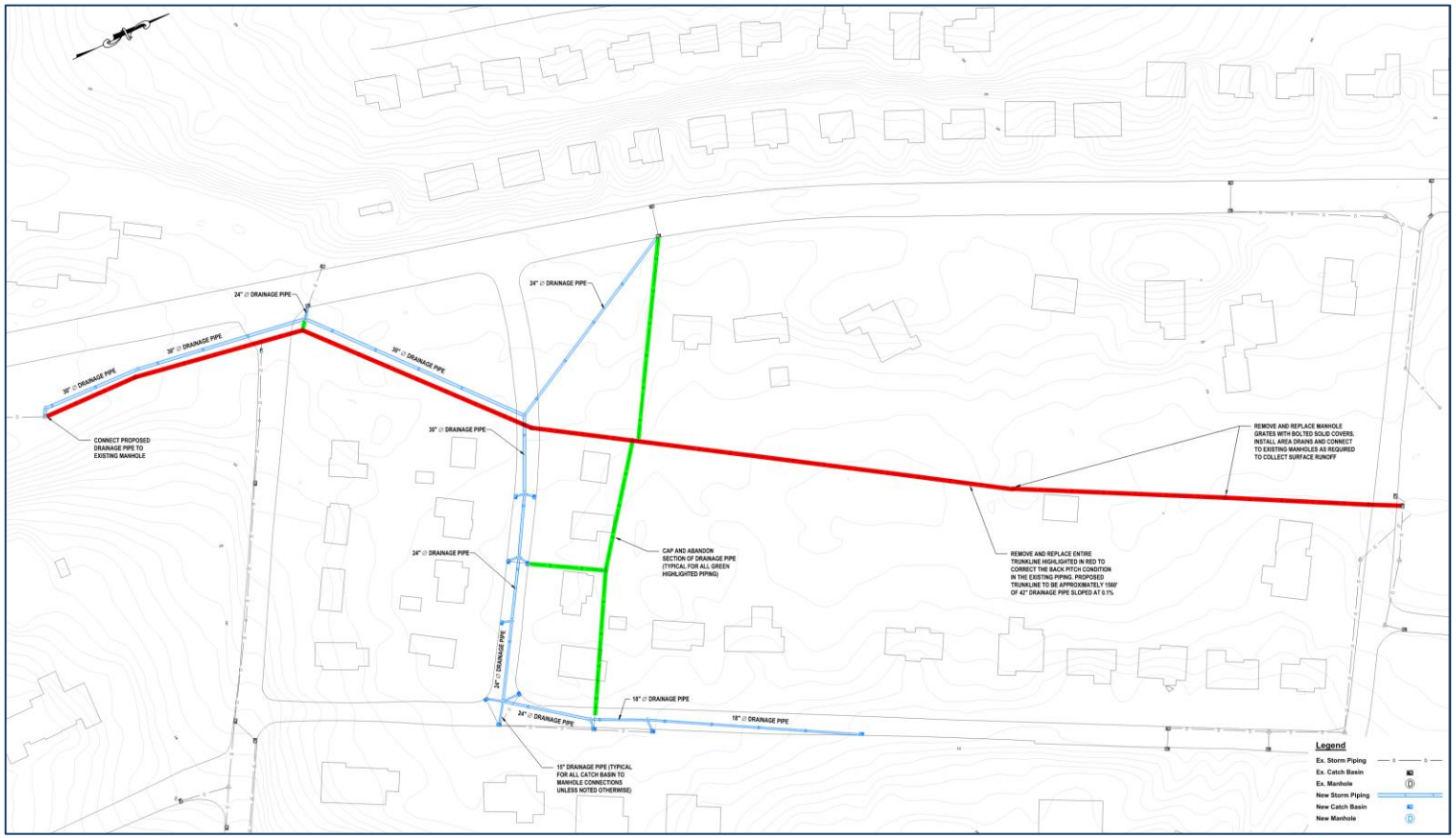
Opinion of Probable Cost: $2,251,600

Proposed Improvements:

- Cap and abandon sections of existing piping. (highlighted in green)
- Install 1,645’ of piping, 10 manholes, and 4 catch basins. (highlighted in blue)
- Routes highlighted in green and blue will be rerouted to Cooper Green.
- Remove and replace catch basins and trunkline between George Field Park and Cooper Green. (highlighted in red)

Impact:

- **Decrease runoff** entering the trunkline between George Field Park and Cooper Green.
- Significantly **reduces** flooding frequency and severity during **10-year design storms.**
- Provides substantial **benefits for 25-year design storms.**



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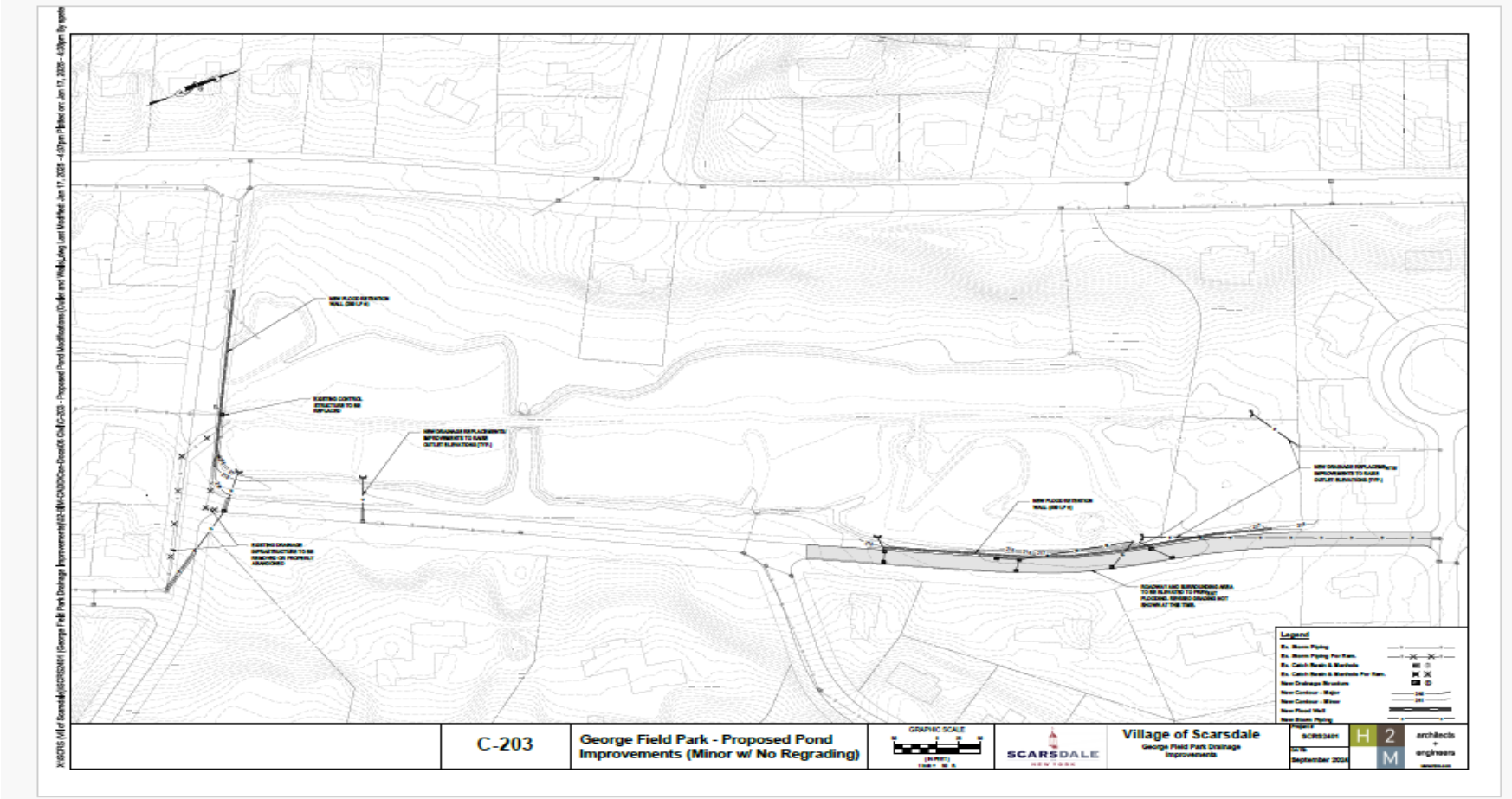
Calculations for BCA Calculator-Piping Improvements

CALCULATIONS FOR BCA CALCULATOR - Piping Improvements						
Improvement Item Description	**Unit**	**Quantity**		**Unit Price**		**Total**
Annual Maintenance - Inspect and Clean Drainage Structures	EA	21	$	18.00	$	378.00
Damages Before Mitigation - 100 year						
Property Damages - Hurrican Ida (2021) - 100 year	EA	33	$	100,000.00	$	3,300,000
DPW	/100 LF	550	$	15,000.00	$	82,500.00
Pavement and Drainage Repairs	/100 LF	3100	$	800.00	$	24,800.00
Police Cost	EA Location	4	$	3,100.00	$	12,400.00
Heavy Cleaning - Drainage	/750 LF	1400	$	4,500.00	$	8,400.00
				Total	$	3,428,100.00
Damages Before Mitigation - 10-year						
Property Damages from Major Rain Events - 10 year	EA	33	$	5,500.00	$	181,500
DPW	/100 LF	550	$	15,000.00	$	82,500.00
Pavement and Drainage Repairs	/100 LF	3100	$	800.00	$	24,800.00
Police Cost	EA Location	4	$	3,100.00	$	12,400.00
Heavy Cleaning - Drainage	/750 LF	1400	$	4,500.00	$	8,400.00
Sanitary Backups, Maintenance, and Repairs	LF	1500	$	3.50	$	5,250.00
				Total	$	314,850.00
Damages After Mitigation - Property, Roadway and Drainage (100-year)						
Property Damages	EA	16	$	75,000.00	$	1,200,000
DPW	/100 LF	750	$	15,000.00	$	112,500
Pavement and Drainage Repairs	/100 LF	3100	$	800.00	$	24,800
Police Cost	EA Location	4	$	3,100.00	$	12,400
Heavy Cleaning - Drainage	/750 LF	800	$	4,500.00	$	4,800.00
				Total	$	1,354,500.00
Damages After Mitigation - Property, Roadway and Drainage (10-year)						
Property Damages	EA	0	$	-	$	-
DPW	/100 LF	0	$	15,000.00	$	-
Pavement and Drainage Repairs	/100 LF	3100	$	800.00	$	24,800
Police Cost	EA Location	3	$	3,100.00	$	9,300
Heavy Cleaning - Drainage	/750 LF	390	$	4,500.00	$	2,340.00
Sanitary Backups, Maintenance, and Repairs	LF	350	$	3.50	$	1,225.00
				Total	$	37,665.00

George Field Park-Minor Pond Improvements w/ No Regrading

Minor Pond Improvements w/ No Regrading – George Field Park	
Opinion of Probable Cost: $1,924,600 (see Appendix E)	
Drainage Issue: Insufficient pond capacity and downstream conveyance, suboptimal outlet control structure design.	**Concept Drawing Location:** Appendix C, C-203
Proposed Improvements: - Install new outlet control structure to reduce discharge for small storm events and reduce risk of surcharge in downstream pipe network. - Elevate section of Greendale Road to prevent local flooding, increase pond detention elevation, and raise elevations of drainage outlets to prevent surcharge and drainage issues upgrade. - Install two new retaining walls (700 LF±) along southern and eastern portions of pond to prevent pond overtopping for up to 10-year storm event. **Flood Mitigation:** As discussed, the existing pond is not optimized to best store runoff for design storms and as modeled would overtop the roadway on Oxford Road prior to the 10-year storm event. The proposed improvements will allow for the storage of the 10-year storm without overtopping the roadway or needing to regrade the pond as indicated in the first alternative.	
Downstream Impact: The existing outlet control structure allowed for significant flows to continue downstream with little attenuation and storage within the pond. The proposed new outlet control structure would reduce smaller storm events and store more runoff volume within the pond which would alleviate some of the downstream pipe capacity issues the drainage system currently experiences. These improvements would lessen the chance of pipe surcharge.	

George Field Park- Proposed Pond Improvements (Minor w/ No Regrading)



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George Field Calculations for BCA Calculator- Piping & Minor Improvements (No Regrading)

CALCULATIONS FOR BCA CALCULATOR - Piping & Minor Pond Improvements (No Regrading)						
Improvement Item Description	**Unit**	**Quantity**		**Unit Price**		**Total**
Annual Maintenance - Inspect and Clean Drainage Structures	EA	36	$	18.00	$	648.00
Damages Before Mitigation - 100 year						
Property Damages - Hurrican Ida (2021) - 100 year	EA	36	$	100,000.00	$	3,600,000
DPW	/100 LF	4000	$	15,000.00	$	600,000.00
Pavement and Drainage Repairs	/100 LF	4000	$	800.00	$	32,000.00
Police Cost	EA Location	6	$	3,100.00	$	18,600.00
Heavy Cleaning - Drainage	/750 LF	1400	$	4,500.00	$	8,400.00
				Total	$	4,259,000.00
Damages Before Mitigation - 10-year						
Property Damages from Major Rain Events - 10 year	EA	33	$	4,000.00	$	132,000
DPW	/100 LF	4000	$	15,000.00	$	600,000.00
Pavement and Drainage Repairs	/100 LF	4000	$	800.00	$	32,000.00
Police Cost	EA Location	6	$	3,100.00	$	18,600.00
Heavy Cleaning - Drainage	/750 LF	1400	$	4,500.00	$	8,400.00
Sanitary Backups, Maintenance, and Repairs	LF	1750	$	3.50	$	6,125.00
				Total	$	797,125.00
Damages After Mitigation - Property, Roadway and Drainage (100-year)						
Property Damages	EA	19	$	60,000.00	$	1,140,000
DPW	/100 LF	4000	$	15,000.00	$	600,000
Pavement and Drainage Repairs	/100 LF	2200	$	800.00	$	17,600
Police Cost	EA Location	6	$	3,100.00	$	18,600
Heavy Cleaning - Drainage	/750 LF	1000	$	4,500.00	$	6,000.00
				Total	$	1,782,200.00
Damages After Mitigation - Property, Roadway and Drainage (10-year)						
Property Damages	EA	12	$	4,000.00	$	48,000
DPW	/100 LF	500	$	15,000.00	$	75,000
Pavement and Drainage Repairs	/100 LF	500	$	800.00	$	4,000
Police Cost	EA Location	3	$	3,100.00	$	9,300
Heavy Cleaning - Drainage	/750 LF	500	$	4,500.00	$	3,000.00
Sanitary Backups, Maintenance, and Repairs	LF	600	$	3.50	$	2,100.00
				Total	$	141,400.00

George Field Park

The BCA explored 3 alternatives based on the H/H analysis

- Proposed piping improvements
- Proposed minor pond improvements with no regrading
- Combination of piping improvements and minor pond improvements (w/ no regrading)

The other alternatives (minor improvements w/ regrading and major pond improvements) was not further explored as they resulted in additional cost with minimal additional benefits.

BCA is shown below:

Proposed Improvement Option	BCR
Piping Improvement	0.52
Minor Pond Improvements w/ no regrading	0.12
Combined Improvements	0.32

Cushman, Willow, and Sheldrake - Background

- A Village-wide flood study from May 2022, highlighted flood-prone areas, including Cushman Road, Garden Road, Willow Lane, and Sheldrake Road.
- The Village has historically received complaints from residents in these neighborhoods.
- Primary concerns involve drainage issues affecting both private properties and public areas.

Cushman, Willow, and Sheldrake – Projected Costs & BCA Based On 4 Alternatives

Projected costs an BCA was generated based on 4 alternatives. The existing drainage system does not have sufficient capacity to convey a 2 year storm event.

The alternatives are listed as:

Drainage Improvements Area 1- Cushman West
Drainage Improvements Area 2- Cushman North
Drainage Improvements Area 3- Cushman East/Immediate
Drainage Improvements Area 3- Cushman East/ Future

2 Year Storm Plan Plot
Cushman Rd, Garden Rd, Willow Lane & Sheldrake Rd.

Cushman, Willow, and Sheldrake – Drainage Area 1 (Cushman West)

Opinion of Probable Cost: $1,447,000

Proposed Improvements:

- Install approximately 2,040’ of new drainage infrastructure within Cushman Road.
- It is recommended that 7 existing structures should be removed and replaced with NYSDOT standard catch basins.
- Install an additional 8 catch basins within Cushman Road to assist in runoff capture.

Impact:

- Provide a higher level of collection and conveyance to reduce runoff bypassing the existing infrastructure.

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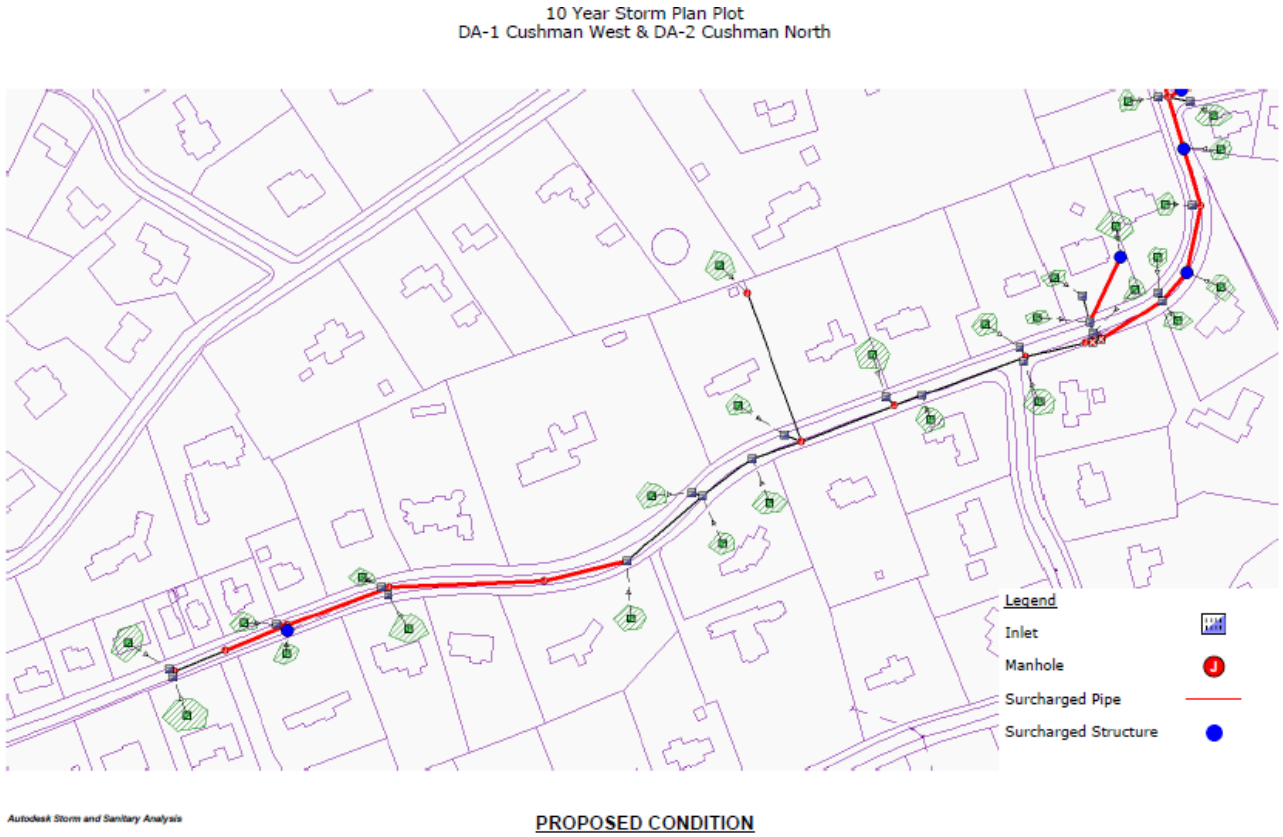
10 Year Storm Plan Plot
DA-1 Cushman Rd West & DA-2 Cushman North



25 Year Storm Plan Plot
DA-1 Cushman Rd West & DA-2 Cushman North

25 Year Storm Plan Plot
DA-1 Cushman West & DA-2 Cushman North

Autodesk Storm and Sanitary Analysis

PROPOSED CONDITION

Cushman, Willow, and Sheldrake – Drainage Area 2 (Cushman North)

Opinion of Probable Cost: $91,200

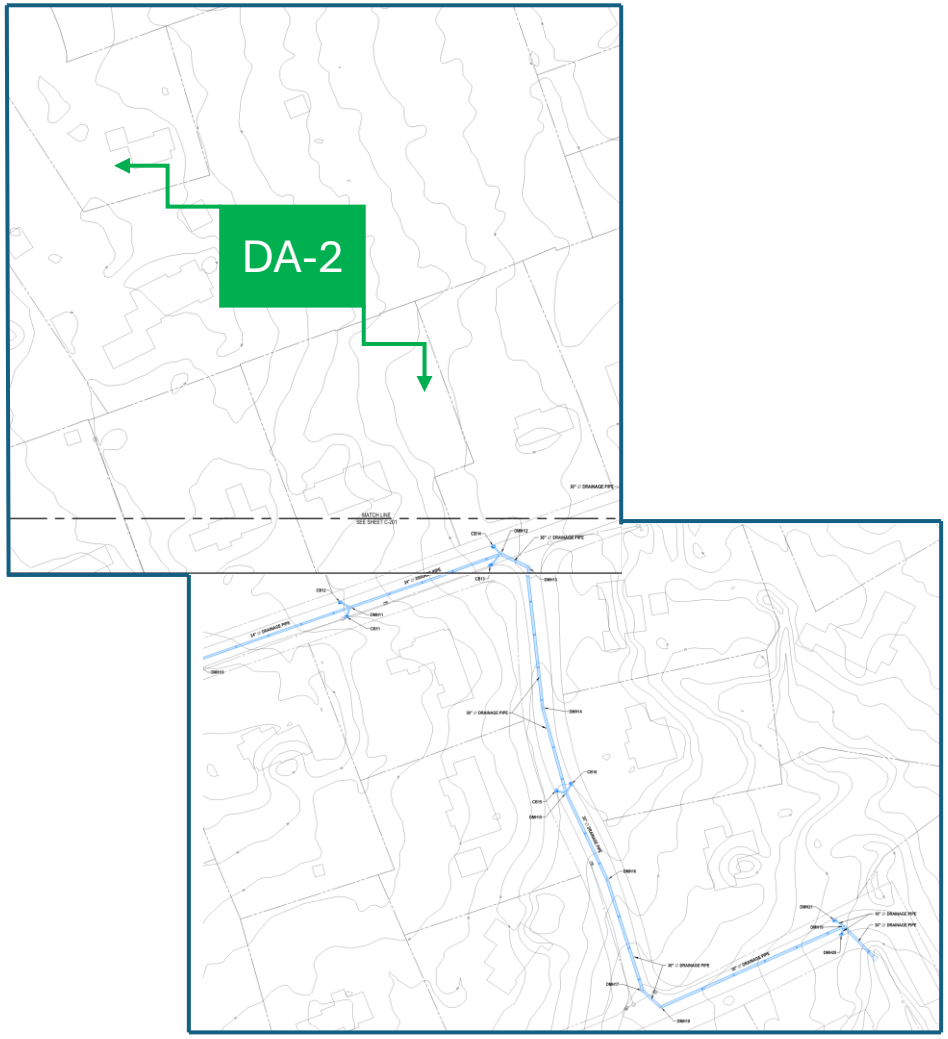
Proposed Improvements:

- Remove and replace the existing, damaged 18” pipe on 105 Cushman Road with a 24” pipe.
- Remove and replace 1 catch basin with a NYSDOT standard catch basin.

*The Village may need to obtain an easement to perform this work if no existing easement is in place.

Impact:

- Improve flow capacity and reduce stormwater backups.
- Reduced ponding and flooding impacts during heavy rain events.
- Address damaged pipe requiring repair or replacement in 5-10 years.



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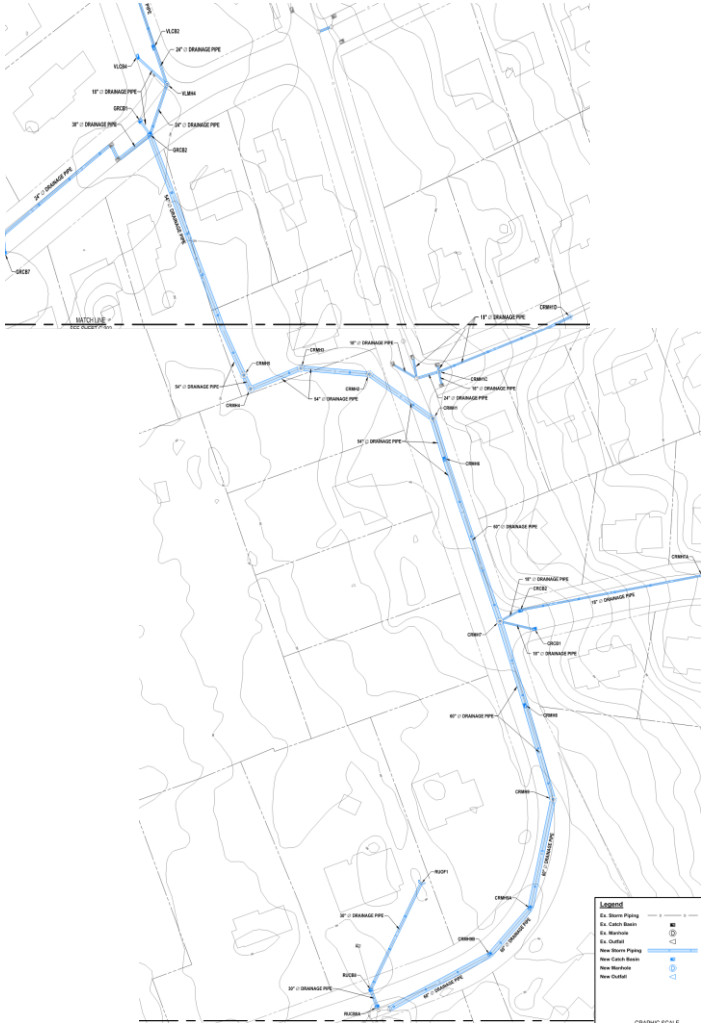
Cushman, Willow, and Sheldrake – Drainage Area 3 (Cushman East – Immediate Improvements)

Opinion of Probable Cost: $759,700
<u>Proposed Improvements:</u> - Remove and replace damaged piping along Cushman Road, Garden Road, and Varian Lane. - Remove and replace 4 existing catch basins with NYSDOT standard catch basins. - Install a total of 6 new catch basins and 1 manhole. - Immediate improvements based on CCTV & defective condition rating (NASSCO rating system) - Additional basins are proposed where ponding was observed. <u>Impact:</u> - Replace damaged piping that will likely require repair or replacement within 10 years.



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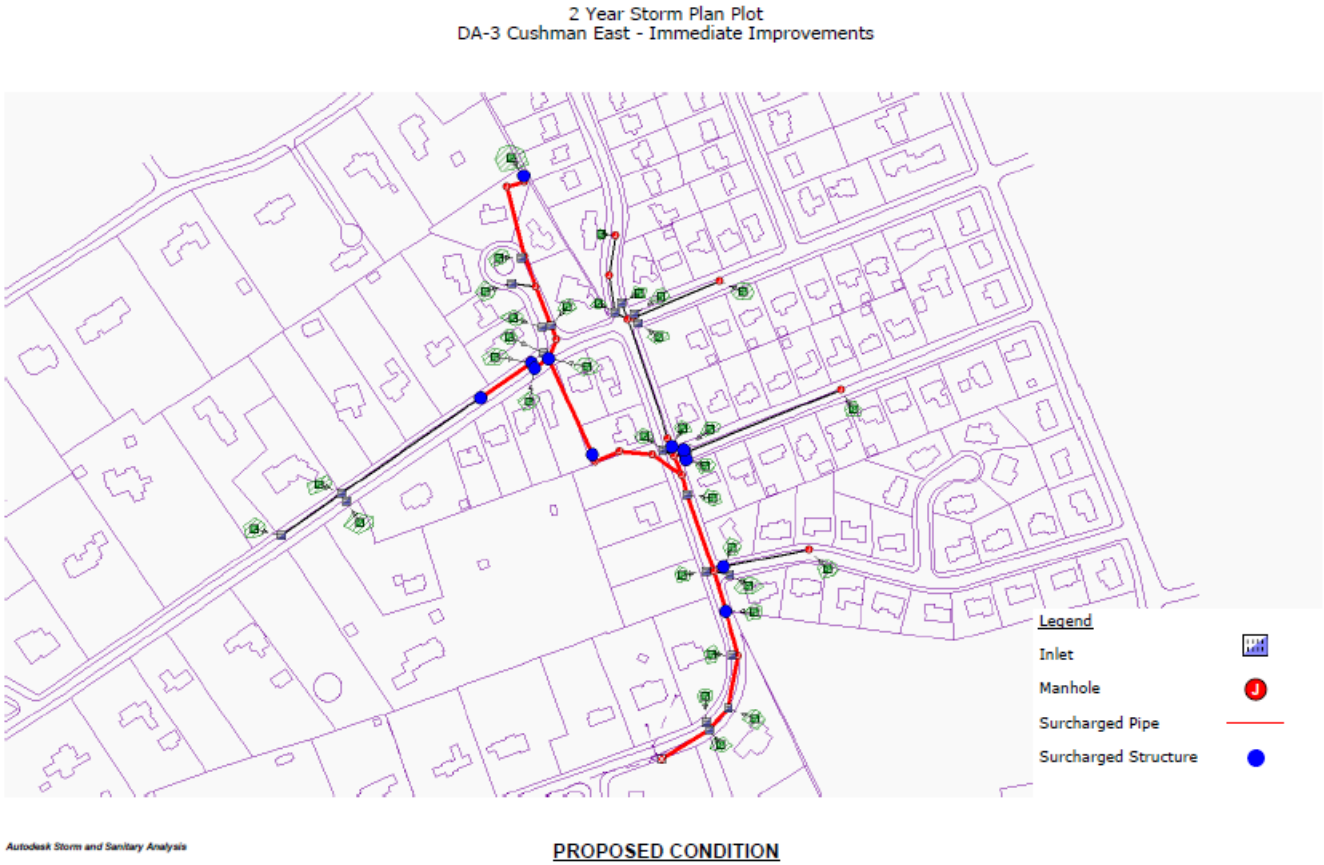
2 Year Storm Plan Plot
DA-3 Cushman East- Immediate Improvements



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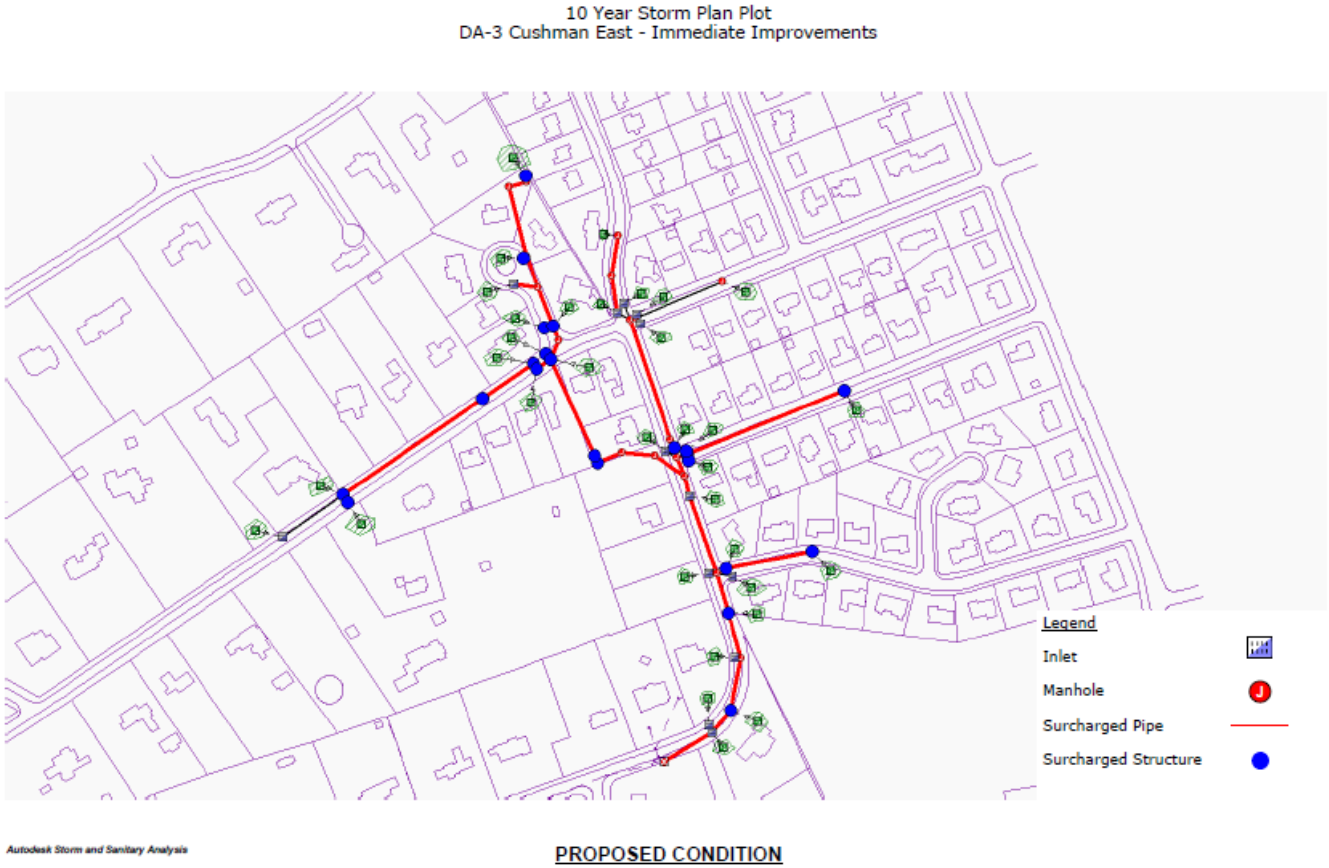
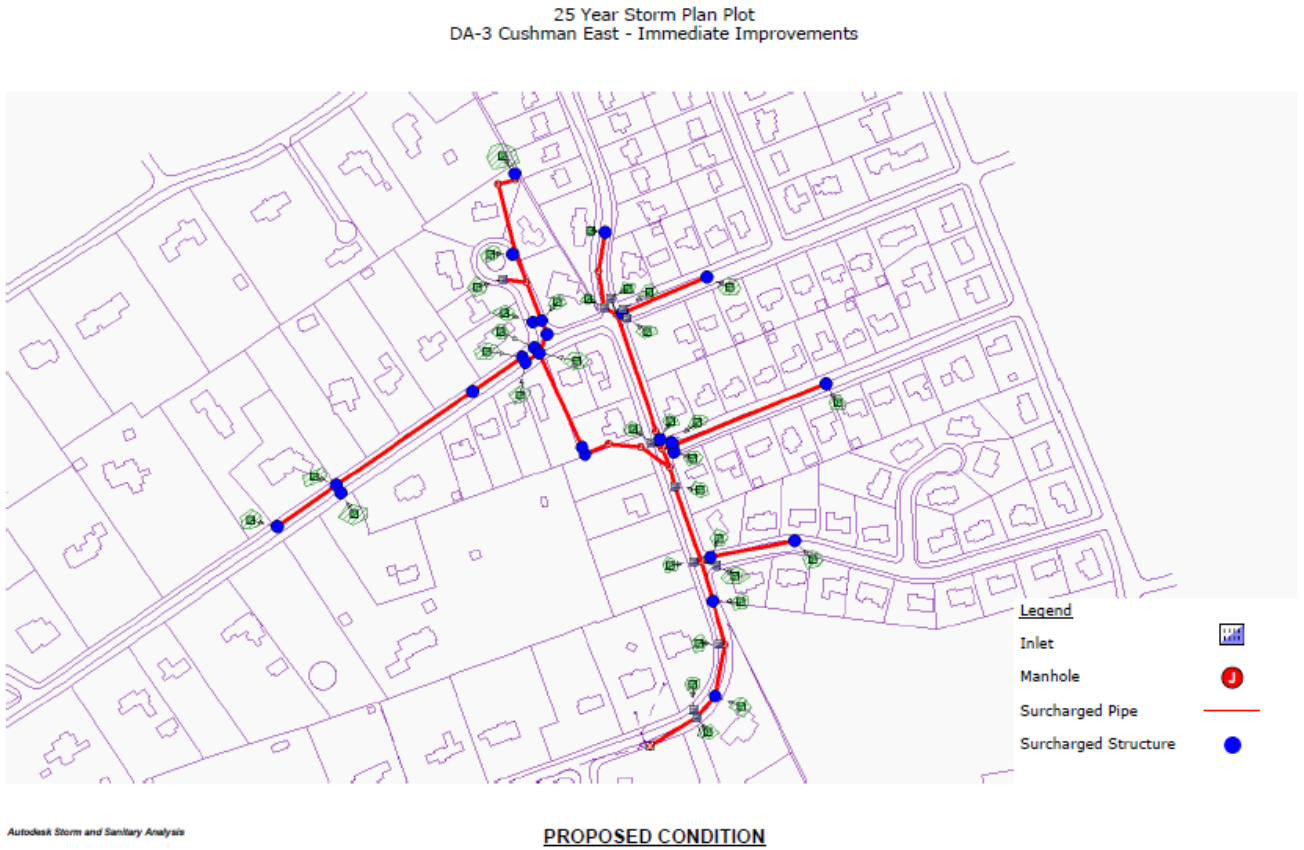
10 Year Storm Plan Plot
DA-3 Cushman East- Immediate Improvements



25 Year Storm Plan Plot
DA-3 Cushman East- Immediate Improvements



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Cushman, Willow, and Sheldrake – Drainage Area 3 (Cushman East – Future Improvements)

Opinion of Probable Cost: $3,347,700

Proposed Improvements:

- Increase the existing 35” pipe capacity from the intersection of Garden Road and Cushman Road to the intersection of Earlwoode Drive and Cushman Road to 54”, approximately 515’.
- Increase the existing 35”-42” pipe capacity from the intersection of Earlwoode Drive to the existing sedimentation chamber to 60”, approximately 800’.
- Increase the existing 12” capacity within Garden Road to 24”, approximately 620’.
- Increase the existing 12” capacity within Varian Lane to 24”, approximately 440’.

Impact:

- The existing storm network cannot manage the peak discharge rates generated by the 2, 10, and 25-year storms.
- The proposed improvements will increase flow capacity in the storm network and mitigate surface flooding during heavy rainfall.

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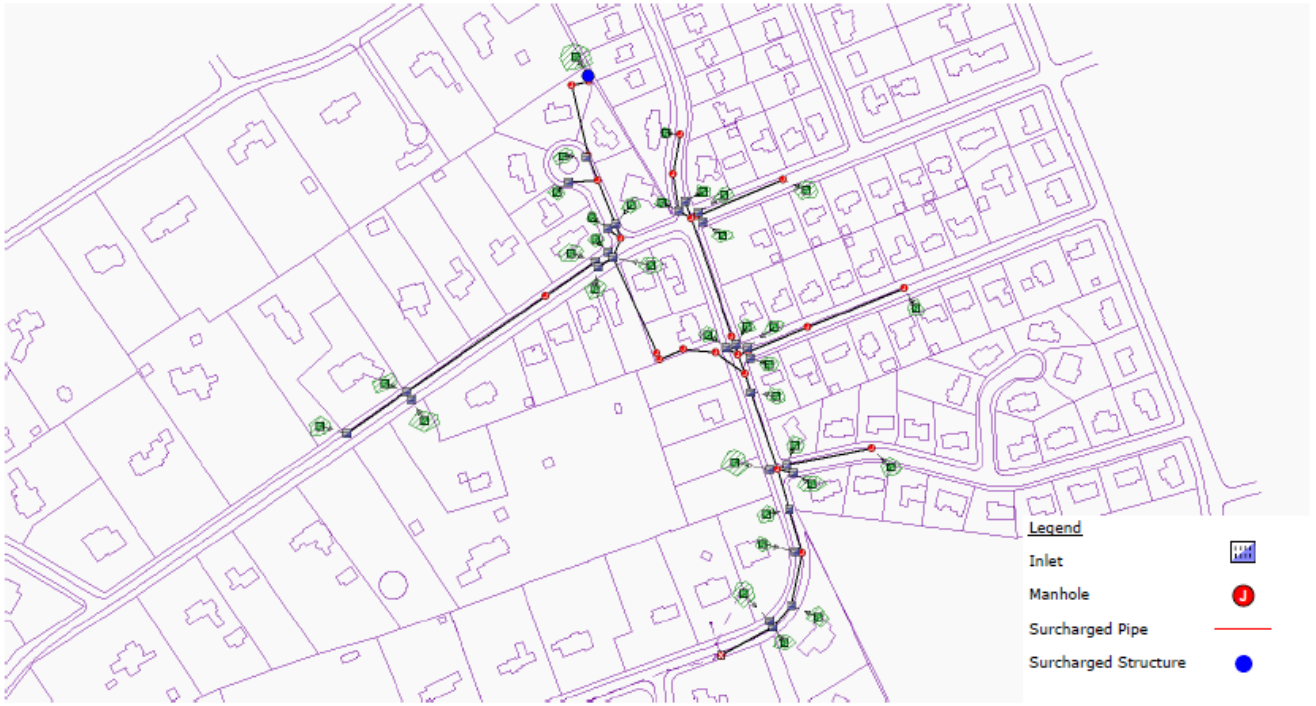
2 Year Storm Plan Plot
DA-3 Cushman East- Future Improvement

2 Year Storm Plan Plot
DA-3 Cushman East - Future Improvement



Autodesk Storm and Sanitary Analysis

PROPOSED CONDITION

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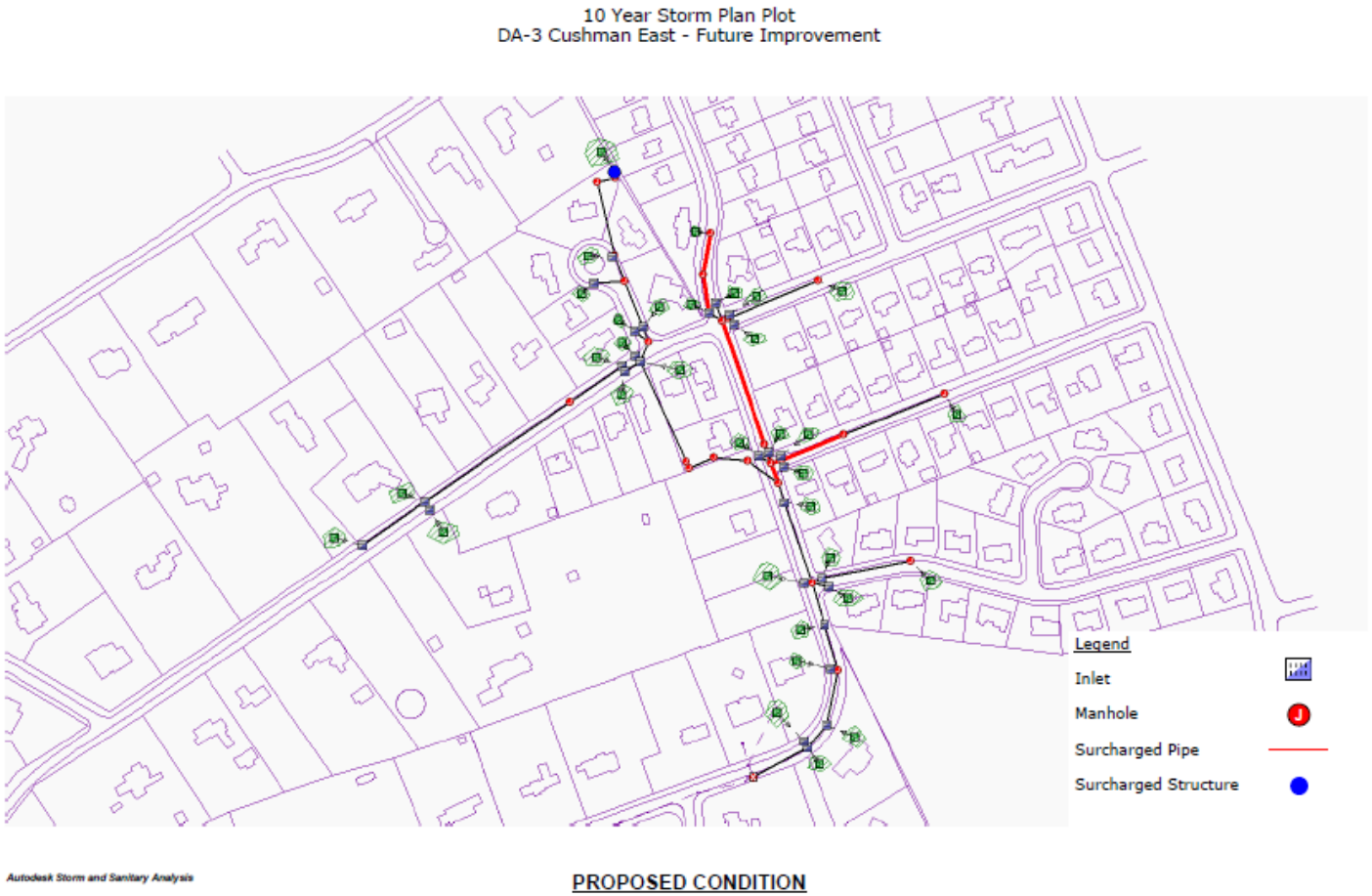
10 Year Storm Plan Plot
DA-3 Cushman East- Future Improvement



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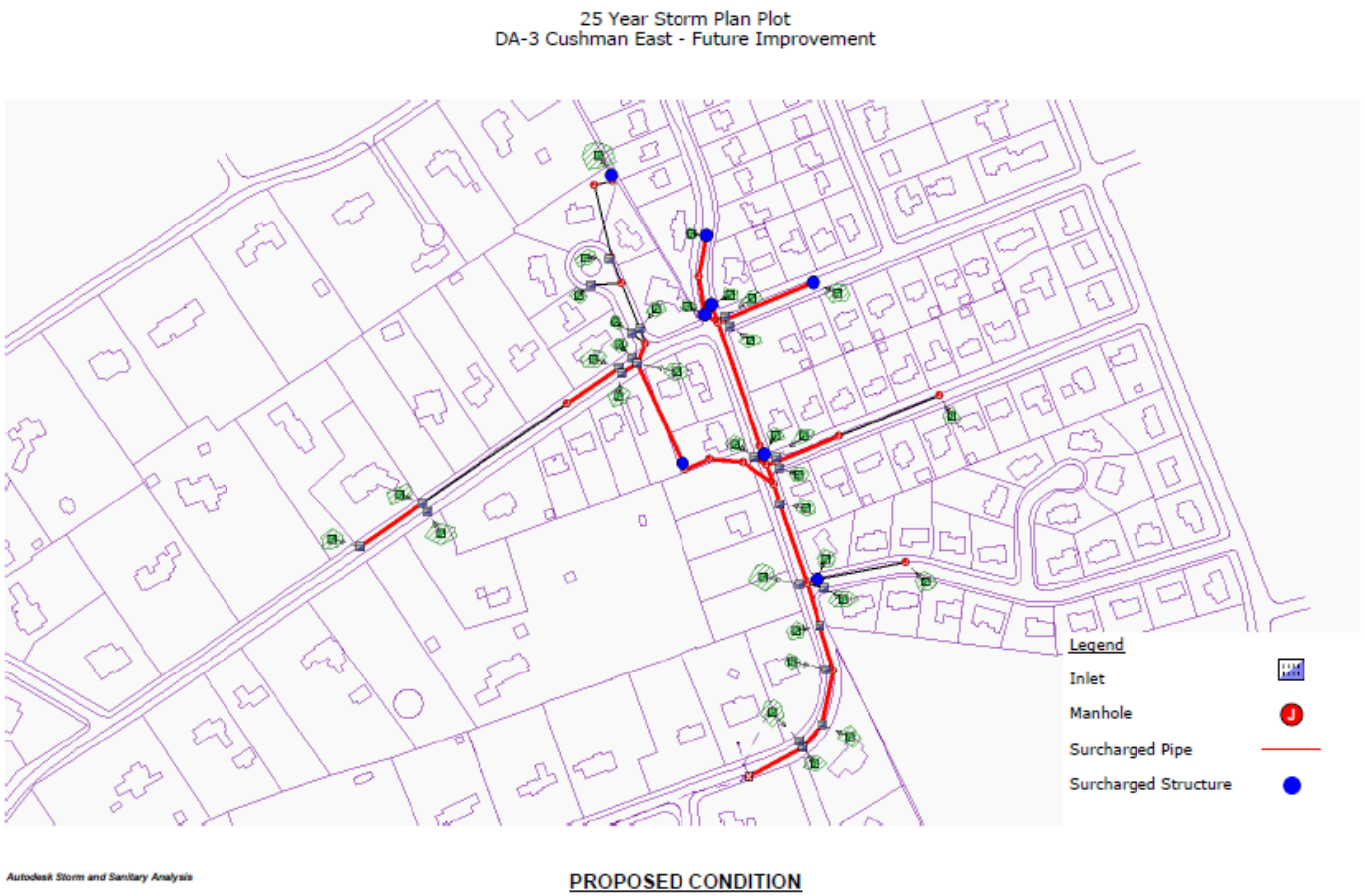
25 Year Storm Plan Plot
DA-3 Cushman East- Future Improvement



Cushman Drainage Improvement BCA Summary

Proposed Improvement Option	Benefit Cost Ratio
Drainage Area1/Cushman West	0.34
Drainage Area2/Cushman North	0.18
Drainage Area3/East- Immediate	0.20
Drainage Area3/East- Future	0.21

Based on the BCA, the greatest benefit in flood reduction and future costs are the improvements to Cushman West and North. Improvements to Drainage Area East (both immediate and future) while beneficial will still experience surcharges in pipe segments for the 10 and 25 year storm events. Downstream storm network capacity will limit these improvements.

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To: Mayor Arest and the Village Board of Trustees

From: Emily Giovanni, Assistant Village Manager

Date: Friday, July 11, 2025

RE: Drainage Improvement Reports

MEMORANDUM
Village Manager's Office

Please find below links to three engineering reports prepared by the Village's consultants as part of ongoing drainage improvement efforts:

1. **BR4 Drainage Improvements – George Field Park**
   Prepared by H2M architects + engineers
   https://www.scarsdale.gov/DocumentCenter/View/10675/George-Field-Park-Drainage-Improvement-Study-H2M-Architects-and-Engineers---Revised-June-2025

2. **SR2 Drainage Improvements – Cushman Road, Garden Road, Willow Lane & Sheldrake Road**
   Prepared by H2M architects + engineers
   https://www.scarsdale.gov/DocumentCenter/View/10698/Drainage-Improvements-Study---Cushman-Road-Garden-Road---Varian-Lane---Revised-June-2025

3. **Brite Avenue and Fox Meadow Road Drainage Study (Draft)**
   Prepared by Mott MacDonald
   https://www.scarsdale.gov/DocumentCenter/View/10975/Brite-Avenue-Drainage-Improvements-Report---June-2025

Due to the extensive length of each report, they are not included as agenda backup materials. However, they are available in full via the above links for your review and reference.

Please let me know if you have any questions or would like assistance navigating the documents.

Village Wide Stormwater Studies
Funding and Project Status Summary

July 14, 2025

Budgeted Funding

Budget Year	Budget	Source
2023/2024	$300,000	Fund balance
2024/2025	$1,714,000	Debt
2025/2026	$100,000	Fund balance
2026/2027	$5,456,000	Debt
2027/2028	$6,300,000	Debt
Total	$13,870,000	

Stormwater Projects

Project	BCR	Construction Cost	Project Cost
Brite Ave/Fox Meadow	1.1	$2,600,000	$3,380,000
Sheldrake River	TBD	TBD	TBD
George Field Park			
Downstream Piping	0.52	$2,251,600	$2,927,080
Minor Pond Improvements - no regrading	0.12	$1,924,600	$2,501,980
Combined	0.32	$4,176,200	$5,429,060
Cushman, Willow and Sheldrake			
Area 1 - Cushman West	0.34	$1,447,000	$1,881,100
Area 2 - Cushman North	0.18	$91,200	$118,560
Area 3 - Cushman East/Immediate	0.2	$759,700	$987,610
Area 3 - Cushman East/Future	0.21	$3,347,700	$4,352,010
Griffen Avenue Culvert		$575,000	$747,500
		Total	$16,895,840

SCARSDALE
1701
NEW YORK

Date: Tuesday, July 15, 2025
Re: Discussion on sidewalks and pathways

ATTACHMENT(S):

- 07.10.2025 J. Coleman Memo - Sidewalks and Pathways
- PMG Pavement Management Report
- PMG Pathways Conditions Map
- FY2024-2025 Pathway Improvements
- Capital Project Overview - Sidewalks and Pathways

SCARSDALE
1701
NEW YORK

To: Alexandra Marshall, Village Manager

From: Jeffrey C. Coleman, PE, Superintendent of Public Works
David Goessl, PE, Village Engineer

Date: July 10, 2025

Re: Sidewalks and Pathways

MEMORANDUM
Department of Public Works

In advance of the Village Board discussion on Sidewalks and Pathways, scheduled for Tuesday, July 15th, we offer the following information:

- Attached, is the information included in ClearGOV in support of the Department's 2025/2026 capital budget request for the sidewalk replacement program. The attachments to that request are also attached to this memorandum. This includes the 2023 report by PMG (Village consultant) which assessed all sidewalks and pathways in the Village.

- For historical perspective, the following represents the annual budget appropriation for sidewalks for the past several budget cycles. With the exception of the current year, all funds have been expended.

Budget Year	Budget
2019/2020	$20,000
2020/2021	$20,000
2021/2022	$46,700
2022/2023	$20,000
2023/2024	$155,000
2024/2025	$185,000
2025/2026	$295,000

- As some of the discussion may focus on the consideration of concrete sidewalk in lieu of asphalt sidewalk, we have performed a simple cost analysis based on our current unit price contract. A more accurate economic analysis would entail determining present and future value of each replacement cycle and quantifying the cost over time. However in the interest of providing a ballpark comparison, we offer the following.

  The estimated cost to repair/replace approximately 126,400 sf (1 mile) of sidewalk with asphalt is $336,000. Removing and replacing the same with concrete is approximately $528,000. The expected serviceable life of asphalt sidewalk is approximately 10 years while concrete is approximately 40 years. Both lifecycles assume minor spot repairs are necessary.

657 Hopewell Dr
PO Box 2407
Heath, OH 43056
(800) 638.8040
Sales@PavementManagementGroup.com

PAVEMENT MANAGEMENT GROUP

PAVEMENT MANAGEMENT FINAL PROJECT REPORT

Scarsdale, NY - PATHWAYS

Friday, May 12, 2023

Pavement Management Group

COMPLETE PAVEMENT MANAGEMENT SOLUTIONS

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The Village of Scarsdale contracted with Pavement Management Group (PMG) to provide a turn-key Pavement Management Program (PMP). The backbone of PMG's turnkey PMP is the PAVER Pavement Management System (PMS) which provides specific tools such as pavement modeling, maintenance decision trees and budget/target driven scenarios maximizing the return on investment from available maintenance and rehabilitation funds, generating a prioritized plan, and identifying specific areas in need of maintenance and rehabilitation.

- Verify and setup any new pavement network inventory
- Provide an HD video of each pavement section
- Identify all distress types, severity levels and quantities within through ASTM D6433-20
- Calculate the Pavement Condition Index (PCI) for each pathway section
- Assign all pavement management data to GIS
- Create GIS current condition map
- Provide an HTML based condition map with geo located streaming HD video
- Provide a complete inventory and condition listing of each pavement section
- Provide a final report of findings
- Provide continued support services

2023 PATHWAY NETWORK SUMMARY

- 20 centerline miles
- 527,533 square feet
- 220 management sections
- Average network PCI is 64
- Average network condition category of **FAIR**

INTRODUCTION

PMG was contracted by The Village of Scarsdale to provide pavement management services for the village's 20-centerline mile pathway network. Through these services a field inventory setup of pathways, an inventory review and inspections were performed on all 220 management sections within the network. All inventory items were added or updated within their PMS database and a PCI was calculated for each section. HD videos were taken at each section location (from beginning to end of section). This provides for a virtual, high-definition account of the pathway network, and provides value in a variety of ways such as condition review and network level decision making from the office. This report provides a thorough definition of the inspection process performed as well as the condition results of our project.

CONDITION ASSESSMENT PROCESS

PMG adheres to the ASTM D6433-20 standard for assessing the condition of asphalt and concrete surfaces. Our skilled inspection team reviews high-definition video of each pavement section in conjunction with our proprietary artificial intelligence (AI) model to identify and document the distress types, severity levels, and quantities that are occurring. The data goes into the PAVER™ Pavement Management System (PMS) for Pavement Condition Index (PCI) calculation, resulting in a PCI score for each management section within the network.

PAVEMENT DISTRESS DEFINITION

20 possible distress types can occur within asphalt-based surfaces and 19 possible distress types that can occur within a concrete surface. The U.S. Army Corps of Engineers publishes the Asphalt Distress Manual and the Concrete Distress Manual. These manuals describe each distress type, the criteria to determine each severity level (low, medium, high), and how to measure each. The asphalt and concrete distress types are highlighted below in Figure 1.

01 – Alligator Cracking	06 – Depression	11 – Patch/Utility Cut	16 – Shoving
02 – Bleeding	07 – Edge Cracking	12 – Polished Aggregate	17 – Slippage Cracking
03 – Block Cracking	08 – Joint Reflection	13 – Pothole	18 – Swell
04 – Bumps and Sags	09 – Lane/Shoulder Drop	14 – Railroad Crossing	19 – Raveling
05 - Corrugation	10 – L&T Cracking	15 – Rutting	20 – Weathering
21 – Blow Up/Buckling	26 – Joint Seal Damage	31 – Polished Aggregate	36 – Scaling
22 – Corner Break	27 – Lane/Shoulder Drop	32 – Popouts	37 – Shrinkage Cracks
23 – Divided Slab	28 – Linear Cracking	33 – Pumping	38 – Corner Spalling
24 – Durability Cracking	29 – Large Patch/Utility Cut	34 – Punchout	39 – Join Spalling
25 - Faulting	30 – Small Patch	35 – Railroad Crossing	

Figure 1. Asphalt and Concrete Distresses

PCI AND CONDITION CATEGORY DEFINITION

The PCI is on a scale of 0 – 100 with 0 being the worst and 100 being the best. PAVER calculates it through the input of distress type, severity, and quantity information. Figure 2 illustrates the factors that go into the PCI and the 5 condition categories of the PCI.

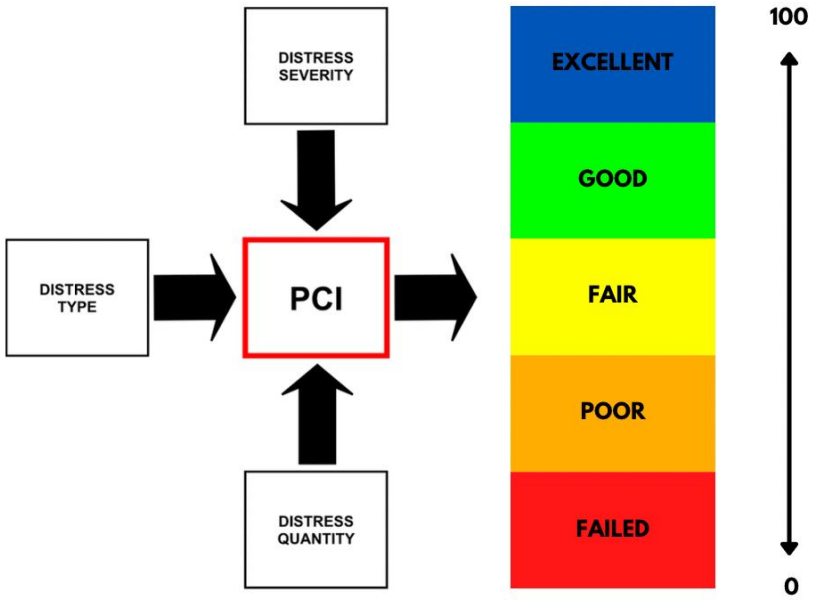


Figure. 2 Factors Determining PCI Value

CONDITION CATEGORY	LOW PCI VALUE	HIGH PCI VALUE
EXCELLENT	90	100
GOOD	70	89
FAIR	50	69
POOR	30	49
FAILED	0	29

Table 1. Condition Category Values

EXAMPLES OF PATHWAY CONDITIONS

During the inspection process, high resolution video was captured for each pathway section. A snapshot from several videos have been chosen to provide as documentation for this report of the inspected section location and serves as visual identification as to what types of distresses are occurring within the pavement section. The following 2023 images of pavements from within the Pathway Network provide a sense of what various PCI levels look like:

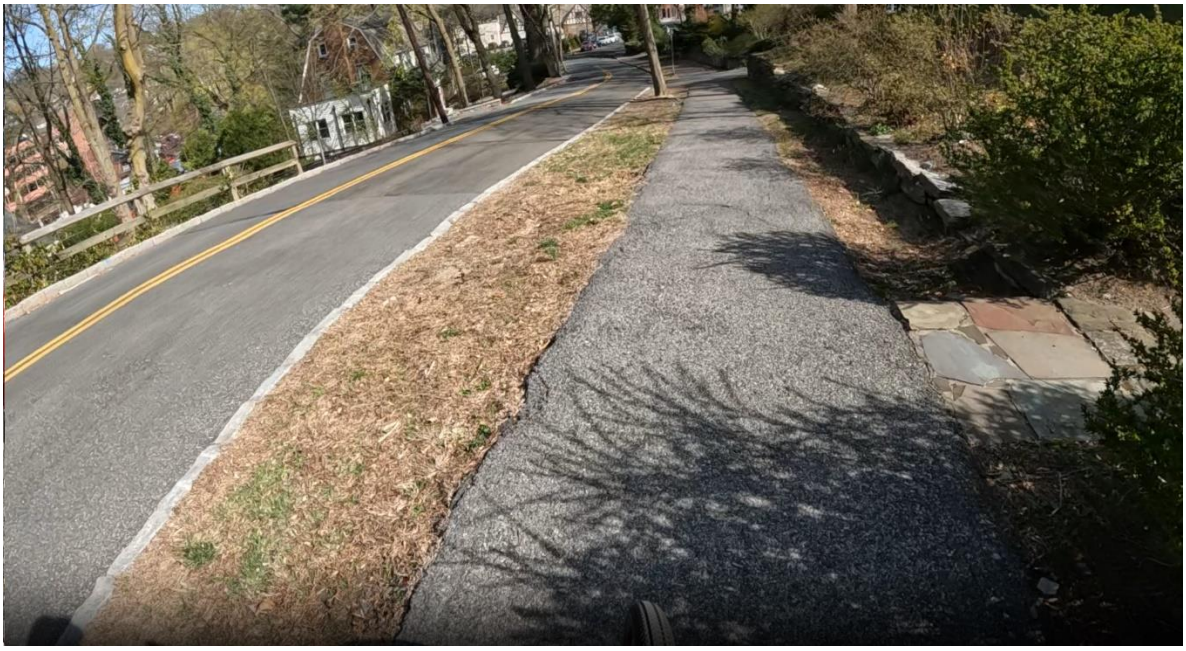
EXCELLENT CONDITION

POPHAM ROAD | PCI 93

GOOD CONDITION

SPENCER PLACE | PCI 88

FAIR CONDITION



OVERHILL ROAD | PCI 61

POOR

CRANE ROAD | PCI 32

FAILED

CHURCH LA | PCI 26

NETWORK CONDITION RESULTS

After completion of the 2023 pavement management project, PMG has determined that the average PCI for Scarsdale's 20 centerline mile pathway network is a 64 and considered to be in "FAIR" condition. Table 2 displays the condition summary data by category across the network while Figures 3, 4, and 5 illustrate the conditions in graph form. A complete Inventory and Condition Report in Excel spreadsheet was provided as a part of this project deliverable.

CONDITION CATEGORY	SECTIONS	CENTERLINE MILES	PAVEMENT AREA (SF)	PERCENT AREA	AVERAGE CONDITION
EXCELLENT	26	2.32	61,351	11.63%	95
GOOD	75	7.88	207,904	39.41%	81
FAIR	46	3.85	101,758	19.29%	60
POOR	63	4.98	131,477	24.92%	39
FAILED	10	0.95	25,043	4.75%	24
TOTALS	**220**	**20**	**527,533**	**100%**	

Table 2. Condition Summary

CONDITION GRAPHS

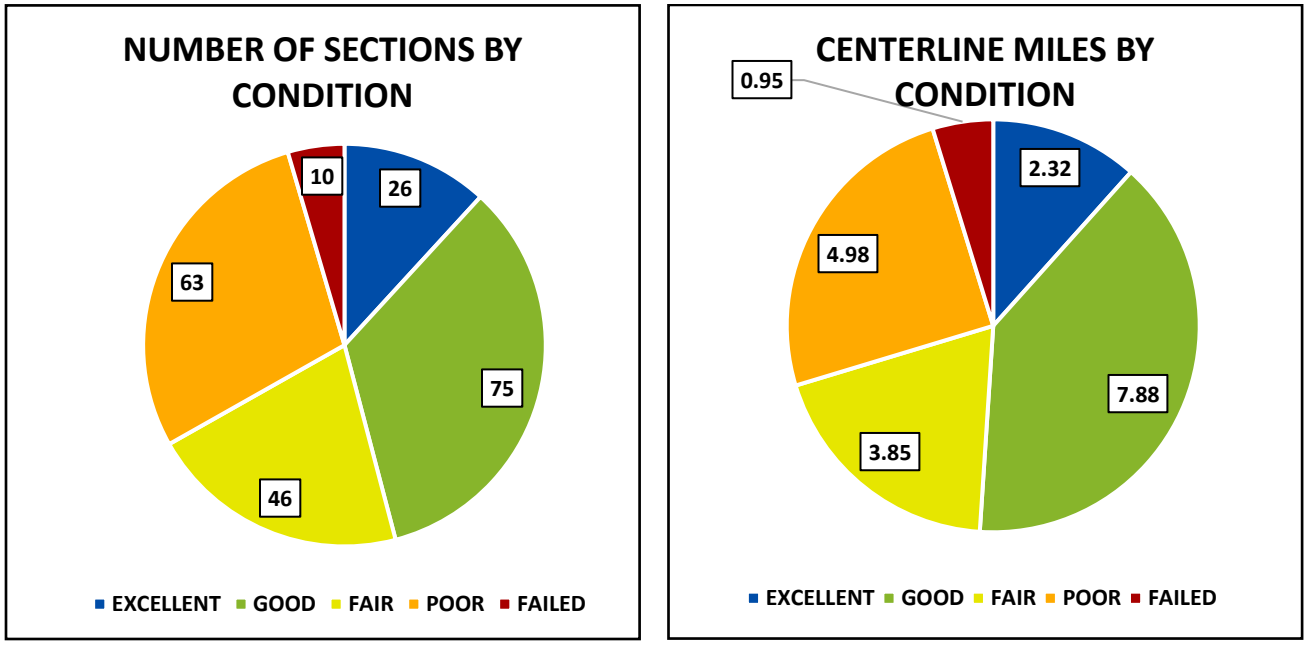


Figure 3. Number of Sections and Centerline Miles by Condition Category

CONDITION CATEGORY	SECTIONS	CENTERLINE MILES	PAVEMENT AREA (SF)	PERCENT AREA	AVERAGE CONDITION
ASPHALT	149	13.17	347,616	65.89%	56
BLUE STONE	24	3.35	88,461	16.77%	84
BRICK	3	0.08	2,153	0.41%	80
CONCRETE	44	3.38	89,303	16.93%	77
TOTALS	**220**	**20**	**527,533**	**100%**	

Table 3. Surface Material Summary

SURFACE GRAPHS

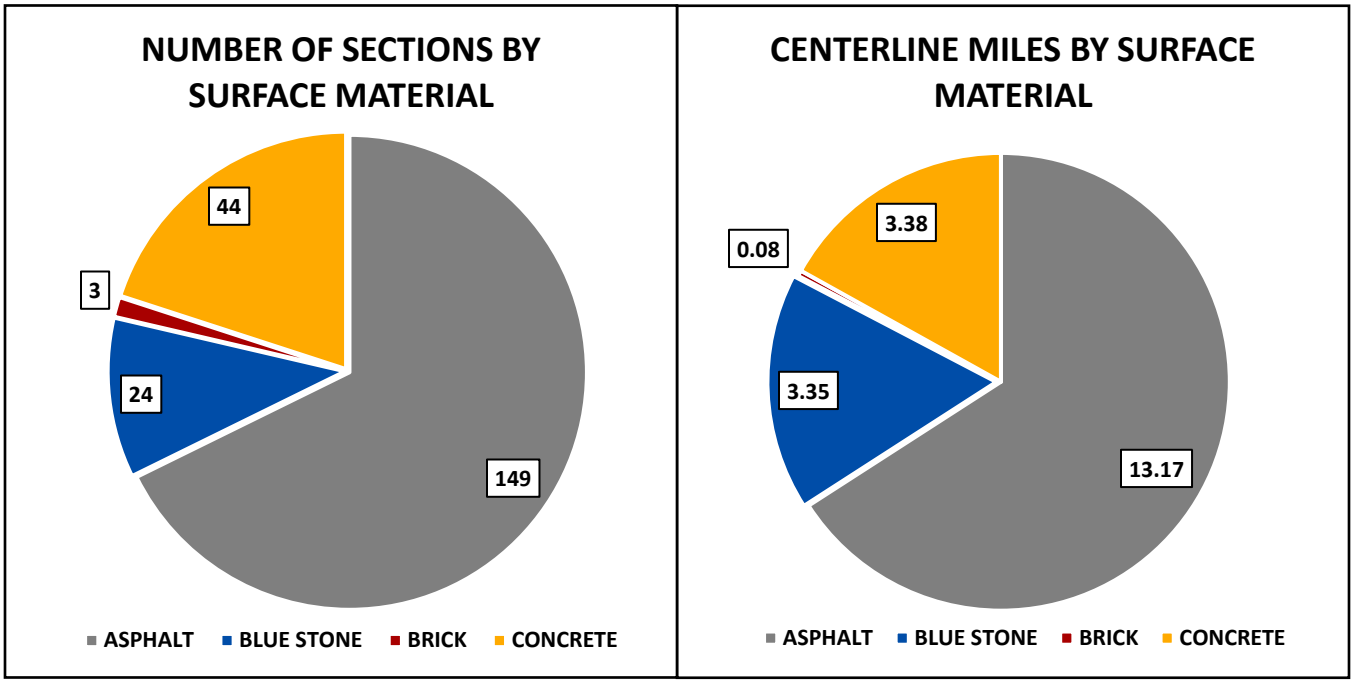


Figure 4. Average Condition, Number of Sections, and Centerline Miles by Surface Material

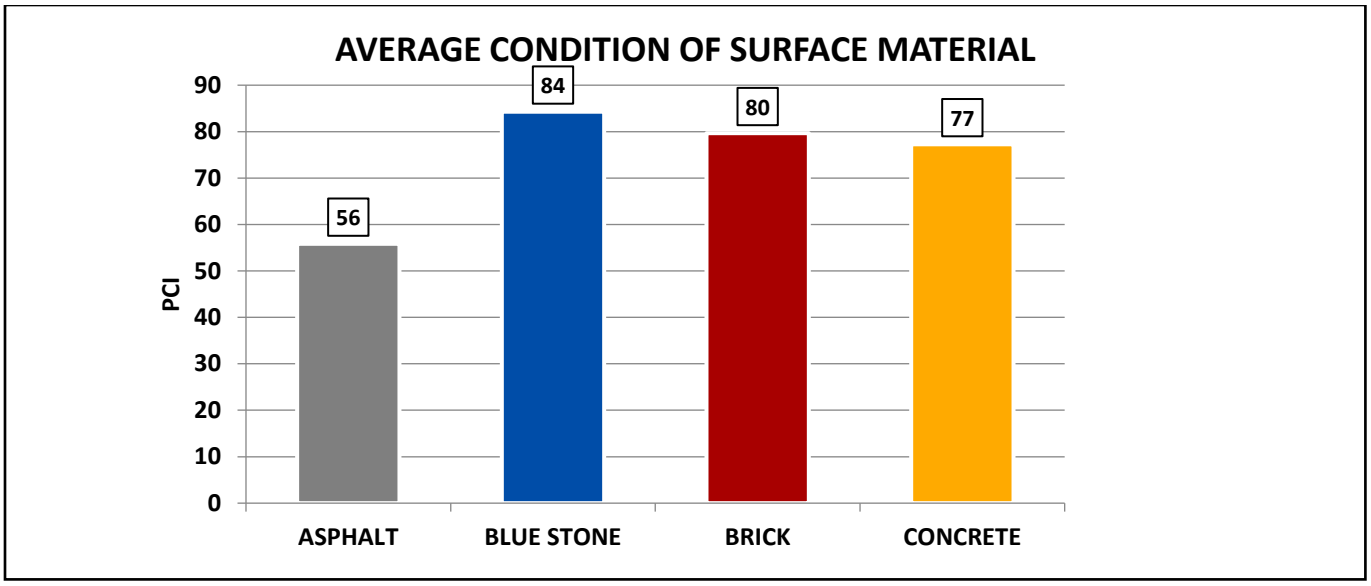


Figure 5. Average Condition, Number of Sections, and Centerline Miles by Surface Material

GIS CONDITION MAP

PMG assigned all pavement management data to GIS and will provide the shapefile to the agency. This allows for a wide variety of mapping options within both ESRI's ArcGIS and Google Earth. The following shows an example of a Latest Condition Map that has been created in both GIS and Google Earth for illustrative purposes. An ANCI Size C plot ready PDF version has been provided as a part of the project deliverable.

Figure 6. Pathway Section Latest Condition maps

CONCLUSION

The PCI study provides a PCI rating on each pavement section within the maintained pathway network. Based upon the distresses identified within each representative sample location inspected, a PCI number is assigned to each pavement section. This number is on a scale of 0 – 100 with 0 being the worst and 100 being the best.

The Scarsdale pathway network is approximately 20 centerline miles in size. Through the ASTM D6433-20 PCI study, PMG has determined the pathway network has an average PCI of **64** and is classified as being in **FAIR** condition.

PMG would again like to The Village of Scarsdale for the opportunity to provide them with this PCI study and our pavement management services. Our goal is to provide the highest level of services and support, providing our clients with the data, tools, and expertise necessary to be successful in their goals of pavement management. Should you require any additional information or support regarding this PCI study or the PAVER™ PMS, please do not hesitate to ask.

PAVEMENT MANAGEMENT GROUP
JAMES GOLDEN III
Founder/CEO

P: (740) 507-3842
E: James@PavementManagementGroup.com

Scarsdale New York
2023 Pathway Conditions

N

Legend

Town Line

Condition

- EXCELLENT
- GOOD
- FAIR
- POOR
- FAILED

New York State, Maxar

PMG
PAVEMENT MANAGEMENT GROUP

VILLAGE OF SCARSDALE
PATHWAY IMPROVEMENT PROGRAM
FY 2024-2025

VM 1306 B - Acocella Contracting Corp.

UNIT COSTS APPLIED:

Sidewalk and Pathway Restoration (per SF)	$	14.50
Portland Concrete Sidewalk and Pathway Restoration (per SF)	$	20.00
Sidewalk and Pathway Overlay (per SF)	$	5.50
Sidewalk and ADA Ramp (Per EACH)	$	1,500.00

SCORE	Year Proposed	Location	Width (Ft)	Length (Ft)	Area	Cost for Pathway Overlay	Cost for Full Depth Pathway Resoration	Date Completed
61	FY 24/25	Greenacres Ave (Fountain Ter-Walworth) **Concrete**	5	643	3215		$64,300.00	Aug-24
-	FY 24/25	Hampton Rd (Dead End) **Concrete**	5	93	465		$10,800.00	Sep-24
38	FY 24/25	Oxford Road (Park Rd - Garden Rd) **Overlay**	5	516	2580	$14,190.00		Oct-24
38	FY 24/25	Oxford Road (Park Rd - Garden Rd) **Full Depth Asphalt**	5	180	900		$13,050.00	Oct-24
38	FY 24/25	Heathcote Rd (Bridge - Scarsdale Medical Group) **Concrete**	5	431	2155		$43,100.00	Nov-24
38	FY 24/25	Heathcote Rd (House #17 - Morris La) **Full Depth Asphalt**	5	678	3390		$49,155.00	Dec-24
38	FY 24/25	Heathcote Rd (House #17 - Morris La) **Overlay**	5	1013	5065	$27,857.50		Dec-24
			Total Miles	0.67		$ 42,047.50	$ 180,405.00	
						Total Cost	**$ 222,452.50**	

PCI AND CONDITION CATEGORY DEFINITION

The PCI is on a scale of 0 – 100 with 0 being the worst and 100 being the best. PAVER calculates it through the input of distress type, severity, and quantity information. Figure 2 illustrates the factors that go into the PCI and the 5 condition categories of the PCI.

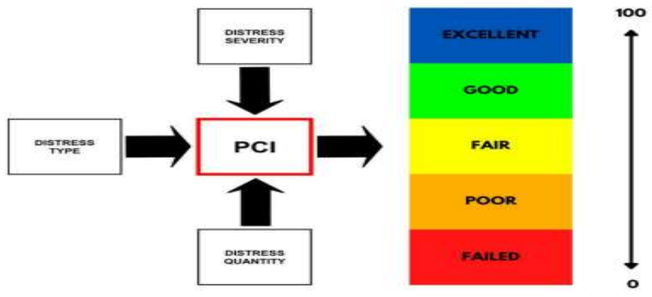


Figure. 2 Factors Determining PCI Value

CONDITION CATEGORY	LOW PCI VALUE	HIGH PCI VALUE
EXCELLENT	90	100
GOOD	70	89
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POOR	30	49
FAILED	0	29

Highway Improvements - Sidewalk and Pathway Restoration

Overview

Request Owner	David Goessl, Village Engineer
Est. Start Date	06/01/2025
Est. Completion Date	05/31/2030
Department	Engineer
Form Type	Capital Improvement
Request Type	Roadways

Description

Pathway Improvement Program: In the 2023 assessment for Village pathways performed by consultant PMG, it was determined that the Village has an estimated 20 miles of bike paths and walkways utilized by residents, commuters and school children. As time progresses, pathways tend to deteriorate due to various conditions. The Village often receives requests to repair sections of walkways due to uneven and potentially hazardous conditions. The most cost-efficient method to rehabilitate walkways is to overlay them with new materials. However, at times, walkways, whether originally constructed of concrete or asphalt, have been found with multiple overlays of asphalt, and it does become necessary to fully remove and construct with new materials. The work may often include regrading, tree stump/root removal, tree protection, form work, and full depth reconstruction of base materials. The average lifecycle of asphalt pathways ranges anywhere from 10 to 20 years (with exception to snowplow damage). The schedule for rehabilitation is estimated as the following: 20 miles / 15 years = 1.4 miles per year.

The estimated annual cost for rehabilitation and types of repairs are the following:

- Asphalt Overlay: 1.0 miles x (5,280 ft/mile) x 4.5 ft avg. width @ $ 5.50/sf = $ 130,680 (round to $131,000)
- Full Depth Asphalt Replacement: 0.2 miles x (5,280 ft/mile) x 4.5 ft avg. width @ $14.50/sf = $ 68,904 (round to $69,000)
- Concrete Sidewalk Replacement: 0.2 miles x (5,280 ft/mile) x 4.5 ft avg. width @ $ 20.00/sf = $ 95,040 (round to $ 95,000)

TOTAL ESTIMATED ANNUAL COST = $ 295,000

Images

David Goessl

New ADA Ramp Photo

David Goessl

Asphalt Pathway Overlay Photo

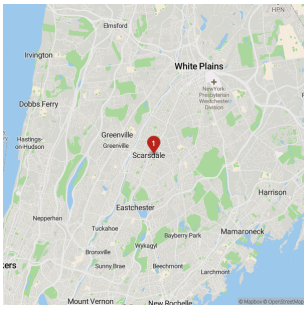
David Goessl

Pathway Over Heathcote Bypass. (2020 project photo)

Details

Type of Project	Other

Location



Supplemental Attachments

Village Map of Pathways(/resource/cg-prod-v2/projects/documents/cf2cc5ed0795eb945a3a.pdf)

Pathway Improvements Location Map 2022

PMG Final Report on Pathway Assessment(/resource/cg-prod-v2/projects/documents/8c620253f06a2edbd78a.pdf)

PMG Final Report on Pathway Assessment

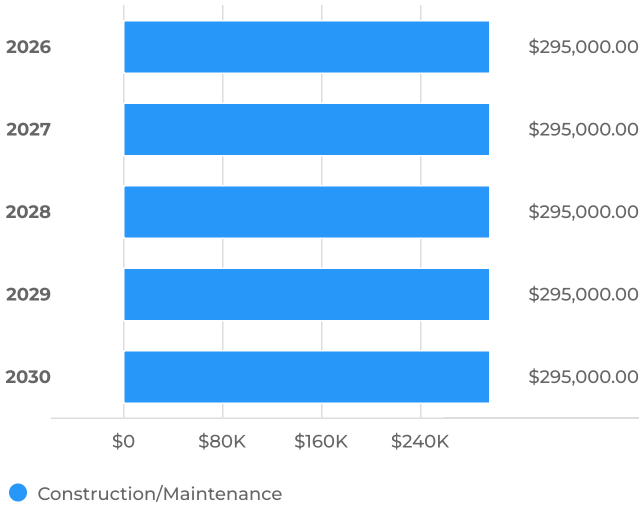
FY 24-25 Actual Costs Expended(/resource/cg-prod-v2/projects/documents/1deb95d287af247588dd.pdf)

FY 25-26 Estimated Annual Budget - Lifecycle Costs(/resource/cg-prod-v2/projects/documents/ba52ab25cd95461c86f7.pdf)

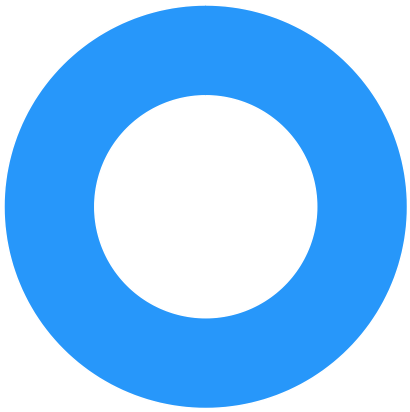
Capital Cost

Total Historical	FY2026 Budget	Total Budget (all years)	Project Total
$185,000	$295,000	$1.475M	$1.66M

Capital Cost by Year



Capital Cost for Budgeted Years



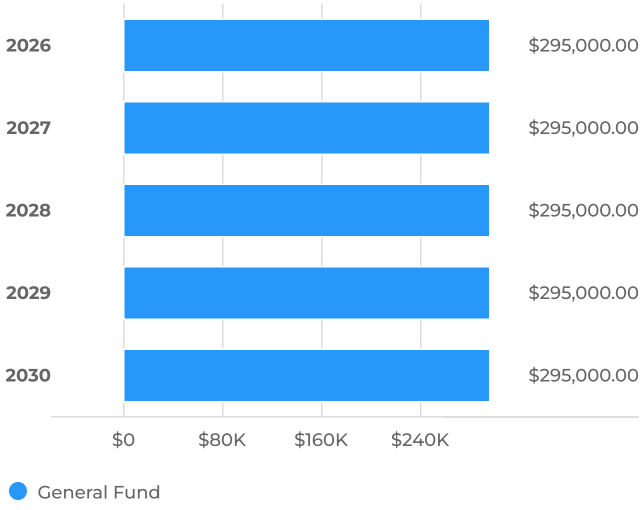
Capital Cost Breakdown

Capital Cost	Historical	FY2026	FY2027	FY2028	FY2029	FY2030	Total
Construction/Maintenance	$185,000	$295,000	$295,000	$295,000	$295,000	$295,000	$1,660,000
Total	**$185,000**	**$295,000**	**$295,000**	**$295,000**	**$295,000**	**$295,000**	**$1,660,000**

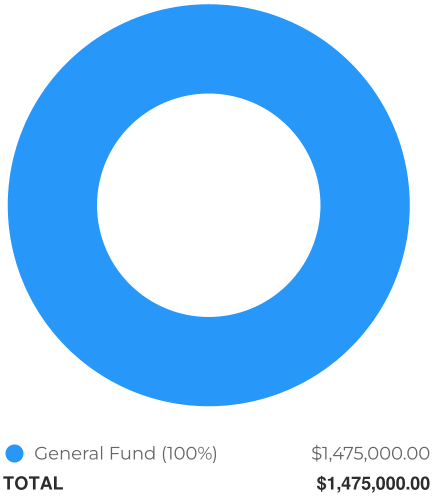
Funding Sources

Total Historical	FY2026 Budget	Total Budget (all years)	Project Total
$185,000	$295,000	$1.475M	$1.66M

Funding Sources by Year



Funding Sources for Budgeted Years



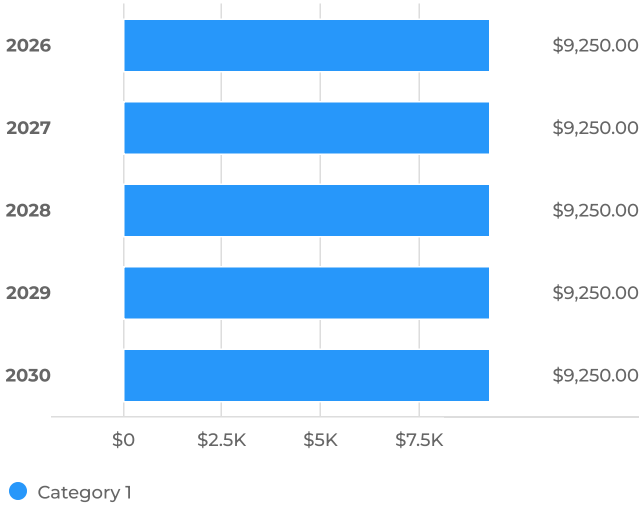
Funding Sources Breakdown

Funding Sources	Historical	FY2026	FY2027	FY2028	FY2029	FY2030	Total
General Fund	$185,000	$295,000	$295,000	$295,000	$295,000	$295,000	$1,660,000
Total	**$185,000**	**$295,000**	**$295,000**	**$295,000**	**$295,000**	**$295,000**	**$1,660,000**

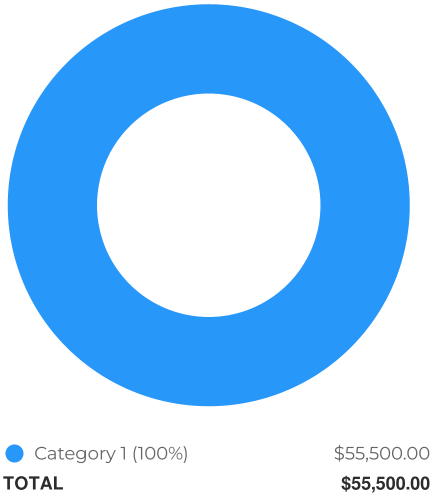
Cost Savings

Total Historical	FY2026 Budget	Total Budget (all years)	Project Total
$9,250	$9,250	$46.25K	$55.5K

Cost Savings by Year



Cost Savings for Budgeted Years



Cost Savings Breakdown

Cost Savings	Historical	FY2026	FY2027	FY2028	FY2029	FY2030	Total
Category 1	$9,250	$9,250	$9,250	$9,250	$9,250	$9,250	$55,500
Total	**$9,250**	**$9,250**	**$9,250**	**$9,250**	**$9,250**	**$9,250**	**$55,500**