

PRIORITIZATION METHODOLOGY AND RESULTS

AE STORMWATER CAPITAL IMPROVEMENT PLAN PRIORITIZATION METHODOLOGY AND RATING CRITERIA

A risk-based approach was used to analyze and prioritize the stormwater capital projects identified through the field investigations, including stream improvements, localized flood mitigation and culvert projects. Prioritization helped identify and rank projects for the capital improvement plan. A priority matrix with several parameters related to the assets' consequence of failure and likelihood of failure if no action was taken.

$$\text{Risk Factor} = \text{Consequence Factor} * \text{Likelihood of Failure}$$

AE 1.0 Consequence Factor

The consequence of failure was based on six parameters that were scored one through five, where one was the lowest consequence and five was the highest. The extent of the impact of each consequence was assigned a value ranging from one to 5, where one correlates to very little negative impact and five correlates to a very high negative impact.

Table 1. Consequence of Failure Categories and Rating Descriptions

Consequence of Failure Metric	Description
Impact to Public Health and Safety	Will the project reduce the potential for human injury or illness? Is the project critical to the protection of public safety & public health?
Potential for Property Damage	Will the project mitigate impacts related to flooding? Will the project address damage to public or private property?
Cost of Deferred Maintenance	What is the cost of deferred maintenance? If the project is not completed now, will the project's scope and cost increase substantially in the future?
Number of People Impacted	How many people does the project affect? How many people will be positively impacted by the project's implementation?
Impacts to Traffic	Will any major arterial streets be impacted? If the work is not done soon, will the magnitude of the impact to these streets be worse in the future if the work has to be done under emergency conditions?
Impact on Town Development Priorities	How does the project impact economic development within the Town and the Town's development priorities?

Table 2. Rating the Number of People Impacted and Flood Reports

Rating	Report(s) of Flooding
1	0-1
2	2 - 3
3	4 - 6
4	7 - 9
5	10+

In ranking infrastructure projects in localized flooding locations, the Number of People Impacted took into account responses from a survey that was sent to all residents. Table 2 describes the rating methodology.

The Consequence Factor (Q) was then calculated by summing the product of the consequence rating and percent weight for all six categories of consequence for each asset. Table 3 summarizes each impact, or category of consequence, and its weighted value.

$$Q = \sum_{i=1}^{i=6} \left(Q_i \frac{W_i}{W_T} \right)$$

Where:

i = consequence of failure category counter

Q_i = i-th consequence rating ranged from 1-5

W_i = Weight of i-th consequence

W_T = Total Weight

Table 3. Weighted Values per Category of Consequence

Category of Consequence	Weight Value (W _i)	% of Weight
Public Health & Safety	10.0	23.9%
Property Damage	8.0	19.0%
Cost of Deferred Maintenance	8.0	19.0%
People Impacted	6.0	14.3%
Traffic Impacts	6.0	14.3%
Town Development Priorities	4.0	9.5%
Totals	42.0 (W_T)	100.0%

AE 2.0 Likelihood of Failure

Likelihood of Failure was based on the condition of the asset. Three scoring tables were developed to classify the condition of the following assets: streams, drainage infrastructure (as it relates to localized flooding), and culverts. Condition values ranged from one to five with one being the best condition and five being the worst condition. Each value was then assigned a corresponding rating of failure ranging from one to five. The asset's overall Likelihood of failure is equal to the value given to the condition of the asset.

Likelihood of Failure = Overall Condition Value

AE 2.1 Stream Improvement Projects

Stream condition was evaluated based on the following factors: extent of overgrowth, extent of debris within the stream channel, streambank condition and the amount of sediment within the stream channel. Table 4 provides a detailed description for each condition value, along with the likelihood of failure.

Table 4. Stream Improvement Likelihood of Failure

Overall Condition Value	Description	Likelihood of Failure
1	Good – Overgrowth and Debris Within the Stream Channel is Minor; and Sediment Accumulation is < 6”.	1
2	Above Average/ Minor Deferred Maintenance – Overgrowth is Minor to Moderate; Debris within the Stream Channel is Minor to Moderate; Sediment Accumulation within the Stream Channel is between 6” and 12”.	2
3	Average / Major Deferred Maintenance – Overgrowth is Moderate; Debris within the Stream Channel is Moderate; Sediment Accumulation within the Stream Channel is between 12” and 18”.	3
4	Below Average– Overgrowth is Moderate to Severe; Debris within the Stream Channel is Moderate to Severe; Sediment Accumulation within the Stream Channel is between 18” and 24”.	4
5	Failing / Serious Condition – Overgrowth is Severe; Substantial Debris, Including Large Fallen Trees, are Located within the Stream Channel; Sediment Accumulation within the Stream Channel is > 24”.	5

AE 2.2 Localized Flooding Projects

For localized flooding area, the condition of the drainage system, as it relates to the severity of flooding, was evaluated based on the following factors: the adequacy of the existing drainage system, the frequency of maintenance, the number of flooding complaints/frequency of flooding and the extent of flooding (street vs. private property). Table 5 provides a detailed description for each condition value, along with the likelihood of failure.

Table 5. Infrastructure in Localized Flooding Areas Likelihood of Failure

Overall Condition Value	Description	Likelihood of Failure
1	Drainage System Requires Only Routine Maintenance and is Functioning as Designed; Flooding Complaints & Occurrences Are Rare. Flooding is Minimal.	1
2	Above Average/ Minor Deferred Maintenance - Drainage Structures/Pipes Require Minor Repair/Maintenance and/or Expansion (Additional Drainage Structures); Flooding Complaints & Occurrences Happen Occasionally; Flooding is Minor but Occasionally Impacts Private Property.	2
3	Average / Functional - Drainage Structures/Pipes Require Minor to Moderate Repair/Maintenance and/or Expansion (Additional Drainage Structures); Flooding Complaints & Occurrences Happen Occasionally; Flooding is Moderate and Impacts Private Property.	3
4	Below Average /Moderate to Major Deferred Maintenance - Drainage Structures/Pipes Require More Substantial Repairs/Maintenance and/or Expansion (Additional Drainage Structures); Flooding Complaints & Occurrences Happen Regularly; Flooding has a Greater Impact on Private Property.	4
5	Serious Condition / Failing – Drainage System is Failing and in Need of Immediate Attention; Flooding Complaints & Occurrences Are Numerous.	5

AE 2.3 Culvert Projects

Culvert condition was evaluated based on the following factors, where applicable: headwall and wingwall condition, including extent of cracks and spalls; condition of steel beams; presence of exposed rebar; pipe barrel condition; condition of stone masonry walls; depth of sediment within the culvert, and other maintenance issues as noted below. Table 6 provides a detailed description for each condition value, along with the likelihood of failure.

Table 6. Culvert Likelihood of Failure

Overall Condition Value	Description	Likelihood of Failure
1	Good – Culvert Has No Visible Defects and Appears to be Structurally Sound and No Maintenance is Needed at This Time.	1
2	Above Average/ Minor Deferred Maintenance - Sediment Removal Needed (<30%); Minor Concrete Spalling Visible at Headwalls and/or Wingwalls	2
3	Average / Functional – Map Cracks w/Efflorescence Visible at Wing Walls; Missing Bricks, Stone & Mortar Requiring Minor to Moderate Masonry Repair; 30%-60% Sediment Removal Required.	3
4	Below Average / Moderate to Major Deferred Maintenance – Moderate Surface Spalls and/or Cracks Visible at Wingwalls and/or Headwalls; Stone Masonry Walls have Large Areas of Missing Mortar & Loose Stones; Wingwall Needs Repair; Sediment Removal Needed (60-80%); Extensive Concrete Deterioration with Exposed Rebar.	4
5	Serious Condition / Failing – Culvert is At Risk of Imminent Failure – Significant Pipe Deformation and Cracking; Large Sections of Exposed Steel Rebar, Significant Concrete Loss; Undermining of Culvert Walls. >80% Sediment Build Up.	5

Stormwater Capital Improvement Plan - Prioritization Matrix
Chelmsford, MA

Project Type	Project	Project Description / Justification	Overall Condition 5: Worst to 1: Best	CONSEQUENCE OF FAILURE CATEGORIES & WEIGHTS - 1 (Very Little Impact) to 5 (Very High Impact)					Public Health & Safety	Property Damage	Cost of Deferred Maintenance2	Number of People Impacted3	Impacts to Traffic4	Impact on Town Development Priorities5	Sum of Weights 42.6				
				Weight 3.0	Weight 8.0	Weight 8.0	Weight 6.0	Weight 6.0							Condition Likelihood Failure	Likelihood of Failure	Conseq. Factor	Risk Factor	
				Impact to Public Health & Safety	Potential for Property Damage	Cost of Deferred Maintenance	Number of People Impacted	Impacts to Traffic											
Culverts	CU-239-Action Road-Debris Removal/ Inspection	Both inlet and outlet are completely buried under debris. Inlet is in a pond. Water is seeping under roadway, potential undermining may occur. This 60-foot long culvert is an unknown width.	5	3	4	5	4	5	1	0.71	0.76	0.95	0.57	0.71	0.10	5.00	5.00	3.81	190.5
Culverts	CU-61-Cathy Road- Debris Removal/Investigation	Beavers have built a dam at the inlet of pipe, causing homes to flood during rain events. CCTV pipe segment to determine internal defects. Culvert is 24" RCP and 300' long.	5	4	5	4	3	2	1	0.95	0.95	0.76	0.43	0.29	0.10	5.00	5.00	3.48	173.8
Culverts	CU-261-Stony Brook - Meadowbrook Road - Design & Construction of Culvert Improvements	Remove debris. Moderate spalling on wingwall on north end of culvert. Consists of Two 10' wide 50' long box culverts in parallel.	4	5	5	4	4	5	1	1.19	0.95	0.76	0.57	0.71	0.10	4.00	4.00	4.29	171.4
Culverts	CU-307-River Meadow Brook - Tuttle Road - Design & Construction of Culvert Improvements, **	Repair culvert. Pipe broken on north end of culvert. Metal pipe deformed and corroding on south end of culvert. Complete culvert repair to prevent culvert collapse and flooding risk. Culvert is 24" RCP/CMP, 140' long.	5	4	2	4	3	3	5	0.95	0.38	0.76	0.43	0.43	0.48	5.00	5.00	3.43	171.4
Localized Flooding	Flooding Location #2 - Tyngborough Road	Box culvert near #50 Tyngborough Road plugs and floods after a storm. Culvert is approximately 30'x54" made from stone blocks, 50' long.	5	4	4	3	2	5	1	0.95	0.76	0.57	0.29	0.71	0.10	5.00	5.00	3.38	169.0
Stream Maintenance	River Meadow Brook - Stream Maintenance (From Donna Road to Janet Road)	Remove Sediment & Debris; Cut Back Overgrowth / Moderate to severe overgrowth & fallen trees up to 12"; Up to 30" of sediment in stream bed in some areas.	5	3	5	4	5	1	1	0.71	0.95	0.76	0.71	0.14	0.10	5.00	5.00	3.38	169.0
Culverts	CU-7-Deep Brook - #30 Dunshire Drive - Construction of Culvert Improvements**	Replace CMP culvert concrete box culvert. / CMP culvert has rusted out. 96" diameter CMP half-pipe, 45' long.	4	4	5	4	4	2	5	0.95	0.95	0.76	0.57	0.29	0.48	4.00	4.00	4.00	160.0
Culverts	CU-8-Deep Brook - #17 Dunshire Drive - Construction of Culvert Improvements**	Replace CMP culvert with concrete box culvert. / CMP culvert has rusted out. 96" diameter CMP half-pipe, 45' long.	4	4	5	4	4	2	5	0.95	0.95	0.76	0.57	0.29	0.48	4.00	4.00	4.00	160.0
Culverts	CU-208-School Street- Design & Construction of Culvert Improvements.	Repair culvert and headwall. Repair partially collapsed headwall. Remove debris to locate and further inspect this culvert. Culvert is 42" wide made of stone block, 50' long.	4	4	4	4	5	4	4	1	0.95	0.76	0.95	0.57	0.71	4.00	4.00	3.90	156.2
Culverts	CU-12-Wotton Street-Design & Construction of Culvert Improvements**	Repair and Clean. Two culverts both have debris blocking flow. Flow is beginning to go under the rail way abutments. CMP pipe is deteriorated. Culvert composed of 48" CMP and HDPE pipe, 55' long.	4	4	3	5	4	5	1	0.95	0.57	0.95	0.57	0.71	0.10	4.00	4.00	3.86	154.3
Culverts	CU-96-River Meadow Brook - Bonanza Road - Design & Construction of Culvert Improvements	Replace culvert. / Large part of stone masonry walls missing. Roofs visible inside of culvert. Complete culvert repair to prevent culvert collapse and flooding risk. Culvert is 54" RCP, 70' long.	4	5	5	4	4	2	1	1.19	0.95	0.76	0.57	0.29	0.10	4.00	4.00	3.86	154.3
Stream Maintenance	Black Brook - Stream Maintenance (From North Road & Mainwell Road Intersection to Old Middlesex Turnpike)	Remove debris; Cut back overgrowth / Moderate overgrowth & fallen trees up to 24"	4	4	5	5	5	1	1	0.95	0.95	0.95	0.71	0.14	0.10	4.00	4.00	3.81	152.4
Culverts	CU-95-River Meadow Brook - Dakota Drive - Design & Construction of Culvert Improvements	Repair culvert. / Stone masonry walls have almost completely collapsed on north end of culvert. Complete culvert repair to prevent culvert collapse and flooding risk. Culvert is 54" RCP, 75' long.	4	4	5	4	2	5	3	0.95	0.95	0.57	0.29	0.48	0.48	4.00	4.00	3.81	152.4
Localized Flooding	Flooding Location #7 - Graniteville Road	Approximately four houses experience flooding on Graniteville Road. 30" CMP culvert at end of drainage infrastructure is completely rotted out.	4	4	3	5	3	4	3	0.71	0.95	0.57	0.43	0.48	0.48	4.00	4.00	3.71	148.6
Stream Maintenance	Deep Brook - Stream Maintenance (From Seams Pond to East Side of Dunshire Drive)	Rebuild retaining wall. Remove debris; Cut back overgrowth / Moderate overgrowth & fallen trees up to 30"	4	4	5	4	5	1	1	0.95	0.76	0.71	0.43	0.14	0.10	4.00	4.00	3.62	144.8
Culverts	CU-33-Stony Brook - Springfield Terminal Railroad Tracks South of Route 3 - Design & Construction of Culvert Improvements	Repair four culverts. Major spalling along concrete headwalls on east and west end of culverts. Severe deterioration between culverts. Interior erosion of concrete. Rebar exposed on east end of culverts. Complete culvert repairs to prevent culvert collapse and flooding risk. Culvert is 48" RCP and 130' long.	5	3	4	5	1	2	1	0.71	0.95	0.76	0.14	0.29	0.10	5.00	5.00	2.76	138.1
Culverts	CU-26-Stony Brook - Clydesdale Road - Design & Construction of Culvert Improvements	Replace culvert. Half of brick headwall has collapsed on the north end of culvert. Complete culvert repairs to prevent culvert collapse and flooding. Culvert is 40" RCP, 100' long.	4	4	4	4	4	2	1	0.95	0.76	0.76	0.57	0.29	0.10	4.00	4.00	3.43	137.1
Culverts	CU-35-Springfield Terminal Railroad-Structural Investigation	Investigate defects to determine repair or replacement. Large section of exposed rebar and large areas of chipping. Culvert is 48" RCP, 100' long.	4	3	2	5	4	5	1	0.71	0.38	0.95	0.57	0.71	0.10	4.00	4.00	3.43	137.1
Stream Maintenance	River Meadow Brook - Stream Maintenance (East of Janet Road)	Remove sediment; Up to 30" of sediment in stream bed in some areas; Minor debris	4	3	5	4	5	1	1	0.71	0.95	0.76	0.71	0.14	0.10	4.00	4.00	3.38	135.2
Stream Maintenance	River Meadow Brook - Stream Maintenance (From West of Sandra Drive to Donna Road)	Remove sediment & debris; Cut back overgrowth. / Moderate overgrowth & fallen trees up to 12"; Up to 29" of sediment in stream bed in some areas.	4	3	5	4	5	1	1	0.71	0.95	0.76	0.71	0.14	0.10	4.00	4.00	3.38	135.2
Localized Flooding	Flooding Location #5 - Donna Drive	Sandra Drive, Donna Road, and Janet Road all flood at bank crossing after storms.	4	3	5	3	4	4	3	0.71	0.95	0.57	0.43	0.57	0.10	4.00	4.00	3.33	133.3
Stream Maintenance	Deep Brook - Stream Maintenance (East Side of Dunshire Drive to Tyngborough Road)	Remove sediment & debris; Cut back overgrowth. / Moderate overgrowth & fallen trees up to 24"; Up to 24" of sediment in stream bed in some areas.	4	4	5	4	3	1	1	0.95	0.95	0.76	0.43	0.14	0.10	4.00	4.00	3.33	133.3
Culverts	CU-22-Spaulding Road- Debris Removal/Inspection	Clean and inspect. Approximately 15-inches of sediment through the length of pipe. Culvert is 18" RCP and 30' long.	4	4	4	4	3	2	1	0.95	0.76	0.57	0.57	0.29	0.10	4.00	4.00	3.24	129.5
Stream Maintenance	Stony Brook - Stream Maintenance (From Old Westford Road to Northeast of Thomas Drive)	Remove sediment; Cut back overgrowth / Moderate to severe overgrowth, fallen guard rail in stream	4	3	5	4	4	1	1	0.71	0.95	0.76	0.57	0.14	0.10	4.00	4.00	3.24	129.5
Culverts	CU-101-River Meadow Brook - Boston/Concord Road - Design & Construction of Culvert Improvements**	Replace culvert. Stone masonry wall has missing stones on west and east end. Concrete headwall damaged with visible cracks and spalling on east end of culvert. Metal pipe deteriorating on east end of culvert. Complete culvert repairs to prevent culvert collapse and flooding. Culvert is 40" CMP and 175' long.	3	5	4	5	4	5	1	1.19	0.76	0.95	0.57	0.71	0.10	3.00	3.00	4.29	128.6
Culverts	CU-107-River Meadow Brook - Warren Avenue - Design & Construction of Culvert Improvements	Repair culvert. Concrete walls spalling and scaling on north and south ends of the culvert. Complete culvert repairs to prevent culvert collapse and flooding risk. Culvert is 15-wide Concrete Box Culvert, 50' long.	3	5	4	5	4	5	1	1.19	0.76	0.95	0.57	0.71	0.10	3.00	3.00	4.29	128.6
Culverts	CU-100-River Meadow Brook - Pecos Circle - Design & Construction of Culvert Improvements	Repair culvert. / Concrete headwall has large hole. Complete culvert repairs to prevent culvert collapse and flooding risk. Culvert is 54" RCP, 125' long.	4	4	4	4	3	1	1	0.95	0.76	0.76	0.43	0.14	0.10	4.00	4.00	3.14	125.7
Culverts	CU-258-Elm Street- Design & Construction of Culvert Improvements.**	Repair and clean. Both headwalls need to be repaired. The pipe has sediment throughout the length. Culvert is 12" CMP, 25' long.	4	3	3	4	3	4	1	0.71	0.43	0.57	0.43	0.57	0.10	4.00	4.00	3.14	125.7
Stream Maintenance	Black Brook - Stream Maintenance (From Old Middlesex Turnpike to Smith Street)	Remove debris; Cut back overgrowth / Moderate to severe overgrowth & fallen trees up to 24"; Minor sediment build up	4	2	4	5	1	1	1	0.48	0.95	0.76	0.71	0.14	0.10	4.00	4.00	3.14	125.7
Culverts	CU-221-Stony Brook - #276 Old Westford Road - Design & Construction of Culvert Improvements**	Further inspect culvert. / Concrete wall has cracks in east end of culvert. Severely overgrown. Culvert is 24" CMP, 45' long.	4	3	5	3	4	1	1	0.71	0.57	0.57	0.57	0.14	0.10	4.00	4.00	3.05	121.9
Stream Maintenance	River Meadow Brook - Stream Maintenance (From Concord Road to Pecos Circle)	Remove debris; Cut back overgrowth / Moderate to severe overgrowth & fallen trees up to 24"; Minor sediment build up	4	5	4	3	2	1	1	1.19	0.76	0.57	0.29	0.14	0.10	4.00	4.00	3.05	121.9
Stream Maintenance	Black Brook - Stream Maintenance (From East Sheppard Lane to North Road)	Remove debris; Cut back overgrowth / Moderate overgrowth & fallen trees up to 12"	4	2	5	5	3	1	1	0.48	0.95	0.95	0.43	0.14	0.10	4.00	4.00	3.05	121.9
Culverts	CU-306-Beaver Brook - #133 Robin Hill Road - Design & Construction of Culvert Improvements**	Replace CMP culvert with HDPE. CMP culvert has rusted out. Culvert is 12" CMP, 40' long.	5	3	3	2	2	1	1	0.71	0.57	0.57	0.29	0.10	5.00	5.00	2.38	119.0	
Culverts	CU-65-Bentley Lane- Design & Construction of Culvert Improvement **	Replace deteriorated CMP. Build headwall on southern end. Repair headwall on northern end. Culvert is 36" CMP, 130' long.	4	3	3	4	2	1	5	0.71	0.57	0.76	0.29	0.14	0.48	4.00	4.00	2.95	118.1
Stream Maintenance	River Meadow Brook - Stream Maintenance (From Old Stage Road to Sierra Drive)	Remove sediment & debris; Cut back overgrowth / Moderate to severe overgrowth & fallen trees up to 24"; Up to 28" of sediment in stream bed in some areas	4	2	5	3	5	1	1	0.48	0.57	0.57	0.71	0.14	0.10	4.00	4.00	2.95	118.1
Stream Maintenance	Cold Springs Brook- Stream Maintenance (Richardson Road to Route 3)	Remove sediment and dam. Approximately 30 cubic yards total. Removal of fallen trees, 13 trees 6-12", 10 trees <6". Moderate overgrowth the entire length.	4	3	4	4	3	1	1	0.48	0.76	0.76	0.43	0.14	0.10	4.00	4.00	2.90	116.2
Culverts	CU-126-North Road- Design & Construction of Culvert Improvements.**	Repair culvert. CMP has deteriorated and separated from the headwall. The pipe has deteriorated and is allowing soil to fall into the culvert. Culvert is 24" CMP, 60' long.	4	2	3	4	3	4	1	0.48	0.57	0.76	0.43	0.48	0.10	4.00	4.00	2.90	116.2
Stream Maintenance	River Meadow Brook - Stream Maintenance (From Sierra Drive to Dakota Drive)	Remove sediment & debris; Cut back overgrowth. / Moderate overgrowth & fallen trees in stream bed in some areas.	4	3	3	3	1	1	1	0.71	0.95	0.57	0.43	0.10	0.10	4.00	4.00	2.90	116.2
Culverts	CU-23-Stony Brook - Longspur Road - Design & Construction of Culvert Improvements	Repair culvert. Top row of stones in headwall are missing and cracks in headwall on west end of culvert. Rebar exposed on east side of culvert. Complete culvert repairs to prevent culvert collapse and flooding. Culvert is 36" RCP, 105' long.	3	5	5	4	4	2	1	1.19	0.95	0.76	0.57	0.29	0.10	3.00	3.00	3.86	115.7
Culverts	CU-98-River Meadow Brook - Old Stage Road - Design & Construction of Culvert Improvements	Repair culvert. Stone masonry headwalls beginning to fall on west end of culvert. Complete culvert repairs to prevent culvert collapse and flooding risk. Culvert is 48" RCP, 80' long.	3	5	4	5	2	2	1	1.19	0.76	0.76	0.71	0.29	0.10	3.00	3.00	3.81	114.3
Stream Maintenance	Beaver Brook - Stream Maintenance (From Lisa Lane to Southeast of Littleton Road)	Remove Debris; Cut Back Overgrowth / Moderate overgrowth & fallen trees up to 24"	4	3	4	3	4	1	1	0.71	0.76	0.57	0.57	0.14	0.10	4.00	4.00	2.86	114.3
Stream Maintenance	Stony Brook - Stream Maintenance (From Meadowbrook Road to Malbury Street)	Remove debris; Cut back overgrowth / Moderate overgrowth & fallen trees up to 24"	4	3	5	2	4	1	1	0.71	0.95	0.38	0.57	0.14	0.10	4.00	4.00	2.86	114.3
Culverts	CU-255-Pond Street-Design & Construction of Culvert Improvements**	Clean and inspect. Inlet was discovered to be blocked with 10 inches of sediment. Outlet was completely blocked 15 feet in. Investigate connections between the two Culverts is 24" CMP, 130' long.	4	2	4	2	4	3	2	0.48	0.76	0.76	0.43	0.29	0.10	4.00	4.00	2.81	112.4
Localized Flooding	Flooding Location #6 - Lantern Lane	Lantern lane experiences localized flooding.	4	2	5	3	2	3	1	0.48	0.95	0.43	0.29	0.43	0.10	4.00	4.00	2.81	112.4
Stream Maintenance	Black Brook - Stream Maintenance (From Wiggins Street to East Sheppard Lane)	Remove debris; Cut back overgrowth / Moderate overgrowth & fallen trees up to 24"	4	2	5	2	5	1	1	0.48	0.95	0.38	0.71	0.14	0.10	4.00	4.00	2.76	110.5
Culverts	CU-57-Beaver Brook - #133 Robin Hill Road - Design & Construction of Culvert Improvements**	Replace two CMP culverts with HDPE. Both CMP culverts have rusted out. Culverts are 36" CMP, 45' long.	4	2	4	4	2	1	1	0.71	0.76	0.76	0.29	0.14	0.10	4.00	4.00	2.52	101.0
Culverts	CU-105 - Hill Road- Design & Construction of Culvert Improvement. Further Investigation	Repair headwall. Displaced stones have fallen into flow path. Investigate culvert's structural condition to determine any repairs needed. 60" Stone Box Culvert, 40' long.	4	3	3	4	2	2	5	0.95	0.76	0.76	0.29	0.48	0.29	3.00	3.00	3.33	100.0
Culverts	CU-119-Black Brook - Gregory Road - Design & Construction of Culvert Improvements	Repair culvert. Stone masonry wall has missing stones on west end of culvert. Rebar exposed on west end of culvert. Complete culvert repair to prevent culvert collapse and flooding risk. Culvert is 30" RCP, 45' long.	3	4	5	4	2	2	2	0.95	0.95	0.76	0.29	0.29	0.10	3.00	3.00	3.33	100.0
Culverts	Industrial Avenue- Debris Removal/ Inspection	The outlet to this culvert is under water. The inlet seems to be a concrete sediment basin to capture sediment from the landscaping company's yard. Culvert is 8" in diameter, unknown material, approximately 70' long.	5	2	1	3	1	1	5	0.48	0.19	0.57	0.14	0.48	5.00	5.00	2.00	100.0	
Stream Maintenance	Beaver Brook - Stream Maintenance (From Walking Trail to Lisa Lane)	Remove Sediment & Debris; Cut Back Overgrowth / Moderate overgrowth & fallen trees up to 24"; Up to 24" of sediment in stream bed in some areas.	4	2	4	3	1	1	1	0.48	0.76	0.57	0.43	0.10	0.10	4.00	4.00	2.48	99.0
Culverts	CU-226-Riverview Road- Design & Construction of Culvert Improvement.	Replace Pipe. Partial collapse with exposed rebar. Heavy overgrowth at inlet and outlet. Culvert is 18" RCP, 60' long.	4	2	4	3	2	2	2	0.48	0.76	0.57	0.29	0.29	0.10	4.00	4.00	2.48	99.0
Stream Maintenance	River Meadow Brook - Stream Maintenance (From Dakota Drive to Eldorado Road)	Remove Sediment &																	

Storminster Capital Improvement Plan - Prioritization Matrix
Chelmsford, MA

Project Type	Project	Project Description / Justification	Overall Condition 5: Worst to 1: Best	CONSEQUENCE OF FAILURE CATEGORIES & WEIGHTS - 1 (Very Little Impact) to 5 (Very High Impact)								Public Health & Safety	Property Damage	Cost of Deferred Maintenance2	Number of People Impacted3	Impacts to Traffic4	Impact on Town Development Priorities5	Sum of Weights			
				Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight							Condition Likelihood Failure	Likelihood of Failure	Conseq. Factor	Risk Factor
				10.0	8.0	6.0	4.0	2.0	1.0	0.5	0.2										
Stream Maintenance	Beaver Brook - Stream Maintenance (From Galloway Road to Canter Road)	Remove Sediment & Debris; Cut Back Overgrowth / Moderate overgrowth & fallen trees up to 36"; Up to 20" of sediment in stream bed in some areas.	4	1	2	2	4	1	1	0.24	0.38	0.38	0.57	0.14	0.10	4.00	4.00	1.81	72.4		
Stream Maintenance	Stony Brook - Stream Maintenance (From Springfield Terminal Railroad Tracks to Meadowbrook Road)	Remove debris; Cut back overgrowth / Moderate to severe overgrowth & fallen trees up to 24"; Minor sediment build up	4	2	2	2	2	1	1	0.48	0.38	0.38	0.29	0.14	0.10	4.00	4.00	1.76	70.5		
Culverts	CU-139 - Prancing Road - Further Investigation	Use CCTV to determine the inside condition of this culvert. Culvert is 36" RCP / CMP, 290' long.	3	2	2	2	2	1	1	0.48	0.57	0.76	0.29	0.14	0.10	3.00	3.00	2.33	70.0		
Culverts	CU-134 - Acton Road - Debris Removal/Inspection	Clean trash rack. Approximately 6 inches of debris has built up slowing flow from the pond. Culvert is 32" HDPE Pipe, 60' long.	2	3	4	4	4	4	1	0.71	0.76	0.76	0.57	0.57	0.10	2.00	2.00	3.48	69.5		
Culverts	CU-202 - Oak Hill Road - Design & Construction of Culvert Improvement**	Replace deteriorated CMP pipe. Sediment has built up in pipe. Culvert is 18" CMP, 15' long.	5	1	2	2	1	1	1	0.24	0.38	0.38	0.14	0.14	0.10	5.00	5.00	1.38	69.0		
Culverts	CU-97 - River Meadow Brook - Sierra Drive - Design & Construction of Culvert Improvements	Repair culvert. Stone masonry headwalls have some missing mortar and loose stones on north and south end of culvert. Complete culvert repairs to prevent culvert collapse and flooding risk. Culvert is 48" RCP, 60' long.	2	4	4	4	4	2	1	0.95	0.76	0.76	0.57	0.29	0.10	2.00	2.00	3.43	68.6		
Localized Flooding	Flooding Location #3 - Vincent Road	Backyards of homes on Vincent Road, Julio Street, and Dominic Drive Road.	3	2	1	5	3	1	1	0.24	0.95	0.57	0.29	0.14	0.10	3.00	3.00	2.29	68.6		
Stream Maintenance	Stony Brook - Stream Maintenance (From Wetlands North of Jordan Street to Windsor Street)	Remove Debris; Cut Back Overgrowth / Moderate overgrowth & fallen trees up to 24"; Minor sediment build up	3	2	2	2	3	1	1	0.48	0.76	0.38	0.43	0.14	0.10	3.00	3.00	2.29	68.6		
Culverts	CU-248 - Wedgewood - Design & Construction of Culvert Improvement.	Replace Culvert and Repair Headwalls. Culvert has visible aggregate and deep spalling on both headwalls. Moderate overgrowth. Culvert is 36" RCP, 55' long.	4	2	1	2	2	2	2	0.48	0.19	0.38	0.29	0.29	0.10	4.00	4.00	1.71	68.6		
Culverts	CU-45 - Fondy Street - Structural Investigation	Industrial building located on top of a culvert. Investigate this culvert's structural condition to determine any repairs needed. Culvert is 10' wide Concrete/Brick, 250' long.	2	3	5	5	3	2	1	0.71	0.95	0.95	0.43	0.29	0.10	2.00	2.00	3.43	68.6		
Culverts	CU-222 - Westford Street - Debris Removal/Inspection	Pipe is completely full of debris. Investigate pipe to find any defects. Culvert is 12" RCP, 50' long.	3	3	3	2	2	1	1	0.71	0.57	0.38	0.29	0.14	0.10	3.00	3.00	2.19	65.7		
Culverts	CU-247 - Tadnuck Road - Design & Construction of Culvert Improvement	Repair headwall and pipe. Partially collapsed headwall. Exposed rebar on face of pipe. Culvert is 12" RCP, 95' long.	3	3	2	3	2	1	3	0.71	0.29	0.57	0.29	0.14	0.10	3.00	3.00	2.19	65.7		
Stream Maintenance	Beaver Brook - Stream Maintenance (From Pinehill Road to Galloway Road)	Remove debris; Cut back overgrowth / Moderate overgrowth & fallen trees up to 24"	4	2	2	2	1	1	1	0.48	0.38	0.38	0.14	0.14	0.10	4.00	4.00	1.62	64.8		
Culverts	CU-113 - Hornbeam Hill Road - Design & Construction of Culvert Improvement **	Replace CMP culvert with HDPE. CMP culvert has rusted out. Culvert is 24" CMP, 70' long.	4	2	2	2	1	1	1	0.48	0.19	0.57	0.14	0.14	0.10	4.00	4.00	1.62	64.8		
Culverts	CU-59 - Macintosh Road - Further Investigation	Use CCTV to determine the interior condition of this culvert. Culvert is 36" RCP, 210' long.	2	2	2	2	2	2	2	0.38	0.48	0.14	0.29	0.14	0.10	4.00	4.00	2.62	64.8		
Stream Maintenance	River Meadow Brook - Stream Maintenance (From Bilerica Road to Turnpike Road)	Remove debris; Cut back overgrowth / Moderate overgrowth & fallen trees up to 24"	2	4	5	5	1	1	1	0.95	0.95	0.95	0.14	0.10	0.10	2.00	2.00	3.24	64.8		
Culverts	CU-206 - Springfield Terminal Railroad - Structural Investigation	Train tracks spanning over Deep Brook. Investigate this culvert's structural condition to determine any repairs needed. Culvert is 30' wide stone box culvert, 40' long.	2	4	2	3	4	3	1	0.95	0.38	0.76	0.43	0.10	0.10	2.00	2.00	3.19	63.8		
Culverts	CU-388 - Grantville Road - Design & Construction of Culvert Improvement**	Deteriorated CMP. Replace pipe. Rebuild collapsed headwalls. Culvert is 60" Oval CMP, 33' long.	2	3	1	4	4	2	3	0.71	0.48	0.76	0.57	0.48	0.10	2.00	2.00	3.14	62.9		
Culverts	CU-58 - Robbin Hill Road - Design & Construction of Culvert Improvement**	Repair culvert. Rebar exposed on west end of culvert. Spalling on headwall. Complete culvert repair to prevent culvert collapse and flooding risk. Culvert is 36" RCP (inlet) and CMP (outlet), 225' long.	1	2	4	4	1	1	4	0.95	0.76	0.57	0.57	0.14	0.10	3.00	3.00	3.10	61.9		
Culverts	CU-252 - Acton Road - Design & Construction of Culvert Improvement	Partial headwall collapse. Moderate overgrowth. Culvert is 36" RCP, 70' long.	3	2	2	2	2	3	2	0.48	0.29	0.38	0.29	0.14	0.10	2.00	2.00	2.05	61.4		
Culverts	CU-53 - Acton Road - Design & Construction of Culvert Improvement	Repair headwall. Headwall has separated from pipe. Culvert is 27" RCP, 45' long.	3	2	2	2	2	2	2	0.48	0.38	0.38	0.29	0.14	0.10	2.00	2.00	2.05	61.4		
Culverts	CU-224 - North Road - Design & Construction of Culvert Improvements	Repair headwall. Patch Spalling located on concrete surfaces. Culvert is 24" RCP, 55' long.	2	4	2	2	2	2	2	0.95	0.38	0.57	0.57	0.10	0.10	2.00	2.00	2.95	59.0		
Stream Maintenance	Stony Brook - Stream Maintenance (From Windsor Street to Longspur Road)	Remove debris; Cut back overgrowth / Moderate overgrowth & fallen trees up to 24"	2	2	5	5	1	2	1	0.95	0.57	0.71	0.38	0.14	0.10	2.00	2.00	2.95	59.0		
Stream Maintenance	River Meadow Brook - Stream Maintenance (From Boston Road to Family Brook Split)	Remove debris; Cut back overgrowth / Moderate overgrowth & fallen trees up to 24"	2	4	4	4	2	2	2	0.95	0.76	0.76	0.14	0.10	0.10	2.00	2.00	2.86	57.1		
Culverts	CU-213 - Glen Avenue - Debris Removal/Inspection	Approximately 5-8 inches of sediment in pipe. Culvert is 18" HDPE Pipe, 65' long.	3	2	2	2	2	2	2	0.48	0.29	0.29	0.29	0.10	0.10	3.00	3.00	1.90	57.1		
Culverts	CU-147 - Bilerica Road - Further Investigation	Use CCTV to determine the inside condition of this culvert. Culvert is 36" RCP, 110' long.	2	2	2	2	2	3	2	0.48	0.38	0.29	0.43	0.29	0.10	2.00	2.00	2.81	56.2		
Culverts	CU-235A - Misty Meadow Road - Design & Construction of Culvert Improvement.	Repair / Replacement. Partial pipe collapse within pipe. Culvert is 60" RCP, 20' long.	4	2	1	1	1	1	1	0.38	0.48	0.38	0.14	0.10	0.10	4.00	4.00	1.38	55.4		
Culverts	CU-263 - River Meadow Brook - Bilerica Road - Design & Construction of Culvert Improvement	Repair culvert. Minor chipping exposing small segments of rebar on the face. Culvert is 16-foot wide concrete box culvert, 50' long.	2	3	1	1	3	4	5	0.71	0.19	0.38	0.43	0.57	0.48	2.00	2.00	2.76	55.2		
Stream Maintenance	Beaver Brook - Stream Maintenance (From Hunt Road to Walking Trail)	Remove debris; Cut Back Overgrowth / Moderate overgrowth & fallen trees up to 24"	2	2	2	2	2	1	1	0.48	0.38	0.38	0.29	0.14	0.10	3.00	3.00	2.76	52.9		
Culverts	CU-223 - Westford Street - Design & Construction of Culvert Improvements	Repair shifting headwalls. Remove debris from the culvert. Culvert is 12" RCP, 50' long.	3	2	2	2	2	1	2	0.48	0.38	0.38	0.29	0.14	0.10	3.00	3.00	1.76	52.9		
Stream Maintenance	Stony Brook - Stream Maintenance (From Westford/Chelmsford Line to School Street)	Remove sediment & debris. Fallen trees. Up to 20" of sediment in stream bed in some areas.	3	2	2	2	2	1	2	0.48	0.38	0.38	0.29	0.14	0.10	3.00	3.00	1.76	52.9		
Culverts	CU-169 - Boston Road - Further Investigation	Use CCTV to determine the internal condition of this culvert. 48" box culvert, 230' long.	2	2	2	2	2	2	2	0.48	0.48	0.48	0.29	0.14	0.10	2.00	2.00	2.57	51.4		
Culverts	CU-203 - Swain Road - Debris Removal/Inspection	Approximately 95% clogged. Culvert is 12" RCP, 35' long.	5	1	1	1	1	1	1	0.24	0.19	0.14	0.14	0.10	0.10	5.00	5.00	1.00	50.0		
Culverts	CU-1 - Dunstable Road - Design & Construction of Culvert Improvement.	Rebuild Headwalls. Both headwalls are partially collapsed. Culvert is 30" in diameter; Half is PVC, the other is HDPE, 55' long.	3	1	1	1	2	3	2	0.24	0.19	0.38	0.29	0.14	0.10	3.00	3.00	1.62	48.6		
Culverts	CU-16 - Dayton Street - Design & Construction of Culvert Improvement	Rebuild Headwalls. Both headwalls are partially collapsed. Culvert is 32" RCP, 100' long.	3	2	2	2	1	1	1	0.48	0.38	0.38	0.14	0.14	0.10	3.00	3.00	1.62	48.6		
Culverts	CU-204 - Welman Road - Debris Removal/Inspection	Approximately 50% clogged. Culvert is 28" CMP, 30' long.	3	2	2	2	3	2	1	0.24	0.19	0.38	0.29	0.14	0.10	3.00	3.00	1.62	48.6		
Culverts	CU-207 - Hollow Ridge Road - Further Investigation	Use CCTV to determine the inside condition of this culvert. Culvert is 18" RCP, 100' long.	3	3	1	1	1	1	1	0.48	0.38	0.38	0.29	0.14	0.10	3.00	3.00	1.62	48.6		
Culverts	DD211 - Lloyds-Moscan Lane - Debris Removal / Inspection	Bark mulch and leaves have settled at the inlet and outlet of this culvert. Approximately 60% blocked. Culvert is 12" RCP, 115' long.	3	2	1	2	1	1	1	0.48	0.38	0.38	0.14	0.14	0.10	3.00	3.00	1.62	48.6		
Culverts	CU-62 - Livery Road - Design & Construction of Culvert Improvement**	Replace 42" Oval CMP with HDPE. Section is 75 feet long. Culvert is 98 Livery Road.	3	2	1	2	1	1	1	0.48	0.14	0.14	0.14	0.10	0.10	3.00	3.00	1.62	48.6		
Culverts	CU-235A - Misty Meadow Road - Design & Construction of Culvert Improvement	Replace both culverts due to deterioration and sediment. Culverts area 24" RCP / CMP, each 20' long.	4	1	1	1	1	1	1	0.24	0.14	0.14	0.14	0.10	0.10	4.00	4.00	1.19	47.4		
Culverts	Unmapped @ Shore Drive and Spring Street - Debris Removal/Inspection	This culvert is approximately 50% full of sediment. Culvert is 48" CMP, 15' long.	3	2	2	2	2	1	2	0.48	0.19	0.38	0.29	0.14	0.10	3.00	3.00	1.57	47.1		
Culverts	CU-124 - Main Street - Debris Removal/Inspection	Approximately 20% full of debris. Culvert is 48" RCP, 80' long.	2	2	2	2	2	2	2	0.48	0.38	0.38	0.29	0.14	0.10	2.00	2.00	2.29	45.7		
Culverts	CU-211 - Grandview Drive - Design & Construction of Culvert Improvement	Minor debris build up within pipe. Partial headwall collapse on both sides. Culvert is 18" PVC Pipe, 60' long.	2	2	2	2	2	2	2	0.48	0.29	0.76	0.29	0.14	0.10	2.00	2.00	2.29	45.7		
Culverts	CU-73 - Beaver Brook - High Street - Debris Removal/Inspection	Debris blocking flow from entering the culvert. Culvert is 36" RCP, 45' long.	2	2	2	2	2	2	2	0.48	0.38	0.38	0.29	0.14	0.10	2.00	2.00	2.29	45.7		
Culverts	CU-225 - Lincoln Street - Debris Removal/Inspection	Inlet and outlet have debris that is interfering with the flow. Culvert is 12" RCP, 85' long.	3	2	2	2	2	2	2	0.48	0.38	0.38	0.29	0.14	0.10	2.00	2.00	2.29	45.7		
Culverts	Canal Street 3 - Design & Construction of Culvert Improvement	Replace pipe. Both CMP pipes are submerged and deteriorated. Culvert is 24" CMP, 40' long.	3	3	1	1	1	1	1	0.71	0.19	0.14	0.14	0.10	0.10	3.00	3.00	1.48	44.3		
Culverts	CU-15 - Bradford Road - Design & Construction of Culvert Improvement**	Sediment built up needs to be removed to further evaluate culvert. Measured to be three inches, but the pipe is 48" in diameter. CMP is also likely to be deteriorated under the sediment. Culvert is 48' long.	3	2	2	2	2	2	1	0.71	0.38	0.38	0.29	0.14	0.10	2.00	2.00	2.14	42.9		
Culverts	CU-75 - Clover Hill Drive - Design & Construction of Culvert Improvement**	Replace 30" CMP culvert with HDPE. Section is 35 feet long. Located within the towns selected high priority area.	2	3	2	2	2	2	2	0.48	0.38	0.38	0.29	0.14	0.10	2.00	2.00	2.14	42.9		
Culverts	CU-141 - Getting Road - Further Investigation	Use CCTV to determine the inside condition of this culvert. Culvert is 24" RCP, 85' long.	3	1	3	3	1	1	1	0.24	0.19	0.57	0.14	0.14	0.10	3.00	3.00	1.38	41.4		
Culverts	CU-201 - Leidge Road - Debris Removal/Inspection	Repair headwall. Moderate stone displacement on the headwall. Culvert is 36" RCP, 45' long.	3	1	2	2	2	2	2	0.48	0.38	0.38	0.29	0.14	0.10	3.00	3.00	1.48	41.4		
Culverts	CU-228 - Moore Street - Debris Removal/Inspection	Remove overgrowth from east end of pipe. Remove debris from the inside of pipe and further investigate any defects. Culvert is 18" RCP, 80' long.	3	1	1	3	1	1	1	0.24	0.14	0.57	0.14	0.10	0.10	3.00	3.00	1.38	41.4		
Culverts	CU-6 - Dunstable Road - Debris Removal/Inspection	Remove tree blocking flow. Moderate overgrowth along headwall. Culvert is 40' wide, 20' long stone box culvert.	2	2	2	2	3	2	3	0.48	0.29	0.38	0.43	0.29	0.10	2.00	2.00	2.05	41.0		
Culverts	CU-232 - Westford Street - Debris Removal/Inspection	Moderate overgrowth on western headwall. Culvert is 24" PVC Pipe, 20' long.	2	2	2	2	2	2	2	0.48	0.38	0.38	0.29	0.14	0.10	2.00	2.00	2.05	41.0		
Culverts	CU-205 - Dunstable Road - Further Investigation	Use CCTV to determine the inside condition of this culvert. Culvert is 36" RCP, 165' long.	2	2	2	3	3	3	2</												

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				Weight	Weight	Weight	Weight	Weight							Condition Likelihood Failure	Likelihood of Failure	Conseq. Factor	Risk Factor
				3.0	8.0	8.0	6.0	6.0										
Culverts	CU-121 - Old Westford Road - Further Investigation	Use CCTV to determine the internal condition of this 48" PVC culvert that is 50' long	1	2	1	1	2	1	0.48	0.19	0.19	0.29	0.43	0.10	1.00	1.00	1.67	16.7
Culverts	CU-114 - Dalton Road - Debris Removal/Inspection	Remove vegetation at outlet and inspect outlet headwall. Culvert is 24" HDPE Pipe, 65' long.	1	2	2	2	1	2	0.48	0.38	0.19	0.14	0.29	0.10	1.00	1.00	1.57	15.7
Culverts	CU-123 - Black Brook - Elin Road - Further Investigation	CCTV both 24" and 30" HDPE culvert pipes. A total of 460'.	1	2	2	1	2	0.48	0.38	0.19	0.29	0.14	0.29	0.10	1.00	1.00	1.57	15.7
Culverts	CU-47 - Mill Road	No Defects. Four 15" wide concrete box culverts, 40' long.	1	2	1	1	2	0.48	0.19	0.19	0.29	0.14	0.29	0.10	1.00	1.00	1.52	15.2
Culverts	CU-340 - Meadow Brook Road	No Defects. Four 48" RCP culverts, each 45' long.	1	1	2	2	2	0.24	0.38	0.19	0.29	0.14	0.29	0.10	1.00	1.00	1.48	14.8
Culverts	Canal Street-2 Debris - Design & Construction of Culvert Improvement	Redesign and rebuild headwalls. 12" Ductile Iron Culvert, 32' long.	1	3	1	1	1	0.71	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.48	14.8	
Culverts	CU-122 - Black Brook - East Shepard Lane - Further Inspection	CCTV both the 24" and 30" PVC pipes, both 280' long.	1	2	2	1	1	0.48	0.38	0.19	0.14	0.14	0.10	1.00	1.00	1.43	14.3	
Culverts	CU-243 - Eugenie Terrace - Debris Removal/Inspection	Remove vines growing on headwall. Culvert is 24" PVC Pipe, 60' long.	1	2	2	1	1	0.48	0.38	0.19	0.14	0.14	0.10	1.00	1.00	1.43	14.3	
Culverts	CU-250 - Brush Hill Road - Further Investigation	Use CCTV to determine the inside condition of this culvert. Culvert is 12" RCP, 90' long.	1	2	2	1	1	0.48	0.38	0.19	0.14	0.14	0.10	1.00	1.00	1.43	14.3	
Culverts	CU-251 - Boston Road - Further Investigation	Use CCTV to determine the inside condition of this culvert. Culvert is 30" HDPE Pipe, 60' long.	1	2	1	2	1	0.48	0.38	0.19	0.14	0.14	0.10	1.00	1.00	1.43	14.3	
Culverts	CU-259 - Natick Road	No Defects. Culvert is 36" RCP, 75' long.	1	2	2	1	1	0.48	0.38	0.19	0.14	0.14	0.10	1.00	1.00	1.43	14.3	
Culverts	CU-40 - Old Westford Road - Debris Removal/Inspection	Remove vegetation from inlet headwall. Culvert is 24" HDPE Pipe & RCP, 60' long.	1	1	1	2	3	0.24	0.19	0.19	0.29	0.43	0.10	1.00	1.00	1.43	14.3	
Culverts	CU-67 - Fox Hunt Condominiums - Design & Construction of Culvert Improvement	Patch exposed brick on North end of headwall. Culvert is 80" HDPE, 50' long.	1	2	2	1	1	0.48	0.38	0.19	0.14	0.14	0.10	1.00	1.00	1.43	14.3	
Culverts	CU-84 - River Meadow Brook - Term Road - Design & Construction of Culvert Improvement	Replace Culvert with a circular RCP with the equivalent area. 48" Concrete box culvert, 60' long.	1	1	2	2	1	0.24	0.38	0.19	0.14	0.14	0.10	1.00	1.00	1.38	13.8	
Culverts	CU-136 - Beaver Brook - Galloway Road - Debris Removal/Inspection	Remove debris at inlet of culvert. Culvert is 40" RCP Pipe, 70' long.	1	1	2	1	2	0.24	0.38	0.19	0.14	0.29	0.10	1.00	1.00	1.33	13.3	
Culverts	CU-144 - Bridge Street - Further Investigation	Drainage infrastructure mapping is incomplete. Launch investigation to map connectivity and structures. Culvert is 30" RCP, 50' long.	1	1	2	1	2	0.24	0.38	0.19	0.14	0.29	0.10	1.00	1.00	1.33	13.3	
Culverts	CU-120 - Black Brook - Old Middlesex Turnpike - Design & Construction of Culvert Improvement	Replace retaining wall. Retaining wall is leaning. Culvert is 24" HDPE Pipe, 45' long.	1	1	1	2	2	0.24	0.19	0.19	0.29	0.29	0.10	1.00	1.00	1.29	12.9	
Culverts	CU-58 - Beaver Brook - Lisa Lane - Debris Removal/Inspection	Remove debris inside culvert. Further inspect for additional defects. Remove fallen tree. Culvert is 30" HDPE Pipe, 120' long.	1	2	1	1	1	0.48	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.24	12.4	
Culverts	CU-93 - Watershed Lane	No Defects. Culvert is 72" RCP, 50' long.	1	2	1	1	1	0.48	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.24	12.4	
Culverts	CU-148 - Vincent Road - Further Investigation	Use CCTV to determine the inside condition of this culvert. Culvert is 36" PVC Pipe, 340' long.	1	1	2	1	1	0.24	0.38	0.19	0.14	0.14	0.10	1.00	1.00	1.19	11.9	
Culverts	CU-79 - Cutting Place - Debris Removal/Inspection	Remove all moss and vegetation growing on culvert and wingwalls. 96" Concrete Box Culvert, 40' long.	1	1	2	1	1	0.24	0.38	0.19	0.14	0.14	0.10	1.00	1.00	1.19	11.9	
Culverts	CU-130 - Parkhurst Road	No Defects. Culvert is 48" RCP, 40' long.	1	1	1	1	2	0.24	0.19	0.19	0.14	0.29	0.10	1.00	1.00	1.14	11.4	
Culverts	CU-145 - Oak Knoll Avenue	No Defects. 15" wide concrete box culvert, 70' long.	1	1	1	1	2	0.24	0.19	0.19	0.14	0.29	0.10	1.00	1.00	1.14	11.4	
Culverts	CU-234 - Moore Street - Debris Removal/Inspection	Remove sediment in pipe and inspect any covered defects. Culvert is 36" RCP, 45' long.	1	1	1	1	2	0.24	0.19	0.19	0.14	0.29	0.10	1.00	1.00	1.14	11.4	
Culverts	CU-262 - Shedd Lane - Debris Removal/Inspection	Remove debris from the interior of the culvert and inspect for any covered defects. Culvert is 18" RCP, 80' long.	1	1	1	1	2	0.24	0.19	0.19	0.14	0.29	0.10	1.00	1.00	1.14	11.4	
Culverts	CU-301 - Stony Brook - Windsor Street - Further Inspection	CCTV 190' long 40" diameter RCP culvert.	1	1	1	1	2	0.24	0.19	0.19	0.14	0.29	0.10	1.00	1.00	1.14	11.4	
Culverts	CU-66 - Longmeadow Road	No Defects. Culvert is 18" HDPE, 50' long.	1	1	1	1	2	0.24	0.19	0.19	0.14	0.29	0.10	1.00	1.00	1.14	11.4	
Culverts	CU-104 - Parker Road	No Defects. Culvert is 24" HDPE Pipe, 50' long.	1	1	1	1	1	0.24	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.00	10.0	
Culverts	CU-11 - Butterfield Street - Debris Removal	Remove vegetation in stream and on headwall. 60" wide Box Culvert, 40' long.	1	1	1	1	1	0.24	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.00	10.0	
Culverts	CU-118 - Black Brook - Claude Road - Debris Removal/Inspection	Remove vegetation and debris from culvert. Further inspect the interior of the pipe and headwalls. Culvert is 30" RCP, 75' long.	1	1	1	1	1	0.24	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.00	10.0	
Culverts	CU-132 - Higate Road - Further Investigation	Use CCTV to determine the internal condition of this culvert. Culvert is 24" RCP, 370' long.	1	1	1	1	1	0.24	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.00	10.0	
Culverts	CU-134 - Weston Street	No Defects. 60" wide Concrete Box Culvert, 30' long.	1	1	1	1	1	0.24	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.00	10.0	
Culverts	CU-17 - Deval Drive - Debris Removal/Inspection	Remove all debris from inside of culvert and inspect for ties. Culvert is 32" RCP, 100' long.	1	1	1	1	1	0.24	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.00	10.0	
Culverts	CU-233 - St. Josephs Cemetery	No Defects. Culvert is 36" RCP, 45' long.	1	1	1	1	1	0.24	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.00	10.0	
Culverts	CU-260 - Elm Street	No Defects. Culvert is 18" RCP, 70' long.	1	1	1	1	1	0.24	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.00	10.0	
Culverts	CU-3 - Dunstable Road - Design & Construction of Culvert Improvement	Repair headwall. Minor headwall displacement. Culvert is 30" HDPE Pipe, 20' long.	1	1	1	1	1	0.24	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.00	10.0	
Culverts	CU-311 - Black Brook - North Road	No Defects. Culvert is 30" RCP, 80' long.	1	1	1	1	1	0.24	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.00	10.0	
Culverts	CU-48 - Richardson Road	No Defects. Culvert is 24" HDPE Pipe, 25' long.	1	1	1	1	1	0.24	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.00	10.0	
Culverts	CU-49 - Richardson Road	No Defects. Culvert is 24" HDPE Pipe, 50' long.	1	1	1	1	1	0.24	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.00	10.0	
Culverts	CU-72 - Beaver Brook - Bruce Freeman Rail Trail	No Defects. 144" Stone Box Culvert, 30' long.	1	1	1	1	1	0.24	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.00	10.0	
Culverts	00796C1021 - Arms Way - Further Investigation	Use CCTV to determine the inside condition of this culvert. Culvert is 18" HDPE/RCP/PVC Pipe, 145' long.	1	1	1	1	1	0.24	0.19	0.19	0.14	0.14	0.10	1.00	1.00	1.00	10.0	

** Indicates that the culvert is currently made from CMP. The Town would like to replace all CMP culverts.