

MEMORANDUM

David Desrosiers, P.E., Highway Superintendent, Town of Granby
Julianne Busa, PhD, Sarah Hayden, MSc
March 18, 2021
MS4 Catchment Investigations

This memorandum summarizes the methods and results of an initial catchment investigation to detect potential illicit discharges in the Town of Granby's regulated stormwater system. This work supports the Town's compliance with Section 2.3.4.8 of the 2016 Massachusetts MS4 General Permit, which requires such catchment investigations as part of an illicit discharge detection and elimination (IDDE) program.

Methods

System Vulnerability Factors

Per MS4 requirements, system vulnerability factors (SVFs) were screened for each catchment with an outfall in the MS4 regulated area in accordance with the screening factors identified in Section 2.3.4.8.c.i of the MS4 Permit. Catchments in Town were screened for the presence of:

- History of sanitary sewer overflows (SSOs)
- Common or twin invert manholes
- Common trench construction
- Storm/sanitary crossings (sanitary sewer located above stormwater system)
- Sanitary lines with underdrains
- Inadequate level of sanitary service
- Areas formerly served by combined sewers
- Sanitary infrastructure defects

Screening for SVFs began with a desktop GIS analysis of sanitary and storm sewer data, where available, to identify potential intersections of sanitary sewer above the stormwater system or other areas where the two systems are in close alignment, increasing the potential for illicit discharges. Local knowledge from Town staff provided supplemental insight into potential areas in Town with a history of sanitary sewer overflows, and areas formerly served by combined sewers (none). Field observations of structures during catchment investigations were used to provide additional information and confirm the presence or absence of SVFs.

Results for the screening factors are included in **Attachment 1**. No catchments within the MS4 regulated area were identified as having any SVFs. This finding is not unexpected, as the Town's infrastructure is relatively new and assumed to be in good condition. As such, wet weather screening was not required for any catchments.



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Catchment Investigations

Pursuant to Section 2.3.4.8.c.ii, key junction structures¹ were identified for each catchment with an outfall located in the regulated area.² Where a given catchment does not contain any junction structures (i.e. where the alignment is straight and un-branching), the permit allows the previously conducted dry weather screening and sampling to be considered as meeting the manhole inspection requirement. Dry weather screenings (<0.1 inches of precipitation in the past 24 hours) were conducted for each key junction structure. Each structure was screened for flow as well as visual or olfactory evidence of illicit discharges (e.g., excrement, toilet paper, gray filamentous bacterial growth, or sanitary products present). If visual and olfactory evidence of illicit discharge was observed, the catchment was flagged for additional upstream structure observation. If flow was observed at a structure, a sample was taken to measure ammonia, chlorine, and surfactants. Detailed information on the findings of each structure is available in **Attachment 2**. In accordance with the permit, samples were considered indicative of likely sewer inputs when all three of the following indicators were present: ammonia levels \geq 0.5 mg/L, surfactant levels \geq 0.25 mg/L, and detectable levels of chlorine. Samples exhibiting all three of these indicators would require follow-up source tracing. Catchments with definitive visual or olfactory evidence of sewage also require follow-up source tracing.

Results and Recommendations

Dry weather catchment investigations were conducted on September 25th, October 15th, October 22nd, and November 17th, 2020. A total of 109 observations for 96 structures in 91 catchments were screened. Structures in catchments 007, 008, 0131, and 0055 were paved or sealed shut and were unable to be inspected. Catchments 0057, 0061, 0071, and 0075 have cement-top stormwater structures and were also unable to be inspected. These eight catchments contain no key junction structures and dry weather outfall screening for these catchments from July/August 2019 indicates no flow or evidence of illicit discharges. As a result, outfall screening results are sufficient evidence to consider the catchment investigations complete; no follow-up is required at these locations.

 $F: P2019 \\ 1119 \\ A10 \\ Deliverables \\ Report \\ CatchmentInvestigation \\ Memo20210225 \\ SH. docx \\ Deliverables \\ Report \\ CatchmentInvestigation \\ Memo20210225 \\ SH. docx \\ Deliverables \\ Report \\ CatchmentInvestigation \\ Memo20210225 \\ SH. docx \\ Deliverables \\ Report \\ CatchmentInvestigation \\ Memo20210225 \\ SH. docx \\ Deliverables \\ Report \\ CatchmentInvestigation \\ Memo20210225 \\ SH. docx \\ Deliverables \\ Report \\ CatchmentInvestigation \\ Memo20210225 \\ SH. docx \\ Deliverables \\ Report \\ Report \\ Report \\ SH. docx \\$

¹ As defined in Appendix A of the MS4 Permit: "Key Junction Manhole – For the purposes of this permit, key junction manholes are those junction manholes that can represent one or more junction manholes without compromising adequate implementation of the illicit discharge program. Adequate implementation of the illicit discharge program would not be compromised if the exclusion of a particular junction manhole as a key junction manhole would not affect the permittee's ability to determine the possible presence of an upstream illicit discharge. A permittee may exclude a junction manhole located upstream from another located in immediate vicinity or that is serving a drainage alignment with no potential for illicit connection." A "Junction Manhole" is defined as "For the purposes of this permit, a junction manhole is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes." In the case of alignments with only catch basins and no manholes, catch basins were substituted in as key junction structures.

² If pre-determined key junction structure was inaccessible, a structure directly upstream or downstream was substituted for investigation.



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The key findings of the catchment investigations were as follows:

- Dry weather flow was detected during only one structure inspection (catchment 0107). A sample was collected and tested for ammonia, chlorine, and surfactants. The sample showed exceedances for chlorine and surfactants but not for ammonia. As such, no additional follow-up screening is required as it does not trigger the exceedance threshold for all three criteria. This catchment also has no key junction structure and July/August 2019 dry weather screening results for the associated outfall revealed no evidence of illicit discharges.
- Damp pipes were discovered at 25 structures in catchments across the Town's regulated area (Attachment 2). Because there was no active flow at the time of field visits, samples could not be obtained. All but one of these catchments is on a straight alignment without key junction structures. Locations with damp pipes were cross-referenced with dry weather screening results from July/August 2019. Records indicated that a "trickle" of flow was observed at the outfall at time of screening at two locations (Outfall 82 and Outfall 91). A sewage smell was recorded during screening for outfall 127. It is therefore recommended that the Town conduct a follow-up inspection at structures in these three catchments (82, 91, and 127) within the year to gather additional information/confirm that no illicit discharges are present. One damp pipe was detected in a catchment with a key junction structure (Catchment 0082). This catchment should also be monitored for follow-up to determine if dry weather flow is present.
- Potential visual evidence of illicit discharge (oily sheen) was noted for structures at two catchments (catchments 0113 and 0096; photos were taken, but due to the depth/angle they do not capture what was observed in person), both of which are on straight alignments without key junction structures. Dry weather outfall screening results from July/August 2019 indicate no flow and no evidence of illicit discharge. As such, illicit discharges at these structures and within these catchments is unlikely (oily sheens can be produced by a number of causes unrelated to illicit discharges). We recommended that the Town conduct follow-up inspections at these locations within a year.
- Potential olfactory evidence of illicit discharge was discovered at six catchments. A musty odor was recorded for five structures (catchment 0068, 0030, 0079, 0081, and 0130), and a sewage/rotten eggs smell was recorded at a sixth (catchment 0030; structure 0403). Of these, only catchment 0081 contains a key junction structure; the remainder of the catchments are on straight, unbranching alignments. Dry weather outfall screening results from July/August 2019 indicate that evidence of illicit discharge was not present at any of the associated outfalls. Because a musty odor may be present as a result of normal conditions and no other indicators suggested an illicit discharge, we do not suspect an illicit discharge within those five catchments, but it is recommended that the Town perform follow-up inspections within one year. Additional follow-up is required for catchment 0030, where a sewage smell was recorded. The Town should undergo source-tracing at that catchment to determine the source of the odor and



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correct any illicit discharges.

Attachments:

SVF Screening Table Catchment Investigation Results



Attachment 1

SVF Screening Table

Outfall Catchment System Vulnerability Factor (SVF) Inventory Granby, Massachusetts Revision Date: January 28, 2021

	1	2	3	4	5	6	7	8
Outfall ID	History of	Common or	Common	Storm/Sanitary	Sanitary Lines	Inadequate	Areas Formerly	Sanitary
Outrainin	History of SSOs	Twin Invert	Trench	Crossings	with	Sanitary Level	Served by	Infrastructure
	3305	Manholes	Construction	(Sanitary Above)	Underdrains	of Service	Combined Sewers	Defects
1	No	No	No	No	No	No	No	No
2	No	No	No	No	No	No	No	No
3	No	No	No	No	No	No	No	No
4	No	No	No	No	No	No	No	No
5	No	No	No	No	No	No	No	No
6	No	No	No	No	No	No	No	No
7	No	No	No	No	No	No	No	No
8	No	No	No	No	No	No	No	No
9	No	No	No	No	No	No	No	No
10	No	No	No	No	No	No	No	No
11	No	No	No	No	No	No	No	No
12	No	No	No	No	No	No	No	No
13	No	No	No	No	No	No	No	No
14	No	No	No	No	No	No	No	No
15	No	No	No	No	No	No	No	No
16	No	No	No	No	No	No	No	No
17	No	No	No	No	No	No	No	No
18	No	No	No	No	No	No	No	No
19	No	No	No	No	No	No	No	No
20	No	No	No	No	No	No	No	No
21	No	No	No	No	No	No	No	No
22	No	No	No	No	No	No	No	No
24	No	No	No	No	No	No	No	No
25	No	No	No	No	No	No	No	No
26 28	No No	No No	No No	No No	No No	No No	No No	No No
28	No	No	No	No	NO	No	No	No
30	No	No	No	No	No	No	No	No
30	No	No	NO	NO	NO	No	No	No
31	No	No	No	No	No	No	No	No
33	No	No	No	No	No	No	No	No
33	No	No	No	No	No	No	No	No
35	No	No	No	No	No	No	No	No
36	No	No	No	No	No	No	No	No
37	No	No	No	No	No	No	No	No
38	No	No	No	No	No	No	No	No
39	No	No	No	No	No	No	No	No
40	No	No	No	No	No	No	No	No
41	No	No	No	No	No	No	No	No
42	No	No	No	No	No	No	No	No
43	No	No	No	No	No	No	No	No
44	No	No	No	No	No	No	No	No
45	No	No	No	No	No	No	No	No
46	No	No	No	No	No	No	No	No
47	No	No	No	No	No	No	No	No
48	No	No	No	No	No	No	No	No
49	No	No	No	No	No	No	No	No
50	No	No	No	No	No	No	No	No
51	No	No	No	No	No	No	No	No
52	No	No	No	No	No	No	No	No
53	No	No	No	No	No	No	No	No
54	No	No	No	No	No	No	No	No

Outfall Catchment System Vulnerability Factor (SVF) Inventory Granby, Massachusetts Revision Date: January 28, 2021

	1	2	3	4	5	6	7	8
Outfall ID		Common or	Common	Storm/Sanitary	Sanitary Lines	Inadequate	Areas Formerly	Sanitary
Outfall ID	History of	Twin Invert	Trench	Crossings	with	Sanitary Level	Served by	Infrastructure
	SSOs	Manholes	Construction	(Sanitary Above)	Underdrains	of Service	Combined Sewers	Defects
55	No	No	No	No	No	No	No	No
56	No	No	No	No	No	No	No	No
57	No	No	No	No	No	No	No	No
58	No	No	No	No	No	No	No	No
59	No	No	No	No	No	No	No	No
61	No	No	No	No	No	No	No	No
62	No	No	No	No	No	No	No	No
63	No	No	No	No	No	No	No	No
64	No	No	No	No	No	No	No	No
65	No	No	No	No	No	No	No	No
66	No	No	No	No	No	No	No	No
67	No	No	No	No	No	No	No	No
68	No	No	No	No	No	No	No	No
69	No	No	No	No	No	No	No	No
70	No	No	No	No	No	No	No	No
71	No	No	No	No	No	No	No	No
72	No	No	No	No	No	No	No	No
73	No	No	No	No	No	No	No	No
74	No	No	No	No	No	No	No	No
75	No	No	No	No	No	No	No	No
76	No	No	No	No	No	No	No	No
77	No	No	No	No	No	No	No	No
78	No	No	No	No	No	No	No	No
79	No	No	No	No	No	No	No	No
80	No	No	No	No	No	No	No	No
81	No	No	No	No	No	No	No	No
82	No	No	No	No	No	No	No	No
83	No	No	No	No	No	No	No	No
84	No	No	No	No	No	No	No	No
85	No	No	No	No	No	No	No	No
86	No	No	No	No	No	No	No	No
87 88	No No	No No	No No	No No	No No	No No	No No	No No
		-	-					
89 90	No No	No No	No No	No No	No No	No No	No No	No No
90	NO	No	No	No	No	No	No	No
91	No	No	No	No	No	No	No	No
92	No	No	No	No	No	No	No	No
94	No	No	No	No	No	No	No	No
95	No	No	No	No	No	No	No	No
96	No	No	No	No	No	No	No	No
97	No	No	No	No	No	No	No	No
98	No	No	No	No	No	No	No	No
99	No	No	No	No	No	No	No	No
100	No	No	No	No	No	No	No	No
100	No	No	No	No	No	No	No	No
101	No	No	No	No	No	No	No	No
102	No	No	No	No	No	No	No	No
100	No	No	No	No	No	No	No	No
105	No	No	No	No	No	No	No	No
106	No	No	No	No	No	No	No	No
107	No	No	No	No	No	No	No	No

Outfall Catchment System Vulnerability Factor (SVF) Inventory Granby, Massachusetts Revision Date: January 28, 2021

	1	2	3	4	5	6	7	8
Outfall ID	History of SSOs	Common or Twin Invert Manholes	Common Trench Construction	Storm/Sanitary Crossings (Sanitary Above)	Sanitary Lines with Underdrains	Inadequate Sanitary Level of Service	Areas Formerly Served by Combined Sewers	Sanitary Infrastructure Defects
108	No	No	No	No	No	No	No	No
109	No	No	No	No	No	No	No	No
110	No	No	No	No	No	No	No	No
111	No	No	No	No	No	No	No	No
112	No	No	No	No	No	No	No	No
113	No	No	No	No	No	No	No	No
114	No	No	No	No	No	No	No	No
115	No	No	No	No	No	No	No	No
116	No	No	No	No	No	No	No	No
117	No	No	No	No	No	No	No	No
118	No	No	No	No	No	No	No	No
119	No	No	No	No	No	No	No	No
120	No	No	No	No	No	No	No	No
121	No	No	No	No	No	No	No	No
122	No	No	No	No	No	No	No	No
123	No	No	No	No	No	No	No	No
124	No	No	No	No	No	No	No	No
125	No	No	No	No	No	No	No	No
126	No	No	No	No	No	No	No	No
127	No	No	No	No	No	No	No	No
128	No	No	No	No	No	No	No	No
129	No	No	No	No	No	No	No	No
130	No	No	No	No	No	No	No	No
131	No	No	No	No	No	No	No	No
132	No	No	No	No	No	No	No	No

Presence/Absence Evaluation Criteria:

- 1. History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages
- 2. Common or twin-invert manholes serving storm and sanitary sewer alignments
- 3. Common trench construction serving both storm and sanitary sewer alignments
- 4. Crossings of storm and sanitary sewer alignments where the sanitary system is shallower than the storm drain system
- 5. Sanitary sewer alignments known or suspected to have been constructed with an underdrain system
- 6. Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints
- 7. Areas formerly served by combined sewer systems
- 8. Sanitary sewer infrastructure defects such as leaking service laterals, cracked, broken, or offset sanitary infrastructure, directly piped connections between storm drain and sanitary sewer infrastructure, or other vulnerability factors identified through Inflow/Infiltration Analyses, Sanitary Sewer Evaluation Surveys, or other infrastructure investigations



Attachment 2

Catchment Investigation Results

	Olfactory dence of Illicit Comments Discharge
	None Outlet only. None 9 o'clock=315 NW, 1 o'clock=60 NE, 2 o'clock =116 SE.
	None 12 o'clock = 154 SE, 4 o'clock= 283 W. None
	None None
	None Road was recently paved. All structures in catchment were paved shut.
	Road was recently paved. All structures in catchment were paved shut.
	None None None
	None egg/sewage
	smell None
	None Only outlet pipe facing 224° SW toward outfall.
	None Outlet 90° to road towards outfall at 358° north. None Cannot visually inspect pipes. Too deep underneath shelf.
	None Could not be openedstuck shut. Same with other catch
	basin in this catchment. None Outlet 322° NW.
	Cement block cover. Not in good shape/destroyed. None Outlet facing 82° E.
Image: Proper bial Image: Properbial Image: Proper bial Image: P	None Outlet directly across from next structure. Under vegetation and cement block on top.
N N N N N N	
	None Inlet facing 135° SE.
	None None
	None None None
N N	None None
	None Musty
N N	
	All structures in catchment have stone slab covers, unable to open.
	None None
Image Image <th< td=""><td>None</td></th<>	None
1 1	Concrete slab cover, unable to access.
A A A A A A A A A A A A A A A A A A <th< td=""><td></td></th<>	
Image Image <th< td=""><td>None Musty None</td></th<>	None Musty None
	Musty
Image Image Image Image <td>None None None 12 o'clock = 57 NE, 1 o'clock=98 E.</td>	None None None 12 o'clock = 57 NE, 1 o'clock=98 E.
No No No No No No No No No No No	None 3 o'clock = 138 SE, 12 o'clock = 56 NE, 9 o'clock =326NW.
N N N N N N <	None None None 12 o'clock = 8 N, 9 o'clock = 275 W.
10 10 10 10 10 10 <td>None 12 o'clock = 8 N, 9 o'clock = 275 W. All catch basins (except this one) are covered in concrete None slab and unable to access. This structure only has outlet</td>	None 12 o'clock = 8 N, 9 o'clock = 275 W. All catch basins (except this one) are covered in concrete None slab and unable to access. This structure only has outlet
Image: Note of the state of the st	pipe at 180° to Smith Ave.
N N	None None Inlet from state road at 6 o'clock.
<td>None None</td>	None None
N N N N N N	None None All other catch basins in catchment were covered in stone
Image: Note of the state of the st	None slabs and inaccessible. Could not open cover for this structure.
No No No No No No No No No No No No No No No No N	None None None
No No No No No No No No No No No No No <	None None None
N A N A N A N A N A N A N A N A N A N A N A N A N A N A N A N A N	None None Outlat facing 06° E
No No No No No No No No No No No No No No No No No No No No	
Pic Pic Pic Pic Pic Pic Pic Pic Pic<	None pH =6.66. None
1 1 1 1 1 1	None Crate attached to stone bricks and unable to lift grate
N 1 N 1 N 1 N 1 N 1 N 1 N 1	Grate attached to stone bricks and unable to lift grate. None Catch basin filled with leaf litter.
N N N N N N <	None
1 1	None None None
<td>None All three catch basins have same interior with 1 pipe coming in. Cannot view underneath concrete "shelf" to see if more index pipes</td>	None All three catch basins have same interior with 1 pipe coming in. Cannot view underneath concrete "shelf" to see if more index pipes
	inlet pipes. All other catch basins in this line were also shut. Could not open any.
No No No No No N	None
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	None None None
1 1	None None
1 </td <td>None</td>	None
1 030 1 045 1 05/200 1 04 0 10 0 10	Flow coming from two mysterious hoses coming from house None #8. Cannot open cover. Attempted to open other structure in
1 030 1 045 1 05/200 1 04 0 10 0 10	catchment but could not open. Both in steep grassy areas.
01308308 </td <td>Musty None All catch basins in this line were inaccessible/covered/could</td>	Musty None All catch basins in this line were inaccessible/covered/could
0069 014 11/1/200 0ry SH,MG Clear 24.0 7.1 No No No No No No No No 0069 024 MH 11/1/200 Dry SH,MG Clear 24.0 7.1 No No No No No 0080 011 MH 9/2/200 MH 9/2/200 Dry SH,MG Clear 10 7.2 0.6 10 No No No No 0081 MH 9/2/200 MH 9/2/200 MH 9/2/200 SH,MG Clear 10 To To<	All catch basins in this line were inaccessible/covered/could not find or were welded shut. None
	None More centered in middle of intersection than shown on map.
	None Road too busy.
0096 011 MH 10/5/202 Dry SH,MG Clear 24.0 5.2 Yes 3.0 0.1 MH 10/5/202 Dry SH,MG Clear 24.0 5.2 Yes 3.0 7.4 9 1.0 9.0 MH	None All pipes were under about an inch or so of water. Could not open.
0117 004 MH 10/15/2020 Dry SH,MG Clear 24.0 5.3 No No No No No No	None Shelf blocking inlets - cannot see any inlets. Pipes potentially coming in from 231° SW and 25° NE.

Granby, MA Catchment Investigation Data