

MEMORANDUM

TO: David Desrosiers, P.E., Highway Superintendent, Town of Granby

FROM: Julianne Busa, PhD, Sarah Hayden, MSc

DATE: March 18, 2021

RE: 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 infrastructure defects, 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 ≥ 0.5 mg/L, surfactant levels ≥ 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.

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

Outfall ID	1	2	3	4	5	6	7	8
	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
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	No	No	No	No	No	No	No	No
28	No	No	No	No	No	No	No	No
29	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
32	No	No	No	No	No	No	No	No
33	No	No	No	No	No	No	No	No
34	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

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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	No	No	No	No	No	No	No	No
88	No	No	No	No	No	No	No	No
89	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
93	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
101	No	No	No	No	No	No	No	No
102	No	No	No	No	No	No	No	No
103	No	No	No	No	No	No	No	No
104	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

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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

