Stormwater Sediment Management Survey Analysis and Summary of Results

Prepared for
Minnesota Pollution Control Agency

Prepared by
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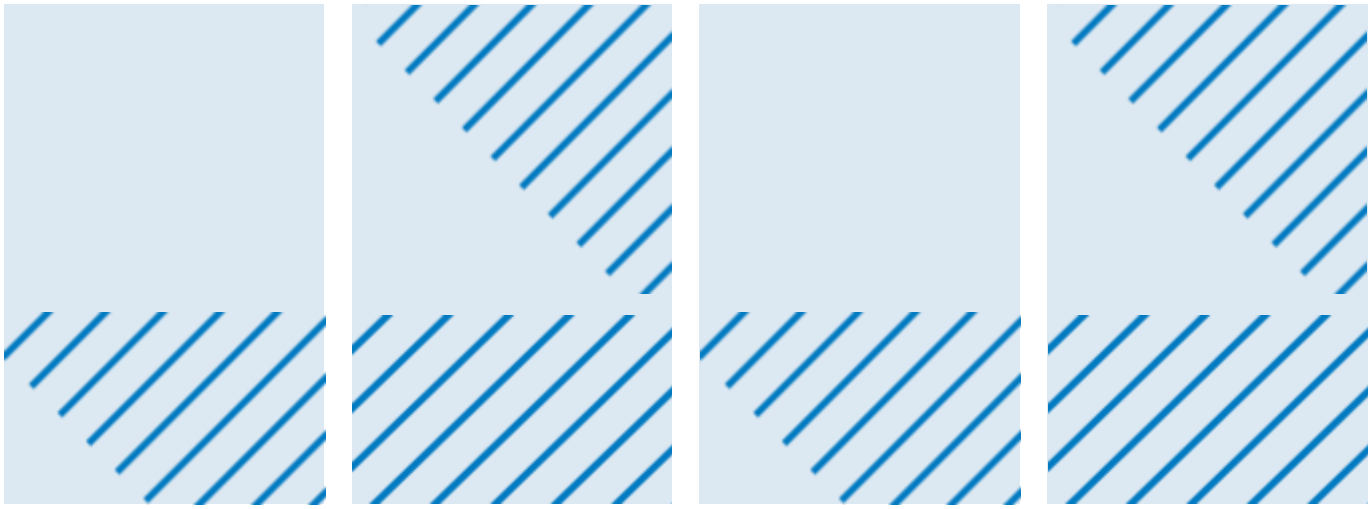

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1 Introduction

This memo summarizes the results of a follow-up survey conducted as part of the Minnesota Pollution Control Agency's (MPCA) broader effort to evaluate stormwater residuals management practices. The survey, administered by Barr Engineering Co. on behalf of the MPCA, supports MPCA's goal of completing a gap analysis comparing current practices and policies with the sustainable solids management program envisioned by stormwater professionals. The results are intended to help identify recommended actions, future research needs, and potential policy changes necessary to move toward more sustainable stormwater residuals management practices.

The survey was developed in coordination with the MPCA and distributed following practitioner engagement sessions to collect more detailed and quantifiable feedback on the topics discussed during those meetings. Survey questions focused on current stormwater residuals management practices, desired future conditions and goals for sustainability, and key challenges or barriers to implementation. The information summarized in this memo is intended to inform MPCA decision-making and guide next steps in advancing sustainable stormwater residuals management across Minnesota.

The survey was structured in four parts: (1) respondent characteristics and organizational context; (2) program goals and components; (3) barriers to sustainable stormwater residuals management; and (4) current BMP maintenance practices. Questions included a variety of formats: free-response, multiple-selection, and ranking questions. Not all respondents answered every question; response counts (n) are reported throughout this memo. The full survey is available as a separate PDF (SW Residuals Mgmt Engagement Workshop Follow-up Survey v3.pdf).

2 Summary of Findings

Consistent themes resulted from survey respondents. MS4 programs are generally effective at capturing stormwater residuals, but the system breaks down after collection. Across BMP types, recovered material is most often landfilled or stockpiled indefinitely. This is not due to a lack of interest or effort by practitioners. It reflects the absence of clear, affordable, and defensible pathways for material characterization, reuse, and disposal. Financial constraints are the most significant challenge, closely followed by regulatory uncertainty. In that environment, many programs default to landfill disposal as the lowest-risk option.

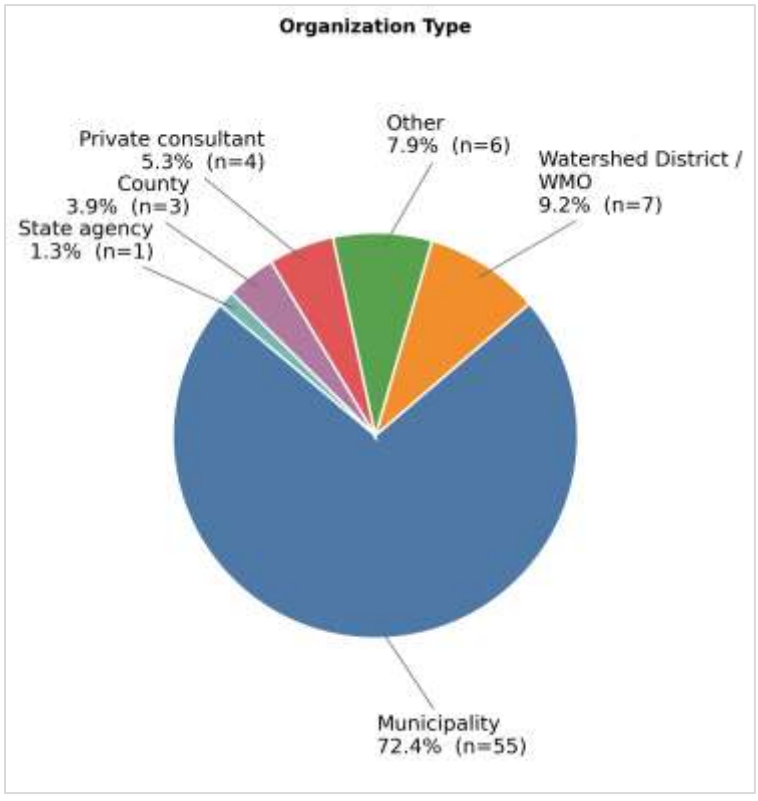
Maintenance and program staff experience residuals management as an operational problem, driven by limited staffing, high hauling and disposal costs, lack of storage space, and reduced visibility when contractors control material fate. Engineering consultants and researchers see a related gap in knowledge and research, particularly around material characterization, reuse thresholds, and emerging contaminants. These perspectives are not in conflict. They are sequential. Without standardized testing protocols, aligned regulatory criteria, and clear, plain-language decision tools, programs cannot confidently pursue reuse, justify costs, or manage risk. As a result, even widely supported objectives such as reducing landfill dependency and expanding reuse remain difficult to implement, especially for small and under-resourced MS4s.

3 Respondent Characteristics

The survey received 81 completed responses. The respondent pool is dominated by permitted MS4 municipalities: 67 of 73 respondents who answered the permit status question (91.8%) hold MS4 permits, with an additional 3 providing services to permitted MS4s. Organization type data (n=76) confirm that municipalities represent 55 of 76 respondents (72%), followed by Watershed Districts/WMOs (7), consultants (4), counties (3), and state agency respondents (n=1) and other organizations (n=6, including townships and academic/educational organizations). Position data indicate that leadership/management (n=27) and engineering (n=22) roles account for the majority of respondents, with program coordination (n=16) also well represented. These characteristics should be considered when interpreting findings: results most directly reflect the perspectives and practices of mid- to large-size MS4 municipal programs.

3.1 Question 2 – Organization Type

Municipalities were the largest respondent group (55 of 76 respondents, 72%), reflecting the survey's primary target audience of MS4 permit holders. Watershed Districts and Watershed Management Organizations (WMOs) were the next largest group (n=7), followed by private consultants (n=4), counties (n=3), and state agency respondents (n=1). 'Other' respondents (n=6) included townships, a nontraditional MS4, and academic/educational organizations.

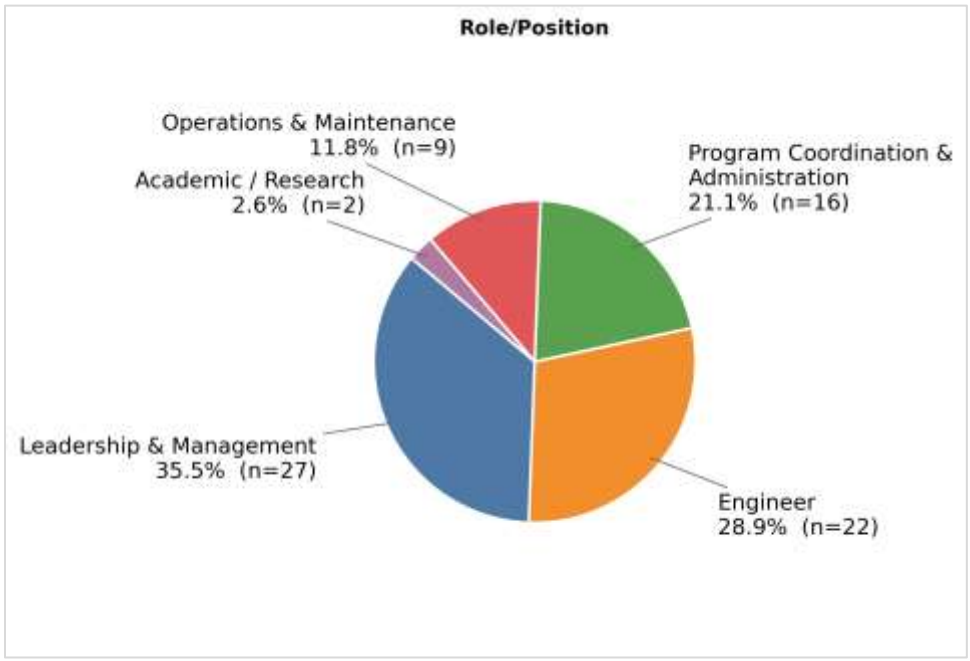


(Q2, n=76)

Figure 3-1 Respondent organization type.

3.2 Question 3 – Position / Role Title

Respondents provided free-text position/role titles, which were categorized into five groups. Leadership & Management was the largest category (n=27), followed by Engineer (n=22) and Program Coordination & Administration (n=16). The full list of submitted titles by category is provided in Appendix B.

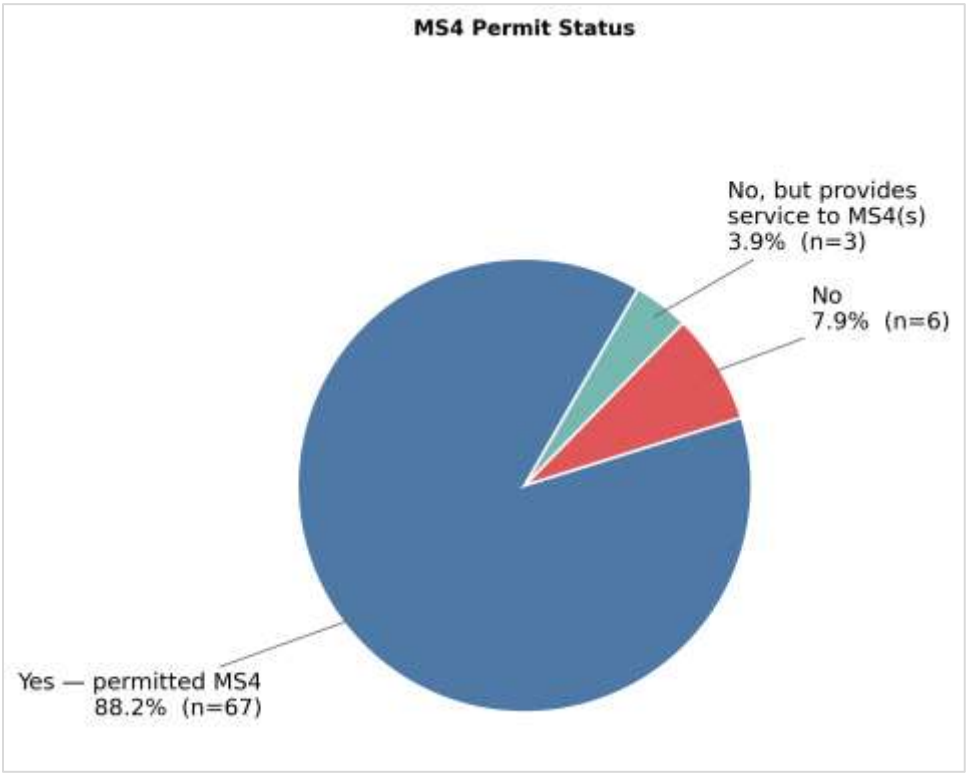


(Q3, n=76; free-text responses categorized)

Figure 3-2 Respondent position categories.

3.3 Question 4 – MS4 Permit Status

Of the 73 respondents who answered Q4, 67 (92%) hold a municipal separate storm sewer system (MS4) permit. Three additional respondents indicated they do not hold a permit but provide services to one or more permitted MS4s, and 6 reported no MS4 permit affiliation. The strong MS4 majority (91.8%) means survey findings are most representative of permitted stormwater programs. The 67 MS4 respondents form the basis for BMP-specific ownership and maintenance analyses in Section 6.

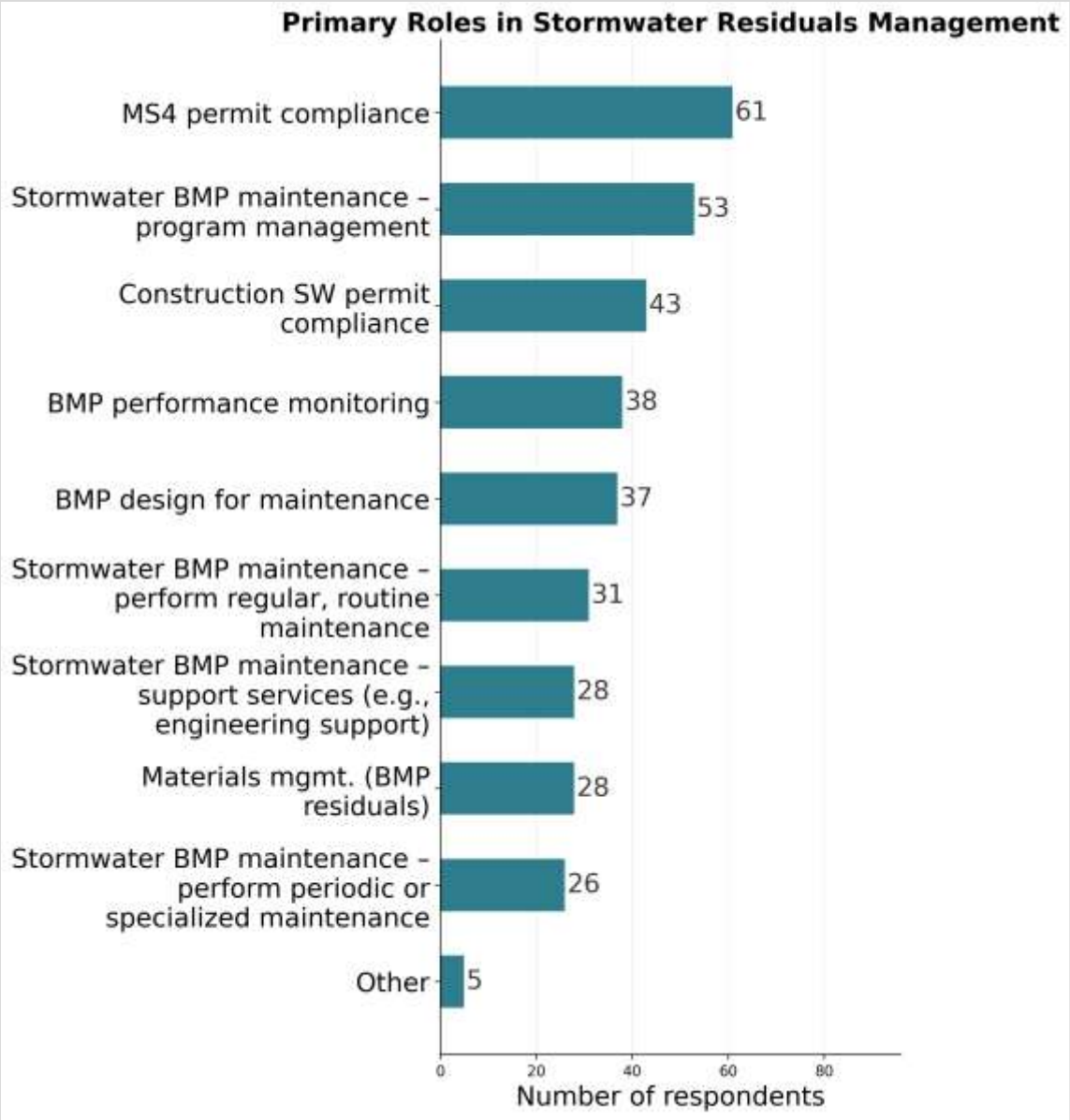


(Q4, n=73)

Figure 3-3 MS4 permittee status of respondents.

3.4 Question 5 – Primary Roles

Respondents were asked to select all primary roles that applied from a list of ten options. MS4 permit compliance was the most frequently selected role, followed by BMP maintenance program management and construction stormwater permit compliance. Of the 76 respondents who answered Q5, 68 (89%) selected two or more roles, reflecting that many practitioners hold cross-functional responsibilities.



(Q5, n=76; multi-select)

Figure 3-4 Primary roles in stormwater residuals management.

3.5 BMP Ownership Overlap

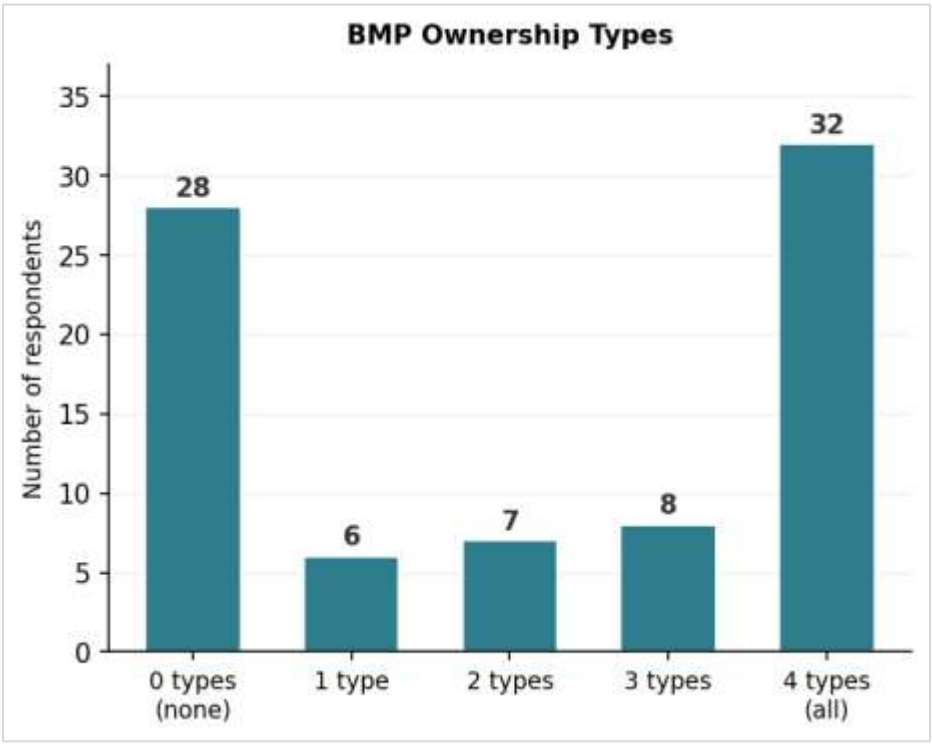
Among all 81 respondents, ownership and maintenance responsibility was reported across all four BMP types: street sweeping (n=49), sumps (n=45), other pretreatment (n=40), and wet sedimentation/bio-

retention basins (n=38). The distribution of how many BMP types each respondent owns or maintains shows a strongly bimodal pattern: respondents either own all four types or none.

Table 3-1 BMP ownership and maintenance responsibility by BMP type.

BMP Type	Respondents Answered	Number Who Own / Maintain	% Who Own / Maintain	Number Who Do Not Own	No Response	Number of MS4 Respondents Who Own / Maintain
Street Sweeping (incl. porous pavement)	57	49	86.0%	8	24	46
Sumps	54	45	83.3%	9	27	43
Other Pretreatment (forebays, swales, etc.)	53	40	75.5%	13	28	38
Wet Sedimentation / Bio-Retention Basins	52	38	73.1%	14	29	36

(Q21, Q29, Q37, Q45, n=81)



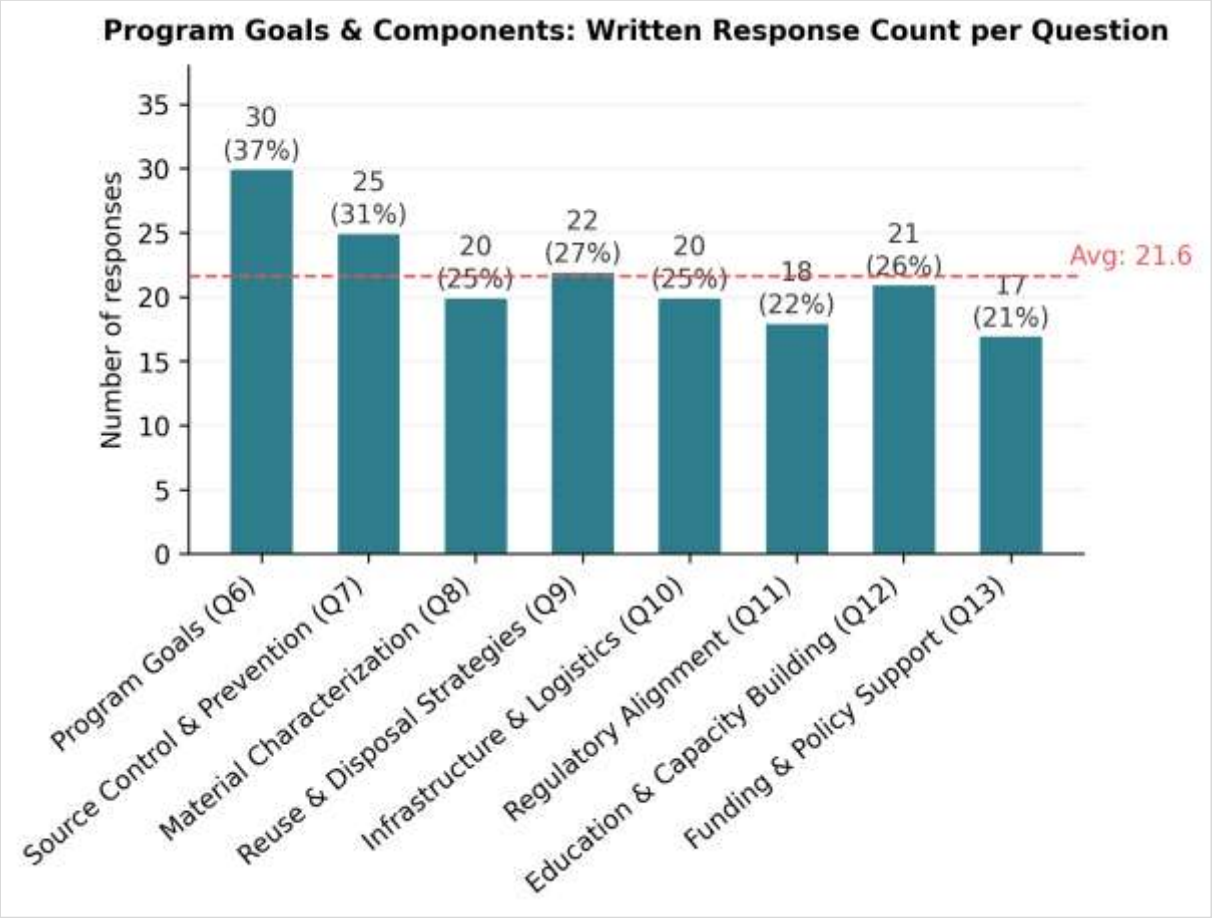
(Q21/Q29/Q37/Q45, n=81)

Figure 3-5 BMP ownership overlap — number of BMP types owned/maintained per respondent.

4 Program Goals and Components

Section 4-2 asked respondents to provide open-ended written feedback on five overarching program goals (Q6) and seven program component areas (Q7–Q13). Response rates ranged from 21% to 37% of the 81 respondents.

4.1 Questions 6–13 – Engagement Overview



(Q6–Q13)

Figure 4-1 Number of written responses per open-ended question.

Program Goals (Q6) generated the highest written engagement (n=30, 37% of respondents), followed by Source Control & Prevention (Q7, n=25, 31%) and Reuse & Disposal Strategies (Q9, n=22, 27%). Funding & Policy Support (Q13) received the fewest responses (n=17, 21%), and Material Characterization (Q8) and Infrastructure & Logistics (Q10) tied for the second lowest (n=20, 25% each). The relatively consistent response rates across questions suggest broad practitioner interest in all seven component areas.

4.2 Question 6 – Overarching Program Goals

Table 4-1 summarizes recurring themes across the 30 written responses to Q6. Full verbatim responses are compiled in Section A1 of Appendix A.

Table 4-1 Recurring themes — Program Goals

Theme	n	% of n	Representative Quote
General agreement / no feedback	11	36.7%	“I agree with the intent of the program goals. At face value they are reasonable and achievable.”
Reduce landfill dependency and expand reuse	6	20.0%	“Minimizing landfill dependency is important to sustain long term.”
Regional collaboration and shared infrastructure	1	3.3%	“Consider additional stakeholders and partnerships that make management of residual materials simple and cost effective.”
Reduce regulatory burden and simplify reporting	5	16.7%	“Need to simplify. Less reporting frequency. When things are mandated like this without additional resources, it is very difficult.”
Equity and accessibility	3	10.0%	“OK - smaller MS4s with ponds and or sediment traps don't have the resources that larger municipalities have to treat / manage residuals so goal 5 is very important.”
Adaptive management	4	13.3%	“Supports adaptive management by incorporating ongoing research, education, and data-driven decision-making.”

n=30 respondents provided written responses. A single response may reflect more than one theme; counts are not mutually exclusive.

4.3 Questions 7-13 - Program Component Areas

Q7 through Q13 addressed seven program component areas. Table 4-2 through Table 4-8 summarize recurring themes for each component. Full verbatim responses for all component areas (Q6–Q13) are compiled in Section A1 of Appendix A.

Table 4-2 Recurring themes — Source Control & Prevention

Theme	n	% of n	Representative Quote
Specific prevention and maintenance actions	7	28.0%	"Designing and installing the proper BMP at the proper spot (location, soils, trash, accessibility, and efficiency)"
Sweeping program evaluation and credit	4	16.0%	"Enhanced street sweeping is effective and should be prioritized for continued funding and credit."
Public education role and delivery	4	16.0%	"Public education ought to be coming from MPCA- this way there can be a well-developed and statewide program that meets permit requirements."
Construction erosion control and enforcement	3	12.0%	"Better compliance with restrictions on vehicle tracking from construction sites (including sites significantly smaller than an acre) should be included."
General agreement with goals	4	16.0%	"Feel the goals are realistic and applicable"
High capital and operating costs	3	12.0%	"High Capital & Operating Costs: Enhanced street sweeping and sump maintenance require significant upfront investment in specialized equipment."

n=25 respondents provided written responses. A single response may reflect more than one theme; counts are not mutually exclusive.

Table 4-3 Recurring themes — Material Characterization & Testing

Theme	n	% of n	Representative Quote
Testing is costly and slow	3	15.0%	"Testing protocols are often numerous, costly, and slow to produce results, and may still be inconclusive."
MPCA guidance preferred over AI tools	4	20.0%	"We don't need AI to tell us how to interpret lab results. We need guidance from MPCA."
Standardized protocols and thresholds needed	7	35.0%	"Establish standardized material characterization and testing protocols to replace subjective judgment with repeatable, defensible data."
Simplified guidance for maintenance staff	2	10.0%	"The primary goal should be to provide maintenance staff and program managers with clear, simple, and defensible direction on how collected materials are to be handled."
General agreement / no feedback	4	20.0%	"Looks great. Love the AI component"

n=20 respondents provided written responses. A single response may reflect more than one theme; counts are not mutually exclusive.

Table 4-4 Recurring themes — Reuse & Disposal Strategies

Theme	n	% of n	Representative Quote
General agreement / no feedback	7	31.8%	“these goals listed, if implemented, would help very much.”
Alternatives to landfill disposal needed	3	13.6%	“If there were other clear options outside of landfills or ways to cooperate with private entities that need material, this would greatly reduce cost.”
On-site reuse	2	9.1%	“On-site reuse is OK - if proven safe”
Regional dewatering methods and concerns	3	13.6%	“guidance on dewatering of material prior to disposal”
Standardized classifications and regulatory alignment	4	18.2%	“Standardized classifications for material removed from specific BMPs, based on existing research, should be adopted, along with alternatives to landfilling.”
Innovative and emerging reuse pathways	3	13.6%	“Characterization of materials for reuse in full depth reclamation pavement projects or other pavement rehab approaches.”

n=22 respondents provided written responses. A single response may reflect more than one theme; counts are not mutually exclusive.

Table 4-5 Recurring themes — Infrastructure & Logistics

Theme	n	% of n	Representative Quote
Theme	n	% of n	Representative Quote
Shared regional facilities	7	35.0%	“Shared regional facilities have potential but are likely costly and of limited effectiveness.”
Equipment sharing and collaboration frameworks	7	35.0%	“Advocating for and assisting in equipment sharing would greatly help in the street sweeping program.”
Vegetation management	1	5.0%	“Vegetation management is a continuous ongoing process, especially with invasive plants. We are creating a Thistle management plan.”
General agreement / no feedback	5	25.0%	“Feel the goals are realistic and applicable”

n=20 respondents provided written responses. A single response may reflect more than one theme; counts are not mutually exclusive.

Table 4-6 Recurring themes — Regulatory Alignment & Risk Management

Theme	n	% of n	Representative Quote
Theme	n	% of n	Representative Quote
General agreement / no feedback	7	38.9%	“Feel the goals are realistic and applicable”
Clear and flexible written guidance needed from MPCA	5	27.8%	“Clear Guidance on reuse and soil/water thresholds and setbacks are very important.”
Emerging contaminants, regulatory uncertainty, and proactive planning	6	33.3%	“Future contaminants should be identified before managing for them becomes a regulatory requirement.”

n=18 respondents provided written responses. A single response may reflect more than one theme; counts are not mutually exclusive.

Table 4-7 Recurring themes — Education & Capacity Building

Theme	n	% of n	Representative Quote
Theme	n	% of n	Representative Quote
Theme	n	% of n	Representative Quote
General agreement / no feedback	6	28.6%	“Feel the goals are realistic and applicable”
Diverse audiences, venues, and delivery formats	6	28.6%	“Education and capacity building must prioritize buy in across multiple audiences, including technical experts, water resource managers, and maintenance or public works staff.”
Small MS4s lack capacity and need targeted support	3	14.3%	“Small and under-resourced municipalities often lack dedicated stormwater staff, in-house technical expertise, and time to track evolving guidance.”
MPCA should provide centralized training resources	3	14.3%	“Having the MPCA create base materials for education would be beneficial. MS4s can modify their program as needed.”
Simplify requirements and reduce training burden	3	14.3%	“The training requirements for the MS4 permit are exhausting and there is not a lot of opportunities to attend training events.”

n=21 respondents provided written responses. A single response may reflect more than one theme; counts are not mutually exclusive.

Table 4-8 Recurring themes — Funding & Policy Support

Theme	n	% of n	Representative Quote
Theme	n	% of n	Representative Quote
General agreement / no feedback	9	52.9%	“Feel the goals are realistic and applicable”
Stormwater funding is insufficient and inconsistent	3	17.6%	“Stormwater management is widely underfunded and understaffed. Stormwater needs to be considered more in line with drinking water and sanitary sewer services.”
Grant barriers and O&M eligibility gaps	3	17.6%	“Grants are hard to get if you don't have the personnel to write grant applications. For small MS4s requirements are often just an added responsibility to an already overworked staff.”
Cost-effective reuse reduces financial burden	2	11.8%	“Management of these materials can be large financial burden. Flexibility for appropriate reuse can reduce that burden if more cost effective options are available/acceptable.”

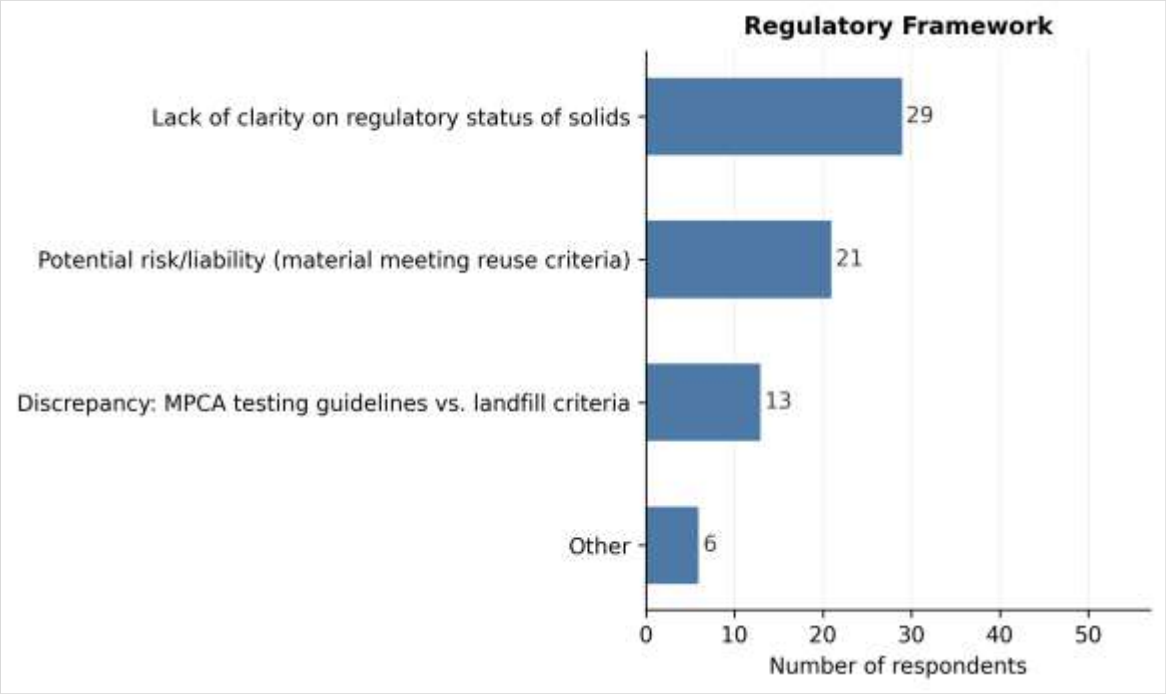
n=17 respondents provided written responses. A single response may reflect more than one theme; counts are not mutually exclusive.

5 Barriers to Sustainable Stormwater Residuals Management

Section 5 asked respondents to identify barriers across five categories and to rank those categories by overall significance.

5.1 Question 14 – Regulatory Framework Barriers

Of the 39 respondents who identified regulatory framework barriers, 19 (49%) selected two or more options. The most commonly identified barrier was lack of clarity on the regulatory status of recovered solids (74%), followed by potential risk or future liability when reusing material that meets current criteria (54%).

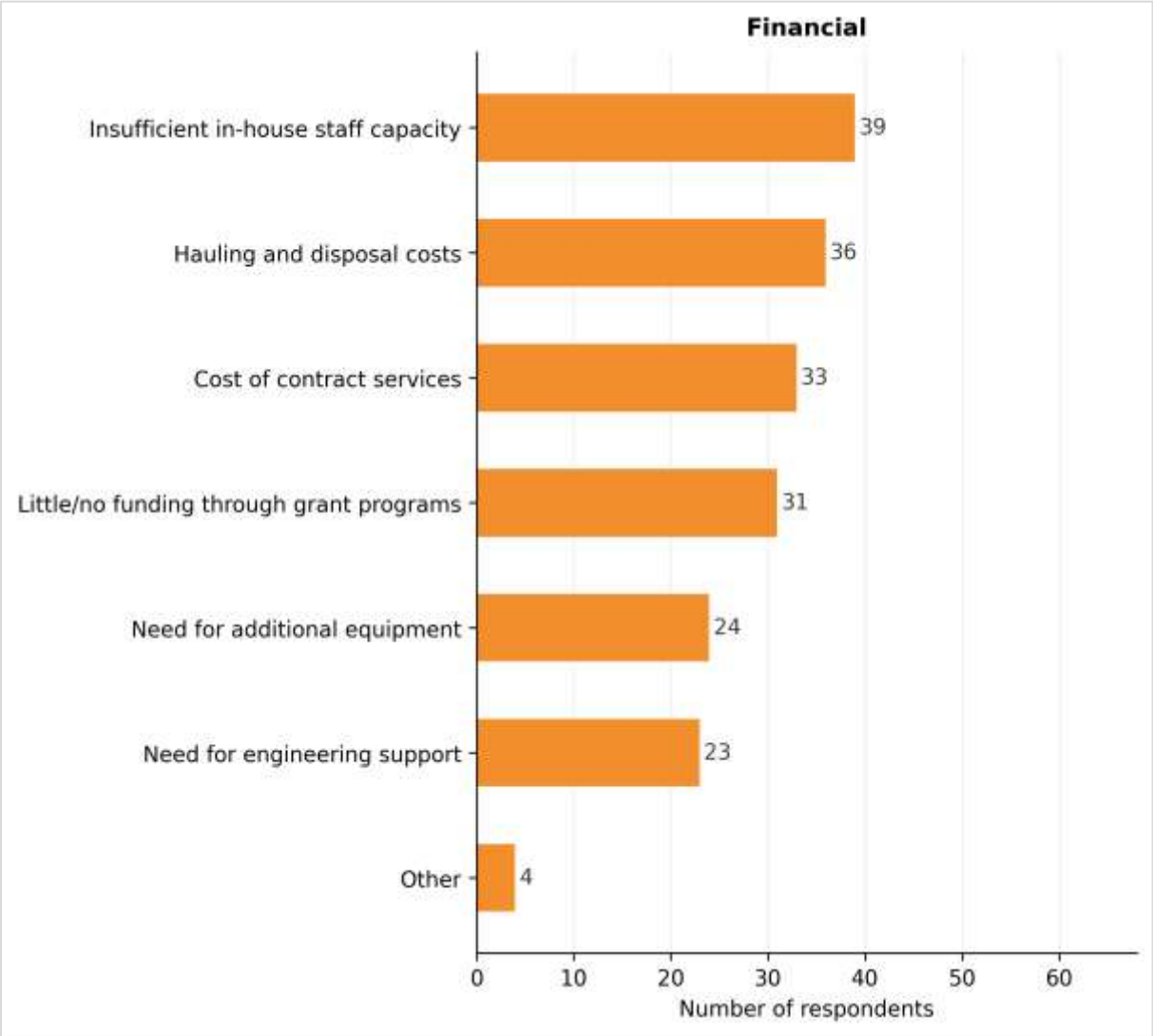


(Q14, n=39; multi-select)

Figure 5-1 Regulatory framework barrier options selected.

5.2 Question 15 – Financial Barriers

Financial barriers were the most broadly identified category. Of 50 respondents, 46 (92%) selected two or more options. Insufficient in-house staff capacity was the most selected barrier (78%), followed by hauling and disposal costs (72%) and cost of contract services (66%).

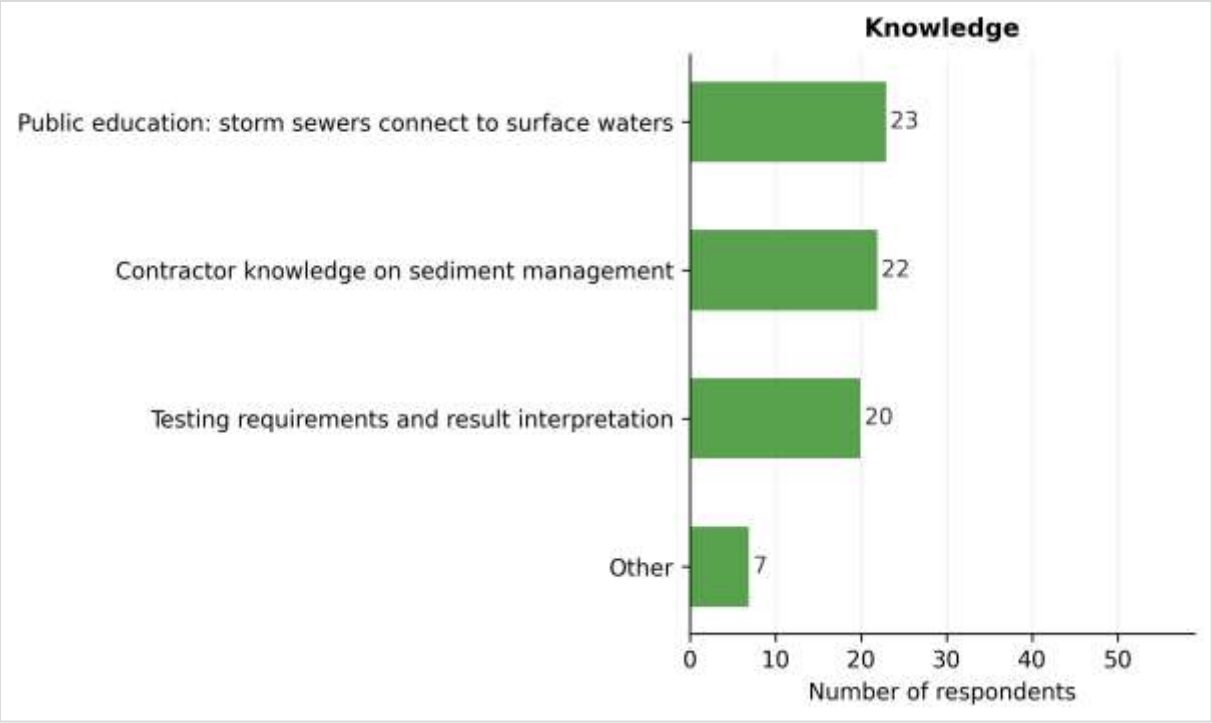


(Q15, n=50; multi-select)

Figure 5-2 Financial barrier options selected.

5.3 Question 16 – Knowledge Barriers

Of the 41 respondents who identified knowledge barriers, 20 (49%) selected two or more options. Public awareness that storm sewers connect to surface waters was the most frequently selected (56%), followed by contractor knowledge on sediment management (54%) and testing requirements and interpretation of results (49%).

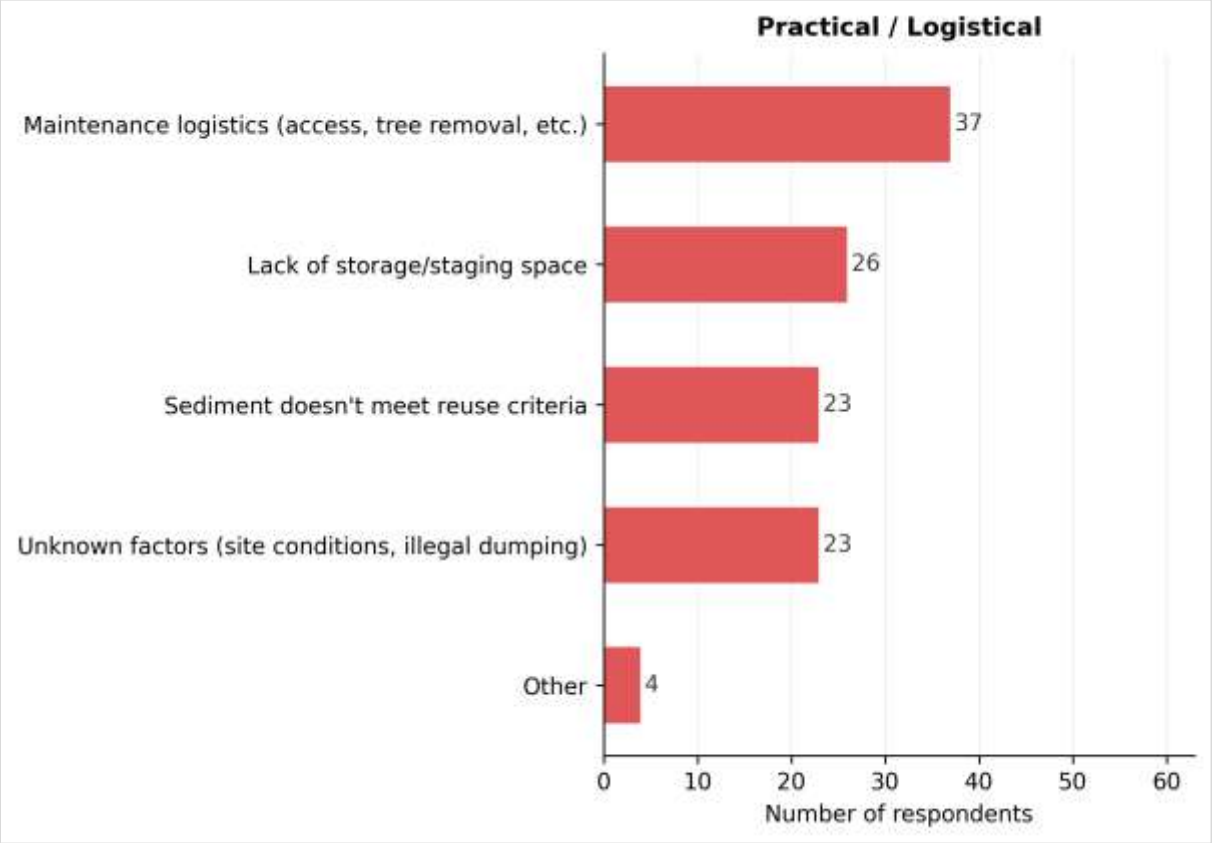


(Q16, n=41; multi-select)

Figure 5-3 Knowledge barrier options selected.

5.4 Question 17 – Practical/Logistical Barriers

Practical/logistical barriers were broadly experienced, with 35 of 45 respondents (78%) selecting two or more options. Maintenance logistics was the most common barrier (82%), followed by lack of space for material storage and management (58%).

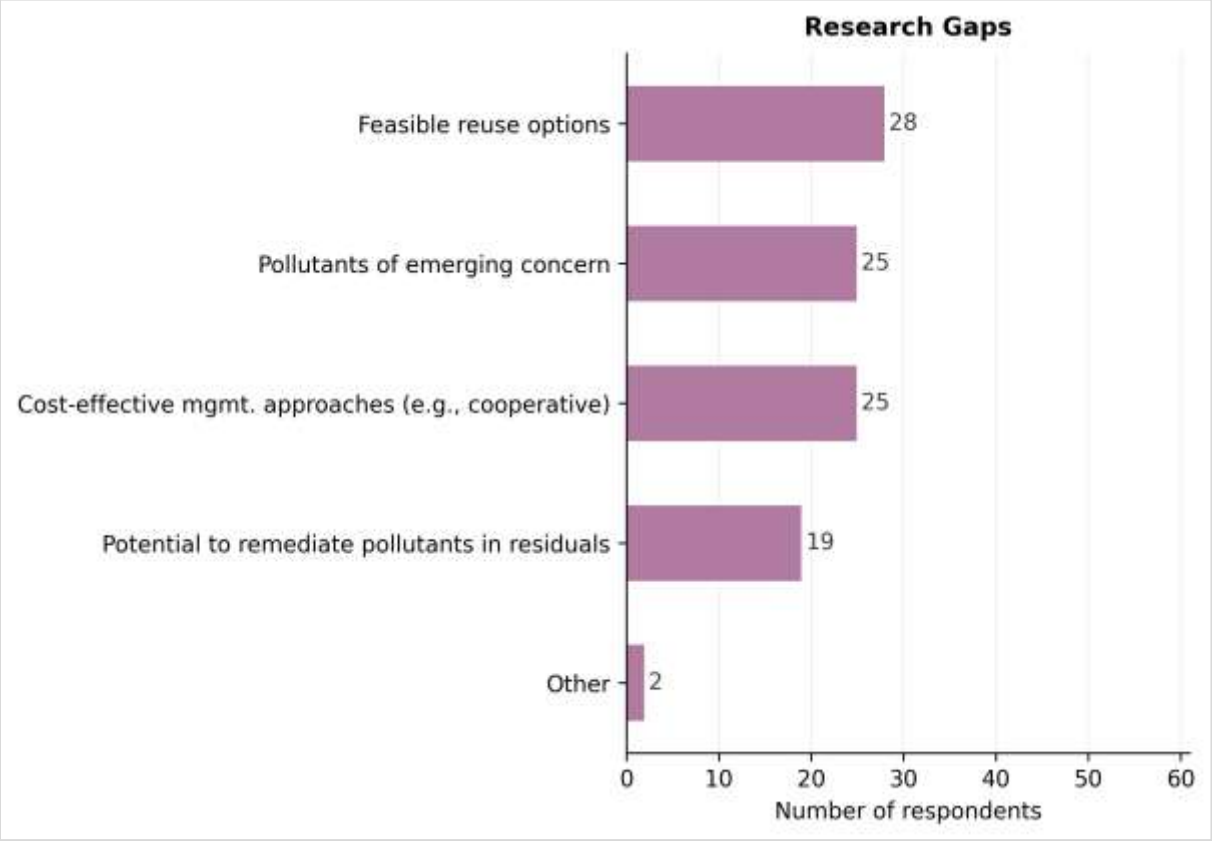


(Q17, n=45; multi-select)

Figure 5-4 Practical/logistical barrier options selected.

5.5 Question 18 – Research Gaps

Of 43 respondents who identified research gaps, 29 (67%) selected two or more options. Research on feasible reuse options was the most frequently cited gap (65%), followed by pollutants of emerging concern (58%) and cost-effective residuals management approaches (58%).

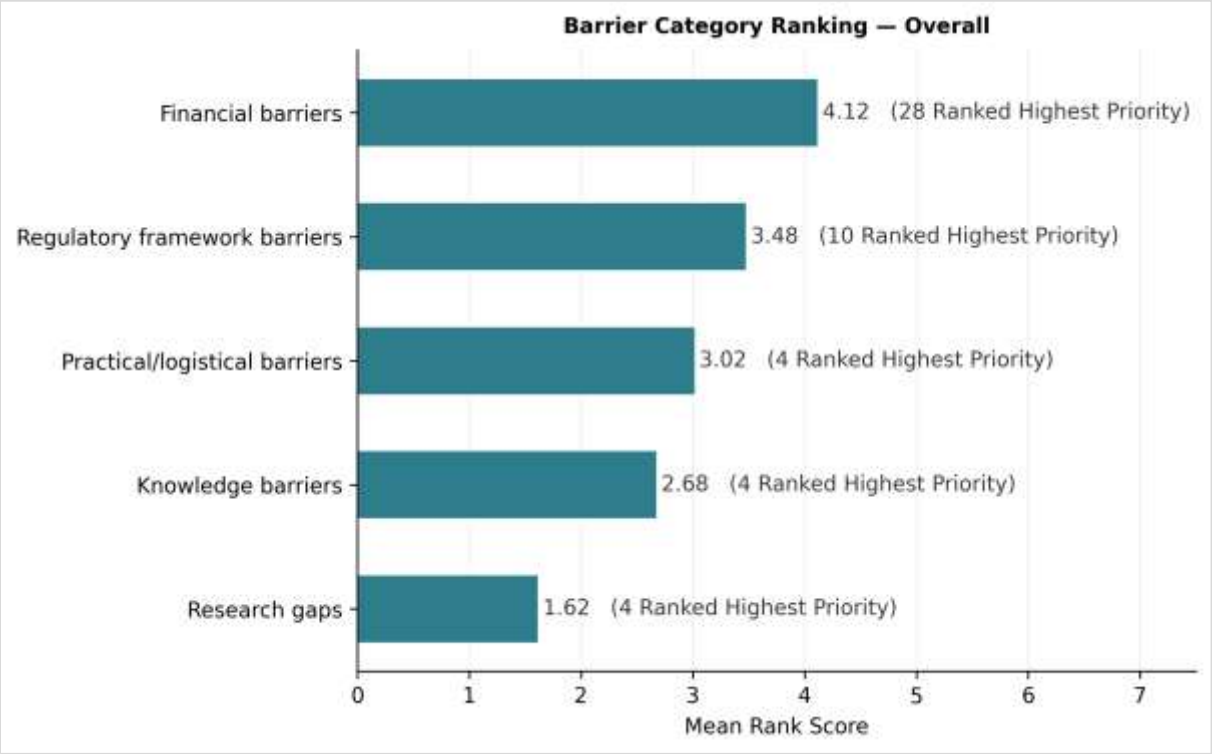


(Q18, n=43; multi-select)

Figure 5-5 Research gap barrier options selected.

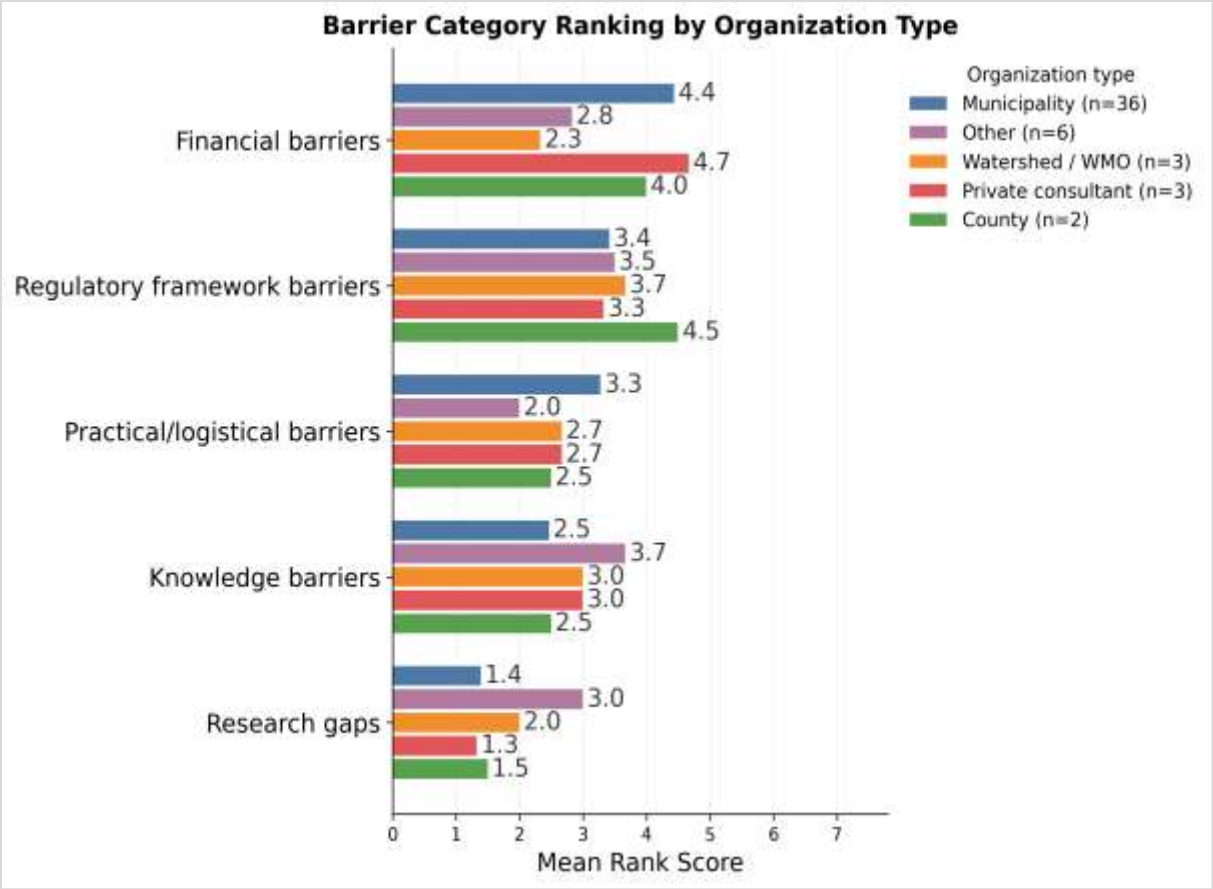
5.6 Question 19 – Barrier Ranking

Two distinct barrier profiles emerge from the data. A research + regulatory knowledge profile is characterized by co-selection of research gap and knowledge barriers, and tends toward respondents in monitoring and engineering roles. An operational/practical feasibility profile is characterized by co-selection of financial and practical/logistical barriers, and tends toward maintenance and program management roles. These two clusters are also evident in the co-occurrence patterns across barrier categories: all category pairs show strong co-occurrence (φ ≥ 0.65), with the financial–practical/logistical and research–knowledge pairs showing the tightest associations.



(Q19, n=50; ranked 1–5, higher score = more concerning)

Figure 5-6 Barrier category priority scores — overall.



(Q19, n=50; Municipality n=36, Other n=6, Watershed/WMO n=3, Private consultant n=3, County n=2)

Figure 5-7 Barrier category priority scores by organization type — Municipality vs. all org types.

5.7 Question 20 – Other Barriers

Four respondents provided text for Q20. Two indicated that the existing five barrier categories were sufficiently comprehensive and identified no additional barriers. The remaining two responses echoed options already present in the structured questions: one cited staffing, time, and cost (corresponding to “Insufficient staff capacity” and “Hauling and disposal costs” in Q15), and one cited a need for clearer testing guidance (corresponding to “Testing requirements and interpretation of results” in Q16). No novel barrier types emerged from Q20.

6 Current BMP Maintenance Practices

Section 6 asked respondents about current maintenance practices for four BMP types. Questions were conditional on ownership.

6.1 Questions 21/29/37/45 – MS4 Ownership Overview

BMP ownership and maintenance responsibility by respondent is summarized in Table 3-1 (Section 3.5). Of 67 permitted MS4 respondents, street sweeping was the most widely owned BMP type (n=46), followed by sumps (n=43), other pretreatment (n=38), and wet sedimentation/bio-retention basins (n=36).

6.2 Questions 22–28 – Street Sweeping (including Porous Pavement)

Of 57 respondents who indicated they own or maintain streets, 49 (86%) reported responsibility for street sweeping.

6.2.1 Program Scale

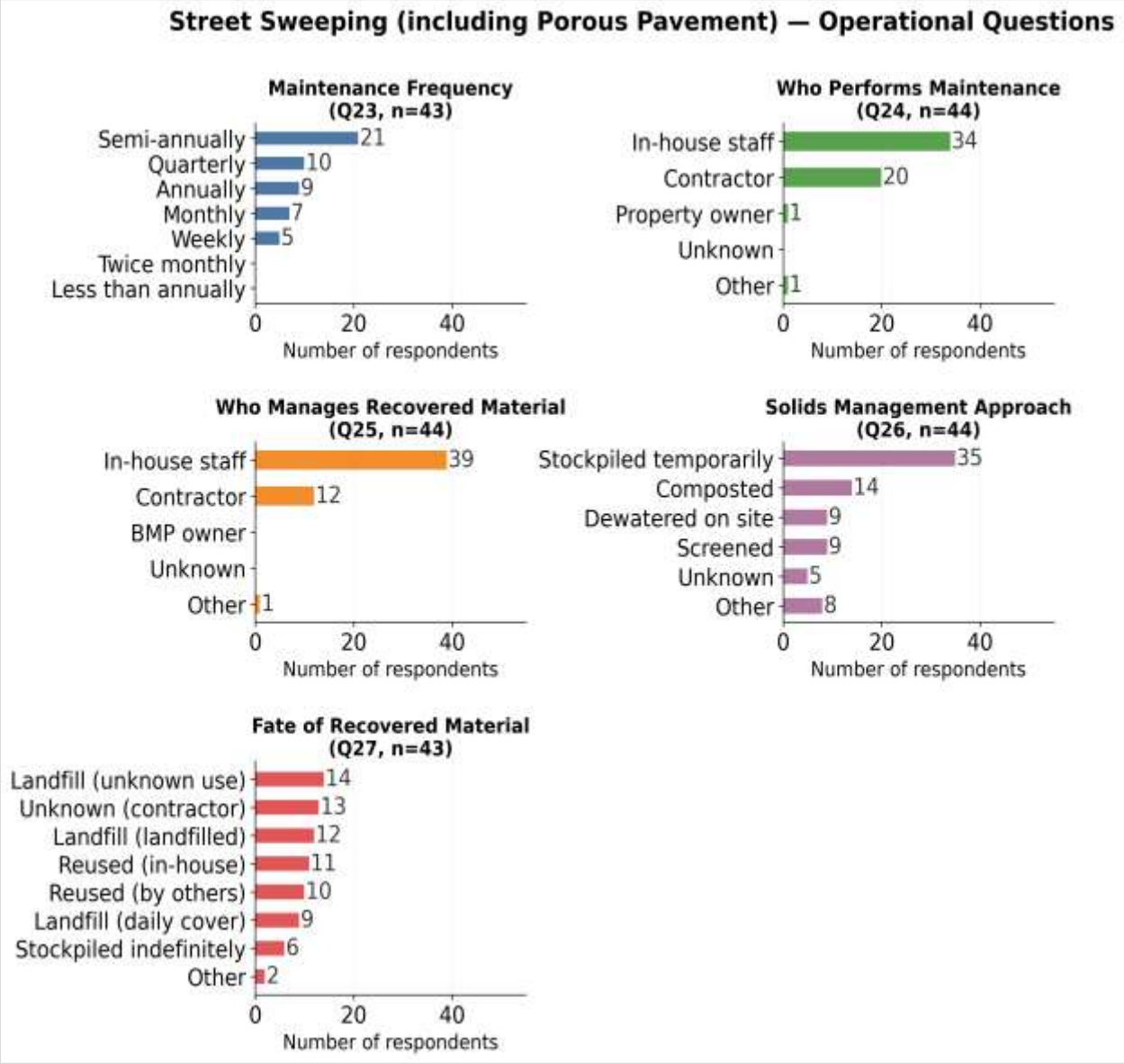
Of the 46 respondents who answered Q22, 34 provided numeric street mile estimates. Reported values ranged from 2.25 to 500 street miles (median: 90; mean: 125.7). The distribution is right-skewed, driven by a small number of large jurisdictions. Note: Q22 asked for 'street miles,' which may have been interpreted as centerline miles by some respondents and lane miles by others; values should be compared with caution.

(Q22, n=34 numeric responses; see note on unit interpretation)

Figure 6-1 Distribution of street miles maintained by street sweeping respondents.

6.2.2 Operations Overview

Semi-annual sweeping was the most common frequency (49% of 43 respondents), with 6 (14%) selecting two or more options. Sweeping is predominantly performed and managed by in-house staff (77% performers; 89% managers), though 11 respondents (25%) use a mix of in-house and contracted services. Temporary stockpiling is the dominant solids management approach (80%), with 26 respondents (59%) using multiple handling steps. The fate of recovered material is highly variable, transport to a landfill with unknown end use was most common (33%), but 23 respondents (53%) reported two or more fate options. See Figure 6-7 through Figure 6-11 (Section 6.6) for cross-BMP comparisons.



(Q23–Q27): maintenance frequency, who performs, who manages, solids management, and fate of recovered material (n=43–44 respondents per panel; multi-select)

Figure 6-2 Street sweeping operational questions.

6.2.3 Comments

Question 28 received four comments:

Table 6-1 Optional Comments for Question 28

#	Response
1	Each county needs multiple sites that take all municipality sediment without issue
2	Typically not able to find uses for recovered solids
3	Disposal of material is complicated and costly, new ideas need to come to the forefront to improve maintenance and operation.
4	Street sweepings are temporarily stockpiled then disposed of at landfill, sump pit sediment (vac truck) is disposed of by the contractor

6.3 Questions 29–36 – Sumps

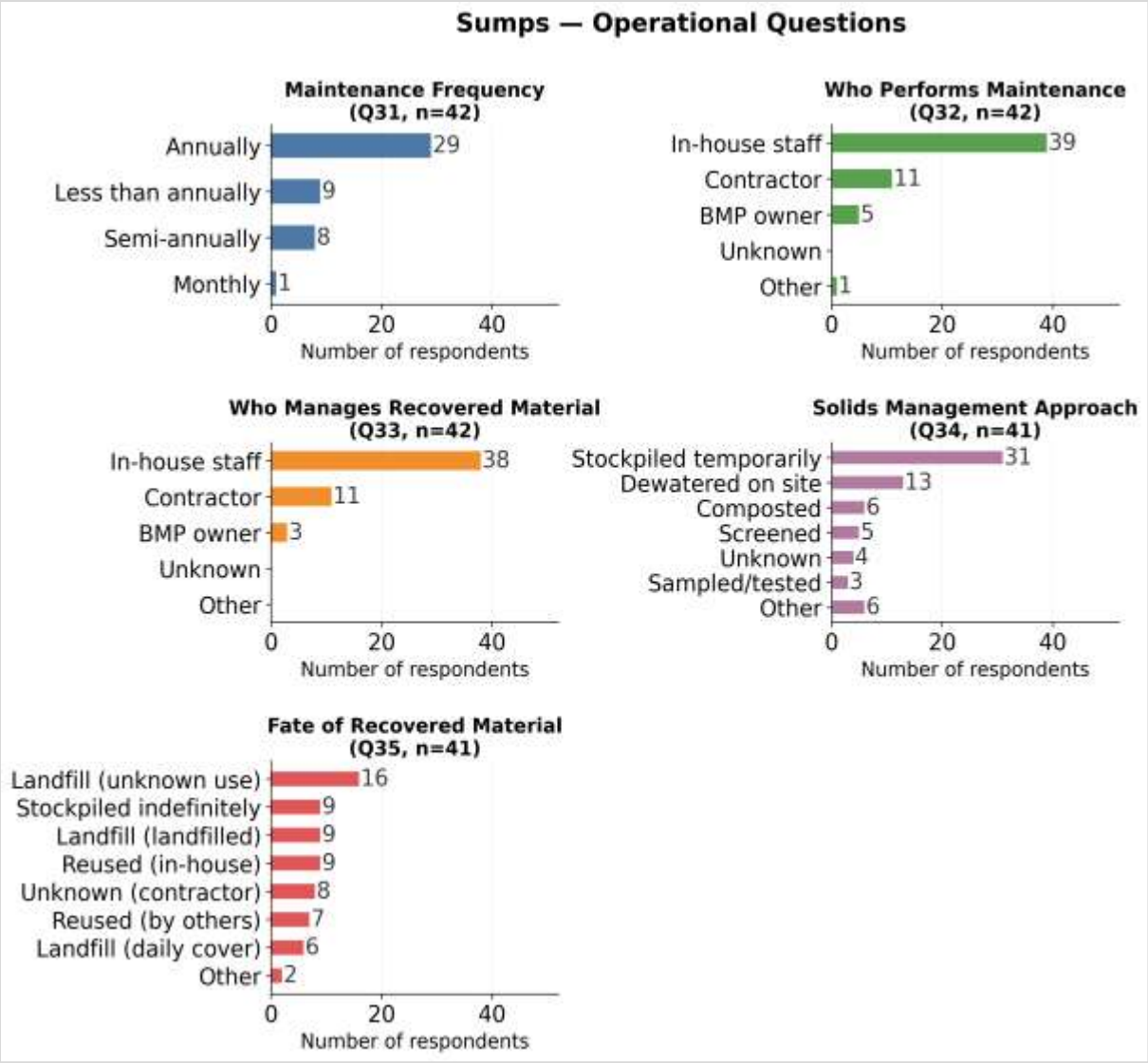
Of 54 respondents who indicated they own or maintain sumps, 45 (83%) reported responsibility for sump cleanout.

6.3.1 Program Scale

Respondents reported maintaining between 2 and 4,300 sumps (median: 50; mean: 259; n=42). The distribution is strongly right-skewed, driven by a small number of large municipalities with extensive sump networks.

6.3.2 Operations Overview

Annual cleanout was the most common frequency (69% of 42 respondents). Sump cleanout is predominantly an in-house operation (93% performers; 90% managers). Temporary stockpiling was the most common solids management approach (76%), with 22 respondents (54%) using multiple handling steps. Notably, only 3 respondents (7%) reported sampling and testing solids for pollutants prior to disposal, the only BMP section where this option was available. Transport to a landfill with unknown end use was the most common fate (39%), with 20 respondents (49%) selecting multiple fate options. See Figure 6-7 through Figure 6-11 (Section 6.6) for cross-BMP comparisons.



(n=41–42 respondents per panel; multi-select)

Figure 6-3 Sumps operational questions (Q31–Q35): maintenance frequency, who performs, who manages, solids management, and fate of recovered material.

6.3.3 Comments

Question 36 received four comments:

Table 6-2 Optional Comments for Question 36

#	Response
1	Need easy spot to haul to for each municipality.
2	Still doing sump inventory and creating BMP's and cleaning work sheets.
3	Frequency of inspection / maintenance depends on the type of sediment trap and historical need. All are inspected annually (as required by MS4), but some that are known to fill up sooner are inspected bi-monthly. Sediment from surface traps are cleaned in-house and sediment is stored temporarily with our street sweepings. Sump pits are cleaned as needed (we hire it out once a year) by a contractor and sediments are disposed of by them.
4	For small and under-resourced MS4s, audits and enforcement actions—when not paired with adequate guidance, funding, or technical assistance—can unintentionally hinder progress. Agencies attempting to meet requirements may fall further behind when limited resources are redirected from maintenance and improvements to address enforcement outcomes.

6.4 Questions 37–44 – Other Pretreatment (Forebays, Swales, Underground Chambers)

Of 53 respondents who indicated they own or maintain other pretreatment practices, 40 (75%) reported maintenance responsibility.

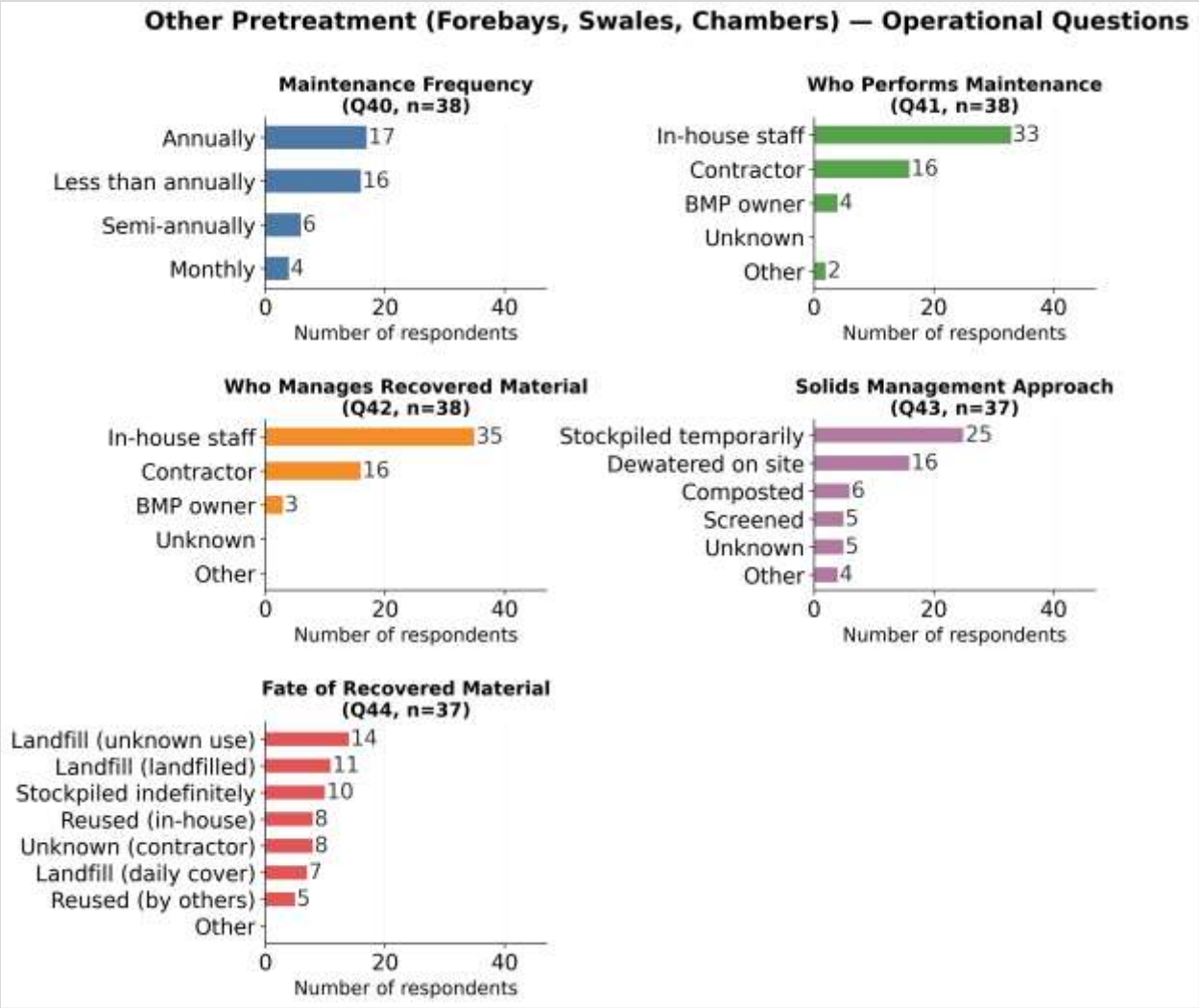
6.4.1 Structure Types and Scale

Twelve respondents described their other pretreatment structure types. The most commonly mentioned were swales and ditches, sediment forebays, underground filter tanks and sediment vaults, and rain gardens. Several responses described process approaches rather than structure types, including passive dewatering on-site prior to disposal, and annual vacuum removal. Full text is compiled in Section A4 of Appendix A.

Respondents reported maintaining between 1 and 50 structures (median: 10; mean: 15.9; n=33).

6.4.2 Operations Overview

Annual maintenance was most common (45% of 38 respondents). In-house staff were the primary performers (87%) and managers (92%), though 16 respondents (42%) also used contracted services. Temporary stockpiling was the dominant solids management approach (68%), with 19 respondents (51%) using multiple steps. Transport to a landfill with unknown end use was the most common fate (38%), with 20 respondents (54%) selecting multiple options. See Figure 6-7 through Figure 6-11 (Section 6.6) for cross-BMP comparisons.



(Q40–Q44): maintenance frequency, who performs, who manages, solids management, and fate of recovered material (n=37–38 respondents per panel; multi-select)

Figure 6-4 Other pretreatment operational questions.

6.4.3 Comments

Question 44b received one substantive comment:

Table 6-3 Optional Comments for Question 44b

#	Response
1	See comments in last section. Sod removed from swales is put in with our land care debris and removed and composed into black dirt by a vendor.

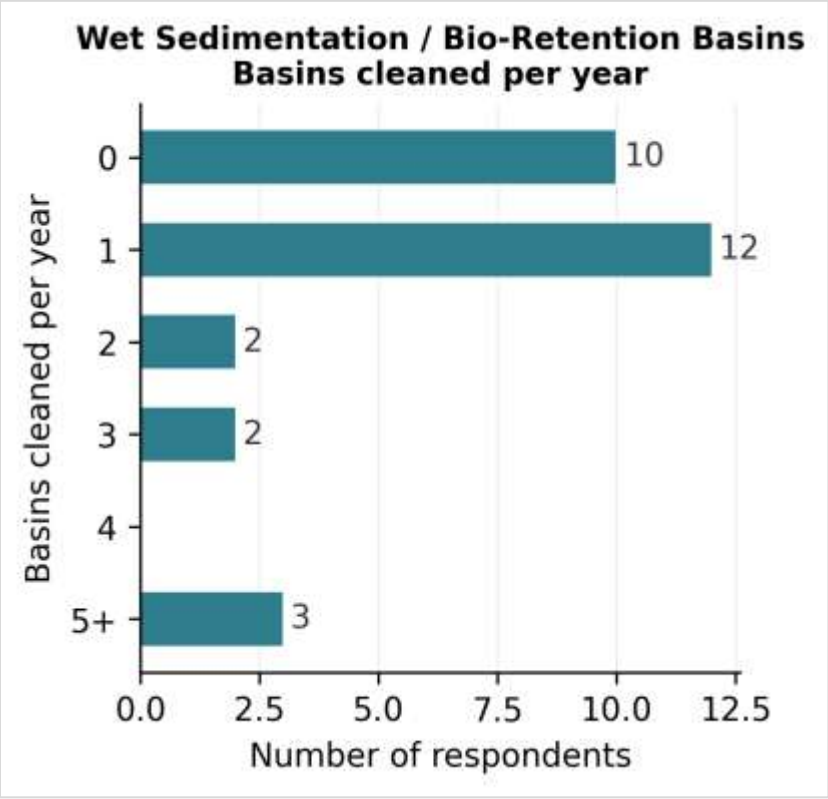
6.5 Questions 45–52 – Wet Sedimentation / Bio-Retention Basins

Of 52 respondents who indicated they own or maintain wet basins, 38 (73%) reported maintenance responsibility.

6.5.1 Program Scale

Respondents reported maintaining between 2 and 800 wet basins (median: 53; mean: 156.2; n=34). As with sumps, the distribution is right-skewed, with a few large programs accounting for the elevated mean.

Of 29 respondents who provided a numeric answer to Q47, 10 (34%) reported cleaning zero basins per year on a regular annual schedule, indicating that cleanout is event-driven or infrequent for a significant share of programs. Among those with a regular schedule, one basin per year was most common.

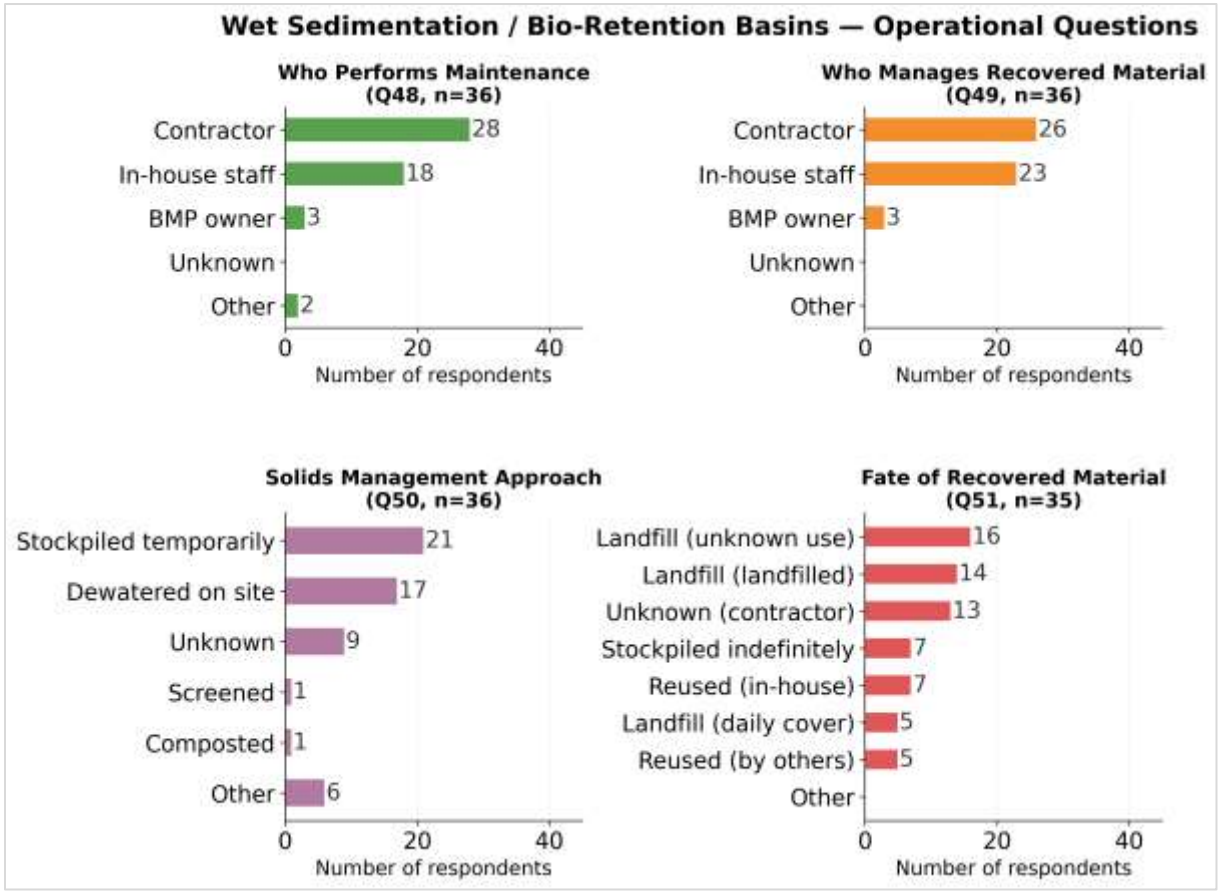


(Q47, n=29 numeric responses)

Figure 6-5 Wet sedimentation/bio-retention basins cleaned per year.

6.5.2 Operations Overview

Wet basins stand out from the other BMP types in their reliance on contracted services. Contracted providers performed cleanout for 78% of respondents and managed the program for 72%, which was notably higher than for any other BMP type. Temporary stockpiling was the most common solids management approach (58%), with 17 respondents (47%) using multiple steps. Transport to a landfill with unknown end use was the most common fate (46%), and 23 respondents (66%) selected two or more fate options, the highest multi-select rate of any BMP type. See Figure 6-7 through Figure 6-11 (Section 6.6) for cross-BMP comparisons.



(Q48–Q51): who performs, who manages, solids management, and fate of recovered material (n=35–36 respondents per panel; multi-select)

Figure 6-6 Wet sedimentation/bio-retention basin operational questions.

6.5.3 Comments

Question 52 received five comments:

Table 6-4 Optional Comments for Question 52

#	Response
1	Previous pond dredging activities with level 1 results were disposed of in partnership with local agricultural land uses.
2	Type of disposal required is based on testing of sediment prior to removal.
3	Recovered solids are tested and determined if suitable for reuse or landfill
4	Wet ponds and bio-retention (rain gardens) are two wildly different BMPs. Ponds are dredged every 20-30 years (or more) and bioretention might have sediment cleaned out of the inlet areas every 5-15 years depending on the amount of pretreatment and rebuilt every 25+ years (again it depends on the sediment load).
5	All excavated material is tested first and only reused if meets MPCA thresholds

6.6 Cross-BMP Summary

Table 6-5 summarizes key maintenance characteristics across all four BMP types. Percentages shown are of respondents who answered each question for that BMP type.

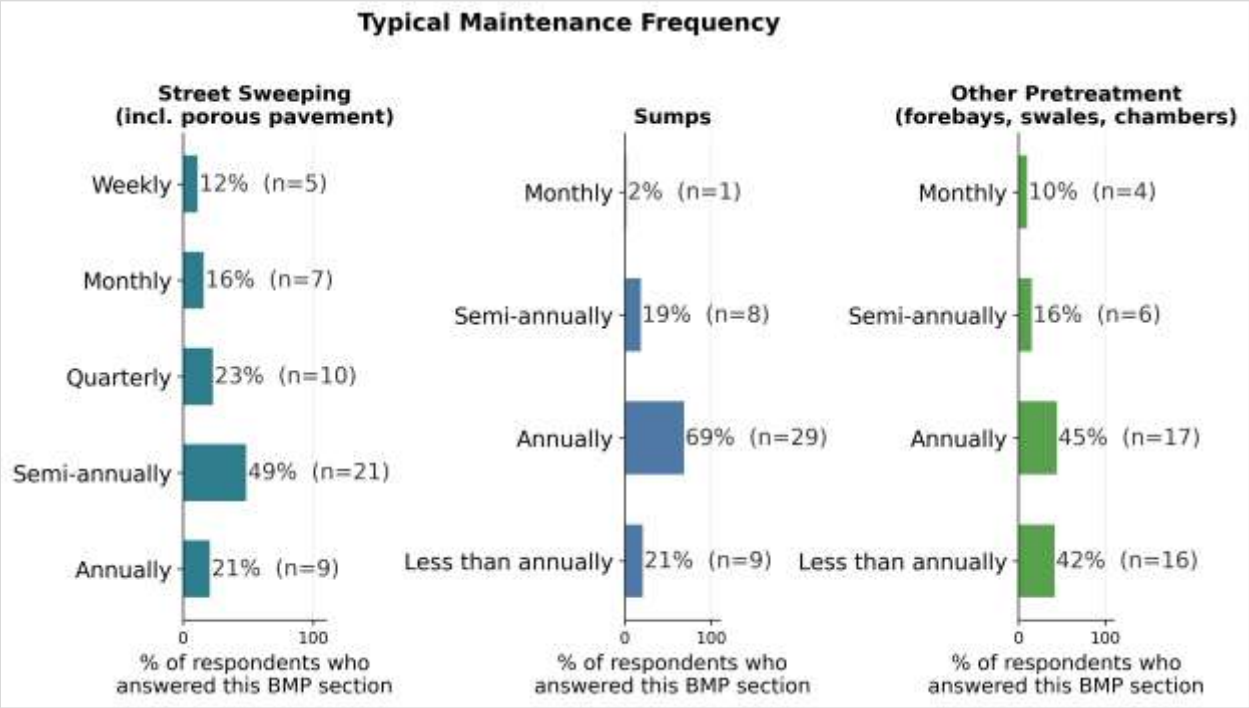
Table 6-5 Cross-BMP maintenance practices summary

BMP Type	# Owners / Maintainers	Typical Frequency	Primary Performer	Primary Manager	Most Common Fate of Solids
Street Sweeping (incl. porous pavement)	49	Semi-annually (49%)	In-house staff (77%)	In-house staff (89%)	Landfill (unknown use) (33%)
Sumps	45	Annually (69%)	In-house staff (93%)	In-house staff (90%)	Landfill (unknown use) (39%)
Other Pretreatment (forebays, swales, chambers)	40	Annually (45%)	In-house staff (87%)	In-house staff (92%)	Landfill (unknown use) (38%)
Wet Sedimentation / Bio-Retention Basins	38	~1/year (n=29; 10 report no regular schedule)	Contractor (78%)	Contractor (72%)	Landfill (unknown use) (46%)

(n=38–49 owners/maintainers per BMP type)

6.7 Cross-BMP Comparisons

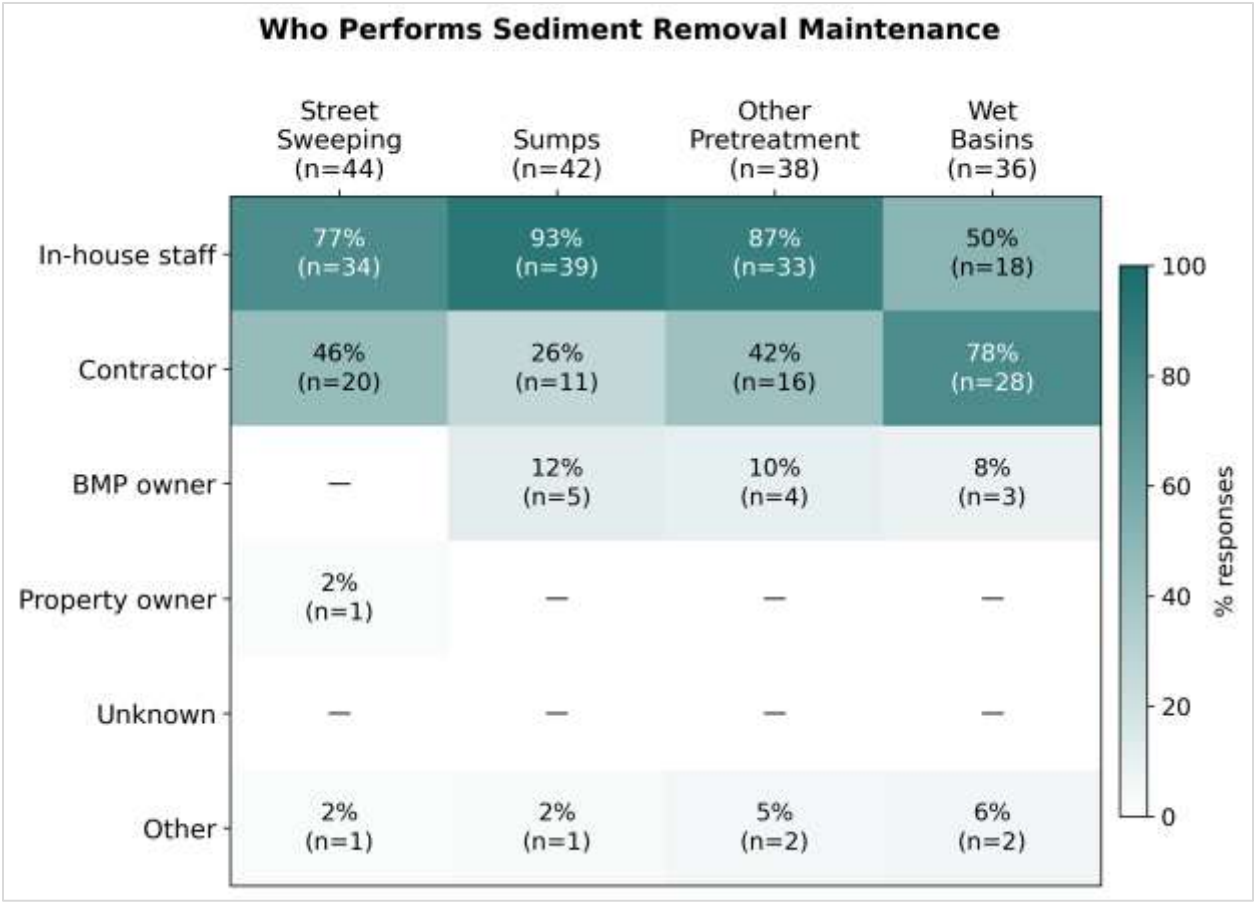
Figure 6-7 through Figure 6-11 compare maintenance practices across all four BMP types. Key patterns are summarized below.



(Q23/Q31/Q40; n=38–43 per BMP type; percentages of respondents answering each section)

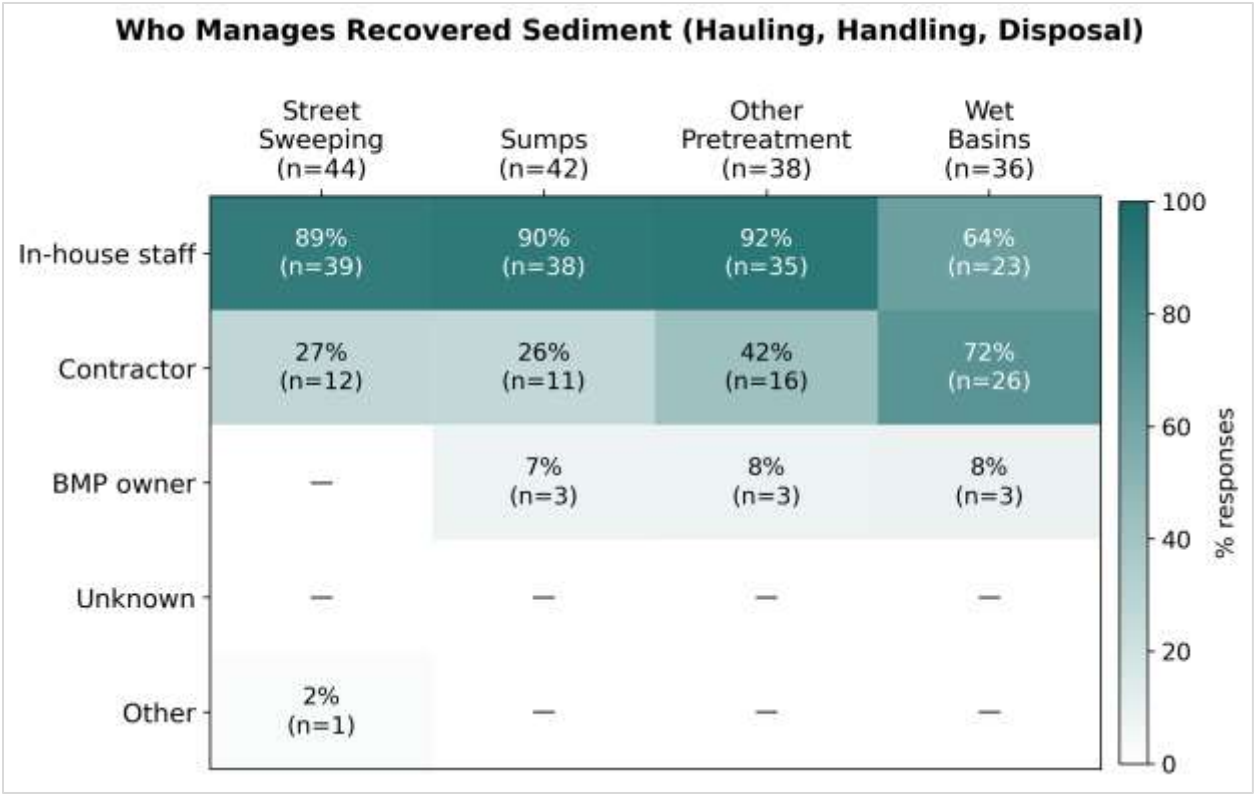
Figure 6-7 Maintenance frequency by BMP type.

Maintenance frequency differs markedly across BMP types (Figure 6-7). Street sweeping is performed most frequently: semi-annually by 49% of respondents and quarterly by 23%, which reflects its role as a routine operational activity. Sumps and other pretreatment structures are maintained on longer cycles. Annually is the most common schedule for sumps (69%) and other pretreatment (45%), with a substantial share of other pretreatment respondents (42%) reporting less-than-annual maintenance. Wet basins follow a variable or event-driven schedule (see Section 6.4).



(Q24/Q32/Q40/Q48; n=36–44 per BMP type; multi-select, percentages of respondents answering each section)

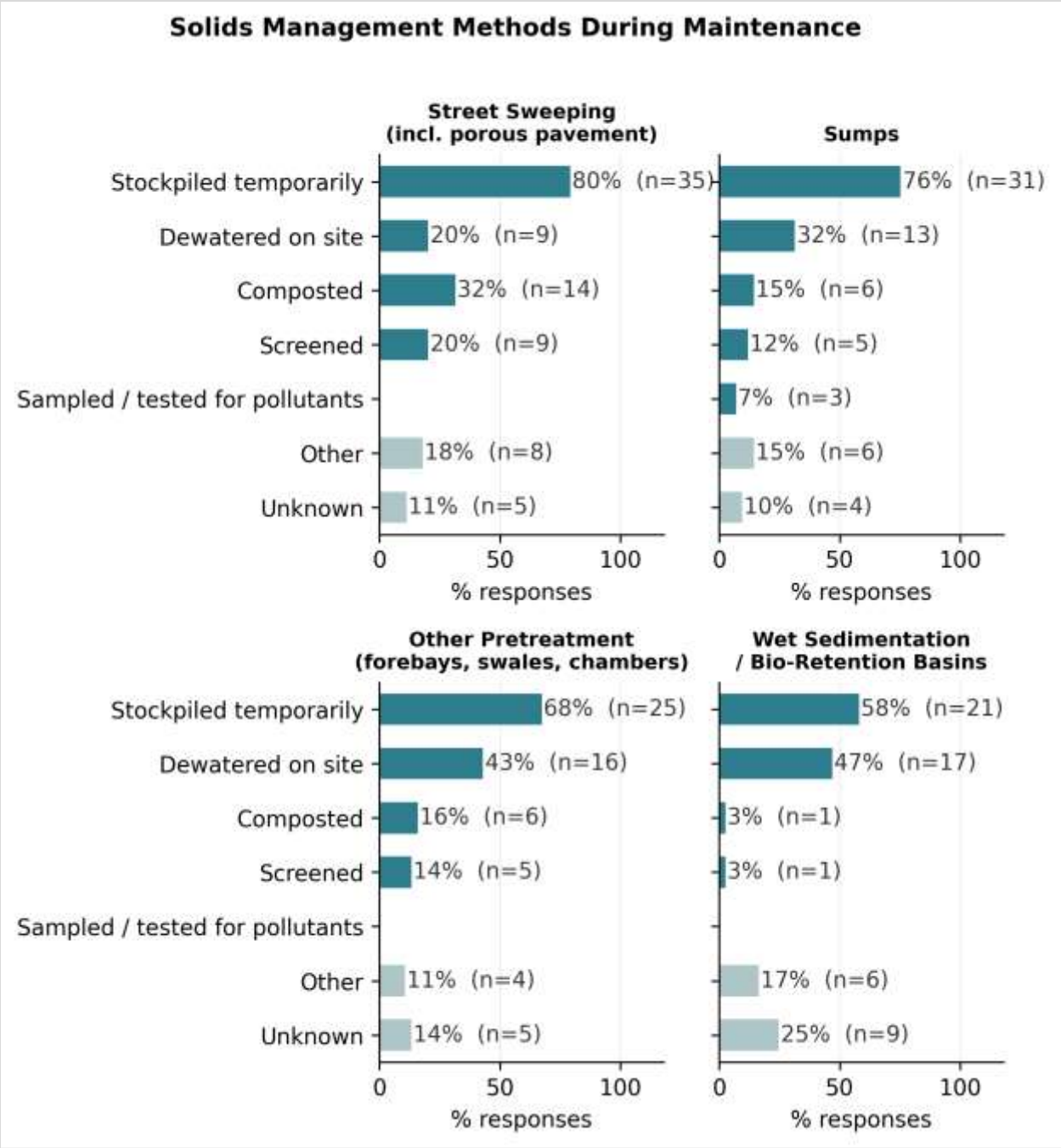
Figure 6-8 Who performs sediment removal maintenance by BMP type.



(Q25/Q33/Q41/Q49; n=36–44 per BMP type; multi-select, percentages of respondents answering each section)

Figure 6-9 Who manages recovered sediment by BMP type.

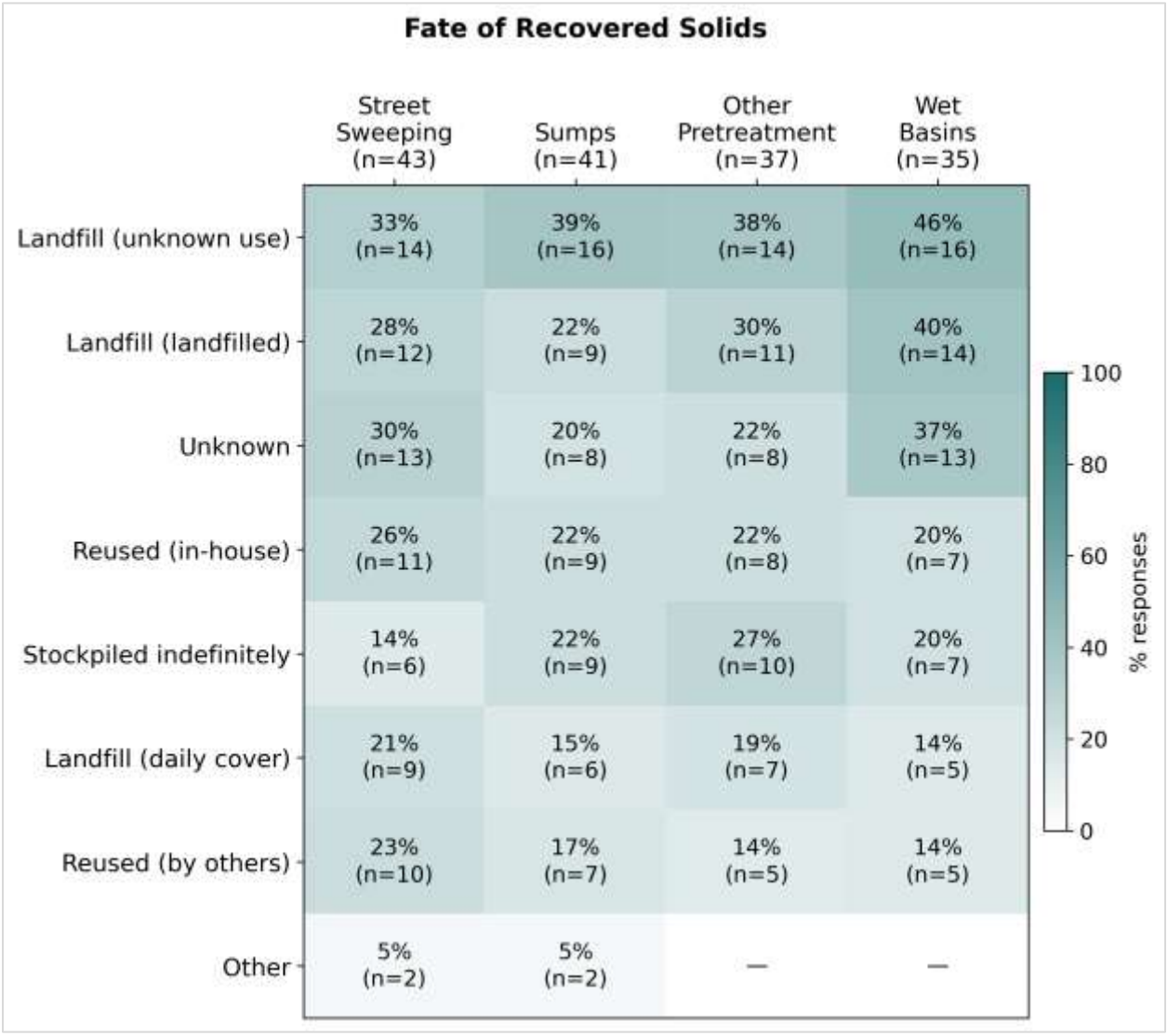
In-house staff perform maintenance for the majority of respondents across street sweeping (77%), sumps (93%), and other pretreatment (87%), with contractors playing a secondary role. Wet basins are the exception: contracted providers are the primary performer (78%) and manager (see Section 6.4), reflecting the more specialized nature of basin cleanout. Across all BMP types, contractor use tends to be higher for management of recovered material than for performing the physical maintenance work.



(Q26/Q34/Q43/Q50; n=36–44 per BMP type; multi-select, percentages of respondents answering each section)

Figure 6-10 Solids management approaches by BMP type.

Temporary stockpiling is the most common solids handling approach across all BMP types (Figure 6-10): 80% for street sweeping, 76% for sumps, 68% for other pretreatment, and 58% for wet basins. Testing and characterization of recovered material is uncommon across all BMP types, suggesting that most programs do not routinely assess material quality before disposal or reuse.



(Q27/Q35/Q43/Q51; n=35–43 per BMP type; multi-select, percentages of respondents answering each section)

Figure 6-11 Fate/disposal of recovered material by BMP type.

Transport to a landfill with unknown end use is the most commonly reported fate across all four BMP types (Figure 6-11), ranging from 33% for street sweeping to 46% for wet basins. Landfilling (known) is also prevalent for wet basins (40%) and other pretreatment (30%). The high proportion of ‘unknown’ landfill outcomes across BMP types reflects contractor-managed disposal where the generating organization has limited visibility into final material use. Reuse rates are low across all BMP types.

6.8 Question 53 – Volume and Mass Estimates

Volume and mass estimates should be interpreted with caution. Responses were voluntary and self-reported, with no standardized guidance on what time period or scope to use. The question asked for annual estimates, but respondents may have interpreted this differently (e.g., per event, per site, program-wide). Response rates for this question were low relative to the total respondent pool, and the subset who provided numeric estimates may not be representative of the full group.

Because respondents used a variety of units (cubic yards, tons, truckloads, and others), a two-tier approach is used. Tier 1 reports only responses already expressed in cubic yards (CY), for which descriptive statistics can be calculated directly. Tier 2 responses in other units are reported as a unit-type count only; no conversion to a common unit is attempted as bulk density and truck capacity assumptions introduce significant uncertainty. Cross-BMP comparisons and program-level totals are not appropriate given these limitations.

6.8.1 Tier 1 — Cubic Yard Responses

Table 6-6 Volume/mass estimates by BMP type — Tier 1: CY-direct responses

BMP Type	Total respondents	CY-direct n	Range (CY)	Median (CY)	Mean (CY)	Note
Street Sweeping (incl. porous pavement)	32	9	7.5–5,660	90	827	Mean skewed by outlier (5,660 CY); rely on median
Sumps	28	12	2–150	20	44	
Other Pretreatment (forebays, swales, chambers)	21	12	1–100	12	30	
Wet Sedimentation / Bio-Retention Basins	20	10	50–2,500	1,200	1,160	Volumes ~order of magnitude larger than sumps / other pretreatment

(Q53; n=9–12 CY-direct responses per BMP type)

6.8.2 Tier 2 — Other-Unit Responses

Table 6-7 Volume/mass estimates by BMP type — Tier 2: other-unit responses

BMP Type	Tons	Truckloads	Other units		Interpretation
			n	unit	
Street Sweeping (incl. porous pavement)	10	7	19	Hoppers (1), Pounds (1)	Bulk density varies widely (~0.6–1.4 t/CY); conversion unreliable
Sumps	9	1	10	—	Bulk density varies; 1 truckload also reported
Other Pretreatment (forebays, swales, chambers)	5	1	6	—	Bulk density varies; 1 truckload also reported
Wet Sedimentation / Bio-Retention Basins	4	0	4	—	Bulk density varies; no truckloads or other units reported

(Q53; n=4–19 other-unit responses per BMP type)
Excluded responses: gallons/vac truck (water fraction unknown), unitless numbers, and qualitative responses (e.g., 'varies widely', 'doesn't happen annually'). Several wet basin respondents indicated cleanouts do not occur on any regular annual schedule.

For respondents who provided estimates in other units, only the unit-type distribution is reported: street sweeping (n=19: 10 tons, 7 truckloads, 1 hopper, 1 pounds); sumps (n=10: 9 tons, 1 truckload); other pretreatment (n=6: 5 tons, 1 truckload); wet basins (n=4: 4 tons). Wet basin volumes are roughly an order of magnitude larger than sumps or other pretreatment. The street sweeping mean (827 CY) is skewed by outliers; the median (90 CY) is more representative.

7 Question 54 - Final Comments

Question 54 received five comments (5 of 81 respondents, 6% response rate):

Table 7-1 Optional Comments for Question 54

#	Response
1	Glad to help!
2	You're welcome!
3	Thank you!
4	Thank you, thank you, thank you.
5	As a Watershed District representative, we do not own/maintain many BMPs but assist with design and construction and serve as a technical resource to our municipal partners.

8 Conclusions

Financial barriers were ranked as the highest-priority constraint by 56% of respondents (28/50, Q19). 92% of respondents who identified this as a barrier selected two or more sub-issues, most commonly spanning insufficient in-house staffing (78%), hauling and disposal costs (72%), contract service costs (66%), or limited grant support (62%). As one respondent put it, "Management of these materials can be a large financial burden. Flexibility for appropriate reuse can reduce that burden if more cost-effective options are available/acceptable" (Q13). Respondents also noted that current funding mechanisms tend to favor capital improvements over ongoing operations and maintenance costs, leaving day-to-day material handling without a clear funding pathway, which may be supported by the operational nature of the most common financial sub-issues listed above.

Landfill disposal is the dominant fate for recovered stormwater residuals across all four BMP types surveyed. For wet basins, 100% of respondents reported at least one landfill-related fate option; for other BMP types the figure ranges from 76% to 86% (Q27/Q35/Q44/Q51). Additionally, many respondents are unaware of what happens to their material: 30% of street sweeping respondents and 37% of wet basin respondents reported that fate is unknown because it becomes contractor responsibility. Beyond active disposal, 14–27% of respondents across BMP types selected "stockpiled indefinitely", meaning material is being collected and held with no defined end use. Reuse does occur, but at secondary rates of roughly 20–26% across BMP types. Overall, this indicates that programs are effective at capturing material but lack the viable reuse options, storage, financial capacity, and clear guidance needed to manage it productively once collected.

Regulatory barriers ranked second overall in the priority ranking (Q19). Of the 39 respondents who identified regulatory barriers (Q14), 74% cited lack of clarity on the regulatory status of recovered solids, and 54% cited potential liability risk associated with reuse, even when materials meet current criteria. A discrepancy between MPCA testing guidelines and criteria used by landfills (cited by 33%) adds a further layer of confusion at the point of disposal. As one respondent noted, "there needs to be clarity on this for agency attorneys to support these programs — otherwise they may advise to pursue other, safer, options even if these are the most practical or cost-effective" (Q11). Clear, written guidance on material classification, reuse liability, and testing standards would be the most direct method of addressing this barrier.

Formal material characterization before disposal or reuse decisions is rare outside of wet basin dredging. Only 3 of 41 sump respondents reported sampling and testing solids for pollutants as part of their management approach (Q34). Wet basins appear to be tested more frequently because the scale and infrequency of dredging make it worth the investment. For routine maintenance BMPs like street sweeping and sumps, cost and complexity are the primary barriers: respondents described testing protocols as "numerous, costly, and slow to produce results" (Q8), and noted that "material characterization and disposal determinations are highly technical and involve specialized terminology... most maintenance and public works staff are not trained to navigate" (Q8). Without accessible, cost-appropriate testing protocols and clear guidance, programs will continue to default to landfill disposal as the safest and easiest option.

Answers to free response questions highlighted that at least 4-5 respondents feel that the challenges described throughout this memo fall hardest on small and under-resourced MS4s: "For small MS4s, requirements are often just an added responsibility to an already overworked staff person or in some cases even a volunteer" (Q13). Enforcement actions without accompanying guidance or technical assistance can make things worse rather than better: "agencies attempting to meet requirements may fall further behind when limited resources are redirected from maintenance and improvements to address

enforcement outcomes" (Q36). Future guidelines, regulations, and funding should be accessible and useful at the small MS4 scale, not just for large municipal programs.

Several additional findings provide useful context for the five priorities above. BMP ownership varies among respondents with 40% owning and maintaining all four BMP types and 35% owning none. But wet basins stand out as significantly more contractor-dependent (78% use a contractor for maintenance, Q48), which likely contributes to the higher rate of "unknown" fate for recovered materials observed for that BMP type. Across all BMP types, temporary stockpiling is the most common solids handling method (58–80% depending on BMP type, Q26/Q34/Q43/Q50), which is consistent with the landfill dependency and indefinite stockpiling findings above. Finally, respondents generally agree with MPCA's program goals (Q6 received the highest open-ended response rate of any Part II question at 30 responses) but were clear about where they want MPCA to direct its energy: producing centralized guidance, standardized protocols, and education resources that individual MS4s can adopt, rather than expecting each program to develop its own. As one respondent put it, "the overall program education should be provided by the MPCA — this would eliminate all the MS4s from creating a similar document" (Q12).

Appendices

Appendix A

Free Responses

A1. Program Goals and Component Feedback (Q6–Q13)

Verbatim responses are listed below, organized by question and theme category. Responses assigned to multiple themes are listed once under the first applicable theme.

Q6 — Program Goals

General agreement / no feedback (n=11)

1. Minimizes environmental impact through source control, reuse, and reduction of landfill dependency.
2. These seem good.
3. Minimizes environmental impact through source control, reuse, and reduction of landfill dependency. Addresses regulatory and legal risks by aligning with current and anticipated environmental standards. Optimizes operational efficiency and cost-effectiveness through regional collaboration, shared infrastructure, and improved logistics. Supports adaptive management by incorporating ongoing research, education, and data-driven decision-making.
4. These seem to capture the workshop outcomes.
5. Source control, regulatory and legal risks as well as cost-effectiveness seem to be goals within our immediate reach. Reducing contaminants, ie, source control should be high priority.
6. All of the above
7. Good enough start. Encourage incorporating some type of evaluation cycle to refine and update over time as this is an evolving topic with new ideas, methods, technologies, strategies, issues, and conflicts arising and shifting.
8. Provide resources to educate everyone about clean stormwater
9. These goals look good. Might be helpful to add something like "sustainable residuals management so all BMPs can be maintained as needed to optimize pollutant removal."
10. no issue with these as stated

Reduce landfill dependency and expand reuse (n=6)

1. Need to simplify. Less reporting frequency. When things are mandated like this without additional resources, it is very difficult. Once storm water infrastructure is in place, city would be better served by offering services to manage businesses that need to be reviewed or inspected. MPCA could be the oversight on the private businesses first and then look at municipality.
2. It would be very helpful to put some focus on design for TMDL and WLA compliance. We intend to work on documentation of BMPs and their capacity to help meet these goals for TSS and nutrient removal-
3. Refinance measurable goals and outcomes
4. Finding ways to either work spoils to bring contaminant levels below levels that would require landfill disposal would benefit communities. Additionally, establishing means such as grants to promote neighboring MS4s to create combined stockpiles of contaminated material could help.
5. No comments
6. OK - smaller MS4s with ponds and or sediment traps (and probably private land owners / companies at some point in the future) don't have the resources that larger municipalities have to treat / manage residuals so goal 5 is very important (although the use of the word "municipalities" is not inclusive, "owners" would be a better term).

Regional collaboration and shared infrastructure (n=1)

1. I agree with the intent of the program goals. At face value they are reasonable and achievable.

Reduce regulatory burden and simplify reporting (n=5)

1. All looks good and proper order. However, lot more emphasis is needed for goal 1: prevention - source control, reuse, and reduction of landfill dependency
2. I think these goals are sufficient, but would be looking for more uniformity among BMPs and practices to verify the residuals across a larger area and time.
3. Concur with & support stated goals
4. Agree with goals. Especially interested in bullet 3, to reduce costs for sediment disposal.
5. Provide financially responsible maintenance while protecting our surface waters.

Equity and accessibility (n=3)

1. Consider additional stakeholders and partnerships that make management of residual materials simple and cost effective. This is related to bullet 3, but it seems that more collaboration could increase sustainability.
2. I agree with the bullets and have no additional comments.
3. These seem like appropriate goals for the program.

Adaptive management (n=4)

1. Goals appear to be inline with my expectations. Minimizing landfill dependency is important to sustain long term.
2. This is a well rounded set of goals. The last goal should try to address getting information to cities that are not MS4s so they know about proper residuals management concepts and goals
3. Sounds good.
4. I support all these. Well written

Notable individual responses

1. Focus on TMDL and WLA compliance documentation for TSS and nutrient removal credit from BMPs.
2. Establishing grant mechanisms to promote neighboring MS4s creating combined contaminated material stockpiles.
3. Add explicit language about sustainable residuals management so all BMPs can be maintained to optimize pollutant removal.

Q7 — Source Control & Prevention

Specific prevention and maintenance actions (n=7)

1. Assist the municipality by inspecting the run-off at private businesses and enforce for the municipality. This would lessen most contamination.
2. enforcement of CSW permit
3. adopt a drain/full sump hotline,
4. Grants for sumps, hydrodynamic separators, or other means of enhanced pretreatment of storm sewer
5. Better compliance with restrictions on vehicle tracking from construction sites (including sites significantly smaller than an acre) should be included. General public education would have limited effect as the general public doesn't impact sediment on roadways all that much. Municipalities (winter) and construction (summer) have the greatest impact and education $$ should be targeted to them.

6. Public education should be top priority. Changing habits to prevent pollution in storm water is essential.
7. High Capital & Operating Costs: Enhanced street sweeping and sump maintenance require significant upfront investment in specialized equipment, as well as ongoing costs for staffing, fuel, parts, repairs, and replacement. Equipment Lifecycle Impacts: Street sweepers and vacuum units experience accelerated wear due to abrasive materials, increasing maintenance frequency and long-term replacement costs. Sustainable Level of Service: Establish a realistic level of service that can be maintained long-term without creating deferred maintenance or excessive reliance on outside contractors. Prioritized Deployment: Focus enhanced sweeping and sump maintenance on areas with the greatest sediment reduction benefit to avoid unsustainable citywide expansion. Funding Limitations: Recognize that sweeping frequency and scope are constrained by available funding and competing infrastructure needs. Outcome-Based Justification: Evaluate sweeping and sump maintenance increases based on measurable benefit relative to cost, rather than frequency targets alone.

Sweeping program evaluation and credit (n=4)

1. Public Education is important to gain more funding for these activities
2. Excellent!
3. More education regarding need for proper construction controls.

Public education role and delivery (n=4)

1. Public education ought to be coming from MPCA- this way there can be a well-developed and statewide program that meets permit requirements. This way there can be a homogenous message applied statewide that is consistent with the MS4 requirements.
2. Smart Salting training for agencies, property owners, and contractors
3. Fall leaf collection programs to reduce nutrient loading (leaf litter is another form of residuals management).
4. "... to reduce sediment load AND ATTACHED POLLUTANTS". Maybe add something about how enhanced sweeping enables materials recovery for re-use (sand, salt)

Construction erosion control and enforcement (n=3)

1. Feel the goals are realistic and applicable
2. These goals are feasible. The problem is investment into equipment and staff time to meet the requirements of these goals for some municipalities. I also think how these goals are measured and what credit received for reaching these goals needs to be looked at. As of now, very little credit is given toward the large effort and resources put into enhanced street sweeping and sump maintenance programs.
3. These are fine. I think most agencies (my own included) are missing an opportunity by not exploring community-based social marketing to address some of the issues typically addressed by education and outreach. (Just telling someone that dumping leaves down a storm drain is problematic won't change behavior.)

General agreement with goals (n=4)

1. Enhanced street sweeping is effective and should be prioritized for continued funding and credit. Sumps are useful but are unlikely to produce meaningful water quality improvements on their own. Public education remains important but is often overemphasized; it can be costly, time-intensive, and typically delivers limited measurable outcomes.

2. Storage Inspections are needed on a regular basis.
3. I think that the MPCA has done a good job on this.
4. Reduce and minimize are too loose of terms. Better to use some type of measurable outcome, target, or threshold that can be used to create an implementation strategy. This might be okay to start with but will become an issue in time once the early adopters expand their programs as best they can but when they get push back or run out of easily implementable options (upgrading equipment and methods) they will be forced to ask if they have done enough and how far they NEED to go. And this provide little support to those that either want to do enhance their programs but don't have internal support or those who are not wanting to enhance their program but may need to.

High capital and operating costs (n=3)

1. Potential for chloride reduction through enhanced/specialty sweeping in the spring
2. Identify source of sediment, i.e gravel alleys/roads, winter maintenance sand, erosion, etc.
3. No comment, the goals are appropriate.

Q8 — Material Characterization & Testing

Testing is costly and slow (n=3)

1. Volume reduction? can this material go into compost, or is it always destined for the landfill?
2. We don't need AI to tell us how to interpret lab results. We need guidance from MPCA.
3. Economical characterization protocol to support reuse.

MPCA guidance preferred over AI tools (n=4)

1. Agreed, although having to test individual sump pit sediments would be cost / time prohibitive. The MPCA should do some sort of study looking at upstream land use of ponds / sediment traps / sweeping ares to limit the requirements based on potential for pollution. (residential areas (suburban vs urban) vs commercial vs institutional vs industrial vs multi lane road vs single lane road vs parking lot, etc) Then the MS4 / owner could look at the individual subwatershed that feed the practice to determine the amount of testing required. MS4s are required to know all their BMPs and in theory at least, they should know the shed areas that feed them.
2. We've noticed testing is very expensive and it makes it challenging to operate a program with this. It can be cost prohibitive.
3. What parts of the characterization can be done by internal staff vs. what needs to be done at a contract laboratory
4. We need more testing protocols.

Standardized protocols and thresholds needed (n=7)

1. Feel the goals are realistic and applicable
2. Add chloride, PFAS or other tests to guidance/requirement if able to subsidize. Conditional on sharing results to a central database.
3. No comment
4. I think the current method of inputting lab results into a spreadsheet that compares RSV's is fine.
5. While making this automated would be helpful, the existing spreadsheet has worked for years. Keeping it within a goal to keep it current would also be beneficial.
6. Material characterization and disposal determinations are highly technical and involve specialized terminology, chemical thresholds, and regulatory considerations that most maintenance and

public works staff are not trained to navigate. This complexity can be intimidating and creates hesitation, particularly given past experiences where materials were disposed of in good faith but later identified as hazardous. In practice, maintenance expertise and material testing expertise are distinct skill sets. Expecting maintenance staff to interpret testing requirements or rely on tools they cannot independently validate places an unrealistic burden on their roles. The primary goal should be to provide maintenance staff and program managers with clear, simple, and defensible direction on how collected materials are to be handled and disposed of. Standardized testing and AI tools should serve as supporting strategies that reduce uncertainty and risk, rather than shifting technical responsibility onto staff who are not equipped to manage it.

Simplified guidance for maintenance staff (n=2)

1. Lack of Consensus: There is no universal agreement among regulators, engineers, contractors, or municipalities on whether street sweepings should be considered “clean,” conditionally reusable, or waste requiring disposal. Inconsistent Guidance: Regulatory interpretation and recommended handling of sweepings varies by agency, facility, and reviewer, creating uncertainty and inconsistent outcomes for similar material. Data Over Opinion: Establish standardized material characterization and testing protocols to replace subjective judgment with repeatable, defensible data. Decision Transparency: Use documented test results and objective thresholds to guide reuse or disposal decisions, reducing reliance on individual opinion or informal precedent. Cost-Conscious Testing: Implement testing only at a level necessary to inform decisions, avoiding excessive or redundant analysis that adds cost without improving outcomes. Automated Interpretation: Utilize automated tools (e.g., R scripts or AI-assisted analysis) to interpret lab results consistently, flag exceedances, and recommend appropriate reuse or disposal pathways. Defensibility: Ensure that reuse and disposal decisions can be clearly justified to regulators, auditors, and elected officials based on documented criteria rather than subjective judgment.
2. Support these goals

General agreement / no feedback (n=4)

1. Need more county and state sites to easily haul street sweepings to for municipalities.
2. Testing protocols are often numerous, costly, and slow to produce results, and may still be inconclusive, which creates project schedule issues. AI could be helpful in processing results, but fast processing of lab analysis is minor when it takes weeks to obtain the lab results.
3. Testing protocols are needed. I do not recommend AI to interpret lab results.
4. Note: we've had issues getting PAH/cPAH test results for Iron-enhanced sand media due to the presence of magnetic particles interfering with the sample processing methods required (microwave) to be compliant with MPCA sediment disposal/testing guidance.

Notable individual responses

1. Issues with PAH/cPAH test results for iron-enhanced sand media due to magnetic particles interfering with required microwave sample processing (index 19).
2. Need to determine whether material can go into compost or is always destined for the landfill (index 5).
3. Need more county and state sites to easily haul street sweepings to for municipalities (index 2).

Q9 — Reuse & Disposal Strategies

General agreement / no feedback (n=7)

1. Feel the goals are realistic and applicable
2. Standardized classifications for material removed from specific BMPs, based on existing research, should be adopted, along with alternatives to landfilling. While regional storage facilities have merit, they are likely impractical. onsite or regional treatment methods that reduce pollutant concentrations and enable material reuse would provide a more effective solution.
3. Good.
4. OK Regional areas might get messy - potential of mixing pollutants from different sources could cause "cradle to grave" issues.
5. This has barely been touched.
6. Aligning with and/or updating applicable solid waste statutes and rules. Coordination with permitted landfills to ensure alignment with their requirements. We just heard from one landfill that they needed an evaluation of DRO and Metals prior to accepting waste street sweepings.
7. need better guidance on what's allowed for composting screened sweepings. Another innovative thing would be centralized vermiremediation

Alternatives to landfill disposal needed (n=3)

1. On site dewatering methods and storage guidelines until quantities justify a more cost-effective hauling contract.
2. Characterization of materials for reuse in full depth reclamation pavement projects or other pavement rehab approaches.
3. No comment, the goals are appropriate.

On-site reuse (n=2)

1. these goals listed, if implemented, would help very much.
2. Approved design detail library for different reuse and disposal strategies. Could show liners and caps, minimum clean material cover, etc.

Regional dewatering methods and concerns (n=3)

1. This is the big question for any maintenance operations, what do we do with the material accumulated? If there were other clear options outside of landfills or ways to cooperate with private entities that need material, this would greatly reduce cost.
2. Need robust reuse plan to avoid landfilling.

Standardized classifications and regulatory alignment (n=4)

1. I was a DOT maintenance worker in the Colorado mountains. We used sediment from ditch cleaning for filling on narrow shoulders and slopes as well as to construct bar ditches and berms. Good way to minimize hauling, etc.
2. No comment
3. Give clarity on how PAHs can affect human health.
4. Any potential for agricultural incorporation`

Innovative and emerging reuse pathways (n=3)

1. Volume Exceeds Local Reuse Capacity: The City generates street sweepings in quantities that exceed feasible on-site reuse opportunities. Available berms, upland areas, and maintenance uses cannot absorb the full annual volume. Cost Prohibitive Disposal: Off-site hauling and landfill disposal costs (transport, tipping fees, and contractor time) can exceed the operational value of sweeping, making frequent or expanded sweeping financially infeasible. Operational Tradeoff: Without cost-effective reuse or disposal options, increased sweeping frequency directly competes with other essential street and stormwater maintenance activities.
2. Support these goals
3. guidance on dewatering of material prior to disposal

Q10 — Infrastructure & Logistics

Shared regional facilities (n=7)

1. Shared might be hard for small communities that only work within their means. good for large scale projects/cities
2. Hauling to regional sites, dewatering, etc has an adverse environmental impact through trucking and drying emissions as well as removing nutrients from the nutrient cycle via landfilling.
3. preferred contractor lists, shared/public regional facilities for permanent disposal of publically funded excavations/disposals.
4. Guidance/examples for partner cooperator agreements or policy
5. Shared regional facilities may be best organized by County.
6. Screening equipment can be expensive for limited use so it fits nicely into "Equipment sharing" goal. Materials characterization oftentimes will dictate logistics for removal, transport, storage, and disposal.
7. Support these goals

Equipment sharing and collaboration frameworks (n=7)

1. Same as last question
2. Advocating for and assisting in equipment sharing would greatly help in the street sweeping program.
3. Vegetation management is a continuous ongoing process, especially with invasive plants. We are creating a Thistle management plan.
4. I think there is cooperation between local and state entities in some areas is already happening. It would be nice to have a better way to find opportunities to cost / equipment share other managers talking directly to manager. This might be in the form of a directory with resources available or entities looking to solve the same issues in the same region partnering.
5. I'm skeptical of regional facilities. This seems very metro centric (not a bad thing, just limits range of effectiveness) and de-watering usually needs to be done onsite before it can be hauled to another location.
6. 1. Capital Costs (Facilities & Major Equipment) Options (pick one or allow hybrids): Host Agency Model Host city/authority owns the site and equipment. Other cities pay user fees. ✓ Simple ❌ Host carries most risk and political burden Proportional Buy-In Cities contribute based on: Population Lane miles Annual sweeping volume Ownership shares match contribution. ✓ Fair ❌ More admin upfront Grant + Local Match Regional entity pursues grants. Local agencies split the required match. ✓ Best optics ❌ Timing dependent Recommended language: Capital costs shall be shared proportionally based on

agreed-upon metrics such as lane miles, material volume, or population. 2. Operating Costs (Day-to-Day Use) These should always be pay-as-you-go: Hauling (by load or mile) Dewatering time Testing fees Stockpile duration Disposal if required Rule of thumb: You pay for what you use. This avoids resentment and keeps participation voluntary. 3. Maintenance & Replacement This is where most shared programs fail if not defined. Best practice: Annual replacement reserve funded by: Flat annual member fee or Per-use surcharge (e.g., $/hour or $/ton) Key line to include: All shared equipment shall include a funded replacement reserve to prevent deferred maintenance and sudden cost shifts. How You Get Equipment & Capacity When You Need It 1. Defined Access Tiers (Critical) Without this, emergencies become arguments. Example: Tier 1 – Emergency / Regulatory Flooding, compliance deadlines Guaranteed access Tier 2 – Scheduled Operations Sweeping, sump cleaning Tier 3 – Opportunistic Stockpiling, pilot reuse 2. Reservation System (Simple, Not Fancy) Does not need to be high-tech. Options: Shared Outlook calendar Google Sheet with time blocks Quarterly scheduling calls Rule to include: Scheduled use takes priority over first-come access, except during Tier 1 events. 3. Guaranteed Minimum Access This protects small cities. Example: Each member city guaranteed: X days/month of equipment OR X tons/year of facility access This prevents larger cities from crowding you out. 4. Backup Clause (Very Important) You will lose access occasionally. Include: If shared equipment or facilities are unavailable, member agencies may procure private services at their own cost without penalty. This keeps you operational.

7. No comment, the goals are appropriate.

Vegetation management (n=1)

1. Comment same as #9

General agreement / no feedback (n=5)

1. Feel the goals are realistic and applicable
2. Shared regional facilities have potential but are likely costly and of limited effectiveness. Greater emphasis should be placed on improved BMP access and development of new BMPs. While equipment sharing already occurs, it is often constrained by overlapping seasonal demand and ongoing maintenance needs, which can cause delays.
3. The Minnesota Stormwater Manual doors a good job of these.
4. Fair ideas but mostly rely on demand and practicality. Not sure these are needed to be called out as these should occur organically out of demand. An addition would be to the shared technical resources for various audiences like the stormwater manual has guides for engineers, designers, maintenance staff, administration/reporting staff, monitoring staff...

Notable individual responses

1. Hauling to regional sites has adverse environmental impact through trucking and drying emissions, and removes nutrients from the nutrient cycle via landfilling.
2. Detailed cost-sharing governance framework proposed covering capital, O&M, equipment access tiers, and backup clauses.
3. Vegetation management (invasive plants, thistle) raised as an ongoing infrastructure concern but is tangential to the core Q10 topic.

Q11 — Regulatory Alignment & Risk Management

General agreement / no feedback (n=7)

1. Start measuring ho many tons of salt each community is allotted in order to avoid salination of community water and surface water. When is the MPCA actually going to ban salt and stop the poisoning of the water. This should be your priority #1. Its too late out east in parts of New York and Maine, etc. The wells and lakes cannot recover.
2. Clear guidance is valuable but often lacks the flexibility needed for field maintenance, where conditions frequently deviate from plans and professional judgment is required. Planning for emerging contaminants should be expanded; however, rigid regulatory implementation can hinder routine maintenance and create unintended consequences. Flexible approaches are needed to address emerging contaminants while still allowing effective operation and maintenance.
3. None.
4. This would mitigate some of my concerns noted above, but I'm not all that confident the MPCA will get anything out in a timely fashion. History shows that they make MS4 rules and then produce guidance years after MS4s are already supposed to be in compliance (i.e they wait until MS4s figure it out and then "steal" whatever they like the best and push that out as "guidance").
5. You seem to be doing your best.
6. This might be a bigger issue than some realize. Well intended practices now can create future liability if those actions cause even unintended harm. There needs to be clarity on this for agency attorneys to support these programs otherwise they may advise to pursue other, safer, options even if these are the most practical or cost-effective.
7. alignment with landfill protocols for testing and acceptance

Clear and flexible written guidance needed from MPCA (n=5)

1. Simplicity and practicality of these items is critical for implementation to be successful. PFAS needs to be dealt with at the level of production, not on the tail end of things.
2. No comment
3. Guidance regarding solid waste and trash contamination and screening
4. Future contaminants should be identified before managing for them becomes a regulatory requirement. Proactive planning was effective with PAH management. Other than PFAS, what is next i.e. microplastics, etc.

Emerging contaminants, regulatory uncertainty, and proactive planning (n=6)

1. Feel the goals are realistic and applicable
2. provide a 1-page document outlining the process for different material types. Hand-in-hand with "clear guidance"
3. Clear Guidance on reuse and soil/water thresholds and setbacks are very important. I agree with both these goals
4. Regulatory Uncertainty: Current guidance on the classification, reuse, and disposal of street sweepings and sediment can vary by agency, reviewer, or facility, creating uncertainty and compliance risk. Need for Written Direction: Verbal or informal guidance is insufficient for risk management; written, consistent direction from MPCA and partner agencies is needed to support defensible decisions. Liability Awareness: Reuse decisions may carry long-term liability for the generating agency, even when material is transferred or reused off-site. Conservative Default Path: In the absence of clear guidance, establish conservative default handling procedures to limit legal and environmental exposure. Future Contaminant Planning: Anticipate emerging

contaminants (e.g., PFAS, PAHs, microplastics) that may affect reuse eligibility or increase testing and disposal requirements. Adaptive Management: Design policies that can be adjusted as regulations, analytical methods, and contaminant thresholds evolve. Cost & Risk Balance: Recognize that increasing regulatory complexity may drive higher testing, handling, and disposal costs, requiring reassessment of program scale and feasibility. Documentation & Traceability: Maintain clear records of testing, decisions, and agency guidance relied upon to demonstrate due diligence in the event of audits or future regulatory changes.
5. No comment, the goals are appropriate.
6. Support these goals

Notable individual responses

1. Response 13 is a detailed multi-point comment covering regulatory uncertainty, liability, emerging contaminants, adaptive management, and documentation needs; assigned to liability/uncertainty as its central organizing theme.
2. Response 9 critiques MPCA's historical lag in producing guidance after mandating MS4 rules; merged into the guidance theme.

Q12 — Education & Capacity Building

General agreement / no feedback (n=6)

1. Ongoing training is essential in a rapidly changing regulatory environment, particularly to address differences among urban, suburban, and rural land uses. While centralized guidance exists in the MN Stormwater Manual, key information is often difficult to locate or apply. Additional technical support or greater flexibility within MS4 requirements is needed.
2. Presentation (horse's mouth) presentation at CEAM, Mn Watersheds, WR conference, public works forums, contractor industry groups, etc. This would go a long way to get folks on the same page
3. None.
4. Internally we are trying to incorporate "private" rain gardens inspections. Adopt better soil management with major developers. Continue to hold a joint agreements with Carver County, and surrounding cities.
5. Education and capacity building must prioritize buy in across multiple audiences, including technical experts, water resource managers, and maintenance or public works staff. Care is needed in how the term "enhance" is used. Water resource professionals use this term to describe enhancing existing efforts to achieve higher water quality outcomes but maintenance staff may hear it as an implication that their programs are somehow underperforming. In reality, the opposite is often true. These maintenance programs are well established, take pride in their work, and are among the most effective and cost efficient tools available for improving water quality. If achieving water quality goals were possible through traditional maintenance alone, it would already be happening. The intent of enhancement is not to correct deficiencies, but to invest in proven programs by providing better tools, clearer guidance, and additional support so their success can be expanded. Clear, respectful messaging that acknowledges existing strengths and aligns perspectives is essential to building trust and achieving lasting improvements.
6. simplify the PAH BaP equivalency guidance!

Diverse audiences, venues, and delivery formats (n=6)

1. Training for contractors who do frequent dredging work

2. No comment
3. Would be helpful. MPCA lead or sponsored webinars are very helpful. I particularly like the "lunch and learn" style when they are offered during the lunch hour. Webinars are better than in person classes / meetings, because not all of us live in the metro area (state agencies often forget this)
4. These goals are good. I do think the training requirements for the MS4 permit are exhausting and there is not a lot of opportunities to attend training events. There are a few national training certifications but nothing specific to the state of Minnesota. It would be nice if there was an established training available through U of M or another entity that was specific for MS4 related items. Similar to the Site Management and SWPPP design certifications. I also think annual training on certain topics gets repetitive and would likely make more sense to move toward a once per permit renewal cycle or every 2 or 3 years.
5. Capacity Gaps: Small and under-resourced municipalities often lack dedicated stormwater staff, in-house technical expertise, and time to track evolving guidance and best practices. Practical, Not Theoretical Training: Training and assistance should focus on implementable, field-tested practices rather than academic or one-size-fits-all solutions. Cost & Time Constraints: Participation in training and webinars must be balanced against daily operational demands and limited staffing levels. Standardized Resources: Centralized, up-to-date guidance reduces duplication of effort and inconsistent interpretation across MS4s. Small MS4 Representation: Ensure that case studies and examples reflect the scale, budget, and staffing realities of small municipalities—not just large metro systems. On-Demand Access: Recorded trainings and self-service resources are critical for small crews that cannot attend live sessions. Peer Learning: Encourage peer-to-peer knowledge sharing among similar-sized communities to exchange practical solutions and lessons learned. Funding Awareness: Pair training with information on grants, cost-sharing opportunities, and regional programs that help implement what is taught.
6. A review of the direction/guidelines to see where biggest impact can be made to make best use of limited budgets.

Small MS4s lack capacity and need targeted support (n=3)

1. How about including an educational resources inventory (who is doing it), assessment (are they meeting Cities' needs), what to add, will you be working with league MN Cities, UoM Water Recourses, and UoM Extension, SW Research Council?
2. Having the MPCA create a base materials for education would be beneficial. MS4's can modify their program as needed, but the overall program education (as described by the MPCA), should be provided by the MPCA. This would eliminate all the MS4's from creating a similar document.
3. Support these goals

MPCA should provide centralized training resources (n=3)

1. Simplify education. Cut out NaCl, shorten and cut-down on the red-tape bureaucracy and legal items, cut the policies in half on all state parameters and mandates and just get to the heart of the matter and do not let big business contaminate stuff anymore.
2. yes, please.
3. You do a good job of this. Bravo!

Simplify requirements and reduce training burden (n=3)

1. Feel the goals are realistic and applicable
2. May need to do public service announcements as well.

Notable individual responses

1. Concern about use of the word 'enhance' -- maintenance staff may interpret it as criticism of their programs rather than investment in them.
2. Presentation at industry conferences (CEAM, MN Watersheds, public works forums) recommended to reach practitioners.
3. Simplify PAH BaP equivalency guidance specifically called out as a near-term improvement.

Q13 — Funding & Policy Support

General agreement / no feedback (n=9)

1. State needs to worry about themselves first and limit NaCl use.
2. Feel the goals are realistic and applicable
3. Stormwater management is widely underfunded and understaffed. Stormwater needs to be considered and more inline with drinking water and sanitary sewer services.
4. None.
5. We need to research more grants for Stormwater Management.
6. Need to be thoughtful to provide consistent funding support.
7. Good.
8. Comment is related to navigating what is baseline operations and maintenance responsibility (typically not eligible for external funding) and what is above and beyond (typically available for incentive based external funding) while recognizing there might be better targeted water quality BMPs depending on each agencies situation.

Stormwater funding is insufficient and inconsistent (n=3)

1. we need to do things that are WORTH the money they cost.
2. OK, but grants are hard to get if you don't have the personnel to write grants applications. For small MS4s MS4 requirements are often just an added responsibility to an already overworked staff person or in some cases even a volunteer.
3. Management of these materials can be large financial burden. Flexibility for appropriate reuse can reduce that burden if more cost effection options are available/acceptable

Grant barriers and O&M eligibility gaps (n=3)

1. Good Goals
2. No comment, the goals are appropriate.
3. Support these goals

Cost-effective reuse reduces financial burden (n=2)

1. No comment
2. Ongoing O&M Gap: Current funding programs often support capital improvements but provide limited or no assistance for ongoing operation, maintenance, and replacement costs. True Cost Recognition: Policy discussions and funding decisions must account for the full lifecycle cost of stormwater programs, including staffing, equipment maintenance, material handling, and disposal. Small MS4 Disadvantage: Funding formulas and competitive grants frequently favor larger municipalities with greater administrative capacity and matching funds. Predictable Funding: Sustainable stormwater management requires consistent, predictable funding sources rather than one-time or short-term grants. Eligibility Expansion: Advocate for grant eligibility that

includes O&M, equipment replacement, testing, and material management—not just construction. Cost-Benefit Evidence: Support data-driven research that quantifies environmental benefit relative to cost, particularly for sweeping, sediment removal, and material handling. Policy Alignment: Use cost-benefit findings to inform realistic permit requirements and policy expectations that reflect fiscal constraints. Regional Cost Sharing: Encourage funding mechanisms that support regional infrastructure and shared services to reduce per-city costs.

Notable individual responses

1. Full lifecycle cost recognition needed in policy discussions, including staffing, equipment maintenance, material handling, and disposal -- not just capital (response 13).
2. Cost-benefit evidence should inform realistic permit requirements and policy expectations that reflect fiscal constraints (response 13).
3. Regional cost-sharing mechanisms to support shared infrastructure and reduce per-city costs (response 13).

A2. BMP-Specific Comments

Street Sweeping (Q28)

1. Each county needs multiple sites that take all municipality sediment without issue
2. Typically not able to find uses for recovered solids
3. Disposal of material is complicated and costly, new ideas need to come to the forefront to improve maintenance and operation.
4. Street sweepings are temporarily stockpiled then disposed of at landfill, sump pit sediment (vac truck) is disposed of by the contractor

Sumps (Q36)

1. Need easy spot to haul to for each municipality.
2. Still doing sump inventory and creating BMP's and cleaning work sheets.
3. Frequency of inspection / maintenance depends on the type of sediment trap and historical need. All are inspected annually (as required by MS4), but some that are known to fill up sooner are inspected bi-monthly. Sediment from surface traps are cleaned in-house and sediment is stored temporarily with our street sweepings. Sump pits are cleaned as needed (we hire it out once a year) by a contractor and sediments are disposed of by them.
4. For small and under-resourced MS4s, audits and enforcement actions—when not paired with adequate guidance, funding, or technical assistance—can unintentionally hinder progress. Agencies attempting to meet requirements may fall further behind when limited resources are redirected from maintenance and improvements to address enforcement outcomes.

Other Pretreatment (Q44b)

1. See comments in last section. Sod removed from swales is put in with our land care debris and removed and composed into black dirt by a vendor.

Wet Basins (Q52)

1. Previous pond dredging activities with level 1 results were disposed of in partnership with local agricultural land uses.
2. Type of disposal required is based on testing of sediment prior to removal.
3. Recovered solids are tested and determined if suitable for reuse or landfill

4. Wet ponds and bio-retention (rain gardens) are two wildly different BMPs. Ponds are dredged every 20-30 years (or more) and bioretention might have sediment cleaned out of the inlet areas every 5-15 years depending on the amount of pretreatment and rebuilt every 25+ years (again it depends on the sediment load).
5. All excavated material is tested first and only reused if meets MPCA thresholds

A3. Other Pretreatment — Structure Descriptions (Q38)

Free-text descriptions of other pretreatment structure types and processes maintained by respondents (Q38).

1. Ditches and swales
2. AS new road projects come in, we have been using weir walls in sumps and retention/sediment ponds before it goes to wetlands or lakes
3. Forebays and swales
4. Annual inspection and vac removal. Media replacement as needed.
5. The city has a few sediment chambers around the city that get cleaned annually.
6. Garage sump
7. We vacuum out all underground filter tanks, sediment vaults.
8. See previous comment for sum pits
9. Recovered sediment is typically staged on site and allowed to dewater through passive drying prior to further handling or disposal. This approach is used due to limited access to mechanical dewatering equipment or regional facilities.
10. Rain gardens
11. Inspected periodically for functionality.
12. No underground. Inspect with MS4 infrastructure and remove sediment as necessary.

A4. Final Comments (Q54)

Final open-ended comments submitted by respondents.

1. As a Watershed District representative, we do not own/maintain many BMPs, but assist with design and construction and serve as a technical resource to our municipal partners.
2. Glad to help!
3. You're welcome!
4. Thank you!
5. Thank you, thank you, thank you.

Appendix B

Respondent Roles

This table lists individual position/role titles submitted by respondents (Q3, n=76), organized by the five categories used in Figure 3-2 (Section 3.2).

Respondent position/role title categories and submitted titles (Q3, n=76).

Category	Roles / Titles Submitted
Leadership & Management (n=27)	Assistant Director of Public Works; Director; Environmental Manager; Facilities Manager; Manager; Project Manager - Environmental; Public Works; Public Works Director; Public Works Supervisor; Public Works/Stormwater Dept; Senior Manager of Road Maintenance; Stormwater Supervisor; Superintendent; Utilities Superintendent; Utility and Infrastructure Director; Water Resources Manager; Water Resources-Environmental Manager; Water resources manager; superintendent
Engineer (n=22)	Assistant City Engineer; City Engineer; Civil Engineer; Civil Specialist; Engineer; Environmental Engineer; Natural Resources/Engineering; Principal Engineer; Project Engineer; Sr Engineering Technician; Stormwater Coordinator / Civil Engineer; Township Engineer; Water Resources Engineer; Water resources engineer
Program Coordination & Administration (n=16)	Administrator; Administrator (previously director and project manager); City Clerk; Coordinator; Environmental Resources Specialist; Environmental Specialist; Environmental and Water Resources Coordinator; Planner; Regulatory Coordinator; Utility Programs Coordinator; Water Quality Coordinator; Water Resources Coordinator
Operations & Maintenance (n=9)	Environmental Resource Technician; Environmental Technician; Facility Operations Specialist; Field Technician; Sewer Maintenance Supervisor; Storm lead; Street Maintenance; Wastewater/Storm water operator; Worker
Academic / Research (n=2)	Professor Emeritus

Appendix C

Survey Questions

1. If you would like a copy of the survey results or the final report to MPCA with recommendations for resource development and needed research, please provide an email contact address. This survey is administered by Barr Engineering Co. on behalf of the MPCA, and your responses are confidential, whether or not you provide a contact email. These reports will also be made available through the MN Stormwater Manual.

    a. I would like to receive a copy of the survey responses (expected March 2026)
    b. I would like to receive a copy of the final report to MCPA (Expected June 2026

Part I - Respondent information

2. Organization type (select response)

    a. Municipality
    b. Watershed District
    c. Watershed Management Organization
    d. County
    e. State agency
    f. Private consultant
    g. Other (please specify)

3. Position (free response)
4. My organization is a permitted MS4:

    a. Yes
    b. No
    c. No, but we provide service for one or more permitted MS4s

5. My primary role(s) with respect to stormwater residuals management (select all that apply):

    a. Stormwater BMP maintenance – program management
    b. Stormwater BMP maintenance – perform regular, routine maintenance
    c. Stormwater BMP maintenance – perform periodic or specialized maintenance
    d. Stormwater BMP maintenance – support services (e.g., engineering support)
    e. Stormwater BMP performance monitoring
    f. MS4 permit compliance
    g. Construction stormwater permit compliance
    h. BMP design for maintenance Management of materials recovered during BMP maintenance
    i. Other (please specify)

Part II - Sustainable Stormwater Residuals Management

6. Please provide feedback on the draft program goals and components as you feel appropriate (free response)

    - Goals of a sustainable stormwater residuals management program:
    - Minimizes environmental impact through source control, reuse, and reduction of landfill dependency. Addresses regulatory and legal risks by aligning with current and anticipated environmental standards. Optimizes operational efficiency and cost-effectiveness through regional collaboration, shared infrastructure, and improved logistics.

- Supports adaptive management by incorporating ongoing research, education, and data-driven decision-making.
- Promotes equity and accessibility for municipalities of varying sizes and resources.

7. Source Control & Prevention

    - Enhanced street sweeping and sump maintenance to reduce sediment load.
    - Public education and outreach to minimize pollutant entry into stormwater systems.

Missing goals/comments (free response):

8. Material Characterization & Testing

    - Standardized, cost-effective testing protocols.
    - Use of AI or automated tools (e.g., R scripts) to interpret lab results and guide disposal or reuse decisions.

Missing goals/comments (free response):

9. Reuse & Disposal Strategies

    - On-site reuse (e.g., berms, upland forests, pothole repair) where feasible.
    - Regional dewatering and storage facilities to reduce hauling and landfill costs.
    - Exploration of innovative reuse options (e.g., asphalt plants, winter road reapplication).

Missing goals/comments (free response):

10. Reuse & Disposal Strategies

    - On-site reuse (e.g., berms, upland forests, pothole repair) where feasible.
    - Regional dewatering and storage facilities to reduce hauling and landfill costs.
    - Exploration of innovative reuse options (e.g., asphalt plants, winter road reapplication).

Missing goals/comments (free response):

11. Regulatory Alignment & Risk Management

    - Clear guidance from MPCA and other agencies on reuse thresholds and legal responsibilities.
    - Proactive planning for future contaminants (e.g., PFAS, PAHs) and changing land use.

Missing goals/comments (free response):

12. Education & Capacity Building

    - Regular training webinars and technical assistance.
    - Centralized resources (e.g., stormwater manual updates, case studies).
    - Support for small MS4s and under-resourced municipalities.

Missing goals/comments (free response):

13. Funding & Policy Support

    - Advocacy for consistent funding sources, including eligibility for O&M in grants.

- Cost-benefit research to support policy changes and justify investments.

Missing goals/comments (free response):

Part III – Barriers to meeting BMP maintenance goals

14. Check all Regulatory framework barriers that your organization has experienced:

    a. Potential risk /future liability when material that meet current reuse criteria is used.
    b. Discrepancy between testing guidelines from MPCA and criteria used by landfills
    c. Lack of clarity on the regulatory status of solids recovered through maintenance
    d. Other (describe):

15. Check all financial barriers that your organization has experienced:

    a. Insufficient staff capacity to perform needed maintenance in house
    b. Need for additional equipment (e.g., trommel screener, roll-off dumpster, etc.)
    c. Hauling and disposal costs Need for engineering support in order to perform maintenance
    d. Cost of contract services
    e. Little or no funding support through existing grant programs
    f. Other (describe):

16. Check all knowledge barriers that your organization has experienced:

    a. Testing requirements and interpretation of results
    b. Public education - Storm sewers are connected to surface waters
    c. Contractors knowledge on sediment management
    d. Other (describe):

17. Check all practical/logistical barriers that your organization has experienced:

    a. Lack of space to store and manage materials recovered during maintenance
    b. Sediment recovered does not meet reuse criteria
    c. Maintenance logistics (e.g., difficult access or tree removal needed)
    d. Unknown factors (e.g., unexpected site conditions, illegal dumping, etc.)
    e. Other (describe)

18. Check all research gaps that your organization has experienced:

    a. Feasible reuse options
    b. Pollutants of emerging concern as applicable to stormwater residuals
    c. Potential to remediate pollutants found in stormwater residuals
    d. Need to develop cost-effective residuals management (e.g., cooperative efforts for small MS4s)
    e. Other (describe):

19. Thinking of your responses to the previous question, rank barrier categories from most (1) to least (6) concerning for your organization (ranked multi select):

    a. Regulatory framework barriers
    b. Financial barriers

c. Knowledge barriers
d. Practical/logistical barriers
e. Research gaps
f. Other

20. If you ranked "Other" in the last question, please describe

Part IV - Stormwater BMP Maintenance, Current Practices

<u>Source control: Street sweeping (including porous pavement)</u>

21. Do you own and/or maintain streets that are swept regularly (minimum once per year)?

    a. Yes
    b. No

22. Approximate miles of street owned and/or maintained by your organization (ballpark estimate):
23. Typical maintenance frequency (# of times per year):

    a. Weekly
    b. Twice monthly
    c. Monthly
    d. Quarterly
    e. Semi-annually
    f. Annually
    g. Less than annually

24. Who performs street sweeping operations (select all that apply)?

    a. Staff within my organization
    b. Contracted service provider
    c. Property owner
    d. Unknown
    e. Other (please specify)

25. 25. Who is responsible for managing sediment removed during street sweeping (select all that apply):

    a. Staff within my organization
    b. Contracted service provider
    c. BMP owner
    d. Unknown
    e. Other (please specify)

26. Solids Management: sediment recovered during maintenance is typically (select all that apply):

    a. Dewatered on site
    b. Stockpiled temporarily
    c. Screened
    d. Composted
    e. Unknown
    f. Other (please specify)

27. Fate of Recovered Solids: sediment recovered during maintenance is typically (select all that apply):

    a. Stockpiled indefinitely
    b. Transported to a landfill – use as daily cover
    c. Transported to a landfill – landfilled
    d. Transported to a landfill – unknown use at landfill
    e. Reused by my organization in other projects
    f. Reused by others outside my organization (exclude landfill daily cover)
    g. Unknown (contractor or maintainer responsibility)
    h. Other (please specify)

28. Comments (free response)

Pretreatment: Sumps

29. Do you own and/or maintain sumps?

    a. Yes
    b. No

30. Approximate number owned and/or maintained by your organization (ballpark estimate) (free response)
31. Typical maintenance frequency (# of times per year):

    a. Monthly
    b. Annually
    c. Less than annually

32. Who performs sediment removal maintenance (select all that apply)

    a. Staff within my organization
    b. Contracted service provider
    c. BMP owner
    d. Unknown
    e. Other (please specify)

33. Who is responsible for managing sediment (e.g., hauling, handling, disposal) removed during maintenance (select all that apply):

    a. Staff within my organization
    b. Contracted service provider
    c. BMP owner
    d. Unknown
    e. Other (please specify)

34. Solids Management: sediment recovered during maintenance is typically (select all that apply):

    a. Dewatered on site
    b. Stockpiled temporarily
    c. Screened
    d. Composted

e. Sampled and tested for pollutants
f. Unknown
g. Other (please specify)

35. Fate of Recovered Solids: sediment recovered during maintenance is typically (select all that apply):

    a. Stockpiled indefinitely
    b. Transported to a landfill – use as daily cover
    c. Transported to a landfill – landfilled
    d. Transported to a landfill – unknown use at landfill
    e. Reused by my organization in other projects
    f. Reused by others outside my organization (exclude landfill daily cover)
    g. Unknown (contractor or maintainer responsibility)
    h. Other (please specify)

36. Comments (free response)

<u>Pretreatment: Other (sediment forebays, swales, underground chambers)</u>

37. Do you own and/or maintain other pretreatment practices (sediment forebays, swales, underground chambers)?

    a. Yes
    b. No

    Describe the process (free response)

38. Approximate number owned and/or maintained by your organization: (ballpark estimate) (free response)
39. Typical maintenance frequency (# of times per year):

    a. More than annually
    b. Annually
    c. Less than annually

40. Who performs sediment removal maintenance (select all that apply)

    a. Staff within my organization
    b. Contracted service provider
    c. BMP owner
    d. Unknown
    e. Other (please specify)

41. Who is responsible for managing sediment removed during maintenance (select all that apply):

    a. Staff within my organization
    b. Contracted service provider
    c. BMP owner
    d. Unknown
    e. Other (please specify)

42. Solids Management: sediment recovered during maintenance is typically (select all that apply):

    a. Dewatered on site
    b. Stockpiled temporarily
    c. Screened
    d. Composted
    e. Unknown
    f. Other (please specify)

43. Fate of Recovered Solids: sediment recovered during maintenance is typically (select all that apply):

    a. Stockpiled indefinitely
    b. Transported to a landfill – use as daily cover
    c. Transported to a landfill – landfilled
    d. Transported to a landfill – unknown use at landfill
    e. Reused by my organization in other projects
    f. Reused by others outside my organization (exclude landfill daily cover)
    g. Unknown (contractor or maintainer responsibility)
    h. Other (please specify)

44. Comments (free response)

<u>Main treatment: Wet sedimentation basins or bio-retention basins (with or without underdrain)</u>

45. Do you own and/or maintain wet sedimentation basins or bio-retention basins (with or without underdrain)?

    a. Yes
    b. No

46. Approximate number owned and/ or maintained by your organization: (ballpark estimate) (free response):
47. Approximate number owned and/ or maintained by your organization: (ballpark estimate):

    a. Annually
    b. Every 2 to 3 years
    c. Every 5 years
    d. Less than every 5 years

48. Who performs sediment removal maintenance (select all that apply)

    a. Staff within my organization
    b. Contracted service provider
    c. BMP owner
    d. Unknown
    e. Other (please specify)

49. Who is responsible for managing sediment removed during maintenance (select all that apply):

    a. Staff within my organization
    b. Contracted service provider

c. BMP owner
d. Unknown
e. Other (please specify)

50. Solids Management: sediment recovered during maintenance is typically (select all that apply):

    a. Dewatered on site
    b. Stockpiled temporarily
    c. Screened
    d. Composted
    e. Unknown
    f. Other (please specify)

51. Fate of Recovered Solids: sediment recovered during maintenance is typically (select all that apply):

    a. Stockpiled indefinitely
    b. Transported to a landfill – use as daily cover
    c. Transported to a landfill – landfilled
    d. Transported to a landfill – unknown use at landfill
    e. Reused by my organization in other projects
    f. Reused by others outside my organization (exclude landfill daily cover)
    g. Unknown (contractor or maintainer responsibility)
    h. Other (please specify)

52. Comments (free response)

<u>Residuals recovered through regular maintenance</u>

53. Please provide a rough estimate of the mass or volume of solids recovered annually during maintenance operations (e.g., 5 tons, 32 CY, 71 truckloads, 16 dumpsters, etc.) for each type of solid listed below (free response for each):

    Street sweeping (including porous pavement)

    Sump

    Other (sediment forebays, swales, underground chambers)

    Wet sedimentation basins or bio retention basins (with or without underdrain)

54. Please provide a rough estimate of the mass or volume of solids recovered annually during maintenance operations (e.g., 5 tons, 32 CY, 71 truckloads, 16 dumpsters, etc.) for each type of solid listed below (free response)