Cost Impact Analysis

for the

Proposed 2020 Multi-Sector General Permit (MSGP)

I. CONTENTS

II. EXECUTIVE SUMMARY

Total Incremental Cost

The Proposed 2020 MSGP economic analysis evaluates the incremental cost implications of the proposed permit changes as compared to the 2015 MSGP. EPA examined each proposed change in the 2020 MSGP considering the current permit's (i.e., the 2015 MSGP) requirements. The objective of this examination is to show where or to what extent the proposed 2020 MSGP requirements impose an incremental increase in costs on operators in relation to costs that are already accounted for in the 2015 MSGP.
The approximate incremental cost (above the 2015 MSGP) to comply with proposed 2020 MSGP:

- **$5.6 million for 2,400 facilities over the 5-year permit term**
- **$2,363 per facility over the 5-year permit term**
    - $5.6 million total incremental cost accounts for the cost of some proposed requirements that do not apply to all facilities; different facilities will have different compliance costs therefore an average cost per facility is not necessarily reflective of total cost. The total incremental cost was averaged over 2,400 facilities to obtain a per facility cost of $2,363.
    - Although $5.6 million total incremental cost does not account for some proposed requirements that require site-specific controls and can only be calculated per unit cost, EPA expects many facilities will have already implemented controls under the previous permit to comply with some new requirements and that some controls can satisfy multiple requirements. Therefore, it is possible total costs may be lower, depending on which controls the operator has at their facility.

Key Assumptions on Cost

- **Estimating costs for a general permit depends on a number of input factors.** Estimating the cost of several proposed permit requirements is challenging and therefore is not included in total cost (see summary table of costs on Page 4 for an outline of which proposed requirements were calculated in total costs and which were not). The MSGP is a general permit and covers a wide variety of activities across the 29 different sectors in a range of climates and geographic regions. The general permit structure also precludes EPA from knowing exactly where and what type of facilities will be covered under the general permit ahead of permit issuance. Variables such as industrial activity and sector, facility and operations size, precipitation pattern, climate, existing stormwater control measures, and variable labor and material costs across the country may impact the overall total compliance cost of the MSGP significantly. These factors make many of the proposed requirements highly location-specific making it difficult to develop a unique global assumption for all facilities that may be covered under this permit while conducting a cost analysis. In addition, EPA does not currently collect data on number of employees or annual receipts of entities that may seek coverage under the MSGP, and therefore estimating impacts on small entities is not possible.
- **Not all proposed requirements apply to all facilities all of the time.** For example, the total incremental cost estimate includes the cost of adding new benchmark monitoring requirements for only the first year for certain sectors with a relatively few number of facilities. These nuances for each proposed permit requirement are not necessarily clear in an average incremental cost estimate.

- **The number of discharge points and pollutants varies greatly between facilities.** EPA assumes an average of 2.4 discharge points per facility based on analysis of 2015 MSGP NOI data, noting that currently permitted facilities have a broad range of discharge points, from as few as 1 to as many as 66.
- **EPA presents all costs in June 2019 dollars.** EPA developed sampling costs by updating 2015 sampling costs adjusting for inflation factors. Sampling costs include the cost of sampling materials such as containers, coolers, and packing materials but do not include shipping costs to laboratories and any discounts. When calculating industrial facility private sector labor costs, EPA assumed the average hourly rate of $34.49.
- **Not all items considered in this cost analysis are included in the proposed permit**. From the recommendations of the National Research Council (NRC) National Academies of Sciences (NAS) 2019 report on industrial stormwater, EPA considered two recommendations from the study in this cost analysis that are not included in the proposed permit and thus not included in total cost estimate. Based on the results of this cost analysis, no additional monitoring for PAHs is being proposal at this time, but EPA may consider additional monitoring in the final permit if it receives sufficient information during the comment period to develop an appropriate benchmark threshold. Similarly, the results of this cost analysis show that the inspection-only option in lieu of propose universal benchmark monitoring is not a viable alternative. EPA may consider this option in the final permit if it receives enough information during the comment period on other third-party professional certifications in industrial stormwater inspections.
- **This cost analysis does not account for impacts on operators permitted under state-issued MSGPs.** NPDES-authorized states are not required to conform or match their industrial stormwater permits to EPA's MSGP. However, EPA recognizes that many states use EPA's MSGP as a model for their own permits. EPA's analysis of state MSGPs indicates that approximately 30% of state permits are substantially similar to EPA's MSGP; approximately 47% are somewhat similar; and approximately 22% are substantially different. To the extent a given state decides to propose their next MSGP to mirror any changes proposed in EPA's MSGP, those state permittees would likely incur similar incremental costs detailed in this analysis.

Summary Table of Costs

The two items that are grayed-out in this chart were considered in this cost analysis but are not being proposed in the permit and therefore are not included in total cost estimate.

Topic	Number of facilities affected	Average cost: Per facility for 5-year permit term	Total cost: All applicable facilities for 5-year permit term	Rationale/Assumptions summary
Permit authorization relating to enforcement: Additional time for EPA to review NOI for facilities with a pending	Unknown at this time, data not currently collected	N/A	N/A	The new language does not add a new requirement for the operator but clarifies that there will be an additional permit authorization wait time for certain operators.

Topic	Number of facilities affected	Average cost: Per facility for 5-year permit term	Total cost: All applicable facilities for 5-year permit term	Rationale/Assumptions summary
enforcement action				
CERCLA eligibility requirement: Expand existing CERCLA eligibility criterion to all Regions	103	Unknown, expect facilities will have already implemented controls for existing requirements to comply	Unknown, expect facilities will have already implemented controls for existing requirements to comply	Unable to estimate total cost given the controls are highly site-specific and dependent on pollutants of concern. Based on 2015 MSGP NOI data, estimate that 4% of facilities, or 103 facilities total, may be affected.
Eligibility relating to use of Coal Tar Sealants (CTS): Add new eligibility criterion related to CTS use	Unknown at this time, data not currently collected	Unknown at this time, data on use of CTS not currently collected	Unknown at this time, data on use of CTS not currently collected	Comparable costs (~$10 difference for 2.5ft^3) among similar products, assume that most facilities who intend to use coal-tar sealcoat will find a product alternative at reasonable cost difference.
Additional Implementation Measures (AIM): Flexible, tiered response protocol based on the nature and magnitude of triggering events (e.g., benchmark exceedances)	Unknown at this time, data on specific proposed triggering events not currently collected	Unknown, costs vary depending on controls, but expect facilities will have already implemented controls for existing requirements to comply	Unknown, costs vary depending on controls, but expect facilities will have already implemented controls for existing requirements to comply	Unable to estimate total cost because the information on the prevalence of the proposed triggering events among currently permitted facilities is not captured by any current reporting requirement under the 2015 MSGP and cost per control varies widely. AIM Tier 1 & 2 - Assume negligible cost. Responses are substantially similar to those requirements in 2015 MSGP. AIM Tier 3 – Estimated unit cost of various controls operator can elect to implement (detailed in full economic analysis).
Impaired waters monitoring language: Option to discontinue impaired waters monitoring based on compliance success after 3 years and narrow list of monitoring parameters	912	$121 (cost likely lower; does not account for the decrease in cost from the narrowing of the list of pollutants since the list varies per facilities)	$110,350	Under the 2015 MSGP 912 facilities subject to impaired waters monitoring. Proposed for 2 more samples @ $25.28 sampling cost, with 2.4 average discharge points.

Topic	Number of facilities affected	Average cost: Per facility for 5-year permit term		Total cost: All applicable facilities for 5-year permit term	Rationale/Assumptions summary
Universal benchmark monitoring: All facilities conduct universal benchmark monitoring for pH, TSS, and COD	2,194	$2,100 (cost varies from $415 to $2,570, depends on which parameters facility already monitors for)		$4,607,400	Under the 2015 MSGP, many facilities currently monitor for at least one of the three parameters. 2,194 facilities would have some increase in cost, depending on which parameters were added, for 4 samples/year, for 5 years, with 2.4 average discharge points.
Allow inspection-only option for low-risk facilities: Allow inspection-only in lieu of industry wide monitoring	436	$16,470		$7,180,920	436 facilities eligible for 2 professional inspections/site reviews, completed by a PE for 46 hours @ $179.04/hour. Using these parameters, costs may be prohibitive for this alternative to be viable. EPA requests comment on other criteria for this option, see Fact Sheet Part 4.2.1.1.
Add new benchmarks for certain sectors: Add new benchmarks for 3 sectors and solicit comment on PAH benchmarks	29	Sector I	$1,190	$34,510	6 new parameters
	426	Sector P	$600	$255,600	3 new parameters
	77	Sector R	$1,040	$80,080	6 new parameters
	1,116	PAH	$280 - $2,090	$312,480 - $2,332,440	3 options: all PAHs, total PAHs, or COD as a surrogate for 1,116 facilities with subsectors with PAH loading of 1kg/yr or greater. COD is the cheapest option as a surrogate, and it is already being proposed under universal benchmark monitoring.
Update certain benchmark values: Update some benchmark values based on EPA WQ criteria and suspend others	Selenium – 61 Arsenic – 66 Aluminium - 516 Cadmium – 61 (likely overlap)	N/A		N/A	Benchmark parameters are in the current permit and the proposal would just update the values, assume no additional cost. Note some cost savings if some benchmarks are suspended.
Composite sampling: Option to use composite sampling instead of grab sampling	Unknown how many will elect to use composite sampling	N/A		N/A	Because composite sampling is optional, this cost is not included in total cost.

Topic	Number of facilities affected	Average cost: Per facility for 5-year permit term	Total cost: All applicable facilities for 5-year permit term	Rationale/Assumptions summary
Public signage of permit coverage: Facilities post a public sign with facility information and how to obtain the SWPPP.	2,400	$190	$456,000	2,400 facilities throughout the permit term that EPA expects to seek coverage under the 2020 MSGP
Major storm risk planning: Facilities should consider implementing enhanced measures to mitigate asset and community impacts from major natural disasters.	Unknown how many will elect to implement additional controls	Unknown, depends on what controls are chosen; can estimate on per unit cost per control	Unknown, depends on what controls are chosen; can estimate on per unit cost per control	Only a consideration of controls is proposed to be required and where controls are appropriate is up to the operator. Estimated unit cost to implement each enhanced control measure suggested in the permit.
Total Quantifiable Costs		$2,363 per facility incremental cost over 5-year permit term (~$5.6 million averaged over 2,400 facilities)	~$5.6 million total incremental cost over the 5-year permit term	

III. BACKGROUND

The U.S. Environmental Protection Agency (EPA) developed this draft economic analysis as part of the administrative record in support of the proposed 2020 Multi-Sector General Permit (MSGP). This analysis evaluates the cost implications of the significant proposed changes to the 2020 MSGP as compared to the 2015 MSGP. EPA examined each significant proposed change in the 2020 MSGP considering the current permit's (i.e., the 2015 MSGP) requirements. The objective of this examination is to show where or to what extent the proposed 2020 MSGP requirements impose an incremental increase (or decrease) in costs on operators in relation to costs that are already accounted for in the 2015 MSGP. The 2015 MSGP costs define the baseline of costs to which operators are currently subject.

Since 1995, EPA has issued a series of MSGPs that cover areas where EPA is the National Pollutant Discharge Elimination System (NPDES) permitting authority. At present, EPA is the permitting authority in four states (Idaho[1], Massachusetts, New Hampshire, and New Mexico), the District of Columbia, Puerto Rico, all other U.S. territories with the exception of the Virgin Islands, federal facilities in four states (Colorado, Delaware, Vermont, and Washington), most Indian lands and for other specifically designated activities in specific states (e.g., oil and gas activities in Texas and Oklahoma). See Appendix C of the permit for a complete list of areas where EPA's MSGP

[1] Idaho is currently a NPDES authority. However, authority for stormwater general permits does not transfer until July 1, 2021.

applies. The 2015 MSGP, became effective on June 4, 2015 (see 80FR 34403), and will expire on June 4, 2020. The 2020 MSGP will replace the 2015 MSGP, when finalized.

Below are summaries of the requirements in the 2015 permit and the proposed requirements in the 2020 MSGP.

IV. 2015 MSGP

The 2015 MSGP requires industrial facilities in 29 different industrial sectors to implement control measures to meet the effluent limits in the permit and develop a site-specific Stormwater Pollution Prevention Plan (SWPPP). The 2015 MSGP includes a thirtieth sector, which grants EPA the authority to require permit coverage for industrial stormwater discharges not included in the other 29 industrial sectors. In addition to implementing control measures and developing a SWPPP, the 2015 MSGP also requires operators to preform inspections; conduct various types of monitoring, including effluent limit monitoring, impaired waters monitoring, and benchmark monitoring; preform corrective actions, and comply with other sector-specific requirements. EPA reorganized the 2015 MSGP from the 2008 MSGP to more clearly distinguish effluent limitations from SWPPP documentation requirements. The 2015 MSGP also more clearly distinguished between technology-based and water quality-based effluent limits. The 2015 MSGP currently covers approximately 2,400 facilities.

V. COST IMPLICATIONS OF KEY PROPOSED PERMIT CHANGES

Total Incremental Cost to Comply with the 2020 MSGP

This analysis demonstrates that the new proposed requirements in the proposed 2020 MSGP will conservatively have an approximate average incremental cost (compared to the 2015 MSGP) of:

- $472.75 per facility per year; or
- $2,363.74 per facility over the 5-year permit term; or
- $5,672,983 for all 2,400 facilities over the 5-year permit term to comply with new requirements.

Assumptions and Limitations

EPA estimated the cost of certain proposed 2020 MSGP requirements as unit cost instead of total cost, which are not included in the overall incremental cost of $2,363 per facility over the 5-year permit term. EPA conducted generic assessments of economic impacts for some requirements predominantly due to data unavailability and the site-specific nature of the proposed changes. The MSGP is a national general permit and covers a wide variety of activities across the 29 different sectors in a range of climates and geographic regions across the United States. The nature of the general permit also presents challenges for an accurate cost estimate since EPA issues the permit first then receives Notices of Intent from facilities seeking coverage under the permit. This permitting structure precludes EPA from knowing exactly where and what type of facilities will be covered under the general permit ahead of permit issuance, although the Agency is aware that many facilities are existing facilities that have been covered under previous MSGPs. Although some industrial facilities under the MSGP have similar operations and discharge properties, variables such as industrial activity and sector, facility and operations size, precipitation pattern, climate, existing stormwater control measures, and variable labor and material costs across the country may impact the overall compliance cost significantly. These

factors make many of the proposed requirements highly location-specific making it difficult to make a unique global assumption for all facilities that may be covered under this permit while conducting a cost analysis. In addition, EPA does not currently collect data on number of employees or annual receipts of entities that may seek coverage under the MSGP, and therefore estimating impacts on small entities is not possible.

For example, under the proposed Additional Implementation Measures (AIM) specified in part E.2, facilities would be subject to tiered responses based on benchmark exceedance events. EPA was unable to estimate the "total cost" associated with tiered responses because the information on the prevalence of the proposed triggering events among currently permitted facilities is not captured by any current reporting requirement under the 2015 MSGP. Therefore, EPA assessed the unit cost of each proposed requirement, ensuring facilities have a general cost estimate for each measure that could be used to comply with the proposed requirement and to calculate the estimated total cost in the future (please see section specific discussion in part E of this report).

EPA assumes an average of 2.4 discharge points per facility based on analysis of 2015 MSGP NOI data, noting that currently permitted facilities have a broad range of the number of discharge points, from as few as 1 to as many as 66.

EPA presents all costs are in June 2019 dollars. EPA developed sampling costs by updating 2015 sampling costs (Tetra Tech, 2015) and adjusting for inflation factors. Sampling costs include the cost of sampling materials such as containers, coolers, and packing materials but do not include shipping costs to laboratories and any discounts. When calculating industrial facility private sector labor costs, EPA assumed the average hourly rate of $34.49 (BLS, 2019).

From the recommendations of the National Research Council (NRC) National Academies of Sciences (NAS) 2019 report on industrial stormwater, EPA considered two recommendations from the study in this cost analysis that are not included in the proposed permit and thus not included in *total* cost estimate. After conducting a cost analysis for the 3 options for developing a benchmark threshold for PAHs, EPA concluded that COD is the most cost-effective option as a surrogate, and since it is already being proposed under the new universal benchmark monitoring, no additional monitoring for PAHs is being proposal at this time and therefore costs for PAH monitoring are not included in the total cost estimate. See Section E.3 of this analysis. Similarly, EPA considered the inspection-only option in the cost analysis conducted for this proposed permit using the criteria discussed in Section E.5 of this analysis (i.e., "light manufacturing" facilities; two inspections per permit term; the inspections conducted by a PE). Based on the results of this analysis, EPA made a preliminary conclusion that the costs show the inspection-only option may not be a viable alternative and that benchmark monitoring may be more cost effective for operators. This is due to the relatively high labor rates of a professional inspection from a PE as compared to the sampling costs of benchmarking monitoring. EPA notes this is just one approach and requests comment on other approaches the Agency should evaluate in order to make the inspection-only option an effective alternative for low-risk facilities. See Part 4.2.1.1 of the Fact Sheet for this proposed permit for more background this request for comment.

Finally, EPA notes that this cost analysis does not account for impacts on operators permitted under state-issued MSGPs. NPDES-authorized states are not required to conform or match their industrial stormwater permits to EPA's MSGP. However, EPA recognizes that many states use EPA's MSGP as a model for their own permits. EPA's analysis of state MSGPs indicates that approximately 30% of state permits are substantially similar to EPA's MSGP; approximately 47%

are somewhat similar; and approximately 22% are substantially different. To the extent a given state decide to propose their next MSGP to mirror any changes proposed in EPA's MSGP, those state permittees would likely incur similar incremental costs detailed in this analysis.

A. Streamlining of Permit

For the proposed 2020 MSGP, EPA streamlined and simplified the permit language to present the requirements in a generally more clear and readable manner. This structure should enhance operators' understanding of and compliance with the permit's requirements. For example, EPA moved language that was not necessary for the permit into the relevant appendix or to the fact sheet. EPA improved the permit language by simplifying text and took an organizational approach to re-order permit sections. The anticipated outcome of this approach is to improve permit readability, help operators better understand and comply with the permit's requirements, and reduce time and cost associated with understanding the permit's requirements.

Cost Impact

EPA assumes no additional cost or burden from permit streamlining. The new proposed structure improved permit clarity and readability and should result in a slight reduction in burden as operators can more quickly read and understand the requirements.

B. Eligibility

1. Coal Tar Sealants

Proposed Permit Change

EPA proposes to include an eligibility criterion that would apply to operators who will use coal-tar sealcoat. To be eligible for coverage under the proposed 2020 MSGP, operators must not have any stormwater discharges from paved surfaces that will be sealed or re-sealed with coal-tar sealcoat where industrial activities are located.

2015 MSGP	Proposed 2020 MSGP
No equivalent requirement	Permit To be eligible for coverage under this permit, you must not have any stormwater discharges from paved surfaces that will be initially sealed or re-sealed with coal-tar sealcoat where industrial activities are located during your coverage under this permit. EPA may authorize your coverage under this permit if you eliminate such discharge or EPA will notify you that an individual permit application is necessary per Part 1.3.7. Notice of Intent (NOI) Will you, during the term of this permit, use coal-tar sealcoat on paved surfaces where industrial activities are located? ☐Yes ☐ No

Cost Impact Discussion

The coal tar sealant requirement specified above is a new requirement for the proposed 2020 MSGP.

To be eligible under the proposed 2020 MSGP, the operator must not have any stormwater discharges from paved surfaces that will be sealed or re-sealed with coal-tar sealcoat where industrial activities are located. At present, EPA does not have information on the universe of facilities that are currently using a coal-tar sealcoat on paved surfaces associated with industrial activities. EPA assumes there might be some cost burden to facilities associated with the identification process of such locations. To determine the cost, EPA assumed operators need on average 2 hours to identify locations they intend to pave with coal-tar sealcoat and assess appropriate control measures to eliminate discharges from those surfaces. The overall process will incur a cost of $68.98 (considering $34.49 hourly labor rate for private industry sector workers, BLS 2019) on average per site.

One of the many alternatives of using coal-tar sealcoat is to substitute the product with an asphalt-based sealant or acrylic sealant. Unlike coal-tar sealcoat (see proposed MSGP Fact Sheet discussion Part 1.1.8), asphalt sealant has negligible polycyclic aromatic hydrocarbons (PAH) levels and is considered significantly less harmful to water quality and the environment than coal-tar based sealant (USGS, 2019). EPA estimated that an operator using an asphalt-based sealant on 5 feet by 2 feet with a design thickness of 3 inches (2.5 cubic feet) paved surface will incur an average cost of $24.30/cubic feet for the application of an asphalt-based alternative (Needleman, 2016). This is equitable to the cost of using a coal-tar based sealcoat of approximately $34.02/cubic feet for the same area. Given the comparable costs among products, EPA assumes that most facilities who intend to use coal-tar sealcoat will be able to find a product alternative at negligible cost difference. This cost does not account for labor cost as labor cost widely varies with the dimension of the paved surface and facility-specific location and other factors. Since the labor cost will be similar for both applications, there will be no significant economic impact associated with labor cost under the proposed requirement. There are different alternatives of coal-tar sealcoat available and the price of these alternatives widely differ based on their characteristics.

Under the 2015 MSGP, there was no condition or provision of eligibility that applied to operators who planned to use coal-tar sealcoat. In the proposed 2020 MSGP, facilities would be required to document in their NOI if they will use coal-tar sealant on paved surfaces where industrial activities are located during the permit term. Therefore, with the addition of this proposed eligibility criterion, EPA proposes adding a new question on the NOI for operators to indicate if they will use coal-tar sealant on paved surfaces where industrial activities are located during the permit term. This new question allows EPA to determine the operator's eligibility for permit coverage and understand the prevalence of the use of coal-tar sealcoat within the MSGP permitted universe. EPA assumes no additional cost or burden for the proposed changes to the NOI form.

2. CERCLA eligibility provision

Proposed Permit Change

The 2015 MSGP requires facilities in EPA Region 10 and Indian country that discharge stormwater to certain Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) sites (as defined in MSGP Appendix A and listed in MSGP Appendix P) to notify the EPA Regional Office in advance, and requires the EPA Regional Office to determine whether the facility is eligible for permit coverage. In determining eligibility for coverage, the EPA Regional Office may evaluate whether the facility has included appropriate controls and implementation procedures designed to ensure that the discharge will not lead to recontamination of aquatic media at the CERCLA Site. In the proposed 2020 MSGP, EPA requests comment on whether this current

eligibility criterion should be applied in all EPA Regions for facilities that discharge to Federal CERCLA sites that may be of concern for recontamination from stormwater discharges. EPA is also interested in information from the public that would assist the Agency in identifying such sites. EPA also requests comment on requiring such facilities to notify the EPA Regional Office a minimum of 30 days in advance of submitting the NOI form.

2015 MSGP	Proposed 2020 MSGP
For Discharges to a Federal CERCLA Site. If you discharge to a federal CERCLA Site listed in Appendix P, you are ineligible for coverage under this permit, unless you notify the EPA Regional Office in advance and the EPA Regional Office determines that you are eligible for permit coverage. In determining eligibility for coverage under this Part, the EPA Regional Office may evaluate whether you are implementing or plan to implement adequate controls and/or procedures to ensure that your discharge will not lead to recontamination of aquatic media at the CERCLA Site such that your discharge will cause or contribute to an exceedance of a water quality standard. If it is determined that your facility discharges to a CERCLA Site listed in Appendix P after you have obtained coverage under this permit, you must contact the EPA Regional Office and ensure that you either have implemented or will implement adequate controls and/or procedures to ensure that your discharges will not lead to recontamination of aquatic media at the CERCLA Site such that it will to cause or contribute to an exceedance of a water quality standard.	No changes to permit language besides the following "and/or procedures to ensure that your discharges will not lead to recontamination of aquatic media at the CERCLA Site such that it will not meet an applicable water quality standard; possible additional sites listed in Appendix P.

Cost Impact Discussion

Under the 2015 MSGP, EPA limited the applicability of this eligibility criterion to specific CERCLA clean-up sites only in EPA Region 10 (see Appendix P) based on sites most likely to experience contamination/recontamination from stormwater discharges introduced/reintroduced into these sites and subsequent receiving waters. Because of the very limited list of CERCLA sites currently in Appendix P that EPA identified for the 2015 MSGP, EPA expected that very few MSGP facilities would be affected by the requirement. Expected costs to operators discharging stormwater to these CERCLA sites were not quantifiable with information available at the time. EPA evaluated 2015 MSGP NOI data and found that only 12 facilities have been subject to this requirement in the current permit. All facilities were able to get coverage under the MSGP, and only one facility was required to do additional monitoring.

Under the proposed 2020 MSGP, EPA requests comment on whether this current eligibility criterion applicable to EPA Region 10 should be applied in all EPA Regions for facilities that discharge to Federal CERCLA sites that may be of concern for contamination/recontamination from stormwater discharges. If new sites are added to Appendix P and an operator discharges to one of those sites, there is a probability of potential cost burden for operators to implement additional controls and/or procedures, if the EPA Region determined planned controls were not adequate to ensure that discharges will not lead to recontamination of aquatic media at the CERCLA Site such that the discharge will cause or contribute to an exceedance of a water quality standard. The controls and their associated implementation costs to meet this eligibility criterion are highly site-specific and dependent on pollutants of concern. During the 2015 MSGP reissuance, EPA had no knowledge of the on-site conditions or existence of pollutants of

concern that could impact the cost of compliance with this provision at the few industrial facilities possibly affected by this requirement. Due to the variable site-specific nature of the requirement and the lack of information on which CERCLA sites would be added to Appendix P, EPA is currently not able to accurately assess the total cost impacts for facilities to meet this requirement. However, as with the 2015 MSGP, EPA expects very few facilities in each EPA Region to be impacted. Based on 2015 MSGP NOI data on this current eligibility criterion for Region 10, EAP estimates that approximately 4% of facilities in each EPA Region, or 103 facilities total, may be required to meet the requirement.

C. Getting MSGP Authorization

1. Permit Authorization Relating to Enforcement

Proposed Permit Change

EPA proposes to establish a discharge authorization wait period of 60 calendar days after NOI submission for any operators whose discharges were not previously covered under the 2015 MSGP and who have a pending enforcement action related to stormwater by the EPA, a state, or a citizen (to include both notices of violation (NOVs) by the EPA or a state and notices of intent to bring a citizen suit).

2015 MSGP	Proposed 2020 MSGP
Category of Facility No equivalent category in the 2015 MSGP **Discharge Authorization Date** 30 days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization has been denied or delayed	**Category of Facility** New or existing facility without 2015 MSGP coverage that has a pending enforcement action. Operators of industrial activities whose discharges were not covered previously under the 2015 MSGP and who have a pending enforcement action related to stormwater by EPA, a state, or a citizen (to include both notices of violation (NOVs) by EPA or a State and notices of intent to bring a citizen suit). **Discharge Authorization Date** 60 calendar days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization has been denied or delayed.

Cost Impact Discussion

EPA assumes no additional cost for this proposed eligibility criterion. The new language does not add a new requirement for the operator but simply clarifies that there will be an additional permit authorization wait time for operators who have a pending enforcement action who were not previously covered under the 2015 MSGP.

2. Public signage of permit coverage

Proposed Permit Change

EPA proposes to include a requirement that MSGP operators must post a sign of permit coverage at a safe, publicly accessible location in close proximity to the facility. EPA proposes that this notice must also include information that informs the public on how to contact EPA if

stormwater pollution is observed in the discharge. EPA is requesting comment on this proposal and what information could be included on any sign or other notice.

2015 MSGP	Proposed 2020 MSGP
No equivalent requirement	You must post a sign or other notice of your permit coverage at a safe, publicly accessible location in close proximity to your facility and at potentially impacted public access areas. You must use a font large enough to be readily viewed from a public right-of-way and conduct periodic maintenance of the sign to ensure that it is legible, viable, and factually correct. At a minimum, the sign must include: • The NPDES ID (i.e., permit tracking number assigned to your NOI); • A contact name and phone number for obtaining additional facility information; • The Uniform Resource Locator (URL) for the SWPPP (if available), or the following statement: "If you would like to obtain a copy of the Stormwater Pollution Prevention Plan (SWPPP) for this site, contact the EPA Regional Office at [include the appropriate MSGP Regional Office contact information found at https://www.epa.gov/npdes/contact-us-stormwater#regional];" and • The following statement "If you observe indicators of stormwater pollutants in the discharge or in the receiving waterbody, contact the EPA through the following website: https://echo.epa.gov/report-environmental-violations."

Cost Impact Discussion

EPA assumes a one-time production and installation cost and recurring maintenance cost from the proposed requirement for posting signage at a publicly accessible location. The production cost of signage depends on multiple factors such as size, materials, location, and type of signs. Due to EPA's intentional lack of specificity on material or dimension of the signage, costs may vary widely depending on facilities' choice of size, materials, location, and type of sign. According to the Department of Transportation, an informative sign should have a font size of at least 3 inches for an ideal 30 feet readable distance and be sized between 10 by 18 to 42 by 24 inches (USDOT, 2019a, 2019b). EPA's average cost estimate for public signage requirements for Combined Sewer System permittees is $127.65 to produce and install a sign and $12.45 for annual maintenance (USEPA, 2017). For this analysis, EPA assumes these costs are representative of the cost that industrial facilities may experience while installing and maintaining a similar signage under the proposed signage requirement of 2020 MSGP. This equates to an incremental

cost of $37.98 per facility per year, $189.91 per facility per permit term, and $455,792 for all 2,400 facilities throughout the permit term that EPA expects to seek coverage under the 2020 MSGP.

D. Control Measures

1. Major storm planning

Proposed Permit Change

EPA proposes that operators would be required to consider implementing enhanced measures, such as structural improvements, additional pollution prevention measures, and other mitigation measures that are complementary to stormwater pollution prevention planning to encourage industrial site operators to consider the risks to their industrial activities and the potential impact of pollutant discharges caused by high stormwater flows, extreme flooding conditions, and major storm events.

2015 MSGP	Proposed 2020 MSGP
No equivalent requirement	**Control Measure Selection and Design Considerations.** You must consider the following when selecting and designing control measures: • … • Implementing structural improvements, enhanced pollution prevention measures, and other mitigation measures, to minimize impacts from stormwater discharges during extreme flooding conditions, such as the following: o Reinforce materials storage structures to withstand flooding and additional exertion of force; o Prevent floating of semi-stationary structures by elevating to the Based Flood Elevation (BFE)[2] level or securing with non-corrosive device; o When a delivery of materials is expected, and a storm is anticipated within 48 hours, delay delivery until after the storm or store materials as appropriate (refer to emergency procedures); o Temporarily store materials and waste above the BFE level; o Temporarily reduce or eliminate outdoor storage; o Temporarily relocate any mobile vehicles and equipment to upland areas; o Develop scenario-based emergency procedures for major storms that is complementary to regular stormwater pollution prevention planning and identify emergency contacts for staff and contractors; and o Conduct staff training for implementing your emergency procedures at regular intervals.

[2] Base Flood Elevation (BFE) is the computed elevation to which floodwater is anticipated to rise during the base flood. BFEs are shown on FEMA Flood Maps and on the flood profiles.

Cost Impact Discussion

This proposed requirement would require the operator to consider implementing enhanced control measures to minimize impacts from stormwater discharges during extreme flooding conditions. Because only a consideration of these controls is proposed to be required and EPA would leave this determination up to the operator where controls are appropriate (e.g., if the facility was located in a flood zone), EPA estimated a unit cost to implement each enhanced control measure suggested in the permit. To develop this cost estimate, EPA conducted a literature review from publicly available literature and provided an approximate cost estimate of each recommended enhanced control measures.

- **Reinforce materials storage structures to withstand flooding and additional exertion of force:**
    - Different type of barriers (levees/floodwalls) used to withstand and protect the storage structure from a flood and floodwaters. For Levees, the cost ranges between $84 to $240 per linear foot (depending on the levee height). For Floodwalls, the cost ranges between $130 to $276 per linear foot (FEMA, 2002). These numbers were generated using the U.S. Army Corps of Engineers' publication, *Flood Proofing - How to Evaluate Your Options*, and updated to June 2019 dollars using inflation factors.
    - Steel beams: Walls may be strengthened with steel beams to reinforce the structure and provide further protection to the structure from a flood and floodwaters. For steel beams, the average costs of production and installing a steel beam ranges between $1,021 and $4,646. However, this cost is highly variable and depends on the site characteristics, raw steel prices, labor cost, type of steel beams, and structural design (HomeAdvisor, 2019b).
- **Prevention of floating of semi-stationary structures by elevating BFE level or securing with non-corrosive device:**
    - Elevating existing BFE may be achieved by: (1) lifting the structure and building a new, or extending the existing, foundation below it or (2) leaving the structure in place and either building an elevated floor within the house or adding a new upper story. A study conducted by the Association of State Floodplain Managers (ASFPM) estimated the approximate cost of elevating a 2,000 square-foot house's base level to prevent it from the flood (ASFPM, 2018). Depending on the foundation characteristics, the cost of building higher than the BFE level was estimated between $890 and $4,470 per additional foot.
    - Anchoring: Non-corrosive anchors might be an excellent option to secure a semi-stationary structure from floating during a flood event. EPA did not estimate the cost of the non-corrosive anchor as the selection, and the number of anchors needed to secure the structure will depend on the type of structure. Many online retailers recommended one anchor per leg per stationary structure (ShelterLogic, 2010) and provided a cost of approximately $20 for a set of 4 anchor kit (PGD, 2013).
- **Delayed delivery of products or materials:** Facilities may experience extra cost due to the delayed delivery or materials for major storm events. EPA estimates this cost will be minimal and may vary significantly with location and carrier.
- **Temporarily store materials and waste above the BFE level:** Once a flood event occurs within the facility boundary, operators may transport and store their materials and wastes at a temporary location that has an elevated level compared to BFE level. EPA assumed an

additional cost to store the materials in a temporary space, which includes storage fee, labor cost, and conveyance cost. The land rental or leasing cost for temporary storage will vary widely depending on geographic location. EPA estimated that the monthly average cost of renting commercial land is between $3 to $6 per square foot (LoopNet, 2019). The cost is estimated based on Louisiana rental (LoopNet, 2019) and did not include labor cost, which may impact the overall costs associated with this measure.

- **Temporarily reduce or eliminate outdoor storage:** During a flood event, outdoor storage areas may be reduced by renting indoor storage and temporarily store the materials inside the desired location. For 20 feet by 20 feet indoor storage unit in New Orleans, LA, the cost is estimated at $170 per month.
- **Temporarily relocate any mobile vehicles and equipment to upland areas:** The cost should be similar to the cost of temporary storage described in the "Temporarily store materials and waste above BFE level" section above.
- **Develop scenario-based emergency procedures for major storms:** EPA expects there to be a minimal cost for developing a scenario-based emergency procedure for major storms. Per the requirement of 29 CFR 1910.38, an employer must have an emergency action plan when an Occupational Safety and Health Administration (OSHA) standard requires one. Therefore, if a facility plans to update their existing emergency action plan to include emergency procedures for major storm event, the only incurred cost is labor cost associated with additional time required to update the existing plan.
- **Conduct staff training for implementing your emergency procedures at regular intervals:** EPA estimates this is a negligible cost for employee training to implement emergency procedures. This is based on the current requirements of the 2015 MSGP, in which facilities are already required to conduct employee training on SWPPPs, spill response procedures, pollution prevention requirements, etc. Including the additional component regarding emergency procedures during major storm events will incur very minimal cost involving increased labor.

In summary, Table 2 outlines the summary of cost estimates of enhanced control measures described in Part D.1.

Table 2: Cost Estimates of Enhanced Control Measures for High Stormwater Flows

Description of enhanced measure	Cost (low)	Cost (high)	Unit	Notes	References
Levee	$84	$240	Per linear foot	Cost varies with barrier height above ground	FEMA, 2002
Floodwall	$130	$276	Per linear foot	Cost varies with barrier height above ground	FEMA, 2002
Steel Beams	$1,021	$4,646	--	--	HomeAdvisor, 2019b
Building higher than the BFE level	$2,345	$7,035	--	For a 2000 square feet	ASFPM, 2018

Description of enhanced measure	Cost (low)	Cost (high)	Unit	Notes	References
				house filled with stem wall	
Anchors	--	$20	Set of 4	30" Auger Anchor Kit Set of 4	PGD, 2013
Delayed delivery	--	--	--	--	See discussion above
Temporary storage at a location with elevated ground level	$3	$6	Per square feet	Monthly	LoopNet
Indoor storage (eliminating outdoor storage)	--	$170	--	Monthly, For 20 feet by 20 feet storage unit	LoopNet
Development of emergency action plan (for major storm)	--	--	--	Negligible; Labor cost specific	See discussion above
Staff training	--	--	--	Negligible; Labor cost specific	See discussion above

The total cost to the affected industrial facilities is a function of the number of facilitates that implement one of these listed enhanced measures and the cost of specific measures chosen from the list above. Moreover, the site-specific nature of enhanced measures implementation complicates the process of determining appropriate measures. EPA clarifies that the cost estimates for the enhanced measures described above are conservative as they do not account for site-specific factors (e.g., topography, soil type) that may impact the costs and/or installation of the recommended enhanced measures.

Moreover, the proposed requirement explicitly says that the recommended enhanced measures must be considered, but not required. Therefore, EPA assumes that 2020 MSGP facilities would incur about half of the potential cost burden associated with implementing site-specific enhanced control measures.

E. Monitoring

1. Discharges to Impaired Waters without an EPA-Approved or Established TMDL

Proposed Permit Change

The 2015 MSGP requires facilities discharging to impaired waters to monitor once per year for pollutants for which the waterbody is impaired. Facilities can discontinue if these pollutants are not detected or not expected in the discharge. EPA proposes to require monitoring only for

those pollutants that are both causing impairments and associated with the industrial activity and/or are benchmarks. The proposal specifies that impaired waters monitoring would continue for three years, at which point it can be discontinued if the pollutants are not detected.

2015 MSGP	Proposed 2020 MSGP
Discharges to impaired waters without an EPA-approved or established TMDL: Beginning in the first full quarter following September 2, 2015 or your date of discharge authorization, whichever date comes later, you must monitor all pollutants for which the waterbody is impaired and for which a standard analytical method exists (see 40 CFR Part 136) once per year at each outfall (except substantially identical outfalls) discharging stormwater to impaired waters without an EPA-approved or established TMDL. If the pollutant of concern for the impaired waterbody is suspended solids, turbidity or sediment/sedimentation, you must monitor for Total Suspended Solids (TSS). If a pollutant of concern is expressed in the form of an indicator or surrogate pollutant, you must monitor for that indicator or surrogate pollutant. No monitoring is required when a waterbody's biological communities are impaired but no pollutant, including indicator or surrogate pollutants, is specified as causing the impairment, or when a waterbody's impairment is related to hydrologic modifications, impaired hydrology, or other non-pollutant. Permittees should consult the appropriate EPA Regional Office for any available guidance regarding required monitoring parameters under this part. If the pollutant of concern is not detected and not expected to be present in your discharge, or it is detected but you have determined that its presence is caused solely by natural background sources, you may discontinue monitoring for that pollutant. To support a determination that the pollutant's presence is caused solely by natural background sources, you must document and maintain with your SWPPP, as required by Part 5.5: • An explanation of why you believe that the presence of the pollutant of concern in your discharge is not related to the activities or materials at your facility; and	**Discharges to impaired waters without an EPA-approved or established TMDL:** Beginning in the first full quarter following [date 90 days after permit effective date] or your date of discharge authorization, whichever date comes later, you must monitor once per year at each discharge point (except substantially identical discharge points) discharging stormwater to impaired waters without an EPA-approved or established TMDL, as follows: Compare the list of industrial pollutants identified in Part 5.2.3.2 and any sector-specific benchmark monitoring pollutants to the list of pollutants for which the waterbody is impaired and for which a standard analytical method exists (see 40 CFR Part 136). You must monitor for pollutants that appear on both lists, including "indicator" or "surrogate" pollutants that clearly overlap those lists. Note: if the pollutant of concern for the impaired waterbody is suspended solids, turbidity, or sediment/sedimentation, you must monitor for Total Suspended Solids (TSS). If a pollutant of concern is expressed in the form of an indicator or surrogate pollutant, you must monitor for that indicator or surrogate pollutant. No monitoring is required when a waterbody's biological communities are impaired but no pollutant, including indicator or surrogate pollutants, is specified as causing the impairment, or when a waterbody's impairment is related to hydrologic modifications, impaired hydrology, or other non-pollutant. If you have questions, you should consult the appropriate EPA Regional Office for any available guidance regarding required monitoring parameters under this part. If the monitored pollutant is not detected in your discharge for three consecutive years, or it is detected, but you have determined that its presence is caused solely by natural background sources, you may discontinue monitoring for that pollutant only after submitting a change NOI per Part 7.4 with the appropriate justification . To support a determination that the pollutant's presence is caused solely by natural background

2015 MSGP	Proposed 2020 MSGP
• Data and/or studies that tie the presence of the pollutant of concern in your discharge to natural background sources in the watershed. Natural background pollutants include those that occur naturally as a result of native soils, and vegetation, wildlife, or ground water. Natural background pollutants do not include legacy pollutants from earlier activity on your site, or pollutants in run-on from neighboring sources that are not naturally occurring. However, you may be eligible to discontinue annual monitoring for pollutants that occur solely from these sources and should consult the appropriate EPA Regional Office for related guidance.	sources, you must document and maintain with your SWPPP, as required by Part 5.5: • An explanation of why you believe that the presence of the pollutant of concern in your discharge is not related to the activities or materials at your facility; and • Data and/or studies that tie the presence of the pollutant of concern in your discharge to natural background sources in the watershed. Natural background pollutants include those that occur naturally as a result of native soils, and vegetation, wildlife, or ground water. Natural background pollutants do not include legacy pollutants from earlier activity on your site, or pollutants in run-on from neighboring sources that are not naturally occurring. However, you may be eligible to discontinue annual monitoring for pollutants that occur solely from these sources and should consult the appropriate EPA Regional Office for related guidance.

Cost Impact Discussion

Incremental costs for facilities subject to impaired waters monitoring are due to a change in frequency of monitoring events under the proposed 2020 MSGP (i.e., a continuation of monitoring for 3 years vs. 1 year). EPA evaluated 2015 MSGP NOI data and concluded that 912 facilities are subject to impaired waters monitoring under the 2015 MSGP. Each of these 912 facilities would be required to monitor industrial pollutants identified in both the impaired water pollutant list and those parameters which are associated with the industrial activity and/or are sector-specific benchmark monitoring parameters. Under the proposed 2020 MSGP, these 912 facilities would be required to monitor 2 additional events over the first 3 years (once per year at each discharge point) over the permit term. Considering the average sampling cost of $25.28 (Tetra Tech, 2015, as updated) and the average number of discharge points of 2.4, the additional monitoring cost for this proposed requirement would be approximately $24.27 per facility per year, $121.34 per facility over the permit term (considering two additional samples over the permit term), and $110,649 for all 912 facilities over the permit term. For the purpose of analysis, EPA assumed that the list of monitored pollutants under the proposed requirement remained the same from the 2015 MSGP. The table below displays the breakdown of costs by facility and permit year:

Table 3: Cost Estimates of Impaired Water Monitoring

Number of Facilities	Cost per Facility per year ($June 2019)	Cost per Facility per Permit Term ($June 2019)	Total Incremental Cost for all Facilities over the Permit Term ($June 2019)
912	$24.27	$121.34	$110,649
Total Sampling Cost ($June 2019)			$110,649

Under the 2015 MSGP, facilities that discharge to an impaired water without approved total maximum daily loads (TMDLs) are required to monitor all pollutants for which the waterbody is impaired. However, under the proposed 2020 MSGP, operators would be required to monitor only those parameters that are apparent in both impaired water pollutant list (pollutants for which the waterbody is impaired) and are associated with the industrial activity and/or are sector-specific benchmark monitoring parameters. These lists widely vary within sectors and water bodies, and different operators may require monitoring different sets of parameters. Therefore, EPA expects the implementation of the requirement to be lower than the above cost estimate, which does not account for the potential decrease in cost from the proposed narrowing of the list of pollutants that operators would be required to monitor.

2. Additional Implementation Measures

Proposed Permit Change

The EPA proposes revisions to the 2015 MSGP's provisions regarding benchmark monitoring exceedances. The corrective action conditions, subsequent action deadlines, and documentation requirements in proposed Part 5.1 remain unchanged from the 2015 MSGP. In proposed Part 5.2, the EPA proposes new tiered "additional implementation measures," or AIM, that are primarily triggered by benchmark monitoring exceedances. There are three AIM levels: AIM Tier 1, Tier 2, and Tier 3. Operators would be required to respond to different AIM levels with increasingly robust control measures depending on the nature and magnitude of the benchmark threshold exceedance. The EPA proposes to retain exceptions to AIM triggers based on natural background sources or run-on. The EPA also proposes two other exceptions for a one-time catastrophic event and for operators who are able to demonstrate that the benchmark exceedance does not result in any exceedance of applicable water quality standards

2015 MSGP	Proposed 2020 MSGP
4.2 Conditions Requiring SWPPP Review to Determine if Modifications Are Necessary. If any of the following conditions occur, you must review your SWPPP (e.g., sources of pollution, spill and leak procedures, non-stormwater discharges, selection, design, installation and implementation of your control measures) to determine if modifications are necessary to meet the effluent limits in this permit: • Construction or a change in design, operation, or maintenance at your facility that significantly changes the nature of pollutants discharged in	**5.2 Additional Implementation Measures (AIM)** If any of the following events in Parts 5.2.1, 5.2.3, or 5.2.3 occur, you must follow the response procedures described in those parts, called "additional implementation measures" or "AIM." There are three AIM levels: AIM Tier 1, Tier 2, and Tier 3. You are required to respond to different AIM levels which prescribe increasingly robust responses depending on the nature and magnitude of the benchmark exceedance. See Part 5.2.4 for AIM exceptions. **5.2.1 AIM Tier 1** **5.2.1.1 AIM Tier 1 Triggering Events**. If any of the following events occur, you are in AIM Tier 1. You must follow AIM Tier 1 responses (Part 5.2.1.2) and deadlines (Part 5.2.1.3). One Annual Average Over the Benchmark Threshold. If one annual average for a parameter is over the benchmark threshold, you are in AIM Tier 1. An annual average

2015 MSGP	Proposed 2020 MSGP
stormwater from your facility, or significantly increases the quantity of pollutants discharged. • The average of four quarterly sampling results exceeds an applicable benchmark (see Part 6.2.1.2). If less than four benchmark samples have been taken, but the results are such that an exceedance of the four quarter average is mathematically certain (i.e., if the sum of quarterly sample results to date is more than four times the benchmark level) this is considered a benchmark exceedance, triggering this review. **4.3.1 Immediate Actions.** If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the work day when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following work day. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date. "All reasonable steps" for purposes of*	exceedance can occur from the average of four quarterly samples for a parameter, or from less than four samples with results such that an exceedance is mathematically certain (i.e., the sum of quarterly sample results to date is already more than four times the benchmark threshold). One Single Sampling Event Over 4 Times the Benchmark Threshold. If one single sampling event for a parameter is over 4 times the benchmark threshold, you are in AIM Tier 1. *(If one single sampling event is 8 times over the benchmark, you are in AIM Tier 2).* ***5.2.1.2 AIM Tier 1 Responses.*** Except as provided in Part 5.2.4 (AIM Exceptions) if any of the triggering events in Part 5.2.1.1 occur, you must: Review Stormwater Control Measures. Immediately review the selection, design, installation, and implementation of your control measures to determine if modifications are necessary to meet the benchmark threshold for the applicable parameter[3] and Implement Additional Measures. After reviewing your control measures, you must implement additional implementation measures to ensure the effectiveness of your control measures to bring your exceedances below the parameter's benchmark threshold; or if you determine nothing further needs to be done with your control measures, you must document per Part 5.3 and include in your annual report why you expect your existing control measures to bring your exceedances below the parameter's benchmark threshold for the next 12-month period; and Continue Quarterly Benchmark Monitoring. After compliance with (a) and (b) in this Part, you must continue quarterly benchmark monitoring into the next year. AIM Tier 1 Deadlines. If any modifications related to control measures are necessary, you must implement those actions or modifications within 14 days, unless doing so within 14 days is infeasible. If doing so within 14 days is infeasible, you must document per Part 5.3 why it is infeasible and implement such modifications within 45 days. Exception: You do not have to implement any modifications if you determine and document in your SWPPP that the exceedance is solely attributable to natural background sources or, with EPA agreement, run-on sources, consistent with Part 5.2.4 (AIM Exceptions).

[3] Examples include: review sources of pollution, spill and leak procedures, and/or non-stormwater discharges; conducting a single comprehensive clean-up, making a change in subcontractor, implementing a new control measure, and/or increasing inspections.

2015 MSGP	Proposed 2020 MSGP
complying with Part 4.2 Conditions Requiring SWPPP Review to Determine if Modifications Are Necessary, when you conclude a corrective action is, in fact, not necessary, could include documenting why a corrective action is unnecessary **4.3.2 Subsequent Actions.** If you determine that additional actions are necessary beyond those implemented pursuant to Part 4.3.1, you must complete the corrective actions (e.g., install a new or modified control and make it operational, complete the repair) before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, you must document why it is infeasible to complete the corrective action within the 14-day timeframe. You must also identify your schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45 day timeframe, you may take the minimum additional time necessary to complete the corrective action, provided that you notify the EPA Regional Office of your intention to exceed 45 days, your rationale for an extension, and a completion date, which you must also include in your corrective action documentation (see Part 4.4). Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work. These time intervals are not grace periods, but are schedules considered reasonable for documenting your findings and for making repairs and improvements. They are included in this permit to ensure that the conditions prompting the need for these repairs and improvements do not persist indefinitely.	

2015 MSGP	Proposed 2020 MSGP
	5.2.1 AIM Tier 2 **5.2.2.1 AIM Tier 2 Triggering Events.** If any of the following events occur, you are in AIM Tier 2. You must follow AIM Tier 2 responses (Part 5.2.2.2) and deadlines (Part 5.2.2.3). **a. Two Consecutive Annual Averages Each Over the Benchmark Threshold.** If two consecutive annual averages for a parameter are each over the benchmark threshold, you are in AIM Tier 2. An annual average exceedance can occur from the average of four quarterly samples for a parameter, or from less than four samples with results such that an exceedance is mathematically certain (i.e., the of quarterly sample results to date is already more than four times the benchmark threshold). **b. Two Sampling Event Results in 2-Year Period Each Over 4 Times the Benchmark Threshold**. If two single sampling event results for a parameter within a 2-year period are each over 4 times the benchmark threshold, you are in AIM Tier 2. **c. One Single Sampling Event Over 8 Times the Benchmark Threshold.** If one single sampling event for a parameter is over 8 times the benchmark threshold, you are in AIM Tier 2. **i. Exception:** This event triggers Tier 2 unless you immediately document per Part 5.3 that the single event was an aberration, how any measures taken within 14 days of such event will prevent a reoccurrence, and you take a sample during the next qualifying rain event that is either less than the benchmark threshold, in which case you do not trigger any AIM requirements based on the aberrant event, or less than 4 times but greater than 1 time the benchmark threshold, in which case you trigger Tier 1. You may only avail yourself of the "aberration" demonstration opportunity one time per parameter per discharge point, which shall include substantially similar discharge points. **5.2.2.2 AIM Tier 2 Responses.** Except as provided in Part 5.2.4 (AIM Exceptions), if any of the events in 5.2.2.1 occur, you must: **a. Implement Sector-Specific Stormwater Control Measures.** Implement all feasible SCMs from the relevant sector-specific Stormwater Control Measure Checklist(s) that applies to your facility in Appendix Q of the permit. You must notate in the checklist which SCMs you implement and keep the checklist with your SWPPP. (*Note: You do not have to implement an SCM where it would be counter-productive to the implementation of another control measure, or not result in any reduction in the discharge of the pollutant of concern.)*

2015 MSGP	Proposed 2020 MSGP
	b. **Continue Quarterly Benchmark Monitoring.** After compliance with (a) in this Part, you must continue quarterly benchmark monitoring into the next year. **5.2.2.3 AIM Tier 2 Deadlines**. You must implement all feasible SCMs within 14 days and document per Part 5.3 how the measures will achieve benchmark thresholds and why you did not implement any sector-specific measures from the checklist. If it is feasible for you to implement a measure, but not within 14 days, you may take up to 45 days to implement such measure. You must document per Part 5.3 why it was infeasible to implement such measure in 14 days. EPA may also grant you an extension beyond 45 days, based on an appropriate demonstration by you, the operator. **i. Exception**: You do not have to implement any of the feasible control measures if you determine and document in your SWPPP that the exceedance is solely attributable to natural background sources or, with EPA agreement, run-on sources, consistent with Part 5.2.4 (AIM Exceptions).
	5.2.2 AIM Tier 3 **5.2.3.1 AIM Tier 3 Triggering Events.** If any of the following events occur, you are in AIM Tier 3. You must follow AIM Tier 3 responses (Part 5.2.3.2) and deadlines (Part 5.2.3.3): **a.** **Three Consecutive Annual Averages Each Over the Benchmark Threshold.** If three consecutive annual averages for a parameter are each over the benchmark threshold, you are in AIM Tier 3. An annual average exceedance can occur from the average of four quarterly samples for a parameter, or from less than four samples with results such that an exceedance is mathematically certain (i.e., the sum of quarterly sample results to date is already more than four times the benchmark threshold). **b.** **Three Sampling Event Results in 3-Year Period Each Over 4 Times the Benchmark Threshold.** If three sampling event results for a parameter within a 3-year period are each over 4 times the benchmark threshold, you are in AIM Tier 3. **c.** **Two Sampling Events in 3-Year Period Each Over 8 Times the Benchmark Threshold.** If two sampling events for a parameter within a 3-year period are each over 8 times the benchmark threshold, you are in AIM Tier 3. **d.** **Four Consecutive Samples Each Over Benchmark Threshold with Average More than 2 Times the Benchmark.** If four consecutive samples for a parameter are each over the benchmark threshold and their average is more than 2 times the benchmark threshold, you are in AIM Tier 3. **5.2.3.2 AIM Tier 3 Responses.** Except as provided in Part 5.2.4 (AIM Exceptions), if any of the triggering events in 5.2.3.1 occur, you must:

2015 MSGP	Proposed 2020 MSGP
	a. **Install Permanent Controls.** Install structural source controls (e.g. permanent controls such as permanent cover, berms, and secondary containment), and/or treatment controls (e.g., sand filters, hydrodynamic separators, oil-water separators, retention ponds, and infiltration structures), except as provided in Part 5.2.4 (AIM Exceptions). The treatment technologies or treatment train you install should be appropriate for the pollutants that triggered AIM Tier 3 and should be more rigorous than the pollution prevention-type measures employed under AIM Tier 2 in Part 5.2.2. You must select controls with pollutant removal efficiencies that are sufficient to bring your exceedances below the benchmark threshold. You must have a professional engineer or geologist assist with the installation of such controls for the discharge point in question and for substantially similar discharge points, unless you individually monitor those substantially similar discharge points and demonstrate that Tier 3 requirements are not triggered at those discharge points; and **b.** **Alternative Option: Infiltrate.** As an alternative or adjunct to structural source controls and/or treatment controls, you may install infiltration or retention controls (e.g., through green infrastructure) for your industrial stormwater, if such an approach is appropriate and feasible for your site-specific conditions. If this approach is feasible, the execution must be compliant with regulations for ground water protection and underground injection control (UIC). The analysis that shows infiltration/retention is appropriate for your site-specific conditions and is compliant with other applicable regulations must be provided to the EPA Regional Office in Part 7 BEFORE you can choose this option and the EPA Regional Office must concur with your conclusions. Successful compliance with the provisions in this part may allow EPA to waive or lessen benchmark monitoring requirements; and **c.** **Continue Quarterly Benchmark Monitoring.** After compliance with (a) and/or (b) (if EPA approves) in this Part, you must continue quarterly benchmark monitoring into the next year.

2015 MSGP	Proposed 2020 MSGP
	5.2.3.3 **AIM Tier 3 Deadlines**. You must install the appropriate structural source and/or treatment control measures within 30 days. If is not feasible within 30 days, you may take up to 90 days to install such measures, documenting in your SWPPP why it is infeasible to install the measure within 30 days. EPA may also grant you an extension beyond 90 days, based on an appropriate demonstration by you, the operator. a. **Exception:** You do not have to install structural source controls or treatment controls if you determine and document in your SWPPP that the exceedance is solely attributable to natural background sources or, with EPA agreement, run-on sources, consistent with Part 5.2.4 (AIM Exceptions). b. **Exception:** You do not have to install structural source controls or treatment controls if you adequately demonstrate to EPA within 30 days of the Tier 3 trigger occurrence that your discharge does not result in any exceedance of water quality standards and EPA approves such demonstration within 90 days of receipt (EPA may take up to 180 days upon notice to you before the 90th day that EPA needs such extra time). The demonstration to EPA, which will be made publicly available, must include the following minimum elements in order to be considered for approval by EPA: (1) the water quality standards applicable to the receiving water; (2) the flow rate of the stormwater discharge; (3) the instream flow rates of the receiving water immediately upstream and downstream of the discharge point; (4) the ambient concentration of the parameters) of concern in the receiving water immediately upstream and downstream of the discharge point demonstrated by full-storm composite sampling; (5) the concentration of the parameter(s) of concern in the stormwater discharge demonstrated by full-storm, flow-weighted composite sampling; (6) any relevant dilution factors applicable to the discharge; and (7) the hardness of the receiving water. If EPA disapproves such demonstration within 90 days (or 180 days if EPA notifies you that it needs more than 90 days), you must install structural source controls and/or treatment controls

2015 MSGP	Proposed 2020 MSGP
	within 30 days of such disapproval (or 90 days if you document in your SWPPP why it is infeasible within 30 days; EPA may also grant an extension beyond 90 days based on an appropriate demonstration by you, the operator). If you continue to exceed the benchmark threshold for the same parameter even after installation of structural source controls or treatment controls, EPA may require you to apply for an individual permit. If EPA does not approve or disapprove the demonstration within 90 days (or 180 days if EPA has provided notice that it needs that extra time), then you may submit to EPA a Notice of Dispute. Within 30 days, EPA shall submit a response. If that response does not include an approval or disapproval of the demonstration, then both filings shall be submitted to the Director of the Water Management Division for the EPA Region, who shall approve or disapprove the demonstration within 30 days of receiving the filings. Time for action by you, the operator, upon disapproval shall be tolled during the period from filing of the Notice of Dispute until the decision is issued by the Director of the Water Management Division. That decision shall be final and not appealable.
Notes from 4.2 Conditions Requiring SWPPP Review to Determine if Modifications Are Necessary. *Note: A benchmark exceedance does not trigger a corrective action if you determine that the exceedance is solely attributable to natural background sources, or if you make a finding that no further pollutant reductions are technologically available and economically practicable and achievable in light of best industry practice (see Part 6.2.1.2).* *Note: When run-on to your facility causes a benchmark exceedance, in addition to reviewing and revising, as appropriate, your SWPPP, you should notify the other operators contributing run-on to your discharges to abate their pollutant contribution. Where the other operators fail to take action to address the stormwater run-on, you should contact your EPA Regional Office.* **6.2.1.2 Benchmark Monitoring Schedule.** **Data exceeding benchmarks** After collection of four quarterly samples, if the average of the four monitoring values for any parameter exceeds the benchmark, you must, in	**5.2.4 AIM Exceptions.** At any point or tier level of AIM, the below exceptions from AIM requirements and additional benchmark monitoring below may apply. You must still review your stormwater control measures, SWPPP, and other on-site activities to determine if actions or modifications are necessary or appropriate. **5.2.4.1 Natural Background Pollutant Levels:** You are not required to perform AIM or additional benchmark monitoring for any parameters for which you can demonstrate that the benchmark exceedance is solely attributable to the presence of that pollutant in natural background sources, provided that all the following conditions are met and you submit your analysis and documentation to the EPA Regional Office: **a.** The four-quarter average concentration of your benchmark monitoring results minus the concentration of that pollutant in the natural background is less than or equal to the benchmark threshold; and **b.** You document and maintain with your SWPPP, as required in Part 6.5, your supporting rationale for concluding that benchmark exceedances are in fact attributable solely to natural background pollutant levels. You must include in your supporting rationale any data previously collected by you or others (including literature studies) that describe the levels of natural background pollutants in your stormwater discharge. Natural background pollutants are those substances that are naturally occurring in soils or ground water. Natural background pollutants do not

2015 MSGP	Proposed 2020 MSGP
accordance with Part 4, review the selection, design, installation, and implementation of your control measures to determine if modifications are necessary to meet the effluent limits in this permit, and either: • Make the necessary modifications and continue quarterly monitoring until you have completed four additional quarters of monitoring for which the average does not exceed the benchmark; or • Make a determination that no further pollutant reductions are technologically available and economically practicable and achievable in light of best industry practice to meet the technology-based effluent limits or are necessary to meet the water-quality-based effluent limitations in Parts 2.1 and 2.2 of this permit, in which case you must continue monitoring once per year. You must also document your rationale for concluding that no further pollutant reductions are achievable, and retain all records related to this documentation with your SWPPP. You must review your control measures and perform any required corrective action immediately (or document why no corrective action is required), per Part 4, without waiting for the full four quarters of monitoring data, when an exceedance of the four quarter average is mathematically certain. If after modifying your control measures and conducting four additional quarters of monitoring, your average still exceeds the benchmark (or if an exceedance of the benchmark by the four quarter average is mathematically certain prior to conducting the full four additional quarters of monitoring), you must again review your control measures and take one of the two actions above. ***Natural background pollutant levels:*** Following the first four quarters of benchmark monitoring (or sooner if the exceedance is triggered by less than four quarters of data; see above), if the average concentration of a pollutant exceeds a benchmark value, and you	include legacy pollutants from earlier activity on your site, or pollutants in run-on from neighboring sources which are not naturally occurring, such as other industrial facilities or roadways. **5.2.4.2** **Run-On:** You are not required to perform AIM or additional benchmark monitoring for any parameters for which you can demonstrate and obtain EPA agreement that run-on from a neighboring source (e.g., a source external to your facility) is the cause of the exceedance, provided that all the following conditions are met and you submit your analysis and documentation to the EPA Regional Office for concurrence: **a.** After reviewing and revising your SWPPP, as appropriate, you should notify the other facility or entity contributing run-on to your discharges and request that they abate their pollutant contribution. **b.** If the other facility or entity fails to take action to address their discharges or sources of pollutants, you should contact your EPA Regional Office.

2015 MSGP	Proposed 2020 MSGP
determine that exceedance of the benchmark is attributable solely to the presence of that pollutant in the natural background, you are not required to perform corrective action or additional benchmark monitoring provided that: • The average concentration of your benchmark monitoring results is less than or equal to the concentration of that pollutant in the natural background; and • You document and maintain with your SWPPP, as required in Part 5.5, your supporting rationale for concluding that benchmark exceedances are in fact attributable solely to natural background pollutant levels. You must include in your supporting rationale any data previously collected by you or others (including literature studies) that describe the levels of natural background pollutants in your stormwater discharge. Natural background pollutants are those substances that are naturally occurring in soils or ground water. Natural background pollutants do not include legacy pollutants from earlier activity on your site, or pollutants in run-on from neighboring sources which are not naturally occurring, such as other industrial sites or roadways. However, the EPA Regional Office may determine that you are eligible to discontinue monitoring for pollutants that occur solely from run-on sources.	

Cost Impact Discussion

As noted previously, EPA was unable to estimate "total cost" associated with the proposed Additional Implementation Measures (AIM) responses because the information on the prevalence of the proposed triggering events among currently permitted facilities is not captured by any current reporting requirement under the 2015 MSGP.

EPA conducted a general analysis of the number of facilities that had at least one benchmark exceedance per permit year under the 2015 MSGP for calendar years 2016, 2017, and 2018. Out of the 1,010 facilities that started submitting benchmark monitoring data in calendar year 2016, 374 facilities (about 37%) had at least one benchmark exceedance in the 2016. From those 374 facilities, 290 (about 29%) had at least one exceedance in 2017. From those 290 facilities, 251 (about 25%) had at least one exceedance in 2018. Note that the percentage of facilities is

calculated based on the number of facilities that started submitting benchmark monitoring data in 2016, not the total number of facilities covered under the permit.

This analysis gives a broad overview of the percentage of facilities that continue to have at least one parameter exceed the benchmark threshold over a three-year period. The data show that a moderate number of facilities are exceeding at least one benchmark threshold, but that benchmark exceedances decline over time.

The results of this analysis cannot be used to estimate one-to-one how many facilities might trigger AIM Tier 1, 2, or 3. This analysis did not consider the magnitude of the exceedance, what pollutant parameter was exceeded or repeatedly exceeded, when exactly each facility obtained permit coverage or may have terminated coverage, or other nuances that affect how and whether benchmark data is captured on a per facility basis, such as if the facility becomes inactive (or active), or whether benchmark data was no longer required (e.g., due to an exception such as exceedances solely due to natural background concentrations). The analysis focused on facilities that submitted benchmark data in 2016 and continued to submit data through 2018.

However, generalizing from the above analysis, the number of facilities that may trigger AIM Tier 3 responses would be relatively fewer compared to the facilities that would trigger AIM Tier 1 or Tier 2 under the proposed 2020 MSGP.

For compliance with AIM Tier 1 responses, EPA assumes facilities will not incur any additional cost that was not already accounted for in 2015 MSGP requirements. AIM Tier 1 responses to review and modify stormwater existing controls and the SWPPP are substantially similar to those requirements for corrective action for benchmark exceedances which are already in the 2015 MSGP. Therefore, this requirement would not incur an incremental cost under the proposed 2020 MSGP. Operators who previously did not have benchmark monitoring requirements in the 2015 MSGP, but are now proposed to have them in the 2020 MSGP, were still subject to the corrective action requirements in the 2015 MSGP to review and revise the SWPPP for certain other triggers in Part 4.1 and 4.2 of the 2015 MSGP, akin to the proposed Tier 1 requirements. EPA expects that operators who did not have benchmark monitoring requirements in the 2015 MSGP could still have reason to review their SWPPP and keep it up-to-date during their permit coverage. For informational purposes, EPA is providing MDEP (2014) information on the labor hours that may be required for existing and new facilities to revise SWPPPs. According to MDEP (2014), it takes 4 hours and 10 hours, respectively, to update existing and new facility SWPPPs subject to MS4 permits in Massachusetts. For analysis, EPA assumes that these hours are representative of the labor hours that are required to update a SWPPP for an industrial facility. The additional cost to revise the existing SWPPP may cost between $96 and $240 (depending on the SWPPP length and complexity) based on an approximate hourly labor rate of $24.00. EPA assumed facilities subject to AIM Tier 1 might experience a similar cost burden.

Facilities that would be subject to AIM Tier 2 responses are required to implement sector-specific feasible SCMs whenever an AIM Tier 2 triggering event occurs. The operator must select SCMs from the appropriate sector-based Stormwater Control Measure Checklist(s) in the proposed 2020 MSGP.

Facilities that would be subject to AIM Tier 3 responses are required to select and install permanent structural source controls and treatment controls. EPA estimated the unit cost of these controls. Under the proposed 2020 MSGP, the recommended options for structural source controls include permanent cover, berms, and secondary containment; for treatment controls,

recommendations include sand filters, hydrodynamic separators, oil-water separators, retention ponds, and infiltration structures. The cost of implementing permanent controls varies depending on the type of control measure the operator selects and installs.

The estimated cost of structural source controls (e.g., berms and secondary containment) are discussed below. FEMA (2013) provided a general estimate of the unit costs for typical barrier projects. The cost for a standard berm ranged between $85 to $240 per linear feet depending on the height above ground. Similarly, the cost of a floodwall varied between $130 and $276 per linear foot. These costs were initially developed for a study for the St. Louis Metropolitan Sewer District and were generated using the U.S. Army Corps of Engineers' publication, *Flood Proofing - How to Evaluate Your Options*. Structural controls may also include secondary containment that prevents the leaks or spills from spreading and eliminates a corresponding discharge from leaving a specified containment area. If a new or replaced tank is used as secondary containment, the installation and one-time cost is estimated at $9,112. These one-time expenditures are annualized over 20 years at a seven percent interest rate (USEPA, 2015).

EPA also recommended several treatment controls for AIM Tier 3 responses such as sand filters, retention ponds, and infiltration structures. The initial cost of treatment control SCM varies widely from $6.3 to $63.74 per cubic feet, depending on the characteristics of the measures (USEPA, 2016). Operations and maintenance costs (O&M) may also vary between $1,500 to $3,000 depending on the type of control measures and associated maintenance hours. EPA estimates that the average annual cost of installation and maintenance of a bioretention system is $1,890 ($2016) and $3,060 ($2016) for a retention pond (USEPA, 2016). However, it is difficult to obtain accurate O&M costs, because they are highly variable depending on the size, location, and equipment needed. Table 4 below summarizes the proposed cost estimates for treatment controls installation and O&M costs recommended for AIM Tier 3 responses.

Table 4: Cost Estimates for AIM Tier 3 Treatment Controls

AIM Tier 3 treatment controls	Cost ($/ft^3) ($2010)	Cost ($/ft^3) ($2019)	Annual O&M cost ($2016)	Annual O&M cost ($June 2019)
Enhanced bioretention	$13.50	$15.62	$1,890	$2,209
Infiltration basin	$5.40	$6.31	--	--
Infiltration Trench	$10.80	$12.62	--	--
Sand filter	$15.51	$18.13	$2,807	$3,280
Wet pond	$5.88	$6.87	--	--
Subsurface infiltration	$54.54	$63.74	--	--

Source: USEPA, 2016

Additional recommendations for AIM Tier 3 responses treatment controls include oil-water separators and hydrodynamic separators. These technologies can help to improve water quality by treating complex influent properties with variable nature. An online retailer has a price guide for oil-water separators, ranging from $2,500 to $100,000 depending on the specifications and capacity (Cleanwater, 2019), not including installation. The hydrodynamic separator (HDS) is also considered as a treatment control option to manage stormwater runoff. HDS is considered a

structural SCM and widely used to treat and pre-treat stormwater. The capital and installation cost of a standard Continuous Deflective Separation HDS ranged between $2,300 to $7,200 per cubic feet capacity depending on site-specific considerations (USEPA, 1999)

As an alternative or adjunct to structural source controls and/or treatment controls, facilities may install infiltration or retention controls (e.g., green infrastructure) for industrial stormwater. Costs are estimated for green infiltration controls, which include rain gardens. Initial purchase and installation cost are estimated to be $15.62 per cubic feet for rain garden (USEPA, 2016).

The proposed requirements include the assistance of a qualified person to design and/or install AIM Tier 3 control measures. EPA estimates that a Professional Engineer would have an hourly labor cost of $179.04. but the total cost for compliance with AIM Tier 3 is unquantifiable because of the site-specific nature of the control measures. The hourly labor rate for professional engineers was calculated assuming $114,081 average annual salary, 2,080 labor hours (ASCE, 2013, as updated), and a net labor multiplier of 2.97 (Deltek, 2015) accounting for overhead and company profit.

3. Adding New Sector Specific Benchmarks for Sectors I, P and R, and for PAHs

Proposed Permit Change

Currently, the 2015 does not require sector-specific benchmark monitoring for Sector I (Oil and Gas Extraction), Sector P (Land Transportation and Warehousing), nor Sector R (Ship and Boat Building and Repair Yards). EPA proposes to add sector-specific benchmark monitoring requirements for these three sectors.

Facilities in Sector I (Oil and Gas Extraction) use many types of chemicals that could become sources of pollutants in stormwater discharges. These include diesel fuel, oil, solvents, drilling fluid, acids, and various chemical additives. The NRC study listed ammonia, lead, nickel, nitrate, zinc, and polycyclic aromatic hydrocarbons (PAHs) as pollutants associated with oil and gas extraction facilities. EPA proposes that facilities in Sector I have benchmark monitoring for ammonia, nickel, total recoverable lead, nitrate-nitrogen, total recoverable zinc, and hardness. EPA does not currently have recommended aquatic life criteria for PAHs so no specific PAH benchmark monitoring is required. However, the NRC study suggested that COD could be used as a surrogate for PAHs and EPA recognizes that it could be a surrogate for other organic pollutants as well.

Facilities in Sector P (Land Transportation and Warehousing) typically have areas for vehicle and equipment storage, cleaning, and maintenance, fueling, material storage, and locomotive sanding areas. They can use onsite chemicals like solvents, diesel fuel, gasoline, hydraulic fluids, antifreeze, and transmission fluids. Leaks and spills from petroleum-based products and chemicals can also contain PAHs. EPA proposes that facilities in Sector P have benchmark monitoring for lead, mercury, and hardness.

Facilities in Sector R (Ship and Boat Building and Repair Yards) perform activities like fluid changes, mechanical repairs, engine maintenance and repair, parts cleaning, refinishing, paint removal, painting, fueling, metal working, welding, cutting, and grinding. These sorts of activities can include using solvents, oils, fuel, antifreeze, acid and alkaline wastes, abrasives, and paints and can create dust. EPA proposes that facilities in Sector R have benchmark monitoring for

total recoverable chromium, total recoverable copper, total recoverable lead, total recoverable nickel, total recoverable zinc, and hardness.

	2015 MSGP	Proposed 2020 MSGP
Sector I: Oil and Gas	No benchmark monitoring requirements	Add ammonia, nickel, total recoverable lead, nitrate-nitrogen, total recoverable zinc, and hardness
Sector P: Land Transportation	No benchmark monitoring requirements	Add lead, mercury, and hardness
Sector R: Ship & Boat Building	No benchmark monitoring requirements	Add total recoverable chromium, total recoverable copper, total recoverable lead, total recoverable nickel, total recoverable zinc, and hardness

Cost Impact Discussion

In developing the proposed new sector-specific benchmark monitoring requirements for the proposed 2020 MSGP, EPA evaluated 2015 MSGP NOI information submitted by currently permitted industrial facilities. EPA estimates there are 29, 426, and 77 facilities from Sectors I, P, and R, respectively, who are not subject to sector-specific benchmark monitoring under the requirements of the 2015 MSGP. Under the proposed 2020 MSGP, there will be an incremental cost associated with proposed benchmark monitoring in these sectors.

Assuming an average sampling cost of $25.28 per pollutant (Tetra Tech, 2015, as updated), 2.4 average discharge points per facility, and quarterly sampling during the first year of permit coverage, the total incremental sampling cost for all facilities from Sectors I, P, and R over the permit term was estimated at approximately $366,272 ($0.37 million). To provide a better understanding of the estimates, EPA provided a breakdown of total incremental sampling costs in Table 5, below.

Table 5: Incremental Sampling Cost for Sectors I, P, and R

Sector	Number of Facilities	Cost per Facility for First Year ($June 2019)[1]	Cost per Facility per Year ($June 2019)[2]	Cost per Facility per Permit Term ($June 2019)	Total Incremental Sampling Cost for all Facilities over the Permit Term ($June 2019)
I	29	$1,191	$238.26	$1,191	$34,548
P	426	$591	$118.19	$591	$251,734
R	77	$1,039	$207.77	$1,039	$79,990
Total Sampling Cost ($June 2019)					$366,272

[1]Sampling is only required quarterly during the first year of permit term.

[2] Cost per facility per year is calculated from averaging the cost per facility per permit term over five years. The cost per facility per permit term is the same as cost per facility for the first year given that sampling is only required quarterly during the first year of the permit term.

Permitted facilities currently submit their benchmark monitoring data through NetDMR, which will incur an additional cost for facilities. Under the 2015 MSGP, facilities in these sectors do not submit benchmark monitoring data because they do not have benchmark monitoring requirements. The proposed 2020 MSGP will increase the amount of information that facilities in these sectors must submit to EPA. Estimating data entry costs are a function of the number of

data elements, the frequency at which those elements are reported, and data entry time per data element, depending on the method chosen, the labor may fluctuate significantly between 1.62 minutes to 5.45 minutes per data element for industrial and stormwater facilities (USEPA, 2015). Considering data clerk hourly wage rate of $29.22 (USEPA, 2015, as updated), an average number of 2.4 discharge points per facility, and quarterly data reporting for the first year of permit term, the total estimated incremental data entry cost for all applicable facilities during the permit term was estimated between $14,498 and $48,775. Similar to the sampling cost, EPA provided a breakdown of total incremental data entry costs in Table 6, below.

Table 6: Incremental Data Entry Cost for Sector I, P, and R [1]

Sector	Number of Facilities	Cost per Facility for First Year ($June 2019) [1]		Cost per Facility per Year ($June 2019) [2]		Cost per Facility per Permit Term ($June 2019)		Total Incremental Data Entry Cost for all Facilities over the Permit Term ($June 2019)	
		Low	High	Low	High	Low	High	Low	High
I	29	$45.45	$152.90	$9.09	$30.58	$45.45	$152.90	$1,318.01	$4,434.05
P	426	$22.72	$76.45	$4.54	$15.29	$22.72	$76.45	$9,680.57	$32,567.34
R	77	$45.45	$152.90	$9.09	$30.58	$45.45	$152.90	$3,499.55	$11,773.17
			Total Incremental Data Entry Cost ($June 2019)					$14,498.13	$48,774.56

[1]Data entry is only required quarterly during the first year of permit term.

[2] Cost per facility per year is calculated from averaging the cost per facility per permit term over five years. The cost per facility per permit term is the same as cost per facility for the first year given that sampling is only required quarterly during the first year of the permit term.

Under the proposed 2020 MSGP, the incremental cost (sampling and data entry) to address additional benchmark monitoring for sectors I, P, and R is estimated at approximately between $380,770 ($0.38 million) and $415,047 ($0.42 million).

Table 7 summarizes the potential incremental costs to the applicable industrial sector facilities of complying with the changes described in this Part.

Table 7: Total Incremental Cost (Sampling and Data Entry) Estimates for Sector I, P, and R

Sectors	Num-ber of Facil-ities	Number of Monitored Parameters	Cost per Facility per Year		Cost per Facility per Permit Term		Total Cost for all Facilities over the Permit Term	
			Low	High	Low	High	Low	High
Sector I	29	6	$247	$268.84	$1,237	$1,344.21	$35,865.97	$38,982
Sector P	426	3	$123	$133.47	$614	$667.37	$261,414.91	$284,302
Sector R	77	6	$217	$238.35	$1,084	$1,191.73	$83,489.51	$91,763
Total incremental costs for all facilities over the permit term							**$380,770.40**	**$415,046.83**

Proposed Permit Change

The NRC study also recommended that EPA collect data to inform possibly requiring new benchmarks to reduce stormwater risks from polycyclic aromatic hydrocarbons (PAH), which can be toxic to aquatic life. Activities like vehicle maintenance and using certain chemicals as well as spills and leaks can become sources of PAHs in stormwater discharges. EPA conducted an industry analysis that looked at sectors/subsectors included in the 2015 MSGP that may have petroleum hydrocarbons at their facilities and could be exposed to stormwater. The analysis looked at industrial process wastewater discharges as a proxy to identify industries that may use, handle, or generate PAHs. EPA identified the following subsectors and related activities that have total PAH loadings of greater than 1 kg/year:

Applicable MSGP Sub-Sector	Activity Represented	Contributing SIC Codes[1]	Pollutant Load (kg/year)
C5	Industrial Organic Chemicals; Petroleum Refining	2865, 2869, 2911	131,073[2]
Q1	Water Transportation Facilities	4491, 4493	6,351[3]
C4	Plastics Materials and Synthetic Resins, Synthetic Rubber, Cellulosic and Other Manmade Fibers Except Glass	2821, 2822	3,270[4]
F1	Steel Works, Blast Furnaces, and Rolling and Finishing Mills	3312, 3313, 3317	628[5]
C2	Industrial Inorganic Chemicals	2812,2813, 2819	491[6]
C3	Soaps, Detergents, and Cleaning Preparations; Perfumes, Cosmetics, and Other Toilet Preparations	2843	287
Y2	Miscellaneous Plastic Products; Musical Instruments; Dolls, Toys, Games, and Sporting and Athletic Goods; Pens, Pencils, and Other Artists' Materials; Costume Jewelry, Costume Novelties, Buttons, and Miscellaneous Notions, Except Precious Metal; Miscellaneous Manufacturing Industries	3081	282
P1	Railroad Transportation; Local and Highway Passenger Transportation; Moto Freight Transportation and Warehousing; United States Postal Service; Petroleum Bulk Stations and Terminals	4011, 4013, 4213, 4226, 4231, 5171	253[7]
A2	Wood Preserving	2491	251
A1	General Sawmills and Planing Mills	2421	206

Applicable MSGP Sub-Sector	Activity Represented	Contributing SIC Codes[1]	Pollutant Load (kg/year)
AC1	Computer and Office Equipment; Measuring, Analyzing, and Controlling Instruments; Photographic and Optical Goods, Watches, and Clocks; Electronic and Electrical Equipment and Components, Except Computer Equipment	3624	164
D2	Miscellaneous Products of Petroleum and Coal	2992, 2999	90
C1	Agricultural Chemicals	2873	46
I1	Crude Petroleum and Natural Gas; Natural Gas Liquids; Oil and Gas Field Services	133, 1321, 1389	11[8]
M1	Automobile Salvage Yards	5012	6.9
S1	Air Transportation Facilities	4581	4.9
F5	Primary Smelting and Refining of Nonferrous Metals; Secondary Smelting and Refining of Nonferrous Metals; Miscellaneous Primary Metal Products	3334, 3399	3.7[9]
AB1	Industrial and Commercial Machinery, Except Computer and Office Equipment; Transportation Equipment Except Ship and Boat Building and Repairing	3523, 3537, 3713, 3714, 3721, 3724, 3743	1.4[10]

1 Applicable SIC codes with reported total PAH loadings used in calculating the total annual pollutant load.

2 Petroleum refining (SIC code 2911); and industrial organic chemicals, not elsewhere classified (SIC code 2869) accounts for most of the loading identified in this sector (130,571 kg/year and 496 kg/year, respectively).

3 Marinas (SIC code 4491) account for most of the loading identified in this sector (6,379 kg/year).

4 Plastics materials, synthetic resins, and nonvulcanizable elastomers (SIC code 2821) accounts for most of the loading identified in this sector (3,265 kg/year).

5 Steel works, blast furnaces (including coke ovens), and rolling mills (SIC code 3312); and electrometallurgical products, except steel (SIC code 3313) account for most of the loading identified in this sector (589 kg/year and 39 kg/year, respectively).

6 Industrial inorganic chemicals, not elsewhere classified (SIC code 2819); and alkalies and chlorine (SIC code 2812) account for most of the loading identified in this sector (440 kg/year and 51 kg/year, respectively).

7 Petroleum bulk stations and terminals (SIC code 5171); railroads, line-haul operating (SIC code 4011); and special warehousing and storage, not elsewhere classified (SIC code 4226) account for most of the loading identified in this sector (146 kg/year, 85 kg/year, and 22 kg/year, respectively).

8 Oil and gas field services, not elsewhere classified (SIC code 1389); and crude petroleum and natural gas (SIC code 1311) account for most of the loading identified in this sector (9 kg/year and 2 kg/year, respectively).

9 Primary production of aluminum (SIC code 3334) accounts for most of the loading identified in this sector (3 kg/year).

10 Aircraft engines and engine parts (SIC code 3724) account for most of the loading identified in this sector (0.9 kg/year).

EPA could consider requiring monitoring for PAHs or surrogates if the information and/or preliminary monitoring shared with EPA indicates it is warranted. However, EPA does not have recommended aquatic life criteria for either individual or total PAHs at this time. The 1995 and

2000 MSGPs included a benchmark for pyrene of 0.01 mg/L based on the laboratory-derived minimum level (ML). As an alternative, EPA could consider requiring monitoring for total petroleum hydrocarbons (TPH), a variety of chemicals that come from crude oil. These chemicals can include hexane, jet fuels, mineral oils, benzene, toluene, xylenes, naphthalene, fluorene, other petroleum products, and gasoline components. Another alternative is to require monitoring for chemical oxygen demand (COD) as a surrogate for PAHs. The NRC study stated that COD could be a possible surrogate, but that more data could help analyze to correlate PAH concentrations to COD and COD may not be specific or sensitive enough to detect moderate/low concentrations.

2015 MSGP	Proposed 2020 MSGP
No sectors with benchmark monitoring requirements for PAHs	Options for subsectors and related activities that have total PAH loadings of greater than 1 kg/year: • Requiring benchmark monitoring for PAHs • Requiring benchmark monitoring for total petroleum hydrocarbons (TPH) • Requiring benchmark monitoring for chemical oxygen demand (COD) as a surrogate for PAHs

Cost Impact Discussion

EPA is considering how to develop new benchmark monitoring requirements for PAHs and is evaluating several options for subsectors that have total PAH loadings of greater than 1 kg/year, including developing a benchmark threshold for PAHs, total petroleum hydrocarbons (TPH), or chemical oxygen demand (COD) as a surrogate for PAHs for facilities from subsectors (A1, A2, C1, C2, C3, C4, C5, D2, F1, F5, I1, M1, P1, Q1, S1, Y2, AB1, and AC1) specified in the table above. To address the cost associated with a potential new benchmark for PAHs, EPA evaluated 2015 MSGP NOI data from currently permitted industrial facilities and identified 1,116 facilities with the applicable subsectors listed above. Since there is no benchmark monitoring requirement for PAHs in the 2015 MSGP, there would be an incremental cost associated with proposed PAH, TPH, or COD benchmark monitoring in these sectors under the proposed 2020 MSGP, depending on which is used for the benchmark parameter.

As benchmark monitoring of PAHs, TPH, and COD are three separate options, EPA estimated and presented the cost for each option separately.

- **Option 1 (Cost for implementing benchmark monitoring for PAHs):** The sampling and data entry cost could be substantially significant for PAHs class compared to other pollutants (i.e., COD) as the laboratory analytical testing of PAHs involves an analysis of the pollutant group instead of a single pollutant. In nature, PAHs can exist in over 100 different combinations. However, using the Toxic Release Inventory reporting category for polycyclic aromatic compounds, the National Waste Minimization Program defined this group by including 28 specific pollutants in this category (USEPA, 2008). Most laboratories offer a package of PAH sampling that includes testing for on average 16 PAH pollutants (ENR, 2019). Assuming a sampling cost of $218.28 per sample (Energylab, 2014, as updated; ENR, 2019), an average of 2.4 discharge points per facility, and quarterly sampling over the first year of the permit term, the total sampling cost is estimated at $2,337,371 ($2.34 million) (cost of $419 per facility per year, cost of $2,094 per facility per permit term) for all applicable subsectors. The data entry cost ranges between $135,255 and $455,025 (cost of $24.24-$81.55 per facility per year, cost of

$121.10-$407.73 per facility per permit term) assuming quarterly data reporting frequency for first year, 16 data elements, an average data entry time per element of 1.62-5.45 minutes, and a data clerk hourly wage rate of $29.22 (USEPA, 2015, as updated). This option is the most expensive among the three options.

- **Option 2 (Cost of implementing benchmark monitoring for total petroleum hydrocarbons (TPH):** Similar to PAHs sampling, TPH sampling also refers to numerous test methods and includes analysis of many different petroleum hydrocarbon ranges, which may affect the sampling cost significantly. Usually, the gasoline range organics (GRO) method is considered the standard analysis method of TPH and is comprised of an individual analysis of 10 pollutants (AAL, 2016). Depending on the combination of pollutants and test methods, the sampling cost for TPH varies widely. Pricing also varies lab to lab $63 (Weld Laboratories, 2016), $75 (Energy lab, 2014; Envirochem, 2019) and $195 (ENR, 2019). For the purpose of this analysis, EPA assumed a sampling cost of $80 for TPH sampling providing an analysis of 10 TPH pollutants. The total sampling cost is estimated at $857,088 ($0.86 million) (cost of $154 per facility per year, cost of $768 per facility per permit term) for all applicable subsectors assuming an average of 2.4 discharge points per facility and quarterly sampling over the first year only of the permit term. The data entry cost ranges between $84,534 and $284,391 (cost of $15.15-$50.97 per facility per year, cost of $75.75-$254.83 per facility per permit term)considering quarterly data reporting frequency for first year, 10 data elements, an average data entry time per element of 1.62-5.45 minutes, and a data clerk hourly wage rate of $29.22 (USEPA, 2015, as updated).

- **Option 3 (Cost of implementing benchmark monitoring for chemical oxygen demand (COD) as a surrogate for PAHs):** Assuming $29.06 sampling cost for COD sampling (Tetra Tech, 2015, as updated), an average of 2.4 discharge points per facility, and quarterly sampling over the first year only of the permit term, the total sampling cost is estimated at $311,326 for all applicable sectors (cost of $56 per facility per year, cost of $279 per facility per permit term). The data entry cost is ranges between $8,453 and $28,439 (cost of $1.51-$5.10 per facility per year, cost of $7.57-$25.48 per facility per permit term) assuming quarterly data reporting frequency for first year, an average data entry time per element of 1.62-5.45 minutes, and a data clerk hourly wage rate of $29.22 (USEPA, 2015, as updated). It is important to note that COD monitoring can be used as a surrogate for PAHs and it is already monitored per the requirement in Part E.4 of the proposed 2020 MSGP. This option is the least expensive among the three options.

Tables 8 through 10 below provide the breakdown of both sampling and data entry costs for each option based on the number of facilities and compliance time:

Table 8: Incremental Sampling Cost for Three Alternatives ($June 2019)

Options	Cost per Facility for First Year ($June 2019) [1]	Cost per Facility per Year ($June 2019) [2]	Cost per Facility per Permit Term ($June 2019)	Total Incremental Sampling Cost for all Facilities over the Permit Term ($June 2019)
PAHs monitoring	$2,094	$419	$2,094	$2,337,371
TPH monitoring	$768	$154	$768	$857,088
COD monitoring	$279	$56	$279	$311,326

[1]Sampling is only required quarterly during the first year of permit term.

[2] Cost per facility per year is calculated from averaging the cost per facility per permit term over five years. The cost per facility per permit term is the same as cost per facility for the first year given that sampling is only required quarterly during the first year of the permit term.

Table 9: Incremental Data Entry Cost for Three Alternatives ($June 2019)

Options	Cost per Facility for First Year ($June 2019) [1]		Cost per Facility per Year ($June 2019) [2]		Cost per Facility per Permit Term ($June 2019)		Total Incremental Data Entry cost for all facilities over the Permit Term ($June 2019)	
	Low	High	Low	High	Low	High	Low	High
PAHs monitoring	$121.20	$407.73	$24.24	$81.55	$121.20	$407.73	$135,255.24	$455,025.34
TPH monitoring	$75.75	$254.83	$15.15	$50.97	$75.75	$254.83	$84,534.52	$284,390.84
COD monitoring	$7.57	$25.48	$1.51	$5.10	$7.57	$25.48	$8,453.45	$28,439.08

[1]Sampling is only required quarterly during the first year of permit term.

[2] Cost per facility per year is calculated from averaging the cost per facility per permit term over five years. The cost per facility per permit term is the same as cost per facility for the first year given that sampling is only required quarterly during the first year of the permit term.

Table 10: Total Incremental Cost for Three Alternatives ($June 2019)

Options	Sampling Cost	Data Entry Cost		Total Cost	
		Low	High	Low	High
PAHs monitoring	$2,337,371	$135,255	$455,025	$2,472,626	$2,792,396
TPH monitoring	$857,088	$84,535	$284,391	$941,623	$1,141,479
COD monitoring	$311,326	$8,453	$28,439	$319,780	$339,765

Assuming appropriate sampling cost per sample ($218.25 for PAHs, $80 for TPHs, and $29.06 for COD), an average of 2.4 discharge points per facility, and quarterly sampling over the first year only of the permit term, the range of total incremental cost is estimated between $319,780 (COD monitoring) and $2,792,396 (PAH monitoring). **After conducting this cost analysis for the 3 options for developing a benchmark threshold for PAHs, EPA concluded that COD is the most cost-effective option as a surrogate, and since it is already being proposed under the new universal benchmark monitoring, no additional monitoring for PAHs is being proposal at this time and therefore costs for PAH monitoring are not included in the total cost estimate. EPA clarifies that operators will not have to covert or compare COD for PAH monitoring purposes. EPA requests comment on information and data related to specific sectors with petroleum hydrocarbon exposure that can release PAHs, any concentrations of individual PAHs and/or total PAHs at industrial sites, and the correlation of PAHs and COD. EPA may consider additional monitoring for PAHs in the final permit if it receives sufficient information to develop an appropriate benchmark threshold.**

4. Universal Benchmark Monitoring Applicable to All Sectors

Proposed Permit Change

EPA is continuing to require benchmark monitoring as an indicator of the performance of the stormwater control measures. For clarity, EPA continues to emphasize that the benchmark thresholds in the EPA MSGP are not, and have never been, effluent limits themselves. The 2015 MSGP required benchmark monitoring for around 55% of MSGP facilities; the other 45% of facilities did not have any chemical-specific benchmark monitoring. More specifically, in the 2015 MSGP, 19 subsectors were not subject to any benchmark monitoring requirements (B2, C5, D2, E3, F5, I1, J3, N2, P1, R1, T1, U3, V1, W1, X1, Y2, Z1, AB1, and AC1) while the remaining 34 subsectors did have required benchmark monitoring.

EPA proposes to require facilities to conduct benchmark monitoring for three indicator parameters of pH, total suspended solids (TSS), and chemical oxygen demand (COD), regardless of sector/subsector, called universal benchmark monitoring, as recommended by the NRC study. This proposed requirement would apply to all sectors/subsectors, including those facilities that previously did not have any chemical-specific monitoring requirements and those that previously did not have these three specific benchmark parameters under the 2015 MSGP. The NRC study suggested that such universal benchmark monitoring would provide a baseline and comparable understanding of industrial stormwater risk, broader water quality problems, and stormwater control effectiveness across all sectors. The NRC study states that "all three parameters are direct measures of water quality and are appropriate choices for industry-wide sampling because all three can be indicators of broader water quality problems and the presence of other pollutants." In addition, the NRC study says these parameters can indicate absence, neglect, or failure of a stormwater control measure, which can lead to high concentrations of potential pollutants (NRC, 36). EPA previously considered adding these three parameters as universal benchmark monitoring requirements to the 2005 MSGP (O'Donnell, 2005), and several states currently require some degree of universal monitoring in their industrial stormwater permits (California, Connecticut, Minnesota, and Washington).

All operators in all sectors would be required to monitor for these three parameters in addition to any existing or proposed benchmark parameters that may be finalized in the 2020 MSGP, if applicable. Any sector/subsector that had to monitor for pH, TSS, and/or COD as a sector-specific benchmark under the 2015 MSGP would now monitor for these parameters in the 2020 MSGP as part of universal benchmark monitoring, which EPA is proposing to have a different monitoring frequency than existing sector-specific benchmark monitoring, discussed further below.

For universal benchmark monitoring parameters of pH, TSS, and COD, EPA proposes that operators would be required to conduct quarterly benchmark monitoring, as identified in proposed Part 6.1.7, for each year of permit coverage commencing no earlier than [date 90 days after permit effective date]. For any data exceeding the benchmark threshold for these three parameters that triggered any event as specified in Parts 5.2.1.1, 5.2.2.1, and 5.2.3.1, operators would be required to comply with Part 5.2 (Additional Implementation Measures).

EPA proposes that facilities monitor and report for these three parameters on a quarterly basis for the entire permit term, regardless of any benchmark threshold exceedances or not, to ensure facilities have current indicators of the effectiveness of their stormwater control measures throughout the permit term. For facilities that had pH, TSS, and/or COD as a benchmark in the 2015 MSGP, those parameter(s) would follow the newly proposed quarterly monitoring schedule for the entire permit term. The NRC study suggests that quarterly stormwater event samples collected over only the first year of the permit term are inadequate to characterize industrial stormwater discharges or describe industrial stormwater control measure performance over the

permit term. The study states that "extended sampling over the course of the permit would provide greater assurance of continued effective stormwater management and help identify adverse effects from modifications in facility operation and personnel over time" (NRC, 83).

There are well-established standardized analytical procedures for all three parameters of pH, TSS, and COD. Analytical determinations are expected to be relatively inexpensive (less than $100/year for all three). The NRC study acknowledges that the additional cost burden for these three parameters is expected to be relatively small given that all facilities are already required to collect quarterly stormwater samples for visual monitoring.

Because some operators choose to sample more than the required number of times, EPA has included specific proposed language in the permit that the extra samples may be used to calculate their benchmark average. Any additional sampling does not reduce the requirement that the monitoring be completed over a minimum of four calendar quarters. Therefore, additional samples collected in one quarter for this purpose cannot replace sampling required in other quarters. (Note: requirement for four calendar quarters of monitoring is not applicable to airports given that the monitoring requirements for that sector are related to winter application of deicing chemicals.)

2015 MSGP	Proposed 2020 MSGP
Benchmark Monitoring. This permit specifies pollutant benchmark concentrations that are applicable to certain sectors / subsectors. Benchmark monitoring data are primarily for your use to determine the overall effectiveness of your control measures and to assist you in determining when additional corrective action(s) may be necessary to comply with the effluent limitations in Part 2. The benchmark concentrations are not effluent limitations; a benchmark exceedance, therefore, is not a permit violation. However, if corrective action is required as a result of a benchmark exceedance, failure to conduct required corrective action is a permit violation. At your discretion, more than four samples may be taken during separate runoff events and used to determine the average benchmark parameter concentration for facility discharges. **Applicability of Benchmark Monitoring.** You must monitor for any benchmark parameters	**Benchmark Monitoring.** This permit proposes benchmark monitoring parameters that are both universal (applicable to all sectors) and sector-specific. Benchmark monitoring data are primarily for your use to determine the overall effectiveness of your control measures and to assist you in determining when additional action(s) may be necessary to comply with the effluent limitations in Part 2. The benchmark thresholds are not effluent limitations; a benchmark exceedance, therefore, is not a permit violation. However, if a benchmark exceedances triggers Additional Implementation Measures in Part 5, failure to conduct any required measures would be a permit violation. At your discretion, you may take more than four samples during separate discharge events to determine the average benchmark parameter value for facility discharges. ***Applicability of Benchmark Monitoring.*** **a. Universal and Sector-specific Benchmark Monitoring**. You must monitor for pH, TSS, and COD, and for any benchmark parameters specified for the industrial sector(s), both primary industrial activity and any co-located industrial activities, applicable to your discharge. Universal benchmark monitoring thresholds applicable to all sectors (pH, TSS, and COD) and your sector-specific benchmark thresholds are listed in Part 8.

2015 MSGP	Proposed 2020 MSGP
specified for the industrial sector(s), both primary industrial activity and any co-located industrial activities, applicable to your discharge. Your industry specific benchmark concentrations are listed in the sector-specific sections of Part 8. If your facility is in one of the industrial sectors subject to benchmark concentrations that are hardness-dependent, you are required to submit to EPA with your NOI a hardness value, established consistent with the procedures in Appendix J, which is representative of your receiving water. Samples must be analyzed consistent with 40 CFR Part 136 analytical methods and using test procedures with quantitation limits at or below benchmark values for all benchmark parameters for which you are required to sample. **Benchmark Monitoring Schedule**. Benchmark monitoring must be conducted quarterly, as identified in Part 6.1.7, for your first four full quarters of permit coverage commencing no earlier than September 2, 2015. Facilities in climates with irregular stormwater runoff, as described in Part 6.1.6, may modify this quarterly schedule provided that this revised schedule is reported directly to EPA by the due date of the first benchmark sample (see EPA Regional contacts in Part 7.9.1), and that this revised schedule is kept with the facility's SWPPP as specified in Part 5.5. When conditions prevent you from obtaining four samples in four consecutive quarters, you must continue monitoring until you have the four samples required for calculating your benchmark monitoring average. As noted in Part 6.1.7, you must use NetDMR to report using a "no data" or "NODI"	If your facility is in one of the industrial sectors subject to benchmark thresholds that are hardness-dependent, you must submit to EPA with your NOI a hardness value, established consistent with the procedures in Appendix J, that is representative of your receiving water. Hardness is not a specific benchmark and therefore the permit does not include a benchmark threshold with which to compare. Samples must be analyzed consistent with 40 CFR Part 136 analytical methods and using test procedures with quantitation limits at or below benchmark thresholds for all benchmark parameters for which you are required to sample. ***Benchmark Monitoring Schedule.*** **Schedule for Universal Benchmarks Applicable to All Sectors (pH, TSS, and COD).** For universal benchmark monitoring parameters of pH, TSS, and COD, you must conduct quarterly benchmark monitoring, as identified in Part 6.1.7, for each year of permit coverage commencing no earlier than [date 90 days after permit effective date]. You must comply with Part 5.2 (Additional Implementation Measures) for any data exceeding the benchmark threshold as specified in Parts 5.2.1.1, 5.2.2.1, and 5.2.3.1. **Schedule for Sector-Specific Benchmarks**. For all sector-specific benchmark monitoring parameters, you must conduct quarterly benchmark monitoring, as identified in Part 6.1.7, for your first four full quarters of permit coverage commencing no earlier than [date 90 days after permit effective date]. If the annual average for any parameter does not exceed the benchmark threshold, you have fulfilled your benchmark monitoring requirements for that parameter for the permit term and can discontinue benchmark monitoring for that parameter. You must comply with Part 5 (Additional Implementation Measures) and continue quarterly benchmark monitoring for any data exceeding the benchmark threshold as specified in Parts 5.2.1.1, 5.2.2.1, and 5.2.3.1. **Facilities in Climates with Irregular stormwater Discharges.** As described in Part 4.1.6, facilities in climates with irregular stormwater discharges may modify this quarterly schedule provided you report this revised schedule directly to EPA by the due date of the first benchmark sample (see EPA Regional

2015 MSGP	Proposed 2020 MSGP
code for any 3-month interval that you did not take a sample. **Data not exceeding benchmarks:** After collection of four quarterly samples, if the average of the four monitoring values for any parameter does not exceed the benchmark, you have fulfilled your monitoring requirements for that parameter for the permit term. **Data exceeding benchmarks:** After collection of four quarterly samples, if the average of the four monitoring values for any parameter exceeds the benchmark, you must, in accordance with Part 4, review the selection, design, installation, and implementation of your control measures to determine if modifications are necessary to meet the effluent limits in this permit, and either: • Make the necessary modifications and continue quarterly monitoring until you have completed four additional quarters of monitoring for which the average does not exceed the benchmark; or • Make a determination that no further pollutant reductions are technologically available and economically practicable and achievable in light of best industry practice to meet the technology-based effluent limits or are necessary to meet the water-quality-based effluent limitations in Parts 2.1 and 2.2 of this permit, in which case you must continue monitoring once per year. You must also document your rationale for concluding that no further pollutant reductions are achievable, and retain all records related to this	contacts in Part 7.9.1), and you keep this revised schedule with the facility's SWPPP as specified in Part 5.5. When conditions prevent you from obtaining four samples in four consecutive quarters, you must continue monitoring until you have the four samples required for calculating your benchmark monitoring average. As noted in Part 4.1.7, you must use NetDMR to report using a "no data" or "NODI" code for any 3-month interval that you did not take a sample. **Part 8 – Sector Requirements for Industrial Activity** **<u>Universal Benchmark Monitoring Applicable to All Sectors (see also Part 4.2.1)</u>** You must comply with the universal benchmark monitoring requirements below for pH, total suspended solids (TSS), and chemical oxygen demand (COD). These requirements apply to all sectors/subsectors and are in addition to any sector-specific requirements contained in this Part and requirements applicable to all facilities in Parts 1 through 7 and the appendices of the permit. Table 8.1.1 identifies the benchmark monitoring thresholds for pH, TSS, and COD that apply to all industrial sectors/subsectors. These benchmark parameters serve as performance indicators of other stormwater pollutants. **Table 8.1.1 – Universal Benchmark Monitoring Applicable to All Sectors** **Subsector** / **Parameter** / **Concentration** All sectors/ subsectors: pH — 6.0 – 9.0 s.u. All sectors/ subsectors: Total Suspended Solids (TSS) — 100 mg/L All sectors/ subsectors: Chemical Oxygen Demand (COD) — 120 mg/L

2015 MSGP	Proposed 2020 MSGP
documentation with your SWPPP. You must review your control measures and perform any required corrective action immediately (or document why no corrective action is required), per Part 4, without waiting for the full four quarters of monitoring data, when an exceedance of the four quarter average is mathematically certain. If after modifying your control measures and conducting four additional quarters of monitoring, your average still exceeds the benchmark (or if an exceedance of the benchmark by the four quarter average is mathematically certain prior to conducting the full four additional quarters of monitoring), you must again review your control measures and take one of the two actions above.	

Cost Impact Discussion

The universal benchmark monitoring requirements in the proposed 2020 MSGP may trigger additional sampling cost and additional data entry cost. Under the proposed 2020 MSGP, the estimated 2,400 industrial facilities that EPA expects to seek coverage under the MSGP irrespective of subsectors would be required to collect quarterly samples of three conventional parameters, pH, TSS, and COD, during each year of permit coverage. Based on EPA's analysis of benchmark monitoring requirements for currently permitted facilities under the 2015 MSGP, there are approximately 1089 facilities that currently monitor for at least one of these parameters. Therefore, EPA estimates that universal benchmark sampling would cost an average of $269 per facility per year (or approximately an average of $1,353 per facility for the 5-year permit term) and a total cost of $4.33 million for all 2,194 applicable facilities over the 5-year permit term. Note that EPA only evaluated primary sub-sector data for this analysis and therefore this is a conservative cost estimate; around 400 operators have multiple sub-sectors and could already monitor for a parameter not captured in their primary sub-sector monitoring requirements in this analysis. Note that the total estimated number of facilities that would have new parameter(s) does not add up to 2,400 facilities. This is due to a legacy error in the NPDES eReporting Tool, EPA's online NOI system, that led to the collection of incomplete subsector data.

Table 11 shows the cost breakdown for the number of facilities that would have new parameters under the proposed universal benchmark monitoring requirements. EPA makes the following assumptions: 1) a facility is covered for the duration of the permit term (5 years) meaning 20 samples are taken over the permit term, and 2) the average unit sampling and analysis cost of

pH, TSS, and COD is $8.66, $15,88, and $29.06, respectively (Tetra Tech, 2015, as updated), and 3) the average number of discharge points per facility is 2.4.

EPA assumes a negligible cost for facilities with existing benchmark monitoring and reporting requirements to enter additional benchmark monitoring information into the NetDMR. However, there will be some additional cost to enter this information into the NetDMR for facilities that were not previously required to conduct and report any benchmark monitoring data. Based on 2015 MSGP NOI data, there are 1,105 facilities that currently do not have any benchmark monitoring requirements but would be required to report universal benchmark monitoring information under the proposed 2020 MSGP. The data entry cost range is between $125,551and $422,381 ($22.72 - $76.45 cost per facility per year, $113.62 - $382.25 per facility per permit term). This assumes a data clerk hourly wage rate of $29.22, 3 data elements, an average of 2.4 discharge points per facility, and quarterly data reporting frequency (4 times per year) over the permit term (USEPA, 2015).

Table 11: Incremental Sampling Cost ($June 2019)

New Parameter(s)	Number of Subsectors that would have new Benchmark Parameter(s)	Subsectors that would have new Benchmark Parameter(s)	Average Number of Discharge Points per Facility	Number of New Parameter(s)	Estimated Cost per Facility per Year	Estimated Additional Cost per Facility for 5-year Permit Term	Estimated Number of Facilities that would have new Benchmark Parameter(s) [4]	Estimated Additional Cost for ALL Facilities 5-year Permit Term
pH	5 subsectors	A1, A4, G1, N1, U2	2.40	1	$83	$415.85	218	$90,470
pH and TSS	2 subsectors	B1, K1	2.40	2	$235	$1,178.24	5	$5,875
TSS	1 subsector	S1	2.40	1	$152	$762.39	149	$113,240
pH and COD	10 subsectors	A3, D1, E2, F2, H1, J1, J2, L1, M1, U1	2.40	2	$362	$1,810.68	676	$1,223,560
COD	1 subsector	G2	2.40	2	$278	$1,394.90	41	$56,990
pH, TSS, and COD	35 subsectors	A2, B2, C1, C2, C3, C4, C5, D2, E1, E3, F1, F3, F4, F5, I1, J3, L2, N2, O1, P1, Q1, R1, T1, U3, V1, W1, X1, Y1, Y2, Z1, AA1, AA2, AB1, AC1, AD1	2.40	3	$514	$2,573.07	1,105	$2,839.850
Total for all Facilities for 5-year Permit Term								**$4,329,985 ($4.33 million)**

[4] Note that the total for estimated number of facilities that would have new parameter(s) does not add up to 2,400 facilities. This is due to a legacy error in the NPDES eReporting Tool, EPA's online NOI system, that led to collection of incomplete subsector data.

5. Inspection-only option in lieu of benchmark monitoring

Proposed Permit Change

The NRC study recommended that EPA provide low-risk facilities with an option to have a certified inspector perform a comprehensive site inspection in lieu of the benchmark monitoring requirements (including proposed universal benchmark monitoring for pH, TSS, and COD) in the proposed 2020 MSGP. Providing an option for inspection in lieu of monitoring can reduce the burden on small, low-risk facilities while improving stormwater management.

Identifying "low-risk" facilities:

Categorizing low-risk facilities that would be eligible for an inspection-only option is somewhat challenging. The NRC Study suggested some example conditions for low pollutant discharge risk but acknowledges that EPA would need to further develop concrete and implementable criteria for determining low-risk facilities (NRC, 57). One option EPA could consider is an inspection-only option based on "light manufacturing" industrial facilities (e.g., food processing, printing and publishing, electronic and other electrical equipment manufacturing, public warehousing and storage) categorized in 40 CFR 122.26(b)(14)(xi). These facilities have a primary standard industrial classification (SIC) code of one of following: 20XX, 21XX, 22XX, 23XX, 2434, 25XX, 265X, 267X, 27XX, 283X, 285X, 30XX, 31XX (except 311X), 323X, 34XX (except 3441), 35XX, 36XX, 37XX (except 373X), 38XX, 39XX, and 4221-25 (where "X" indicates other possible digits in the SIC code, e.g., 20XX could be 2041). Light manufacturing industrial facilities are involved in the manufacturing and distribution of goods and services that typically take place indoors, as opposed to the production and handling of raw materials and chemicals, and therefore exhibit a lower risk of contributing to water quality problems via stormwater discharges. The Phase II stormwater rule brought "light industry" under the stormwater permitting regulations but continued to acknowledge the low-risk characteristics of this category of industries. See 64 FR 68722.

Frequency of Inspections:

EPA is interested in the appropriate inspection frequency for an inspection-only option. One approach could be to require eligible facilities to undergo two comprehensive site inspections conducted by a certified, professional inspector during their permit coverage instead of conducting benchmark monitoring. The first professional site inspection could be conducted within the first year of permit coverage, and the second inspection could occur in the third year of permit coverage. EPA initially considered two inspections per permit term in the cost analysis, but requests comment the appropriateness of other frequencies for this option.

Contents of the Inspection:

The inspection could include the following, or a combination thereof:

- Review the permit and the Stormwater Pollution Prevention Plan (SWPPP); include in the report a detailed description and professional opinion of whether and/or to what degree the SWPPP meets the requirements set forth in the permit;
- Review all permit-related records, including self-inspection reports; include in the report a detailed description and professional opinion of whether and/or to what degree the facility is complying with the permit and the SWPPP;
- Walk the facility site and verify that the SWPPP is accurate and that the SCMs are in place and functioning; include in the report a detailed description and professional opinion of whether and/or to what degree the SWPPP is accurate and that the SCMs are in place and functioning; and

- Identify in the report additional control measures or other actions the facility needs to take and the timeframe by which those measures or actions should be completed to effectively manage stormwater pollution.
- Consideration of the degree of exposure of industrial activities and materials at a facility.

EPA also requests comment on what follow up the Agency should require with the inspection report. EPA could consider requiring the operator to submit the original, unmodified inspection report from the professional inspector to EPA electronically within 30 days of the inspection. If after reviewing the inspection report, EPA determines that conditions at the facility indicate substantial concerns and/or recurrent problems that have remained unaddressed, or there has been a lapse in inspections, EPA could consider requiring the operator to conduct benchmark monitoring.

Professional Inspector Credentials:

The NRC Study recommended that the certified inspector be an employee of a municipal separate storm sewer system (MS4), a private third-party company, or a parent corporation, as long as the inspector is not directly involved in the day-to-day operation or oversight of the facility being inspected (NRC, 55). Because the inspection-only option would be available to eligible facilities instead of conducting benchmark monitoring, EPA wants to ensure the inspector has the appropriate credentials to evaluate the effectiveness of the facility's stormwater control measures, does not have any conflicts of interest, and will conduct an un-biased, fair inspection.

EPA currently does not have its own certification program for industrial stormwater inspections nor can the Agency officially endorse private third-party certification programs. The 2015 MSGP does require a "qualified personnel" to prepare the SWPPP and conduct facility self-inspections. In this context, a "qualified personnel" is defined as "qualified personnel are those who are knowledgeable in the principles and practices of industrial stormwater controls and pollution prevention, and who possess the education and ability to assess conditions at the industrial facility that could impact stormwater quality, and the education and ability to assess the effectiveness of stormwater controls selected and installed to meet the requirements of the permit." EPA assumes that the "qualified personnel" who prepares the SWPPP and conducts facility self-inspections is involved in the day-to-day operation of the facility, therefore this person would not be appropriate to conduct the professional inspection. EPA initially evaluated the professional inspection being conducted by a Professional Engineer (PE) in the cost analysis.

Cost Impact Discussion

EPA considered the inspection-only option using the criteria discussed above (i.e., "light manufacturing" facilities; two inspections per permit term; the inspections conducted by a PE). EPA evaluated 2015 MSGP NOI data and identified 436 facilities with SIC codes under the light manufacturing categories that would be eligible for the inspection-only option, about 18% of facilities. Based on the email communication with certified inspectors and engineers (PG, 2019a), EPA provided an approximate breakdown of hours that might be needed for a professional engineer or geologist to conduct a professional inspection described above (PG, 2019):

Table 12: Inspection hours breakdown by items (PG, 2019a)

Inspection Item	Estimated hours	Notes
Permit review	2	Focused on the understanding SWPPP requirements
SWPPP review	4	Detailed review of SWPPP
Report on SWPPP compliance with permit Requirements	4	--

Inspection Item	Estimated hours	Notes
Review permit-related records	8	The inspection hours are dependent on breadth of records to review
Updating SWPPP compliance report based on observations from records review	4	--
Site inspection (onsite SWPPP and SCM verification)	8	Estimated for one full day on site
Updating SWPPP compliance report based on observations from site inspection	4	--
Updating SWPPP compliance report to include recommendations regarding additional control measures and actions	6	--
General QA time for SWPPP compliance report draft and final	6	3 hours for internal QA to draft; 3 hours to respond to client comments
Total estimated hours to complete an inspection under the requirements of 2020 MSGP	**46**	

Using an hourly labor rate of $179.04 for professional engineers (ASCE, 2013, as updated; Deltek, 2015), two complete inspections over the permit term, and 46 hour per inspection event, the cost is approximately $16,471 per facility per permit term, about $7,181,653 ($7.18 million) for all eligible facilities over the 5-year permit term. However, EPA estimates there are a potential savings of $1,121,859.23 ($1.12 million) for the 436 facilities that are not required to do benchmark monitoring (assuming the permittees are required to do monitoring for on at minimum 3 parameters, per proposed universal benchmark monitoring for pH, TSS, and COD. Note that the inspection-only option is envisioned to be in lieu of all benchmark monitoring, but EPA used the sampling cost for these 3 parameters as they are proposed to be the minimum parameters facilities would be required to monitor for). The savings might vary from facility to facility as the number of parameters that have a benchmark monitoring requirement varies widely.

Table 13 shows the cost and benefit breakdown for the number of facilities that would require inspection under the proposed requirements.

Table 13: Cost and benefit breakdown for the number of facilities that would require inspection

Number of Facilities	436
Inspection Cost	
Cost per facility per year	$3,294.34
Cost per facility per permit term	$16,471.68
Total inspection cost over the permit term ($June 2019)	$7,181,652.48
3-parameter Sampling Savings	
Savings per facility per year	$514.61
Savings per facility per permit term	$2,573.07
Total samplings savings from all facilities	$1,121,859.23
Data Entry Savings	

Savings per facility per year - low	$22.72
Savings per facility per permit term - low	$113.62
Total data entry savings from all facilities - low	$49,539.05
Savings per facility per year -high	$76.45
Savings per facility per permit term -high	$382.25
Total data entry savings from all facilities-high	$166,659.15
Total Incremental Cost - Low ($June 2019)	$5,893,134.10
Total Incremental Cost - High ($June 2019)	$6,010,254.20

Based on the results of this analysis, EPA made a preliminary conclusion that the costs show the inspection-only option may not be a viable alternative and that benchmark monitoring may be more cost effective for operators. This is due to the relatively high labor rates of a professional inspection from a PE as compared to the sampling costs of benchmarking monitoring. EPA notes this is just one approach and requests comment on other approaches the Agency should evaluate in order to make the inspection-only option an effective alternative for low-risk facilities. See Part 4.2.1.1 of the Fact Sheet for this proposed permit for more background this request for comment.

6. Require lab results in DMR

Proposed Permit Change

EPA proposes to require facilities to include a copy of their monitoring data lab reports with the Discharge Monitoring Report (DMR). Facilities would be able to upload a copy or PDF file to NeTDMR.

2015 MSGP	Proposed 2020 MSGP
Monitoring Reports. Monitoring data must be reported using EPA's electronic NetDMR tool at www.epa.gov/netdmr, as described in Part 7.4 (unless a waiver from electronic reporting has been granted from the EPA Regional Office, in which case you may submit a paper DMR form).	**Monitoring Reports.** Monitoring data. including a copy of your lab report(s), must be reported using EPA's electronic NetDMR tool at www.epa.gov/netdmr, as described in Part 7.4 (unless a waiver from electronic reporting has been granted from the EPA Regional Office, in which case you may submit a paper DMR form).

Cost Impact Discussion

EPA assumes a negligible cost or burden for including the additional information (a copy of lab report) since the operators are already required to report their monitoring data through eReporting (NetDMR). Therefore, uploading additional information should not add a high incremental cost to the existing costs.

References:

- ASFPM. (2018). *The Costs & Benefits of Building Higher*. Retrieved from https://www.floods.org/ace-images/BenefitsCostFreeboardFlyerFinalFeb2018.pdf
- ASCE (American Society of Civil Engineers). 2013. The Engineering Income and Salary Survey. Retrieved from: https://www.asce.org/uploadedFiles/Membership_and_Communities/salary-survey-asce-asme-2013.pdf

- American Analytical Laboratories (AAL). (2016). Sampling Guide. Retrieved from http://www.american-analytical.com/wp-content/uploads/2013/06/Sampling-Guide-2016.pdf
- Bureau of Labor Statistics (BLS). (2019, March). EMPLOYER COSTS FOR EMPLOYEE COMPENSATION – MARCH 2019. Retrieved from https://www.bls.gov/news.release/pdf/ecec.pdf
- CleanWater. (2019). Oil-water separators: a price guide. Retrieved from https://cleanawater.com.au/information-centre/oil-water-separators-a-price-guide
- Deltek. 2015. Architecture and Engineering Industry Study. 36th Annual Comprehensive Report.
- Energylab. (2014). Technical services and fee schedule. Energy Laboratories Inc. Retrieved from: http://www.energylab.com/wp-content/uploads/2012/04/Technical-Services-and-Fee-Schedule.pdf
- ENR (Environmental and Natural Resources). 2019. Taiga Environmental Laboratory Price Guide. Retrieved from: https://www.enr.gov.nt.ca/en/services/taiga-environmental-laboratory/price-guide
- Enviro-Chem Laboratories. 2019. Services. Retrieved from: http://www.enviro-chem.net/content/services.
- HomeAdvisor. 2019a.*Make and Install Signs. https://www.homeadvisor.com/cost/safety-and-security/make-and-install-signs/ (accessed 07/23/2019).*
- HomeAdvisor. 2019b. *Make and Install Signs.* https://www.homeadvisor.com/cost/additions-and-remodels/install-steel-beams/ *(accessed 07/23/2019).*
- LoopNet. (2019). https://www.loopnet.com/for-lease/land/?sk=72a4467b6de978a278ae40365fe3aae2&bb=x09hlg27xlkt8kpmxR
- MDEP (Massachusetts Department of Environmental Protection). (2014). Comprehensive Cost Analysis of the 2014 Massachusetts MS4 Permit. Retrieved from https://web.wpi.edu/Pubs/E-project/Available/E-project-121714-142442/unrestricted/DEP_Final_Paper_V9.pdf
- MDOT (Maryland Department of Transportation). (2019, January). *Price Index January 2019*. Retrieved from https://www.roads.maryland.gov/ohd2/MDOTSHA_Priceindex_Jan2019.pdf
- PGD (Portable Garage Depot). (2013). *Anchors: Portable Garage Shelter Anchors, Carport Anchors*. Retrieved from https://www.portablegaragedepot.com/index.cfm?catid=505
- PG Environmental (PG). 2019a. Email communication with contractors. August 10, 2019.
- Ryan Martin. *Signage 101 – Letter Height Visibility. https://www.signs.com/blog/signage-101-letter-height-visibility/ (accessed 07/23/2019).2017.*
- ShelterLogic. (2010). Anchor Quick Guide. Retrieved from https://www.shelterlogic.com/wp-content/uploads/anchor_guide.pdf
- Tetra Tech. (2015). Cost data for MSGP benchmark monitoring. EPA Memorandum.
- USGS. (2019). Coal-Tar-Based Pavement Sealant, PAHs, and Environmental Health. Retrieved from https://www.usgs.gov/mission-areas/water-resources/science/coal-tar-based-pavement-sealcoat-pahs-and-environmental-health?qt-science_center_objects=0#qt-science_center_objects
- U.S. Department of Transportation. (2019a). *Manual on Uniform Traffic Control Devices (MUTCD) - FHWA*. Retrieved from https://mutcd.fhwa.dot.gov/
- United States Department of Transportation (USDOT). (2019b). *Chapter 2H - MUTCD 2009 Edition*. Retrieved from https://mutcd.fhwa.dot.gov/htm/2009/part2/part2h.htm

- USEPA. (2017, December). *Public Notification Requirements for Combined Sewer Overflows to the Great Lakes Basin: Supporting Documentation for the Cost and Burden Analysis*.
- USEPA. (2015, September). *Economic Analysis of the National Pollutant Discharge Elimination System (NPDES) Electronic Reporting Final Rule*. Enforcement Targeting and Data Division, office of compliance. Docket No. EPA-HQ-OECA-2009-0274.
- USEPA. (2017a). Cost Impact Analysis for the 2017 Construction General Permit (CGP). 2017 Construction General Permit (CGP).
- Weld Laboratories. 2016. Services and Pricing Guide. Retrieved from: https://weldlabs.com/electronic-services-and-pricing.pdf#10