Water Resources
Environmental Quality

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MEMORANDUM

April 5, 2017

To: Forrest Westall, Upper Neuse River Basin Association

From: S. Jay Zimmerman

Subject: Approval of Remedying Illicit Discharges Nutrient Reduction Practice

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I received the proposal entitled "Design Specifications and Nutrient Accounting for Remedying Illicit Discharges to Surface Waters or Stormwater Systems," dated February 3, 2017, for consideration as a nutrient reduction practice to support water quality restoration in the State of North Carolina. The Division acknowledges and thanks the Upper Neuse River Basin Association for serving as the proponent of this practice.

I understand that this nutrient reduction practice has been developed in consultation with independent subject matter experts and the Division's Nonpoint Source Planning Branch, was reviewed by the Nutrient Scientific Advisory Board on December 2, 2016, and received public comment from February 9, 2017 to March 13, 2017. All comments have been reconciled to the satisfaction of the Nonpoint Source Planning Branch, which has recommended this practice for approval.

I have also reviewed this proposal and find it to be satisfactory. Therefore, through the authorities delegated to me by the Governor of the State of North Carolina and provided by applicable legislation and nutrient strategy rules, I approve the use of this nutrient reduction practice for compliance with existing development stormwater rules according to the prerequisites, conditions and requirements described therein.

Cc: Linda Culpepper, DWR

Tom Fransen, DWR

Rich Gannon, DWR

Trish D'Arconte, DWR

Design Specifications and Nutrient Accounting for Remedying Illicit Discharges to Surface Waters or Stormwater Systems

Practice Description and Utility

Purpose: This chapter defines the practice of remedying illicit discharges, provides design criteria and implementation specifications, and provides nutrient credit assignments used for compliance with Nutrient Management Strategy Rules.

Applicability: This practice is developed to provide nutrient reduction credits for remedying illicit discharges towards compliance with Existing Development rules. This practice applies to any lands or activities that generate non-stormwater discharges to a surface water body or stormwater system, except allowable discharges pursuant to an NPDES permit, including those resulting from firefighting activities. Remediation actions for illicit discharges that were present during the baseline year for the applicable Nutrient Management Strategy are eligible for nutrient reduction credit as provided by this method.

Method: Remedying Illicit Discharges includes the identification, remediation, and prevention of any discharge to a surface water body or stormwater system that is not composed entirely of storm water, except allowable discharges pursuant to an NPDES permit, including those resulting from firefighting activities. Illicit discharges may occur as dry weather flow (e.g., laundry washing machines) or wet weather flow (e.g., sanitary sewer overflows caused by intrusion of stormwater or groundwater). The specific practices that are implemented to reduce or eliminate an illicit nutrient discharge to a surface water or stormwater system will vary based on the cause or source of the discharge. The most common sources typically include gray water discharges or industrial and commercial pollutant discharges. This practice does not include remedying malfunctioning onsite wastewater treatment systems or sand filter systems: these practices are credited using the methods described in their specific practice standard documents.

This practice prevents future non-stormwater discharges and associated pollutants from entering surface waters or stormwater systems and requires programs to prevent new sources of the same type. The credit is based on the reduction or elimination of nutrient loading relative to the baseline period for the applicable Nutrient Management Strategy. Implementation of this practice must comply with existing local, state, and federal laws.

Nutrient Credit Overview

Nutrient credits for remedying illicit discharges vary based on the type of discharge. The nutrient credit is specified as mass per year (lb/yr) based upon an annual estimate of flow, frequency of occurrence, and concentration. The crediting method is based on a user-derived (e.g., monitored) or default concentration, flow rate and duration, or flow volume. To account for the uncertainty associated with this practice, a default factor of safety of 20 percent is applied. Local governments may submit justification to DWR for a lower factor of safety based on site specific information and reduced uncertainty in credit estimates.

Practices to remedy illicit discharges that are installed to meet the nutrient reduction requirements of Existing Development rules shall be credited using the methods described in this document or other State-approved calculation tool.

Nutrient crediting for this practice will require site specific information relevant to the type of discharge. Three types of data are needed to derive the nitrogen and phosphorus credits. Concentrations, flow rates or volumes, and duration of the discharge may rely on default values provided in this document, site-specific monitoring data, or regional studies. The product of these data and conversion factors will yield the annual nutrient credit. The entity applying for credit will provide the site specific data, when available, estimates, and assumptions to DWR to support the credit calculations.

Relative Confidence in Credit Assignments

Remedying Illicit Discharges credit estimates are considered to have low to moderate confidence because they rely heavily upon literature values, estimated flow rates, little actual study on individual discharge types, and variable site specific conditions. In addition, default values may be based on local studies when available and on an understanding of common types of illicit discharges developed from long-term implementation of Chesapeake Bay local government programs. Due to the low to moderate confidence, a default factor of safety of 20 percent is assumed. The factor of safety may be modified based on justification by the local government with approval by DWR.

Prerequisites and Requirements

- Confirmed illicit discharge based on water quality monitoring data, visual inspection, and/or site-specific documentation, or a local IDDE (Illicit Discharge Detection and Elimination) program.
- Confirmation the remediation was successful and discharge was either eliminated or reduced
- Adoption of approved monitoring methods and quality assurance and control samples taken when site-specific data are collected including sample analyses using EPA approved analytical methods
- Justification that the illicit discharge was likely present during the baseline period for the applicable Nutrient Management Strategy
- For each type of illicit discharge for which credit is sought, a program to prevent future loads from similar sources shall be developed by the applicant and shall be in place at the time credit is awarded. Where there is an existing regulatory framework to prevent illicit discharges that shall suffice. Where these existing frameworks are not applicable or not in place, programs shall be developed and in place by the time the credit is applied for. The following are components of a required program:
    - Reference to an existing regulatory framework that specifies loading is not allowed (e.g., zoning ordinances, building codes, MS4 NPDES permit requirements)

- o Identification of likely dischargers or types of discharge sources and outreach or communications to this group regarding regulations of this discharge type and guidelines or assistance for reducing current and preventing future discharges.
- – Documentation of these programs shall be maintained for review by DWR along with project records of the load reduced or eliminated and a description of the repair or action taken. Documentation may include NPDES annual reports.
- – Additional sources of loading that were present during baseline that are uncovered as a result of the aforementioned outreach programs would be eligible for crediting following corrective action.

Nutrient Credit Estimation and Relative Confidence

A. Summary of Nutrient Load Reduction Credit Method

This section summarizes how nutrient credits are awarded towards compliance with Jordan and Falls rules. Nutrient credits are calculated based on the change in nutrient loading to the stream or stormwater system after the discharge is eliminated or reduced. The nutrient loading may be based on default or measured concentration data and flow volumes or flow rates and flow durations (Table 1). The default values provided in Table 1 for concentration are derived from the literature or from local studies. For example, the City of Durham completed a study on the wastewater generated by mobile commercial car washing operations (City of Durham 2012), and a study on HVAC coil cleaning discharges (City of Durham 2016). Confirmation that the discharge was eliminated or reduced is a requisite of the credit.

Depending on the type of discharge and method of remediation, two methods are eligible for nutrient crediting: 1) eliminated load or 2) reduced load.

I – Eliminated Load Method: This type of credit is available for illicit discharges that are eliminated when corrective actions are taken. Examples of eliminated loads include the proper discharge of laundry washwater (e.g., to the sanitary sewer system) or change in operational or maintenance practices of mobile car washing companies, floor drains, or HVAC coil cleaning service companies. The credit is the load of nitrogen and phosphorus eliminated. Measured or default concentration values for the discharge are used with an estimate of flow rate and duration (or flow volume) of the discharge to streams or storm sewer systems. The credit is based on the confirmation of the elimination of the illicit discharge via project documentation, observation evidence (photographs, videos), or monitoring data, etc.

II – Reduced Load Method: This type of credit is available for corrective actions that either reduce the frequency of sanitary sewer overflows or reduce losses from sewer systems. Crediting reduced losses from sewer systems acknowledges some unavoidable leakage or loading. It is assumed that these background levels will continue despite corrective actions taken to, for example, remove sewer blockages or slipline sewers to reduce infiltration of stormwater or groundwater. The credit for reduced loads is based on the difference in nitrogen and phosphorus loads before and after the corrective action. The concentration of nitrogen and phosphorus for the discharge may be measured or a default value may be applied, if available. The flow rate for the illicit discharge is based on a measured value, estimated from pressure tests, or estimated from other site specific information. The flow duration is estimated based on observation, reporting, or site specific information such as water quality monitoring data. The change in frequency of illicit discharges or reduction in losses may be based on engineering design of corrective actions, observational data, or reporting requirements associated with permits.

The following are examples of some of the types of discharges that are creditable under this practice, with suggested information that may be needed to calculate credits. DWR will review the information and justifications submitted with applications for credit by local governments.

Six versions of the basic equation to calculate the credit are provided below, and the information needed to support these values may vary for each illicit discharge type. A description of the type of illicit discharge and the information used to estimate the load is provided, along with suggestions as to the equation to use. Detailed examples to calculate credits are provided in Section C.

The first five equations are location- or discharger-specific, i.e., it is assumed you are calculating a load reduction from remediating discharges at a single location, or a reduction from remediating an individual discharger's practices:

Near-Continuous Discharge (NCD) – *(example: Sanitary Direct Connection)*

> Annual Load Reduction (lb/yr) $_{NCD}$ = Concentration x Average Annual Flow volume x Conversion factor x (1 - Safety Factor)

Sewer Exfiltration (SE) – *(example: Sewer Exfiltration)*

> Annual Load Reduction (lb/yr) $_{SF}$ = Concentration x (Average Annual Flow Volume Before Repair – Average Annual Flow Volume After Repair) x Attenuation Factor x Conversion factor x (1 - Safety Factor)

Frequent Localized Events (FLE) – *(example: Laundry Wash Water)*

> Annual Load Reduction (lb/yr) $_{FLE}$ = Concentration x Average Flow rate x Average Duration of Each Occurrence x Frequency of Occurrence in a Year x Conversion factor x (1 - Safety Factor)

OR

> Annual Load Reduction (lb/yr) $_{FLE}$ = Concentration x Average Volume x Frequency of Occurrence in a Year x Conversion factor x (1 - Safety Factor)

Rare Localized Events (RLE) – *(example: location-specific Wet Weather SSOs)*

> Annual Load Reduction (lb/yr) $_{RLE}$ = Concentration x (Sum of Discharge Volumes Over a Period / Period Length (yrs)) x Conversion factor x (1 – Safety Factor)

The sixth equation is for systemwide situations, where events can happen randomly in time and space across a given area, and remediating actions are area-wide. This method should only be used in cases where all discharge events of a type are known and volumes measured directly or estimated using the same method across all events. This would be recalculated every year with the most recent year's number of events.

Systemwide Events (SWE) – *(example: FOG-based dry weather SSOs)*

> Annual Load Reduction (lb/yr) $_{SWE}$ = Concentration x Average Event Discharge Volume x (Average # Annual Events Before Prevention Program – Annual # Events After Prevention Program) x Conversion factor x (1 – Safety Factor)

1. Laundry Wash water: Wash water flows that result in the discharge of wash water to surface waters or stormwater systems. This situation may involve a residence or a commercial laundry operation, and corrective actions would result in an eliminated annual load. A default value for concentration may be used, along with measured or estimated values of flow volume for the illicit discharge. Example information used for crediting this type of illicit discharge includes assumption of the total amount of wash water used based on number of machines, capacity of machines, and the number of washes per year. Interviews with building managers, home owners, or business owners may be needed to collect site specific information. Either equation for frequent, localized events may work best for the available data.

2. Mobile Vehicle Washing: Washing of vehicles that results in the discharge of wash water to surface waters or stormwater systems. Corrective actions for this source would represent an eliminated annual load. Examples of the information used for crediting this type of illicit discharge include nutrient concentrations and volume of car wash water (defaults listed in Table 1), the number of cars washed per day, and hours or days of year in operation by the business undergoing corrective action. The equation for frequent, localized events may work best for the available data.

3. Floor Drains: Floor drains that are connected to surface waters or stormwater systems. Corrective actions for this source would represent an eliminated annual load. Examples of information used for crediting this type of illicit discharge includes nutrient concentrations for the floor drain (values may be based on

monitoring data, published literature, or other data rows from Table 1 if justifiable based on the type of floor drain) and an estimate of the annual volume of water discharged to the drains. Interviews or observations of businesses may be used to determine the duration of the discharge, such as hours and operations of the business. Depending on the available information, the equation for frequent, localized events may work best, or the equation for near-continuous discharges may work best.

4. HVAC Coil Cleaning: Nutrient-based outfall screening programs may detect other illicit discharge types that can contribute high nutrient loads to local waterways. For example, the City of Durham has recently determined that washing of HVAC coils can generate high loads of nutrients depending on the surfactant type. Corrective actions for this source would represent an eliminated annual load. Examples of the types of information used for crediting this type of illicit discharge include nutrient concentrations for the coil cleaning wash water (defaults listed in Table 1 based on local data), volume of water used per service visit, and either the number of service visits per year to all sites conducted by the cleaning company, or, the number of service visits per year to the business hiring the cleaning company. The equation for frequent, localized events may work best for the available data.

5. Other Illicit Discharges: There are additional types of illicit discharges that a local government may discover that may not fall under one of the types listed above (e.g., mobile pet washing, dumpster leachate, petroleum leaks or dumping, paint, grease, cooking oil, food, concrete washout, outdoor wash areas). Depending on the situation, a corrective action may result in an eliminated or a reduced annual load. As with the other types of illicit discharges, the local government will need to provide the data, assumptions, and methods used to select representative values and calculate the credits including annual flow volume and concentrations. The applicant would need to document if this is an eliminated or reduced load and provide documentation for defining the baseline load. Depending on the available information, the equation for frequent, localized events may work best, or the equation for near-continuous discharges may work best.

6. Sanitary Direct Connection: A sanitary sewer pipe that is connected to a surface water or stormwater system, either through a cross-connection or from a straight pipe. This discharge category produces a near-continuous discharge of raw sewage into the storm sewer system or directly to a stream. Corrective action for this discharge would result in an eliminated annual load. Examples of information that may be used to calculate this credit include the annual volume of wastewater discharged, the wastewater nutrient concentrations (monitored, literature values, or defaults presented in Table 1), and the method used to arrive at these values. The equation for near-continuous localized discharges may work best for the available data.

7. Sewer Pipe Exfiltration: Untreated sewage may leak through pipe joints and cracks and migrate into adjacent storm drain pipes or into shallow groundwater. While it is expected for sewer pipes to have some small losses of sewage as a result of small cracks, joints, etc. due to standard or accepted design practices, older or damaged pipes may have exfiltration at rates higher than expected due to age and deterioration. Corrective actions for this source results in a reduced annual load. Examples of the type of information used to calculate credits for a reduced load include testing to estimate the change in estimated exfiltrated volume over an annual period and default sewage concentrations (specified in Table 1). For this type of discharge, the local government will be required to account for nutrient attenuation between the pipes in question and nearby streams or waterbodies in the calculation of the credit and provide justification for the estimated attenuation. Calculation of the attenuation factor will likely require modeling and/or dye testing. The equation for sewer exfiltration may work best for the available data.

8. Dry Weather Sanitary Sewer Overflows (SSOs): A sanitary sewer overflow that occurs during dry weather periods as a function of either a blockage (e.g., from fats, oil, and grease (FOG)) or failure of the sanitary sewer system. Corrective actions for dry weather SSOs may result in an eliminated annual load or a reduced annual load, depending on site specific conditions (i.e., a corrective action may reduce the frequency of SSOs each year or completely eliminate them). Where this is a systemwide problem, such as clogs from fats, oils, and grease, the calculation may be based on the change in the number of events before and after the prevention program, and the average event discharge volume. Systemwide credits may be revised annually based on these reductions. Since SSO events due to a localized problem (such as site-specific damage or defects) tend to happen less than annually, average annual volume may be calculated by the total volume over a period of years divided by the period of years with those events (equation for rare, localized events). Examples of information needed to calculate credits include the volume of wastewater released to streams or the storm sewer system and the nutrient concentrations of the wastewater (monitored, literature values, or defaults presented in Table 1).

9. Wet Weather SSOs: A sanitary sewer overflow due to the entry of stormwater or groundwater into the sanitary sewer system that overwhelms the system (i.e., overflows at manholes or other points in the system). Repairing pipes to reduce infiltration and inflow (I and I) of stormwater or groundwater into the sanitary sewer system may result in a reduced annual load or an eliminated annual load, depending on the action. Concentrations of wet weather SSOs may be estimated from the assumed ratio of wastewater to stormwater and concentrations reported in the literature for these sources (Table 1), or monitoring data when available. If overflows are related to specific locations with I&I problems or other system defects, the calculation would be handled with the equation for rare, localized events. If overflows are not as clearly localized, and remediation is systemwide, the equation for systemwide events will work better.

Table 1. Types of Illicit Discharges Eligible for Nutrient Credits and Default Data that May Be Used to Estimate Credits

Type of Discharge	Crediting Method	Default Concentration[1] (mg/L)	Default Flow[1]	Information Source
Laundry wash water and rinse water	Eliminated Load	TN: 7.2 TP: 0.3	Business or site specific information is needed to estimate flow.	National Association of Plumbing-Heating-Cooling Contractors (1992), Howard (2005), Schueler et al. (2014)[2]
Mobile Car Wash	Eliminated Load	TN: 15.9 TP: 2.7	May assume 5.3 gallons per car washed combined with business specific information such as number of cars washed per day	City of Durham (2012)
Floor Drain	Eliminated Load	Depends on site specific conditions; data from other rows may be used to extrapolate if justifiable	Depends on site specific conditions; data from other rows may be used to extrapolate if justifiable	Schueler et al. (2014)
HVAC Coil Cleaning	Eliminated Load	TN: 68.2 TP: 2.6	Business or site specific information is needed to estimate flow	City of Durham (2016)[3]
Other Illicit Discharge (e.g., dumpster leachate, outdoor wash areas)	Reduced or Eliminated Load	Depends on site specific conditions; data from other rows may be used to extrapolate based if justifiable; literature values may also be applied	Depends on site specific conditions; data from other rows may be used to extrapolate based on what the floor drains; literature values may also be applied if justifiable	Schueler et al. (2014)
Sanitary Direct Connection	Eliminated Load	TN: 33 TP: 6.0	60 gallons per capita per day	EPA 2004
Sewage Exfiltration (Sewer leak, break)	Reduced Load	TN: 33 TP: 6.0	Site specific or local programmatic information is needed to estimate flow	EPA 2004
Dry Weather SSO	Reduced or Eliminated Load	TN: 33 TP: 6.0	Site specific or local programmatic information is needed to estimate flow	EPA 2004
Wet Weather SSO	Reduced or Eliminated Load	Estimate based on concentrations for wastewater (33 mg-N/L and 6.0 mg-P/L) and	Site specific or local programmatic information is needed to estimate flow	EPA 2004

Type of Discharge	Crediting Method	Default Concentration[1] (mg/L)	Default Flow[1]	Information Source
		stormwater runoff (1.4 mg-N/L and 0.27 mg-P/L), and relative amounts of the two sources; in the absence of information assume a SSO is 1/3 wastewater and 2/3 stormwater		

[1]Site specific data and information may also be used to calculate credits when available.
[2]For total nitrogen, assumed average of values reported by National Association of Plumbing-Heating-Cooling Contractors (1992) and Howard (2005) for the wash cycle and the values reported by Schueler et al (2014) for drinking water for the rinse cycle. For total phosphorus in the absence of data following phosphate detergent bans, assume value reported by Schueler (2014) for drinking water for both the wash and rinse cycle.
[3]The ranges for total nitrogen concentrations are 24 - 123 mg-N/L and total phosphorus are 0.9 – 5.2 mg-P/L

Table 1 provides default concentrations for many of the different types of discharges. Measured values for any of the data requirements is always an option but shall be collected using approved methods and with appropriate quality assurance and control methods employed. The applicant should meet with DWR to discuss the monitoring plan for the determination of credits. The types of discharge may vary in the nature of the flow patterns, where the flow may be intermittent or continuous throughout the day. The pattern of flow needs to be taken into consideration when estimating or measuring the average daily flow.

The default factor of safety applied to the credit for this practice is 20 percent. This factor of safety acknowledges that site specific conditions may vary from the default concentrations and flow estimates used in credit calculation. This practice requires documentation of all assumptions, data, and methods used to calculate credits. Where uncertainty in credit estimates is reduced due to the collection of site specific data and justification, the local government may petition DWR for a lower factor of safety. DWR may require a higher factor of safety where data quality is lower.

B. Reductions Obtained with Practice

The credits associated with removal of illicit discharges will be highly variable depending on the type of discharge, flow volume or flow rates, duration, and concentrations. The range of reductions in nutrient loads associated with remedying illicit discharges depends on the type of discharge and corrective action.

C. Remedying Illicit Discharge Example Calculations

The following are examples of how to calculate the nutrient load reduction credits for remedying illicit discharge for the two categories of illicit discharges: eliminated load and reduced load. See the equations in Section B for how to calculate annual load reductions based on the type of discharge and available data. For each type discharge listed in Table 1, different types of information may be available to estimate the nutrient concentrations and flow volumes used to calculate the credits.

<u>Example of an Eliminated Load for Laundry Wash water</u>
Wash water from a commercial laundry facility was found to be piped to the stormwater system rather than the sanitary sewer system. The facility was constructed before the baseline year of the applicable rules and includes 20 washing machines with a 5 cubic foot capacity. A corrective action has been initiated to properly dispose of the wash water into the sanitary sewers. Observations confirm the discharge has been eliminated. The local government applying for the credit has chosen to assume the default nutrient concentrations for laundry wash water listed in Table 1 (wash cycle: 12.7 mg-N/L and 0.3 mg-P/L and rinse cycle: 1.7 mg-N/L and 0.3 mg-P/L). On average, each washer is used 4 times per day with two cycles (wash and rinse). To calculate the credit, multiply the number of machines, the capacity of the machines, the number of cycles, the number of washes per day, the average nutrient concentrations, conversion factors, and factor of safety:

Nitrogen Credit (lb-N/yr) = 20 machines * 5 ft^3/machine * 4 washes/day * 2 cycles/wash * 365 days/year * 7.2 mg-N/L * 28.317 L/ft^3 * 1 lb/453.6 g * 1 g/1000 mg * (1 – 20% FOS) = 105 lb-N/yr

Phosphorus Credit (lb-P/yr) = 20 machines * 5 ft^3/machine * 4 washes/day * 2 cycles/wash * 365 days/year * 0.3 mg-P/L * 28.317 L/ft^3 * 1 lb/453.6 g * 1 g/1000 mg * (1 – 20% FOS) = 4.4 lb-P/yr

<u>Example of a Reduced Load for Sewage Exfiltration</u>
A local government used pressure testing to determine that approximately 5,000 gallons per day of sewage was being lost from a section of the system that was old and deteriorated. The pipe was sliplined and retested to determine the post-action losses had been reduced to 500 gallons per day. The local government used dye testing to determine that approximately 25 percent of the loading from this loss reaches nearby surface waters. The local government has chosen to assume the default nutrient concentrations for wastewater listed in Table 1 (33 mg-N/L and 6 mg-P/L). To calculate the credits for this action, multiply the change in loss rate (5000 to 500 gallons per day, or a reduction in flow of 4500 gallons per day), the number of days per year, the nutrient concentrations of wastewater, the amount of wastewater reaching the stream, conversion factors, and factor of safety:

Nitrogen Credit (lb-N/yr) = 4500 gallons per day * 365 days/year * 33 mg-N/L * 28.317 L/ft^3 * 1 lb/453.6 g * 1 g/1000 mg * 25% * (1 – 20% FOS) = 677 lb-N/yr

Phosphorus Credit (lb-P/yr) = 4500 gallons per day * 365 days/year * 6 mg-P/L * 28.317 L/ft^3 * 1 lb/453.6 g * 1 g/1000 mg * 25 % * (1 – 20% FOS) = 123 lb-P/yr

D. Relative Confidence in Credit Estimates

Overall, relative confidence in the reductions estimated for the practice is low to moderate. To evaluate relative confidence in the measure's estimated reduction, Division staff considered a range of factors outlined in the document "*DWR Approval Process for Alternative Nutrient Load-Reducing Measures.*"

The factors contributing to confidence for this measure include national studies of processes for the reduction or elimination of loading from illicit discharges, opportunities for direct measurement, availability of local data, and a factor of safety of 20 percent. The factors that moderate confidence include heavy reliance on literature values from areas outside of NC, the small number of available studies for any given discharge type, and the highly variable nature of illicit discharges in terms of the types, sources, and site specific conditions. As more data is collected through the crediting process and additional local and regional studies, confidence in load reductions will increase. While the default factor of safety is 20 percent, poor data quality or quantity may call for a higher factor of safety, or the local government applying for credit may petition DWR for a lower factor of safety based on site specific data or other circumstances that increase the certainty of the credits.

The methods used to estimate the reduction or elimination in nutrient loading associated with illicit discharges are based on estimates or measurements of nutrient concentration, flowrate and duration, or flow volume. Four national studies including the Chesapeake Bay *Recommendations of the Expert Panel to Define Removal Rates for the Elimination of Discovered Nutrient Discharges from Grey Infrastructure Final Approved Report* available online at http://chesapeakestormwater.net/bay-stormwater/urban-stormwater-workgroup/illicit-discharge-detection/) and two local studies form the basis for this credit and the default values for concentration and flow for the various discharge types. Site specific data and information should be used to confirm the illicit discharge, estimate flow and duration, and confirm the reductions or elimination of the discharge following remediation.

Crediting for this practice is applicable to areas under a Nutrient Management Strategy for non-stormwater discharges that were likely occurring during or before the baseline year of the Strategy. This practice does not apply to remedying malfunctioning onsite wastewater treatment systems or sand filter systems which are credited using the methods described in their respective practice standards.

Co-Benefits

In the case of remedying illicit discharges, additional benefits may include reducing other pollutants including metals, Total Suspended Solids (TSS), biological oxygen demand and pathogens. This practice may also reduce exposure of humans and other animals to untreated wastewater due to system backups and other types of failures.

References

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