

# **Draft Guidance for Future NPDES Permitting of Combined Sewer Systems**

## Disclaimer

The Clean Water Act and implementing regulations contain legally binding requirements. This Guidance document does not impose any new legally binding requirements on EPA, states, or the regulated community. Further, this Guidance document does not confer legal rights or impose legal obligations on any member of the public. In the event of a conflict between the discussion in this Guidance document and any statute or regulation, the statute and regulations are controlling.

The general descriptions and recommendations provided herein may not apply to particular situations based upon the circumstances. EPA and other decisionmakers retain the discretion to adopt or recommend approaches on a case-by-case basis that differ from those described in this Guidance document, where appropriate.

## 1 BACKGROUND

The 1994 Combined Sewer Overflow Control Policy (CSO Policy) describes the first two phases of National Pollutant Discharge Elimination System (NPDES) permitting for CSO communities.<sup>1</sup> Phase I CSO permits should require CSO permittees to implement the Nine Minimum Controls (NMC) (59 Fed. Reg. 18691.II.B) and develop and submit a long-term control plan (LTCP) to the NPDES permitting authority that includes selected controls necessary to meet Clean Water Act (CWA) requirements (59 Fed. Reg. 18691.II.C). Phase II CSO permits should require implementation of the LTCP, in addition to continuing to implement the NMCs (59 Fed. Reg. 18696.IV.B.2).

The CSO Policy was developed with extensive stakeholder engagement (59 Fed. Reg. 18688) and, among other things, importantly details two key objectives for CSO communities. First, it provides discrete design targets to help communities begin the process of reducing and eliminating CSOs. Second, it articulates the long-term goal to establish a clear pathway for permittees to come into compliance with requirements of the CWA, including NPDES permitting requirements for meeting applicable Water Quality Standards (WQS) (59 Fed. Reg. at 18688, 18695, and 18696). In the Wet Weather Water Quality Act of 2000, Congress added Section 402(q) to the CWA to provide that each permit, order, or decree issued after December 21, 2000, for a discharge from a municipal combined storm and sanitary sewer shall conform to the 1994 Combined Sewer Overflow Control Policy (33 U.S.C. § 1342(q)(1)).

Since its issuance, communities nationwide have made substantial progress toward the goals established in the CSO Policy. EPA estimates that over 95% of CSO communities have developed and are implementing LTCPs and substantially reducing the number of CSOs, while nearly 20% have fully separated their systems.<sup>2</sup> During this same time, many factors that influence how communities address CSOs have evolved. Cities have seen population growth, urbanization with accompanying increases in impervious surfaces, and aging of combined sewer systems (CSS) infrastructure. Climate change is impacting precipitation patterns and storm intensity and frequency and further affecting existing and planned CSS infrastructure. Conversely, the increased use of green infrastructure<sup>3</sup> and other source control efforts (e.g., street sweeping) have helped to mitigate stormwater runoff and reduce pollutant loadings in receiving waterbodies. In addition to these factors, some communities with CSSs are also increasingly working to address the disproportionate environmental impacts underserved communities are facing by better taking these impacts into account through actions, such as permitting decisions and infrastructure planning.

Recognizing these ongoing changes and to aid communities addressing multiple municipal CWA requirements, including those with CSSs, in 2012, EPA developed an Integrated Planning Framework that clarifies CWA flexibilities and offers a voluntary opportunity for a municipality to prioritize and sequence, where appropriate, those infrastructure projects that provide the greatest or fastest environmental and public health benefits. In 2019, the Water Infrastructure Improvement Act (H.R. 7279) amended the CWA to add Section 402(s) that defines an Integrated Plan as one developed in accordance with the 2012 Integrated Municipal Stormwater and

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<sup>1</sup> The term "CSO permit" used throughout this document refers to an NPDES permit for CSO communities. As the CSO Policy and this guidance are implemented, there will be different ways NPDES permits are evaluated. Unless otherwise stated, the use of the term "next permit" is used throughout this Guidance as a short-hand term to cover modified, amended, reissued, and new permits, where appropriate.

<sup>2</sup> A combined sewer system is considered fully separated when sanitary wastewater and stormwater are collected in separate pipes and all previous CSO outfalls have been sealed or repurposed as stormwater outfalls.

<sup>3</sup> Green infrastructure is the range of measures that use plant or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspire stormwater and reduce flows to sewer systems or to surface waters (33 U.S.C. § 1362(27)).

Wastewater Planning Approach Framework; and requires EPA to inform municipalities of the opportunity to develop an Integrated Plan that may inform permit terms and conditions to help meet their existing CWA obligations (33 U.S.C. § 1342(s)). These amendments clarified that municipalities may develop an Integrated Plan as defined under the CWA and the permitting authority may develop NPDES permit terms and conditions informed by that plan.

As communities continue working to meet the requirements in their CSO permits, and in recognition of the changing environmental conditions and additional policy considerations, EPA is issuing this Guidance to clarify and inform future CSO permitting actions for CSO communities once they have completed construction of CSO controls and demonstrated that they are achieving the performance objectives outlined in their LTCPs.<sup>4</sup> This Guidance discusses the options that permitted CSO communities, permitting authorities, and the public may consider when the permitting authority develops future CSO permits in accordance with the requirements and flexibilities of the CWA.

This Guidance is primarily intended to apply when CSO communities are nearing completion of the projects and activities identified in their LTCPs. EPA recommends CSO communities allow for adequate time for monitoring, assessing, and planning by beginning the process outlined in this Guidance several years before completing the projects and activities in their LTCPs. EPA recognizes that there may be some communities that have already completed the projects identified in their LTCPs and have not yet assessed whether their system meets or exceeds the performance objectives in their LTCP and if the remaining discharges are continuing to contribute to an exceedance of WQS.<sup>5</sup> Other communities may have already demonstrated that the remaining CSO discharges are contributing to such exceedances. This Guidance is also applicable for these communities. CSO communities can benefit from coordination with their permitting authority and the public about appropriate permitting terms and conditions while they complete the monitoring, assessment, and planning steps described in the CSO Policy (59 Fed. Reg. 18694.II.C.9) and this Guidance.

## 2 MONITORING TO INFORM NEXT STEPS

The NMC serve as the minimum technology-based effluent limits (TBELs) for all CSO permittees (59 Fed. Reg. 18691.II.B). As provided in the CSO Policy, all CSO permittees should have been required by their CSO permits to implement the NMC by January 1, 1997 (59 Fed. Reg. 18691–II.B). CSO permits should continue to require implementation of the NMC.<sup>6</sup> The CSO Policy also contains provisions for CSO permits to include any additional technology-based and water quality-based controls to meet water quality-based requirements, including the development and implementation of an LTCP. There are nine elements of an LTCP from characterization to

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<sup>4</sup> If initial CSO controls do not meet WQS, the permitting authority may require the development, submittal, and implementation of a revised LTCP which contains additional controls to meet WQS. (59 Fed. Reg. 18696.IV.B.2.g.)

<sup>5</sup> NPDES permits must include requirements necessary to meet or implement water quality standards established under Section 303 of the CWA (CWA Section 301(b)(1)(C), 33 U.S.C. § 1311(b)(1)(C); 40 CFR § 122.44(d)(1)). In designating WQS for a waterbody, WQS are required to protect both that waterbody, in addition to waters downstream of that waterbody (40 CFR § 131.10(b)). These types of permit requirements “must control all pollutants or pollutant parameters,” like from CSO discharges, that a permitting authority “determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard” (40 CFR § 122.44(d)(1)(i)). Where CSO discharges cause or contribute to an exceedance of applicable WQS, CSO dischargers are required to attain WQS through the water-quality based effluent limits in NPDES permits, in accordance with the CWA and EPA’s implementing regulations (CWA Section 301(b)(1)(C), 33 U.S.C. § 1311(b)(1)(C)). As a short-hand reference, “contribute to an exceedance of WQS” means compliance with the permittee’s CSO obligations that are necessary to meet or implement WQS as required by Section 301(b)(1)(C) of the CWA, 33 U.S.C. § 1311(b)(1)(C).

<sup>6</sup> EPA’s [Combined Sewer Overflow Nine Minimum Controls Guidance](#) outlines the expectations for these controls in more detail.

analysis to monitoring (59 Fed. Reg. 18691–94.II.C.1 through 9). Phase II CSO permits should require implementation of the LTCP that typically includes construction of the selected CSO controls over multiple permit terms. During construction and upon completion of the selected CSO controls, permittees are expected to conduct Post Construction Compliance Monitoring (PCCM).

PCCM is the ninth element of the LTCP (59 Fed. Reg. 18694.II.C.9) and should be part of a Phase II CSO permit (59 Fed. Reg. 18696.IV.B.2.d). PCCM should be conducted by all CSO permittees including those using the “demonstration” or “presumption” approach, those that began planning and implementing CSO controls before the CSO Policy was finalized (59 Fed. Reg. 18690.I.C.1), those that had substantially developed or were implementing a CSO control program pursuant to an existing permit or enforcement order (59 Fed. Reg. 18690.I.C.2), and those that have separated their systems.<sup>7</sup> The PCCM program should be adequate to:

- Verify compliance with WQS; and
- Ascertain the effectiveness of CSO controls (59 Fed. Reg. 18692.II.C.4.a(i), (ii), (iii), and II.C.4.b).

The PCCM program should detail the monitoring protocols, such as necessary effluent and receiving water monitoring, and, where appropriate, other monitoring protocols, such as biological assessments, whole effluent toxicity testing, and sediment sampling.<sup>8</sup>

In accordance with the CSO Policy (59 Fed. Reg. 18696.IV.B.2.d and g) and CWA Section 402(q), PCCM in Phase II CSO permits should, at a minimum, contain the following:

- A requirement to implement, with an established schedule, the PCCM program<sup>9</sup> including requirements to monitor and collect sufficient information to demonstrate whether the remaining CSO discharges are contributing to an exceedance of WQS, and to determine the effectiveness of CSO controls; and
- A reopener clause authorizing the permitting authority to reopen and modify the permit if it is determined that the CSO controls are contributing to an exceedance of WQS.

Where CSO Phase II permits do not already contain these permit conditions, the permitting authority should add them through a permit modification or in the next CSO permit, as appropriate.

### 3 PLANNING FOR FUTURE CSO PERMITS

After conducting PCCM, if a community discovers that its CSO controls are not achieving the performance objectives to which it has committed in its LTCP, the permitting authority should include additional requirements in the next permit reissuance with the terms and conditions necessary to ensure that the performance objectives associated with the LTCP are achieved.<sup>10</sup>

In the instance where PCCM documents that a community has achieved both the performance objectives to which they committed in their LTCP and that any remaining CSO discharges are not contributing to an

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<sup>7</sup> PCCM should also be conducted for CSSs that have undergone sewer separation to confirm separation was successful and complete. NPDES permitting authorities should verify any remaining discharges are stormwater only or that outfalls are closed and not causing sanitary sewer overflows. Consideration should also be given to whether stormwater only discharges need to receive coverage under an applicable MS4 permit.

<sup>8</sup> For additional tools and resources on PCCM, [see CSO Post Construction Compliance Monitoring Guidance \(2012\)](#) and the [Post Construction Compliance Monitoring Checklist \(2022\)](#).

<sup>9</sup> If the PCCM has not been submitted as part of the LTCP or needs to be revised, the Phase II permit should require submittal of a PCCM program for approval.

<sup>10</sup> Where appropriate, a permitting authority should conduct an analysis to demonstrate compliance with CWA 402(o), CWA Section 303(d)(4), and 40 CFR 122.44(l).

exceedance of WQS, the permitting authority should ensure the next CSO permit accounts for these conditions. In this case, the permit should include monitoring, reporting, effluent limitations, and performance standards to ensure that CSO controls continue to meet:

- The NMCs and any other technology-based controls the permitting authority deems appropriate;
- The design and performance criteria that are specified in the LTCP; and
- All water quality-based effluent limits as necessary to continue meeting WQS.

In addition to a reissued permit, communities should plan for robust asset management and operation and maintenance programs, ongoing stakeholder engagement and communication regarding system performance and future investments, and the impacts of climate change on annual precipitation and storm intensity, including those impacts on overburdened communities.

EPA anticipates, however, that after conducting PCCM, many CSO communities will find that the remaining discharges are still contributing to an exceedance of WQS, even in instances when PCCM demonstrates that the implemented CSO controls are achieving the performance objectives outlined in their LTCPs. In this instance, when a community has demonstrated they are achieving the performance objectives outlined in their LTCP but the CSO discharges are contributing to an exceedance of WQS, there are several options available to the community that the permitting authority may incorporate into the next permit. First, in some instances, additional CSO controls may be the most appropriate option for the waterbody to meet WQS. In such instances, the community may choose to expand or retrofit the completed CSO controls as necessary to further reduce loadings and facilitate the waterbody's ability to meet WQS (59 Fed. Reg. 18691.II.C). Second, where appropriate, states may consider adopting new or revised WQS, in accordance with EPA's Financial Capability Analysis Guidance,<sup>11</sup> to better reflect the highest attainable water quality conditions achievable following the completion of the projects identified in CSO communities' LTCPs (59 Fed. Reg. 18694.III).

Third, in addition to the aforementioned options identified in the CSO Policy, communities may choose to develop an Integrated Plan that addresses discharges other than, or in addition to, the remaining CSO discharges when these other discharges are also contributing to exceedances of WQS. As authorized in CWA Section 402(s), when an Integrated Plan demonstrates through documented analyses that an effort to prioritize controlling a broader suite of discharges will yield more water quality improvements than only addressing CSO discharges through additional CSO control projects, the community may propose to prioritize addressing other discharges first. The Integrated Plan can then inform the permitting process and support the development of conditions and requirements in permits. For more information about Integrated Plans, see Part 4 of this Guidance below.

Future analyses and permits implementing LTCPs and Integrated Plans should include consideration of the following:

- Transparent and robust public engagement, as detailed in both the CSO Policy and Integrated Planning Framework;
- Evaluation of any disproportionate impacts to underserved areas after initial capital projects are completed (e.g., locations of active CSOs, prevalence of basement backups) and identification of approaches to remedy the identified disparities;

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<sup>11</sup> The assessment of the community's financial capability should take into consideration current sewer rates, stormwater fees and other revenue, planned rate or fee increases, and the costs, schedules, anticipated financial impacts to the community of other planned stormwater or wastewater expenditures and other relevant factors impacting the utility's rate base. See [EPA's Clean Water Act Financial Capability Assessment Guidance \(2023\)](#).

- Assessment of the impacts of projected changes in precipitation patterns and/or sea level rise due to climate change on current and future infrastructure, including measures needed to maintain the achieved performance objectives of the LTCP as precipitation patterns change;
- Opportunities to enhance climate resiliency through green infrastructure investments, smart sewer technology, and proactive asset management approaches; and
- Reevaluation of the impacts of remaining CSO discharges on sensitive areas (see CSO Control Policy, 59 Fed. Reg. 18692.II.C.3).

When developing future CSO permits, permitting authorities, in coordination with the community, should evaluate the temporary or long-term water quality impacts of any remaining CSO discharges. When remaining CSO discharges contribute to a waterbody’s inability to meet WQS, the CSO Policy identifies three potential approaches: schedules of compliance, WQS variances, and designated use changes (see CSO Control Policy, 59 Fed. Reg. 18694—5.III). Where appropriate, a schedule of compliance can be included in a permit with an enforceable sequence of interim effluent requirements that can lead to compliance with the CWA and implementing regulations (see 40 CFR §§ 122.2, 122.47(a)).<sup>12</sup> Where the applicable designated use is not attainable for a period of time, CSO communities can work with their state to evaluate whether a WQS variance, with EPA approval, is appropriate to allow for incremental water quality improvements (40 CFR § 131.3(o); 40 CFR § 131.14).<sup>13</sup> There may be other cases where a CSO community can work with its state and EPA to evaluate whether data are sufficient to demonstrate that a revised temporal designated use or criterion (referred to as a “partial use” in the CSO Policy) is appropriate, in accordance with the CWA and EPA’s implementing WQS regulations (40 CFR § 131.10; 40 CFR § 131.11).<sup>14</sup> Existing planning documents and supporting analyses (including an Integrated Plan or revised LTCP) may be used to support evaluation of the potential for schedules of compliance, WQS variances, or a temporal designated use.

#### 4 INTEGRATED PLANNING FOR COMBINED SEWER SYSTEMS

As with the CSO Policy, one of the objectives of Integrated Planning is to help communities achieve compliance with WQS.<sup>15</sup> Rather than focusing on each type of discharge individually, Integrated Planning can help a community identify and consider all applicable CWA requirements holistically to address the highest-priority discharges first to meet water quality goals. A community should identify and characterize its existing and future municipal CWA requirements from permits, total maximum daily loads (TMDLs), and waste load allocations (WLAs), to inform future permit limits, or requirements of enforcement orders or consent decrees. Integrated Planning can cover CSSs, separate sewer systems, publicly owned treatment works (POTWs), and municipal separate stormwater sewer systems (MS4s), among other types of stormwater and wastewater discharges.<sup>16</sup> In an Integrated Plan, communities can consider the CWA requirements for all these systems together: for

<sup>12</sup> For more information on permit compliance schedules, refer to [Compliance Schedules for Water-Quality Based Effluent Limitations in NPDES Permits \(2007\)](#).

<sup>13</sup> A WQS variance is designed to allow the permittee time to achieve incremental improvements in WQS, by, for example, implementing different levels and/or types of CSO controls for the waterbody or waterbody segment covered by the WQS variance. Any limitations and requirements necessary to implement the WQS variance shall be included as enforceable conditions of the NPDES permit (40 CFR § 131.14(c)). See EPA’s [WQS Variance webpage](#) for additional information.

<sup>14</sup> EPA has prepared additional guidance on designated use changes, available here: [Use Attainability Analysis \(UAA\)](#).

<sup>15</sup> See Clean Water Act 33 U.S.C. § 1342(s)(5)(A). Choosing to develop an Integrated Plan does not affect a community’s obligations to comply with the CWA, including meeting existing regulatory and permitting requirements.

<sup>16</sup> See Clean Water Act 33 U.S.C. § 1342(s)(3)(A). Communities developing plans to meet multiple municipal CWA permitting obligations could consider water quality trading, watershed-based permits, total maximum daily loads, and other permitting flexibilities or market-based approaches, as approved by the permitting authority, to meet permit requirements derived from applicable WQS.

example, stormwater control measures, POTW and CSO water quality goals, or combined sewer or separate sanitary sewer overflows, as well as actions that provide additional water quality benefits (See Clean Water Act 33 U.S.C. § 1342(s) and the Integrated Planning Framework).

While Integrated Plans may be used in different ways to support water quality objectives,<sup>17</sup> this Guidance is focused on CSO communities using Integrated Planning after they have demonstrated they are meeting the performance objectives of the CSO controls from their LTCP but the remaining CSO discharges are still contributing to an exceedance of WQS. EPA recommends that the following factors are in place before a permit incorporates terms and conditions based upon an Integrated Plan in lieu of a CSO community only working with its permitting authority to update its LTCP.

1. PCCM should demonstrate that the community is or will be achieving the performance objectives to which it committed in its LTCP upon the completion of the planned CSO projects.
2. Quantified water quality modeling should demonstrate that the sequencing of projects identified in the Integrated Plan would provide greater environmental and public health benefits (e.g., increased number of days of primary contact recreation) than an equivalent investment in additional CSO reductions only (e.g., volume, frequency of discharges).
3. The permitting authority, in coordination with the community, should identify specific projects and performance metrics derived from the Integrated Plan that can be incorporated into the next CSO permit.

The Integrated Plan should clearly state the applicable water quality objectives and anticipated outcomes to support meeting water quality and compliance objectives. Similar to LTCP development, in an Integrated Plan a community should also identify sensitive environmental areas such as waterbodies that provide drinking water, waters that allow swimming, national heritage sites, wildlife areas, and water with critical habitat (e.g., wetlands, natural habitat) to ensure that these areas are protected and enhanced wherever possible. Community members may also be interested in protecting other valuable public spaces (e.g., trails, parks) and recreation areas. A municipality's planning, parks, transportation, health, and other relevant departments could have valuable sources of information on environmental sensitivity—such as source water protection plans, wetlands maps, and open space plans—that can be used as part of an Integrated Planning process. Additionally, the permittee should identify low-income and overburdened parts of the community early in the planning process to mitigate impacts during project selection and when determining how to finance Integrated Planning projects. Furthermore, communities should directly engage with residents of those communities to help them get involved early in the planning process and ensure they have the same protection from environmental and health hazards as other communities.

Where appropriate, the permitting authority can base permit conditions on projects identified in the Integrated Plan, which may incorporate stormwater controls in addition to, or instead of, CSO controls where shown to more effectively make water quality improvements to achieve WQS (33 U.S.C. § 1342(s)(3)). Although EPA recognizes that the projects in an Integrated Plan may need to be sequenced across multiple permit terms, the permitting authority should document all specific projects and milestones that are necessary to achieve WQS

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<sup>17</sup> Some communities have used Integrated Planning to seek modifications to existing CSO consent orders or permits when they have identified projects that can provide greater water quality benefits or equivalent water quality benefits but with broader environmental and community benefits than those in the original enforceable mechanisms (see [Integrated Planning in Action](#) for examples). The Integrated Planning pathway discussed in this Guidance is not intended to cover those types of situations. Instead, this Guidance is intended for communities that have achieved the performance objectives to which they have committed in their LTCPs and are planning to use an Integrated Plan to address remaining water quality needs after implementation of initial CSO controls.



through the appropriate mechanism – permit compliance schedule, enforcement compliance schedule, or WQS variance. Additionally, the permit should include monitoring and reporting requirements that give the permitting authority and the public increased certainty that the projects are progressing as planned and achieving the anticipated water quality benefits. This could include producing annual progress reports and monitoring water quality parameters.

Integrated planning is a joint effort between the community and the permitting authority. It provides an opportunity for the community to develop an alternative pathway to meet WQS. Since Integrated Planning is voluntary, the opportunity to develop an Integrated Plan rests with the community. The permitting authority, per Section 402(s) of the CWA, may integrate projected outcomes from the Integrated Plan as permit terms and conditions. Permit conditions should be discrete and measurable, and the permit should incorporate monitoring to demonstrate adequate progress toward achieving the intended water quality outcomes.

Because both the community and permitting authority are involved in the Integrated Planning process, EPA recommends that the community begin coordinating with the permitting authority early in the process of developing the Integrated Plan to ensure that the Integrated Plan provides sufficient detail about water quality improvements to allow for the development of appropriate permit terms and conditions. Through this early coordination, communities and permitting authorities may also choose to evaluate a potential WQS variance or temporal use change. A cornerstone of Integrated Planning, as with CSO LTCP development, is active and effective community engagement and collaboration to identify the water quality, public health, and broader environmental and community goals. As part of this process, the community should have a financial strategy and capability assessment that ensures investments will be sufficiently funded, operated, maintained, and replaced over time.

## 5 ENSURING EQUITY AND CLIMATE RESILIENCY IN CSO COMMUNITIES

Permitting authorities and CSO permittees should consider the impacts of climate change on the performance of existing and future systems and the implications that remaining CSOs and future infrastructure investments may have for communities that are underserved or overburdened. EPA recommends that permitting authorities ensure that these project analyses are clearly documented in infrastructure plans (e.g., LTCPs, Integrated Plans) and WQS revision packages and incorporate any necessary provisions in the next permit and fact sheet.

### 5.1 CONSIDER EQUITY IN CURRENT AND FUTURE INFRASTRUCTURE PLANNING AND PROJECTS

EPA recommends that communities and permitting authorities continue to identify and evaluate remaining CSO outfall locations and discharges against certain socioeconomic indicators by screening for areas of potential concern and, where appropriate, conducting an environmental justice analysis. From a preliminary analysis, EPA estimates that more than 65% of active CSO outfalls are in Census block groups that are at or above the 80<sup>th</sup> percentile for at least one of eight demographic indicators in EJScreen.<sup>18</sup> Impacts vary widely across the country and disparities need to be assessed locally. However, generally, disproportionate impacts can exist if CSO outfalls are more frequently located in Census block groups where any of the socioeconomic indicators are at or above the 80<sup>th</sup> percentile.

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<sup>18</sup> [EJScreen](#) uses eight demographic indicators to screen for areas of potential concern at the block group level. These indicators include people of color, low income, population under age 5, population over age 64, linguistically isolated, less than high school education, unemployment, and the demographic index (average of the percent people of color and percent low-income populations). EJScreen uses percentiles as a way to compare how the demographics in one Census block group compares to the rest of state and U.S. The methodology in EJScreen flags percentiles at or above the 80<sup>th</sup> percentile as areas of potential concern.

When assessing future wet weather projects, EPA recommends that communities and permitting authorities consider:

- Socioeconomic factors of the CSO community as a whole and specifically for Census block groups where CSO outfalls are located;
- Compliance history and discharge data of CSOs – frequency, duration, and volume of overflow events, pollutant loadings from discharges, especially bacteria counts;
- Waterbody characteristics – conditions such as impairment (reference CWA 303(d) list) and flow characteristics;
- Frequency and location of basement backups, residential sewer overflows, and flooding in both separate and combined portions of the system as it relates to inflow/infiltration, capacity challenges, and operation and maintenance of collection system;
- Relevant public health data or potential impacts on the affected community;
- Community and population growth resulting in additional stress on the collection system and CSS infrastructure;
- Impacts of infrastructure improvements and potential community displacement;
- Stakeholder input, including the affected community; and
- Location of other municipal and industrial NPDES discharges.

Based on these analyses and other factors, EPA recommends that permitting authorities consider the following recommendations during the permitting process:

- Prioritize projects that will improve water quality in areas with communities that are underserved or overburdened;
- Increase and adapt community outreach efforts and the availability of and access to information during permitting and other related processes (e.g., LTCP development, Integrated Planning, Use Attainability Analysis), especially to overburdened community members and community-based or other types of entities representing these parts of the community;<sup>19</sup>
- Increase the length of the public comment period for permits to increase opportunities for interested stakeholders to provide input;
- Include more stringent monitoring requirements or permit limits for CSO outfalls in areas with environmental justice concerns;
- Track basement backup, sewer overflow, and flooding data and report or visualize in a public-facing, accessible interface; and
- Inform communities of the various financing and technical assistance programs available through EPA and the states.

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<sup>19</sup> Permitting authorities can consider developing and including measurable metrics as part of their permitting processes to ensure accessibility and transparency of community engagement. Examples of adapted and accessible outreach include developing a plain language information sheet, outreach via multiple channels and in multiple languages and/or with real-time translation, modifying timing and location of meetings, making childcare available during public meetings, school-based education program, etc.

## 5.2 PLAN FOR CLIMATE READY, RESILIENT INFRASTRUCTURE INVESTMENTS

CSO controls in LTCPs are designed based on rainfall patterns from a “typical year.”<sup>20</sup> However, climate change is leading to increased annual precipitation amounts and increased precipitation intensity in many areas of the country, which are likely to result in increased flows in combined sewers; therefore, “typical year” estimates and analyses may need to be updated. Projections from the World Climate Research Programme Coupled Model Intercomparison Project predict that by 2035 annual rainfall totals will increase by an average of 5% in CSO communities and 100-year storm intensity will increase by an average of 4–11% in CSO communities.<sup>21</sup> These increases may impact collection system capacity and responses to wet weather events. Furthermore, many combined sewers are also located along the coasts and the impacts of sea level rise, which are also increasing due to climate change, could lead to backflow and flooding.

EPA’s CWA implementing regulations require an NPDES permittee to properly operate and maintain its facility to ensure compliance with other conditions of the permit (40 C.F.R. § 122.41(e)). Because of climate change, however, past operation and maintenance practices may not be as effective, and may need to be modified, sometimes significantly, to account for sea level rise, increased rainfall, flooding risk, or other climate change related impacts. At the discretion of a permitting authority, managing for the current and expected impacts of climate change on a facility could be considered as part of proper operation and maintenance.<sup>22</sup>

When planning future wet weather projects and maintaining the existing CSS to ensure that it continues to meet the performance objectives of the LTCP, EPA recommends that communities and permitting authorities consider:

- Impacts of annual precipitation changes and future precipitation projections on existing and planned infrastructure;
- Acute impacts of increased storm intensity leading to increased stress on collection system infrastructure and potential increases in basement backups, sewer overflows, and flooding;
- Impacts of sea level rise and storm surge for coastal communities and backflow and flooding of CSO outfalls;
- Opportunities to enhance resiliency through green infrastructure investments, smart sewer technology,<sup>23</sup> and proactive asset management approaches;
- Additional impacts and stressors that the impacts of climate change will have on communities that are underserved and overburdened;
- Community and population growth projections and the current infrastructure’s ability to accommodate increased loadings; and
- Other infrastructure vulnerabilities due to the impacts of climate change.

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<sup>20</sup> The CSO Policy explains that the permittee should examine the complete rainfall record for the geographic area of its existing CSS using sound statistical procedures and best available data. (59 Fed. Reg. 18691.II.C.1.a) Under this approach, “typical year” usually relied on historic rainfall data.

<sup>21</sup> Average rainfall projections are based on the warm/wet scenario for precipitation. The “warm/wet” scenario is based on the average of the five climate models that project less warming but increased precipitation relative to other models. The average percentage range for the 100-year storm intensity is based on the “non-stormy” and “stormy” storm intensity projections relative to a baseline of observed climate at the same location from 1981–2010. For additional details, refer to [CREAT Methodology Guide](#).

<sup>22</sup> For more information on the Agency’s ongoing efforts on climate resiliency, refer to EPA’s [Creating Resilient Water Utilities website](#) for the most recent tools and additional strategies to address infrastructure resiliency in the water sector.

<sup>23</sup> Refer to EPA’s Smart Data Infrastructure for Wet Weather Control and Decision Support and [EPA’s smart sewer website](#).

Based on analyzing these factors, EPA recommends that permitting authorities consider the following permit requirements:

- Assess and review climate change projections that may impact current and future CSO infrastructure design and capacity. EPA recommends that communities and permitting authorities use the best available science and data to look forward, using more than historical data to assess the impacts and risks to the community from changes in precipitation, storm intensity, and other climate change-related factors. Additional controls should be designed based on recent and future-looking data and not solely historic precipitation data;
- Vulnerability assessment of climate change risks and impacts on current and future CSO infrastructure due to increased storm intensity and frequency, storm surge, and associated flooding; for example, prioritizing projects where sea level rise or storm surge impacts are concerns, such as first closing those CSO outfalls that are located at or slightly above sea level and at risk for backflow and flooding; and
- More stringent monitoring and reporting requirements for flow volume and frequency, as well as precipitation data, to capture local changes.