SEWERLOCK™

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INTEGRATED WASTEWATER AND STORMWATER PLANNING

BLUE is the new GREEN

ELIMINATE STORM WATER FROM ENTERING SANITARY SEWER SYSTEMS

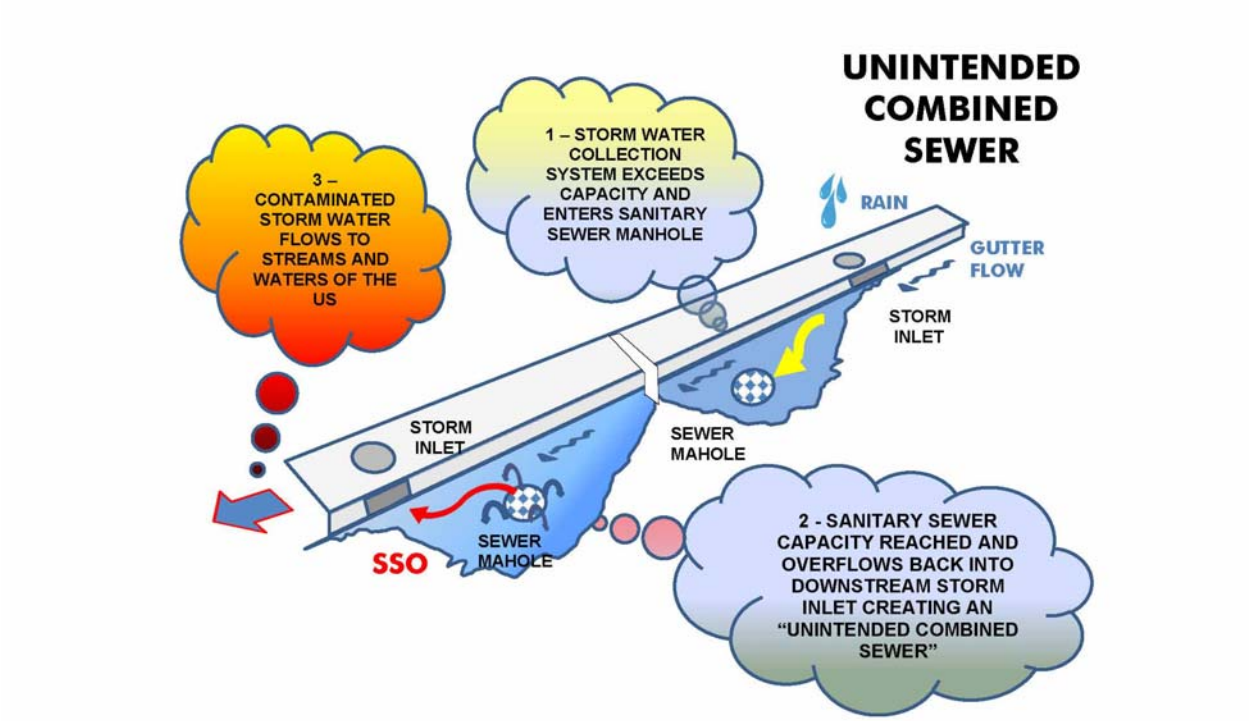
1. **`The United States and various State Environmental Protection Agency regulations require** elimination of Sanitary Sewer Overflows (SSOs) – The effect of this regulation is that **"Sanitary sewer systems can no longer accept storm water."**

2. **"Keep storm water out of sanitary sewers – they are not sized for storm flow."** Inflow fills the small capacity sewer pipes causing SSOs. Separating combined systems is expensive. Agencies with separated systems still face wet weather inflow and infiltration and need to block inflow and fix and line sewerage pipes to reduce infiltration. Even with these improvements, wet weather flow-caused SSOs continue - now we need to examine how to keep storm water out of sanitary sewers. Keep the sewerage in the conveyance pipes and keep storm water out with SEWERLOCK and STORM SEWERLOCK physical control system that prevents inflow into sanitary sewer manholes and meters storm inflow into storm inlets in order to maintain storm pipe capacity.

SEWERLOCK BLUE INFRASTRUCTURE SYSTEM SOLUTION

3. **Start by integrating storm management planning and sanitary sewer projects funding for a "BLUE INFRASTRUCTURE."** This is accomplished by combining watershed "green projects," with "grey sewer infrastructure projects" to reduce the amount of storm water entering sanitary sewers, thereby reducing inflow that can fill the smaller capacity sewer pipe, causing SSOs and violation of US and State Clean Water Act and related laws. Eliminating SSOs means no contamination from sanitary sewers in water sources, and better quality of life for the community.
4. **Provide <u>physical control</u> to eliminate inflow into sanitary sewer manholes and close storm inlets** before they surcharge the sanitary system and cause overflow of the manholes. If you are a sanitary sewer agency, install SEWERLOCK in the sewer manholes and if you are a storm or watershed management agency, install STORM SEWERLOCK IN THE INLETS at vulnerable locations. Start with SEWERLOCK installations in the sewer manholes that have a

history of overflowing into waters of the US and State ground water sources, including creeks, rivers, bays, lakes, and water storage areas. Analyze each watershed basin separately, placing STORM SEWERLOCK into inlets in upper basin locations to detain and meter inflow and preserve capacity in the lower end of the basin. At vulnerable locations, storm water flowing into sanitary sewer manholes quickly overtakes the sewer's pipe capacity**, surcharging it, resulting in popping off the sanitary sewer manhole covers and spilling into the streets**, gutters, and drainage ways. Then the contaminated surface flow enters the downstream storm inlets and in essence creates an "unintended Combined Flow", and into waters of the US and State. Coordinate the placement of STORM SEWERLOCK in inlets located in low lying flood-prone areas, to avoid the reverse outflow from the inlet to the surface and inflow into the sewer manholes and which in turn surcharge the sanitary sewer at that location.



5. **Currently sanitary sewer agencies are on their own to pay for projects to eliminate storm water in the sanitary sewer system**. Both sanitary sewer and storm water or water management agencies are involved in the cause of wet weather SSOs and now need to be jointly involved in the solution to meet the objectives of the Clean Water Act.
6. The **initial cycles** of the planning process involved Capacity Management Operations & Maintenance (CMOM), a process that assesses the condition of the assets, maintenance & requirements for operation planning and repairing. This approach provided a report on the condition of the assets and the related costs to fix or replace failing structures, with a timeline for improvement, and maintenance. The **assumption was that if these improvements were carried out, SSOs would be reduced if not eliminated. However, time showed that even a well-maintained separated system has SSO events due to additional**

wet weather flows. Eliminating SSOs requires physical control to prevent storm water entering into the sanitary sewer manholes.

7. Assessing the condition and the need to improve the system to eliminate SSOs, without integrated system management (using data and expertise from all agencies as well as funds available to maintain clean water from all sources), means **spending sewer collection budgets on large capacity sewer pipes to catch, store, convey and treat storm water**. This approach has proven to be **unaffordable.**
8. The solution to add capacity is an expensive option running into billions of dollars. Collection agencies and treatment plants **do not have sufficient funds for the "immediate solution" of building bigger pipes to collect storm water causing SSOs.** Some agencies entered into agreements with EPA committing to make improvements and now find the funds are more limited than hoped.
9. Because of the **high unfunded costs associated with adding more pipes and enlarging the treatment facilities**, agencies are discovering other more achievable ways that involve Blue Watershed Management and Green Infrastructure Projects. For example, large fields in parks, school fields, landscape areas, outlying parking areas, bio-swales, detention areas, underground detention, will redirect the excess storm water flows until capacity in the storm system returns. Santa Clara Valley Water District, in Silicon Valley provides extensive studies on the use of watershed areas to receive excess storm water, returning it to underground aquifers.
10. Moving from concrete and asphalt to **"green parking lots,"** is an approach among others taken by Pennsylvania and Louisville, Kentucky in their 2009 demonstration projects. The idea is to catch and detain clean fresh storm flows upstream, before the flow accumulates downstream, and causes SSO in the sanitary sewer.
11. Disconnect illegal roof drains, sump pumps, storm drains, HVAC cooling and industrial drains from sanitary sewers. Redirect surface water to the appropriate watershed area or storm drain system. Muncie, Indiana provides a website for review of their experience in **Blue Infrastructure**, see www.munciesanitary.org
12. **Use BMAP areas designated for the NPDES permits to identify project locations. Meter storm water with STORM SEWERLOCK** in upstream sub-basins to prevent overloading storm pipe capacity further downstream. The design restricts flow and closes storm inlets where the pipes are already at capacity while correspondingly physically securing sanitary sewer manholes to block surface water inflow. Leave excess storm water on the green designed surface when possible. **PHYSICAL CONTROL OF INFLOW AND OVERFLOW IS REQUIRED TO ELIMINATE SSOs AND CSOs, and avoid violation of the Clean Water Act. SEWERLOCK AND STORM SEWERLOCK provides the physical control of inflow at the manhole and metering and closing of the inlet until capacity returns in the storm system, for a BLUE INFRASTRUCTURE SYSTEM.**

SEWERLOCK BLUE INFRASTRUCTURE SYSTEM FUNDING

13. **Integration Plan – COSTS AND PROJECT PAYBACK** - The EPA recognizes the exorbitant costs of an immediate fix and the need to adopt an integrated plan to meet the objective of Blue Infrastructure over a longer period of time. If the agencies adopt an integrated plan then the sewer and storm water management agencies will likely avoid heavy fines and penalties from Environmental Protection Agencies and Non-Governmental Organization lawsuits meant to protect the clean water. It they **do nothing, they will continue to have SSOs and fines and penalties will increase.** Agencies can't choose the do-nothing approach if it violates the Clean Water Act. Stating that sufficient funds are not available for the **"big fix solution**" will result in EPA and NGO actions against the Agency. **Agencies that are taking physical control of SSOs with integrated storm and wastewater-funded projects, are better able to avoid lawsuits and penalties by demonstrating proactive affirmative response to adverse conditions.**
14. Clean Water Act and Watershed Management funds can be used to address the storm management and detention portion of the integrated plans, capacity management. Collection system funding can be utilized for the inflow/infiltration portion of the integrated Plan Capacity Management together with fees can be augmented by the savings realized by the local agency from the **reduced cost to convey and treat storm water**. For Blue Water Project Funding, look for recent passage of State Water Bonds such as the $7.5 Billion Water Quality, Supply, and Infrastructure Improvement Act of 2014 in California (click here for link). FOR CALIFORNIA FUNDING CLICK HERE.
15. Considering the **cost for conveyance and treatment**, a penny ($0.01) is saved for each gallon of excess storm water that is kept out of the sanitary sewer system. Let's assume for this example one of the BMAP areas consists of 60 acres with 50% impervious surface. For a storm lasting 1 hour with an average intensity of 1" per hour, the runoff from this area is 9,774,864 gallons. Based on an average wet weather inflow and infiltration of 10%, the extra sanitary sewer cost for conveyance and treatment is $10,000 for the 1 hour storm in the 60 acre sample. So you can quickly see that eliminating the excess storm water **will save you money and eliminate the need for building large capacity systems to collect and treat the storm water entering the sanitary sewer.** Neenah's Manhole Covers Inflow Study shows $13.20 per hour per inch of rain with pick holes and half that volume without pick holes in the cover.
16. The use of **catching and metering upstream storm water** needs to be considered as a more economically feasible integrated solution than the cost prohibitive added pipe capacity fix which then in turn creates the need to enlarge sanitary sewer treatment plants. Storm management likewise will realize the savings from the reduced need to build large capacity storm conveyance facilities.

SEWERLOCK BLUE INFRASTRUCTURE SYSTEM PROJECTS

17. Next step, action and assignments. **SEWERLOCK THE MANHOLES AND STORM SEWERLOCK THE INLETS FOR METERING AND PHYSICAL CONTROL. Each agency can begin to take physical control of SSOs. Sanitary Sewer Agencies eliminate inflow/overflow with SEWERLOCK installed in the manholes; Storm Water/Watershed Management Agencies meter the inlets by installing STORM SEWERLOCK while redirecting flow to Green Infrastructure. Coordinate stakeholder agencies.** Share information with affected community. Work toward an integrated plan that EPA will accept as a replacement for the current agreements that are not feasible. The Integrated Plan is not meant to reduce the requirements or regulations, but to coordinate the sequencing of projects necessary to eliminate SSOs in such manner to best utilize the funds available to all of the agencies involved in clean water compliance. See USEPA website which provides numerous sections designed to help agencies coordinate planning and implement solutions to maximize use of funds available over time.
18. Schedule Committee meetings to begin coordination with agencies and associations, involving stakeholder to initiate Integrated Planning, sharing of data, and ideas. Get going on the next steps to effectively implement the solutions needed for eliminating SSOs as required `under the Clean Water Act. Begin to protect the environment, and save operation costs with SEWERLOCK.

The engineers at SEWERLOCK can assist you in analyzing your basins for strategic placement of SEWERLOCK BLUE INFRASTRUCTURE SYSTEM to get started. Whether you are a collection agency or a storm water management agency, physical control of storm water in sanitary sewers is the next step to eliminating SSOs.

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