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**Introduction and Purpose**

The Metropolitan St. Louis Sewer District (MSD) prepared an update to its Combined Sewer Overflow Long-Term Control Plan, dated February 2011, that described the development and selection of MSD’s plan for controlling combined sewer overflows to area waterways. The plan was approved by the Missouri Department of Natural Resources on June 1, 2011. The CSO Control Measures defined in the plan—including descriptions, design criteria, performance criteria, and critical milestone dates—were subsequently incorporated into a Consent Decree between the United States EPA, the Missouri Coalition for the Environment Foundation, and MSD. The Consent Decree was entered on April 27, 2012.

On March 26, 2013, MSD proposed a modification to two of the CSO Control Measures for Maline Creek described in the Long-Term Control Plan and Consent Decree: *CSO Treatment Unit at Bissell Point Outfall 051* and *Bissell Point Outfall 052 Storage Tank*. The CSO Control Measures described in the Long-Term Control Plan are depicted in Figure 1 below. The treatment unit at Outfall 051 was to be an Enhanced High Rate Clarification facility with a capacity of 94 MGD, providing the equivalent of primary treatment and seasonal disinfection to CSO prior to discharge to Maline Creek. The storage tank at Outfall 052 was to temporarily store up to 1 million gallons of CSO until secondary treatment capacity became available at the Bissell Point WWTP.

![Figure 1: CSO Control Measures for Maline Creek as Described in LTCP](image-url)
MSD proposed that the two above-named CSO Control Measures be replaced with a single 12.5-million-gallon CSO storage facility to accommodate overflows from both outfalls until secondary treatment capacity becomes available at the Bissell Point WWTP; see Figure 2. In essence, the flow that would have received primary treatment and seasonal disinfection in the CSO treatment unit at Outfall 051 and been discharged to Maline Creek, will now be stored and transported to the Bissell Point WWTP for secondary treatment and seasonal disinfection before being discharged to the Mississippi River.

Figure 2: Proposed New CSO Control Measures for Maline Creek

This Supplement No. 2 to the Long-Term Control Plan addresses modifications to the plan to incorporate these two modified CSO Control Measures. This Supplement addresses each of the minimum elements of the Long-Term Control Plan, as defined in the CSO Control Policy (59 FR 18688):

- Characterization, Monitoring and Modeling of the Combined Sewer System
- Public Participation
- Consideration of Sensitive Areas
- Evaluation of Alternatives
- Cost/Performance Considerations
- Operational Plan
- Maximizing Treatment at the Existing POTW Treatment Plant
• Implementation Schedule
• Post-Construction Monitoring Program

Characterization, Monitoring and Modeling of the Combined Sewer System
Additional flow meter data acquired since the completion of the LTCP’s planning-level model was used for building and calibrating a design-level model. The calibrated design-level model predicts higher CSO volumes in the typical year and higher peak flow rates compared to the LTCP’s planning-level model, as shown in the table below.

<table>
<thead>
<tr>
<th>Model</th>
<th>CSO Volume (MG)</th>
<th>Peak Flow Rate (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTCP’s planning-level</td>
<td>147</td>
<td>179</td>
</tr>
<tr>
<td>New, design-level</td>
<td>250</td>
<td>282</td>
</tr>
</tbody>
</table>

The new CSO volumes and peak flow rates exceeded the hydraulic capacities of the LTCP’s selected CSO Control Measures. This fact necessitated a re-sizing of the LTCP’s CSO Control Measures. Due to the significant change in design parameters and costs, MSD sought a re-evaluation of the selection of CSO controls, as explained below under “Evaluation of Alternatives.”

Public Participation
The modification to the CSO Control Measures for Maline Creek will not result in a change to the level of CSO control which was presented to the public during the development of the LTCP and included in the approved Plan. The original LTCP considered a local storage option as one of its alternatives. No adverse public comments were received regarding either alternative. Additionally, since these modifications gave rise to the need to modify the above mentioned Consent Decree there was a public comment process included in that effort. The Consent Decree modification process did afford the public an opportunity to comment on the proposed modification to the CSO control measures. As part of the Consent Decree modification process The United States published notice of these proposed amendments in the Federal Register on July 11, 2013 (78 Fed. Reg. 41803), and invited the public to submit comments on the Decree. The public comment period closed on August 26, 2013 and no comments were received.

Consideration of Sensitive Areas
The modification to the CSO Control Measures for Maline Creek does not result in CSO discharges to any receiving waters other than those previously described and characterized in the Long-Term Control Plan. Therefore, MSD’s evaluation of Sensitive Areas as presented in the Long-Term Control Plan, and approved by MDNR, remains unchanged as a result of the modification.

Evaluation of Alternatives
As noted above, the design-level model indicates higher CSO volumes and peak flow rates in the typical year compared to the planning-level model. Costs associated with the CSO Control Measures to meet the Performance Criteria of the Consent Decree also increased significantly as a result of the CSO flow and volume increases. Consequently, MSD sought a new evaluation of
CSO controls for the Maline Creek to determine if the LTCP’s solution was still the best choice economically and environmentally.

The following alternatives were originally evaluated in the LTCP:

1. Local storage for both Outfall 051 and Outfall 052
2. Local treatment for Outfall 051 and local storage for Outfall 052.

The LTCP determined that the alternatives provided similar benefits, differing in only a few ways. The storage alternative provided the higher benefit to Maline Creek and greater public acceptance, but these benefits were outweighed by its significantly greater expense compared to the treatment alternative. Therefore, the LTCP selected the less expensive treatment alternative.

MSD re-evaluated the two alternatives based on the new CSO volumes and peak flow rates at a level of control equivalent to the Performance Criteria in the Consent Decree, four overflow events in the typical year. MSD selected the local storage alternative for both outfalls for the following reasons:

- The estimated project cost to store the flow from both outfalls in a below-grade storage facility is approximately $72 million; the cost for a treatment system for Outfall 051 and a storage system for Outfall 052 is approximately $97 million.
- The local storage solution will provide lower pollutant loadings to Maline Creek. A local storage solution will result in all captured flow receiving full secondary treatment and seasonal disinfection prior to discharge to Mississippi River. The treatment alternative provides the equivalent of primary treatment and seasonal disinfection prior to discharge to Maline Creek.
- A below grade storage system will be better for the largely residential community.
- A below-grade storage system will eliminate the need for electrical and mechanical equipment like the large remote pumping and treatment facilities of the treatment alternative which require O&M to maintain proper performance during wet weather.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Local storage for both outfalls</th>
<th>Local treatment for Outfall 051 and local storage for Outfall 052</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD (tons)</td>
<td>9.4</td>
<td>24.9</td>
</tr>
<tr>
<td>TSS (tons)</td>
<td>118</td>
<td>206</td>
</tr>
<tr>
<td>Ammonia N (tons)</td>
<td>0.45</td>
<td>1.46</td>
</tr>
<tr>
<td>Organic N (tons)</td>
<td>0.93</td>
<td>2.46</td>
</tr>
<tr>
<td><em>E. Coli</em> (10⁶ counts)</td>
<td>5.32 E+08</td>
<td>5.06 E+08</td>
</tr>
</tbody>
</table>
**Cost/Performance Considerations**

The LTCP indicated that the appropriate level of control, based on a cost-benefit analysis, was at four overflow events in the typical year. MSD has estimated the capital cost of the selected local storage solution at various levels of control to verify that the “knee-of-the-curve” still occurs at the same level of control as indicated in the LTCP. Figure 3 below provides the cost-performance curve for the local storage solution.

As indicated in the curve, expenditures for a level of control beyond four overflow events result in diminishing benefits. At this level of control, the maximum untreated overflow volume in the typical year increases to 70 million gallons due to the increased peak flow rates and volumes predicted by the design-level hydraulic model.

The proposed modification to the CSO control measures for Maline Creek will involve the construction of a 12.5 MG storage facility to control overflows from Bissell Point Outfalls 051 and 052 to four overflow events in the typical year. The total capital cost is estimated at $72 million.

![Figure 3: Cost-Performance Curve for Storage Solution](image)

**Operational Plan**

Operation of the CSO Control Measures will change as noted in the Evaluation of Alternatives section. It is expected that the new solution will reduce O&M demands due to the passive nature of below-grade storage systems. Specific O&M manuals will be developed for the CSO storage...
facility and associated diversions and de-watering components as the project is designed and constructed.

Maximizing Treatment at the Existing POTW Treatment Plant
The use of storage tanks for CSO control will increase flows to the Bissell Point WWTP compared to the LTCP’s treatment unit. Stored flows will be drained to the Bissell Point Interceptor Tunnel to receive full secondary treatment at the Bissell Point WWTP. Peak instantaneous flows to the treatment plant will not change, but sustained flow may increase modestly during tank drainage. The existing collection system and treatment plant have the hydraulic capacity to convey and treat, respectively, the small increase in post-event flows. The net benefit is an additional 180 MG receiving full secondary treatment in the typical year.

Implementation Schedule
MSD has determined that the implementation schedule for the below-grade storage system, and the Critical Milestone Dates defined in the Consent Decree and originating from that schedule, do not change, based on timely approval so that MSD can progress to the next step in the design, construction, and delivery process.

Post-Construction Monitoring Program
Minor changes to the post-construction compliance monitoring program as defined in the February 2011 Long-Term Control Plan and further developed in the CSO Post-Construction Monitoring Program plan (PCMP), dated April 27, 2013 and approved by EPA on June 20, 2013, will be needed as a result of the proposed modification. Monitoring elements associated with the treatment unit at Outfall 051 will no longer be needed and MSD anticipates that the monitoring program for the proposed storage facility will be similar to that identified for the Maline Creek Storage Tank, corresponding to CSO Outfall 052, in the EPA-approved PCMP. Many elements of the monitoring program will not change. Both CSO outfalls will still be continuously monitored for outfall activation. The monitoring program will still utilize MSD’s network of long-term rain gages for record of rainfall depth, duration, intensity, and event distribution. The monitoring program will also record flow measurements and additional monitoring to ascertain event storage volume at the locations identified for the Maline Creek Storage Tank Monitoring Program for a period of one year or as sufficient to properly update the hydraulic model.

The final changes will be documented in the detailed monitoring plan that will be submitted one year prior to the Achievement of Full Operation date, December 31, 2020. The plan will show final monitoring site selection based on final design configurations.