City of Albany | City of Cohoes | City of Rensselaer | City of Troy | City of Watervliet | Village of Green Island

September 2013

Albany Pool CSO Long Term Control Plan

Supplemental Documentation

Submitted to

CDRPC

and

NYSDEC

Joint Venture Team
albany pool
CDM | MALCOLM PIRNIE | CHA

Joint Venture Team
albany pool
CDM MALCOLM PIRNIE CHA

Submitted: June 20, 2013
Rev. 1: September 13, 2013

Mr. Koon Tang, P.E.
New York State Department of Environmental Conservation
Division of Water, Bureau of Water Permits, 4th Floor
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Albany, New York 12233-3505

Ms. Andrea Dzierwa, P.E.
New York State Department of Environmental Conservation
Region IV Headquarters
1150 North Westcott Road
Schenectady, New York 12306

Re: Draft Albany Pool CSO Long Term Control Plan, dated June 30, 2011
SPDES Permit No. NY-002 5747 (City of Albany)
SPDES Permit No. NY-002 6026 (City of Rensselaer)
SPDES Permit No. NY-009 9309 (City of Troy)
SPDES Permit No. NY-003 0899 (City of Watervliet)
SPDES Permit No. NY-003 1046 (City or Cohoes)
SPDES Permit No. NY-003 3031 (Village of Green Island)

Dear Koon/Andrea:

This submission was prepared in response to the technical assessment of the Draft Albany Pool Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP), as summarized in correspondence from the New York State Department of Environmental Conservation (DEC), dated December 5, 2012. This document is intended to supplement and update the original Draft Albany Pool CSO LTCP to provide the final documentation requested by the Department for approval of the LTCP.

In an effort to better understand the Department's concerns and to ultimately resolve the issues outlined in the Department's technical assessment of the Draft Albany Pool CSO LTCP, a series of technical discussions and workshops have been conducted since January of 2013. These discussions were organized based upon the following "categories" for the comments:

- Green Infrastructure (GI) Program
- Receiving Waters Assessment
- CSO Model Development and WWTP Capacity Study
- Development and Evaluation of Alternatives, Cost/Benefit Analysis

The Albany Pool Joint Venture Team (APJVT), Capital District Regional Planning Commission (CDRPC) and the Albany Pool Communities (APCs) would like to acknowledge the Department's participation and contributions throughout the technical discussions and workshops; and appreciate the assistance that the Department provided in regards to the preparation of the final approvable CSO LTCP.

We trust that the Department finds the responses to be consistent with the discussions from the meetings and technical workshops. Should you have any questions or concerns that you would like to discuss in more detail, please feel free to call me directly at (518) 453-3910.

Very truly yours,

ALBANY POOL JOINT VENTURE TEAM

Michael F. Miller, P.E.
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Appendix N

Response to Comments

Joint Venture Team
albany pool

Appendix N: Response to Comments

The Albany Pool Joint Venture Team (APJVT), Capital District Regional Planning Commission (CDRPC) and the Albany Pool Communities (APCs) would like to acknowledge the efforts of the DEC in regards to the Department's participation and contributions throughout the technical discussions and workshops. The following responses summarize these ongoing discussions between the DEC, APJVT, CDRPC and the APCs.

Intent of the Federal CSO Control Program

Comment: *The proposed LTCP strategy often focuses on controlling non-CSO sources of bacteria in the Albany Pool portion of the Hudson River. While containing useful elements, this strategy does not demonstrate that the LTCP will: (i) result in compliance with water quality standards in Hudson River tributaries impacted by CSOs; (ii) provide the maximum pollution reduction benefits reasonably attainable through CSO abatement; and (iii) are designed to allow cost effective expansion or cost effective retrofitting to address CSO flows should additional controls be determined necessary in the future (e. g. , due to community growth accompanied by increased stormwater and sewage flows) to meet water quality standards. (See, EPA Policy Section II. C. 4. b).*

Response: The CSO control strategies defined in the Draft LTCP take into consideration the benefits of a regional watershed approach that addresses both CSO and non-CSO sources of bacteria. The program also seeks to maximize the capacity of the existing infrastructure to capture and treat greater volumes of CSO. The receiving waters modeling (see Table 5-12 on page 5-39 in the Draft LTCP) shows that reduction of bacterial sources through the proposed control plan provides a significant water quality (WQ) benefit by reducing the frequency of bacterial exceedances during the recreational season. The modeling was performed for a five year simulation period which focused on the 6 month recreational season, totaling 30 recreational months. Baseline or existing conditions indicate that receiving water quality is not met during the recreation season, predicting exceedances in all 30 months. Upon implementation of the long term control plan, the number of predicted monthly exceedances is reduced from 30 to 0 over the identical span of the five year modeling period. Recognizing that elements of the long term control plan will address flow during both dry and wet weather conditions, the CSO control strategy identified non-CSO sources of bacteria in addition to CSO control to provide similar WQ benefits within the collection system as at the WWTPs. This approach is consistent with integrated planning efforts currently supported by the United States Environmental Protection Agency (EPA) which assess water quality benefits from a more regional or watershed based perspective. Further discussion follows.

i. Baseline conditions, as represented in sampling data collected in 2008 and 2009, generally indicate non-compliance for smaller tributaries during dry and/or wet weather conditions. The smaller tributaries (e. g. , Poesten Kill, Wynants Kill, Patroon Creek, Mill Creek, and Normans Kill) all indicated high concentrations of bacteria during wet weather conditions, contributing to the accumulation of bacteria through the Albany Pool region of the Hudson River. As documented in the Draft LTCP, preliminary investigations and the subsequent elimination of illicit discharges along Patroon Creek resulted in significant reductions in fecal coliform counts in the 2009 sampling data. Further investigations are proposed in the Draft LTCP for the Mill Creek, Poesten Kill, and Wynants Kill within the municipal boundaries of Rensselaer and Troy. Considering the reduced volume and frequency of CSO remaining upon implementation of the Draft LTCP, we do not believe that these remaining CSOs preclude the attainment of water quality standards or the

uses of the tributaries. Additional discussions of CSO discharges to specific tributaries are presented in more detail later in this response. While it is recommended that the upstream separately sewered communities investigate the potential bacterial influences which could be associated with farm runoff, failed septic systems, stormwater or a number of other sources; such investigations for non-member Albany Pool communities are outside the scope of this LTCP as the APCs are not responsible for investigations, enforcement or compliance measures outside their jurisdictional boundaries.

ii. The Recommended Plan achieves the maximum water quality benefits reasonably attainable by addressing continuous non-CSO bacteria sources in addition to CSO improvements. As a result, the recommended projects in the Draft LTCP provide benefits during both dry and wet weather conditions, thereby addressing periods when the waters are most likely to be used for recreational purposes in addition to short duration wet weather discharges. This approach provides a cost effective means of maximizing the water quality benefits of CSO reduction; while meeting existing DEC bacterial water quality standards.

In an effort to further address the Department's concerns, the APCs are proposing additional CSO controls to further reduce bacteria counts and enhance the "recovery time" for the Hudson River. Specifically, the APCs are proposing to incorporate disinfection for the effluent at the "Big C" outfall (CSO 016) in the City of Albany. The APCs propose to begin the preliminary design report for the facility in the summer of 2015, with completion of the report in 2016. Upon submittal of the report to the Department (and subsequent approval), the APCs propose to begin the SEQR review and eminent domain process. Based upon past experiences of the APCs, the eminent domain process may take up to four years to complete in order to take ownership of the required parcels. The APCs anticipate that the final design of the facility will begin no later than 2018; and should coincide with the development of any proposed changes to the NYS water quality standards. Construction for the facility is proposed to be completed in years eight and nine of the executed order on consent; with start-up of the facility no later than May 1, 2023, or within ten years of the order. Should state or federal funding become available for the project, the schedule will be re-visited in an effort to accelerate the project. Additional discussions of the Big C Disinfection Project are presented in more detail later in this response; as well as Table 7-4B: Recommended Final CSO LTCP and Table 9-3: Recommended Final CSO LTCP Implementation Schedule (See Appendices O and P).

iii. The Recommended Plan maximizes the capacity of existing infrastructure to capture and convey wet weather flows to the WWTPs for treatment. In light of NYSDEC's triennial review and potential modification of the NYS WQ Standards (which we understand will include the new USEPA Recreational WQ Standards), CSO LTCP projects were developed in a way that allows future expansion.

Comment: *The LTCP must be revised to evaluate the effectiveness, costs and water quality impacts of a broader array of alternative programs to address the control of CSOs. The Albany Pool sewer systems contain flows from combined sewers that often exceed the interceptor and regulator capacity, resulting in raw sewage being discharged directly to the Hudson River before any treatment. The proposed abatement of CSOs proposed in the draft LTCP (i. e. , the proposed approach of reducing non-CSO sources of bacteria levels in the Hudson River) is not a complete approach, necessitating the need for the Albany*

Pool communities to develop and evaluate a more stringent set of alternative CSO control programs for consideration by DEC, EPA and the affected community.

Response: The recommended plan presented in the Draft LTCP, dated June 30, 2011, increases CSO capture by ~300MGal and percent capture from 69. 5% to 77. 2%. Predicted bacterial geomean exceedances were reduced from 30 to 0, during the 30 recreational months covering the 5 year model simulation period. The recommended plan was selected upon considering a broad range of CSO control technologies (as presented in the Development and Evaluation of CSO Control Alternatives Report, Appendix J) and results in compliance with current New York State water quality standards; while defining a cost-effective program using the Demonstration Approach of the USEPA CSO Policy.

However, in an effort to further address the Department's concerns, the APCs are proposing additional CSO controls to further reduce bacteria counts and enhance the "recovery time" for the Hudson River. Specifically, the APCs are proposing to provide disinfection for the effluent at the "Big C" outfall (CSO 016) in the City of Albany and are proposing an expanded Green Infrastructure Program. The Big C Disinfection Project would provide treatment consisting of screening and disinfection for an additional ~285MGal on an average annual basis, and allow the APCs to provide treatment of greater than 85% of all wet weather flows from a regional perspective.

Additional discussions of the proposed Green Infrastructure Program are presented in more detail later in this response. Furthermore, the effectiveness of the proposed LTCP will be verified through the Post Construction Compliance Monitoring Program.

The LTCP must Adequately Address CSO Mitigation Alternatives as follows:

1. *Alternatives screening process*

   Comment: *Section 7. 4 of the LTCP provides a summary of screening analysis of CSO abatement technologies. For each potential individual control option, the LTCP indicates whether that technology should be included as part of the LTCP strategy. However, the LTCP provides no information on the screening process itself or the criteria used and data relied upon to determine whether an individual control option should be retained or rejected. Without such an evaluation, DEC cannot determine whether the recommended control alternative meets the regulatory standard of maximum pollution reduction benefits reasonably attainable.*

   Response: Appendix J provides a detailed summary of the technologies considered and the screening process. The screening process was performed in consideration of the Receiving Water Bacteria Modeling Results provided in Table 5-12 of the Draft LTCP. In light of the fact that the reduction of continuous bacteria sources provided the greatest water quality benefits, particularly during dry weather when the public is most likely to be in the water, the APJVT applied strategies to identify technologies that best addressed a regional watershed approach and provided multiple benefits. For example, separation of streams from the combined sewer system in Troy provides multiple benefits. This approach reduces the risk of DWOs, reduces the frequency, duration and volume of remaining CSOs, provides collection system capacity to convey wet weather flow from upstream and downstream sewersheds, reduces the amount of sediment and debris entering the sewer system, and reduces the risk of collection system surcharging and basement flooding, among other benefits. The proposed tributary enhancement projects are another example. Investigation and correction of sewer

system defects within sewers located adjacent to or at crossings of waterways reduces I/I during high groundwater conditions in the Spring and Fall, while reducing the risk of exfiltration during the summer months when the public is more likely to be in the water. The dual benefit addresses CSO issues while also addressing potential non-CSO impacts that create as much or greater risk to the public.

2. *Maximize Capture or Treatment*

Comment: *The LTCP should evaluate controls that achieve 100% capture, 90% capture, 85% capture, 80% capture and 75% capture of the CSO total annual volume for treatment at the three wastewater treatment plants in the Albany Pool. (See, Section II. C. 4 'Evaluation of Alternatives' in the CSO Control Policy). The alternatives analysis must be sufficient to provide enough data to make a cost/performance curve to demonstrate the relationship between the cost and the benefits among the different level of CSO capture. The goal of this cost and performance assessment is to determine if the incremental reduction in the pollutant of concern, pathogen in this case, diminishes as cost increases. This comment is related to the "Knee of Curve" comment below.*

Response: The recommended plan includes projects to restore full capacity of the collection system and WWTPs among other projects. The purpose of the KOC is to support determinations that a certain level of CSO control, or a defined program, will maximize the environmental benefits in cases when it is not practicable to achieve WQ standards. For the Albany Pool, the receiving waters bacteria modeling demonstrates that the geomean WQ standard will be met within the Hudson River. As the recommended plan (using the Demonstrative Approach), meets the affordability criteria, there is no need to perform the KOC to show that the plan is cost effective.

3. *Tributary Water Quality Impacts*

Comment: *The LTCP must include data and information concerning the water quality impacts from CSO outfalls to waters tributary to the Hudson River. The data must be presented, evaluated and incorporated into the LTCP's demonstration approach to the alternatives analysis under Section II. C. 4. b of the Policy (e. g. Albany-Krum Kill / Cohoes -Mohawk River, Salt Kill, Eagles Nest Ravine / Rensselaer - Mill Creek).*

Response: Albany, Krum Kill - The overflow from the Woodville Pump Station is the only known CSO that exists along the Krum Kill (CSO 012). The Krum Kill conveys flows downstream to the Normans Kill, and ultimately the Hudson River. Modeling for the Albany CSS predicts an average of three overflows per year at the pump station. Considering the baseline conditions along the Krum Kill, these overflows will not preclude the attainment of water quality standards based upon the criteria defined for the presumptive approach. In response to concerns expressed by the DEC, the City of Albany is proposing to modify the monitoring equipment in the pump station to record the activation periods of overflow events; along with the volumes discharged to the Krum Kill. This data will be compiled and included in the City’s annual reports addressing Best Management Practices for Combined Sewer Overflows.

Cohoes, Mohawk River As per discussions at the April 25, 2013 Technical Workshop with the DEC, a spreadsheet mixing model was used to assess the relative impact of the City of Cohoes CSO discharges to the Mohawk River. By applying the fecal coliform concentrations for the upstream boundary conditions with the recorded Mohawk River flows, baseline conditions along the Mohawk

River were established. Bacteria loadings associated with the CSOs were applied to the predicted CSO discharge volumes to estimate the resulting fecal coliform concentrations in the river, downstream of the "Little C" outfall. The estimated downstream hourly concentrations were then used to calculate monthly geomean values and annual fecal coliform concentration frequency distributions. The evaluation methodology, key assumptions and results are as follows.

- Daily Mohawk River flows were obtained from USGS gage 01357500.
- Local bathymetric data was not readily available, therefore an equal flow split was assumed for the three Mohawk River branches. Additional sensitivity analyses for the flow split assumption were also performed and described further in this response.
- A calibrated SWMM baseline model developed as part of the Hudson River evaluation was used to estimate hourly CSO discharge volumes for Cohoes CSOs. The evaluation selected two years from the 5-year simulation period in the Draft LTCP (1987 and 1989) which represented years with greater than average rainfall.
- Analysis of the western branch represents the most conservative assessment in regards to potential CSO discharges, and thereby potential WQ impacts.
- There is no tidal influence upstream of the Troy dam.
- Fecal coliform decay rate was neglected. This is a reasonable assumption as the travel time in the Mohawk River is short and the downstream impact from the CSO discharges is included in the Hudson River model.
- Non-CSO bacteria sources, such as stormwater, non-point runoff and wildlife, were not included in this assessment.
- A geometric mean upstream fecal coliform concentration of 20. 6 cfu/100ml was derived from all samples collected at the upstream Mohawk River location (RT-1) during the 2008 sampling period; and was used for both dry and wet weather conditions. This conservative assumption was based on the fact that there was very little variation observed in the RT-1 fecal coliform concentrations during the sampling period.
- CSO discharges for the three overflows upstream of the split in the river channel (Conboy Ave. , Mohawk St. and Johnston Ave.) were also divided by 3.
- The fecal coliform concentration in all CSO discharges used for the mixing model was based on the conservative value of 1,139,683 cfu/100 mL, the higher event mean fecal coliform concentration used in the calibrated Hudson River WQ model.
- Monthly geometric mean fecal coliform concentrations in the western branch of the Mohawk River were calculated from the hourly values at noon of each day.

The evaluation results for each month of the recreational season are presented in the table below. The results of the analysis show that the estimated fecal coliform concentrations never exceeded 32 cfu/100ml on a monthly geometric mean basis. As discussed in the April 25, 2013 Technical Workshop, the City of Cohoes total volume of overflows is limited to approximately ~20 MGal on an annual basis.

Recreational Period Fecal Coliform, Monthly Geomeans

	Recreational Period Geomeans (Noon Values) cfu/100 mL	
Date	1987	1989
May	21. 0	23. 0
June	22. 7	25. 3
July	21. 6	30. 6
August	21. 3	21. 8
September	31. 7	21. 5
October	27. 0	22. 5

One of the largest simplifying assumptions in the model was to use a 1/3 flow split for the western branch of the river, determined to be the most sensitive reach based on the predicted volumes of overflows from the CSS. As a form of sensitivity analysis, the mixing evaluations were repeated with a more conservative assumption of lower flow (20% of total) in the western branch. The highest monthly geomean estimated from the same two years under this flow split scenario was 33 cfu/100ml, which represented a very minor change from the original evaluation. As demonstrated by these evaluations, the City of Cohoes CSO discharges have little impact on fecal coliform concentrations in the Mohawk River; and do not preclude the attainment of the existing NYS DEC water quality standards for fecal coliform bacteria.

Cohoes, Salt Kill-There are no known overflows discharging to the Salt Kill.

Cohoes, Eagles Nest Ravine-The Eagles Nest Ravine had only one known overflow from the CSS. CSO 013 was eliminated in August 2012, as part of a storm sewer improvement project within the City. This project is included in the Recommended Plan and has been completed well in advance of the implementation schedule.

Rennselaer, Mill Creek-Two of the three CSO Outfalls to Mill Creek and an unnamed tributary have been eliminated. The projects are included in the Recommended Plan and have been completed well in advance of the implementation schedule. The CSO modeling indicates that the remaining CSO (Outfall 011) only discharges once per year for a period less than an hour in length. Sampling performed along Mill Creek indicated elevated bacteria levels during both dry and wet weather

conditions upstream of CSO 011. Considering the baseline conditions of the receiving water, a single discharge event from the outfall annually will not preclude the attainment of water quality standards based upon the criteria defined for the presumptive approach.

Green Infrastructure

Comment: *The LTCP proposes very little Green Infrastructure as a means of controlling or reducing CSOs. A more substantive Green Infrastructure program is required. Properly planned green practices naturally manage storm water and improve water quality by keeping water out of the CSO collection systems. EPA strongly promotes the use of green infrastructure to manage wet weather through infiltration, evapotranspiration and rain water harvesting. The Albany Pool communities will need to address the use of public and private Green Infrastructure projects in the LTCP and identify the mechanisms for implementation (e. g. maintenance agreements for green controls on privately owned properties). State grant funding is currently available to assist in Green Infrastructure projects. Many communities, including Syracuse and New York City, are implementing extensive Green Infrastructure programs as part of their CSO abatement program.*

Response: The Draft Albany Pool CSO LTCP supports the implementation of Green Infrastructure (GI) strategies. As part of the development of CSO control strategies, green infrastructure tools and measures have been considered and incorporated into the proposed CSO control projects, to the greatest extent practicable. Incorporated green infrastructure elements include the reduction of inflow to the combined sewer systems and WWTP's; which results in a reduction of the energy usage and treatment costs, and maximizes the CSO percent capture for the system. In addition to the defined projects in the CSO LTCP Program that incorporate "green benefits", the APCs have defined program goals which include the specification and installation of energy efficient equipment; the promotion of Green Infrastructure Practices within Municipal Capital Improvement Programs; and the promotion and enforcement of the 2011 NYSDEC Stormwater Regulations for both public and private development projects (as presently required through the MS4 Programs). The Draft LTCP includes the advancement of the Green Practices Technical Guidance Document for both public and private projects; and proposes additional efforts to coordinate with the MS4 programs in regards to public education and outreach efforts.

In addition, in response to the Department's comments, the APCs are proposing an expanded Green Infrastructure Program which will evaluate the effectiveness of "green practices" through codes and local law review; documentation/reporting of new public and private development projects within the APCs; performance of a feasibility assessment for a "Green Infrastructure Banking System"; and the implementation of additional demonstration projects. Based on preliminary discussions with the Department, the following items will be included in the APCs approach to advancing "green" strategies:

a. Performance of a Codes and Local Law Review in regards to the inclusion and advancement of green infrastructure practices. Green infrastructure includes a range of development and planning strategies, some of which are embedded within existing codes and local laws. Others are new concepts gaining increasing attention in the developer community, but as yet are not clearly embedded within either municipal Comprehensive Plans or local land use laws.

   While green infrastructure techniques may be attractive, whether or not these techniques are used depends to a large degree on establishing the necessary legal underpinnings to either encourage or require "green infrastructure" techniques. Of equal importance are informed and receptive local

land use decision makers, willing to ask for and/or carefully critique development proposals which attempt to embrace green infrastructure principles. There are several necessary, simultaneous steps which need to be taken to encourage the use of green infrastructure.

Step 1: Educate land use decision makers, municipal and/or municipal designated engineers in green infrastructure techniques. This will be accomplished by conducting a survey of land use decision makers in each municipality. The survey instrument will serve to identify knowledge gaps, and from that develop and conduct training workshops targeting priority concepts. Expanding the core knowledge of municipal leaders will encourage a more probing review of development proposals; and assist in any effort to update local land use laws as well as the development and acceptance of the Green Practices Technical Guidance Document to encourage green infrastructure.

Step 2: Inventory existing Comprehensive Plans and Local Laws for Green Infrastructure strategies and Smart Growth principles, possibly using as assessment tools, such guidance documents as the list of New York State Smart Growth Principles, NY Code Ordinance Worksheet, LEED for Neighborhood Development (2009), U. S. EPA Managing Wet Weather with Green Infrastructure Municipal Handbook-Water Quality Scorecard (April, 2009), and/or materials previously researched by the Stormwater Coalition of Albany County.

Step 3: Research other green infrastructure local laws, and based on the results of the local law inventory and input from APC members, the developer community, and others, develop a Model Local Law or guidelines beneficial to the unique needs of each Albany Pool member community.

Step 4: Within the context of the APCs CSO programs, MS4 permit requirements, Construction Activity Permits and NYSDEC Design Manual, present these model local law(s) or guidelines to the land use decision makers associated with each APC. At that point, ask governing board members to consider adopting the green infrastructure model law(s) or guidelines.

a. This task would build upon the efforts that have been progressed through the Stormwater Coalition of Albany County. In general, these efforts set in motion the necessary outreach to land use decision makers, reinforced with targeted educational programs, to begin the process of re-tooling existing laws to embrace green infrastructure strategies.

b. Documentation/Reporting of new public and private green projects within the APCs, including an estimated runoff volume reduction on an annual basis. The objective of this task is to provide a mechanism by which to document the installation of “green practices or infrastructure” within the individual communities; and to assess the use of green practices within new development and redevelopment projects for both public and private sectors. It is anticipated that the individual APCs will include this documentation within their respective annual reports addressing Best Management Practices for Combined Sewer Overflows.

c. Completion of a feasibility assessment for a “Green Infrastructure Banking System”. This task will identify and evaluate various models associated with the potential implementation of a green infrastructure banking system, including the following:

- Stormwater In-Lieu Fees: An in-lieu-fee (ILF) approach for stormwater management occurs in circumstances where a permittee provides funds to an ILF sponsor instead of completing specific stormwater mitigation onsite. In general, a public entity, or entity designated by the public office would act as an aggregator to develop stormwater retention projects on public or private lands and receive payment from entities who cannot meet stormwater retention regulations with onsite mitigation. This model may also be able to support stormwater credits being offered to developers as a means to incentivize investment of private funds within designated priority areas/zones for redevelopment.

- Stormwater Retention Credit Banking: Market based solution similar to wetland mitigation banking systems. Under this model, private property owners install stormwater best management practices on private lands and sell excess retention credits to permitted entities.

The feasibility assessment will include the following tasks:

- Review of Stormwater Retention Regulations and Building Codes
- Projected Development Demand
- In-house Human Capital Assessment
- Topographical Assessment
- Stormwater Retention Strategies and Site Evaluations
- Financial Assessment of ILF Costs and Fee Calculations, or Off-Site Credits
- Compliance and Regulatory Structure Review

b. Implementation of 5 demonstration projects to collect and assess performance criteria. Proposed projects and/or initiatives include the following:

- City of Albany, Quail Street Green Infrastructure Project - The proposed project lies along Quail Street from Madison Avenue to Central Avenue, approximately 3,850 linear feet, and includes a $1. 8M "Green Component" of street trees, pervious pavers and bioretention areas to increase infiltration and water quality. The project includes a collaborative educational component to be performed in conjunction with the College of St. Rose and the University of Albany's Downtown Campus.

- City of Albany, North Swan Street Park Revitalization - It's the City's intent to "green-up" the park's existing infrastructure, using EPA's fix-it-first philosophy. The proposed project will reduce impervious surfaces by approximately 25%, and will evaluate the feasibility of various GI practices including: dry swales, tree plantings, stormwater planter(s), soil restoration/de-compaction and permeable pavers/pavement treatments.

- City of Watervliet, Route 32 Green Street Project - The City of Watervliet is proposing the reconstruction of approximately 0. 71 mile of Rt. 32. This section of Rt. 32 has single lanes of traffic going North and South, with one lane of street parking on both sides of the road. This area of the city has a mixed use of residential and small businesses, and is a highly traveled area for vehicles and pedestrians. The project would remove and replace approximately 152,080 square-feet of roadway with new pavement, and 30,416 square-feet of new sidewalk. Porous surfaces would be evaluated for sidewalks, parking lanes

and/or travel lanes. In addition, approximately 50 trees would be removed and replaced with environmentally friendly tree pits. This project is in its early development phase. The final project limits, and subsequent quantities, will be determined based on engineering considerations in conjunction with available funding constraints.

- City of Troy, Monument Square Green Infrastructure Project - The site of the former Troy City Hall (1 Monument Square) is undergoing a review process for redevelopment that will allow for riverfront access and commercial development. In conjunction with this project, the City of Troy is proposing to develop a GI project within the public right-of-way. The project would be located in a highly visible area of Downtown Troy (home of the popular Farmers Market), and would promote public education and awareness. Approximately 11,543 square-feet of sidewalk and 22,476 square-feet of roadway would be replaced with porous pavement or pavers; which would intercept stormwater runoff and reduce flow to the CSS. It is estimated that a project of this magnitude would cost between $1 million to $1. 5 million, dependent on subsurface percolation tests. As part of this demonstration project, the City would like to use the project as a case study for developing a "green infrastructure banking system".

- Village of Green Island, Albany Avenue Green Street Project - The Village of Green Island is proposing to reconstruct approximately 1,300 linear-feet of Albany Street. The Village is proposing to redesign the roadway, incorporating low impact development principles, to achieve a reduction of impervious surfaces of approximately 10%. The project is proposing the use of Filterra BioRention Systems™, as manufactured by Americast, in an effort to demonstrate the performance of these systems. The combination of landscape vegetation and a designed filter media allows bacteria, metals, nutrients and total suspended solids (TSS) to be removed naturally. The Filterra unit is well suited for the ultra-urban environment, and its small footprint allows it to be used in highly developed sites such as landscaped areas, green space, parking lots, and streetscapes. The project also proposes to use a hydro-dynamic separator to provide treatment of flows which exceed the capacity of the Filterra units.

Reporting requirements for the demonstration projects will depend on the final definition of the CSO LTCP program goals and objectives, and will be defined in consultation with the Department.

Cost/Performance Considerations

The required cost/performance considerations lack sufficient information.

1. Evaluation of Costs.

Comment: *Cost data for the various projects are provided in Chapter 7 of the draft LTCP and summarized in Table 7-2. These costs, however, are not related to performance. There is no comparison of different potential control scenarios that would allow the DEC to undertake a cost/performance analysis for the proposed control alternatives;*

Response: As noted above, the recommended CSO LTCP uses the Demonstration Approach. As the LTCP achieves compliance with the current water quality standards and meets the affordability criteria, there is no need to undertake additional cost/performance analysis.

2. "Knee of the Curve" analysis.

Comment: *The LTCP does not provide the necessary "knee of the curve" analysis to evaluate the incremental costs of additional CSO controls to determine whether increased control can be achieved at a reasonable cost (See, Section II. C. 5 of the Policy).*

Response: Please refer to the Knee of the Curve discussions in the previous response above.

3. Content of cost calculations.

Comment: *Some projects identified in the LTCP are already required by existing Consent Orders as well as other "non-LTCP" permit requirements. Inclusion of such projects in the cost calculations for the Albany Pool LTCP are inappropriate. The Department recognizes the Albany Pool Communities' effort to improve water quality of the Hudson River by implementing these projects. However, these projects need to be removed from the cost/performance calculations in the revised Albany Pool CSO LTCP because these are non-CSO sources of pollution. The following are examples of non-CSO projects that are already required: the disinfection upgrades at the three major sewage treatment plants under the respective county sewer district SPDES permits; the elimination of Dry Weather Overflows (DWOs) of raw sewage and the implementation of three green infrastructure Environmental Benefit Projects by the Rensselaer County Sewer District under a Consent Order (4-20091123-154).*

Response: Many of the projects (outside of the Environmental Benefit Projects) provide a secondary benefit in addition to the reasons they are required under the consent orders. For example, the recommended LTCP includes projects which maximize flows to the treatment plants during wet weather which will be disinfected. As a result, the WWTP disinfection provides benefits for CSO control in addition to dry weather conditions. Improvements to the combined sewer systems' capacities maximize flow to the WWTP, thereby reducing overflow volumes conveyed to the receiving waters. It should also be noted that none of the consent orders were in place at the time the project was initiated and many of the solutions were identified as part of the development of the LTCP. The solutions were developed with the intent of maximizing the benefits of the proposed projects. By looking beyond the consent order issues, the proposed solutions have been developed to provide the maximum environmental benefits.

Implementation Schedule

Comment: *The LTCP is also incomplete because it does not provide all pertinent information necessary to develop the construction and financing schedule for implementation of CSO controls. (See, Section II. C. 8 of the EPA Policy). For example, the revised LTCP will need to separate all of the proposed projects by municipal political entities (as between each of the six Albany Pool Communities and the county sewer districts) responsible for the implementation and payment of projects. The projects that are proposed to be shared by those entities must be specifically identified and their cost sharing arrangement detailed (see, Section 4. 4, pg. 4-13 in Combined Sewer Overflows, Guidance for Long-Term Control Plan (EPA 832-8-95-002). September, 1995: "It is important that the individuals and entities responsible for implementing each aspect of the program is identified in the LTCP"). The six municipalities and the*

county sewer districts will need to enter into inter-municipal agreement(s) ("IMA's") or equivalent legal mechanism that must be executed within the first year of the approved LTCP implementation schedule. The IMA's or equivalent legal mechanism need to document any agreement(s) between the Albany Pool Communities and county sewer districts concerning the specific municipal and inter-municipal responsibilities and commitments, funding responsibilities and cost-allocation or cost-sharing arrangements.

Response: The recommended Albany Pool CSO LTCP has been developed from a regional perspective to build the most cost-effective program practicable; while maximizing the environmental benefits. The communities and sewer districts are currently developing a governance structure for the implementation of the LTCP. A more detailed response addressing the proposed governance structure is currently being developed, and will be provided under a separate cover. Additional information required by the Department pertaining to the responsible parties for implementation of CSO controls is provided in Table 7-4B: Recommended Final CSO LTCP (See Appendix O).

Attachment to the Department's December 5, 2012 comment letter on the Albany Pool draft LTCP

This attachment provides the detailed comments, as well as additional general comments, on the Albany Pool draft LTCP dated June 30, 2011. The comments are organized in the format of the LTCP.

Executive Summary (ALL)

***Comment:** Page ES-15, BMPs/System Optimization: The report states that projects within this category will focus on SPDES permit BMPs and maximizing the performance of the existing infrastructure through regulator and weir modifications, reduction of system inflow, capacity upgrades, and improved operations. The report should specifically identify what will be done for each of these categories. If any of the projects will be undertaken pursuant to the terms of a separate administrative consent order that must be stated.*

Response: BMPs and System Optimization Projects primarily consist of projects to improve capacity and maximize flow to the WWTPs. The Sewer Separation and Stormwater Storage Projects either reduce inflow to the system or provide storage for the purposes of reducing peak wet weather flows. The Tributary Enhancement Projects primarily consist of investigations of sewers that cross or parallel tributaries. The purpose of these projects is to reduce infiltration during periods of high ground water and exfiltration during the low groundwater months (recreational season). Additional Pool-Wide Projects include Sewer System Operations, Maintenance and Inspection Plans and Asset Management Plans for each community. The development and implementation of these plans will improve pool-wide maintenance and operation of the collection and treatment systems. While some of these projects have

been undertaken to address administrative consent orders, these projects also provide CSO control benefits beyond the intent of the order(s).

Tables 7-4 and 7-5 in the Draft LTCP categorize each recommended and completed project, respectively. In addition, Table 7-6 characterizes the benefits associated with the proposed projects and indicates whether the project is required under an existing consent order. An overview of the proposed projects was provided to the DEC at the April 25, 2013 Technical Workshop. An expanded description for all of the projects to be implemented under this program has been compiled and included in Table 7-4B:

Recommended Final CSO LTCP included in Appendix O. Table 7-4A: Recommended Draft CSO LTCP (Completed Projects) is also provided in Appendix O and provides additional details for projects that have been completed to date.

Comment: *Page ES-17, Green Projects: Incorporate more green infrastructure projects. The report lists a few green pilot or demonstration projects that have been completed or are presently under development but these are very limited.*

Response: The communities are committed to implementing green projects and strategies. The Green Infrastructure Technical Guidance Document, as discussed in the Draft LTCP, will identify green technologies that are best suited for the Albany Pool region and the capabilities of the communities' current maintenance staff. The guidance document will develop consistent design, construction and maintenance practices for pool-wide use by the municipalities, as well as private property owners and developers.

In response to the Department's concerns, the APCs are proposing an expanded Green Infrastructure Program which will evaluate the effectiveness of "green practices" through codes and local law review; documentation/reporting of new public and private development projects within the APCs; performance of a feasibility assessment for a "Green Infrastructure Banking System"; and the implementation of additional demonstration projects. Please refer to earlier discussions of the expanded Green Infrastructure Program in the comment letter for more details.

Comment: *Page ES-19, Governance: The report states that it is the intent among the Albany Pool communities to establish a Phase II inter-municipal arrangement for future governance of the Albany Pool CSO program. With regard to the anticipated application to the Department of State for a Shared Services Municipal Planning Grant, provide the status of this effort and timeframe for completion.*

Response: The communities and sewer districts are currently developing a governance structure for the implementation of the LTCP. A more detailed response addressing the proposed governance structure is currently being developed, and will be provided under a separate cover.

Chapter 2

Comment: *Page 2-21, Patroon Creek: This section states that there is a significant source of bacteria between Rensselaer Lake and the Fuller Road sampling location and additional investigations are ongoing with remedial actions proposed as part of the LTCP. Describe the investigations, and present and evaluate the proposed remedial actions. It is also stated that the Patroon Creek is negatively impacted by Sand Creek. The Department repeats the same comment: Describe the investigations and present and evaluate remedial actions for this area. (ALB)*

Response: The 2008 Receiving Waters Conditions Assessment showed dry and wet weather exceedances for fecal coliform bacteria at the Patroon Creek sampling location. Between the 2008 and 2009 sampling sessions, investigations were performed and two properties were found with sanitary sewer service connections to the storm sewer system. The laterals at these properties were disconnected from the storm sewer and connected to the sanitary sewer. During the 2009 tributary sampling program, the fecal coliform levels were found to be significantly reduced compared to the 2008 samples. However, multiple upstream tributaries to the Patroon Creek from the Town of Colonie continued to exceed the monthly geomean water quality standard for fecal coliform of 200 cfu/100mL for the dry weather events. In

addition, all the tributaries sampled continued to exceed the water quality standard for the wet weather events. Despite the improvements, the results indicate that elevated counts of fecal coliform continue to impact the Patroon Creek from sources upstream of the City of Albany. While it is recommended that the upstream communities investigate potential sources of bacteria, such investigations for non-member Albany Pool communities are outside the scope of this LTCP as the APCs are not responsible for investigations, enforcement or compliance measures outside their jurisdictional boundaries.

As a result of the monitoring performed on Patroon Creek and tributaries to Patroon Creek, remedial measures were identified and corrective actions were completed. Please note that there are no CSO's within this reach of the Patroon Creek; and as such, investigations will focus on non-CSO sources. Similar investigations may ultimately be necessary by others upstream of the City of Albany to achieve water quality standards for this waterbody.

Comment: *Page 2-21, Normans Kill: The Krum Kill location showed exceedances of the bacteria standards. Same comment. (ALB)*

Response: The overflow from the Woodville Pump Station is the only known CSO that exists along the Krum Kill (CSO 012). The Krum Kill conveys flows downstream to the Normans Kill; which ultimately discharges into the Hudson River. There are no documented overflows that discharge directly to the Normans Kill. Sampling performed in the upstream reach of the Krum Kill indicated elevated fecal counts but, because it runs along the border between Albany and Bethlehem and also has a source in the Town of Guilderland, source conclusions are difficult to determine.

Modeling for the Albany CSS predicts an average of three overflows per year at the Woodville pump station. Considering the baseline conditions along the Krum Kill, these overflows will not preclude the attainment of water quality standards based upon the criteria defined for the presumptive approach. In response to concerns expressed by the DEC, the City of Albany is proposing to modify the monitoring equipment in the pump station to record the activation periods of overflow events; along with the volumes discharged to the Krum Kill. This data will be compiled and included in the City's annual reports addressing Best Management Practices for Combined Sewer Overflows.

Comment: *Page 2-22, Mill Creek: Same comment. (REN)*

Response: The 2008 and 2009 Receiving Waters Conditions Assessment was performed to characterize the conditions of the receiving waters upstream of the Albany Pool CSOs, as well as assess potential impacts of CSOs to the receiving waters. In the case of Mill Creek, the geometric mean for fecal coliform bacteria was found to exceed the water quality standards during dry and wet weather conditions. The exceedances during dry weather indicate that there are bacteria sources, other than CSOs, impacting the ability to achieve NYS water quality standards. The scope of the sampling efforts for the development of the LTCP were limited to characterizing the receiving waters and did not include extensive efforts to identify the sources of bacteria outside of CSOs. Although identification of sources of bacteria upstream of the Albany Pool CSOs is not directly related to development of CSO controls, the recommended plan includes a project to further investigate non-CSO bacteria sources to Mill Creek. This project will focus on the investigation of sewers within the boundaries of the City of Rensselaer that cross or parallel Mill Creek or its tributaries. These investigations will assess the condition of these sewers and will make recommendations for repairs where there is believed to be a high risk for exfiltration of sewage from these existing sewers.

Comment: *Page 2-24, Wet Weather Conditions Observed in 2009: Patroon Creek, Normans Kill, Krum Kill, Wynants Kill, Poesten Kill, and Mill Creek results all showed exceedances of bacteria standards. Same comment. In particular, the Krum Kill may be impacted by the Woodville Pump Station overflow. An assessment needs to be done on the effect of overflows from this station on the water quality in the Krum Kill. (TROY, ALB, RCSD, ACSD)*

Please refer to responses above that address Patroon Creek, Krum Kill and the Normans Kill. Rensselaer CSOs 011 and 012 are the only outfalls on the east side of the Hudson River that discharge to tributaries. All other permitted outfalls discharge to the Hudson River. The Recommended CSO LTCP provided in Table 7-4B includes a project that will eliminate CSO 012. This project has since been completed and CSO 012 outfall has been permanently closed. The collection system model indicates that CSO 011 overflows once per year, discharging approximately 10,000 gallons to Mill Creek on an annual average basis. Considering the baseline conditions of the receiving water, a single discharge event from this outfall annually will not preclude the attainment of water quality standards based upon the criteria defined for the presumptive approach.

Recent inspections in the City of Troy identified an apparent diversion of a permitted CSO outfall (CSO 045) to the Wynants Kill. The diversion results in unpermitted discharges from the existing Cross Street sewer outfall during wet-weather periods, downstream of the regulator for CSO 045, which result in direct discharges to the Wynants Kill. The Recommended CSO LTCP provided in Table 7-4B includes provisions for the evaluation of alternatives for restoration of the permitted discharge to the Hudson River and elimination of the unpermitted discharge to the Wynants Kill. The schedule for the performance of the evaluations and construction of the proposed improvements is provided in Table 7-4B; and considers potential issues with contaminated soils and the coordination of activities with the railway.

Comment: *2. 5. 3. 5, The Department has identified an unpermitted CSO on Broadway to Mill Creek in the City of Rensselaer. This CSO was overflowing under dry weather during an inspection with City staff. The City of Rensselaer is required to eliminate this CSO under the terms of an existing Consent Order and so this project will occur regardless of the LTCP. However, the Albany Pool is to include the presence of this unpermitted CSO into Mill Creek among the contributing sources to the exceedances of water quality standards that must be analyzed and properly addressed by the LTCP. (REN)*

Response: The Recommended CSO LTCP summarized in Table 7-4 includes a project for elimination of the dry weather overflow on Broadway. This project will also eliminate the unpermitted CSO. This project has been completed and the unpermitted discharge eliminated as part of sewer separation work performed along Broadway.

Comment: *2. 5. 4. 3, Although no SSOs were reported to the Department during the time that sampling occurred, complaints from residents in the Brookside Avenue area have indicated that SSOs regularly occurred in that area during wet weather events. The Town of North Greenbush is required to eliminate the SSOs under the terms of an existing Consent Order. Detail in the LTCP how this is being investigated and resolved under the Consent Order. (REN)*

Response: The Town of North Greenbush is not a member of the Albany Pool. As a result, SSOs occurring within the town are out of the scope of this LTCP. It is our understanding that the Town of North Greenbush is currently required to complete actions under an existing order on consent which may result in improved conditions within the receiving waters.

Chapter 5

Comment: *Page 5-10, Troy: Tide gates at most of the regulators north of the Federal Dam are susceptible to leakage under high stage conditions. The Rensselaer County Sewer District is required to investigate and address the impact of this leakage under the terms of an existing Consent Order (CO4-20091123-154). The LTCP must acknowledge this issue. (TROY)*

Response: These conditions were acknowledged in the last sentence of Section 5. 3. 4 on Page of 5-10 of the Draft LTCP. As discussed in the text, the tide gate leakage was taken into consideration in the collection system modeling for Troy.

Comment: *Page 5-16, Table 5-3: Most Active CSOs by Volume: Identify in the LTCP which projects will address the most active CSOs. Highlight projects associated with these outfalls. (ALB, TROY)*

Response: The primary outfalls serving the sewersheds for which the projects are located have been identified in the documentation of the Final CSO LTCP. However, it should be recognized that projects, that improve conveyance and treatment capacity or reduce infiltration and inflow to the combined sewer system, may generate benefits to portions of the system beyond the primary outfall serving the sewershed.

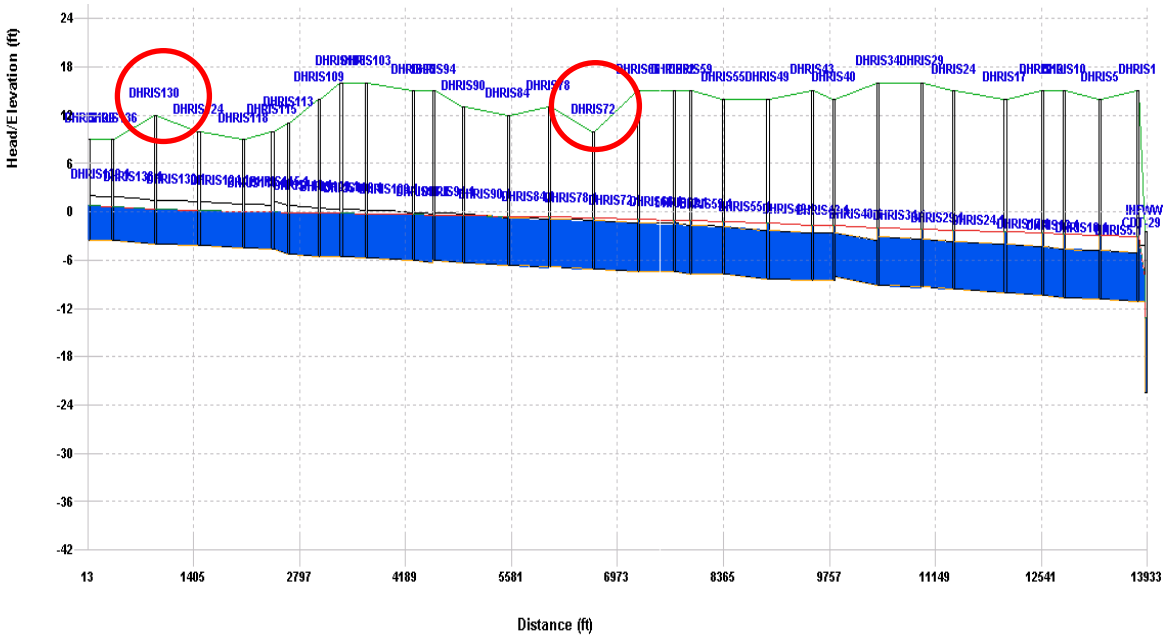
Comment: *5. 3. 1 through 5. 3. 3, Identify how often flows in the collection system exceed the flow capacity at the WWTPs and/or Pump Stations. Identify whether the model represents this condition (i. e. backup to first upstream CSO) at the Albany North and South WWTPs, and at the RCSD WWTP, and if so, describe how the model does so. (COHOES, WAT, GI, ALB, REN, TROY)*

Response: It is important to recognize that the frequency of collection system overflow varies depending upon the intensity and duration of each storm. Overflows are also impacted by the path the storm takes through the Albany Pool and the area impacted by the storm. Should an isolated storm pass west to east through the southern portion of the Albany Pool, overflows may occur in only Albany and Rensselaer with no overflows in the other communities. During these circumstances, an intense isolated storm can also cause an overflow in another portion of the system due to limitations of the gravity sewer. In this case, the overflow may occur without exceeding the full capacity of the pump stations or the WWTP.

The collection system modeling accurately reflects peak wet weather capacity at each of the major pump stations and each of the WWTPs. When the peak capacity of each of these facilities is exceeded, flow surcharges within the collection system and overflows at the nearest upstream CSO outfall(s). In addition to the foregoing, each system is unique in how it operates and how it reacts to wet weather conditions. The following provides additional details on how each of the three collections system models were developed to reflect system performance in reaction to precipitation events.

In the case of the Albany North WWTP, the existing peak wet weather capacity is approximately 90 mgd and is controlled by the firm hydraulic capacity of the influent pump station of 90 mgd and the primary treatment process capacity of 88 mgd. The results from the 5 year baseline run (without a flow limit at the plant) show that the flow influent to the plant exceeds 90 mgd only twice in the five year simulation period, for an average of 2. 6 hours per event. Backwater from the ACSD North WWTP does not influence the North system CSOs. The maximum HGL with the flow limited to 90 mgd at the plant is shown in the figure below. The hydraulic grade line (HGL) profile shows that the interceptor does not surcharge upgradient of node DHRIS72. The most downstream overflow is near node DHRIS130, one mile upgradient of the surcharge.

Figure. Hudson River Interceptor Maximum HGL at 90 mgd ACSD North WWTP Capacity



The Albany South WWTP controls peak flows by adjusting a sluice gate at the head of the plant. The collection system models tributary to the South Plant include controls to limit the peak flow into the WWTP and account for upstream surcharging and resultant overflows at CSO outfalls. These conditions are in fact dynamic in nature as they are manually controlled based upon the operating conditions at the plant, which can be influenced by several factors. The flows at the plant were modeled based on historical flow records and discussions with the ACSD staff.

The models for the Troy and Rensselaer collections systems tributary to the RCSD WWTP are modeled for unobstructed flow to the WWTP. Flow entering the WWTP is not throttled by a sluice gate or limited by an influent pumping station at the head of the plant. As most of the flow tributary to the RCSD WWTP is pumped via the Monroe Street Pump Station in Troy and the Forbes Avenue Pump Station in Rensselaer, capacity restrictions are essentially limited to the capacity of these pump stations. Under existing conditions, RCSD uses the sluice gates upstream of the pump stations to throttle flow to the pump station when the manually cleaned bar screens blind with debris. Therefore under baseline conditions, capacity limitations were based upon the position of the sluice gates used to throttle flow to the pump stations. Under the improved condition, flow limitations were placed upon the pipe upstream of the pump station based upon the peak pumping capacity of the pump station. Once the peak capacity is reached, the model simulates surcharging in the upstream sewer and the hydraulic relief that occurs as a result of the discharges at upstream CSO outfalls.

Comment: *5. 6. 2, The LTCP must properly address the large volume of infiltration and inflow ("I/I") identified in the Albany South interceptor. (ALB)*

Response: During the development of the Draft LTCP, it was identified that the Bouck CSO was not protected by a tide gate to prevent inflow to the system from the Hudson River. The Recommended CSO LTCP, as summarized in Table 7-4A, includes a project to install a new tide gate at the Bouck CSO. This project has since been completed.

Comment: *5. 8, DWOs must be eliminated. Identify whether the control alternatives (113th Street Stream Separation / Hoosick Street Storm Sewer Extension) are for the purpose of eliminating the DWOs at CSOs 013 & 024. If so, clarify that these control alternatives are under Consent Order (CO4-20091123-154). If these control alternatives serve a different purpose, fully explain as requested in the general comments. Priority must be given to completing these projects in the near term. (TROY)*

Response: Prevention of dry weather overflows at CSOs 013 and 024 will be accomplished through modifications to the regulator weir height and/or the regulator orifice opening, both of which control flow to the interceptor sewer.

The 113th Street Stream Separation and Hoosick Street Storm Sewer Extension Projects were proposed for the purposes of eliminating inflow sources from the collections system. The primary purpose of these projects is to reduce stormwater flow to the collection system, thereby reducing the frequency of CSOs. The reduction in stormwater sources tributary to these regulators frees up sewer capacity to convey more wastewater to the interceptor and the WWTP. As a result, the improved conveyance capacity reduces the risk of DWOs and reduces wet weather CSO volumes within the CSS.

Chapter 6

Comment: *The wet weather capacity discussion must mention where collection system capacity limits flow delivery to the WWTPs. (Examples: 1. Influent flows to ACSD South are restricted by the sluice gates. 2. Influent flows to RCSD are restricted by pump station capacity.) (ALL)*

Response: The capacities of the existing collection systems and WWTPs were evaluated against the peak wet weather flow identified in each sewer district's SPDES Permit. Under Best Management Practice 5 (BMP 5) Wet Weather Operating Plan, each District is required to receive and treat a minimum flow during peak wet weather conditions. Chapter 4 and associated appendices summarize the findings of the collection system analyses, while Chapter 6 and associated appendices summarize the findings of the WWTP wet weather capacity analyses. Related projects, identified in the Draft CSO LTCP and Table 7-4B, provide for upgrades to existing facilities for the purposes of addressing capacity limitations and compliance with BMP 5.

Comment: *6. 2 and 6. 3, Considering the capacities of ACSD North and South, it appears there may be an opportunity to divert some flow from the overburdened South sewershed to the North Plant. This could reduce the overall volume of CSO. This must be evaluated in the LTCP. (ALB, COHOES, GI, WAT, ACSD)*

Response: In response to this comment, the APJVT has assessed the feasibility of diverting wet-weather overflows to the ACSD North Plant. Specifically, a new 50 MGD pumping station, along with approximately 3. 1-miles of 42-inch diameter forcemain, would be required to convey Big C overflows to the ACSD North Plant. This conceptual alternative assumes that the pump station would operate only when additional wet weather capacity is available at the North Plant (i. e. plant influent flows are below ~80 MGD) and would deliver up to 50 MGD, limiting the total plant influent to 85 MGD. The estimated cost of constructing the 50 MGD pump station along with the 3. 1 miles of force main (estimated at $100 million) would be more than double the cost to construct screening and disinfection at the Big C Overflow. Such costs cannot be justified based on cost/benefit analyses performed which indicates that a greater reduction in untreated CSO volumes can be achieved through the implementation of the screening and disinfection at the Big C overflow.

Aside from high cost, this concept has a number of other challenges briefly discussed below. Given the intermittent use of the pump station (estimated at only 380 hours per typical year); the force main would have to be drained after each event to eliminate septic conditions, solids settling, corrosion and odor concerns. This would require draining approximately 1. 2 MG either to the ACSD North Plant or back to the pumping station and the ACSD South Plant. Additionally, this proposed concept would result in significant additional energy costs associated with the headlosses in the 3. 1 mile forcemain, and the need to provide double pumping of the flows. Furthermore, the proposed concept would use the available North Plant capacity; thereby, potentially impacting future population growth and development opportunities. Based on these considerations, transferring flows from the South sewershed to the ACSD North Plant does not appear to be cost-effective.

Chapter 7

Comment: *7. 3, Scenarios 2 and 2A presume that there will be improvements in headwaters and tributary water quality. Because the tributaries in questions flow through Albany Pool communities and improvements are required to ensure maintenance of water quality standards in the Hudson River, the LTCP must include the projects necessary to produce and maintain the improvements in order to support the recommended control strategy. (ALL)*

Response: As discussed throughout this recommended CSO LTCP and during CAC meetings, the receiving water samples collected in 2008 from the Hudson River and several of its tributaries clearly indicate that there are dry weather sources of bacteria that have a significant impact on the ability to achieve NYS Water Quality Standards for fecal coliform. Additional receiving water quality sampling was performed on the tributaries in 2009, further documenting elevated bacteria levels upstream of the Albany Pool Communities during both dry and wet weather conditions. This data substantiates the presence of bacteria sources originating outside the Albany Pool Communities.

The 2009 tributary sampling along Patroon Creek also documents reductions in bacteria levels associated with work performed along the Patroon Creek in the City of Albany by the ACSD. These improvements corrected illicit connections to storm sewers and other defects in the collection system. In consideration of the reduction in bacteria levels observed in Patroon Creek, as a result of these improvements, similar investigations were proposed for sewers running parallel to or crossing the other Hudson River tributaries passing through the Albany Pool Communities.

Rehabilitative measures will be performed where investigations indicate a risk of exfiltration from these sewers to adjacent waterways. The elimination of dry weather sources of bacteria provide the greatest water quality and health benefits to the community as they address continuous sources of bacteria that have the greatest impact on the waterway. These non-CSO sources influence the waterways during periods when primary and secondary contact recreation is taking place. This watershed perspective goes beyond CSO control and provides a cost effective approach to achieving water quality standards, maintaining waterbody uses and protecting public health.

While it is recommended that the upstream communities investigate the potential bacterial influences which could be associated with farm runoff, failed septic systems, stormwater or a number of other sources; such investigations for non-member Albany Pool communities are outside the scope of this LTCP as the APCs are not responsible for investigations, enforcement or compliance measures outside their jurisdictional boundaries.

Comment: *7. 3, The sanitary loading may be greater in the morning or evening based on a typical diurnal curve. The executive summary indicates that the noon value was compared to the daily average but was not compared to the value when the sanitary loading is greatest. Identify whether the number of exceedances increases if the geometric means are calculated based on values other than noon (12 pm). If so, evaluate compliance using the more conservative values. (ALL)*

Response: Due to the level of dilution of the wastewater during wet weather conditions, the diurnal sanitary loading has no discernible impact on pollutant concentrations or the risk of exceeding Water Quality Standards. Noon was simply selected as a time that would be reasonable for staff to perform Post Construction Compliance Monitoring and a period of time when people would likely be in the water. Considering the area to be covered from our past sampling experience to characterize the receiving waters, it is more likely that staff would mobilize in the morning and take most of the work day to complete the sampling efforts.

During the review of the Receiving Water Quality Model Development Report, the NYSDEC asked the APJVT to evaluate the following methods of calculating the geomean for fecal coliform:

- Monthly geomean using noon values;
- Monthly geomean using daily averages;
- Rolling geomean using noon values; and
- Rolling geomean using daily averages.

As shown in the following summary table, these analyses showed no discernible difference in the frequency of bacterial exceedances for the each method of calculating the geomean for fecal coliform.

Summary of Methods for Calculating the Geomean for Fecal Coliform, Baseline Conditions

Transect	Monthly Geomean Using Noon Values	Monthly Geomean Using Daily Average Values	Rolling Geomean Using Noon Values	Rolling Geomean Using Daily Averages
RT4	1. 6	1. 8	1. 3	1. 8
RT5	0. 6	1. 2	0. 8	1. 6
RT6	0. 6	0. 6	0. 5	1. 0
RT7	6. 0	6. 0	5. 9	6. 0
RT8	6. 0	6. 0	5. 9	6. 0
RT9	6. 0	6. 0	5. 8	5. 9
RT10	2. 0	3. 0	2. 5	2. 8
B18	1. 4	1. 6	1. 1	1. 3
B17	0. 2	0. 2	0. 1	0. 1

Notes:

1). The results indicate the number of months exceeding the geometric mean water quality standard for fecal coliform of 200 cfu/100 ml during the 6 month recreation season.

2). More detailed information can be found in the Receiving Water Quality Development Model Report contained in Appendix H of this LTCP.

Comment: *7. 3, Determine whether water quality standards would be met year-round if disinfection was performed year-round. (ALL)*

Response: As the current SPDES Permit requirements for the WWTPs are to disinfect seasonally between May 1 and October 31, a review of year-round bacterial impacts is beyond the scope of this CSO LTCP.

Comment: *7. 3, Identify the daily maximum fecal coliform concentration that could be achieved by the recommended alternatives. (ALL)*

Response: Since the current water quality standard for fecal coliform concentrations is based upon a geometric mean with no single sample maximum limit, evaluations to identify maximum fecal concentrations resulting from the Recommended CSO LTCP are beyond the scope of this project. In an effort to address concerns expressed by the DEC regarding the recovery time of the receiving waters, further analyses have been performed. Please refer to the more detailed discussions presented later in this response.

Comment: *7. 4, This subsection provides a summary of a screening analysis of CSO abatement technologies. The list includes quantity and quality source control measures; collection system controls; CSO storage technologies; and CSO treatment technologies. For each potential individual control option, the LTCP indicates whether that technology should be included as part of the LTCP strategy. The results of this evaluation included: the practice is already being implemented and it should be continued; the practice should be adopted as part of the LTCP; or the practice is "not feasible or appropriate. " However, the LTCP provides no information on the screening process itself or the criteria to determine whether an individual control option should be retained or rejected. Therefore, the alternatives screening process is incomplete. Revise this subsection to include an approvable alternatives screening process. (ALL)*

Response: Please refer to Appendix J which contains the CSO Control Evaluations Report. This report discusses each of the CSO controls considered in the development of the CSO LTCP and supports the technologies recommended in the CSO LTCP.

Comment: *Pages 7-3 to 7-5, Identification and Screening of CSO Abatement Technologies: Table 7-2 provides a listing of CSO abatement technologies. For the technologies deemed not feasible or appropriate, more justification shall be provided for each technology regarding why it is not appropriate. Provide the information relied upon and the rationale supporting the rejection of each such CSO abatement technology. (ALL)*

Response: Please refer to Appendix J which contains the CSO Control Evaluations Report. This report provides the justification as to why certain technologies were rejected from consideration.

Comment: *Page 7-6, Green Infrastructure Strategies: Explain the promotion of Green Infrastructure Practices within Municipal Capital Improvement Programs, and describe how such promotion efforts will be accomplished. (ALL)*

Response: A Green Infrastructure Technical Design Guidance will be developed as one of the recommended projects. Strategies for implementing and promoting the use of green infrastructure will be discussed during the development of this document. In addition, the Codes and Local Law Review, as proposed under the expanded Green Infrastructure Program, includes provisions to educate land use decision makers, Municipal and/or Municipal Designated Engineers in green infrastructure techniques. This will be accomplished by conducting a survey of land use decision makers in each municipality. The survey instrument will serve to identify knowledge gaps, and from that develop and conduct training workshops targeting priority concepts. Expanding the core knowledge of municipal leaders will encourage a more probing review of development proposals; and assist in any effort to update local land

use laws as well as the development and acceptance of the Green Practices Technical Guidance Document to encourage green infrastructure.

Comment: *7. 9, Summary of Recommended CSO LTCP: More detail must be provided on each of the proposed projects. Include a narrative summary/description for each project. (Examples: 1. Explain if the RCSD Pump Station upgrade project increases Pump Station capacity to the 63. 5MGD plant capacity. 2. - Explain what the water quality webpage will include. (ALL)*

Response: An overview of the proposed projects was provided to the DEC at the April 25, 2013 Technical Workshop. In addition, more detailed descriptions of the projects, along with their associated benefits, is included in the documentation supporting the Final Recommended CSO LTCP.

Comment: *Cost/performance considerations. Cost for the various projects is provided in Chapter 7 and summarized in Table 7-2. However, these costs are not related to performance. As with the evaluation of alternatives, there is no comparison of different potential control scenarios that would allow the reader to evaluate the tradeoffs in cost versus benefit of individual projects. There is also no "knee of the curve" analysis to show where increased CSO control yields diminishing incremental returns. Summarize the cost and potential benefits of all proposed projects in the form of a table. Information should be presented to demonstrate the following:*

- *Sufficient information to determine if the planned control program will provide the maximum pollution reduction benefits reasonably attainable.*
- *Cost/performance curves that demonstrate if the planned control program will provide the maximum pollution reduction benefits reasonably attainable. (ALL)*

Response: The receiving water quality modeling shows that upon construction and implementation of seasonal disinfection at the WWTPs (Scenario 2), the monthly exceedances of the geometric mean for fecal coliform will be reduced to two times annually, over the five year model simulation period. Headwaters improvements, associated with the implementation of disinfection facilities and CSO programs upstream of the Albany Pool, will improve baseline conditions. These improvements along with the reductions in baseline bacteria levels in Patroon Creek shown in the 2009 tributary sampling (a result of ACSD initiatives to identify and eliminate illicit sewer connections) will achieve water quality compliance in the receiving waters as indicated by Scenario 2 of the bacteria modeling. As a result, all projects beyond the WWTP disinfection facilities and sewer improvements surrounding Patroon Creek as identified in Scenario 2 do not provide additional benefits in regards to meeting the NYS water quality standards for fecal coliform.

The balance of the projects included in the Recommended Plan consist of projects intended for improving WWTP and collection system performance, maximizing flow to the WWTP, reducing the risk of flooding, addressing tributary impacts, addressing floatables control and improving operations and maintenance. As these projects address other issues while providing reductions in CSO discharge, the APCs believe that there is benefit to implementing these additional projects. In consideration of the foregoing, the Recommended LTCP provides the maximum pollution reduction benefits reasonably attainable.

In an effort to address concerns expressed by the DEC regarding the recovery time of the receiving waters, further analyses have been performed. Please refer to the more detailed discussions presented later in this response.

Comment: *Post construction compliance monitoring program. The LTCP proposes a robust post construction compliance monitoring program that is summarized in Section 7-11. The post construction compliance monitoring program focuses on evaluating the same beach sites monitored during the receiving water monitoring to ensure that water quality standards at sensitive areas are met. Clearly outline how the post construction information will be presented. (ALL)*

Response: It is recommended that any further details on the Post Construction Compliance Monitoring Plan (PCCMP) be deferred until the Final Recommended CSO LTCP is approved. The structure of the regional entity responsible for implementing the plan will impact who will be responsible for performing the PCCMP and how it will be implemented. In addition, any changes to the recommended plan, implementation schedule or other components of the LTCP could influence the details of the program. The post-construction monitoring plan will be submitted to DEC for review and approval prior to implementation of the monitoring program.

Please note that the proposed PCCMP does not focus on the future potential beach sites but rather on the Hudson River transects RT8 and RT9 which appear to be the most impacted by the Albany Pool CSOs, based on the WQ sampling and modeling efforts. Should a public beach be developed for the sites identified in the LTCP, the NYSDOH will require that sampling be performed in accordance with the current WQ standards for public beach sites (NYSDOH Beach Water Quality Monitoring Requirements contained in Part 6, Subpart 6-2 Bathing Beaches).

Chapter 9

Comment: *9. 2, The water quality webpage should be implemented as soon as possible. Indicate when this can be developed. Explain why there is so much time (5 years) in the schedule for implementation of the WQ webpage. (ALL)*

Response: A substantial budget has been carried for the purposes of developing an application that can be used to provide public advisories related to CSO discharges, along with additional program information. The scope of work for this project has not been fully developed, as there are a number of factors that will influence how the tool/website will be developed, what information will be provided, who will maintain it, who will have access to it, data sources to be used in providing alerts and many other considerations. In addition, the water quality tool/website will need to be developed in a manner that is consistent with the recently enacted Sewage Pollution Right to Know (SPRTK) Act. The scope will also need to consider and be consistent with NYSDEC plans to develop a webpage for accommodating SPRTK notifications.

Considering the number of unknowns at this time and the number of stakeholders who will weigh in on the development of this application, it may take some time to develop this tool/website and coordinate these efforts with DEC guidelines (which still need to be developed and published). Once the disinfection facilities at the WWTP's have been completed, receiving water sampling can be performed to confirm the water quality benefits and recalibrate the bacteria model. The updated data can then be used to develop the tool/website, and a process developed to provide appropriate advisories based upon the improved conditions of the receiving waters.

In an effort to address the immediate need to provide notification of CSO discharges, as required by the SPRTK Act, the notification and public advisory system will be developed in a phased approach. The first phase will include the discharge notification system for the Albany Pool CSO's, and is anticipated to be completed prior to December 1, 2014.

Comment: *9. 4. 3, An additional river transect(s) should be considered in the Hudson River mid-pool to determine attainment throughout the Albany Pool. Sampling must cover the waters other than the Hudson River with CSO outfalls (see comments in this Attachment on Chapter 2, above). (ALL)*

Response: As per our discussions during the April 25, 2013 Technical Workshop, based on the WQ sampling and modeling results, the proposed sampling transects RT8 and RT9 appear to represent the most influenced reach along the river from Albany Pool CSOs, and should provide a sufficient and conservative representation of the Hudson River WQ conditions. However, the final sampling locations may be re-evaluated and adjusted accordingly upon approval of the Final Recommended CSO LTCP and in consideration of any additional program requirements established by the DEC.

Comment: *9. 4. 4, Sampling events must be coordinated to capture wet-weather events. Expand the subsection to confirm and describe how this will be accomplished. (ALL)*

Response: As per our discussions during the April 25, 2013 Technical Workshop, the proposed weekly sampling schedule on a preset day of the week simplifies the sampling logistics and avoids weather related data bias. Given the number of precipitation events that occur within the recreational period, there is a reasonable probability of capturing wet weather events during the weekly sampling.

Comment: *9. 4. 4. 2, Clarify in this subsection that if wet-weather conditions are causing or contributing to non-attainment, existing information will first be used to try to determine which source(s) should be addressed prior to undertaking an additional monitoring and modeling study. (ALL)*

Response: The communities will utilize existing and available information to try to identify CSO based bacterial sources that are determined under the PCCMP to preclude the attainment of water quality standards prior to undertaking additional monitoring and modeling studies.

Chapter 10

Comment: *Discussion of public participation. Chapter 10 of the LTCP is devoted to public participation. The LTCP makes it clear that the stakeholders and the general public had multiple opportunities for becoming involved in the LTCP process. However, there does not appear to be a summary of any input that the public had into the process, and how any public input was addressed. Supplement this section to include this public input. (ALL)*

Response: Copies of the presentations and meeting minutes (which document stakeholder comments) for each of the Citizens Advisory Committee and Public Meetings are posted on the CDRPC website.

Appendix I, Chapter 1

Wastewater treatment plant improvements

Comment: *1. 3. 5. 1, Provide a thorough analysis of increasing the capacity of the Albany County Sewer District (ACSD) and Rensselaer County Sewer District (RCSD) Wastewater Treatment Plants to handle*

higher peak wet weather flows because this is one way to reduce the frequency and volume of untreated CSO discharges upstream in the collection system. A justification is required for the cut off point for secondary bypasses and/or a feasible alternatives assessment for the secondary bypasses. Appendix I of the LTCP addresses some WWTP improvements but does not mention anything about expansion of primary or secondary capacity. (ACSD, RCSD)

Response: Appendix I contains the ACSD and RCSD WWTP Process and Hydraulic Capacity Studies. The capacities of the WWTPs were evaluated against the peak wet weather flow requirements identified in each sewer district's SPDES Permit. The report provides a detailed evaluation of the WWTP capacities at all plants, as well as WWTP improvements recommended for the RCSD WWTP.

As discussed previously in this response, the modeling results for the 5 year baseline run (without a flow limit at the plant) show that the flow influent to the ACSD North Plant exceeds the plant's capacity only twice in the five year simulation period for an average of 2. 6 hours per event. As a result, no further analysis for the North Plant is warranted.

The expansion of the ACSD South Plant was evaluated in conjunction with other technologies to provide further CSO improvements for the Albany Pool region. Specifically, an evaluation of alternatives was performed for the Rensselaer or "Big C" sewershed, which represents the largest contributor of CSO volumes within the Albany Pool region. Technologies reviewed included the following: 1.) sewer separation; 2.) green infrastructure; 3.) storage or tunnel systems; and 4.) satellite treatment (screening and disinfection). Based upon the cost/benefits analysis performed, the screening and disinfection of the Big C effluent was recommended for inclusion in the Final Recommended CSO LTCP.

GENERAL COMMENTS: (ALL)

Comment: *The Best Management Practices and implementation of the 9 minimum (or 15 minimum as numerated in the conditions in the permits) controls have not been fully developed. Many of the items in the LTCP should have been completed under a fully executed BMP. For example, the Dry Weather Overflows (DWOs) should have been addressed under the BMPs.*

Response: BMPs are addressed in the Development and Evaluation of CSO Control Alternatives Evaluation Report provided in Appendix J of the CSO LTCP.

Comment: *The projects identified are expected to meet water quality standards and attain the best usage for the Hudson River in the Albany Pool area. Revise the sequencing of the projects to address projects with the greatest benefit(s) first.*

Response: As indicated by the receiving water quality modeling, the WWTP disinfection projects provide the greatest water quality benefits, followed by the investigation and elimination of non-CSO sources to Patroon Creek. The Patroon Creek Trunk Sewer Repairs have been completed and design of the disinfection improvements has been initiated. It should be recognized that the communities have proceeded in good faith on a number of the projects identified in the Recommended CSO LTCP. A revised schedule is included in the final documentation for the Recommended CSO LTCP; see Table 9-3: Recommended Final CSO LTCP Implementation Schedule in Appendix P.

Comment: *The Proposed Implementation Schedule (Figure 9-3), needs to be modified to group projects into sub-categories that can easily be put into a schedule of compliance/consent order for the individual permits for the communities.*

Response: The Recommended CSO LTCP was developed using a regional approach to ensure that the projects identified would achieve the greatest environmental benefits in the most cost-effective manner, practicable. Breaking up the recommended projects and assigning them to individual communities does not support the regional approach and financial efficiencies of the plan, nor does it incentivize the APCs to continue working together to implement the LTCP.

CDRPC should be allowed to proceed with its efforts to develop a "legal entity" or appropriate inter-municipal agreements required to execute the CSO Program, manage the implementation of the Recommended CSO LTCP, perform the PCCMP and maintain the regional facilities.

Comment: *Consideration of sensitive areas. There is no specific discussion of sensitive areas. However, the compliance strategy is based on achieving water quality standards at two potential beach sites during the recreation season. These beach sites could reasonably be assumed to be the sensitive areas of concern. The LTCP should refer to these sites as sensitive areas, and properly address them as such in accordance with the EPA CSO Policy and guidance.*

Response: Although there is no specific section of the Recommended CSO LTCP dedicated to addressing sensitive areas, Tables 5-10A and 5-10B of the Draft LTCP present the findings of the Receiving Water Quality Model for each transect along the Hudson River. These tables summarize the frequency of exceedances of the fecal coliform standards at each transect for Baseline Conditions and improved conditions outlined under Scenarios 1 through 4. Under Scenarios 2 and 2A, the two potential beach sites, Henry Hudson Park (Transect B18) and Schodack Island (Transect B17,) were found to have no exceedances of the 200cfu/100 ml geomean for fecal coliform during the recreation season. Since the modeling shows that water quality compliance is achievable at all transects (including the potential beach sites), these areas were no longer felt to be an area of specific focus. Should a public beach be developed for either of these sites, the NYSDOH will require that sampling be performed in accordance with the current WQ standards for public beach sites (NYSDOH Beach Water Quality Monitoring Requirements contained in Part 6, Subpart 6-2 Bathing Beaches).

Additional supporting information relating to the achievement of water quality standards for fecal coliform at the beach sites was presented at a Technical Workshop held with NYSDEC on April 25, 2013. During previous workshops, NYSDEC raised a question relating to recovery time following wet weather events. The following summarizes the information presented at the workshop.

Receiving water quality modeling data was reviewed for consistency with NYSDOH Beach Water Quality Monitoring Requirements. These standards outline bacteriological indicator levels used in determining the acceptability of water quality for bathing beaches. A single sample limit of 1000cfu/100 ml for fecal coliform is used to identify a potential bacterial issue at a bathing beach. This limit triggers an investigation of the source of the bacterial contamination and the determination of whether the beach should be closed.

In consideration of the beach monitoring requirements, data output from the receiving water quality model was analyzed following each storm event during the recreation seasons for the 1985 to 1989 model

simulation period. The following table provides a summary of the storm distribution during the recreation season over the model simulation period.

Storm Size (inches)	No. of Storms	Percentage of Total	Cumulative Percentage
<0. 1	89	31. 6%	31. 6%
0. 1 to 0. 4	111	39. 4%	70. 9%
0. 4 to 0. 8	41	14. 5%	85. 5%
0. 8 to 1. 0	15	5. 3%	90. 8%
1. 0 to 1. 5	15	5. 3%	96. 1%
1. 5 to 2. 0	5	1. 8%	97. 9%
2. 0 to 2. 5	3	1. 1%	98. 9%
2. 5 to 3. 0	3	0. 7%	99. 6%
>3. 0	1	0. 4%	100%

Notes:

1) Based upon the 1985 to 1989 model simulation period.
2) Only storms greater than 0. 02” were included in the analysis.
3) 283 storms occurred over the five recreation seasons.
4) 57 storms occur on average per recreation season.

Recognizing that recovery times will vary depending on storm size and transect, the following table was developed to show the time elapsed for various size storms before the bacteria concentrations returned to a level of 1000cfu/100 ml or less. Recovery periods are provided for transects downstream of the RCSD WWTP (RT7), Big C (RT8), the Albany South WWTP (RT9) and the potential beach sites (B17 and B18).

Storm Size (inches)	Cumulative Percentage	RT 7		RT 8		RT 9		B 18		B 17	
		Base (hrs)	RP (hrs)	Base (hrs)	RP (hrs)	Base (hrs)	RP (hrs)	Base (hrs)	RP (hrs)	Base (hrs)	RP (hrs)
<0. 1	31. 6%	0	0	2	1	0	0	0	0	0	0
0. 1 to 0. 4	70. 9%	4	2	6	4	7	4	4	3	0	0
0. 4 to 0. 8	85. 5%	8	4	10	6	11	8	8	6	5	0
0. 8 to 1. 0	90. 8%	11	5	12	8	14	10	10	8	7	5
1. 0 to 1. 5	96. 1%	16	8	18	11	20	14	15	12	11	9
1. 5 to 2. 0	97. 9%	21	11	24	15	25	18	20	16	15	12
2. 0 to 2. 5	98. 9%	26	13	29	19	31	23	25	20	19	16
2. 5 to 3. 0	99. 6%	31	16	35	22	37	27	30	25	23	19
>3. 0	100%	37	19	40	26	43	31	36	29	28	22

A review of the findings indicates that recovery times were 24 hours or less at each of the sites for 99% of the storms. Recovery times of 10 hours or less were observed for 91% of the storms. In consideration of the foregoing, the recovery times were found to be reasonable for the protection of public health based upon the NYSDOH beach monitoring criteria.

Comment: *Wet Weather Operational Plan. There is no explicit operation plan included in the LTCP, nor is their explicit discussion of the future operation of the collection system and the WWTPs to manage CSOs or minimize their impacts. The LTCP needs to refer to status of BMP #5 (an approved Wet Weather Operating Plan) for each of the three sewer districts. Additionally, there needs to be an inter-municipal wet weather operating plan for the CSS to control and minimize CSOs.*

Response: The Recommended CSO LTCP includes the development of a Sewer System Operations, Maintenance and Inspection Plan. This plan will include the wet weather operating plans for the collections systems and WWTPs, and is proposed to be completed as part of the implementation of the

LTCP. In addition, each proposed facility (e. g., floatables, screening, disinfection) will have an operating plan developed as part of the commissioning or start-up of the facility.

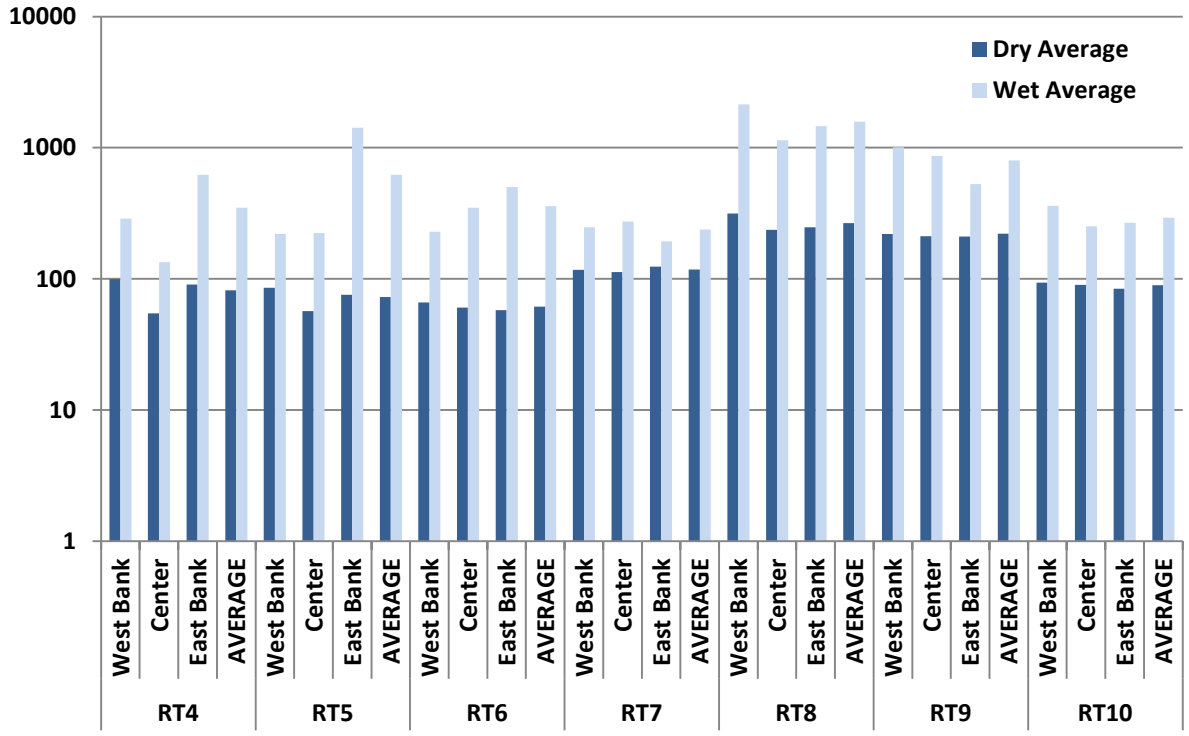
Comment: *Justification for "laterally well-mixed" assumption. The Albany Pool LTCP treats the Hudson River as laterally well-mixed in the impact assessment and modeling and asserts that little lateral variation was observed for bacteria concentrations during dry and wet weather (see, for example, Executive Summary subsections 2. 1. 1. 1 and 2. 1. 1. 3, as well as Chapter 2 subsection 2. 4. 4 and 2. 6). Provide additional explanation, analysis and justification of the adequacy of the laterally well-mixed approach for assessing river bacteria compliance.*

Response: The results of the water quality sampling efforts and presentation of the laterally well-mixed assumption were addressed in past reports and progress meetings held prior to advancing the receiving water quality modeling. As a result of these discussions and supporting documentation, it was agreed that a one dimensional model would be used to evaluate the impacts of fecal coliform from CSO discharges to the Hudson River. In addition, it was determined that it was unnecessary to model impacts to dissolved oxygen. The Receiving Water Quality Model Development Report contained in Appendix H of the CSO LTCP was reviewed extensively by NYSDEC and approval of the report and its conclusions were provided in a letter from the Department, dated August 31, 2010.

Additional supporting information was presented during a NYSDEC Technical Workshop held on March 27, 2013. The information addresses observations and resultant conclusions based upon a thorough review of the receiving water sampling data and calibration of the one-dimensional receiving water model.

The following figure shows the consistency of the sample set across river at each transect. The average concentrations for each location are plotted in addition to the average of all samples for both dry and wet weather conditions. The fact that there is little to no variation between the banks and the center of the river indicates that the river is laterally well mixed.

Laterally Well Mixed River Conditions at Receiving Water Quality Model Transects



With the exception of Transect 5, the maximum difference between the average concentrations is about 2 times the smallest value. At Transect 5, the east bank is 7 times the concentration of the west bank. As this occurred at only one transect and for wet weather conditions only, it could be a factor of the selected sampling location along the east side of the river. In addition, when you consider that there are about 100 CSO discharges with fecal coliform concentrations ranging from 1. 1 million to 1. 7 million cfu/100 ml. , one would expect to see a much greater discrepancy in the samples across the river if it was not laterally well mixed.

Upon calibrating the model, a comparison was performed of the measured and modeled bacteria levels with the "observed" value being the average of the concentrations at each bank and at the center. All of the dry weather samples were compared to the frequency with which the averaged value exceeded a threshold of 200/100 ml. The number of exceedances for the average values were not much different than the highest number of exceedances at either bank (west bank has the highest number of exceedances). Similarly if all wet weather samples were grouped, the average value exceeds the 200/100 ml threshold just as frequently as it is exceeded by the values on either bank.

Appendix O

Program Definition

Joint Venture Team albany pool

Table 7-4A: Recommended Draft CSO LTCP (Completed Projects)

Responsible Party	Project Name	Description	Purpose/Benefits	CSO Outfall No.	Project Completion Dates	Project Cost (millions)
Process Improvements at Wastewater Treatment Plants						
RCSD	Replacement of Mechanical Bar Screens	Replace influent bar screens to maximize screening capacity during wet-weather conditions.	Maximize flow to the plant for treatment, reduce CSO frequency and volume.	N/A	Construction Completion Date: 2012	$0.57
Subtotal						**$0.57**
BMPs/System Optimization						
Albany Water Board	Bouck Tide Gate Installation, City of Albany	Install tide gate on CSO 013 (Bouck Regulator).	Removal of direct inflow from the Hudson River during high tide periods. Installation of the tide gate will result in additional conveyance capacity within the interceptor, therby providing greater capture of wet-weather flows from the CSS. In addition, the removal of inflow will result in lower flows to the WWTP during dry-weather periods.	A-013	Construction Completion Date: 2012	$0.16
Albany Water Board	Woodville Pump Station Upgrades, City of Albany	Installation of a new communitor at the Woodville PS. The new communitor replaced a bar screen which was ineffective in preventing large diameter debris from entering the wet wells of the PS, especially during wet-weather events.	Increased pump reliability and efficiency, resulting in potentially less frequent CSO events at CSO 012 to the Krum Kill.	A-012	Construction Completion Date: 2012	$0.14
City of Cohoes	Upgrade Pump Stations (New Pumps and Controls), City of Cohoes (Order on Consent)	Installation of new pumps and controls within exisiting pump stations at Cedar Street (PS#11) and Peach Street (PS#12). Existing equipment was replaced with state of the art controls and hardware, including remote monitoring and alarm capabilities. Capacity of the pumps was increased by approximately 50% to accommodate current and future demands.	Improved system performance, monitoring and alarm system; thereby preventing unpermitted sewer discharges to the surface.	C-010, 011	Construction Completion Date: 2010	$0.06
City of Cohoes	Pump Station Bypass Evaluation, City of Cohoes (Order on Consent)	Evaluation of installing pump stations bypass connections and screening equipment at City pump stations.	Improved system performance, thereby preventing unpermitted sewer discharges to the surface.	N/A	Completed Evaluation: 2011	$0.03
City of Cohoes	Pump Station Bypass Design and Construction, City of Cohoes (Order on Consent)	Installation of screening equipment at Linen Place PS, along with bypass pumping connections at five (5) of the City's pump stations: McDonald Drive (PS#1), Linen Place (PS#2), North Mohawk (PS#7), DPW Garage (PS#9), and Niver Street (PS#13).	Improved system performance in case of a failure and/or servicing of the pump stations. Bypass allows for mobile pumping equipment to be utilized in case of emergency, thereby preventing unpermitted sewer discharges to the surface.	N/A	Construction Completion Date: 2011	$0.11
Subtotal						**$0.50**
Sewer Separation/Stormwater Storage						
Albany Water Board	Elberon Place Area Storm Water Storage Phases I and II, City of Albany	Connection of the stormwater collection system in the vicinity of Elberon Place to a pipe storage gallery to reduce peak flows conveyed to the CSS.	Reduces local flooding and reduces both the incidence and frequency of combined sewer discharge to the surface, as well as reducing the frequency and intensity of CSO events.	A-016	Construction Completion Date: 2012	$0.25
Albany Water Board	Lawnridge/Grove/Glendale/ Forrest Avenue Separation Phase II, City of Albany	Connection of catch basins to a storm sewer collection system, which is tributary to the Academy Road Detention Basin constructed under Phase I. This detention basin stores stormwater prior to discharging to the Hackett Boulevard sub-trunk sewer which is a branch of the Beaver Creek combined sewer.	Reduction in the stormwater peak flows or loads to the CSS, thereby reserving conveyance capacity with the CSS and reducing the frequency and intensity of CSO events.	A-016	Construction Completion Date: 2012	$0.34

Table 7-4A: Recommended Draft CSO LTCP (Completed Projects)

Responsible Party	Project Name	Description	Purpose/Benefits	CSO Outfall No.	Project Completion Dates	Project Cost (millions)
Albany Water Board	Marion Avenue Stormwater Storage Structures, City of Albany	Construct Stormwater Storage Tank to store 197,000 Gallons of stormwater collected from a new stormwater collection system in the vicinity of Marion Avenue and Western Avenue. Discharge is controlled and does not discharge to the Beaver Creek Trunk Sewer until adequate capacity exists following storms.	Reduces local flooding and reduces both the incidence and frequency of combined sewer discharge to the surface, as well as reducing the frequency and intensity of CSO events.	A-016	Construction Completion Date: 2012	$0.51
City of Cohoes	2011 Storm Sewer Improvements, City of Cohoes	Various stormwater improvements throughout the City, including separation of combined sewers as well as elimination CSO #13.	Reduction of stormwater flows or loads to the CSS, thereby reserving conveyance capacity with the CSS and reducing the frequency and intensity of CSO events.	C-013	Construction Completion Date: 2012	$1.50
City of Rensselaer	Broadway Sewer Separation and Dry-Weather Overflow Elimination Project, City of Rensselaer (Order on Consent for Elimination of Unpermitted Outfall at Broadway Only)	Sewer separation along Broadway, along with the elimination of the undocumented overflow point to Mill Creek.	Removal of inflow from CSS to increase conveyance of wet-weather flows, and reduce the frequency and volume of CSOs. Eliminated CSO to Mill Creek at Broadway.	R-003	Construction Completion Date: 2012	$1.79
City of Rensselaer	Washington Avenue Sewer Improvements and Elimination of Farley Drive CSO, City of Rensselaer (Order on Consent for Elimination of Unpermitted Outfall at Farley Drive Only)	Performed sewer separation along Washington Avenue, and permanently closed CSO 012.	Eliminates CSO discharging to a tributary waterbody.	R-012	Construction Completion Date: 2011	$3.00
City of Troy	113th Street Stream Separation, City of Troy	Diversion of an unnamed stream from the CSS. The stream enters the CSS at 11th Street and conveys flows north to 113th Street in a 36-inch sewer. The project proposes to disconnect all sanitary connections from the 36-inch sewer, with transfer to an 18-inch sewer upstream of the regulator. Upon completion of the project, the collection system upstream of regulator A13R2 will be dedicated to stormwater and stream flows only, and the regulator will be disconnected from the interceptor.	Removal of inflow from CSS to increase conveyance of wet-weather flows, and reduce the frequency and volume of CSOs.	T-013, 013A	Construction Completion Date: 2013	$1.43
Subtotal						**$8.82**
Tributary Enhancements						
ACSD	Patroon Creek Trunk Sewer Repairs	Repair of 2,000 square-feet of junction chamber and 1,150 LF of 26 to 42-inch sewer pipe.	Rehabilition of critical components to the system.	N/A	Construction Completion Date: 2011	$0.68
Subtotal						**$0.68**
Additional Pool-Wide Projects						
Troy, Rensselaer, RCSD	Sewer System Operations, Maintenance and Inspection Plans (Order on Consent)	Documents and improves current procedures for operation, maintenance and inspection of each community's combined sewer system. Scope to be further developed within the established budget based upon the goals and needs of each community.	Provides for improved system performance and CSO capture.	All outfalls.	Task Completion Date: 2013	$0.15
Subtotal						**$0.15**
Total CSO LTCP Program Costs for Completed Projects						**$10.72**

Joint Venture Team albany pool CDM MALCOLM PIRNIE CHA

Table 7-4B: Recommended Final CSO LTCP

Responsible Party has advanced construction plans and specifications, and in some cases, construction activities have commenced.

Responsible Party	Project Name	Description	Purpose/Benefits	CSO Outfall No.	Project Target Milestones	Project Cost (millions)
Disinfection of Wet-Weather Flows at Wastewater Treatment Plants						
ACSD	North Plant Disinfection Project	New Chemical Disinfection System at the ACSD North Plant for wet-weather flows up to 88 mgd, or flows exceeding normal dry-weather flows of ~19 mgd.	Reduce bacteria load to Hudson River, improve water quality during the seasonal disinfection period.	N/A	Completed Plans & Specifications: 9/12/13 NTP to Construction: 1/1/14 Construction Completion Date: 10/1/14 Operational Start-Up Date: 10/1/14	$3.75
ACSD	South Plant Disinfection Project	New UV disinfection facility at the ACSD South Plant for wet-weather flows up to 45 mgd (with expansion capabilities to 60 mgd), or flows exceeding normal dry-weather flows of ~17 mgd.	Reduce bacteria load to Hudson River, improve water quality during the seasonal disinfection period.	N/A	Completed Plans & Specifications: 9/12/13 NTP to Construction: 1/1/14 Construction Completion Date: 10/1/14 Operational Start-Up Date: 10/1/14	$3.38
RCSD	Disinfection Facilities at WWTP (Order on Consent)	New UV disinfection facility at WWTP for treatment of wet-weather flows up to 63.5 mgd, or flows exceeding normal dry-weather flows of ~15 mgd.	Reduce bacteria load to Hudson River, improve water quality during the seasonal disinfection period.	N/A	Construction Completion Date: 11/21/13 Operational Start-Up Date: 5/1/14	$2.53
Subtotal						**$9.66**
Process Improvements at Wastewater Treatment Plants						
RCSD	Primary Sludge Degritting	Upgrade primary sludge degritting capacity to accommodate increased flow to the plant during peak wet-weather conditions.	Maximize flow to the plant for treatment, reduce CSO frequency and volume.	N/A	Completed Plans & Specifications: 12/15/16 NTP to Construction: 4/1/17 Construction Completion Date: 12/15/18 Operational Start-Up Date: 12/15/18	$3.12
RCSD	Evaluation of Secondary Clarification Improvements	Re-evaluate the wet-weather capacity of the WWTP to determine if secondary clarification improvements are needed for future growth and peak wet-weather flow of 63.5 MGD. Evaluate various options including enhanced secondary clarification and/or equalization tanks at the plant and/or pump stations.	Performed after completion of process and pump station upgrades completed under other LTCP Projects, this re-evaluation will determine the combined impacts of those projects on the plant wet-weather capacity.	N/A	Task Start Date: 6/1/19 Task Completion Date: 6/1/20	$0.50
Subtotal						**$3.62**
BMPs/System Optimization						
Albany Water Board	McCormack Pump Station Upgrades, City of Albany	Installation of a new communitor at the McCormack PS. The new communitor will replace a bar screen system which was ineffective in preventing large diameter debris from entering the wet wells of the PS, especially during wet-weather events.	Increase pump reliability and efficiency.	A-016	Construction Completion Date: 12/15/13 Operational Start-Up Date: 12/15/13	$0.08
Albany Water Board	Sewer Rehabilitation Projects Throughout the City of Albany	1.) Kent Street Sewer: Relining of a section of sewer on Kent Street which is tributary to the Quail Street sub-trunk sewer, a branch of the Beaver Creek combined sewer; 2.) Hillcrest Avenue Sewer: Relining of a section on Hillcrest Avenue which is tributary to the Woodville PS; 3.) Replacement of a section of combined sewer on Beacon Avenue which is tributary to the Woodville PS.	Reduction of infiltration or loads to the CSS, thereby reserving conveyance capacity with the CSS and reducing the frequency and intensity of CSO events.	A-016, A-012	Construction Completion Date: 12/15/13 Operational Start-Up Date: 12/15/13	$0.10
APCs	Remove Schyler Overflow, City of Albany	The project will provide for temporary elimination of CSO 015 with monitoring of the upstream CSS. Specifically, the project will remove the regulator assembly in the regulator manhole, and replace the existing 12" connection with a new 36" connection to the Interceptor. Provided that no incidences are observed within a 24-month period, the overflow will be permanately eliminated.	Optimization project that increases conveyance of wet-weather flows to the ACSD South Treatment Plant, resulting in a reduction in annual CSO volumes and reduced impacts to the Hudson River.	A-015	Completed Plans & Specifications: 12/15/26 NTP to Construction: 4/1/27 Construction Completion Date: 12/15/27 Operational Start-Up Date: 12/15/27	$0.27
APCs	Remove Liberty Overflow, City of Albany	The project will provide for temporary elimination of CSO 022 with monitoring of the upstream CSS. Specifically, the project will remove the regulator assembly in the regulator manhole, and replace the existing 12" connection with a new 30" connection to the Interceptor. Provided that no incidences are observed within a 24-month period, the overflow will be permanately eliminated.	Optimization project that increases conveyance of wet-weather flows to the ACSD South Treatment Plant, resulting in a reduction in annual CSO volumes and reduced impacts to the Hudson River.	A-022	Completed Plans & Specifications: 12/15/25 NTP to Construction: 4/1/26 Construction Completion Date: 12/15/26 Operational Start-Up Date: 12/15/26	$1.10

Table 7-4B: Recommended Final CSO LTCP

Responsible Party has advanced construction plans and specifications, and in some cases, construction activities have commenced.

Responsible Party	Project Name	Description	Purpose/Benefits	CSO Outfall No.	Project Target Milestones	Project Cost (millions)
APCs	Modify Bouck Regulator, City of Albany	Modification of the existing regulator structure and connection to the ACSD interceptor. Specifically, the project will replace 245 linear-feet of 12" sewer pipes with a new 30" connection to the interceptor. In addition, a new regulator will need to be installed at the regulator structure to allow for more flow to be conveyed to the treatment plant.	Optimization project that increases conveyance of wet-weather flows to the ACSD South Treatment Plant, resulting in a reduction in annual CSO volumes and reduced impacts to the Hudson River.	A-013	Completed Plans & Specifications: 12/15/26 NTP to Construction: 4/1/27 Construction Completion Date: 12/15/27 Operational Start-Up Date: 12/15/27	$0.25
APCs	Improvements at up to Eleven Regulators, City of Cohoes	Optimization project that includes modification of eleven (11) existing regulator structures: Mohawk St (007), Ducan (012), Ontario (006), Main/Saratoga (015), Continental (005), Cedar (011), Hudson Ave (001), Bridge St (002), Van Schaick (003), Myrtle Ave (004), Peach St (010)	Optimization project that increases capacity of regulators to convey more combined sewage to the interceptor, thus reducing the frequency and volume of CSOs.	C-001 to 007, 010 to 012, 015	Completed Plans & Specifications: 12/15/16 NTP to Construction: 4/1/17 Construction Completion Date: 12/15/17 Operational Start-Up Date: 12/15/17	$0.10
APCs	Swan Street and Hamilton Street Regulator Improvements, Village of Green Island	Optimization project that includes modification of two (2) existing regulator structures: Removal of the orifice at Swan Street, raise weir height at Hamilton Street.	Optimization project that increases capacity of regulators to convey more combined sewage to the interceptor, thus reducing the frequency and volume of CSOs.	GI-002, 003	Completed Plans & Specifications: 12/15/16 NTP to Construction: 4/1/17 Construction Completion Date: 12/15/17 Operational Start-Up Date: 12/15/17	$0.02
APCs	Improvements at Five Regulators, City of Watervliet	Optimization project that includes modification of five (5) existing regulator structures: 25th Street, 14th Street, 7th Street, 6th Street, and 3rd Street.	Optimization project that increases capacity of regulators to convey more combined sewage to the interceptor, thus reducing the frequency and volume of CSOs.	W-001 to 004, 006	Completed Plans & Specifications: 12/15/16 NTP to Construction: 4/1/17 Construction Completion Date: 12/15/17 Operational Start-Up Date: 12/15/17	$0.05
City of Rensselaer	Partition Street Trunk Sewer Evaluation, City of Rensselaer	Inspect and evaluate the condition of the sewer passing under the railroad tracks. Identify any needed repairs based upon results of CCTV inspection.	Improve conveyance capacity of sewer, thereby reducing surcharging and subsequent CSO discharges.	R-006	Task Start Date: 9/1/13 Task Completion Date: 3/1/14	$0.05
RCSD	Upgrade Pump Stations Located in Rensselaer	Rensselaer Pump Station Upgrades (Aikens and Forbes) - replace pumps, repair/replace sluice gates and isolation valves, new channel grinders, new emergency generators, new control system for communication with WWTP. Increase pump station capacity: Aiken from 10.4 MGD to 14 MGD. Forbes from 14.4 MGD to 17.2 MGD.	Improve conveyance of wet-weather flows to WWTP, thereby reducing surcharging and subsequent CSO discharges.	R-002 to 010 (once regulators are opened)	Completed Plans & Specifications: 3/1/14 NTP to Construction: 4/15/14 Construction Completion Date: 4/15/15 Operational Start-Up Date: 4/15/15	$14.00
RCSD	Upgrade Pump Stations Located in Troy	Troy Pump Station Upgrades (106th and Monroe) - replace pumps, repair/replace sluice gates and isolation valves, new mechanical bar screens, new emergency generators, new control system for communication with WWTP. Increases pump station capacity at Monroe from 32.5 MGD to 42.5 MGD. Maintains current capacity at 106th (8 MGD).		T-002 to 044	Completed Plans & Specifications: 9/1/14 NTP to Construction: 3/1/15 Construction Completion Date: 4/1/16 Operational Start-Up Date: 4/1/16	$15.00
RCSD	Regulator Capacity Improvements to Eliminate Dry-Weather Overflows (Order on Consent)	Raise weir elevation and/or increase regulating orifice size for up to 6 regulators: Rensselaer - Partition Street; Troy - 113th Street, 119th Street, Water Street (pending based on further observation), Madison Street, Federal Street. More detailed information is provided within the Regulator Capacity and Assessment Report, dated March 29, 2013.	Increase capacity of regulators to prevent dry-weather overflows, and improve performance of the CSS during wet-weather periods.	T-007, 013, 027, 039, 046A R-006	Completed Engineering Report: 3/29/13 Construction Completion Date: 12/15/13 Operational Start-Up Date: 12/15/13	$0.25
RCSD	Regulator Capacity Improvements	Optimization of conveyance of wet-weather flows to the WWTP by modifying up to 40 regulators.	Optimization project that increases capacity of regulators to convey more combined sewage to the interceptor and thus decrease CSOs.	T-001 to 043, 046A, 046B , 047 R-002, 003, 006, 010	Completed Plans & Specifications: 12/15/14 NTP to Construction: 4/1/15 Construction Completion Date: 12/15/15 Operational Start-Up Date: 12/15/15	$0.28
RCSD	Regulator Tide Gate Inspection and Evaluation (Order on Consent)	This project will be used to evaluate the level of work necessary to rehabilitate or replace tide gates on up to 10 regulator chambers with submerged outfalls upstream of the Federal Dam. Upon completing the inspection work, a report will be developed summarizing the findings, recommendations, cost estimates and schedule for completing the improvements for all ten chambers.	The project will identify methods for control of inflow during performance of the work, means and methods for demolition and rigging of materials into and out of the chamber, address maintenance of overflows during construction and safe access for performance of the work. The work will include inspection of the condition of the tide gate chambers, the outfalls and other features that may impact the materials, equipment, time and cost to perform the work.	T-002 to 020	Task Start Date: 6/1/14 Task Completion Date: 6/1/15	$0.10

Table 7-4B: Recommended Final CSO LTCP

Responsible Party has advanced construction plans and specifications, and in some cases, construction activities have commenced.

Responsible Party	Project Name	Description	Purpose/Benefits	CSO Outfall No.	Project Target Milestones	Project Cost (millions)
RCSD	Regulator Tide Gate Repair/Replacement Program (Order on Consent)	Rehabilitate or replace tide gates on up to 10 regulator chambers with submerged outfalls upstream of the Federal Dam.	Reduce inflow of river water to collection system to increase available capacity of interceptor and pump stations for wet-weather flows.	T-002 to 020	Completed Plans & Specifications: 12/15/15 NTP to Construction: 4/1/16 Construction Completion Date: 12/15/25 Operational Start-Up Date: 12/15/25	$1.50
APCs	Outside Community Metering	Monitoring of flows from outside communities to track I/I impacts on interceptor capacities; include up to 8 connections to Troy system. SCADA connections included to Troy and RCSD for automated reporting of metered flows.	Provides supporting data to encourage outside communities to address I/I issues; while tracking available capacity for future development as well as potential billing purposes.	T-001, 024, 045	Completed Plans & Specifications: 12/15/17 Construction Start Date: 4/1/18 Construction Completion Date: 12/15/18 Operational Start-Up Date: 12/15/18	$2.07
APCs	18th Street and Avenue A Weir Improvements, City of Watervliet	Optimization project that includes modification of the existing regulator structure, increasing the size of the connection pipe.	Eliminates operational challenges within the regulator and increases capacity of regulator to convey more combined sewage to the interceptor, thus reducing the frequency and volume of CSOs.	W-005	Completed Plans & Specifications: 12/15/16 NTP to Construction: 4/1/17 Construction Completion Date: 12/15/17 Operational Start-Up Date: 12/15/17	$0.04
Subtotal						**$35.26**
Sewer Separation/Stormwater Storage						
APCs	Marietta Place Stormwater Storage Facility, City of Albany	Connection of catch basins in the Marietta Place vicinity to a storage facility to reduce peak flows conveyed to the CSS.	Reduces local flooding and reduces both the incidence and frequency of combined sewer discharge to the surface, as well as reducing the frequency and intensity of CSO events.	A-013	Completed Plans & Specifications: 12/15/16 NTP to Construction: 4/1/17 Construction Completion Date: 12/15/18 Operational Start-Up Date: 12/15/18	$0.35
APCs	Mereline Combined Sewage Storage, City of Albany	Connection of catch basins in the Mereline Avenue vicinity to a storage facility to reduce peak flows conveyed to the CSS.	Reduces local flooding and reduces both the incidence and frequency of combined sewer discharge to the surface, as well as reducing the frequency and intensity of CSO events.	A-013	Completed Plans & Specifications: 12/15/18 NTP to Construction: 4/1/19 Construction Completion Date: 12/15/20 Operational Start-Up Date: 12/15/20	$0.64
APCs	Upper Washington Avenue Groundwater Recharge, City of Albany	Construction of dry wells and infiltration gallery beneath the street pavement in Upper Washington Avenue, between Brevator Street and Winthrop Avenue. These will replace catch basins which had formerly collected stormwater and discharged it into the Winthrop Avenue sub-trunk sewer which is a branch of the Beaver Creek combined sewer.	Reduces local flooding and reduces both the incidence and frequency of combined sewer discharge to the surface, as well as reducing the frequency and intensity of CSO events.	A-016	Completed Plans & Specifications: 2/15/14 NTP to Construction: 6/1/14 Construction Completion Date: 12/15/15 Operational Start-Up Date: 12/15/15	$0.20
APCs	Melrose/Winthrop Groundwater Recharge Basins, City of Albany	Construction of dry wells and infiltration galleries beneath the street pavement in the Melrose Avenue vicinity. These will replace catch basins which had formerly collected stormwater and discharged it into the Melrose Avenue sub-trunk sewer which is a branch of the Beaver Creek combined sewer system.	Removing flows from the combined sewer will reduce loads, thereby reserving conveyance capacity with the CSS and reducing the frequency and intensity of CSO events.	A-016	Completed Plans & Specifications: 12/15/14 NTP to Construction: 4/1/15 Construction Completion Date: 12/15/16 Operational Start-Up Date: 12/15/16	$0.20
APCs	Vliet Street Sewer Rehabilitation, Replacement and Separation, City of Cohoes	Continuation of the sewer separation and rehabilitation work along Vliet Street, including: Installation of a new 36" pipe along Diane Court, and a diversion of stormwater flows from the existing stone-arch at Richmond Street to the separated system in the vicinity of Johnston Avenue.	Reduction of stormwater flows and infiltration to the CSS, thereby reserving conveyance capacity with the CSS and reducing the frequency and intensity of CSO events.	C-007	Completed Plans & Specifications: 12/15/21 NTP to Construction: 4/1/22 Construction Completion Date: 12/15/23 Operational Start-Up Date: 12/15/23	$1.93
APCs	Manor Avenue Sewer Rehabilitation, Replacement and Separation, City of Cohoes	Sewer separation and rehabilitation work along Manor Avenue.	Reduction of stormwater flows and infiltration to the CSS, thereby reserving conveyance capacity with the CSS and reducing the frequency and intensity of CSO events.	C-007	Completed Plans & Specifications: 12/15/26 NTP to Construction: 4/1/27 Construction Completion Date: 12/15/27 Operational Start-Up Date: 12/15/27	$1.43
APCs	Columbia Street Phase II Separation, City of Cohoes	Continuation of the sewer separation and rehabilitation work along Columbia Street.	Reduction of stormwater flows and infiltration to the CSS, thereby reserving conveyance capacity with the CSS and reducing the frequency and intensity of CSO events.	C-008, 015	Completed Plans & Specifications: 12/15/21 NTP to Construction: 4/1/22 Construction Completion Date: 12/15/22 Operational Start-Up Date: 12/15/22	$1.00

Table 7-4B: Recommended Final CSO LTCP

Responsible Party has advanced construction plans and specifications, and in some cases, construction activities have commenced.

Responsible Party	Project Name	Description	Purpose/Benefits	CSO Outfall No.	Project Target Milestones	Project Cost (millions)
APCs	George Street Sewer Separation, City of Cohoes	Extension of the existing separated storm sewer on Lancaster Street, south of Columbia Street, which currently re-enters the CSS at George Street; and run the sewer approximately 1,000 linear-feet to the stone arch under George Street Park.	Reduction of stormwater flows or loads to the CSS, thereby reserving conveyance capacity with the CSS and reducing the frequency and intensity of CSO events.	C-008, 015	Completed Plans & Specifications: 12/15/16 NTP to Construction: 4/1/17 Construction Completion Date: 12/15/17 Operational Start-Up Date: 12/15/17	$0.42
APCs	Middle Vliet Street Sewer Separation, City of Cohoes	Sewer separation and rehabilitation work in the vicinity of Middle Vliet Street, including: Harvard Street, Bershire Street, Beacon Avenue, and Edward Road.	Reduction of stormwater flows and infiltration to the CSS, thereby reserving conveyance capacity with the CSS and reducing the frequency and intensity of CSO events.	C-007	Completed Plans & Specifications: 12/15/16 NTP to Construction: 4/1/17 Construction Completion Date: 12/15/17 Operational Start-Up Date: 12/15/17	$1.43
APCs	Partition Street/Broadway Sewer and Drain Improvements, City of Rensselaer	Partial separation of the drainage area to Partition Street (CSO 006). Includes replacement/repair of deteriorated brick catch basins that have contributed to past regulator blockages and DWOs. Also includes approximately 7,000 LF of new storm drain and about 1,000 LF of new sanitary sewer w/ railroad crossing.	Removal of inflow from CSS to increase conveyance of wet-weather flows, and reduce the frequency and volume of CSOs.	R-006	Completed Plans & Specifications: 3/1/14 NTP to Construction: 6/1/14 Construction Completion Date: 12/31/15 Operational Start-Up Date: 12/31/15	$2.80
APCs	123rd Street Stream Separation, City of Troy	Divert unnamed stream from combined sewer.	Removal of inflow from CSS to increase conveyance of wet-weather flows, and reduce the frequency and volume of CSOs.	T-002	Completed Plans & Specifications: 12/15/18 NTP to Construction: 4/1/19 Construction Completion Date: 12/15/20 Operational Start-Up Date: 12/15/20	$4.54
APCs	Van Buren Street Stream Separation, City of Troy	Divert unnamed stream from combined sewer.	Removal of inflow from CSS to increase conveyance of wet-weather flows, and reduce the frequency and volume of CSOs.	T-041	Completed Plans & Specifications: 12/15/22 NTP to Construction: 4/1/23 Construction Completion Date: 12/15/24 Operational Start-Up Date: 12/15/24	$4.74
APCs	Polk Street Stream Separation, City of Troy	Divert unnamed stream from combined sewer.	Removal of inflow from CSS to increase conveyance of wet-weather flows, and reduce the frequency and volume of CSOs.	T-044	Completed Plans & Specifications: 12/15/21 NTP to Construction: 4/1/22 Construction Completion Date: 12/15/22 Operational Start-Up Date: 12/15/22	$2.17
APCs	Hoosick Street Storm Sewer Extension, City of Troy	Separation of existing storm sewer from the combined sewer.	Removal of inflow from CSS to increase conveyance of wet-weather flows, and reduce the frequency and volume of CSOs.	T-024	Completed Plans & Specifications: 12/15/17 NTP to Construction: 4/1/18 Construction Completion Date: 12/15/18 Operational Start-Up Date: 12/15/18	$1.05
Subtotal						**$22.90**
Green Infrastructure Program						
APCs	Performance of a Codes and Local Law Review	Educate land use decision makers, municipal and/or municipal designated engineers in green infrastructure techniques; Inventory existing Comprehensive Plans and Local Laws for Green Infrastructure strategies and Smart Growth principles; Research other green infrastructure local laws and develop a Model Local Law or guidelines beneficial to the unique needs of the APCs; and Present these model local law(s) or guidelines to the land use decision makers associated with each APC.	In general, these efforts set in motion the necessary outreach to land use decision makers, reinforced with targeted educational programs, to begin the process of re-tooling existing laws to embrace green infrastructure strategies.	N/A	Task Start Date: 8/1/15 Task Completion Date: 8/1/16	$0.10
APCs	Green Infrastructure Technical Design Guidance	Provides each community with assistance in developing green infrastructure guidance for public and private application of green infrastructure. Scope to be further developed within the established budget based upon the goals and needs of each community.	Provides consistent pool-wide standards and details for application of green infrastructure (GI) for management of stormwater. Implementation of GI practices will help to reduce inflow to the combined sewer system resulting in reduced frequency and volume of CSO discharges.	N/A	Task Start Date: 8/1/15 Task Completion Date: 8/1/17	$0.15
APCs	Documentation/Reporting of New Public and Private Green Projects	The objective of this task is to provide a mechanism by which to document the installation of "green practices or infrastructure" within the individual communities; and to assess the use of green practices within new development and redevelopment projects for both public and private sectors.	This task will document the extent and acceptance of green strategies within the APCs, and will generate the estimated runoff volume reduction on an annual basis.	N/A	Task Start Date: 8/1/14 Task Completion Date: 3/1/19	$0.05

Table 7-4B: Recommended Final CSO LTCP

Responsible Party has advanced construction plans and specifications, and in some cases, construction activities have commenced.

Responsible Party	Project Name	Description	Purpose/Benefits	CSO Outfall No.	Project Target Milestones	Project Cost (millions)
APCs	Completion of a Feasibility Assessment for a "Green Infrastructure Banking System"	This task will identify and evaluate various models associated with the potential implementation of a green infrastructure banking system, including Stormwater In-Lieu Fees and Stormwater Retention Credit Banking.	This task will evaluate the feasibility and potential benefits associated with "green banking".	N/A	Task Start Date: 8/1/15 Task Completion Date: 8/1/17	$0.075
APCs	Quail Street Green Infrastructure Project, City of Albany	The proposed project lies along Quail Street from Madison Avenue to Central Avenue, approximately 3,850 linear feet, and includes a $1.8M "Green Component" to increase infiltration and water quality. The project includes a collaborative educational component to be performed in conjunction with the College of St. Rose and the University of Albany's Downtown Campus.	Reduction of stormwater flows or loads to the CSS, thereby reserving conveyance capacity with the CSS and reducing the frequency and intensity of CSO events.	A-016	Completed Plans & Specifications: 12/15/14 NTP to Construction: 4/1/15 Construction Completion Date: 12/15/16 Operational Start-Up Date: 12/15/16	$1.80
APCs	North Swan Street Park Revitalization, City of Albany	The proposed project will reduce impervious surfaces by approximately 25%, and will evaluate the feasibility of various GI practices including: dry swales, tree plantings, stormwater planter(s), soil restoration/de-compaction and permeable pavers/pavement treatments.	It's the City's intent to "green-up" the park's existing infrastructure, using EPA's fix-it-first philosophy. Reduction of stormwater flows or loads to the CSS, thereby reserving conveyance capacity with the CSS and reducing the frequency and intensity of CSO events.	A-030	Completed Plans & Specifications: 12/15/13 NTP to Construction: 6/1/14 Construction Completion Date: 12/15/15 Operational Start-Up Date: 12/15/15	$0.15
APCs	Route 32 Green Street Project, City of Watervliet	Reconstruction of approximately 0.71 mile of Rt. 32. The project would remove and replace approximately 152,080 square-feet of roadway with new pavement, and 30,416 square-feet of new sidewalk. Porous surfaces would be evaluated for sidewalks, parking lanes and/or travel lanes. In addition, approximately 50 trees would be removed and replaced with environmentally friendly tree pits. The final project limits, and subsequent quantities, will be determined based on engineering considerations in conjunction with available funding constraints.	Reduction of stormwater flows or loads to the CSS, thereby reserving conveyance capacity with the CSS and reducing the frequency and intensity of CSO events.	Potential CSO's effected, W-001 to 004	Completed Plans & Specifications: 12/15/15 NTP to Construction: 4/1/16 Construction Completion Date: 12/15/17 Operational Start-Up Date: 12/15/17	$1.00
APCs	Monument Square Green Infrastructure Project, City of Troy	The project would be located in a highly visible area of Downtown Troy (home of the popular Farmers Market), and would promote public education and awareness. Approximately 11,543 square-feet of sidewalk and 22,476 square-feet of roadway would be replaced with porous pavement or pavers; which would intercept stormwater runoff and reduce flow to the CSS. It is estimated that a project of this magnitude would cost between $1 million to $1.5 million, dependent on subsurface percolation tests.	As part of this demonstration project, the City would like to use the project as a case study for developing a "green infrastructure banking system".Reduction of stormwater flows or loads to the CSS, thereby reserving conveyance capacity with the CSS and reducing the frequency and intensity of CSO events.	T-030	Completed Plans & Specifications: 12/15/15 NTP to Construction: 4/1/16 Construction Completion Date: 12/15/16 Operational Start-Up Date: 12/15/16	$1.50
Village of Green Island	Albany Street Green Street Project, Village of Green Island	Reconstruction of approximately 1,300 linear-feet of Albany Street. The Village is proposing to redesign the roadway, incorporating low impact development principles, to achieve a reduction of impervious surfaces of approximately 10%.	The project is proposing the use of Filterra BioRention Systems, as manufactured by Americast, in an effort to demonstrate the performance of these systems. Reduction of stormwater flows or loads to the CSS, thereby reserving conveyance capacity with the CSS and reducing the frequency and intensity of CSO events.	GI-004	Construction Completion Date: 12/15/14 Operational Start-Up Date: 12/15/14	$0.25
Subtotal						**$5.08**
Satellite Treatment and/or Floatables Control Facilities						
APCs	"Big C" Disinfection and Floatables Control Facility, City of Albany	The proposed satellite treatment facility provides CSO controls for flows up to 75 mgd to reduce floatable and fecal coliform discharges to the Hudson River. The "Big C" Disinfection Project would provide treatment consisting of screening and disinfection for an additional ~285MGal on an average annual basis.	The project provides a cost-effective, regional solution to enhance the "recovery time" for the Hudson River during periods of combined sewer overflows; and contributes to the treatment of greater than 85% of all wet weather flows from a regional perspective.	A-016	Begin Preliminary Design Report: 8/1/15 Completed Preliminary Design Report: 8/1/16 Begin SEQR & Eminent Domain Process: 2/1/17 Completed SEQR & Eminent Domain Process: 2/1/21 Begin Final Design: 12/15/18 Completed Final Plans & Specifications: 12/15/20 NTP to Construction: 4/1/21 Construction Completion Date: 12/15/22 Operational Start-Up Date: 5/1/23	$45.00
APCs	Floatables Control Facility for CSO 026 Outfall (Regulators Maiden, Stuben and Orange), City of Albany	The proposed floatables facility will collect floatable debris and materials associated with CSOs from the Maiden, Stuben and Orange regulator structures.	The project will provide for the collection of floatables from the combined sewer overflows (CSOs) in the vicinity of the Corning Preserve.	A-026	Completed Plans & Specifications: 12/15/17 NTP to Construction: 4/1/18 Construction Completion Date: 12/15/19 Operational Start-Up Date: 12/15/19	$4.00

Table 7-4B: Recommended Final CSO LTCP

Responsible Party has advanced construction plans and specifications, and in some cases, construction activities have commenced.

Responsible Party	Project Name	Description	Purpose/Benefits	CSO Outfall No.	Project Target Milestones	Project Cost (millions)
APCs	Floatables Control Facility for CSO 030 Outfall (Regulators Quackenbush, Jackson and Livingston), City of Albany	The proposed floatables facility will collect floatable debris and materials associated with CSOs from the Quackenbush, Jackson and Livingston regulator structures.	The project will provide for the collection of floatables from the combined sewer overflows (CSOs) in the vicinity of the Corning Preserve.	A-030	Completed Plans & Specifications: 12/15/17 NTP to Construction: 4/1/18 Construction Completion Date: 12/15/19 Operational Start-Up Date: 12/15/19	$4.00
APCs	"Little C" Floatables Control Facility, City of Cohoes	The proposed floatables facility will collect floatable debris and materials associated with the 'Little C" outfall in Cohoes, discharging to the Mohawk River.	The proposed floatables facility will collect floatable debris and materials associated with the largest CSO in Cohoes.	C-008, 015	Completed Plans & Specifications: 12/15/24 NTP to Construction: 4/1/25 Construction Completion Date: 12/15/26 Operational Start-Up Date: 12/15/26	$2.87
Subtotal						**$55.87**
Tributary Enhancements						
APCs	Investigate Non-CSO Bacteria Sources Along Mill Creek, Poesten Kill, and Wynants Kill	Inspect condition of sewers running parallel and crossing Mill Creek, Poesten Kill, and Wynants Kill to identify repairs that could reduce infiltration and exfiltration.	Potential repairs will reduce infiltration to the CSS, thereby reducing the frequency and volume of CSOs during wet-weather conditions. The project will also reduce exfiltration and associated risks of bacterial contamination during dry-weather conditions.	N/A	Task Start Date: 4/1/16 Task Completed Date: 12/15/17	$0.15
City of Troy	Cross Street Sewer Outfall Evaluation, City of Troy	Evaluation of repair of the existing 48-inch diameter outfall downstream of the regulator for CSO 045. Required limits of repair and/or replacement alternatives will be determined.	Determine repairs required to eliminate unpermitted discharges to the Wynants Kill, and restore the existing outfall to the Hudson River.	N/A	Task Completion Date: 10/7/13	$0.06
APCs	Cross Street Sewer Outfall Repairs and/or Replacment, City of Troy	In accordance with the recommendations identified under the evaluation, repair/replace the existing outfall pipe to the Hudson River to eliminate discharges to the Wynants Kill. Project target milestones were developed in consideration of potential soil contamination issues, along with the required coordination with the railway.	Repairs required to elimination unpermitted discharges to the Wynants Kill.	T-045	Completed Plans & Specifications: 4/1/14 NTP to Construction: 8/1/14 Construction Completion Date: 12/15/14 Operational Start-Up Date: 12/15/14	$0.64
City of Troy	Cross Street Trunk Sewer Rehabilitation Phase I, City of Troy	Replacement of approximately 2,000 linear-feet of 24-inch sewer in the vicinity of Wynants Kill Way. Required limits of repair and/or replacement is currently being evaluated.	Repairs will reduce infiltration and improve conveyance capacity thus reducing the frequency and volume of CSOs during wet weather conditions. The project will also reduce exfiltration and associated risks of bacterial contamination during dry-weather conditions.	T-045	Construction Completion Date: 12/15/14 Operational Start-Up Date: 12/15/14	$0.64
APCs	Cross Street Trunk Sewer Rehabilitation Phase II, City of Troy	Replacement and/or rehabilitation of sewer in the vicinity of Upper Campbell Avenue. Required limits of repair and/or replacement is currently being evaluated.		T-045	Completed Plans & Specifications: 12/15/24 NTP to Construction: 4/1/25 Construction Completion Date: 12/15/25 Operational Start-Up Date: 12/15/25	$0.64
Subtotal						**$2.13**
Additional Pool-Wide Projects						
APCs	Discharge Notification System for Albany Pool CSOs	Development of a public notification system for discharges of Albany Pool CSOs.	Compliance with the requirements of Sewage Pollution Right to Know Act (ECL § 17-0826-a).	N/A	Task Start Date: 12/1/13 Task Completion Date: 12/1/14	$0.21
APCs	Hudson River Water Quality Public Advisory	Notification system to inform the public on the progress of the Albany Pool CSO LTCP Implementation and associated water quality improvements identified through the Post Construction Compliance Monitoring Program. Scope to be further developed within the established budget based upon the goals and needs of each community.	Provides the public with a better understanding of CSO impacts on the water quality of the Hudson River and its tributaries. It also provides a better understanding of the water quality improvements associated with implementation of the CSO LTCP.	N/A	Task Start Date: 4/1/18 Task Completion Date: 4/1/19	$0.25
Albany Water Board, Cohoes, Watervliet, Green Island	Sewer System Operations, Maintenance and Inspection Plans	Documents and improves current procedures for operation, maintenance and inspection of each community's combined sewer system. Scope to be further developed within the established budget based upon the goals and needs of each community.	Provides for improved system performance and CSO capture.	All outfalls.	Task Start Date: 4/1/14 Task Completion Date: 12/1/15	$0.15

Table 7-4B: Recommended Final CSO LTCP

Responsible Party has advanced construction plans and specifications, and in some cases, construction activities have commenced.

Responsible Party	Project Name	Description	Purpose/Benefits	CSO Outfall No.	Project Target Milestones	Project Cost (millions)
Troy, Rensselaer, RCSD	Asset Management Plans (Order on Consent)	Provides each community with assistance in developing asset management plans to improve long term management of capital investments for operation and maintenance of their collection systems. Scope to be further developed within the established budget based upon the goals and needs of each community.	Allows for prioritization of rehabilitative measures based upon condition and criticality of infrastructure. Helps to reduce the risk of failure of critical infrastructure and improves reliability of the collection system to convey wastewater to the WWTP for treatment during dry and wet weather conditions.	All outfalls.	Task Start Date: Ongoing Task Completion Date: LTCP Approval + 18 months	$0.25
Albany Water Board, Cohoes, Watervliet, Green Island	Asset Management Plans	Provides each community with assistance in developing asset management plans to improve long term management of capital investments for operation and maintenance of their collection systems. Scope to be further developed within the established budget based upon the goals and needs of each community.	Allows for prioritization of rehabilitative measures based upon condition and criticality of infrastructure. Helps to reduce the risk of failure of critical infrastructure and improves reliability of the collection system to convey wastewater to the WWTP for treatment during dry and wet weather conditions.	All outfalls.	Task Start Date: 4/1/15 Task Completion Date: 12/1/17	$0.35
Subtotal						**$1.21**
Total Projected CSO LTCP Program Costs						**$135.73**
Total Projected CSO LTCP Program Costs (Excluding Previous Orders on Consent)						**$131.10**

Appendix P

Program Implementation Schedule

Joint Venture Team
albany pool

Table 9-3: Recommended Final CSO LTCP Implementation Schedule

Responsible Party	Project Name	Project Cost (Millions)	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Disinfection of Wet-Weather Flows at Wastewater Treatment Plants																	
ACSD	North Plant Disinfection Project	$3.75		$3.75													
ACSD	South Plant Disinfection Project	$3.38		$3.38													
RCSD	Disinfection Facilities at WWTP (Order on Consent)	$2.53	$2.53														
Subtotal		**$9.66**	$2.53	$7.13	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Process Improvements at Wastewater Treatment Plants																	
RCSD	Primary Sludge Degritting	$3.12					$1.56	$1.56									
RCSD	Enhanced Final Settling	$0.50							$0.25	$0.25							
Subtotal		**$3.62**	$0.00	$0.00	$0.00	$0.00	$1.56	$1.56	$0.25	$0.25	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
BMPs/System Optimization																	
Albany Water Board	McCormack Pump Station Upgrades, City of Albany	$0.08	$0.08														
Albany Water Board	Sewer Rehabilitation Projects Throughout the City of Albany	$0.10	$0.10														
APCs	Remove Schyler Overflow, City of Albany	$0.27															$0.27
APCs	Remove Liberty Overflow, City of Albany	$1.10														$1.10	
APCs	Modify Bouck Regulator, City of Albany	$0.25															$0.25
APCs	Improvements at Eleven Regulators, City of Cohoes	$0.10					$0.10										
APCs	Swan Street and Hamilton Street Regulator Improvements, Village of Green Island	$0.02					$0.02										
APCs	Improvements at Five Regulators, City of Watervliet	$0.05					$0.05										
City of Rensselaer	Partition Street Trunk Sewer Inspection and Cleaning, City of Rensselaer	$0.05	$0.01	$0.04													
RCSD	Upgrade Pump Stations Located in Rensselaer	$14.00		$8.00	$6.00												
RCSD	Upgrade Pump Stations Located in Troy	$15.00			$8.00	$7.00											
RCSD	Regulator Capacity Improvements to Eliminate Dry-Weather Overflows (Order on Consent)	$0.25	$0.25														
RCSD	Regulator Capacity Improvements	$0.28			$0.28												
RCSD	Regulator Tide Gate Inspection and Evaluation (Order on Consent)	$0.10		$0.05	$0.05												
RCSD	Regulator Tide Gate Repair/Replacement Program (Order on Consent)	$1.50				$0.15	$0.15	$0.15	$0.15	$0.15	$0.15	$0.15	$0.15	$0.15	$0.15		
APCs	Outside Community Metering, Rensselaer County	$2.07						$2.07									
APCs	18th Street and Avenue A Weir Improvements, City of Watervliet	$0.04					$0.04										
Subtotal		**$35.26**	$0.44	$8.09	$14.33	$7.15	$0.36	$2.22	$0.15	$0.15	$0.15	$0.15	$0.15	$0.15	$0.15	$1.10	$0.52
Sewer Separation/Stormwater Storage																	
APCs	Marietta Place Stormwater Storage Facility, City of Albany	$0.35					$0.20	$0.15									
APCs	Mereline Combined Sewage Storage, City of Albany	$0.64							$0.40	$0.24							
APCs	Upper Washington Avenue Groundwater Recharge, City of Albany	$0.20		$0.10	$0.10												
APCs	Melrose/Winthrop Groundwater Recharge Basins, City of Albany	$0.20			$0.10	$0.10											
APCs	Vliet Street Sewer Rehabilitation, Replacement and Separation, City of Cohoes	$1.93										$1.00	$0.93				
APCs	Manor Avenue Sewer Rehabilitation, Replacement and Separation, City of Cohoes	$1.43															$1.43
APCs	Columbia Street Phase II Separation, City of Cohoes	$1.00										$1.00					
APCs	George Street Sewer Separation, City of Cohoes	$0.42					$0.42										
APCs	Middle Vliet Street Sewer Separation, City of Cohoes	$1.43					$1.43										
APCs	Partition Street/Broadway Sewer and Drain Improvements, City of Rensselaer	$2.80		$1.40	$1.40												
APCs	123rd Street Stream Separation, City of Troy	$4.54							$2.27	$2.27							
APCs	Van Buren Street Stream Separation, City of Troy	$4.74											$2.37	$2.37			
APCs	Polk Street Stream Separation, City of Troy	$2.17										$2.17					
APCs	Hoosick Street Storm Sewer Extension, City of Troy	$1.05						$1.05									
Subtotal		**$22.90**	$0.00	$1.50	$1.60	$0.10	$2.05	$1.20	$2.67	$2.51	$0.00	$4.17	$3.30	$2.37	$0.00	$0.00	$1.43
Green Infrastructure Program																	
APCs	Performance of a Codes and Local Law Review	$0.10			$0.05	$0.05											
APCs	Green Infrastructure Technical Design Guidance	$0.15			$0.05	$0.05	$0.05										
APCs	Documentation/Reporting of New Public and Private Green Projects	$0.05		$0.01	$0.01	$0.01	$0.01	$0.01									
APCs	Completion of a Feasibility Assessment for a "Green Infrastructure Banking System"	$0.075			$0.02	$0.03	0.025										
APCs	Quail Street Green Infrastructure Project, City of Albany	$1.80			$0.90	$0.90											
APCs	North Swan Street Park Revitalization, City of Albany	$0.15		$0.10	0.05												
APCs	Route 32 Green Street Project, City of Watervliet	$1.00				$0.50	$0.50										
APCs	Monument Square Green Infrastructure Project, City of Troy	$1.50				$1.50											
Village of Green Island	Albany Street Green Street Project, Village of Green Island	$0.25	$0.10	$0.15													
Subtotal		**$5.08**	$0.10	$0.26	$1.08	$3.04	$0.59	$0.01	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Satellite Treatment and/or Floatables Control Facilities																	
APCs	"Big C" Disinfection and Floatables Control Facility, City of Albany	$45.00			$0.25	$0.25	$0.20	$0.20	$0.10	$4.00	$20.00	$20.00					
APCs	Floatables Control Facility for CSO 026 Outfall (Regulators Maiden, Stuben and Orange), City of Albany	$4.00						$2.00	$2.00								
APCs	Floatables Control Facility for CSO 030 Outfall (Regulators Quackenbush, Jackson and Livingston), City of Albany	$4.00						$2.00	$2.00								
APCs	"Little C" Floatables Control Facility, City of Cohoes	$2.87													$1.43	$1.44	
Subtotal		**$55.87**	$0.00	$0.00	$0.25	$0.25	$0.20	$4.20	$4.10	$4.00	$20.00	$20.00	$0.00	$0.00	$1.43	$1.44	$0.00
Tributary Enhancements																	
APCs	Investigate Non-CSO Bacteria Sources Along Mill Creek, Poesten Kill, and Wynants Kill	$0.15				$0.08	$0.07										
City of Troy	Cross Street Sewer Outfall Evaluation, City of Troy	$0.06	$0.06														
APCs	Cross Street Sewer Outfall Repairs and/or Replacment, City of Troy	$0.64		$0.64													
City of Troy	Cross Street Trunk Sewer Rehabilitation Phase I, City of Troy	$0.64		$0.64													
APCs	Cross Street Trunk Sewer Rehabilitation Phase II, City of Troy	$0.64													$0.64		
Subtotal		**$2.13**	$0.06	$1.28	$0.00	$0.08	$0.07	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.64	$0.00	$0.00
Additional Pool-Wide Projects																	
APCs	Discharge Notification System for Albany Pool CSOs	$0.21		$0.21													
APCs	Hudson River Water Quality Public Advisory System	$0.25						$0.13	$0.12								
Albany Water Board, Cohoes, Watervliet, Green Island	Sewer System Operations, Maintenance and Inspection Plans	$0.15		$0.10	$0.05												
Troy, Rensselaer, RCSD	Asset Management Plans (Order on Consent, Completion Date: LTCP Approval + 18 Months)	$0.25	$0.05	$0.10	$0.10												
Albany Water Board, Cohoes, Watervliet, Green Island	Asset Management Plans	$0.35			$0.10	$0.20	$0.05										
Subtotal		**$1.21**	$0.05	$0.41	$0.25	$0.20	$0.05	$0.13	$0.12	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Projected CSO LTCP Program Costs for All Projects		**$135.73**	**$3.18**	**$18.67**	**$17.51**	**$10.82**	**$4.88**	**$9.32**	**$7.29**	**$6.91**	**$20.15**	**$24.32**	**$3.45**	**$2.52**	**$2.22**	**$2.54**	**$1.95**
Total Projected CSO LTCP Program Costs (Excluding Previous Orders on Consent)		**$131.10**	**$0.35**	**$18.52**	**$17.36**	**$10.67**	**$4.73**	**$9.17**	**$7.14**	**$6.76**	**$20.00**	**$24.17**	**$3.30**	**$2.37**	**$2.07**	**$2.54**	**$1.95**