DATE: APRIL 6, 2018

TO: THE HONORABLE MAYOR AND MEMBERS OF CITY COUNCIL
MARK B. JINKS, CITY MANAGER

FROM: SKIP MAGINNISS, CHAIR AD HOC COMBINED SEWER SYSTEM PLAN STAKEHOLDER GROUP (STAKEHOLDER GROUP)

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SUBJECT: Report and feedback on the City's Combined Sewer System Draft Long Term Control Plan Update (LTCPU)

EXECUTIVE SUMMARY AND STAKEHOLDER RECOMMENDATIONS

The Combined Sewer System (CSS) Stakeholder Group met six times between October 2017 and March 2018 to review and monitor the preparation of the City of Alexandria's Long Term Control Plan Update (LTCPU) to meet the mandates of the 2017 Combined Sewer Overflow (CSO) Law. The meetings were facilitated by Staff from the City of Alexandria (the City) and Alexandria Renew Enterprises (AlexRenew), along with their consultants, herein referred to as the *City's team*. Based on the information presented by the City's team, subsequent Stakeholder Group discussions, and input received from the public at the meetings, the Stakeholder Group recommends the following:

- Proceed with *Option B+, Unified Tunnel with Dual-Use Wet Weather Treatment,* as the primary combined sewer system control strategy to accomplish the City's goals, permit requirements and legislative mandates. *Option B+* performance exceeds the water quality regulatory requirements and will provide substantial CSO reductions. The improvements in *Option B+*, when compared to Option B, further reduce the remaining overflow volume at CSO-001 (Oronoco Bay).
- The Stakeholder Group feels it is important the City consider the impacts on the historic character of Old Town, as well as any construction impacts on historic structures, buildings and cemeteries. The construction efforts for these large civil infrastructure projects will be in a densely populated and historic urban environment. The Stakeholder Group urges the City to continue to manage and mitigate the community impact.
- The Stakeholder Group recognizes water quality benefits that can be achieved though Green Infrastructure, yet recognizes the challenges of economically meeting the high level of CSO control within the geographic constraints of the CSO area as well as the legislated timeframe. The Stakeholder Group supports development of a comprehensive

citywide study of Green Infrastructure, and aggressive action and budgetary commitments to promote Green Infrastructure citywide to benefit the entire Alexandria community. It is further recommended the City pursue a holistic integrated stormwater management plan that includes the CSO, municipal separate storm sewer system (MS4), and the Chesapeake Bay total maximum daily load (TMDL) requirements. The Stakeholder Group also recommends that Green Infrastructure be utilized within the CSO area as a tool for adaptability and resiliency. Many members of the Stakeholder Group have encouraged the City to include a specific Green Infrastructure commitment in the LTCPU, in addition to those anticipated in the Chesapeake Bay TMDL Action Plan. Many other members do not believe such a commitment should be part of the LTCPU.

- The long-term impacts of climate change on the City's primary combined sewer control strategy were presented and discussed. The climate change modeling results indicate the performance of the proposed infrastructure would meet current regulatory requirements under a variety of future scenarios. The Stakeholder Group recommends the City incorporate an appropriate amount of conservatism, adaptability, and green infrastructure into the plan to reasonably account for the uncertainty and variability associated with climate change models.
- The Stakeholder Group recommends to further study the feasibility of improving water quality near outfalls CSO-001 (Oronoco Bay) and CSO-002 (Hunting Creek Embayment).
- The Stakeholder Group recognizes that the capital costs associated with the LTCPU are substantial ($350 million to $520 million). The Stakeholder Group recommends the City's team investigate affordability plans, to minimize the impact of these increases on low-income and fixed income residents.
- Given the substantial cost of the CSO project, the Stakeholder Group urges the City's team to investigate ways to leverage this investment for the benefit of the City by taking advantage of local contracting resources and finding synergies with other scheduled infrastructure or capital improvement projects.
- Meeting the State's mandate to remediate the CSOs is the responsibility of the entire City and will achieve a long-held community goal for clean water and a healthy environment. The Stakeholder Group supports equitably sharing costs among all citizens.
- An investment of $350 million or more in our local infrastructure will create many jobs. The City should consider taking steps to the extent permitted by law, such as local hiring preferences in contracts to encourage local resident employment when gray or green infrastructure is deployed, operated, and maintained.

INTRODUCTION

In April 2017 new legislation was passed that requires the City of Alexandria (the City) to substantially revise its Long Term Control Plan Update (LTCPU) to meet a greatly accelerated implementation date of July 1, 2025 for CSO remediation. In response to this new legislation, the Alexandria City Council passed Resolution No. 2781, which reconvened and reconstituted the Ad Hoc Combined Sewer System Plan Stakeholder Group (a similar Stakeholder Group was previously convened in 2015 and 2016). The Stakeholder Group was formed to represent a diverse group of City residents with a wide variety of interests to assist the City in monitoring the development and implementation of the City's Long Term Control Plan Update (LTCPU). Attachment 1 provides a list of the current Stakeholder Group members and their affiliations. Specifically, the resolution charged the Stakeholder Group to:

- Provide recommendations on how a primary combined sewer system control strategy can accomplish the City's goals and permit requirements while minimizing impacts to the community
- Review and monitor the preparation of the Long Term Control Plan Update with regards to:
    - Permit and regulatory issues
    - Engineering and analysis of infrastructure alternatives
    - Implementation plan schedule and funding strategy
- Serve as a central information receiving/dissemination body related to the Long Term Control Plan Update
- Offer additional engagement opportunities following submission of the plan (working groups, implementation groups)

Staff from the City and Alexandria Renew Enterprises (AlexRenew), along with their consultants, presented complex technical information in an easy-to-understand format through a series of six working meetings held between October 2017 and March 2018. Attachment 2 provides additional details for each of the meetings. Presentations were given at each meeting to facilitate discussion among the members of the Stakeholder Group regarding a variety of topics. Meeting notes were prepared by the City's team after each meeting to capture the concepts discussed. Additionally, public comment was received and considered at each meeting.

The intent of this memorandum is to summarize the work completed by the Stakeholder Group and provide a recommendation to City Council regarding a primary combined sewer system control strategy.

BACKGROUND

The Virginia Department of Environmental Quality (VDEQ) completed the Hunting Creek Total Maximum Daily Load (TMDL) Study for Bacteria in 2010, which resulted in required reductions in combined sewer overflows (CSOs) from the City's Combined Sewer System (CSS) in order to meet water quality standards. The CSS permit issued to the City by VDEQ in 2013 required the City to update its Long Term Control Plan to address the Hunting Creek TMDL. The Hunting Creek TMDL specifically applies to CSOs 002 (Hunting Creek), 003 (Hooffs Run), and 004 (Hooffs Run). Planning for mitigation of CSOs is important not only to comply with the City's

CSS permit, but also in demonstrating the City's environmental stewardship and alignment with the City's Eco-City Alexandria Environmental Action Plan.

A previous version of the LTCPU was submitted to VDEQ on August 12, 2016. VDEQ provided comments and the LTCPU was revised and resubmitted on December 2, 2016 for VDEQ approval. The LTCPU outlined the plan and timeline the City had developed to meet the TMDL. While VDEQ was reviewing the LTCPU for approval, new CSO legislation was drafted, passed, and signed into law by the Governor on April 26, 2017 which imposes additional requirements on combined sewer outfalls statewide. The legislation requires:

> *"Any owner of a CSO outfall...shall, by July 1, 2023, initiate construction activities necessary to bring the CSO outfall into compliance and shall, by July 1, 2025, bring the CSO outfall into compliance with Virginia law, the federal Clean Water Act, and the Presumption Approach described in the EPA CSO Control Policy, unless a higher level of control is necessary to comply with a TMDL."*

The legislation requires the City to substantially revise the LTCPU and greatly accelerate the implementation of the plan to meet the July 1, 2025 deadline. In addition, the law requires mitigation of overflows at CSO-001 (Oronoco Bay) to meet the EPA CSO Control Policy Presumption Approach. These changes were the impetus for the City Council to reconvene a reconstituted CSS Stakeholder Group.

SUMMARY OF OPTIONS

The City's team introduced three technical options to address the CSOs and comply with the legislative mandate at the CSS Stakeholder Meeting held on November 20, 2017. Additional technical information regarding these options was presented at subsequent meetings. The options were generally described to the Stakeholder Group as follows:

- Option A: Separate Tunnels with Wet Weather Treatment
- Option B: Unified Storage Tunnel
- Option C: Tunnel for 003/004 with Wet Weather Treatment and Storage Tanks for 001/002

The City's team presented detailed performance data for the various options at the January 10, 2018 Stakeholder Meeting. Key points conveyed to the Stakeholder Group included:

- Substantial reductions in the overflow frequency will be achieved, with the number of predicted overflows reduced from more than 70 per year to less than four (4) per outfall per year on average. The predicted overflow frequency exceeds the Presumption Approach criteria identified in EPA's CSO Control Policy.
- The system-wide percent volume capture will also be substantially improved, with an average of 91% for Option B and greater than 95% for Options A and C. The predicted percent captures exceed the 85% requirement identified under the Presumption Approach.

- All options meet the very stringent regulatory requirements required by the Hunting Creek TMDL for CSOs 002, 003 and 004; as such, all options will provide similar excellent water quality benefits.

Additional information, including all the presentations and meeting summaries, can be found on the City's website (https://www.alexandriava.gov/Sewers).

RECOMMENDED OPTION

At the February 22, 2018 meeting, the City's team presented their recommended option: *Option B – Unified Storage Tunnel,* which had the highest score based on detailed evaluation of its performance relative to the team and stakeholder selected evaluation criteria. As the planning progressed, and at the urging of the Stakeholder Group, the City's team refined Option B in order to address concerns related to the remaining overflow volume at CSO-001. At the March 19, 2018 Stakeholder Meeting, the City's team presented *Option B+, Unified Storage Tunnel with Wet Weather Treatment,* which offered enhancements to Option B for marginal additional capital costs. Option B+ provides similar performance to Options A and C with a total system-wide percent capture of 96% of combined sewer flows.

- **Life Cycle Costs.** Option B+ has a comparatively low estimated capital and lifecycle cost.
- **O&M Complexity and Reliability.** Option B+ is comparatively simple to maintain due to the centralized location of proposed facilities.
- **Adaptability.** Option B+ features a unified tunnel system for all four CSO outfalls and limits the impact at the AlexRenew WRRF, providing the most adaptability for future needs and requirements.
- **Schedule Risk.** Implementing Option B+ can meet the mandated milestone of July 1, 2025, based on current planning estimates.
- **Community Impact.** Option B+ places a majority of the tunnel mining operations at the AlexRenew WRRF instead of out in the community neighborhoods, parks and/or streets. Additionally, most of the long-term maintenance of the tunnel system will take place at the AlexRenew WRRF.

The Stakeholder Group unanimously supports Option B+ as the preferred option.

The Stakeholder Group is not supportive of *Option C - Tunnel for 003/004 with Wet Weather Treatment and Tanks for 001/002.* The Stakeholder Group believes that the long-term operation of CSO storage tanks, including cleaning, maintenance, and debris removal, at tank sites located within the community, and specifically along the Waterfront, is not desirable.

Option A - Separate Tunnels with Wet Weather Treatment was the most expensive option and had the highest schedule risks. The Stakeholder Group expressed concern regarding the additional cost (an additional $78 – $115 M in comparison to Option B) of this option, particularly for infrastructure that would be used less than 20 hours per year on average.

IMPLEMENTATION PLAN

The State-imposed deadline of July 1, 2025 was discussed at each of the six meetings. The City's team presented a seven-year schedule to meet the legislative milestone based on current planning. It was noted by the City's team, as well as many of the Stakeholders, that this is a very aggressive schedule. Particular concern was identified around the permitting and interagency coordination required for such a large infrastructure program. Regardless, the Stakeholder Group supports the schedule as presented for inclusion in the LTPCU.

The City's team presented the capital costs for the program to the Stakeholder Group, which range between $350 million to $535 million. The LTCPU projects will be funded through the sanitary sewer rates. Currently, the average household in Alexandria pays approximately $50 per month per sewer bill. Studies are underway to determine the impact of these projects on the sewer rates, but preliminary estimates indicate that the expected impact could be an increase of $20-$30 per month after the recommended project implementation. Meeting the State's mandate to remediate the CSOs is the responsibility of the entire City and will achieve a long-held community goal for clean water and a healthy environment. The Stakeholder Group supports equitably sharing costs among all citizens. The Stakeholder Group recommends exploring alternative funding sources to limit impacts to the City ratepayers.

The Stakeholder Group generally concludes that the overall schedule and costs presented for the LTCPU is a reasonable balance of cost and compliance with the 2017 CSO Law in the allowed timeframe.

OUTFALL TRANSFER INITIATIVE

At the March 19, 2018 meeting, the City's team presented information related to transferring the combined sewer outfalls, and associated CSO discharge permit, from the City of Alexandria to AlexRenew. This transfer offers both implementation and operational advantages for the recommended plan. After the transfer, the City will continue to partner with AlexRenew on the implementation of the recommended plan. The City's team indicated that the proposed transfer will not alter the overall responsibility and commitment to comply with the 2017 CSO Law. AlexRenew is a political subdivision of the Commonwealth of Virginia and governed by a citizen Board of Directors. Any input and recommendations received during the CSS Stakeholder Group process will be conveyed to and honored by AlexRenew.

The Stakeholder Group supports the proposed combined sewer outfall transfer.

ADDITIONAL STAKEHOLDER RECOMMENDATIONS

Remaining Discharges at CSO-001 (Oronoco Bay)

The Stakeholder Group expressed some concern regarding the remaining overflow volume at CSO-001 (Oronoco Bay) after implementation of the original recommendation by the City's team of Option B. The Stakeholder Group urged the City's team to continue to explore variations for Option B so that it more closely approached the CSO volume reductions and percent capture estimated for Options A and C. The City's team ultimately presented *Option B+, Unified Storage Tunnel with Wet Weather Treatment,* which offered enhancements to Option B, including additional volume reductions, for marginal additional capital costs.

CSO-001 (Oronoco Bay) and CSO-002 (Hunting Creek Embayment) Improvements

The Stakeholder Group recommends the City evaluate the possibility of extending the location of CSO 001 farther from shore into the main flow of the Potomac River rather than into the shallow waters of Oronoco Bay. The Group also recommends exploring water quality improvement strategies near CSO-002 given the relatively still area of Hunting Creek Embayment. The Stakeholder Group recognizes there are many factors to be considered, including efficacy, water hydraulics, state borders, effluent volumes, cost, schedule and the requirements of the Corps of Engineers.

Climate Change

The long-term impacts of climate change on the City's primary combined sewer control strategy were presented and discussed. The climate change modeling results suggested the performance of the proposed infrastructure will meet current regulatory requirements under a variety of future scenarios. However, it was acknowledged there is quite a bit of uncertainty and variability related to future climate change models. As such, the Stakeholder Group recommends the City's team incorporate an appropriate amount of conservatism, adaptability, and Green Infrastructure into the plan to reasonably account for this uncertainty and variability.

Green Infrastructure

At the urging of the Stakeholder Group, the City's team analyzed the potential impact of Green Infrastructure on the tunnel sizing recommended under Option B. It was determined that, due in part to the high level of bacteria reduction and aggressive schedule required by the legislation, Green Infrastructure will not result in a reduced sizing of the tunnel infrastructure. City Staff went on to present information demonstrating the City's commitment to Green Infrastructure as part of meeting its Chesapeake Bay stormwater requirements. City Staff presented the preferred approach for Green Infrastructure as a strategy implemented citywide to meet the Chesapeake Bay TMDL requirements. Green Infrastructure will be a significant component of the City's Chesapeake Bay TMDL Action Plan, which is scheduled to be completed in 2019. Along with City-led projects, the City plans to continue to encourage and promote Green Infrastructure through the development and redevelopment process.

After extended discussions, the Stakeholder Group supports development of a comprehensive citywide study of Green Infrastructure, and aggressive action and budgetary commitments to promote Green Infrastructure citywide to benefit the entire Alexandria community. It is further recommended the City pursue a holistic integrated stormwater management plan that includes the CSO, MS4 and the Chesapeake Bay TMDL requirements. The Stakeholder Group also recommends that Green Infrastructure be utilized within the CSO area as a tool for adaptability and resiliency.

Many members of the Stakeholder Group encourage the City to include a specific Green Infrastructure commitment in the LTCPU, in addition to those anticipated in the Chesapeake Bay TMDL Action Plan. Many other members do not believe such a commitment should be part of the LTCPU.

Continued Engagement
The Stakeholder Group appreciates the City Council's efforts to engage the community on such a large and important program, as well as the City's team efforts to facilitate the Stakeholder meetings and engage in meaningful dialogue. The Stakeholder Group recommends continued engagement with the public as specific projects are developed and implemented.

Construction in Old Town/Historic Areas
The Stakeholder Group feels it is important that the City consider the impacts on the historic character of Old Town, as well as any construction impacts on historic structures, buildings and cemeteries. The construction efforts for these large civil infrastructure projects will be in a densely populated and historic urban environment. The City's team provided assurances that any construction project will include appropriate measures to protect adjacent structures and buildings. The Stakeholder Group urges the City to continue to manage and mitigate the community impact.

Rate Impacts and Affordability for Low-Income Residents
The Stakeholder Group suggests the City continue to work closely with AlexRenew to develop a water affordability plan. The affordability plan should minimize the impact of the substantial rate increases on low and fixed income residents. The City should anticipate this "rate shock" and act now to mitigate the impact on low and fixed income residents.

Prioritizing Local Resident Employment
A $350 million investment in our local infrastructure will create many jobs. A recent national study sponsored by AlexRenew and many other water experts concluded that about 15 jobs are created for every $1 million spent on water infrastructure. The Stakeholder Group recommends that Alexandria take appropriate steps to extent permitted by law, such as local hiring preferences in contracts to encourage local resident employment when gray or green infrastructure is deployed, operated, and maintained.

Adaptive Control Technology
The Stakeholder Group recommends optimizing continuous monitoring and adaptive control technology as part of the solution design. These systems manage the timing and rate of stormwater flow in real-time by integrating information from field-deployed sensors and the weather forecast. If applied in the City, this approach could shave the peak flow into AlexRenew to reduce CSOs while also achieving other watershed goals.

OTHER STAKEHOLDER DISCUSSION

2016 Plan
There was discussion at several meetings related to whether the plan developed and submitted to VDEQ in 2016 should be carried forward and included in this evaluation. It was noted that this option had a substantially lower capital cost than the options described above. The City's team noted that the shorter implementation deadline under the 2017 CSO Law, requirements to further address CSO-001, TMDL requirements as State law versus a permit requirement, and other factors created a new set of boundary conditions. This required the City's team to develop new options separate from those in the 2016 Plan as the 2016 Plan did not meet the 2017 CSO Law.

CLOSING

The Stakeholder Group found City staff, AlexRenew and the consultants to be dedicated to getting to the best solution, given the constraints present, and able to deal with a range of questions and challenges. We appreciate all the hard work, now and to come.

Based on the information presented by the City's team, subsequent Stakeholder Group discussions, and input received from the public at the meetings, the Stakeholder Group recommends City Council support *Option B+, Unified Tunnel with Dual-Use Wet Weather Treatment*, as the primary combined sewer system control strategy to accomplish the City's goals and permit requirements.

LIST OF ATTACHMENTS

Attachment 1 – Members of the Combined Sewer System Stakeholder Group
Attachment 2 – List of Stakeholder Group Meetings

Attachment 1
Members of the Combined Sewer System Stakeholder Group

Name	Organization
Agnes Artemel	At-Large: Oronoco/Rivergate/Tobacco Quay
Liz Birnbaum	Park and Recreation Commission
Yvonne Callahan	Old Town Civic Association
Andrew Duncan	Chamber of Commerce
Lauren Glose	At-Large: Citywide
John Hill	Alexandria Renew Enterprises
Kate Mackenzie	At-Large: Porto Vecchio/Bridgeyard
Skip Maginniss – *Chair*	Budget and Fiscal Affairs Advisory Commission
Stephen Milone	Environmental Policy Commission
Erik Olson	North Old Town Independent Citizens Association
Dixie Sommers	Environmental Advocacy: Friends of Dyke Marsh
Jack Sullivan	At-Large: Citywide
Chuck Weber	Old Town Civic Association
Ivy Whitlatch	Alexandria Archaeological Commission

Attachment 2
List of Stakeholder Group Meetings

Meeting	Date	Topics

Meeting #1	October 12, 2017	• Purpose and Goals
		• City – AlexRenew Partnership
		• Combined Sewer System (CSS)
		  o Overview
		  o 2016 Long Term Control Plan Update
		  o 2017 State Legislation
		• Combined Sewer Overflow Strategies

Meeting #2	November 20, 2017	• CSO Program Options • Evaluation Criteria • Green Infrastructure Recap and Discussion
Meeting #3	January 10, 2018	• Evaluation Criteria and Survey Results • CSO Program Options • Summary of CSO Performance • Green Infrastructure
Meeting #4	February 1, 2018	• Summary of CSO Program Options and Performance • Life Cycle Cost Estimates, Schedule, Community Impact, O&M, and Adaptability
Meeting #5	February 22, 2018	• Green Infrastructure Update • Evaluation Summary and Recommended Option

Meeting #6	March 19, 2018	• Option B/Option B+ Sensitivity Analysis
		• Outfall Transfer Initiative
		• Cost and Rate Impact
		• Discussion
		  o Stakeholder Group Recommendations
		  o Memorandum to City Council

Meeting #7	April 6, 2018	• Stakeholder subcommittee group met to review and incorporate final edits to the Stakeholder Memorandum to City Council