We Are Columbia

March 24, 2016

BY U.S. MAIL TO:

Chief, Water Programs Enforcement Branch
Water Protection Division
U.S Environmental Protection Agency, Region 4
61 Forsyth Street, S.W.
Atlanta, GA 30303

Mr. Glenn Trofatter
SCDHEC-Bureau of Water
Water Pollution Control Division
2600 Bull Street
Columbia, SC 29201

AND BY ELECTRONIC MAIL TO:

Michael S. Traynham, Esquire (traynhams@dhec.sc.gov)
Valerie K. Mann, Esquire (Valerie.Mann@usdoj.gov)
Paul Schwartz, Esquire (Schwartz.paul@epa.gov)
Beth Drake, Esquire (beth.drake@usdoj.gov)
Carol DeMarco King, Esquire (King.carol@epa.gov)
Richard Elliott (Elliott.richard@epa.gov)

Re: *The United States of America and State of South Carolina by and through the Department of Health and Environmental Control vs. The City of Columbia*
Civil Action No. 3:13-2429-TLW
DOJ Case Number 90-5-1-1-00954

Dear Sirs and Madams:

By electronic mail on October 6, 2015, the City of Columbia notified the U.S. Department of Justice, the U.S. Environmental Protection Agency, and the South Carolina Department of Health and Environmental Control of a *force majeure* event which is expected to delay the City's performance of certain obligations under the Consent Decree. Specifically, the City experienced unprecedented rainfall which resulted in catastrophic flooding beginning on October 4, 2015. Pursuant to Paragraph 56 of the Consent Decree, the City provided a preliminary report on a *force majeure* event on October 13, 2015. Provided herein is a supplemental report on the status of the ongoing efforts to assess and restore the wastewater collection

Teresa Wilson • City Manager
1737 Main Street • P.O. Box 147 • Columbia, South Carolina 29217
Office: 803.545.3026 • Fax: 803.545.3051 • Email: tbwilson@columbiasc.net

and treatment system to normal operations and to repair damage caused by the October flooding.

As described in the October 13, 2015 preliminary report, the October 3-5, 2015 rainfall event was initially characterized as an approximate "500 year storm" across the City of Columbia's metropolitan area. This rainfall event was also preceded by almost two weeks of rain conditions in the area. Hundreds of homes were damaged, and approximately 100 streets were blocked, flooded, or impassable as a result of the flood. The devastation caused by the flood interrupted services at State government offices, the State Capitol buildings, five hospitals including a Level 1 Trauma Center, five colleges, one major university, and two U.S. military installations, the Army Training Center at Fort Jackson and McCrady Training Center. The University of South Carolina did not resume classes until Monday, October 12th, and even then, the University continued to deal with the effects of the flood since the City's boil water advisory had not yet been lifted for the campus. The commitment of local and state government resources to flood recovery were such that a University of South Carolina football game scheduled to be played in Columbia on October 10th was moved to the opposing team's stadium in Louisiana. The relocation of this game further impacted local business whose operations had been interrupted because of the flood.

On Sunday, October 4th alone, the National Weather Service rain gauges in Gills Creek and Fort Jackson registered 16.61" and 14.09", respectively. Between October 2nd and October 4th, those same rain gauges registered 20.28" and 16.54", respectively. For both time periods, these levels were greater than a 1,000 year flooding event for the region (12.6" for a 24-hour period and 14.3" for a 3-day period). The City and its residents were affected by six dam failures, one in the Columbia Canal, and five in the Gills Creek watershed. In addition to the failures, three other dams along Gills Creek overtopped. The failures and overtopping in Gills Creek impacted many homes, businesses, and roadways. Statewide, there were 32 confirmed dam failures—sixteen of which were in Richland County—and another 167 dams have been identified as damaged by the flood.

Flood Impacts and Damage to City's Drinking Water System

The dam failure in the Columbia Canal and other flood-related damages to the City's drinking water system resulted in interruption of water service for the entire system. In the early morning of Sunday, October 4th, City water plant operators

Teresa Wilson • City Manager
1737 Main Street • P.O. Box 147 • Columbia, South Carolina 29217
Office: 803.545.3026 • Fax: 803.545.3051 • Email: tbwilson@columbiasc.net

began noticing that tank levels throughout the system were dropping. It was subsequently discovered that flood waters had caused breaks throughout the system. Additionally, dam failures caused breaks in lines ranging from 6 to 18 inches. These breaks caused enough damage that the City's entire water distribution system suffered a loss of pressure. That day, City crews began identifying, isolating and repairing water system line breaks that could be reached; however, numerous sections of the system remained unreachable due to flooding or road conditions. At 2:02 p.m. on October 4th, the City issued an unprecedented system-wide boil water advisory due to the breaks in the system. The system-wide boil water advisory was not fully repealed until Wednesday, October 14th.

In addition to the breaks in the water distribution lines, the dam failure jeopardized the major raw water source for drinking water for the City. The Columbia Canal diverted from the Broad River has supplied raw water to the Canal Water Treatment Plant since 1906 and currently supplies water to approximately half of the 375,000 people who use City drinking water. In the early hours of Monday, October 5th, floodwaters that had overtopped the Canal the previous day caused a 60-foot section of the Canal levee to wash away just upstream of the City's hydroelectric plant. Efforts began well before dawn to mobilize experts, material and equipment to address the breach in order to protect one of the City's two major raw water sources of drinking water. With help from its partners over the next days and weeks, the City followed through on several plans to provide raw water to the Canal plant. These included building a temporary dam in the canal, running by-pass pumps from the Canal to the water plant, running by-pass pumps from the Broad River to the water plant, and supplementing the Canal Plant's production with finished water from the Lake Murray Plant, supplementing the City's production with Cayce and West Columbia finished water. The Canal by-pass pumps were serving the plant by Wednesday, October 7th. Two larger by-pass pumps drawing from the Broad River were supplying raw water to the plant by Monday, October 12th. By Tuesday, October 13th, and after several set-backs, the basic rock coffer dam structure designed to temporarily hold back water in the Canal was completed. The permanent repair to the canal is still to be designed and permitted and will not likely be completed in less than 24 months. The cost for the permanent repair is currently estimated to be approximately $40 million.

Flood Impacts and Damage to the City's Wastewater System

Teresa Wilson • City Manager
1737 Main Street • P.O. Box 147 • Columbia, South Carolina 29217
Office: 803.545.3026 • Fax: 803.545.3051 • Email: tbwilson@columbiasc.net

The City provides sanitary sewer service to approximately 64,000 customers and several satellite systems in Columbia and in portions of Richland and Lexington Counties. Based on the assessment conducted to date, the current cost estimate to repair flood-related damage to the Wastewater Collection and Transmission System (WCTS) and Metro Wastewater Treatment Plant (WWTP) is approximately $10,000,000. The WWTP on Simon Tree Lane continued to operate throughout the duration of the flood event. However, the WWTP was completely surrounded by flood waters, rendering the plant inaccessible by commercial motor vehicles for weeks after the flood event and requiring assistance by the State National Guard to shuttle employees to and from work. As a result of the flood, the WWTP experienced a peak of 160 million gallons in one day into the plant and storage basin, greatly in excess of the design capacity of 60 million gallons per day. Despite the increased influent flow and inability to readily access the WWTP, the WWTP staff was able to manage the influent flow without exceeding the plant's permitted effluent limits as confirmed by sampling conducted throughout the flood event. For example, WWTP averaged 19.5 for 5-day biochemical oxygen demand and 20.5 for total suspended solids for the 2009-2013 time period. During the October flooding and immediate aftermath, Metro WWTP's effluent was sampled above 10.0 for both parameters only seven times, and those occurred when the plant was discharging above design capacity. Throughout this period, the Metro WWTP staff was able to manage the volume in the existing equalization basin effectively, modify operations to ensure proper operation of the plant, coordinate laboratory pick-up of composite samples, and provide for the basic needs of personnel at the WWTP. Despite the lack of access for chemical delivery and sludge removal, the WWTP staff had procured additional fuel and chemicals in preparation for the possible of flooding and implemented measures to manage the solids inventory for an extended period. The WWTP experienced additional flooding in December which again rendered it inaccessible by motor vehicle, but did not interrupt operations.

With respect to the WCTS, the City is continuing its efforts to identify all of the damage to the WCTS as a result of the October flood. Portions of the collection system remained inaccessible for weeks following the flood event. For months after the October flood, each rainfall event caused continued flooding which resulted in access issues. As inspections of the collection system began, major damage was revealed in manholes, piping, and pumps. Inspections and damage assessment is being managed by the City's Department of Utilities Engineering (DUE). This inspection, assessment, and repair work is being performed by both City personnel

Teresa Wilson • City Manager
1737 Main Street • P.O. Box 147 • Columbia, South Carolina 29217
Office: 803.545.3026 • Fax: 803.545.3051 • Email: tbwilson@columbiasc.net

and contractors. Within the first week of recovery from the flood, the City's wastewater maintenance crews were evaluating the WCTS using Closed Circuit Television (CCTV) inspections and field inspections of manholes and easements. Once the flood waters receded, City personnel continued to access flood-damaged locations and are continuing work to complete additional surface and internal pipeline inspections. Major repair and replacement work is being completed by both City staff and contractors. Entire sections of the wastewater collection system have been damaged, and much of this damage has been temporarily addressed through the installation of bypass lines. The maintenance of these bypass lines has diverted substantial City resources from damage assessment and normal maintenance activities. Two of the 15 crews of the City's Wastewater Management Division (WMD), working seven days per week, are almost exclusively engaged in the inspection and maintenance of these bypass lines.

While the initial assessment of the damage to pump stations and force mains has been substantially completed, the City has not yet identified all damage to the collection system—in particularly, damage to manholes and gravity lines. However, the extent of such damage is evidenced by the significant increase in influent flows at the WWTP. In 2013 and 2014, the average influent flow to the WWTP was approximately 41 MGD and 39 MGD, respectively. Prior to the October flood, the average influent flow for 2015 was approximately 43 MGD. From October 2015 through the end of February 2016, the average influent flow was approximate 62 MGD. For the first three weeks of March, the influent flow remains well above normal, averaging approximately 50 MGD. This sustained above-average influent flow at the WWTP is primarily attributed to direct inflow and infiltration through damaged manholes and sewer lines.

Despite the City's commitment of <u>all</u> available resources to the inspection and assessment of the flood-related damage to the WCTS, such damage to the system is still being discovered months later even in sections of the system in which an initial post-flood inspection was conducted. For example, an SSO was discovered by a private citizen on February 17, 2016, at a Stoops Creek force main adjacent to a railroad overpass which had been significantly damaged by the October flood and repaired shortly thereafter. During the City's initial inspections after the flood, City staff conducted a visual inspection of this area and found no problem with the force main. Additionally, in 2011, the City had conducted an inspection of this force main using SmartBall® technology and found no anomalies in that section of the pipe. Indeed, after the SSO was discovered, the City staff inspected the damaged pipe

Teresa Wilson • City Manager
1737 Main Street • P.O. Box 147 • Columbia, South Carolina 29217
Office: 803.545.3026 • Fax: 803.545.3051 • Email: tbwilson@columbiasc.net

and confirmed that the rupture of the pipe was caused by impact damage on the outside of the pipe and not deterioration of the inside of the pipe. Additionally, it is our understanding that the individual who reported the SSO to the City was in the area just days before discovering the SSO and did not notice any problems. Despite the City's efforts to inspect the WCTS and identify all flood-related damage, it is expected that this type of damage may continue to be found in the coming months.

The table below provides a general breakdown of the observed flood-related damage as of the end of January:

Pump Stations	
Seven (7) Pump Stations Mechanical Damage	Damage: • Pump and Motor • General Electrical (Control Panel) • Pump Station Grinders (Macerator) • Discharge Piping Failure • Gas Monitor Equipment
Four (4) Pump Stations Access Road Damage	Repair access roads damaged during flood (access limited)
Metro Wastewater Treatment Plant Repairs	
Seven (7) Locations	Damage: • Processes Include: Bar Screens, Influent Gates, Bypass Gate Actuator • Roof Damage at WWTP • Site Drainage (access roads) • Receiving Station Scales • Fencing

Teresa Wilson • City Manager
1737 Main Street • P.O. Box 147 • Columbia, South Carolina 29217
Office: 803.545.3026 • Fax: 803.545.3051 • Email: tbwilson@columbiasc.net

Sanitary Sewer Collection System Repairs	
More than 150 locations	Damage: • Gravity Sewer Pipeline Collapse and replacement • Gravity Sewer Joint Failure • Creek / Stream Aerial Crossing Failure/Damage • Lateral Service Repair • Erosion Control Adjacent to River/Creeks • Streambank Stabilization • Easement Cleaning (tree removal) • Pipe Supports (pilings) • Manhole repair and replacement

Since the flood, City personnel have accessed a significant amount of the WCTS assets. Additionally, the City has engaged contractors to assist in the inspection of the WCTS, including the following:

- Re-inspection of section of the Major Sewer Lines determined to potentially be at risk
- Manhole inspection in Crane Creek and Smith Branch Basins
- Flow monitoring observations
- Flood recovery program management

In addition to the direct damage to equipment and sewer lines, the October flood has impacted areas of the system on which the City had made significant progress on the initial assessment required under the Continuing Sewer Assessment Program in the Consent Decree. For example, after experiencing flooding and surcharging in major pipes that had been assessed prior to the flood, the City decided to re-inspect specific segments to check for damage. This re-inspection effort will take considerable time and require the engagement of two contractors. Also, many

Teresa Wilson • City Manager
1737 Main Street • P.O. Box 147 • Columbia, South Carolina 29217
Office: 803.545.3026 • Fax: 803.545.3051 • Email: tbwilson@columbiasc.net

efforts to map and assess the minor system have been delayed as existing projects had to be stopped and delayed due to the initial and repeated flooding. Restarting these efforts has been further hampered by access complications due to the flood.

Additionally, one of the most significant setbacks resulting from of the October flood was the loss of a large bypass project in the Crane Creek basin which was undertaken to enable comprehensive rehabilitation of the gravity system. The Crane Creek bypass consisted of approximately 3 miles of temporary 24 inch sewer lines and a pump station and was designed to allow sufficient flow in this area of the system during the City's capacity enhancement of a segment of the Crane Creek trunk line. In September 2015, the Crane Creek bypass was completed and fully operating. During significant rainfall events in late September 2015, the Crane Creek bypass demonstrated sufficient capacity to manage the flow from this area. The operation of the by-pass was restored on March 14, 2016. However, the damage to the bypass has delayed the entire project by at least six months. Prior to the October flood, the Crane Creek gravity sewer line project was scheduled to be completed in September 2016. Under the current revised schedule, the rehabilitation project is expected to be completed in March 2017.

A. Explanation and description of reasons for the delay

As described above, the magnitude of the damage caused by the flood continues to significantly strain the limits of the City's available resources. City staff and contractors have been diverted to flood-related projects and the continuing assessment and repair of flood damage to the City's drinking water supply and distribution system and the City's wastewater system. Additionally, the requirements for FEMA funding for flood-related damages have delayed the procurement of the parts and services required for the permanent repairs to the water and wastewater systems. For example, although emergency repairs have enabled continued operation of the damaged pump stations, the full assessment of damage and permanent repairs have not yet been performed. Normally, the City would engage a contractor to perform the assessment and repair under its general engineering and support services procurement procedures. However, in order to qualify for federal funds under the FEMA Public Assistance Grant Program, each project must be awarded in accordance with the FEMA guidelines, which dictate procurement procedures which must be followed in addition the City's own procedures. Moreover, this delay in funding for the permanent repairs to the system continues to divert resources to the inspection and maintenance of

Teresa Wilson • City Manager
1737 Main Street • P.O. Box 147 • Columbia, South Carolina 29217
Office: 803.545.3026 • Fax: 803.545.3051 • Email: tbwilson@columbiasc.net

temporary repairs to the systems. For all the reasons described herein, the City anticipates delays in the implementation schedules outlined in program deliverables already submitted to EPA and SCDHEC and in certain deadlines in the Supplemental Environmental Project (SEP).

B. The Anticipated Duration of the Delay

With respect to the delay in performance of the City's obligations under the Consent Decree, the following describes the anticipated duration of the delays in the certain implementation schedules outlined in program deliverables already submitted to EPA and SCDHEC and in the deadlines in the Supplemental Environmental Project (SEP).

In addition to the damage described above, the October flood has impacted areas of the system on which the City had made significant progress toward the initial assessment required under the Continuing Sewer Assessment Program (CSAP) in the Consent Decree. As described above, the City decided to re-inspect specific segments post-flood to check for damage. This re-inspection effort will take considerable time and require the engagement of two contractors. Also, many efforts to map and assess the minor system have been delayed as existing projects had to be stopped and delayed due to the initial and repeated flooding. Restarting these efforts has been further hampered by access complications due to the flood. The City therefore requests a one-year extension for completion of the initial assessment of the WCTS under Paragraph 14.a of the CD and Table 4-1 of the CSAP submitted on June 8, 2015. The proposed extension would require that the major components of the WCTS be assessed at least once by no later than 36 months from the date of EPA/DHEC approval of the CSAP and would require the remainders of the entire WCTS to be assessed at least once by no later than 72 months from the date of EPA/DHEC approval of the CSAP.

The City further requests a six-month extension on the implementation schedules in the following Management Operations and Maintenance (MOM) programs which have been previously submitted to EPA/DHEC for approval:

WCTS Training Program (Paragraph 12.c) submitted on January 4, 2016;
Information Management System (Paragraph 12.d) submitted on January 4, 2016;

Teresa Wilson • City Manager
1737 Main Street • P.O. Box 147 • Columbia, South Carolina 29217
Office: 803.545.3026 • Fax: 803.545.3051 • Email: tbwilson@columbiasc.net

Sewer Mapping Program (Paragraph 12.f) submitted on July 17, 2014;
Transmission System O&M Program (Paragraph 12.h) submitted on May 18, 2015;
Gravity System O&M Program (Paragraph 12.i) submitted on November 21, 2015;
Financial Analysis Program (Paragraph 12.j) submitted on January 4, 2016.

The primary obstacle for implementation of these programs is the diversion of City staff and other resources due to the October flood as described above. For example, the Transmission System O&M Program (TSOMP) requires, *inter alia*, inspection and maintenance of easements. As noted in the TSOMP, the City has a crew of three to four employees dedicated to tasks associated with this requirement (see Table 3-1 of the TSOMP). The City maintenance staff continues to be diverted to tasks related to assessment and repairs related to the flood damage. Additionally, as noted in TSOMP, the City will also engage contractors to assist in these tasks. However, assessment and repair work related to the flood has significantly limited the availability of contract labor to perform other tasks. Moreover, the MOM program components which rely on Cityworks® will be delayed because City Information Technology (IT) staff must confer with WCTS and WWTP staff and management in order to customize the system to meet the requirements of these programs. Again, both WCTS and WWTP staff continue to devote considerable time to addressing issues related to the damage from the October flooding and have been unavailable for consultation.

With respect to the SEP, Phase I of the SEP for Gills Creek (Area 3) requires implementation of six projects in the Gills Creek Watershed. These projects are located in one of the areas most severely impacted by the October flood. Additionally, the City has engaged a contractor to implement these projects. The numerous flood-related projects have created a significant delay in normal procurement schedules and diverted personnel needed to secure the required easements and to schedule resources needed for these projects. Accordingly, the City requests a six month extension to November 21, 2016 to complete Phase I of the SEP for the Gills Creek Watershed. Additionally, Phase II of the SEP for all three areas includes one-time stream cleanup projects. Flood debris and fallen trees remain in all three SEP areas and substantially increase the scope of work to be performed during Phase II of the SEP. Therefore, the City requests a six-month

Teresa Wilson • City Manager
1737 Main Street • P.O. Box 147 • Columbia, South Carolina 29217
Office: 803.545.3026 • Fax: 803.545.3051 • Email: tbwilson@columbiasc.net

extension to November 21, 2017 to complete Phase II for all three areas under the SEP.

Additionally, the City requests a one-year extension for the stipulated penalties for Unpermitted Discharges Events pursuant to Paragraph 47.a of the CD. As discussed above, the assessment and repair of flood-related damages is diverting resources previously committed to capacity enhancing projects which had been identified by the City and scheduled for design and construction. Moreover, as discussed above, a significant amount of the City's maintenance staffing has also been diverted from routine inspection and maintenance for these efforts. As such, the City requests a one-year extension on the imposition of stipulated penalties under Paragraph 47.a, such that these penalties are applicable for Unpermitted Discharge Events occurring on or after May 21, 2017, and that the stipulated penalties which may be assessed under Paragraph 47.a(i) and (ii) are revised as follows:

(i) For each Unpermitted Discharge Event of 5,000 gallons or less, a stipulated penalty may be assessed as follows:

Within three to six years from the Date of Entry, $250.
More than six years from the Date of Entry, $1,000.

(ii) For each Unpermitted Discharge Event of more than 5,000 gallons, a stipulated penalty may be assessed as follows:

Within three to fix years from the Date of Entry, $500
More than six years from the Date of Entry, $2,000

C. Actions to Prevent or Minimize the Delay and an Implementation Schedule for those Actions

As noted above, the City has committed all available resources to addressing the damage from the flood to both its drinking water system and its sanitary sewer system. The City staff has worked diligently to conduct the initial inspections, assessment, and repairs needed to maintain the operation of both systems. The City has also engaged contractors to assist in addressing flood assessment and repair, but those resources are also limited and have been utilized to the maximum extent available. However, despite those efforts, the magnitude of the damage and

Teresa Wilson • City Manager
1737 Main Street • P.O. Box 147 • Columbia, South Carolina 29217
Office: 803.545.3026 • Fax: 803.545.3051 • Email: tbwilson@columbiasc.net

the scope of required assessment and repair have strained the limits of the City's resources, and the anticipated delays described above could not be prevented or further minimized.

D. Rationale for Attributing Delay to a *Force Majeure* Event

The basis for expected delays as a result of the flooding are provided herein. Additional support for those delays may be provided in supplemental reports and in response to comments and questions regarding this report.

E. Endangerment to Public Health, Welfare or the Environment

The City does not believe that delays in the performance of its obligations under the Consent Decree will endanger public health, welfare or the environment. The City continues to prioritize projects as additional damage is identified in the system.

The City reserves the right to further supplement its report on the *force majeure* event with additional assessment information and any additional delays resulting from the October flood. Further details regarding the flood damage and the City's efforts to assess and repair the WCTS and Metro WWTP will be provided at the meeting in Columbia scheduled for April 22, 2016.

The City appreciates your consideration of the request for extension of certain deadlines under the CD. If additional information is needed in support of this request, please do not hesitate to contact me.

Sincerely,

Teresa Wilson

Teresa B. Wilson
City Manager

Teresa Wilson • City Manager
1737 Main Street • P.O. Box 147 • Columbia, South Carolina 29217
Office: 803.545.3026 • Fax: 803.545.3051 • Email: tbwilson@columbiasc.net