

City of Columbia, SC

PRE-ISSUANCE VERIFICATION LETTER

WATER INFRASTRUCTURE CRITERIA OF THE CLIMATE BONDS STANDARD

Type of engagement: Assurance Engagement

Period engagement was carried out: May 31, 2018 – July 9, 2018

Approved verifier: Sustainalytics

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Scope and Objectives

The City of Columbia is the capital and the second largest city in the U.S state of South Carolina. Proceeds from the City of Columbia green bond will be allocated towards the financing or refinancing of investments in the development, construction, installation and/or maintenance of stormwater management and surface water quality projects in the City.

The City has engaged Sustainalytics to review and verify that the City of Columbia's stormwater management and surface water quality projects meet the requirements under the Water Infrastructure Criteria of the Climate Bonds Standard¹.

The City of Columbia has identified a portfolio of potentially eligible stormwater infrastructure projects ("Nominated Projects") that may receive allocations from the proceeds of its potential green bond. Please see Schedule 1 for examples of Nominated Projects.

Climate Bonds Standards Criteria

Pre-issuance requirements under Climate Bond Standards Version 2.1:

- Water Infrastructure
 - Mitigation
 - Adaptation & Resilience

Issuing Entity's Responsibility

The City of Columbia was responsible for providing information and documents relating to:

- The details concerning the selection process for the Nominated Projects
- The details of the Nominated Projects
- The management systems for internal processes and controls for Nominated Projects, including: tracking of proceeds, managing unallocated proceeds and earmarking funds to Nominated Projects
- The details of commitments for reporting prior to issuance, including: investment areas, management of unallocated proceeds and frequency of periodic Assurance Engagements

Independence and Quality Control

Sustainalytics, a leading provider of ESG and corporate governance research and ratings to investors, conducted the verification of the City of Columbia's Nominated Projects, and provided an independent opinion informing the City of Columbia as to the conformance of the Nominated Projects with the Pre-Issuance requirement and Water Infrastructure Criteria under the Climate Bonds Standard.

¹ CBI Water Infrastructure Criteria: <https://www.climatebonds.net/files/files/Climate%20Bonds%20Water%20Infrastructure%20Full%20Criteria.pdf>

Sustainalytics has relied on the information and the facts presented by the City of Columbia. Sustainalytics is not responsible if any aspect of the Nominated Projects referred to in this opinion - including estimates, findings, opinions, or conclusions - are incorrect. Thus, Sustainalytics shall not be held liable if any of the information or data provided by City of Columbia management and used as the basis for this assessment is not correct or complete.

Sustainalytics makes all efforts to ensure the highest quality and rigor during its assessment process and has enlisted its Sustainability Bonds Review Committee to provide oversight over the assessment of the bond.

Verifier's Responsibility

The work undertaken as part of this engagement included conversations with relevant City of Columbia employees and review of relevant documentation to confirm the Nominated Projects' conformance with the Climate Bonds Certification Pre-Issuance Requirements, which include:

- Conformance of the City of Columbia's Nominated Projects with the Climate Bonds Standard Version 2.1;
- Conformance with the Technical Criteria on Water Infrastructure
- Conformance with the Internal Processes & Controls requirements
- Conformance with Reporting Prior to Issuance requirements

Basis of the Opinion

Sustainalytics conducted the verification in accordance with the Climate Bond Standard Version 2.1 and with International Standard on Assurance Engagements 3000 – Assurance Engagements other than Audits or Reviews of Historical Information.

Sustainalytics planned and performed the verification by obtaining evidence and other information and explanations that Sustainalytics considers necessary to give reasonable assurance that the City of Columbia's Nominated Projects meet the requirements of the Climate Bond Standard. Upon reviewing evidence and other information, Sustainalytics is of the opinion that the City of Columbia will ensure compliance with Climate Bond Standard requirements.

Conclusion

With the issuance of its inaugural green bond, the City of Columbia is aiming to finance stormwater infrastructure projects that will contribute to the adaptation and resilience of the City in the face of ongoing and potential climate impacts, allowing the City to improve its response to extreme weather events, such as flooding, related to climate change. Based on the limited assurance procedures conducted of the City of Columbia's water infrastructure projects in accordance with the Water Infrastructure Criteria of the Climate Bonds Standard, Sustainalytics believes that, in all material respects, the City of Columbia's Nominated Projects are in conformance with the Water Infrastructure Criteria of the Climate Bonds Standard Pre-Issuance Requirements.

Schedule 1: Detailed Overview of Nominated Projects

Project Name	Project Description (General)
Eight Mile Branch from Danfield to Chinaberry - Northeast of the City off Hwy 1	Eight Mile Branch drainage area. From Eight Mile Branch at City limits near Covenant Road to 430' west of Danfield; from 430' west of Danfield to Carter Street
Randall Avenue -North of the City off N. Main	1,650 L.F. of 48" RCP and 400 L.F. of 43 " RCP beginning north of Ashley Street along Randall Avenue to Oakland Avenue
Gregg Street & Gervais Street, Phase 2 - above Five Points	8' x 5' box culvert - 280 L.F., 7' x 4' box culvert - 550 L.F., 5' x 4' box culvert - 510 L.F. 48" RCP - 570 L.F. from Barnwell to Gervais Street
Columbia College Drive @ Farrow Road - North of the City	18" - 500 L.F.; 15" - 1,900 L.F.: Enclose roadside ditches along Columbia College Drive to Farrow Rd
Shandon phase II - East of Five Points	Stormwater Improvements to Shandon Area Drainage Basin
Penn Branch - East of the City near Forest Acres	Repair and stabilization of existing retaining walls and slopes along the Penn Branch Drainage Channel from N. Beltline Blvd. to Woodlake Dr.
Harlem Heights Drainage Project - North of the City	Stormwater increased capacity and detention project to help alleviate existing flooding in Harlem Heights neighborhood.
Taylor/Washington 60" Improvement - Above Five Points	Evaluation of storm drainage system Taylor south to Washington between Cherokee and Gregg Street above Five Points. Improvements will help alleviate flooding in Five Points
Wallace Street Improvements - North of Elmwood	Replacement of existing 48" Storm Drainage line along Wallace Street in Downtown Columbia
MLK Water Quality and Quantity - above Five Points	Construction drawings for detention in MLK Park
Whaley and Main upgrade - along Rocky Branch south of USC Campus	Dual 25'x6' culverts to be installed at Whaley St. & Main St. intersection adjacent to USGS gage to reduce flooding
Windsor Hill Evaluation and Flood Study - Northeast of the City off Hwy 1	Stream restoration and culvert cleaning or possible upgrades along ditch that runs across Danfield Dr., Mockingbird Rd., Robin Rd., Windsor Hills Dr., and up to Pine Belt Rd
MLK/Greg Property Detention - Above Five Points	Design and construction of detention pond to alleviate Five Points flooding. Property is located between Gervais St., Millwood Ave., and Deal St.
Stream Restoration along Rocky Branch	Stream improvements along Rocky Branch
Whaley at Railroad Crossing - along Rocky Branch south of USC Campus	Upgrade CSX Railroad culvert crossing on Whaley St., east of Assembly St., to alleviate flooding

4000 Old Leesburg	Road widening, pipe ditch, and establish outfall
800 King and Queen Street from Lee to Preston	Stormwater line will be rerouted from under building. Catch basins will be added to address flooding
Sumter and Marion Streets Bio-retention Bumpouts - Downtown Columbia	Green Streets Bio Retention Bumpouts to provide enhanced treatment of parking lot and roadway runoff for water quality improvement.
Gills Creek Debris Removal	Removal of debris and sediment from Oct 2015 flood
Sumter Catawba Detention - along Rocky Branch south of USC campus	Detention along Rocky Branch
Program Management for Bond	Program Management of Storm Bond
Storm Drainage Projects Not Defined	Projects identified during the fiscal year that rate high on priority scale. Most projects are due to road collapse and emergency in nature.
Smith Branch Drainage Area - Tier 1,2,3	Study to characterize the condition of the watershed, further assessment of the need and location for potential restoration initiatives was undertaken. This was completed through a series of detailed evaluations which assessed the restoration need and potential across the watershed, specifically focusing on improving water quality and reducing flood risk.
Rocky Branch Watershed Plan Tier 1,2,3	Study to characterize the condition of the watershed, further assessment of the need and location for potential restoration initiatives was undertaken. This was completed through a series of detailed evaluations which assessed the restoration need and potential across the watershed, specifically focusing on improving water quality and reducing flood risk.

Schedule 2A: Pre-Issuance General Requirements

Selection of Nominated Projects and Assets:	1.1 Statement on the environmental objectives of the bond 1.2 Confirmation that Nominated Projects and Assets meet the Climate Bonds criteria 1.3 Document a list of Nominated Projects and Assets 1.4 Confirmation that Nominated Projects and Assets will not be nominated to other Climate Bonds 1.5 Confirmation that Net Proceeds of the Green Bond shall not be greater than the value of the Nominated Projects and Assets
Internal Processes and Controls	2.1.1 Tracking of proceeds 2.1.2 Managing of unallocated proceeds 2.1.3 Earmarking funds to Nominated Projects and Assets
Reporting Prior to Issuance	3.1.1 Investment area of Nominated Projects and Assets 3.1.2 Intended types of temporary investments for the management of unallocated proceeds 3.1.3 Approach of Verifier 3.1.4 Whether periodic Assurance Engagement will be undertaken, and the expected frequency of any periodic Assurance Engagements

Schedule 2B: Conformance to the Pre-Issuance Requirements

Procedure Performed	Factual Findings	Error or Exceptions Identified
Verification of requirements specified under Selection of Nominated Projects and Assets	1.1 The objective of the bond is to primarily use proceeds to fund stormwater management and surface water quality projects. 1.2 The Nominated Projects and Assets meet the Water Infrastructure Criteria of the Climate Bond Standard. 1.3 The Nominated Projects and Assets include: • Eight Mile Branch from Danfield to Chinaberry - Northeast of the City off Hwy 1 • Randall Avenue -North of the City off N. Main • Gregg Street & Gervais Street, Phase 2 - above Five Points • Columbia College Drive @ Farrow Road - North of the City • Shandon phase II - East of Five Points • Penn Branch - East of the City near Forest Acres • Harlem Heights Drainage Project - North of the City • Taylor/Washington 60" Improvement - Above Five Points • Wallace Street Improvements - North of Elmwood • MLK Water Quality and Quantity - above Five Points • Whaley and Main upgrade - along Rocky Branch south of USC Campus • Windsor Hill Evaluation and Flood Study - Northeast of the City off Hwy 1 • MLK/Greg Property Detention - Above Five Points • Stream Restoration along Rocky Branch • Whaley at Railroad Crossing - along Rocky Branch south of USC Campus • 4000 Old Leesburg • 800 King and Queen Street from Lee to Preston • Sumter and Marion Streets Bio-retention Bumpouts - Downtown Columbia • Gills Creek Debris Removal • Sumter Catawba Detention - along Rocky Branch south of USC campus • Program Management for Bond • Storm Drainage Projects Not Defined • Smith Branch Drainage Area; Tier 1,2,3 • Rocky Branch Watershed Plan Tier 1,2,3 1.4 The City of Columbia's management confirms that the projects shall not be nominated to other Climate Bonds. 1.5 The City of Columbia's management confirms that the net proceeds of the bond shall not be greater than the value of the projects.	None

Verification of requirements specified under Internal Processes and Controls	2.1.1 The City of Columbia’s management confirms that proceeds will be segregated in a general ledger account and tracked by Treasury staff in a systematic manner and will be exclusively used to finance Nominated Projects. 2.1.2 The City of Columbia’s management confirms that unallocated proceeds will be held in a segregated account and proceeds may be temporarily invested according to the City’s investment policy guidelines. 2.1.3 The City of Columbia’s Treasury Department has confirmed that the proceeds from the bond will be maintained in a segregated general ledger account by the Treasury staff. When the monthly bank statements are received, the Treasury staff will record any interest/fees and ensure that the general ledger agrees with the bank statement. Individual capital projects and their funding sources will be tracked by the Water/Sewer accountant. All project expenses will be initially paid from operating cash. Periodically, the Water/Sewer accountant will review expenses and draw down the bond proceeds to reimburse operating cash for all qualifying expenses.	None
Verification of requirements specified under Reporting Prior to Issuance	3.1.1 The City of Columbia’s management confirms that the proceeds of the transaction will primarily be used to fund stormwater and surface water quality projects. 3.1.2 The City of Columbia’s management confirms that unallocated proceeds shall be held in a segregated account and proceeds may be temporarily invested according to the City’s investment policy guidelines. 3.1.3 The bond’s offer letter confirms that an approved third-party verifier has been appointed to confirm the bond’s conformance with pre-issuance requirements of the Water Infrastructure criteria of the Climate Bonds Standard. 3.1.4 The bond’s offer letter confirms that an approved third-party verifier will conduct post-issuance assurance exercise within a year’s time to reaffirm conformance of the bond with the Water Infrastructure Criteria of the Climate Bonds Standard.	None

Schedule 3: Mitigation Assessment and Scorecard for evaluating the Issuer's Vulnerability Assessment & Adaptation Plan

Mitigation

The Mitigation Theme has two major categories: (1) the determination of project- related emissions, and (2) determination of emissions reduced/avoided. Eligibility for certification under this theme is determined through existing methodologies deemed acceptable under the Water Climate Bonds Standard (e.g. CDM, American Carbon Registry, etc.)

Under the guidance of the methodology selected, the Issuer must propose a clear greenhouse gas (GHG) baseline, which must describe the calculations and assumptions (inputs) used to arrive at that baseline. Issuers must also estimate net expected GHG impact (mitigation impact >0) compared to Business As Usual, as well as a credible, independently verifiable, method of tracking impact over the life of the bond. Conservative assumptions, values and procedures must be used to ensure that the GHG emission reductions or removals are not over-estimated.

The issuer is eligible for certification only if either:

- a. No net GHG emissions impact is expected, and the issuer discloses the justification for this decision with supporting documentation;
- b. A negative net GHG emissions impact is expected, and the issuer has estimated the GHG mitigation impact that will be delivered over the operational lifetime of the project or asset. This impact should be defined in terms of the decreased emissions or increased sequestration relative to a business as usual baseline."

Evaluation of the issuer's mitigation assessment

The City of Columbia has determined that the Nominated Projects have no net GHG emissions impact and disclosed suitable justification to Sustainalytics. The City has confirmed that the Nominated Projects do not include mechanical devices (pumps, etc.) or any other elements that will produce GHG emissions. Therefore, the implementation of these projects will result in a zero increase in GHG emissions compared to pre-implementation conditions.

Adaptation and Resilience

		Requirement E = Provide evidence D = Disclose	Max score	Actual score
FOR EVALUATION OF THE ISSUER'S VULNERABILITY ASSESSMENT				
SECTION 1: ALLOCATION (To be completed for all water infrastructure assets)				
1.1	Are there accountability mechanisms in place for the management of water allocations that are effective at a sub-basin and/or basin scale? Yes - SC Surface Water Withdrawal, Permitting, Use, and Reporting Act and Surface Water Withdrawal, Permitting and Reporting Regulation	D SC Code of Laws §§ 49-4-10 thru 49-4-180 SC Regulation 61-119	1	1
1.2	Are the following factors considered in the definition of the available resource pool? Note: The SC Surface Water Withdrawal, Permitting, Use, and Reporting Act and Surface Water Withdrawal, Permitting and Reporting Regulation define individual components of the available resource pool such as River Basin, Surface Water, Diffuse Surface Water, and Supplemental Water Source. - Non-consumptive uses (e.g. navigation, hydroelectricity) – Yes - Environmental flow requirements – Yes, see Minimum Instream Flow and Minimum Water Level - Dry season minimum flow requirements – Yes, included in Minimum Instream Flow definition - Return flows (how much water should be returned to the resource pool, after use) – Yes, see Minimal Changes in Water Quantity - Inter-annual and inter-seasonal variability – Yes, included in Minimum Instream Flow definition - Connectivity with other water bodies – Yes, see 49-4-	E SC Code of Laws §§ 49-4-10 thru 49-4-180, and §§ 49-23-10 thru 49-23-100 SC Regulation 61-119 SC Water Plan Second Edition SC Water Assessment Second Edition	7	7

	170(B)(1) Climate change impacts – Yes, permits issued in accordance with the South Carolina Surface Water Withdrawal, Permitting, Use, and Reporting Act are explicitly stated to be subject to the SC Drought Response Act, which, in the definition of Incipient Drought, states the Department shall routinely monitor climatic variables. Also, See SC Water Plan Second Edition and SC Water Assessment Second Edition			
1.3	Are arrangements in place to accommodate the potentially adverse impacts of climate change on the resource pool? (E.g., using best available science to plan for future changes in availability, undertaking periodic monitoring and updating of plans as climate science improves.) Yes, permits issued in accordance with the SC Surface Water Withdrawal, Permitting, Use, and Reporting Act and Surface Water Withdrawal, Permitting and Reporting Regulation are explicitly stated to be subject to the SC Drought Response Act, which, in the definition of Incipient Drought, states the Department shall routinely monitor climatic variables. Also, See SC Water Plan Second Edition and SC Water Assessment Second Edition	E SC Code of Laws §§ 49-4-10 thru 49-4-180, and §§ 49-23-10 thru 49-23-100 SC Regulation 61-119 SC Water Plan Second Edition SC Water Assessment Second Edition	1	1
1.4	Are arrangements in place to accommodate the potentially adverse impacts of climate change on the resource pool? (E.g., using best available science to plan for future changes in availability, undertaking periodic monitoring and updating of available pool.) Yes, permits issued in accordance with the SC Surface Water Withdrawal, Permitting, Use, and Reporting Act and Surface Water Withdrawal, Permitting and Reporting Regulation are explicitly stated to be subject to the SC Drought Response Act, which, in the definition of Incipient Drought, states the Department shall routinely monitor climatic variables. Also, See SC Water Plan Second Edition and SC Water Assessment Second Edition	E SC Code of Laws §§ 49-4-10 thru 49-4-180, and §§ 49-23-10 thru 49-23-100 SC Water Plan Second Edition SC Water Assessment Second Edition	1	1

1.5	Do plans define responses to “exceptional” circumstances, such as an extended drought, that influence the allocation regime? (E.g., triggers water use restrictions, reduction in allocations according to pre-defined priority uses, suspension of the regime plan, etc.) - Yes	E SC Code of Laws §§ 49-4-10 thru 49-4-180, and §§ 49-23-10 thru 49-23-100 SC Regulation 61-119 SC Water Plan Second Edition SC Water Assessment Second Edition	1	1
1.6	For international / transboundary basins, is there a legal mechanism in place to define and enforce water basin allocation agreements? Is it flexible enough for increased variability in water supplies due to more frequent climate extremes? – Yes, in the South Carolina Surface Water Withdrawal, Permitting, Use, and Reporting Act, section 49-4-170(B)(1)	D SC Code of Laws §§ 49-4-10 thru 49-4-180 SC Regulation 61-119	1	1
1.7	Are water delivery agreements defined on the basis of actual in situ seasonal/annual availability instead of volumetric or otherwise inflexible mechanisms? – Yes. Withdrawal applications to the Department must be evaluated based upon Minimum Instream Flow or Minimum Water Level and the Safe Yield. These factors are defined based upon the biological, chemical, and physical integrity of the stream or surface water and must take into account the needs of downstream users, recreation, and navigation.	E SC Code of Laws §§ 49-4-10 thru 49-4-180 SC Regulation 61-119	1	1
1.8	Has a formal environmental flows (e- flows)/sustainable diversion limit or other environmental allocation been defined for the relevant sub-basin or basin? (If there is a pre-existing plan, then has the environmental flows program been updated to account for the new project?) No	E	1	0

1.9	Have designated environmental flows / allocation programs been assured / implemented? No	E or D	1	0
1.10	Has a mechanism been defined to update the environmental flows plan periodically (e.g., every 5 to 10 years) in order to account for changes in allocation, water timing, and water availability? No	E	1	0
1.11	Is the amount of water available for consumptive use in the resource pool linked to an active, guiding public planning document? (E.g., a river basin management plan or another planning document – please indicate) - Yes	E SC Code of Laws §§ 49-4-10 thru 49-4-180, and §§ 49-23-10 thru 49-23-100 SC Regulation 61-119 SC Water Plan Second Edition SC Water Assessment Second Edition	1	1
1.12	If present, is the water management plan a statutory instrument that must be followed rather than a guiding document? Yes. The SC Drought Response Act states that drought mitigation plans must be compatible with the State Water Plan (49-23-30).	D SC Code of Laws §§ 49-23-10 thru 49-23-100	1	1
	TOTAL ALLOCATION SCORE		Max = 18	15
SECTION 2: GOVERNANCE (To be completed for all water infrastructure assets)				
2.1	Have water entitlements been defined according to one of the following? - Purpose that water may be used for - Maximum area that may be irrigated - Maximum volume that may be taken in a nominated period	D SC Code of Laws §§ 49-4-10 thru 49-4-180 SC	1	1

	Proportion of any water allocated to a defined resource pool – Yes, see proportions as defined in Minimum Instream Flow	Regulation 61-119		
2.2	Is the surface water system currently considered to be neither over-allocated nor over-used? How might climate change affect this? Yes, it is neither considered over-allocated nor over-used. Climate change may affect this through increased severity, frequency and duration of droughts. N.B. Over-allocated would be if e.g. current use is within sustainable limits but there would be a problem if all legally approved entitlements to abstract water were used. Over-used would be if existing abstractions exceed the estimated proportion of the resource that can be taken on a sustainable basis.	E SC Water Assessment Second Edition	1	1
2.3	If the investment uses groundwater, is the groundwater water system currently considered to be neither over-allocated nor over-used? The City of Columbia does not utilize groundwater as a source of public water supply, and the nature of this proposed suite of projects does not directly depend on the availability of groundwater supply. However, the groundwater system is not considered to be over-allocated or over-used. N.B. Over-allocated would be if e.g. current use is within sustainable limits but there would be a problem if all legally approved entitlements to abstract water were used. Over-used would be if existing abstractions exceed the estimated proportion of the resource that can be taken on a sustainable basis.	E SC Water Assessment Second Edition	1	1
2.4	Is there a limit to the proportion (e.g. percentage) of water that can be extracted? How might this need to change if water supplies become more variable due to climate change? (e.g. will having sufficient amounts to meet basic human needs take precedence over others?) Yes, see proportions as defined in Minimum Instream Flow, in the SC Surface Water	E SC Code of Laws §§ 49-4-10 thru 49-4-180, and §§ 49-23-10 thru	1	1

	Withdrawal, Permitting, Use, and Reporting Act. The primary threat posed by climate change to water supplies is increased severity, frequency and duration of drought. The SC Drought Response Act supersedes the SC Surface Water Withdrawal, Permitting, Use, and Reporting Act (49-4-160(B)). The SC Drought Response Act allows the Department to provide for curtailment of nonessential water uses during severe and extreme drought. Essential water uses are defined, with potable drinking water supply and water supply for public safety specified as highest priority.	49-23-100		
2.5	Are governance arrangements in place for dealing with exceptional circumstances (such as drought, floods, or severe pollution events), especially around coordinated infrastructure operations? Yes, many arrangements in place, involving several agencies, laws and regulations.	D SC Code of Laws §§ 49-4-10 thru 49-4-180, and §§ 49-23-10 thru 49-23-100 SCDHEC (Pollution Control Act) SCEMD (Hazard Mitigation) City Floodplain Ordinance	1	1
2.6	Is there a process for re-evaluating recent decadal trends in seasonal precipitation and flow OR recharge regime, in order to evaluate "normal" baseline conditions? Yes - http://www.dnr.sc.gov/climate/sco/, and Water Plan(s)/Assessments(s)	D SC Climatology Office website SC Water Plan Second Edition SC Water Assessment Second Edition	1	1

2.7	Is there a formal process for dealing with new entrants? Yes – surface water withdrawal permit requirements	D SC Code of Laws §§ 49-4-10 thru 49-4-180 SC Regulation 61-119	1	1
2.8	For existing entitlements, is there a formal process for increasing, varying, or adjusted use(s)? Yes, permits require renewal, and can be adjusted in emergency situations if needed	D SC Code of Laws §§ 49-4-10 thru 49-4-180, and §§ 49-23-10 thru 49-23-100 SC Regulation 61-119	1	1
2.9	Is there policy coherence across sectors (agriculture, energy, environment, urban) that affect water resources allocation, such as a regional, national, or basin-wide Integrated Water Resources Management (IWRM) plan? Yes, Water Plan(s) and Assessment(s) address multiple sectors.	E SC Water Plan Second Edition SC Water Assessment Second Edition	1	1
2.10	Are obligations for return flows and discharges specified and enforced? Yes	D SC Code of Laws §§ 49-4-10 thru 49-4-180 SC Regulation 61-119	1	1
2.11	Is there a mechanism to address impacts from users who are not required to hold a water entitlement but can still take water from the resource pool? Yes, some users do not require a permit, but must still be registered and are subject to reporting requirements	D SC Code of Laws §§ 49-4-10 thru 49-4-180	1	1

		SC Regulation 61-119		
2.12	Is there a pre-defined set of priority uses within the resource pool? (E.g., according to or in addition to an allocation regime) - Yes, the SC Drought Response Act, section 49-23-70(C), specifies which discharges have priority over others in times of limited resources (drought).	D SC Code of Laws §§ 49-23-10 thru 49-23-100	1	1
2.13	If there are new entrants and/if entitlement holders want to increase the volume of water they use in the resource pool and the catchment is open, are these entitlements conditional on either assessment of third party impacts, an Environmental Impact Assessment (EIA) or an existing user(s) forgoing use? Yes see surface water withdrawal permit requirements, and note that permits require renewal, and can be adjusted in emergency situations if needed	D SC Code of Laws §§ 49-4-10 thru 49-4-180 SC Regulation 61-119	1	1
2.14	Are withdrawals monitored, with clear and legally robust sanctions? Yes	E SC Code of Laws §§ 49-4-10 thru 49-4-180 SC Regulation 61-119	1	1
2.15	Are there conflict resolution mechanisms in place? Yes	E or D SC Code of Laws §§ 49-4-10 thru 49-4-180, and §§ 49-23-10 thru 49-23-100 SC Regulation 61-119	1	1
	TOTAL GOVERNANCE SCORE		Max = 15	15

SECTION 3: TECHNICAL DIAGNOSTICS (To be completed for all water infrastructure assets)

3.1	Does a water resources model of the proposed investment and ecosystem (or proposed modifications to existing investment and ecosystem) exist? Yes – SC Surface Water Quantity Models have been developed in the Simplified Water Allocation Model (SWAM) for all major river basins in South Carolina. These models are very detailed, identifying all primary sub-basins within each major river basin. In addition, the Gills Creek, Rocky Branch and Smith Branch Watershed Plans, developed for the City of Columbia, include EPA SWMM and/or HEC-RAS models. Together, the state and local models can analyze water resources, both quantity and quality-related, at large and small scales. Specify model types, such as WEAP, SWAT, RIBASIM, USACE applications). Scale should be at least sub- basin.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans	1	1
3.2	Can the system model the response of the managed water system to varied hydrologic inputs and varied climate conditions? Yes – the models are set up to receive numerous variables related to varied hydrologic and climate-related inputs.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans	1	1
3.3	Are environmental performance limits (ecosystem, species, ecological community) and/or ecosystem services specified? Yes – the statewide models are specifically designed to evaluate effects on Minimum Instream Flows as defined in the SC Surface Water Withdrawal, Permitting, Use, and Reporting Act (see Modeling Objectives, #5). As previously detailed, Minimum Instream Flows are directly dependent upon the biological, chemical, and physical	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and	1	1

	integrity of the stream. In addition, models included in the watershed plans are specifically designed to aid in the management of water quantity and quality to protect and improve the ecology of the watersheds.	SB Watershed Plans SC Code of Laws §§ 49-4-10 thru 49-4-180		
3.4	Can these performance limits be defined and quantified using the water resources? Yes – see models for specifics.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans	1	1
3.5	Have these limits been defined based on expert knowledge and/or scientific analysis? Yes – expert scientific and modelling personnel developed laws, regulations, plans and models.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans	1	1
3.6	Are these performance limits linked to infrastructure operating parameters? Yes – all associated infrastructure components (conveyances, culverts, bridges, water withdrawals, water discharges, reservoirs, etc.), and operation of those components, are included as parameters in the models.	E SC Surface Water Quantity Models – Broad and Saluda River	1	1

		Basins GC, RB and SB Watershed Plans		
3.7	Are these limits linked to an environmental flows regime? Yes – the statewide models are specifically designed to evaluate effects on Minimum Instream Flows as defined in the SC Surface Water Withdrawal, Permitting, Use, and Reporting Act (see Modeling Objectives, #5). As previously detailed, Minimum Instream Flows are directly dependent upon the biological, chemical, and physical integrity of the stream. In addition, models included in the watershed plans are specifically designed to aid in the management of water quantity and quality to protect and improve the ecology of the watersheds. Parameters related to environmental flows regime are key components of the water quality aspects of these plans and associated models.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans SC Code of Laws §§ 49-4-10 thru 49-4-180	1	1
3.8	For new projects, is there an ecological baseline evaluation describing the pre-impact state? Yes – the ecological baseline is clearly identified in the watershed plans, and factors into the associated models. On a statewide level, the ecological baseline must be known to determine the appropriate Minimum Instream Flow, management of which is a stated goal of the models.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans SC Code of Laws §§ 49-4-10 thru 49-4-180	1	1

3.9	For rehabilitation / reoperation projects, is there an ecological baseline evaluation available before the projects was developed? Yes – the ecological baseline is clearly identified in the watershed plans, and factors into the associated models. On a statewide level, the ecological baseline must be known to determine the appropriate Minimum Instream Flow, management of which is a stated goal of the models.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans SC Code of Laws §§ 49-4-10 thru 49-4-180	1	1
3.10	Has there been an analysis that details impacts related to infrastructure construction and operation that has been provided? Yes – all associated infrastructure components (conveyances, culverts, bridges, water withdrawals, water discharges, reservoirs, etc.), and operation of those components, are included as parameters in the models. As part of the Broad and Saluda River Basin model development, unimpaired flows were calculated. The unimpaired flows reflect the flow regime prior to infrastructure components being added.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans	1	1
3.11	Are lost species and/or lost or modified ecosystem functions specified for restoration in the environmental evaluation? Yes – the local watershed plans and associated models are aimed at re-establishing the historical ecosystem functions. The current state, which is understood to lack some of the natural/desired ecological components, has been analyzed. The goal of the improvements proposed in the plans is to restore the native species that have been lost (or are present in inadequate quantities). Sources are available to aid in identification of native and endangered species. See	E GC, RB and SB Watershed Plans SCDNR Website SCWF Website	1	1

	http://www.dnr.sc.gov/species/index.html , http://www.scwf.org/native-plant-list/ , http://www.dnr.sc.gov/wildlife/species.html			
3.12	Have regional protected areas / nature reserves been included in the analysis for impacts from the investment asset and future climate impacts? Yes – both local and state models are aimed at providing a balance in all activities that preserves natural areas throughout the regions analyzed. The models are also set up to receive numerous variables related to varied hydrologic and climate-related inputs.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans	1	1
3.13	Does the model include analysis of regression relationships between climate parameters and flow conditions using time series of historical climate and streamflow data? Yes – the statewide models are based upon over 80 years of historical data, and the local models are based upon several decades of historical data.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans	1	1
3.14	Does the model include climate information from a multi-modal ensemble of climate projections (e.g., from the Climate Wizard or the World Bank’s Climate Portal) to assess the likelihood of climate risks for the specified investment horizon(s)? The models are set up to receive numerous variables related to varied hydrologic and climate-related inputs. State and local governments will project water quantity and quality based on data collected moving forward. This approach has the same end goal as running available ensemble climate projections, but relies upon direct statewide and local observations to make targeted projections. State law bases allocation on flexible parameters (see Minimum Instream	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans SC Code of Laws §§ 49-	1	1

	Flow), allowing this approach to be utilized rather than long-term ensemble climate projections.	4-10 thru 49-4-180		
3.15	Are changes in the frequency and severity of rare weather events such as droughts and floods included? Yes – both flooding and drought are key considerations in both the statewide and local models.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans	1	1
3.16	Are sub-annual changes in precipitation seasonality included? Yes – see plans and models. The Broad and Saluda River Basin models incorporate both daily and monthly data, and can run at both daily and monthly timesteps.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans	1	1
3.17	Is GCM climate data complemented with an analysis of glacial melt water and sea level rise risks, where appropriate (e.g., high or coastal elevation sites)? Yes, generally, though given the location of these projects and watersheds, this does not apply.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans	1	1
3.18	Is paleo-climatic data (e.g., between 10,000 and >1000 years before present) included?	E	1	0

	While the models allow for this input, it has not yet been included. <<Does this mean that the City still needs to provide this information, or that it just isn't available at all?>>			
3.19	Is the number of model runs and duration of model runs disclosed? Yes – all information is available, or can be requested. See models.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans	1	1
3.20	Has a sensitivity analysis been performed to understand how the asset performance and environmental impacts may evolve under shifting future flow conditions? Yes – both the local and state models are based upon, and designed to evaluate, shifting future flow conditions.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans	1	1
3.21	Is directly measured climate data available for more than 30 years and incorporated into the water resources model? Yes – well over 30 years of data is utilized in both local and state models.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans	1	1
3.22	Has evidence demonstrated that climate change has already had an impact on operations and environmental targets? Are	E SC Surface	1	1

	these impacts specified and, to the extent possible, quantified? These impacts should be responded to directly in the Adaptation Plan. All key parameters, which include a host of parameters that would vary with climate change, have been analyzed for the time period that data is available. The evidence does, in some cases, show recent changes that may be due to climate change. However, conclusions that these impacts are definitively linked to climate change have not been reached. The observed changes have, to the extent possible, been quantified.	Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans		
3.23	Does the evidence suggest that climate change will have an impact on operations and environmental targets over the operational lifespan? Are these impacts specified and, to the extent possible, quantified? These impacts should be responded to directly in the Adaptation Plan. All key parameters, which include a host of parameters that would vary with climate change, have been analyzed for the time period that data is available. The evidence does, in some cases, suggest that climate change may cause an impact to environmental targets over the operational lifespan. The models are fully capable of tracking these parameters moving forward, and statutes allow for flexibility in approaching these changes (see 3.14)	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans SC Code of Laws §§ 49-4-10 thru 49-4-180	1	1
3.24	Is there a discussion of the uncertainties associated with projected climate impacts on both operations and environmental impacts? Yes – as previously detailed, the models allow for varied inputs, many of which can change in relation to climate change. The purpose of state and local models is to provide for informed decision-making in the future, with the expectation that conditions may vary (sometimes significantly) moving forward.	E SC Surface Water Quantity Models – Broad and Saluda River Basins GC, RB and SB Watershed Plans	1	1

	TOTAL DIAGNOSTIC SCORE		Max = 24	23
SECTION 4: NATURE-BASED SOLUTIONS <i>(To be completed for nature-based-solutions and hybrid water infrastructure only)</i>				
That is, this section only needs to be completed if: A. As a nature-based solution, the asset reflects the intentional use of natural and/or nature-based features, processes, and functions (see Box 1) as an integral part of addressing a human need and doing so in a manner that protects, manages, restores, and/or enhances natural features, processes, and systems in a functioning and sustainable manner. B. Where feasible, the asset prioritises natural features over nature-based features. Such features include the protection, restoration, expansion, and/or creation of natural systems and processes as an explicit component of the desired project outcomes.				
SECTION 4.1: SITE INVENTORY <i>How well do we understand the systems and processes at the project site?</i>				
4.1.1	Is this a “greenfield site” (i.e., undeveloped land used for agriculture, landscape design, or left to evolve naturally)? If so, will existing ecosystem services be expanded / supported / maintained? Yes – greenfield sites are present throughout the watersheds. Improvements will directly restore/expand, or indirectly provide protection and support, to existing ecosystem services in greenfield sites throughout the watersheds	E GC, RB and SB Watershed Plans	1	1
4.1.2	A. Has an eco-hydrological model been developed? Specify model type, such as WEAP, SWAT, RIBASIM, USACE. Yes - EPA SWMM and USACE HEC-RAS B. Is this a quantitative model? Yes C. Has it been calibrated against site data? Yes, in Rocky Branch D. Does the model include water quantity? Yes	E GC, RB and SB Watershed Plans	4	A. 1 B. 1 C. 0.5 D. 1 Total 3.5
4.1.3	Has the calibrated eco-hydrological model been reviewed by an independent expert? Yes – Program Management firm reviewed the calibrated model for Rocky Branch	E	1	1
4.1.4	Have sources of pollution been analysed for the following (even if none have been found)? Point source	E GC, RB and SB	2	2

	Nonpoint source Yes – this has been completed as a part of the watershed plans	Watershed Plans		
	TOTAL SITE INVENTORY SCORE		Max = 8	7.5
SECTION 4.2: ECOLOGICAL BASELINES FOR MANAGEMENT <i>Do we understand how the ecological characteristics of the site will evolve over time?</i>				
4.2.1	Is there an inventory of species that can be used as a baseline for vegetation and animal species? Yes - http://www.dnr.sc.gov/species/index.html, http://www.scwf.org/native-plant-list/, http://www.dnr.sc.gov/wildlife/species.html	E SCDNR Website SCWF Website	1	1
4.2.2	If there is an inventory of species that can be used as a baseline for vegetation and animal species, does it specify or identify endangered / threatened species, ecological communities, or categories of species? Yes - http://www.dnr.sc.gov/species/index.html	E SCDNR Website SCWF Website	1	1
4.2.3	Have studies on current or potential climate impacts on key species (e.g., endangered or threatened species) been included? No	E	1	0
4.2.4	Is the flow regime used as a basis for ecological management? Yes – multiple datasets related to flow regime were analyzed in the watershed plans, and continue to be analyzed through the City stormwater monitoring program	E GC, RB and SB Watershed Plans Stormwater Monitoring Reports	1	1
4.2.5	Is there a climate trends analysis for the site or region based on at least 30 years of climate data? Yes - http://www.dnr.sc.gov/climate/sco/, https://www.columbiasc.gov/depts/cpac/climate-change-sc.pdf	SC Climatology Office website City Climate Protection Action Committee website	1	1
4.2.6	Is there an assessment of exotic invasive species?	E SC Exotic Pest Plant	1	1

	Yes- https://www.se-eppc.org/southcarolina/Publications/InvasivePlantsBooklet.pdf	Council Invasive Plants Booklet		
4.2.7	If there is an assessment of exotic invasive species, has a plan been developed to cope with exotic invasive species? Yes – projects to preserve, expand and/or restore ecosystem will include removal of invasive species and/or installation of native species	E GC, RB and SB Watershed Plans	1	1
4.2.8	Has there been an assessment of tradeoffs between reliability vs environmental benefits to support decision making processes? Cost benefit analysis is included in decision making for all CIP projects; this includes reliability and environmental benefits along with several other factors.	E GC, RB and SB Watershed Plans	1	1
	TOTAL ECOLOGICAL MANAGEMENT SCORE		Max = 8	7
SECTION 4.3: DATA INVENTORIES OF LOCALISED & INDIGENOUS ASSETS				
<i>Do we have access to adequate, credible data about the project site?</i>				
4.3.1	Is there an inventory of existing water-related ecosystem services based on 30 or more years of data? Yes – well over 30 years of data was utilized in this inventory, included in the watershed plans	E GC, RB and SB Watershed	1	1
4.3.2	Does any existing inventory of water-related ecosystem services related to runoff / land-use include the following data? • Fire regime - No • Sediment / erosion load – Yes • Nutrient load - Yes • Land-usechange – Yes Detailed backgrounds and watershed assessments included in watershed plans	E GC, RB and SB Watershed	3	3
4.3.3	Do inventories of water-related ecosystem services related to water <i>quality</i> include the following data: • Water quality for environmental services (e.g., habitat, ecological communities, erosion) - Yes • Water quality for human needs / services (e.g., drinking	E GC, RB and SB Watershed	2	2

	water, agriculture) – Yes Detailed backgrounds and watershed assessments included in watershed plans			
4.3.4	Is there an existing inventory of water-related ecosystem services related to water <i>quantity</i> ? - Water quantity for environmental services (e.g., habitat, flow regime) - Yes - Water quality for human needs / services (e.g., service reliability) – Yes Detailed backgrounds and watershed assessments included in watershed plans	E GC, RB and SB Watershed	2	2
	TOTAL EXISTING INVENTORIES SCORE		Max = 8	8
SECTION 4.4: BROADER ECOSYSTEM IMPACTS <i>Do we understand how the project's impacts may extend beyond the site?</i>				
4.4.1	Has there been a determination of proposed / estimated impacts from project construction and operations regarding local, upstream, and downstream species/ ecological communities? Yes - Watershed plans recommend projects based upon the proposed/estimated impacts and improvement of the watershed/subwatershed. More detailed assessments of impacts will be performed during project design (already completed for projects in design phase or beyond).	E GC, RB and SB Watershed	1	1
4.4.2	Has there been a determination of proposed / estimated impacts on existing local, upstream, and downstream eco-hydrological systems from modification regarding: - Pollution - Yes - Downstream flow regime - Yes - Groundwater impacts - Yes - Land tenure (e.g., public vs private) – Yes All are included in the watershed assessments, and will be further assessed during design, as specified above.	GC, RB and SB Watershed	4	4
4.4.3	Has there been a determination of proposed / estimated impacts and benefits on eco-hydrological systems from changes in allocation via the following? - Relevant environmental flows management plans - Groundwater management plans	GC, RB and SB Watershed	2	2

	All are included in the watershed assessments, and will be further assessed during design, as specified above.			
4.4.4	Has the monitoring system contributed to the development and goals of the basin management plan? Yes – The stormwater monitoring program data contributed to the development of the watershed management plans, and continues to provide data for future planning.	GC, RB and SB Watershed Plans Stormwater Monitoring Reports	1	1
	TOTAL BROADER IMPACTS SYSTEMS SCORE		Max = 8	8
SECTION 4.5: MONITORING & MANAGEMENT SYSTEMS				
<i>Do we have effective management processes and tools to maintain ecological integrity over time?</i>				
4.5.1	Have target performance indicators been explicitly defined for: Infrastructure services No Ecosystem services No	E	2	0
4.5.2	Is there a monitoring plan in place for infrastructure performance indicators? Yes – The stormwater monitoring program has existing data, and will collect future data, for use in analysis of project performance.	E Stormwater Monitoring Reports	1	1
4.5.3	Is there a monitoring plan in place for ecosystem performance indicators? Yes – The stormwater monitoring program has existing data, and will collect future data, for use in analysis of project performance.	E Stormwater Monitoring Reports	1	1
4.5.4	Are monitoring outcomes connected to the decision making and management / operations process? Watershed plans recommend projects based upon the proposed/estimated impacts and improvement of the watershed/subwatershed. More detailed assessments of impacts will be performed during project design (already completed for projects in design phase or beyond). The ability to provide measureable results is a key driver in selection of projects.	E GC, RB and SB Watershed Plans Stormwater Monitoring Reports	1	1
4.5.5	Is there a multi-stakeholder basin management plan?	D	1	1

	Yes – all watershed assessments were developed with multi-stakeholder input, and all projects have been (and will continue to be) vetted through multi-stakeholder groups throughout project duration and afterward.			
	TOTAL MONITORING & MANAGEMENT SYSTEMS SCORE		Max = 6	4
FOR EVALUATION OF THE ISSUER'S ADAPTATION PLAN				
SECTION 5: ADAPTATION PLAN				
AP. 1	Is there a plan to restore or secure lost/modified ecosystem functions/species? Yes – watershed plans propose projects, many of which are included in the proposed suite of projects, to restore/secure lost/modified ecosystem functions	E GC, RB and SB Watershed Plans	1	1
AP. 2	Is the adaptation plan for environmental targets / infrastructure robust across specified <i>observed</i> / recent climate conditions? Confer VA Yes – The stormwater monitoring program data contributed to the development of the watershed management plans, and continues to provide data for future planning.	E GC, RB and SB Watershed Plans Stormwater Monitoring Reports	1	1
AP. 3	Is the adaptation plan for environmental targets / infrastructure robust across specified <i>projected</i> climate conditions? Confer VA Yes – the suite of proposed projects will meet current and projected needs, making system more resilient in cases of increasing extreme weather events that can be caused by climate change.	E GC, RB and SB Watershed Plans Stormwater Monitoring Reports	1	1
AP. 4	Is there a monitoring plan designed to track ongoing progress and impacts to inform future decisions? Yes – the stormwater monitoring program will continue to operate and collect data to be used to track progress and inform future decisions.	E Stormwater Monitoring Reports	1	1
AP. 5	Is there a plan to reconsider on a periodic basis the VA for operational parameters, governance and allocation shifts, and environmental performance targets?	E GC, RB and SB	1	1

	Yes – watershed plans will be updated periodically, as is the typical practice with such plans. This will provide a full assessment on current conditions and implementation progress, and will specify most appropriate action moving forward.	Watershed Plans		
	TOTAL ADAPTATION PLAN SCORE		Max = 5	5

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