Watershed	Upper Barton Creek Watershed
Applicant Name	Triangle J Council of Governments
Contact Person, Title	Mike Schlegel, Water Resources Program Manager
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Date of Submittal	February 22, 2016

What plans will you be using to document the 9 Elements required for 319 funding? Please provide a full reference.

Name of Plan(s)	**Author/Developer**	**Year**	**Link/Location**
Riparian Buffer Preservation and Streambank Restoration in the Upper Neuse Basin	UNRBA and TJCOG	2000	http://archive.unrba.org/docs/unrbufpr.pdf
Technical Memorandum: Summary of Modeling Tools Used in Assessing Management Measures in the Upper Neuse Watershed	UNRBA/Tetra Tech	2002	http://archive.unrba.org/docs/unwmptools.pdf
EPA's Small MS4 Stormwater Program Requirements	EPA	2015	http://water.epa.gov/polwaste/npdes/stormwater/Small-MS4-Stormwater-Program-Requirements.cfm
Measurable Goals Guidance for Phase II Small MS4s	EPA	online	http://water.epa.gov/polwaste/npdes/swbmp/upload/measurablegoals.pdf
Upper Neuse Watershed Management Plan	UNRBA /Tetra Tech	2003	http://archive.unrba.org/docs/finlplan.pdf
Upper Neuse Watershed Management Plan Local Management Strategy Reviews	UNRBA	2011	https://tjcog.box.com/s/vagblr84hvenq6e7rwk70ipozb03i7gy
Neuse River Basinwide Assessment	NC DEQ, Div. of Water Quality, now Div. of Water Resources	2006	https://tjcog.box.com/s/usqeq7iy6g51x5ijic60karfpnctd31b
Neuse River Basinwide Water Quality Plan	NC DEQ, Div. of Water Quality, now Div. of Water Resources	2009	http://portal.ncdenr.org/web/wq/ps/bpu/basin/neuse/2009, Chapter 1 Neuse River Subbasin 03-04-01

Falls Lake Rules	NC DEQ, Div. of Water Quality, now Div. of Water Resources	2009 to 2013	http://portal.ncdenr.org/web/fallslake/home
Falls Lake Watershed Analysis Risk Management Framework (WARMF) Development: Final Report	NC DEQ, Div. of Water Quality, now Div. of Water Resources	2009	http://portal.ncdenr.org/c/document_library/get_file?uuid=ccb8d8f8-a74b-415f-97f9-5e5f621255e6&groupId=38364
Neuse River Basin Restoration Priority Plan	NC Ecosystem Enhancement Program	2010	http://portal.ncdenr.org/web/eep/rbrps/neuse
Fiscal Analysis for Proposed Nutrient Strategy for Falls of Neuse Reservoir	NC DEQ, Div. of Water Quality, now Div. of Water Resources	2010	http://www.osbm.state.nc.us/files/pdf_files/DENR06082010_v2.pdf
Falls Lake New Development Model Program	NC DEQ, Div. of Water Quality, now Div. of Water Resources	2011	http://www.fallslake.org/c/document_library/get_file?uuid=b7dc5937-d7ad-4c70-8bf7-791126a44a0f&groupId=38364
Falls Lake Stormwater Load Accounting Tool	NC DEQ, Div. of Water Quality, now Div. of Water Resources	2011	http://portal.ncdenr.org/web/jordanlake/implementation-guidance-archive
Final UNRBA Monitoring Plan	UNRBA	2014	http://unrba.org/sites/default/files/news-files/DWR_Approved_UNRBA_MonitoringPlan_20140715.pdf
Upper Neuse Monitoring Design Guidelines	TJCOG	2012	https://tjcog.box.com/s/rb13n8wplyz36i6kcrerlg73rgdqsde1
Piedmont Nutrient Reduction Sourcebook	TJCOG and PTRC	2011	http://www.piedmontnutrientsourcebook.org/
A Simplified Guide to Writing Watershed Restoration Plans and North Carolina 9-Element Plan Checklist	TJCOG	2013	http://portal.ncdenr.org/c/document_library/get_file?uuid=71ba2c9f-75f9-44ee-b214-8aba63f0e9f0&groupId=38364
NC BMP Manual	DEMLR	Updated continually	http://portal.ncdenr.org/web/lr/bmp-manual
Financial Assistance for Watershed Water Quality Grants, Cost Shares, and Loans	NC DEQ, Div. of Water Resources	online	http://portal.ncdenr.org/web/wq/ps/bpu/urw/funding

DWR Ambient Monitoring System	NC DEQ, Div. of Water Resources	online	http://portal.ncdenr.org/web/wq/ess/eco/ams
An Integrated Approach to Watershed Management Planning and Implementation in Selected Watersheds of the Falls Lake Reservoir: Water Quality Monitoring Final Report	D.E. Line and J.D. Blackwell, NC State University, Biological and Agricultural Engineering Dept.	No date	https://tjcog.box.com/s/ff6al7wu7f30bm96x8zjt6bmh00khm2t
Other miscellaneous data from Wake County Falls Lake 319 project, including some field assessment information	Wake County SWCD and Environmental Services staff	2007-2008?	https://tjcog.box.com/s/ceqkfun33xxdpqi1wyjwt25y28yeq3op
Once completed, please submit your checklist to Kim Nimmer at *kimberly.nimmer@ncdenr.gov*. DWR will conduct an internal review and notify you when the plan has been determined to meet all of the 9 Elements and is eligible for Section 319 Grant implementation funding. As they are approved, they will be listed on DWR's list of 319 watershed plans at *http://portal.ncdenr.org/web/wq/ps/nps/319program/nc-watershed-plans*. If you are developing a plan that you are hoping to submit to 319 in the same year, please contact Kim Nimmer by *email* or by phone at (919) 807-6438. Your plan will need to be submitted for approval at least 45 days prior to the 319 Grant application due date.			

NB: many UNRBA-related documents can be found at the UNRBA archive, online here: http://archive.unrba.org/downloads.htm. Falls Lake Rules and associated resources (2009 to 2013) are online here: http://portal.ncdenr.org/web/fallslake/home.

1. IDENTIFICATION OF THE CAUSES AND SOURCES CHECKLIST	Yes	No	Notes	Identify location of information (include link or attach plan and identify section and page number)
REQUIRED (This box(es) below must be checked Yes in order to be eligible as a 9 Element plan)				
Does the plan(s) identify stressors and sources in the watershed?	√		The Neuse Basinwide Plan identifies conversion of lands to urbanized uses as a stressor throughout the Falls Lake watershed. The Falls Lake watershed model developed for the Falls Rules included this watershed, and it examined sources of nutrients in this watershed. Based on the receiving waters and the composition of the watershed, nutrients are likely to contribute to water quality impairment in this watershed. The 2014 303(d) list includes AU 27-15-(1), Upper Barton Creek from source to a point 0.5 mile upstream of Wake County SR 1844. IRCategory 5, Benthos Fair (Nar, AL, FW) collection year 2010, listing year 2008. According to the NBP, "Upper Barton Creek will be added to the 2008 303(d) list of impaired waters for impaired biological integrity (Figure 3 and 4). Dan Line's water quality monitoring report for the Wake County 319 project indicated that Upper Barton describes that nitrogen and phosphorous levels in Upper Barton are high relative to other Wake County Upper Neuse watersheds. The Wake County 319 project focused on reducing access of livestock to Upper Barton Creek, which was causing bank erosion and nutrients to be deposited into the stream. The Neuse Basinwide Assessment (p. 25) points to upstream development as a stressor	Neuse Basinwide Plan, Chapter 1 Neuse River Subbasin 03-04-01 (http://portal.ncdenr.org/web/wq/ps/bpu/basin/neuse/2009)

			contributing to degraded instream habitat in Upper Barton Creek.	
OPTIONAL (Supplemental and/or supporting information)				
Was a GIS desktop analysis performed?	√		Yes, the watershed has been mapped and characterized in a number of documents. The 2003 Upper Neuse Watershed Management Plan analyzed by subwatershed: • then-current and future impervious cover • biochemical oxygen demand and dissolved oxygen • urban stormwater runoff • construction activities • agricultural runoff • fecal coliform bacteria • toxics • wetlands and riparian area protection and restoration The Neuse River Basin Plan includes watershed map, a brief statement of impairment, land use within watershed, and background of activities in the watershed.	The Upper Neuse Watershed Management Plan, pp. 30-38 (http://archive.unrba.org/docs/finlplan.pdf) Neuse Basinwide Plan, Chapter 1 Neuse River Subbasin 03-04-01 (http://portal.ncdenr.org/web/wq/ps/bpu/basin/neuse/2009)
Has existing water quality or biological data been reviewed? • Ambient water quality data • USGS data • Other?	√		Yes, existing water quality or biological data been reviewed. • The Neuse River Basinwide Assessment provides an overview of the watershed and instream habitat. • The Neuse Basinwide Plan summarizes data collected by DENR as well as watershed conditions. • USGS has collected flow data throughout the Falls Lake watershed as well as water	Neuse River Basinwide Assessment (https://tjcog.box.com/s/usqeq7iy6g51x5ijic60karfpnctd31b) Upper Barton: An Integrated Approach to Watershed Management Planning and Implementation in Selected Watersheds of the Falls Lake Reservoir (https://tjcog.box.com/s/ff6al7wu7f30bm96x8zjt6bmh00khm2t)

			quality and flow data under the Triangle Area Water Monitoring Project. • The Upper Neuse Watershed Management Plan and the Falls Lake WARMF Model both included reviews of data on nutrients and flow. • The Wake County 319 Falls Lake watershed project reviewed existing data for Upper Barton Creek, among other Falls Lake subwatersheds with Wake County land area.	
Do(es) the plan(s) identify any water quality impairments in this watershed (303(d) list)?	√		Water quality impairments in this watershed are listed in the Final 2014 303(d) List. In addition to the assessment units within the watershed that are listed as impaired on the 2014 303(d) List, the receiving waterbody of Falls Lake is listed on the draft NC 2008 303(d) list in its entirety for exceedances of water quality standards for chlorophyll-*a* as well as for turbidity above I-85.	Final 2014 303(d) List: http://portal.ncdenr.org/c/document_library/get_file?uuid=28b97405-55da-4b21-aac3-f580ee810593&groupId=38364 Falls Lake impairments are described here: http://portal.ncdenr.org/web/fallslake/background
Has a field assessment been conducted? • CWP (Center for Watershed Protection) Method • EEP (Ecosystem Enhancement Program) Manual • Other?	√		The planning efforts conducted in these watersheds have not included extensive field assessment efforts. Wake County 319 project did some field assessments for Upper Barton Creek.	Personal communications, Dale Threatt-Taylor (Wake County SWCD) and Tom Hill (CCAP coordinator, DEQ)
Does the plan indicate if a TMDL has been developed for this watershed?	√		The 2014 303(d) lists includes these assessment units, indicating that a TMDL has not been developed that addresses the particular stressors / causes of impairment for this specific	Final 2014 303(d) List: http://portal.ncdenr.org/c/document_library/get_file?uuid=28b97405-55da-4b21-aac3-f580ee810593&groupId=38364

			subwatershed. The NC Division of Water Resources has a nutrient management strategy for Falls Lake and its tributary watersheds for nitrogen and phosphorous that is equivalent to TMDLs for those pollutants. Details can be found at http://portal.ncdenr.org/web/fallslake/home.	Falls Lake Rules (http://portal.ncdenr.org/web/fallslake/home)
Does the plan(s) include a map that shows where stressors and sources are concentrated?		√	Although maps have been developed for the Upper Neuse River Basin, planning efforts to date have not developed HUC-scale maps that show where specific stressors and pollutant sources are concentrated. The Neuse RBP shows locations of NPDES dischargers but it is a very large-scale map. The UNRBA has done extensive analyses of the entire Falls Lake watershed for nutrients sources.	The Neuse River Basinwide Plan, p.34 Upper Neuse Watershed Management Plan (http://archive.unrba.org/docs/finlplan.pdf)

2. DESCRIPTION OF THE NPS MANAGEMENT MEASURES CHECKLIST	Yes	No	Notes	Identify location of information (include link or attach plan and identify section and page number
REQUIRED (This box(es) below must be checked Yes in order to be eligible as a 9 Element plan)				
Does the plan(s) identify management measures that address the stressors and sources identified in Element 1? (*note: prioritization of projects would be considered to meet this element*)	√		All watersheds, especially urbanizing watersheds, benefit from implementation of NPDES MS4 six minimum measures. The Neuse Basinwide Plan describes management measures appropriate for this subwatershed.	Six Minimum Measures: http://water.epa.gov/polwaste/npdes/stormwater/Small-MS4-Stormwater-Program-Requirements.cfm Neuse Basinwide Plan, Chapter 1 Neuse River Subbasin 03-04-01

	√		Other specific management measures that address the watershed's stressors and sources include: • Stormwater wetlands: protection and restoration • Riparian buffers: protection and restoration • Livestock exclusion • Land use planning Upper Barton management measures should focus on removing livestock access to streams. Techniques include • Manure composting measures • Grassed waterways • Field borders or buffers • Off-stream water sources • Well and waterline installation Watershed restoration measures may also be needed to address historic impacts in Upper Barton Creek.	Riparian Buffer Preservation and Streambank Restoration in the Upper Neuse Basin, http://archive.unrba.org/docs/unrbufpr.pdf Stormwater control measures for new construction are described here: http://www.piedmontnutrientsourcebook.org/newconstruction.html agricultural BMPs are described here: http://www.piedmontnutrientsourcebook.org/agriculture.html Watershed restoration practices are discussed here: http://www.piedmontnutrientsourcebook.org/restoration.html

3. ESTIMATE OF THE LOAD REDUCTIONS EXPECTED FOR THE MANAGEMENT MEASURES	Yes	No	Note	Identify location of information (include link or attach plan and identify section and page number
REQUIRED (This box(es) below must be checked Yes in order to be eligible as a 9 Element plan)				
Have potential indicators been identified for each management measure to determine success?	√		Success indicators for these management measures include	Simplified Guide, Table 1 (http://portal.ncdenr.org/c/document_library/get_file?uuid=71ba2c9f-75f9-44ee-b214-8aba63f0e9f0&groupId=38364)

			• Flow/cross-section measurements • Visual survey of stream-banks/channel • Metals, chlorophyll-a, DO, bacteriological, TSS and turbidity measurements • Number of beach closings • Number of fish kills • Temperature, DO, nutrient, TSS and turbidity measurements • Flow and cross section measurements • Visual survey of stream-banks/channel • TSS, turbidity • Number of violations • Chlorophyll-a, DO, and bacteriological Measurements • Number of livestock animals in stream	
Has it been roughly quantified how much each management measure will reduce one or more parameters identified in Element 1?	√		Table 4 in the Simplified Guide provides information on potential pollutant reductions associated with management activities. The NC BMP Manual provides guidance on quantifying pollutant reductions due to stormwater control measures. The SCM Crediting Team is working on refinements to SCM credits.	Simplified Guide, Table 3 (http://portal.ncdenr.org/c/document_library/get_file?uuid=71ba2c9f-75f9-44ee-b214-8aba63f0e9f0&groupId=38364) NC BMP Manual (http://portal.ncdenr.org/web/lr/bmp-manual)
OPTIONAL (Supplemental and/or supporting information)				
Has a water quality, watershed or lake response model been developed for this watershed?		√	No; however, watershed loading and lake response modeling were done for nutrients as part of the Falls Lake Rules.	Falls Lake Rules (http://portal.ncdenr.org/web/fallslake/home)

4. ESTIMATE OF THE TECHNICAL AND FINANCIAL ASSISTANCE NEEDED	Yes	No	Notes	Identify location of information (include link or attach plan and identify section and page number
REQUIRED (This box(es) below must be checked Yes in order to be eligible as a 9 Element plan)				
Have the potential costs associated with management activities listed in the plan(s) been identified?	√		Tables 4 and 5 in the Simplified Guide provides information on potential costs associated with management activities. A Fiscal Analysis was conducted for the Falls Nutrient Management Strategy.	Simplified Guide, Tables 4 and 5 (http://portal.ncdenr.org/c/document_library/get_file?uuid=71ba2c9f-75f9-44ee-b214-8aba63f0e9f0&groupId=38364) Fiscal Analysis for Proposed Nutrient Strategy for Falls of Neuse Reservoir (http://www.osbm.state.nc.us/files/pdf_files/DENR06082010_v2.pdf)
Has the technical assistance that may be required to help with design, construction, implementation and monitoring of management strategies listed in the plan(s) been identified?	√		Technical assistance may be obtained through consultants, UNRBA, USGS, NC State University/Cooperative Extension, local governments, DWR, Kerr-Tar COG, and TJCOG. DEQ provides a helpful list of programs; see link at right.	Financial Assistance for Watershed Water Quality Grants, Cost Shares, and Loans (http://portal.ncdenr.org/web/wq/ps/bpu/urw/funding)
OPTIONAL (Supplemental and/or supporting information)				
Have potential partners and funding sources to assist with implementation of the watershed plan(s) been identified and/or contacted?	√		Potential partners in implementation have been involved for several decades through the UNRBA, TJCOG, the Falls Lake Rules and other regulatory processes, as well as project implementation efforts. A specific outreach event is planned for 2016.	
Have potential partners/funding sources to assist with maintenance and/or monitoring (following completion) been identified?	√		NCSU is a great partner for project monitoring. DWR and USGS are great partners to monitor waterway response. See the checklist for Element 9 in this document below for a list of potential partners for ambient/ongoing monitoring.	

5. INFORMATION/EDUCATION COMPONENT	Yes	No	Notes	Identify location of information (include link or attach plan and identify section and page number
REQUIRED (This box(es) below must be checked Yes in order to be eligible as a 9 Element plan)				
Have a range of information and education options been identified in the watershed plan?	√		A number of education and public information options are available to those seeking to conduct implementation work in this watershed. These are described in the Piedmont Nutrient Reduction Sourcebook.	Piedmont Nutrient Reduction Sourcebook (http://www.piedmontnutrientsourcebook.org/outreach.html)
OPTIONAL (Supplemental and/or supporting information)				
Have resource agencies that can be integrated into the watershed planning process been identified and/or contacted?	√		The NC Clean Water Education Partnership, local governments, TJCOG, and county Soil & Water Conservation Districts already conduct outreach in this watershed and could also be integrated into the project implementation process.	
6. SCHEDULE FOR IMPLEMENTING MANAGEMENT MEASURES	Yes	No	Notes	Identify location of information (include link or attach plan and identify section and page number
REQUIRED (This box(es) below must be checked Yes in order to be eligible as a 9 Element plan)				
Have the tasks and activities that are related to the implementation and monitoring of management recommendations been identified?	√		Implementation and monitoring of site-specific management measures would follow this process: • Identify potential project locations (short-term) • Coordinate with landowners (short-term) • Design project (short-term) • Create monitoring plan and / or QAPP (short-term)	

			• Conduct pre-project baseline monitoring (mid-term) • Construct and install projects (mid-term) • Identify parties responsible for maintenance (mid-term) • Inspect project, create as-built certifications (mid-term) • Establish maintenance protocols and agreements (mid-term) • Execute maintenance protocols and agreements (long-term) • Conduct post-project water-quality monitoring (long-term) Jurisdictional/programmatic measures: • Identify stakeholders and target land areas (short-term) • Establish program goals and determine key objectives (e.g., specific pollutants that will be targeted) (short-term) • Determine implementation approach and project-specific evaluation mechanisms (short-term) • Obtain resources for implementation (mid-term) • Roll out program/initiative with involvement of key stakeholders (e.g., training, workshop) (mid-term) • Implement program (mid-term) • Collect data on implementation and adjust as necessary	Measurable Goals Guidance for Phase II Small MS4s (http://water.epa.gov/polwaste/npdes/swbmp/upload/measurablegoals.pdf)

			(adaptive management) to sustain the program/initiative (long-term)	
Has it been determined if these tasks and activities are short-term, medium, or long-term in nature (*note: prioritization of projects is acceptable for meeting this element*)?	√		Yes, see previous list of site-specific and jurisdictional/programmatic measures for the time scale (specified in parentheses).	
7. DESCRIPTION OF INTERIM, MEASURABLE MILESTONES	Yes	No	Notes	Identify location of information (include link or attach plan and identify section and page number
REQUIRED (This box(es) below must be checked Yes in order to be eligible as a 9 Element plan)				
Have interim, measurable milestones (things that you can track) that can help determine if management measures (in Element 2) are being implemented been identified?	√		The management measures and activities listed in Element 6, above, serve as milestones for tracking implementation. As measures and activities are completed, they are effective milestones for tracking progress.	
8. CRITERIA THAT CAN BE USED TO DETERMINE IF LOADING REDUCTIONS ARE BEING ACHIEVED	Yes	No	Notes	Identify location of information (include link or attach plan and identify section and page number
REQUIRED (This box(es) below must be checked Yes in order to be eligible as a 9 Element plan)				
Have criteria and/or indicators that can be used to determine if management strategies and activities listed in the plan(s) are being effective been identified?	√		For these watersheds, progress toward milestones and implementation of management measures can be measured through achievement of short-term administrative outputs and milestones (partnerships formed, grants sought), mid-term outcomes (SCMs and other projects designed and/or	Upper Neuse Monitoring Design Guidelines (https://tjcog.box.com/s/rb13n8wplyz36i6kcrerlg73rgdqsde1)

			implemented), and long-term impacts (water quality improvements). Indicators of long-term impacts and implementation effectiveness could include • Flow/cross-section measurements • Visual survey of stream-banks/channel • Metals, chlorophyll-a, DO, bacteriological, TSS and turbidity measurements • Number of beach closings • Number of fish kills • Temperature, DO, nutrient, TSS and turbidity measurements • Flow and cross section measurements • Visual survey of stream-banks/channel • TSS, turbidity • Chlorophyll-a, DO, and bacteriological measurements TJCOG conducted a project to develop monitoring design guidelines that could inform evaluation of specific projects, many of which are innovative.	
9. MONITORING	Yes	No	Notes	Identify location of information (include link or attach plan and identify section and page number
REQUIRED (This box(es) below must be checked Yes in order to be eligible as a 9 Element plan)				
Has a monitoring plan that includes each of the criteria and/or indicators	√		The UNRBA has developed a monitoring plan for the Falls Lake watershed. Sarah	UNRBA Local Management Strategy Reviews (https://tjcog.box.com/s/vagblr84hvenq6e7rwk70ipoz

identified in Element 8 been developed?			Bruce developed an evaluation framework for the Upper Neuse Watershed Management Plan (Local Management Strategy Reviews) that applies to that comprehensive suite of site-specific and jurisdictional/ programmatic watershed management measures. DWR has an ambient monitoring program that conducts intensive monitoring in subwatersheds as well as Falls Lake watershed as a whole.	b03i7gy) DWR Ambient Monitoring System (http://portal.ncdenr.org/web/wq/ess/eco/ams)
OPTIONAL (Supplemental and/or supporting information)				
Are there plans for conducting water quality monitoring? • Intensive/On-going? • Field kits?	√		Federally funded projects require a QAPP be approved prior to data collection. The Neuse Basinwide Plan summarizes data collected by DENR. USGS has collected flow data throughout the Falls Lake watershed as well as water quality and flow data under the Triangle Area Water Monitoring Project. UNRBA has a monitoring plan and is collecting data on nutrients. Potential partners for ambient/ongoing monitoring generally include USGS, discharger monitoring partnerships, the UNRBA/local governments in the watershed, DWR, and NCSU.	Final UNRBA Monitoring Plan (http://unrba.org/sites/default/files/news-files/DWR_Approved_UNRBA_MonitoringPlan_20140715.pdf)
If water quality monitoring is expected	√		The monitoring programs mentioned	

to be conducted, have you contacted NCDWR?			above coordinate closely with DWR.	