

Stormwater Technical Advisory Group Report to Steering Committee

High Rock Lake Stakeholder Process

Summary

The High Rock Lake Stormwater Technical Advisory Group met with representatives from the Division of Water Resources seven times between January and November of 2023. DWR Planning staff brought forward several proposals to implement post-construction stormwater requirements for nutrient control, as well as load reduction goals for existing development across the watershed. These requirements built upon precedent established in the other nutrient strategy watersheds in the State, and adapted provisions based on lessons learned from the history of implementation.

On new development, rather than implement nutrient export rate targets, the proposed post-construction treatment requirement for High Rock Lake would prescribe treatment of runoff from specified storm sizes, progressive requirements based on impervious cover density thresholds, and hydrologic discharge control for the highest density projects. No consensus was achieved on whether or not to recommend this proposal for adoption.

Stormwater TAG members came to a consensus in recommending that post-construction stormwater treatment requirements should apply to all local jurisdictions in the High Rock Lake Watershed. Additionally, tentative consensus was achieved to recommend that single-family lots below a certain BUA threshold should be exempt from post-construction stormwater treatment requirements, though members were unable to agree on a specific BUA threshold and recommended further analysis. Tentative consensus was achieved to recommend ongoing SCM maintenance into perpetuity, though members expressed concerns about existing and future local capacity to perform this maintenance. Tentative consensus was also achieved to recommend that public linear transportation projects should be exempted from post-construction stormwater treatment requirements, and that road-only and sidewalk-only projects should not require post-construction stormwater treatment and should be allowed to comply with rule requirements exclusively via offset payments. All of these consensus items align with existing requirements and exemptions in other nutrient sensitive watersheds.

Regarding existing development, DWR Planning staff brought forward a conceptual proposal for an investment-based requirement that holds local governments accountable for devoting a specified amount of money toward a series of load reducing and good housekeeping nutrient practices, including but not limited to on-site wastewater inspection, repair, and education, stream restoration and enhancement, green infrastructure, state-approved Stormwater Control Measures (SCM), among others. This proposal mirrors a program currently being implemented by stakeholders in the Falls Lake Watershed. TAG members reached consensus in support of this type of investment-based model for existing development.

New Development

With the exception of local flood management ordinances, stormwater was relatively unmanaged in the High Rock Lake watershed after the impoundment of the Yadkin River in the 1920s and before the implementation of EPA's NPDES MS4 Permitting Program. This lengthy lag time has resulted in widespread alterations to the area's hydrologic regime. Significant ongoing sediment and nutrient delivery to High Rock Lake highlight that future load increases from new development should be limited to the greatest practical extent.

DWR Planning Staff Recommendations

Planning staff understands the importance of distributing load reduction goals fairly across the various point and nonpoint sources in the watershed. In the decades since the first nutrient strategies took effect in North Carolina, staff has worked with experts across the state to review the effects of new development stormwater treatment requirements. A number of limitations were identified with existing post-construction stormwater treatment requirements in both conventional state stormwater programs and nutrient stormwater rules. Staff developed an alternative proposal for High Rock watershed to address these limitations. The limitations are described here as the foundation for discussions, along with staff's general recommended approach for addressing them. Further details of DWR's proposal are provided in the sections that follow along with the TAG's responses.

Issue 1 – Nutrient export rate target approach is involved and doesn't consistently address hydrologic impacts

First, a focus on nutrient pounds counting has resulted in a complex calculation process which aims to keep post-development nutrient export below a calculated value for each watershed. Producing this value for each watershed requires a number of simplifying mathematical assumptions, the objective of achieving strategy reduction goals on a project basis involves assumptions that have not necessarily borne out, and compliance with these rates has added administrative complexity to the development approval process, including the resource-intensive component of offsite load reduction measures as part of compliance. In recommending a transition to hydrologic control standards, Planning staff proposes to learn from post-construction stormwater treatment requirements employed by other states. The proposal shifts from the nutrient performance basis used in the Neuse, Tar-Pamlico, Falls Lake, and Jordan Lake nutrient strategies, to a hydrologic performance basis that is designed to address both site nutrient control and receiving stream channel protection. Staff believes this transition will provide greater familiarity, predictability and simplicity for developers and engineers.

Issue 2 – Traditional high density break point for required treatment is too high, and stream impacts are realized at much lower thresholds

Most nutrient strategy new development rules and state stormwater rules trigger stormwater treatment requirements at a high-density threshold of 24% BUA. This threshold is significantly higher than the 10% watershed-scale impervious threshold where streams have been shown to destabilize and experience reductions in ecological integrity, and 24% is in a range where aquatic life and nutrient cycling is significantly degraded, and unstable channels have become sediment and nutrient sources. Additionally, experience in other watersheds tells us that a certain amount of post-construction lot alterations are to be expected as property owners make improvements that add impervious surfaces. This means that a

watershed where treatment requirements are triggered at 24% is likely to have significant portions of the developed landscape that exceed this threshold and have inadequate or no stormflow controls. Planning staff believes that a 12% high density BUA threshold is reasonable and appropriate for purposes of protecting receiving streams' integrity, preventing them from becoming sediment and nutrient sources, and minimizing increases in nutrient loading.

Issue 3 – The conventional state treatment and discharge standard does not appear to adequately protect receiving streams from degradation

It appears that in watersheds where state stormwater controls are implemented, streams still tend to become destabilized, widen, downcut, migrate and exhibit poor biological health. The typical requirement to detain and treat runoff from 1" of rainfall does not appear to sufficiently reign in the increased flashiness of the post-development runoff hydrograph. A previous attempt by the state to address this hydrologic impact issue by adding a pre/post peak flow rate match requirement was found through studies to potentially exacerbate stream channel impacts and was discontinued. Investigation of approaches used in other states finds that various, more protective measures are frequently required to mitigate the hydrologic impacts of development on runoff. Two elements used in comparable physiographic regions of Chesapeake Bay states involve recharging a portion of the water quality volume and using a modified pre/post peak rate match for larger storms in the stream channel bankfull discharge range. Planning staff believe these criteria are suitable for the High Rock watershed and will accomplish the intended stream protection and nutrient objectives while not being overly burdensome on the development community.

TAG Consensus Items, New Development

Overarching Premise – All jurisdictions should be subject to the same requirements across the watershed

Stormwater TAG members concur with the recommendation put forward by DWR that administrative consistency will be key in encouraging buy-in and implementation of new nutrient strategy rules. Members expressed concerns that local capacity to implement stormwater programs is limited in MS4 Phase II communities, non-MS4 communities, and unincorporated county areas, but members ultimately concluded that a patchwork of requirements would likely incentivize development in areas without a post-construction stormwater requirement, which risks straining local jurisdictions even further. Additionally, many developers operate across multiple local jurisdictions, so uniformity will be key in ensuring that they quickly develop the skills needed to comply with local programs so that real improvements to receiving waters can be achieved. In order for a nutrient strategy to distribute regulatory obligations fairly among stakeholders, it is recommended that all local governments be subject to the same requirements.

Overarching Premise – Exemptions used in other nutrient strategies should also be included in the High Rock Lake new development rule

Stormwater TAG members concur with the recommendation put forward by DWR that certain exemptions should be adapted from the existing nutrient strategies. These include the following:

- Single-family lots below a certain BUA threshold should be exempt from post-construction stormwater treatment requirements. Though members were unable to agree on a specific BUA threshold, members were in agreement that requiring SCM installation and maintenance on small private lots would present an overwhelming administrative burden on private property owners, and that SCM treatment requirements are better suited for higher density projects or projects that are part of a larger common plan of development. TAG members recommended further analysis on a suitable BUA threshold for single-family residential development exemption.
- Ongoing SCM maintenance should be performed into perpetuity. Though members expressed concerns about existing and future local capacity to perform this maintenance, DWR expressed a need to ensure ongoing inspection and maintenance for SCMs implemented on public and private property to ensure compliance with the overall load reduction goals of the nutrient strategy.
- Consistent with other nutrient strategies, public linear transportation projects that is subject to the jurisdiction of the Surface Transportation Board should be exempted from post-construction stormwater treatment requirements, and road-only and sidewalk-only projects should not require post-construction stormwater treatment and should be allowed to comply with rule requirements exclusively via offset payments. Transportation projects, by definition, are designed to maximize a ratio of impervious cover to pervious cover, and so would be disproportionately burdened by a BUA-based treatment requirement. TAG members expressed an interest in ensuring that in lieu of treatment requirements, buydowns are available to offset as much of the stormwater impact of transportation projects as is feasible.

TAG Non-Consensus Items, New Development

Post-construction treatment requirements tiered by BUA

DWR Planning staff presented a proposal for progressive stormwater treatment based on built upon area (BUA) thresholds for new development. These thresholds would define treatment requirements based on the existence of hardened stormwater collection systems and scale those treatment requirements by storm size as BUA intensity increases within new residential, commercial, and industrial development projects. DWR's proposal is shown below:

		No Stormwater Collection System as defined in 15A NCAC 02H .1002(48)	Stormwater Collection System as defined in 15A NCAC 02H .1002(48)
BUA < 6%		<ul style="list-style-type: none"> • Vegetated conveyances only • Disconnect impervious cover from conveyances • Disperse IC-concentrated flows 	<ul style="list-style-type: none"> • Treat site runoff from 1" storm w/ primary SCM, including volume reduction requirement (see below), calculated w/ curve number method
6% ≤ BUA < 12%		<ul style="list-style-type: none"> • Vegetated conveyances only • Non-transportation impervious cover <ul style="list-style-type: none"> ○ Disconnect from conveyances ○ Disperse concentrated flows • Transportation impervious cover <ul style="list-style-type: none"> ○ Treat w/ primary SCM or runoff-reducing secondary SCM 	OR <ul style="list-style-type: none"> • Treat site runoff from 90th percentile storm w/ primary SCM
12% ≤ BUA	Stream Protection Criteria	<i>Potential Options for Initial Discussion</i> <ul style="list-style-type: none"> • Control the 2yr/24hr post-development peak flow rate to 50% of the 2yr/24hr pre-development level OR <ul style="list-style-type: none"> • Control the 2yr/24hr post-development peak flow rate to the 1yr/24hr predevelopment level OR <ul style="list-style-type: none"> • Detain the volume difference between the post-development 1yr/24hr storm and the pre-development 1yr/24hr storm, releasing half the volume over no less than 24 hours 	
	Water Quality Treatment Criteria	<ul style="list-style-type: none"> • Treat site runoff from 1" storm w/ primary SCM, including volume reduction requirement (see below), calculated w/ curve number method OR <ul style="list-style-type: none"> • Treat site runoff from 90th percentile storm w/ primary SCM 	

Stormwater TAG members were unable to achieve consensus to recommend the BUA-tiered proposal put forward by DWR. First, some TAG members expressed concerns about applying different treatment requirements on developments that drain to stormwater collection systems (SCS), namely that some drain to pipes and other hardened infrastructure, and others drain to engineered treatment swales. Much more detail will be necessary to ensure that low density requirements within projects that drain to a SCS align with current allowances for a limited amount of channel or pipe conveyance. Second, most members expressed uncertainty regarding the extent to which single family residential requirements below 6% BUA might disincentivize low density development and be overly punitive on builders of single-family homes, but indicated an openness to consider the specified requirements if single-family residential exemptions were maintained and strengthened. Third, most TAG members noted the validity of a BUA density threshold for progressive treatment requirements, but some members were unable to concur with DWR's recommended percentage thresholds. Members noted that low density requirements that fall within private property boundaries will be difficult for local jurisdictions to inspect and/or enforce. Other members noted concerns that traditional density requirements are applied according to proximity to affected receiving waters, and that applying the specified density requirements across the entire watershed would be disproportionately impact low density areas far from High Rock Lake. Still other members expressed more high-level concerns that limited capacity may impact local government readiness. Other members supported DWR's proposal and recommended that it be reviewed for potential incorporation into a new development stormwater rule. All TAG members expressed general and tentative approval for high density requirements beginning at 12% BUA, with the exception of the stream protection criteria which will be discussed later.

Post-construction recharge-type volume reduction requirement for mid- and high-density areas that concentrate storm flows

Additionally, DWR put forward a proposal to begin offering two different stormwater treatment requirements for all development that drains to hardened stormwater collection systems. The first option required treatment of runoff from the 1" storm event, combined with specified portions of that runoff which are required to be recharged via evapotranspiration, infiltration, or slow filtered discharge, called a "volume reduction requirement". Recharge portions of runoff from the 1" storm would be based on hydrologic soil groups. The second option required treatment of the 90th percentile storm event (the depth of rainfall which is not exceeded in 90 percent of all runoff-producing rainfall events in a year), with no recharge component. Developers would be free to choose either option.

Stormwater TAG members were unable to achieve consensus to recommend the volume reduction requirement option. All but one member expressed, at a minimum, that they could live with the proposal as outlined. One TAG member expressed support for requiring treatment of runoff from a storm equal to or greater than 1", especially for high density development, but indicated major concerns about the ability of High Rock Lake soils to allow for significant amounts of infiltration. This member also expressed concern at the significant ongoing maintenance costs that will be required to ensure infiltration and slow filtration practices continue to perform to design standards in perpetuity.

Post-construction stream protection criteria for high density development

For situations where new development projects surpass the highest BUA density threshold, DWR proposed an additional peak flow criteria (called a "stream protection criteria") intended to limit an increase in downstream erosive velocities caused by discharge from stormwater control measures (SCM).

DWR Planning staff noted that in other nutrient strategies erosive flows were resulting from prolonged stormflow discharge at or above the critical erosive velocity that tends to destabilize streambanks.

Stormwater TAG members were unable to achieve consensus to recommend high density stream protection criteria. Some TAG members were unclear on the real-world implications of adding such a criterion to treatment requirements for high density development. Other members expressed concern that developments attempting to design to low density standards may incidentally surpass 12% BUA and trigger stream protection requirements which may be difficult for developers to accommodate.

Retain exemptions for public linear transportation projects, single-family residential development not part of a larger common plan of development with less than 6% BUA, redevelopment, and existing development

TAG members discussed these exemptions and expressed a consistent interest in maintaining the single-family lot exemption, but noted concern that many previously platted lots in the watershed are being developed with much larger homes and at much higher BUA densities than would have been constructed in the past. Members noted that the shape and configuration of some of these lots is likely to result in consistent exceedance of the 6% BUA threshold and recommended that further analysis be performed to identify a reasonable current estimate of average BUA percentage on single-family lots not part of a common plan of development. Such an analysis could inform an improved BUA % threshold for single-family residential exemptions, given member interest in avoiding a requirement that single family lot owners implement complicated and expensive SCMs that are not only nearly impossible for a single family to maintain, but may inadvertently incentivize much higher density development. Members recommended caution in ensuring that situations where single-family residential projects happen to trigger stormwater control should require treatment structures and practices that are compatible with the resource limitations and needs of a single family. Members expressed notably more openness to exemptions listed in the proposed language adapted from the Tar-Pamlico Nutrient Strategy as long as they apply individually, and not collectively. DWR noted that exemptions apply individually, not collectively, but that rule language meant to apply these exemptions could be clearer.

Existing Development

Consensus Items

Overarching Premise – Existing development load reductions are most meaningfully achieved via an investment-based approach that allows local governments to prioritize cost effective solutions

The long-term burden of complying with the High Rock Lake chlorophyll-a standard requires reasonable distribution of regulatory burdens across all the major sources. Existing roads, buildings, parking lots, and structures contribute a significant portion of ongoing nutrient load to High Rock Lake. Current regulations do not allow local jurisdictions to require stormwater treatment on existing impervious surfaces that lie on private property, which means that meaningful load reductions must be achieved elsewhere, on land controlled and maintained by the local government or from other stakeholders and sources. Appropriately designing and sizing retrofits on land that local governments control presents administrative hurdles that have hampered load reduction progress in other nutrient sensitive watersheds. The same dynamic exists in the High Rock Lake Watershed, and so existing developed lands remain a significant source of nitrogen and phosphorus for which reductions from baseline are not only expensive, but logistically complex.

DWR Planning staff introduced the Interim Alternative Implementation Approach (IAIA), which is currently being utilized by the Upper Neuse River Basin Association for compliance with the Falls Lake Nutrient Strategy existing development requirements. In lieu of holding individual local governments accountable for achieving a nutrient load reduction from baseline, it requires that local governments commit a certain amount of funding each year toward a list of eligible programs, practices, and activities. Some programs and practices help achieve load reductions from baseline, while others prevent future load increases. Stormwater TAG members concur with DWR that an incentive- and funding-based approach to load reduction on existing developed lands is likely to yield the most long-term benefit at the lowest cost to local governments. Local jurisdictions should be encouraged to prioritize the programs and practices that are most viable based on their population and rate payer priorities, and a common pool of resources opens the door to cross-jurisdictional collaboration on load reducing practices and activities that go above and beyond what a single local government can accomplish. Capacity is limited to mobilize a regional compliance association that will be capable of shepherding such an initiative through the approval process in the High Rock Lake Watershed, but local governments seem to be in favor of the general concept, and stakeholders have begun laying the groundwork for a similar kind of compliance association to form, though members anticipate that it may not exactly mirror the IAIA's structure.

TAG members achieved a consensus in recommending that a funding-based compliance requirement is a viable path toward reducing nutrient loads from existing development.

Consensus recommendations approved by:

TAG Member	Affiliation
Kelsie Burgess	City of High Point
Brent Cockrum	FEI Consulting
Danica Heflin	Piedmont Triad Regional Council
Kelway Howard	Stimmel Associates
Keith Huff	City of Winston-Salem
Scott Leonard	Davidson County
Zack MacKenzie	City of Lexington
Andy McDaniel	NC Department of Transportation
Edgar Miller	Yadkin Riverkeeper
Chris Millis	NC Homebuilders Association
Benjamin Parker	City of Salisbury