

# ERB recommendations for surface water quality monitoring for:

## Belmeade Cemetery and Memorial Gardens

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February 10, 2009

Initial staff observations suggest that this cemetery project is considered to be “low impact”, based on the proposed limited roadway, development footprint and land use. (See plan). Other than the main building area, it appears that the site will be impacted to the greatest extent from the entrance to the proposed office complex and parking area. The balance of the site will consist of narrow roads/lanes, very limited land disturbance and interspersed gravesite areas. Although engineering drawings have not been presented, the applicant has indicated that the grounds will be “soft” with a lot of existing trees and very limited hardscape and land disturbance. Therefore, post-development stormwater runoff will likely be most impacted at the building site/parking lot area. It is assumed that the stormwater design for this development has to meet the county stormwater ordinance. This does not guarantee that no impacts will be observed in the receiving streams related to water quality. It is important to first discuss why (intent) monitoring is a requirement for this project before making a final monitoring recommendation.

*Based on the planned development, it is recommended that the applicant develop and submit a nutrient management plan for the project. This plan can be used to indicate the methods and type of fertilizer application based on soil testing, etc. The water quality monitoring results may serve to guide the management plan if necessary.*

Water quality monitoring can be done in different ways, depending on the purpose and intent. One method is to monitor the stormwater runoff (immediately after a rainfall event) and prior to entering the receiving stream. This is typically done to determine the effectiveness of Best Management Practices (BMP's) employed to treat the newly generated runoff. This method is difficult to perform and repeat due to the uncertainty of timing and staff resources to collect the samples and test the results in the required timeframe. Automatic samplers are not recommended for this.

Another monitoring method is to sample the receiving waters over time to look for any significant changes in the ambient condition of the receiving waters. This method is

recommended for this applicant if the intent of the monitoring is to observe long term impacts to the receiving waters.

Monitoring receiving waters can be taken from a select few representative locations (need to locate on a map and field verify) that will represent the best opportunity to observe changes to the sites runoff hydrology and water quality. These locations should be easy to access and with sufficient watershed size to ensure a perennial flow. The plan should be used to determine these locations, two (2) located for pre-development ambient (or baseline) conditions and two (2) for post-development conditions, downstream of the developments discharge location(s).

Sampling techniques should be professionally performed and based on the approved EPA and DWQ methods and protocol for surface water quality sampling and testing. This includes chain of custody documentation, reagents & supplies required, sample sizes, label ID, maximum hold times, etc. Automatic sampling is one method and can be set up for stormevents or on a timer. This is an expensive and technically challenging approach and is also not recommended for this site. Stormevent sampling is not recommended due to the complexities and likelihood of errors and hold times exceeding the lab requirements.

Below is an example description of the proper methodology for the pollutants that may be tested. See the DENR url below for all sampling and testing requirements:

<http://h2o.enr.state.nc.us/lab/qa/sampsubguide.htm#1>

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## **NC DENR/DWQ Laboratory Section**

### **Example Guidance for Sample Submission**

#### **2.0 SAMPLE CONTAINERS, PRESERVATION AND HOLD TIMES**

Prior to mobilizing, the sampler must decide what samples to collect, which parameters to request, and whenever possible, where to collect them. Containers, preservatives, holding times, sample volumes, and target analytes must be considered. Environmental testing can be labor intensive and costly. Field personnel must make every effort to follow proper sample handling protocol and limit requests to pertinent analyses.

The parameters to be measured are usually dictated by the purpose of an investigation and should be selected based upon required monitoring conditions or upon the investigators knowledge of the problem. The volume of sample obtained should be sufficient to perform all the required analyses with an additional amount collected to provide for any quality control

needs such as duplicates, matrix spikes, split samples or repeat examinations. Determinations for some parameters may be submitted in the same sample bottle if the bottle contains sufficient sample for each analysis, including quality control and repeat analysis. **The most common practices include: submission of one 500-ml sample bottle for ammonia, TKN, nitrate+nitrite, and total phosphorous analyses**, and one 500-ml container for the following metals: Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr (total), Cu, Fe, K, Li, Mg, Mn, Na, Ni, Pb, Sb, Se, Sn, Tl, V and Zn (Hg may also be included; however the 28-day holding time would apply). When submitting soil samples, a separate sample container must be collected for each of the analytical groups listed in the preservation and hold time tables ( [TABLE I - WQ](#) and [TABLE II - GW](#) ). This will ensure that sufficient sample is submitted for all analyses requested and that the published holding times are met.

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The underlined pollutants above represent the recommended non-point source pollutants that should be tested at the Belmeade Cemetery site. In addition, it is recommended that total suspended solids and turbidity be tested. For rural watersheds such as this, sampling for metals and other elements are not routine unless there is a known problem or substance to monitor for such as zinc, copper or lead. The added expense and protocol to test for metals is a factor to consider as well.

The cemetery may produce total suspended solids, turbidity and total nitrogen and phosphorous from the turf, landscaping and impervious surfaces. If surface water quality monitoring is going to be mandatory for this development, it is also recommended that the applicant be required to develop and provide to the county a nutrient management plan for managed application of fertilizers. Monitoring results for nutrients can be tied to the nutrient management plan for any needed improvements if necessary. The stormwater BMP's will be designed to function and be maintained as required by the stormwater ordinance. These BMP's may or may not effectively reduce nutrient loading.

### **ERB Surface Water Quality Monitoring Recommendations**

Select at-least four (4) sampling sites on two (2) receiving streams, two (2) representing upstream or baseline conditions and two (2) representing downstream or potentially impacted waters downstream from development.

1. Select the applicable pollutants to sample for and test at a certified lab. Elevated nutrients and total suspended solids in the receiving streams are the recommended key pollutants of concern. Monitoring of any pesticides actually used on the site is included.

Include the fertilizer and pesticide information in the Nutrient Management Plan (or similar landscape management plan document).

2. Select a sampling rate that is reasonable for the applicant and relatively easy to perform and repeat. It is recommended that the sampling rate be on a quarterly basis and at ambient or base flow conditions. *(Not immediately following a rain event).*
3. Require that all applicable EPA and DWQ methods are used in the sampling, documenting and testing procedures at the laboratory.
4. Require that the results remain on the site for a minimum of 3 years of the sampling date.
5. Require an annual report of the test results be submitted to the Environmental Resources Division. The report should discuss any recommendations to alter the nutrient management plan and address any other water quality issues as dictated by the lab results over time.
6. Allow monitoring to end after a five (5) year period from the date of the building CO only if the data indicate no significant increase in the pollutants tested and the nutrient management plan is functioning properly and no other relevant water quality issues need to be addressed based on the data.
7. BoC should consider long-term implications of ground water impacts that can result from cemeteries over a long period of time. Fred may have some additional information to provide the BoC concerning this.
8. Perform a pre-construction on- site assessment by Great Trees of Chatham County and from NC Wildlife Resources Commission to evaluate the existing natural resources and how to best enhance and protect them.
9. We encourage the use of native species in any of the landscaping.
10. If the cemetery contributes to exceeding a safe environmental standard, then steps should be taken to reduce the amount of pollutants released. An exceedance of more than 10% would trigger this action.