



HORVATH
ASSOCIATES

Civil Engineers
Planners
Landscape Architects

ADDENDUM #1 – The Carver Street Extension, Project ST-257 July 1, 2015

The city is pleased to receive bids for the construction of the Carver Street Extension. An array of questions are addressed in this addendum; please see below.

NOTE: a signed copy of this addendum is required as part of the construction bid, with authorized signature and date on the last page. Thank you for your efforts; we look forward to opening your bid on bid day.

Regards,

Brian Ruff, Project Manager
Horvath Associates, P.A.

1. **PRE-BID CONFERENCE ITEMS:** Several items from the pre-bid conference are repeated here:
 - a. NCDOT encroachments, Traffic Control & Response to Public – NOTE: Cub Creek Road access to local residents is to be maintained throughout the job, also providing emergency vehicle access at all times. This will be the contractor's responsibility.
 - b. Field investigations should avoid equipment crossing the waterways, i.e., no tracks in the water or on the banks.
 - c. Borrow/spoil site needs be under separate permit and will be the contractor's responsibility.
 - d. City wants to track the project costs in the limits and categories listed below. The contractor may wish to perform his take-off using the categories.
 - i. Danube Lane
 - ii. Cub Creek Road
 - iii. Old Oxford Road
 - iv. Carver Street from Danube to Cub Creek
 - v. Carver Street from Cub Creek to Old Oxford
 - vi. Constructed Wetlands Nos. 1 and 2
 - vii. All Pavement Marking and Road Signage
2. **Will the city's testing agency or contract engineering firms be responsible for engineering certifications required?**
 - a. **MATERIAL TESTING SERVICES:** Quality control material testing services are to be performed by certified personnel under the employ or subcontract to the contractor. Refer to Section 01 40 00 Subsection 1.7 "Testing and Inspection Services." The City of Durham will employ a testing agency known as Cardno/ATC who is familiar with the project and will act as a Quality Assurance testing agency to verify contractor's results (i.e., coming behind the contractor's testing services to repeat tests and confirm adequate results). The City of Durham's testing services will not be relied upon by the contractor to serve as his construction quality control testing services.

- c. **CONSTRUCTED WETLAND SERVICES:** The contractor will have his own geotechnical engineer and BCE certifying engineer complete the wetland certifications using the contractor's surveyor for certified as-built surveys. The contractor's BCE certifying engineer will process the certification through the city Storm Water Department and copy Horvath Associates who will monitor the process. The owner's engineers and geotechnical agency will verify results through quality assurance procedure.
 - d. **CERTIFIED LETTER OF MAP REVISION** (for the flood plain impact north of Danube Lane intersection and to the east): The contractor's certified as-built survey will be delivered to the owner's engineer for use in the owner's certification of flood plain changes. Any required survey information will be provided by the contractor's surveyor in a timely manner. Excessive impacts to the flood plain beyond plan limits will be the contractor's responsibility to rectify so the impacts can be certified to be installed according to the plans.
3. **Who are the consultants working for the City?**
 - a. Horvath Associates, P.A., will administer the contract for construction on behalf of the City of Durham and will employ representatives of Sepi Engineering & Construction, Inc., to act as on-site engineer and inspector to interpret the plans and specifications and verify compliance combining City of Durham and NCDOT specifications for the entire project. In addition, representatives of John Davenport Engineering, Inc., will serve to inspect the temporary and permanent traffic signal installations; Cardno/ATC will service as the city's material testing quality assurance engineer.
4. **In section 26-00-00 Electric pay items, none of these items are included in the bid sheet, do these items need to be added to the bid? And if so are they on the existing plans?**
 - a. Per Sepi Engineering & Construction, Inc., Section 26-00-00 electrical items refer to conduit installation other than the Traffic Signal Line Items 103, 104, and 105 and do not appear on the plans. Therefore, no bid is required for these items.
5. **In section 31-05-13 Soils for Earthwork part C & D – is the intention to have all undercut backfilled with surge stone and fabric? Also in most quarries surge stone is not Class B rip rap, this is also mentioned in the spec.**
 - a. Backfill shall be by surge stone, ABC or select material as directed in the field, depending on the circumstances.
 - b. **DEFINE SURGE STONE:** Per Sepi Engineering & Construction, Inc., Section 31-05-13 Class B rip-rap is specified in the contract for surge stone regardless of the quarry designation. Just consider surge stone as Class B rip-rap.
6. **Pertaining to the asphalt, is there a monthly index adjustment?**
 - a. No monthly index adjustment for asphalt pricing will be used on the project.
7. **Will there be a need to wedge asphalt for the road widenings?**
 - a. Wedging may be required to make the widenings have smooth pavement. Asphalt quantity has been included in the bid to account for wedging; no separate wedging line item will be added to the bid. Contractor will work closely with Sepi Engineering & Construction, Inc., in the field to optimize the widening overlays.
8. **Is the ABC under the curb incidental to that item?**
 - a. Aggregate base course under the curb is incidental to curb & gutter. Binder course under C&G will be paid at the unit price.
9. **There was a question about changing the pavement design to make the job more effective.**
 - a. Value engineering suggestions will be entertained by the owner after the contract award. For example, a modification to the design pavement section or a substitution of readily available material may be made once the owner and consultants have an opportunity to consider alternatives. Please keep track of any value engineering suggestions which good contractor recommends. Until then, please bid the quantities provided; no design modifications will be issued during the bid process.



10. **Sheet 502 shows a level spreader and flow splitter, could a detail of how these are to be built be included in the plans?**
 - a. Refer to constructed wetland plans for details of permanent wetland items, such as level spreader or flow splitter, which may also appear on the erosion control plans. Also, refer to item no. 11 of this memo.

11. **What is the standard operating procedure regarding the hydrating of the BMP prior to planting the BMP(s)? What is the standard operating procedure for post planting of the BMPs in order for the plants to survive (i.e., rehydration of the BMPs)?**
 - a. The project constructed wetlands will require certification under the City of Durham's BCE program. A pre-construction meeting shall be held on site prior to starting work on any part of the wetlands intended to remain permanently, such as the dam and permanent spillway structure. It's expected that will be up front before the temporary basins are activated. The meeting should be scheduled by the contractor and be attended by the contractor and any sub-contractors responsible for the work, the geotechnical engineer providing the contractor's geotechnical certification for the dam (i.e., hired by the contractor), the contractor's BMP certifying engineer (also hired by the contractor), representatives of Horvath Associates and SEPI Engineering & Construction, and a representative from the City of Durham Stormwater Department. Refer to the attached BMP Certifying Engineer Program document.

12. **There is not a bid item for 8" 120 Mils for the standard crosswalks. How will this be paid?**
 - a. The 8" 120 mils is not shown on the plans, so it is not needed.

13. **There is not a bid item for 24" 120 Mils for the High Visibility Crosswalks. How will this be paid?**
 - a. BIDDER TO WRITE IN ITEM #168: Thermo PM Lines (24" 120 mils) 750 LF

14. **I do not see a bid item to cover the temporary striping indicated on TCP-10 note #4. Should this be included in line item 104 – Traffic Control?**
 - a. Temporary pavement marking indicated on TCP-10 note #4 is pre-marking for the roundabout and is incidental.

15. **There is not an item for Detail A sheet PM 1 (White Yield Line 120 mils). How will this be paid?**
 - a. BIDDER TO WRITE IN ITEM #169: White Yield Thermo PM Lines 120 mils 40 EA

16. **Will utilities be relocated prior to the start of construction?**
 - a. The city will order the relocation of utility poles once the project is successfully let. The contractor will be responsible to coordinate the relocation of utilities as needed to complete the project within schedule.

17. **I had a question about the breakup into sections, I believe I recall someone mentioning there was an excel file that would be sent out the broke the job into bidding sections over what is shown in original spec book, but I see in the minutes we received just a list of sections? Is there anything additional we are waiting on?**
 - a. The list of categories sent in the Pre-Bid memo (refer to 1.d. above) is the only information being provided for categorizing the bid, should contractors wish to do so. The successful contractor will be expected to provide their bid broken into the several categories for the city's project management. Contractors are at their own discretion to use the categories to assemble their numbers.

18. **Can you clarify what is to be included in items 133 & 143? I am not sure where to put all the work and materials for the sediment pond #1 & #2, I am thinking there should be items for that work. Can you also tell me what the abbreviations stand for in each of the items?**
 - a. Line item 133 "Constructed Wetland & LS (i.e., level spreader) EFS (i.e.,



- b. Cont'd...engineered filter strip) all inclusive” – The intent is a lump sum price for each constructed wetland Nos. 1 & 2, both of which are shown on drawings C-450 through C-454 including the details. One lump sum price will be paid for Constructed Wetland No. 1 and an additional lump sum price will be paid for Constructed Wetland No. 2, certified under the City of Durham BCE Program. Also refer to item no. 11 of this addendum.
- c. Line item 143 “Convert SCM to Sediment Pond and Maintain per C503 & permit” – SCM stands for “Storm water control measure” and refers to the constructed wetlands. The intent is a lump sum price to use the constructed wetland location as a temporary erosion control device, shown on the erosion control plans, until practicable to complete and certify the constructed wetlands.

19. Question – are there cross sections for Carver Street?

- a. Cross sections for state roads are shown on the plans approved for the NCDOT roadway encroachments. CAD versions of state road cross sections and Carver Street cross sections are located in the file titled “SURVEYED-TOPO-0803-11” on the ftp site.

20. When is the last day for questions?

- a. The last day for questions regarding the project is July 15 with no guarantee that late questions will be answered. Questions will not be addressed on the day of the bid.

21. Addendum No. 1 Receipt is Acknowledged – This form to be submitted with BID.

Authorized Signature

Date

Print Name



Section 8.6: BMP Certifying Engineer Program for SCMs in the City of Durham

8.6.1 Program Description Drainage

A. Background

A registered North Carolina Professional Engineer (NCPE), who designs a stormwater Best Management Practice (BMP) facility, is required to submit a BMP As-Built Certification (“Certification”) of the constructed BMP after it has been completed. It is understood that sometimes the certifying engineer may not be the same engineer that designed the original BMP. The Certification consists of the provision of as-built drawings and information demonstrating that the BMP was constructed in a manner that accomplishes its designed functions. These Certifications must be submitted in accordance with the City of Durham’s (City’s) BMP Certifying Engineer (BCE) Program and must be reviewed and approved by the City’s Stormwater Services Section (S3) of the Engineering and Stormwater Services Division.

While it is recognized that the term “Best Management Practice (BMP)” is an outdated term and that it is being replaced industry wide with the term “Stormwater Control Measure (SCM),” for the purposes of continuity, the BCE Program will continue to be referred to as the BCE Program. However, throughout this document, the acronym “BMP” will be replaced with the acronym “SCM.”

B. Program Objectives

The overall objectives of the City’s BCE Program are three-fold:

1. To improve the quality of SCM facilities being designed and constructed in the City.
2. To improve customer service by decreasing S3 review times for Certifications.
3. To reduce the work load of construction compliance assessments to be provided by the City.

C. BMP Certifying Engineer Qualifications

The City will certify as a “BMP Certifying Engineer”, or “BCE”, any registered NCPE, who demonstrates a thorough knowledge of the evaluation of SCM construction by providing two complete Certifications that are approved by S3 on the first submittal.

For engineers that wish to submit Certifications in the City, enrollment in this program is mandatory.

D. Effective Dates of Program

For dry ponds, wet ponds, constructed wetlands, and pocket wetlands, this program went into effect on July 1, 2006, and applies to all Certifications received after that date.

For all other stormwater SCMs, this program becomes effective on October 1, 2010. If a site plan or preliminary plat has not been accepted for review by the City/County Planning Department by October 1, 2010, all Certifications associated with the SCMs on that site shall be governed by the BCE Program.

E. Benefits to the Development Community

Once an NCPE has completed the process to become a BCE and has been assigned a BCE number, that BCE is granted approval to submit Certifications in the City. The City may, at its discretion, approve a particular Certification based on a review of the documentation received without a field assessment. However, random field assessments will be performed from time to time. For example, the City may field-assess three out of five Certifications from one BCE and one out of ten Certifications from another BCE. All BCEs should submit Certifications under the assumption that the City will perform a field assessment of the certified facility and will provide a comprehensive review of the Certification.

8.6.2 Certification Process

A. Certification as a BCE

To become a BCE, a registered NCPE will be provided four opportunities to submit two complete Certifications that are approved by S3 on the first submittal. One of the two Certifications shall be an SCM that includes a dam. NCPEs endeavoring to obtain certification as a BCE are urged to note the following submittal parameters:

1. Each Certification shall be hand delivered, by scheduled appointment, to S3. A time block of at least four hours per Certification shall be allotted for the submittal meeting as each Certification will be reviewed and each SCM will be assessed in the field during that time. The submitting NCPE will review the Certification with S3 and will accompany S3 on a field assessment of each constructed SCM submitted for certification. As an aside, once an NCPE has been certified as a BCE, appointments with the City will not be required.
2. The Certification of a level spreader, vegetated water quality swale, or proprietary SCM device shall not count as one of the two out of four required Certifications to be approved by S3 at first submittal.
3. The submittal of an approved Certification of more than one SCM without a dam will not subtract from the four opportunities allotted for certification as a BCE; however, any Certifications, whether the SCM includes a dam or not, that are not approved by S3 on the first submittal will subtract from the four opportunities allotted for certification as a BCE.
4. If the NCPE, after four first-submittal Certifications, is unable to achieve certification as a BCE, that individual will not be permitted to submit a Certification for at least six months from the date of the City's last Certification disapproval.

F. Acceptable Certifications

An acceptable Certification shall be defined by the City as indicated below:

1. The Certification must be complete. A complete Certification shall include the following documents in hard copy and electronic compact disc ("electronic CD") formats (Note all documents on the electronic CD must be in PDF format unless indicated otherwise below):
 - a. An executed "General Certification."
 - b. One (1) copy of the approved construction drawings for the SCM.
 - c. One (1) copy of the as-built drawings for the SCM with an executed General Certification on the drawings.
 - d. One (1) copy of the survey plot, including all spot shots, of the SCM.
 - e. One (1) copy of the drainage area map that delineates the drainage area to the SCM as presented in the construction drawings.

- f. One (1) copy of the revised drainage area map that delineates the drainage area to the SCM based on as-built conditions.
 - g. One (1) copy of the summary sheet for the facility as presented in the construction drawings.
 - h. One (1) copy of the revised summary sheet for the SCM based on as-built conditions.
 - i. An original completed copy of the signed and sealed General Certification Assessment Checklist ("Checklist") required by the City. A complete Checklist shall contain no NC (e.g., Non-Compliant) items. Note: If, while completing the Checklist, an NC item is noted at an SCM by the certifying engineer, a Certification for that SCM should not be submitted until the NC item has been brought into compliance. If a BCE awards a score of anything less than 15 and submits a Certification to the City anyway, the City will reject the entire Certification.
 - j. Color digital photographs of the completed SCM, including the dam, emergency spillway, riser, outfall structure, outfall area, impoundment area, access way, etc. (electronic CD format: .jpeg or .tiff).
 - k. One (1) copy of the landscape company's letter certifying the installation of the specific plants required at the SCM.
 - l. One (1) copy of an Operations and Maintenance Manual for the SCM (electronic CD: Word format).
 - m. One (1) copy of a cost accounting for the construction of the SCM (electronic CD: Excel format). Note: If the cost accounting results in an amount 10% or greater than the original construction estimate, an additional payment into the City's Stormwater Facility Replacement Fund will be required prior to Certification approval.
 - n. An original signed and sealed Geotechnical Certification with all supporting geotechnical and materials testing documentation.
 - o. An original signed and sealed Materials Certification, with all supporting documentation, for SCMs with filter media.
2. An additional Checklist completed by the City during the field assessment that scores at least 14. When completing a Checklist, the following parameters shall govern:
- a. If any item within a section is deemed NC, no points shall be awarded for that section.
 - b. The minimum passing score shall be 14 out of 15. If the City scores the SCM as less than 14, the Certification will be deemed not acceptable.

G. Disciplinary Actions for BCEs

The following disciplinary actions will be taken against those BCEs that submit Certifications that do not comply with the requirements of the BCE Program:

1. If the City field assesses a BCE-certified SCM and, in completing the Checklist, scores the SCM with a 13 or less (out of 15 possible points), the Certification will be disapproved, and the certifying engineer's BCE number will be suspended until the following has occurred:
 - a. The appropriate waiting period (see below) has elapsed; and
 - b. The engineer has satisfactorily repeated the process for certification as a BCE.
2. Waiting Period: If a certified BCE submits a Certification that is disapproved by the City, that BCE's certification will be suspended, and the BCE will not be able to submit Certifications for six months for the first offense and one year for any succeeding offenses. The waiting period will always begin the date the City disapproves the Certification.

8.6.3 Certification Forms and Documents

The following documents are required for each Certification:

- General As-Built and Construction Certification. This is required for all Certifications.
- Geotechnical Certification for Dams. This is required for all Certifications of SCMs that include a dam.
- Materials Certification for SCMs with filter media.
- General Certification Assessment Checklists for individual SCMs, as applicable:
 - General Certification Assessment Checklist for Dry Ponds, Wet Ponds, Constructed Wetlands and Pocket Wetlands
 - General Certification Assessment Checklist for Above Ground Sand Filters
 - General Certification Assessment Checklist for Underground Sand Filters
 - General Certification Assessment Checklist for Underground Detention Systems
 - General Certification Assessment Checklist for Bioretention Areas
 - General Certification Assessment Checklist for Level Spreader-Vegetated Filter Strip Systems
 - General Certification Assessment Checklist for Vegetated Water Quality Swales
 - General Certification Assessment Checklist for Green Roof Systems
 - General Certification Assessment Checklist for Rainwater Harvesting Systems
 - General Certification Assessment Checklist for Filterra® Units

The above documents are provided on the following pages. General Certification Assessment Checklists for SCMs not mentioned above will be developed on a case-by-case basis.

General As-Built and Construction Certification

SCM Facility Name

[Click here to enter text.](#)

Note: This certification statement must be executed by a registered North Carolina Professional Engineer with experience in the design and construction or operation of SCMs of a nature similar in scope to that certified to in this certification. Periodic observations of construction and a final assessment for design compliance by the certifying registered professional engineer will be required to complete this certification.

CERTIFICATION STATEMENT

Based upon (1) my assessment of the constructed facility, (2) my review of the as-built survey data, (3) my review of the drainage area treated or managed by the facility, and (4) my analysis of the hydraulic performance of the constructed facility, I hereby certify that the (A) hydrologic and hydraulic, (B) geometric, (C) public safety, (D) facility access, (E) drainage area¹, and (F) vegetative elements of the constructed facility are in compliance with the requirements of the facility as proscribed in the approved Construction Drawings, approved design documents, and/or any approved modifications, except as noted in red on the 'As-Built' drawings. Furthermore, I certify that the red-noted exceptions do not adversely affect the required performance or public safety aspects of the facility.

Note 1: The drainage area treated by the facility must, at a minimum, be the area proposed for treatment in the approved construction drawings. In addition, a minimum of 85% of the drainage area to the facility must be adequately stabilized, and any remaining disturbed areas in the drainage area must have sufficient alternate controls in place to mitigate against the deposition of sediment in the facility. If these drainage area requirements are not met, the Certification will be disapproved.

The following supporting documents are included in hard copy and electronic CD formats (Note all documents on the electronic CD must be in PDF format unless indicated otherwise below):

1. An executed "General Certification."
2. One (1) copy of the approved construction drawings for the SCM.
3. One (1) copy of the as-built drawings for the SCM with an executed General Certification on the drawings.
4. One (1) copy of the survey plot, including all spot shots, of the SCM.
5. One (1) copy of the drainage area map that delineates the drainage area to the SCM as presented in the construction drawing design documents.
6. One (1) copy of the revised drainage area map that delineates the drainage area to the SCM based on as-built conditions.
7. One (1) copy of the summary sheet for the facility as presented in the construction drawing design documents.
8. One (1) copy of the revised summary sheet for the SCM based on as-built conditions.
9. An original completed copy of the signed and sealed General Certification Assessment Checklist ("Checklist") required by the City. A complete Checklist shall contain no NC (e.g., Non-Compliant) items. Note: If, while completing the Checklist, an NC item is noted at an SCM by the certifying engineer, a Certification for that SCM should not be submitted until the NC item has been brought into compliance. If a BCE awards a score of anything less than 15 and submits a Certification to the City anyway, the City will reject the entire Certification.

10. Color digital photographs of the completed SCM, including the dam, emergency spillway, riser, outfall structure, outfall area, impoundment area, access way, etc. (electronic CD format: .jpeg or .tiff).
11. One (1) copy of the landscape company's letter certifying the installation of the specific plants required at the SCM.
12. One (1) copy of an Operations and Maintenance Manual for the SCM (electronic CD: Word format).
13. One (1) copy of a cost accounting for the construction of the SCM (electronic CD: Excel format).
Note: If the cost accounting results in an amount 10% or greater than the original construction estimate, an additional payment into the City's Stormwater Facility Replacement Fund will be required prior to Certification approval.
14. An original signed and sealed Geotechnical Certification with all supporting geotechnical and materials testing documentation.
15. An original signed and sealed Materials Certification, with all supporting documentation, for SCMs with filter media.
16. A copy of the certifier's BCE Certificate.

Name: _____ Date: _____

BCE #: _____ NCPE Seal:

Geotechnical Certification for Dams

SCM Facility Name	Click here to enter text.
Dam Class	Choose an item.

Note: This certification statement must be provided for all dams and must be executed by a registered North Carolina Professional Engineer (NCPE) with experience in the design and construction of small earth dams of a nature similar in scope to that certified to in this certification. For all dams, with the exception of Class C dams that serve a detention only function and that drain an area less than 25 acres and all Class D dams, this certification must be executed by a registered NCPE with geotechnical engineering expertise. Periodic observations of construction and a final assessment for design compliance by the certifying engineer will be required to complete this certification.

CERTIFICATION STATEMENT
Based upon my observation and monitoring of the construction of the dam for this facility, I hereby certify that the constructed facility is in compliance with the geotechnical requirements of the facility, as proscribed in the approved Construction Drawings, approved design documents, and any approved modifications.

The following supporting documents are included in hard copy and electronic CD formats (Note all documents on the CD must be in PDF format unless indicated otherwise below):

1. Copies of all dam embankment material composition and density testing paperwork, including a map that labels all points where the dam and dam foundation areas were tested. Note: Insufficient testing in the zones over and around the principal outlet works for the dam will render this certification invalid.
2. Copies of all concrete compressive strength testing paperwork for any cast-in-place concrete items associated with the construction of the dam.
3. One (1) copy of the purchase receipt for the principal spillway pipe. The purchase receipt should identify the ASTM specifications governing the manufacture of the pipe.
4. One (1) copy of the manufacturer's certification that any armoring, other than concrete, used to armor the emergency spillway was completed in accordance with the manufacturer's published specifications.
5. Colored digital photographs showing the dam foundation areas, the riser, the principal spillway pipe, the concrete cradle, the seepage diaphragm, relief drains, etc, as those items were being prepared and installed (electronic CD format: .jpeg or .tiff).
6. One (1) copy of the certifying engineer's resume that demonstrates required geotechnical engineering expertise.

Name: _____ Date: _____

NCPE Seal:

Materials Certification for SCMs with Filter Media (except Filterras®)

SCM Facility Name	Click here to enter text.
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Note: This certification statement must be executed by a registered North Carolina Professional Engineer with experience in the design, use, identification, and materials testing of SCMs with filter media. Observation of the installation of the filter media used in this SCM will be required to complete this certification.

CERTIFICATION STATEMENT

Based upon my observation and monitoring of the installation of the filter media used in this facility, and based on my testing of the media or my review of the media test results, I hereby certify that the filter media used in this constructed facility is in compliance with the filter media requirements of the facility, as proscribed in the approved Construction Drawings, approved design documents, and any approved modifications.

The following supporting documents are included in hard copy and electronic CD formats (Note all documents on the electronic CD must be in PDF format unless indicated otherwise below):

1. A copy of the portion of the construction drawings that details, by section view, the filter media design proposed for this SCM.
2. A signed and sealed drawing of the installed filter media section view.
3. One (1) copy of the materials testing paperwork for the materials used in the filter media section.
4. One (1) copy of the purchase receipts for the materials used in the filter media section.
5. Color digital photographs that document the installation of the filter media, including the underdrain portion (and cleanouts) of the filter media section, used in this facility (electronic CD format: .jpeg or .tiff).

Name: _____ Date: _____

NCPE Seal:

General Certification Assessment Checklist

for

Dry Ponds, Wet Ponds, Constructed Wetlands, and Pocket Wetlands

Date of Certification Assessment: _____

Assessing and Certifying NCPE: _____ Seal:

BCE #: _____

SCM Facility Name: _____

Access Address: _____

PIN/s of Parcel/s Where the Facility is Sited: _____

SCM and Access Easement Information:

DB _____ PG _____ PB _____ PG _____

Height of Dam: _____

Class of Dam: _____

Impoundment Volume (at Top of Dam): _____

CHECKLIST

CDs: Approved Construction Drawings

NC: Non-compliant with the Approved CDs and/or City of Durham Requirements and Policies. Note: An "NC" should only be circled if the element in question is non-compliant.

Y: Yes

N: No

N/A: Not Applicable. If an element is not applicable, please write "N/A" next to the element.

A. Open Space -- 1 Point

- The SCM is located entirely on open space property (residential areas only). [Note: This restriction shall not apply to inlets and access ways.] _____ NC

B. Easements -- 1 Point

- The constructed SCM facility is located entirely in a recorded SCM easement _____ NC
- The constructed access way is located entirely in a 20-ft wide recorded access easement _____ NC

C. Accessibility -- 1 Point

- A drivable access way to the top of the dam has been provided from a road or parking lot _____. NC
- At its narrowest point, the access width is _____. NC
- At its steepest point, the centerline grade of the access is _____. NC
- At its steepest pitch, the pitch or cross-slope of the access is _____. NC
- Unless it has been surfaced with gravel, asphalt, concrete, etc., 85% of the access way has achieved a healthy stand of grass, and all remaining areas have been seeded and mulched _____. NC
- An access hatch (minimum 3' x 3') and steps down the inside of the riser have been provided _____. NC.
- At least one side of the riser is accessible by foot during permanent pool conditions and direct access from dam embankment is provided _____. NC

D. Dam Embankment -- 3 Points

- The narrowest top of dam width is _____. NC
- The steepest slope on the upstream face of the dam is _____. NC
- The steepest slope on the downstream face of the dam is _____. NC
- Based on manual rod probings of the dam, particularly in the zones over and around the principal spillway pipe, the dam appears to have been well compacted _____. NC
- The dam and dam foundation, groin, toe, and abutment areas are completely free of trees, landscaping, and other woody growth _____. NC
- The dam has been fine graded and is free of ruts, erosion, etc. _____. NC
- 85% of the dam embankment and dam foundation, groin, toe, and abutment areas have achieved a healthy stand of grass, and all areas that have not achieved a healthy stand of grass have been seeded and mulched. The dam is not overgrown and there is no undesirable vegetation _____. NC
- No evidence of seepage was noted on the downstream face of the dam _____. NC

E. Emergency Spillway -- 2 Points

- The narrowest width of the control section is _____. NC
- The side slopes of the control section are [Left] _____ and [Right] _____. NC
- The size, shape, and alignment of the exit channel are in accordance with the CDs _____. NC
- Armoring has been installed in accordance with the CDs _____. NC
- The spillway has been fine graded and is free of ruts, erosion, etc. _____. NC
- Excluding the hard-surfaced armored area, 85% of the spillway has achieved a healthy stand of grass, and all remaining areas have been seeded and mulched. The spillway is not overgrown and there is no undesirable vegetation _____. NC

F. Riser/Control Structure -- 2 Points

- The riser/control structure is reinforced concrete _____. NC
- The diameter or opening dimensions of the riser is/are _____. NC
- A top, peak-roofed trash rack has been provided and bolted down to the riser _____. NC
- An 8" plug valve with an accessible operating mechanism has been provided _____. NC
- A low-flow debris cage has been provided in accordance with the CDs _____. NC
- The riser structure and all appurtenant devices (plug valve, etc.) appear to be sound _____. NC
- For precast structures, the barrel sections were installed with gasketed joints, and adjacent riser barrel sections have been bolted together with steel strapping _____. NC
- All orifices, siphons, ports, and weirs were installed in accordance with the CDs _____. NC
- The anti-floatation ballast has been provided in accordance with the CDs _____. NC
- A placed concrete invert to the invert out of the principal spillway pipe has been provided _____. NC
- The riser is free of debris or obstructions _____. NC

G. Principal Spillway Pipe -- 2 Points

- The principal spillway pipe (PSP) is reinforced concrete _____. NC
- The diameter of the PSP is _____. NC
- Based on a visual inspection, it appears that the joints of the PSP were "homed" reasonably well, and it appears that no joints are leaking _____. NC
- No piping (loss of soil) is evident around the PSP _____. NC

H. Outfall Structure -- 1 Point

- The outfall structure is a concrete endwall (with wing walls if required) _____. NC
- Appropriate fall protection has been provided across the top of the structure _____. NC

I. Outfall Area -- 1 Point

- A level spreader-vegetated filter strip system or a stilling basin (plunge pool) has been provided in accordance with the CDs _____. NC
- The outfall area appears stable, and all accumulated silt and debris has been removed _____. NC

J. Impoundment Area -- 1 Point

- Riprap energy dissipaters and sediment forebays have been installed at the inlets in accordance with the CDs _____. NC

- Forebay berm has been constructed with an armored spillway, and top of berm is no deeper than 3" below permanent pool _____. NC
- The top of the forebay berm has been planted with trees, shrubs, and vegetation conducive to a wetland or wet meadow environment. Seeding has been done only as a supplement to the plantings _____. NC
- The narrowest width of the safety bench is _____. NC
- The positioning of the safety bench is in accordance with the CDs _____. NC
- All accumulated sediment and other debris in the sediment basins, riprap energy dissipaters, forebay/s, and the pond floor has been removed _____. NC
- All inlet pipes have been installed with appropriate end treatments in accordance with the CDs _____. NC
- 85% of the wetland/wet meadow plantings proposed for the pond floor and aquatic shelf are thriving _____. NC
- The landscaping proposed for the riparian buffer surrounding the pond has been planted _____. NC
- The pond has a minimum length:width ratio of 1.5:1 (wet ponds, wetlands, and extended detention dry ponds) _____. NC

BCE's Score: _____

City of Durham's Score: _____

Scoring Notes:

- (1) A passing score shall be 14 out of 15;
- (2) If any item within a section is deemed NC, no points shall be awarded for that section;
- (3) If a BCE awards a score of anything less than 15 and submits an as-built and construction certification to the City anyway, the City will reject the entire submittal.

General Certification Assessment Checklist

for

Open, Vegetated, Sand Filters

Date of Certification Assessment: _____

Assessing and Certifying NCPE: _____ Seal:

BCE #: _____

SCM Facility Name: _____

Access Address: _____

PIN/s of Parcel/s Where the Facility is Sited: _____

SCM and Access Easement Information:

DB _____ PG _____ PB _____ PG _____

CHECKLIST

CDs: Approved Construction Drawings

NC: Non-compliant with the Approved CDs and/or City of Durham Requirements and Policies. Note: An "NC" should only be circled if the element in question is non-compliant.

Y: Yes

N: No

N/A: Not Applicable. If an element is not applicable, please write "N/A" next to the element.

A. Drainage Area – 2 Points

- The drainage area to the facility is less than 5 acres and is, characteristically, 90% impervious or greater _____. NC
- The drainage area to the facility is completely stabilized, and no excess sediment is discharging into the sediment chamber or sand filter _____. NC

B. Easements and Accessibility -- 1 Point

- The constructed SCM facility is located entirely in a recorded SCM easement _____. NC
- The constructed access way is located entirely in a 20-ft wide recorded access easement _____. NC
- Unobstructed maintenance vehicle access from a nearby public or private right-of-way (i.e., road, parking lot, etc.) has been provided to the control structure and all inlets _____. NC
- At its narrowest point, the access width is _____. NC
- At its steepest point, the centerline grade of the access is _____. NC

- At its steepest pitch, the pitch or cross-slope of the access is _____. NC
- Unless it has been surfaced with gravel, asphalt, concrete, etc., 85% of the access way has achieved a healthy stand of grass, and all remaining areas have been seeded and mulched _____. NC
- An access hatch and steps down the inside of the riser/control structure have been provided in accordance with the CDs _____. NC

C. Dam Embankment -- 2 Points

- The narrowest top of dam width is _____. NC
- The steepest slope on the upstream face of the dam is _____. NC
- The steepest slope on the downstream face of the dam is _____. NC
- Based on manual rod probings of the dam, particularly in the zones over and around the principal spillway pipe, the dam appears to have been well compacted _____. NC
- The dam and dam foundation, groin, toe, and abutment areas are completely free of trees, landscaping, and other woody growth _____. NC
- The dam has been fine graded and is free of ruts, erosion, etc. _____. NC
- 85% of the dam embankment and dam foundation, groin, toe, and abutment areas have achieved a healthy stand of grass, and all areas that have not achieved a healthy stand of grass have been seeded and mulched. The dam is not overgrown and there is no undesirable vegetation _____. NC
- No evidence of seepage was noted on the downstream face of the dam _____. NC

D. Emergency Spillway -- 1 Points

- The narrowest width of the control section is _____. NC
- The side slopes of the control structure are [Left] _____ and [Right] _____. NC
- The size, shape, and alignment of the exit channel are in accordance with the CDs _____. NC
- Armoring has been installed in accordance with the CDs _____. NC
- The spillway has been fine graded and is free of ruts, erosion, etc. _____. NC
- Excluding the hard-surfaced armored area, 85% of the spillway has achieved a healthy stand of grass, and all remaining areas have been seeded and mulched. The spillway is not overgrown and there is no undesirable vegetation _____. NC

E. Riser/Control Structure and Principal Spillway Pipe -- 2 Points

- The riser/control structure is reinforced concrete _____. NC
- The diameter or opening dimensions of the riser is/are _____. NC
- A top, peak-roofed trash rack has been provided and bolted down to the riser _____. NC
- The riser structure and all appurtenant devices appear to be sound _____. NC
- The riser is free of debris or obstructions _____. NC

- For precast structures, the barrel sections were installed with gasketed joints, and adjacent riser barrel sections have been bolted together with steel strapping _____. NC
- All orifices, siphons, ports, and weirs were installed in accordance with the CDs _____. NC
- The anti-floatation ballast has been provided in accordance with the CDs _____. NC
- A placed concrete invert to the invert out of the principal spillway pipe (PSP) has been provided _____. NC
- The PSP is reinforced concrete _____. NC
- The diameter of the PSP is _____. NC
- Based on a visual inspection, it appears that the joints of the PSP were “homed” reasonably well, and it appears that no joints are leaking _____. NC

F. Sediment Chamber (Forebay) -- 2 Points

- The sediment chamber minimum size has been installed in accordance with the CDs _____. NC
- A minimum depth of 3 feet (in the deepest portion) has been provided in the sediment chamber _____. NC
- The top of the forebay berm has been installed level, and 100% of the berm has either achieved a healthy stand of turf grass or been armored in accordance with the CDs _____. NC
- All accumulated sediment and other debris in the sediment chamber have been removed _____. NC
- All inlet pipes have been installed with appropriate end treatments in accordance with the approved CDs _____. NC

G. Sand Chamber -- 4 Points

- The sand chamber minimum size has been installed in accordance with the approved CDs _____. NC
- The sand chamber has been constructed such that the maximum head above the sand layer is in accordance with the approved CDs _____. NC
- The required filter media mix, including the minimum mix depth, has been installed in accordance with the approved CDs, and there is no sediment in the sand filter media _____. NC
- The underdrain system has been installed in accordance with the approved CDs _____. NC
- All side slopes leading to the sand chamber are no steeper than 3:1 _____. NC
- Any flow splitters or bypass systems have been constructed in accordance with the approved CDs _____. NC
- Even flow distribution into the sand chamber has been provided in accordance with the CDs and is not creating scour in the sand chamber _____. NC
- The bottom of the lowest part of the underdrain system is located at least two feet above the seasonal high water table _____. NC
- 85% of the plantings specified in the approved CDs are thriving _____. NC

- The filter has been observed by the certifying engineer to drawdown the runoff from the first inch of rainfall in a manner consistent with that specified in the approved CDs _____. NC

H. Outfall Structure and Outfall Area -- 1 Points

- The control structure has been installed in accordance with the CDs _____. NC
- The outfall structure is a concrete endwall (with wingwalls if required) _____. NC
- Appropriate fall protection has been provided across the top of the structure _____. NC
- A stilling basin (plunge pool) has been provided in accordance with the CDs _____. NC
- The outfall area appears stable, and all accumulated silt and debris has been removed _____. NC

BCE's Score: _____

City of Durham's Score: _____

Scoring Notes:

- (1) A passing score shall be 14 out of 15;
- (2) If any item within a section is deemed NC, no points shall be awarded for that section;
- (3) If a BCE awards a score of anything less than 15 and submits an as-built and construction certification to the City anyway, the City will reject the entire submittal.

General Certification Assessment Checklist

for

Closed Sand Filters

Date of Certification Assessment: _____

Assessing and Certifying NCPE: _____ Seal:

BCE #: _____

SCM Facility Name: _____

Access Address: _____

PIN/s of Parcel/s Where the Facility is Sited: _____

SCM and Access Easement Information:

DB _____ PG _____ PB _____ PG _____

CHECKLIST

CDs: Approved Construction Drawings

NC: Non-compliant with the Approved CDs and/or City of Durham Requirements and Policies. Note: An "NC" should only be circled if the element in question is non-compliant.

Y: Yes

N: No

N/A: Not Applicable. If an element is not applicable, please write "N/A" next to the element.

A. Drainage Area -- 2 Points

- The drainage area to the facility is less than 5 acres and is, characteristically, 90% impervious or greater _____. NC
- The drainage area to the facility is completely stabilized, and no excess sediment is discharging into the sediment chamber or sand filter _____. NC

B. Easements and Accessibility -- 2 Points

- The constructed SCM facility is located entirely in a recorded SCM easement _____. NC
- The constructed access way is located entirely in a 20-ft wide recorded access easement _____. NC
- Unobstructed maintenance vehicle access from a nearby public or private right-of-way (i.e., road, parking lot, etc.) has been provided to the control structure and all inlets _____. NC
- At its narrowest point, the access width is _____. NC
- At its steepest point, the centerline grade of the access is _____. NC

- At its steepest pitch, the pitch or cross-slope of the access is _____. NC
- Unless it has been surfaced with gravel, asphalt, concrete, etc., 85% of the access way has achieved a healthy stand of grass, and all remaining areas have been seeded and mulched _____. NC
- Access into the control structure and the sediment and sand chambers has been provided in accordance with the CDs _____. NC

C. Control Structure and Principal Spillway Pipe -- 2 Points

- The control structure is reinforced concrete _____. NC
- The dimensions of the structure are _____. NC
- The structure and all appurtenant devices appear to be sound _____. NC
- The structure is free of debris or obstructions _____. NC
- The foundational support for, and the backfill around, the structure have been placed in accordance with the CDs _____. NC
- All orifices, siphons, ports, and weirs were installed in accordance with the CDs _____. NC
- The PSP is reinforced concrete _____. NC
- The diameter of the PSP is _____. NC
- Based on a visual inspection, it appears that the joints of the PSP were “homed” reasonably well, and it appears that no joints are leaking _____. NC

D. Sediment Chamber -- 3 Points

- The sediment chamber minimum size has been installed in accordance with the CDs _____. NC
- A minimum depth of 3 feet has been provided in the sediment chamber _____. NC
- The ports and weirs that drain the sediment chamber into the sand chamber have been installed in accordance with the CDs _____. NC
- Any flow splitters or bypass systems have been constructed in accordance with the approved CDs _____. NC
- The foundational support for, and the backfill around, the structure have been placed in accordance with the CDs _____. NC
- All accumulated sediment and other debris in the sediment chamber have been removed _____. NC

E. Sand Chamber -- 5 Points

- The sand chamber minimum size has been installed in accordance with the approved CDs _____. NC
- The sand chamber has been constructed such that the maximum head above the sand layer is in accordance with the approved CDs _____. NC
- The foundational support for, and the backfill around, the structure have been placed in accordance with the CDs _____. NC

- The required filter media mix, including the minimum mix depth, has been installed in accordance with the approved CDs, and there is no sediment in the sand filter media _____. NC
- The underdrain system has been installed in accordance with the approved CDs _____. NC
- Any flow splitters or bypass systems have been constructed in accordance with the approved CDs _____. NC
- Even flow distribution into the sand chamber has been provided in accordance with the CDs and is not creating scour in the sand chamber _____. NC
- The bottom of the structure is located at least one foot above the seasonal high water table _____. NC
- The filter has been observed by the certifying engineer to drawdown the runoff from the first inch of rainfall in a manner consistent with that specified in the approved CDs _____. NC

F. Outfall Structure and Outfall Area -- 1 Points

- The outfall structure is a concrete endwall (with wingwalls if required) _____. NC
- Appropriate fall protection has been provided across the top of the structure _____. NC
- A stilling basin (plunge pool) has been provided in accordance with the CDs _____. NC
- The outfall area appears stable, and all accumulated silt and debris has been removed _____. NC

BCE's Score: _____

City of Durham's Score: _____

Scoring Notes:

- (1) A passing score shall be 14 out of 15;
- (2) If any item within a section is deemed NC, no points shall be awarded for that section;
- (3) If a BCE awards a score of anything less than 15 and submits an as-built and construction certification to the City anyway, the City will reject the entire submittal.

General Certification Assessment Checklist

for

Underground Detention Systems

Date of Certification Assessment: _____

Assessing and Certifying NCPE: _____ Seal:

BCE #: _____

SCM Facility Name: _____

Access Address: _____

PIN/s of Parcel/s Where the Facility is Sited: _____

SCM and Access Easement Information:

DB _____ PG _____ PB _____ PG _____

CHECKLIST

CDs: Approved Construction Drawings

NC: Non-compliant with the Approved CDs and/or City of Durham Requirements and Policies. Note: An "NC" should only be circled if the element in question is non-compliant.

Y: Yes

N: No

N/A: Not Applicable. If an element is not applicable, please write "N/A" next to the element.

A. Easements -- 1 Point

- The constructed SCM facility is located entirely in a recorded SCM easement _____. NC
- The constructed access way is located entirely in a 20-ft wide recorded access easement _____. NC

B. Accessibility -- 2 Points

- Unobstructed maintenance vehicle access from a nearby public or private right-of-way (i.e., road, parking lot, etc.) has been provided to the control structure and all inlets _____. NC
- At its narrowest point, the access width is _____. NC
- At its steepest point, the centerline grade of the access is _____. NC
- At its steepest pitch, the pitch or cross-slope of the access is _____. NC
- Unless it has been surfaced with gravel, asphalt, concrete, etc., 85% of the access way has achieved a healthy stand of grass, and all remaining areas have been seeded and mulched _____. NC

- Manhole access has been provided at the four corners of the system. All access manholes are reinforced concrete manholes conforming to the CDs _____. NC
- Traffic bearing cleanouts have been provided at 100-foot intervals, with a minimum of two provided in each pipe run. Manhole access structures may be counted as cleanouts _____. NC
- A Bilco®-type door (or approved equivalent) has been placed at the inlets and at the control structure for the underground detention system. Access points that occur in areas subject to vehicular traffic are of the traffic bearing type _____. NC

C. Control Structure and Principal Spillway Pipe -- 5 Points

- The control structure is reinforced concrete _____. NC
- The dimensions of the structure are _____. NC
- The structure and all appurtenant devices appear to be sound _____. NC
- The structure is free of debris or obstructions _____. NC
- The foundational support for, and the backfill around, the structure have been placed in accordance with the CDs _____. NC
- All orifices, siphons, ports, and weirs were installed in accordance with the CDs _____. NC
- A surface or sub-surface bypass has been installed to safely convey the 100-year, 24-hour post-development storm event or the maximum storm in accordance with the CDs _____. NC
- The PSP is reinforced concrete _____. NC
- The diameter of the PSP is _____. NC
- Based on a visual inspection, it appears that the joints of the PSP were “homed” reasonably well, and it appears that no joints are leaking _____. NC

D. Underground Storage Chambers/Pipes -- 6 Points

- The correct size, linear footage, and materials for the system have been installed in accordance with the CDs _____. NC
- Spacing of the storage pipes was installed to manufacturer specifications and in accordance with the CDs _____. NC
- The foundational supports for, and the backfill around, the storage structures have been placed in accordance with the CDs (Note: The backfill material placed around HDPE, CMP, and aluminum storage pipes has been certified by a registered NCPE with geotechnical engineering expertise) _____. NC
- All inlet pipes have been installed in accordance with the CDs _____. NC
- The system remains water tight for the maximum hydrostatic pressure, calculated at the inlet to the underground detention system, generated during the 10-year storm _____. NC
- A surface or sub-surface bypass has been installed to safely convey the 100-year, 24-hour post-development storm event or the maximum storm in accordance with the CDs _____. NC
- All accumulated sediment and other debris in the system has been removed _____. NC

E. Outlet and Outfall -- 1 Point

- The outfall structure is a concrete endwall (with wingwalls if required) _____. NC
- Appropriate fall protection has been provided across the top of the structure _____. NC
- A level spreader-vegetated filter strip and/or a stilling basin (plunge pool) has been provided in accordance with the CDs _____. NC
- The outfall area appears stable, and all accumulated silt and debris has been removed _____. NC

BCE's Score: _____

City of Durham's Score: _____

Scoring Notes:

- (1) A passing score shall be 14 out of 15;
- (2) If any item within a section is deemed NC, no points shall be awarded for that section;
- (3) If a BCE awards a score of anything less than 15 and submits an as-built and construction certification to the City anyway, the City will reject the entire submittal.

General Certification Assessment Checklist

for

Bioretention Areas

Date of Certification Assessment: _____

Assessing and Certifying NCPE: _____ Seal:

BCE #: _____

SCM Facility Name: _____

Access Address: _____

PIN/s of Parcel/s Where the Facility is Sited: _____

SCM and Access Easement Information:

DB _____ PG _____ PB _____ PG _____

CHECKLIST

CDs: Approved Construction Drawings

NC: Non-compliant with the Approved CDs and/or City of Durham Requirements and Policies. Note: An "NC" should only be circled if the element in question is non-compliant.

Y: Yes

N: No

N/A: Not Applicable. If an element is not applicable, please write "N/A" next to the element.

F. Drainage Area -- 2 Points

- The drainage area to the facility is less than 5 acres and is, characteristically, 90% impervious or greater _____. NC
- The drainage area to the facility is completely stabilized, and no excess sediment is discharging into the forebay/sediment basin or bioretention area _____. NC

G. Easements and Accessibility -- 1 Point

- The constructed SCM facility is located entirely in a recorded SCM easement _____. NC
- The constructed access way is located entirely in a 20-ft wide recorded access easement _____. NC
- Unobstructed maintenance vehicle access from a nearby public or private right-of-way (i.e., road, parking lot, etc.) has been provided to the control structure and all inlets _____. NC
- At its narrowest point, the access width is _____. NC
- At its steepest point, the centerline grade of the access is _____. NC

- At its steepest pitch, the pitch or cross-slope of the access is _____. NC
- Unless it has been surfaced with gravel, asphalt, concrete, etc., 85% of the access way has achieved a healthy stand of grass, and all remaining areas have been seeded and mulched _____. NC
- An access hatch and steps down the inside of the riser/control structure have been provided in accordance with the CDs _____. NC

H. Dam Embankment -- 2 Points

- The narrowest top of dam width is _____. NC
- The steepest slope on the upstream face of the dam is _____. NC
- The steepest slope on the downstream face of the dam is _____. NC
- Based on manual rod probings of the dam, particularly in the zones over and around the principal spillway pipe, the dam appears to have been well compacted _____. NC
- The dam and dam foundation, groin, toe, and abutment areas are completely free of trees, landscaping, and other woody growth _____. NC
- The dam has been fine graded and is free of ruts, erosion, etc. _____. NC
- 85% of the dam embankment and dam foundation, groin, toe, and abutment areas have achieved a healthy stand of grass, and all areas that have not achieved a healthy stand of grass have been seeded and mulched. The dam is not overgrown and there is no undesirable vegetation _____. NC
- No evidence of seepage was noted on the downstream face of the dam _____. NC

I. Emergency Spillway -- 1 Points

- The narrowest width of the control section is _____. NC
- The side slopes of the control section are [Left] _____ and [Right] _____. NC
- The size, shape, and alignment of the exit channel are in accordance with the CDs _____. NC
- Armoring has been installed in accordance with the CDs _____. NC
- The spillway has been fine graded and is free of ruts, erosion, etc. _____. NC
- Excluding the hard-surfaced armored area, 85% of the spillway has achieved a healthy stand of grass, and all remaining areas have been seeded and mulched. The spillway is not overgrown and there is no undesirable vegetation _____. NC

J. Riser/Control Structure and Principal Spillway Pipe -- 2 Points

- The riser/control structure is reinforced concrete _____. NC
- The diameter or opening dimensions of the riser/control structure is/are _____. NC
- A top, peak-roofed trash rack has been provided and bolted down to the riser _____. NC
- The riser/control structure and all appurtenant devices appear to be sound _____. NC
- The riser/control structure is free of debris or obstructions _____. NC

- For precast structures, the barrel sections were installed with gasketed joints, and adjacent riser barrel sections have been bolted together with steel strapping _____. NC
- All orifices, siphons, ports, and weirs were installed in accordance with the CDs _____. NC
- The anti-floatation ballast has been provided in accordance with the CDs _____. NC
- A placed concrete invert to the invert out of the principal spillway pipe (PSP) has been provided _____. NC
- The PSP is reinforced concrete _____. NC
- The diameter of the PSP is _____. NC
- Based on a visual inspection, it appears that the joints of the PSP were “homed” reasonably well, and it appears that no joints are leaking _____. NC

K. Inlet/Flow Distribution Area -- 2 Points

- Pre-treatment (sediment basin + turf filter strip, or something equivalent) has been provided at each inlet in accordance with the CDs _____. NC
- All accumulated sediment and other debris in the pre-treatment areas has been removed _____. NC
- Any flow splitters or bypass systems have been constructed in accordance with the approved CDs _____. NC
- The maximum inflow velocity into the bioretention cell is no greater than one foot per second _____. NC
- The flow into the bioretention cell is evenly distributed across the cell in accordance with the CDs and there is no scour within the bioretention cell _____. NC
- All inlet pipes have been installed with appropriate end treatments in accordance with the approved CDs _____. NC

L. Bioretention Cell -- 4 Points

- The maximum allowable head, H_M , above the mulch layer at V_{WQ} (e.g., during the one-inch event) is less than or equal to 9 inches and is in accordance with the CDs _____. NC
- For bioretention areas with an internal water storage (IWS) zone shown on the CDs:
 - The depth of the IWS zone is between 12 and 18 inches above the gravel layer surrounding the underdrains _____. NC
 - A low-level release outlet has been provided in accordance with the CDs _____. NC
 - If a low-level release has not been provided for the facility, the bioretention area has been excavated to an additional depth to accommodate the IWS and maintain full storage availability within the top 30” of the bioretention soil mix _____. NC
- The surface area of the bioretention cell is in accordance with the approved CDs _____. NC
- The required bioretention soil mix and mulch layer, including the minimum mix depths, has been installed in accordance with the approved CDs, and there is no sediment in the bioretention cell _____. NC
- The underdrain system has been installed in accordance with the approved CDs _____. NC
- All side slopes leading to the bioretention cell are no steeper than 3:1 _____. NC

- Any flow splitters or bypass systems have been constructed in accordance with the approved CDs _____ . NC
- Even flow distribution into the bioretention cell has been provided in accordance with the CDs and is not creating scour in the bioretention cell _____ . NC
- The bottom of the lowest part of the underdrain system is located at least two feet above the seasonal high water table _____ . NC
- 85% of the plantings specified in the approved CDs are thriving _____ . NC
- The bioretention cell has been observed by the certifying engineer to drawdown the runoff from the first inch of rainfall in a manner consistent with that specified in the approved CDs _____ . NC

M. Outfall Structure and Outfall Area -- 1 Point

- The control structure has been installed in accordance with the CDs _____ . NC
- The outfall structure is a concrete endwall (with wingwalls if required) _____ . NC
- Appropriate fall protection has been provided across the top of the structure _____ . NC
- A stilling basin (plunge pool) has been provided in accordance with the CDs _____ . NC
- The outfall area appears stable, and all accumulated silt and debris has been removed _____ . NC

BCE's Score: _____

City of Durham's Score: _____

Scoring Notes:

- (1) A passing score shall be 14 out of 15;
- (2) If any item within a section is deemed NC, no points shall be awarded for that section;
- (3) If a BCE awards a score of anything less than 15 and submits an as-built and construction certification to the City anyway, the City will reject the entire submittal.

General Certification Assessment Checklist

for

Level Spreader-Vegetated Filter Strip Systems

Date of Certification Assessment: _____

Assessing and Certifying NCPE: _____ Seal:

BCE #: _____

SCM Facility Name: _____

Access Address: _____

PIN/s of Parcel/s Where the Facility is Sited: _____

SCM and Access Easement Information:

DB _____ PG _____ PB _____ PG _____

CHECKLIST

CDs: Approved Construction Drawings

NC: Non-compliant with the Approved CDs and/or City of Durham Requirements and Policies. Note: An "NC" should only be circled if the element in question is non-compliant.

Y: Yes

N: No

N/A: Not Applicable. If an element is not applicable, please write "N/A" next to the element.

A. Drainage Area -- 1 Point

- The drainage area to the facility is as indicated in the CDs _____. NC
- The drainage area to the facility is 100% stabilized _____. NC

B. Easements and Accessibility -- 1 Point

- The constructed SCM, including the Vegetated Filter Strip, is located entirely in a recorded SCM easement _____. NC
- The constructed access way is located entirely in a 20-ft wide recorded access easement _____. NC
- At its narrowest point, the access width is _____. NC
- At its steepest point, the centerline grade of the access is _____. NC
- At its steepest pitch, the pitch or cross-slope of the access is _____. NC
- Unless it has been surfaced with gravel, asphalt, concrete, etc., 85% of the access way has achieved a healthy stand of grass, and all remaining areas have been seeded and mulched _____. NC

C. Flow Splitter -- 2 Points

- The flow splitter (FS) structure is reinforced concrete _____. NC
- The FS diameter or opening dimensions is/are _____. NC
- The FS appears to be sound _____. NC
- All orifices, ports, pipes, and weirs have been installed in accordance with the CDs _____. NC
- The FS is free of debris or obstructions _____. NC
- If a high-flow bypass has been provided, such flows are discharged into a stilling basin/plunge pool prior to entering the bypass channel _____. NC

D. Forebay -- 2 Points

- A forebay, with an armored spillway to the blind channel-linear wetland, has been installed in accordance with the CDs _____. NC
- All accumulated sediment and other debris in the forebay have been removed _____. NC

E. Blind Channel-Linear Wetland -- 2 Points

- The size, shape, and depth variations of the blind channel-linear wetland (BC-LW) are in accordance with the CDs _____. NC
- The width (e.g., the dimension perpendicular to the direction of flow from the BC-LW) is a minimum of 10 ft _____. NC
- 85% of the wetland/wet meadow plantings proposed in the BC-LW are thriving _____. NC
- All accumulated sediment and other debris in the BC-LW have been removed _____. NC

F. Level Spreader Lip -- 2 Points

- The level spreader lip (LSL) is reinforced concrete _____. NC
- The LSL is of the correct length _____. NC
- The LSL structure/leveler plate is level, and there are no locations where concentrated flows are discharging across the crest of the structure _____. NC
- The ends of the LSL have been contoured, with appropriate reinforcement, into the existing topography, and flows are not exiting the BC-LW around the ends of the LSL _____. NC
- A minimum 3-ft width of a 3-inch layer of washed #57 stone has been installed immediately downstream of the LSL, and the surface elevation of this stone layer is approximately 2 inches below the crest of the LSL _____. NC

G. Vegetated Filter Strip (VFS) -- 3 Points

- The length, width, grade, cross-slope, and vegetation for each component of the VFS are in accordance with the CDs _____. NC
- Flow across the VFS is even, and sheet flow is sustained throughout the length of the VFS _____. NC

- For an engineered filter strip (EFS), the entire EFS was covered with a 6-inch layer of topsoil prior to the installation of sod _____. NC
- For an EFS, the sod installed was grown in a non-clayey environment _____. NC
- For an EFS, 100% of the EFS and all slopes draining to the EFS have achieved a healthy stand of turf grass _____. NC
- Velocities across the VFS are not causing erosion either within or downstream of the VFS _____. NC
- For riparian buffers, the vegetation in the VFS was not disturbed during LS construction, unless such disturbance was approved specifically in the site plan and CDs _____. NC
- For riparian restoration projects, 100% of the 20-ft wide EFS has achieved a healthy stand of turf grass, and 85% of the vegetation planted in the 50-ft riparian restoration zone is thriving _____. NC

H. Bypass Channel -- 2 Points

- Bypass flows are being directed into a natural draw that can handle flows up to the 10-yr storm event without causing erosion. The “draw” has been observed by the certifying engineer to convey bypass flows without eroding and in a manner consistent with that proposed in the CDs _____. NC
- Bypass flows are being directed into a reinforced bypass conveyance (either a channel or a pipe) that conveys bypass flows up to the 10-yr storm event without causing erosion, the bypass conveyance connects to the stream obliquely, and all approvals for the conveyance and stream connection have been obtained from the North Carolina Division of Water Quality (NCDWQ) and the US Army Corps of Engineers, as appropriate (Note: Copies of these approvals are attached to this Checklist) _____. NC

BCE’s Score: _____

City of Durham’s Score: _____

Scoring Notes:

- (1) A passing score shall be 14 out of 15;
- (2) If any item within a section is deemed NC, no points shall be awarded for that section;
- (3) If a BCE awards a score of anything less than 15 and submits an as-built and construction certification to the City anyway, the City will reject the entire submittal.

General Certification Assessment Checklist

for

Vegetated Water Quality Swales

Date of Certification Assessment: _____

Assessing and Certifying NCPE: _____ Seal:

BCE #: _____

SCM Facility Name: _____

Access Address: _____

PIN/s of Parcel/s Where the Facility is Sited: _____

SCM and Access Easement Information:

DB _____ PG _____ PB _____ PG _____

CHECKLIST

CDs: Approved Construction Drawings

NC: Non-compliant with the Approved CDs and/or City of Durham Requirements and Policies. Note: An "NC" should only be circled if the element in question is non-compliant.

Y: Yes

N: No

N/A: Not Applicable. If an element is not applicable, please write "N/A" next to the element.

A. Drainage Area – 1 Point

- The drainage area to the facility is as indicated in the CDs _____. NC
- 85% of the drainage area to the facility is completely stabilized, and no excess sediment is discharging into the facility _____. NC

B. Easements and Accessibility – 1 Point

- The constructed SCM facility is located entirely in a recorded SCM easement _____. NC
- 100% of the swale is accessible from the right of way or from a parking lot _____. NC

C. Inlets to Swale -- 1 Point

- All inlets have end treatments in accordance with the CDs _____. NC
- Riprap stilling basins have been installed at the inlets in accordance with the CDs _____. NC
- All accumulated sediment and other debris in the stilling basins have been removed _____. NC

D. Grass Swale – 12 Points

- The swale length, width, shape, and side slopes are in accordance with the CDs _____. NC
- The maximum longitudinal slope is in accordance with the CDs and is less than or equal to 5% _____. NC
- There are no visible signs of erosion, either in or downstream of the swale _____. NC
- All accumulated sediment and other debris in the swale have been removed _____. NC
- 85% of the swale vegetation is well established, is of the type specified in the CDs, and all un-vegetated areas have been seeded, mulched, and matted _____. NC
- The check dams (if any) have been constructed in accordance with the CDs _____. NC

BCE's Score: _____

City of Durham's Score: _____

Scoring Notes:

- (1) A passing score shall be 14 out of 15;
- (2) If any item within a section is deemed NC, no points shall be awarded for that section;
- (3) If a BCE awards a score of anything less than 15 and submits an as-built and construction certification to the City anyway, the City will reject the entire submittal.

General Certification Assessment Checklist

for

Rainwater Harvesting Systems

Date of Certification Assessment: _____

Assessing and Certifying NCPE: _____ Seal:

BCE #: _____

SCM Facility Name: _____

Access Address: _____

PIN/s of Parcel/s Where the Facility is Sited: _____

SCM and Access Easement Information:

DB _____ PG _____ PB _____ PG _____

CHECKLIST

CDs: Approved Construction Drawings

NC: Non-compliant with the Approved CDs and/or City of Durham Requirements and Policies. Note: An "NC" should only be circled if the element in question is non-compliant.

Y: Yes

N: No

N/A: Not Applicable. If an element is not applicable, please write "N/A" next to the element.

A. Drainage Area – 1 Point

- The drainage area to the facility is stable and is as indicated in the CDs _____.

B. Easements – 2 Points

- The constructed Rainwater Harvesting System (RHS) tanks are located entirely in a recorded SCM easement _____. NC
- For dedicated uses that involve the irrigation of landscaped or natural areas or other SCMs, the distribution system to said uses are located entirely in a recorded SCM easement _____. NC

C. Access – 1 Point

- Suitable operation and maintenance access as well as structural replacement access has been provided for the RHS tanks and the distribution systems as indicated in the CDs _____. NC

D. RHS Tanks -- 3 Points

- The size, material, and location of the tanks are in accordance with the CDs _____. NC
- The initial inflow system (that which directly conveys rainfall runoff to the storage tanks) includes a heavy-gage debris screen, with a reinforced mosquito screen below it, to screen out trash, debris, and grit as well as to mitigate against the entry of mosquitoes into the storage tanks _____. NC
- The storage tanks include an overflow system that allows inflow volumes in excess of system capacity to discharge, non-erosively, into a grassed or natural area, a downstream SCM, or a downstream storm system that drains to an SCM, and the overflow mechanism is fitted with a reinforced mosquito screen _____. NC
- A winter shut-down low-flow relief drain has been provided in accordance with the CDs _____. NC
- Access to the inside of the tanks has been provided in accordance with the CDs _____. NC

E. Distribution Systems -- 3 Points

- The distribution systems, which include all pumps, pipes, and electrical components have been installed in accordance with the CDs _____. NC

F. Clear and Dedicated Uses -- 5 Points

- The RHS delivers harvested rainwater to the “clear and dedicated uses” as specified in the Site Plans and the CDs _____. NC

BCE's Score: _____

City of Durham's Score: _____

Scoring Notes:

- (1) A passing score shall be 14 out of 15;
- (2) If any item within a section is deemed NC, no points shall be awarded for that section;
- (3) If a BCE awards a score of anything less than 15 and submits an as-built and construction certification to the City anyway, the City will reject the entire submittal.

General Certification Assessment Checklist

for

Filterra® Units

Date of Certification Assessment: _____

Assessing and Certifying NCPE: _____ Seal:

BCE #: _____

SCM Facility Name: _____

Access Address: _____

PIN/s of Parcel/s Where the Facility is Sited: _____

SCM and Access Easement Information:

DB _____ PG _____ PB _____ PG _____

CHECKLIST

CDs: Approved Construction Drawings

NC: Non-compliant with the Approved CDs and/or City of Durham Requirements and Policies. Note: An "NC" should only be circled if the element in question is non-compliant.

Y: Yes

N: No

N/A: Not Applicable. If an element is not applicable, please write "N/A" next to the element.

A. Drainage Area -- 5 Points

- The drainage area to the Filterra® unit is appropriate for the size of unit installed, and is, characteristically, 90% impervious or greater _____. NC
- The drainage area to the facility is completely stabilized, and no excess sediment is discharging into the Filterra® unit _____. NC

B. Easements and Accessibility -- 1 Point

- The Filterra® unit is located entirely in a recorded SCM easement _____. NC
- The constructed access way is located entirely in a 20-ft wide recorded access easement _____. NC
- Unobstructed maintenance vehicle access from a nearby public or private right-of-way (i.e., road, parking lot, etc.) has been provided to the unit _____. NC
- At its narrowest point, the access width is _____. NC
- At its steepest point, the centerline grade of the access is _____. NC

- At its steepest pitch, the pitch or cross-slope of the access is _____. NC
- Unless it has been surfaced with gravel, asphalt, concrete, etc., 85% of the access way has achieved a healthy stand of grass, and all remaining areas have been seeded and mulched _____. NC

C. Inlet -- 3 Points

- The Filterra® Top Curb (TC) and Flowline (FL) elevations are higher than the bypass TC and FL elevations in accordance with the CDs _____. NC
- All accumulated sediment and other debris in the pre-treatment areas has been removed _____. NC
- Any flow splitters or bypass systems have been constructed in accordance with the approved CDs _____. NC

D. Filterra® Unit -- 5 Points

- The size and location of the installed Filterra® unit is in accordance with the CDs _____. NC
- The required Filterra® media mix, including the mulch layer, has been installed in accordance with the CDs, and there is no sediment in the bioretention cell _____. NC
- The invert of the installed Filterra® unit is in accordance with the CDs _____. NC
- The underdrain system has been installed in accordance with the approved CDs _____. NC
- The Filterra® plant specified in the approved CDs has been installed and is thriving _____. NC
- The Filterra® unit has been activated by the manufacturer _____. NC
- The manufacturer has provided a Filterra® Media Quality Assurance Certificate _____. NC

E. Outlet -- 1 Point

- The outlet structure has been installed in accordance with the CDs _____. NC
- Positive drainage of the Filterra® unit is provided by the effluent treatment pipe _____. NC

BCE's Score: _____

City of Durham's Score: _____

Scoring Notes:

- (4) A passing score shall be 14 out of 15;
- (5) If any item within a section is deemed NC, no points shall be awarded for that section;
- (6) If a BCE awards a score of anything less than 15 and submits an as-built and construction certification to the City anyway, the City will reject the entire submittal.