



## State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION  
Bureau of Nonpoint Pollution Control  
Division of Water Quality  
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[http://www.state.nj.us/dep/dwq/bnpc\\_home.htm](http://www.state.nj.us/dep/dwq/bnpc_home.htm)

CHRIS CHRISTIE  
*Governor*

KIM GUADAGNO  
*Lt. Governor*

BOB MARTIN  
*Acting Commissioner*

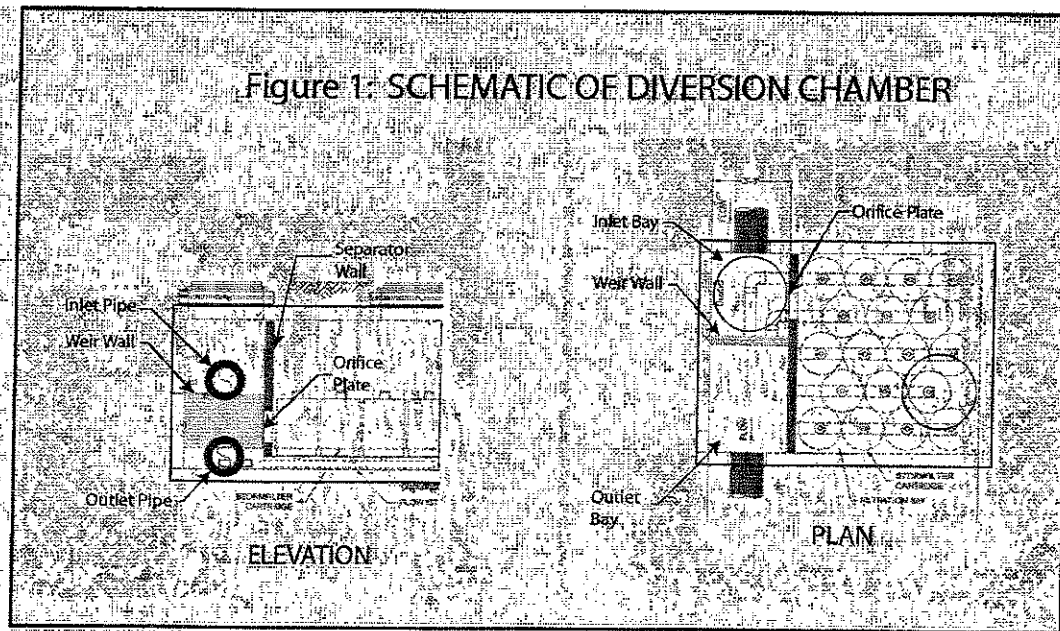
September 1, 2010

Derek M. Berg  
Contech Construction Products, Inc.  
200 Enterprise Drive  
Scarborough, ME 04074

Re: Stormfilter by Contech Construction Products, Inc.

Dear Mr. Berg:

This is in response to your request for a determination regarding a new a bypass configuration for the Stormfilter. The use of the Stormfilter certification is limited to its use as an off-line manufactured treatment device. In such a configuration, the entire runoff from the water quality design storm is treated by the Stormfilter; however, any flows above the water quality design storm will not pass through the approved treatment system.



Based on the submitted information, the use of the chamber shown in Figure 1 qualifies as an off-line configuration provided that the elevation of the water quality design storm does not exceed the elevation of the weir wall, including any head necessary to ensure that the peak flow of the water quality design storm is diverted to the filter cartridges.

Please attach this to your previously issued certification letter for future reference. If you have any questions regarding this letter, please contact Ms. Sandra Blick at (609) 633-7021.

Sincerely,

A handwritten signature in black ink, appearing to read "Barry Chalofsky for B.C.", written in a cursive style.

Barry Chalofsky, P.P., Chief  
Bureau of Nonpoint Pollution Control

c: Richard Magee, NJCAT  
Tom Micai, DLUR



**State of New Jersey**

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Office of the Commissioner  
401 E. State Street – 7<sup>th</sup> Floor

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JON S. CORZINE  
*Governor*

LISA P. JACKSON  
*Commissioner*

May 29, 2007

Jim Lenhart  
Chief Technology Officer  
CONTECH Stormwater Solutions, Inc.  
12021-B NE Airport Way  
Portland, OR 97220

Dear Mr. Lenhart:

The New Jersey Department of Environmental Protection (NJDEP) is pleased to certify the Stormwater Management StormFilter<sup>®</sup> (StormFilter), developed by CONTECH Stormwater Solutions, Inc. This certification is based on the verification report that was submitted by the New Jersey Corporation for Advanced Technology (NJCAT) in accordance with the Energy and Environmental Technology Verification (EETV) Program and the requirements of the NJDEP stormwater regulations at N.J.A.C. 7:8-5.7(d), which require manufactured treatment devices pollutant removal rates to be verified by NJCAT and certified by the Department. This certification letter must be used in conjunction with the Final Certification Report for the StormFilter Manufactured Treatment Device.

The Stormwater Management StormFilter<sup>®</sup> (StormFilter) manufactured treatment device is a passive, flow through stormwater filtration system that improves the quality of storm water runoff by removing pollutants, such as total suspended solids (TSS). The laboratory evaluation of the StormFilter manufactured treatment device was verified by NJCAT in June 2002 and submitted to the NJDEP whereby a Conditional Interim Certification was issued on September 20, 2002. This allowed the StormFilter to be field-tested in accordance with the Technology Acceptance and Reciprocity Partnership (TARP) Protocol for Stormwater Best Management Practice Demonstrations dated 2003 and the New Jersey Tier II Stormwater Test Requirements – Amendments to TARP Tier II Protocol dated 2006, to verify performance relative to the Conditional Interim Certification claim.

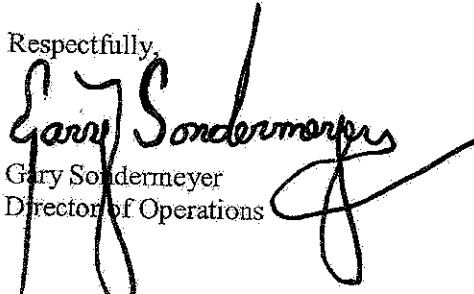
Field-testing of the StormFilter was performed at Greenville Yards, which is a commercial warehouse complex consisting of warehouse space and associated offices, roadways, and cargo docks located in Jersey City, New Jersey. The entire complex covers a 50-acre Brownfield redevelopment site. The performance data from the storm events corresponding to 16 storms with a total rainfall of 17.13 inches were analyzed to verify the overall performance of the

StormFilter. According to NJCAT's final verification report, "The Stormwater Management StormFilter® system operating at a specific flow rate of 2.05 gpm/ft<sup>2</sup> per cartridge (15 gpm, 57 L/m) using perlite media has demonstrated a TSS (EPA Method 160.2) removal efficiency of 80% with 95% confidence limits of 76% and 84% for a sandy loam texture sediment (or finer) in the field using the NJDEP TARP/Tier II Protocol."

Based on the supporting information contained in the NJCAT final verification report, the NJDEP has confidence that the StormFilter has the capability of achieving, in field applications, a TSS removal efficiency of 80%. Therefore, the NJDEP hereby certifies that the Stormwater Management StormFilter® system while operating at a specific flow rate of no greater than 2.05 gpm/ft<sup>2</sup> per cartridge using perlite media is certified by the NJDEP to achieve a removal rate of 80% Total Suspended Solids (TSS) from storm water runoff. Additional conditions such as design storms and maintenance requirements, relating to this certification, are described in the NJDEP final certification report.

Congratulations on obtaining a certification from the NJDEP for your Stormwater Management StormFilter®. If you have any questions, please contact Ravi Patraju at (609) 292-0125.

Respectfully,

  
Gary Sondermeyer  
Director of Operations

Enclosure

- c: Mark Mauriello, Assistant Commissioner, Land Use Management  
Larry Baier, Director, Division of Watershed Management  
Thomas Micai, Director, Division of Land Use Regulation  
Eileen Murphy, Director, Division of Science, Research and Technology  
Ravi Patraju, Research Scientist, Division of Science, Research and Technology

FINAL CERTIFICATION REPORT  
FOR THE **STORMFILTER**  
MANUFACTURED TREATMENT DEVICE

Issued By:

New Jersey Department of Environmental Protection  
Division of Science, Research, and Technology  
401 E. State Street  
Trenton, NJ 08625  
Phone #: (609) 984-5312  
Fax #: (609) 292-7340

Issued To:

CONTECH Stormwater Solutions, Inc.  
12021-B NE Airport Way  
Portland, OR 97220  
Phone #: (800) 548-4667

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## **Introduction**

Pursuant to the Energy and Environmental Technology Verification (EETV) Program at N.J.S.A. 13:ID-134 et seq., the New Jersey Department of Environmental Protection (NJDEP) and New Jersey Corporation for Advanced Technology (NJCAT) have established a Performance Partnership Agreement (PPA) whereby a technology is verified by NJCAT and certified by NJDEP, after ensuring that its performance and use satisfy the NJDEP regulatory intent and result in a net beneficial effect to the environment and human health.

Overall, the NJDEP ensures that verification of an innovative energy or environmental technology from NJCAT must satisfy the following:

1. The use of the technology must satisfy the appropriate regulatory requirements of the respective permitting programs within the NJDEP;
2. The technology must be developed and evaluated in accordance with acceptable scientific and engineering principles, and acceptable protocols; and
3. The technology must be qualitatively and/or quantitatively shown to provide a net beneficial effect to the environment and human health in New Jersey.

Obtaining a certification from the NJDEP would provide the following benefits:

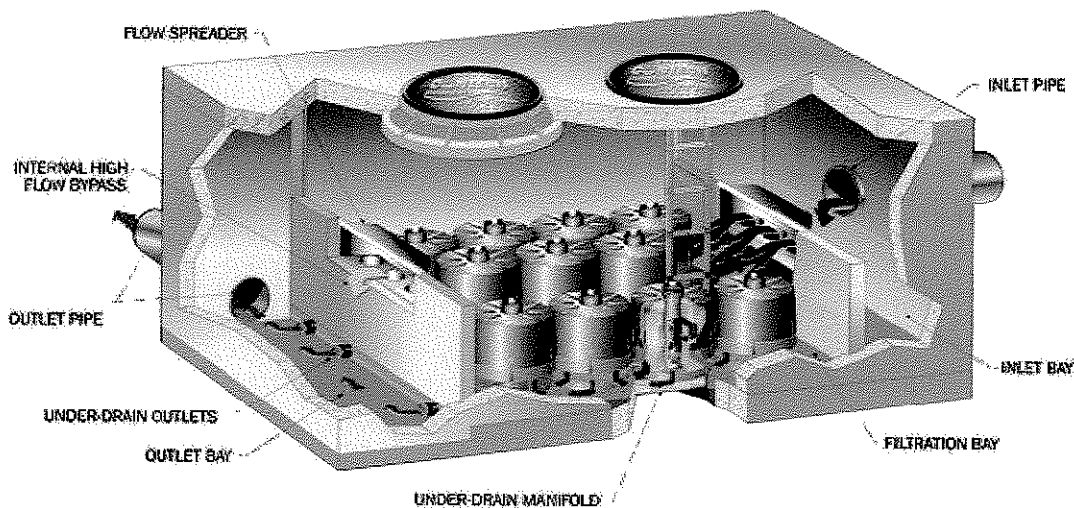
1. The programs that issue permits can rely on the evaluation and verification process to establish contract provisions, protocols, policies, principles and/or technical guidance to develop expedited or more efficient timeframes for the review and decision-making of permits or approvals associated with the technology;
2. The technology will be included in outreach and education seminars to assist in its deployment and expedited commercial use; and
3. The technology will be included in State bid specifications, as deemed appropriate by the State Treasurer.

In addition to the requirements of the EETV Program, this verification of the Stormwater Management StormFilter<sup>®</sup> (StormFilter) by CONTECH Stormwater Solutions, Inc., was submitted to satisfy the NJDEP stormwater regulations at N.J.A.C. 7:8-5.7(d), which require manufactured treatment devices pollutant removal rates to be verified by NJCAT and certified by the Department.

**NB.** Sections of this certification report have been developed by summarizing the information contained in the NJCAT final verification report of the StormFilter titled NJCAT Technology Verification - Stormwater Management StormFilter<sup>®</sup> - CONTECH Stormwater Solutions, Inc., dated January 2007.

## Technology Description

The Stormwater Management StormFilter<sup>®</sup> (StormFilter) manufactured treatment device is a passive, flow through stormwater filtration system that improves the quality of storm water runoff by removing pollutants, such as total suspended solids (TSS), oil and grease, soluble metals, nutrients, organics, and trash and debris. The applications of the StormFilter include retail and commercial developments, residential streets, urban roadways, freeways and industrial sites such as shipyards, and foundries. The construction of the StormFilter includes a vault that houses rechargeable, media-filled filter cartridges, as shown in Figure 1 below. Storm water from storm drains percolates through media-filled cartridges, which remove particulates and adsorb materials such as dissolved metals and hydrocarbons. Other pollutants like surface scum, floating oil and grease have also shown to be removed by this device. After passing through the filter media, the storm water flows into a collection pipe or discharges to an open channel drainage way. Inherent in the design of the StormFilter is the ability to control the individual cartridge flow rate with an orifice disk placed at the base of the cartridge, thus allowing the maximum flow rate through each cartridge to range from 5 to 22.5 gpm.



**Figure 1.** The Precast Stormwater Management StormFilter<sup>®</sup>  
(Reproduced from NJCAT Report)

The number of cartridges to be used in the StormFilter is determined by the peak flow of a design storm that would pass through the system. The peak flow is determined by calculations based on the contributing watershed hydrology and using a design storm magnitude, usually based on the requirements of the local regulatory agency. The StormFilter can also accommodate volume-based, downstream of detention, and flow attenuation designs on a mass-loading basis. The StormFilter is offered in multiple configurations as: precast, high flow, catch basin, curb inlet, linear, volume, and corrugated metal pipe form.



## **Interim Certification & Conditions**

The laboratory evaluation of the StormFilter manufactured treatment device was verified by NJCAT in June 2002. The interim verification report of the StormFilter titled "NJCAT Technology Verification - Stormwater Management, Inc.", dated June 2002 was submitted to the NJDEP whereby a Conditional Interim Certification was issued on September 20, 2002. The performance claim, as described in the verification report, was as follows:

"The StormFilter cartridge at 15 gallons per minute (gpm) using a coarse perlite media has been shown to have a TSS removal efficiency of 79% with 95% confidence limits of 78% and 80%, respectively, for a sandy loam comprised of 55% sand, 40% silt, 5% clay (USDA) in laboratory studies using simulated storm water."

The Conditional Interim Certification issued by the NJDEP stated that the StormFilter<sup>®</sup> system, with influent concentrations of 300 mg/L or less and where Total Suspended Solids (TSS) particle sizes are expected to be similar to those tested, should be able to meet the basic treatment goal of 80% removal of TSS.

One of the conditions of the Conditional Interim Certification by the NJDEP was to field-test the device in accordance with the Technology Acceptance and Reciprocity Partnership (TARP) Protocol for Stormwater Best Management Practice Demonstrations dated 2003 and the New Jersey Tier II Stormwater Test Requirements –Amendments to TARP Tier II Protocol dated 2006, to verify performance relative to the Conditional Interim Certification claim. Other conditions included the recommended design of the StormFilter system in accordance with the requirements of the New Jersey water quality standards, and the submission of a Quality Assurance Project Plan (QAPP) describing these requirements.

Accordingly, a QAPP for field verification and certification testing was completed in accordance with the applicable protocols and accepted in June 2004, resulting in the commencement of monitoring activities. In December 2004, due to the demonstration of field-testing progress, the NJDEP extended the Conditional Interim Certification until the completion of the final certification review.

## Final Verification Summary<sup>1</sup>

### Field-Testing Site Characteristics

Field testing of the StormFilter was performed at Greenville Yards, which is a commercial warehouse complex consisting of warehouse space and associated offices, roadways, and cargo docks located in Jersey City, New Jersey. The entire complex covers a 50-acre Brownfield redevelopment site, adjacent to the New York harbor. Stormwater from this complex is generated by over 10 acres of pavement supporting continuous traffic from boating, rail, and trucking activities. The stormwater treatment for this area was provided by 10 Vault and Catch Basin StormFilter systems. The system monitored consisted of an 8-ft by 18-ft precast StormFilter designed for 27 perlite-filled cartridges operating at 15 gpm per cartridge.

Through the use of the Coulter Counter PSD Analytical Method, the influent samples were characterized as a silt loam and clay loam soil texture type. The influent particle size distribution (PSD) for four individual storm events demonstrated a  $d_{50}$  of 13  $\mu\text{m}$ . A reconstructed influent PSD analysis method also utilized, which represented the sediment retained by the system between maintenance events, and demonstrated a sandy loam texture with a  $d_{50}$  of 97  $\mu\text{m}$ . Both methods satisfied the New Jersey Tier II requirements of less than 100  $\mu\text{m}$  mean particle size.

### Performance Data & Analysis

The performance data from the storm events corresponding to 16 storms with a total rainfall of 17.13 inches are described in Table 1. The influent TSS event mean concentrations (EMC) range from 8 mg/L to 462 mg/L, with a median value of 60 mg/L.

**Table 1.** Performance Data of Storm Events

Rain Intensity (in/hr) <sup>a</sup>	Influent SSC EMC (mg/L)	Effluent SSC EMC (mg/L)	Influent TSS EMC (mg/L)	Effluent TSS EMC (mg/L)
0.17	182	19	150	21
0.49	58	13	70	10
0.14	280	26	240	28
0.14	82	9	85	15
0.10	462	91	420	100
0.20	19	9	19	14
0.80	96	13	100	18
0.10	23	5	23	4
0.10	11	5	8	4
0.23	77	27	62	21
0.27	54	7	58	14
0.17	12	5	12	4
0.23	96	23	93	22
0.34	42	5	31	4
0.17	29	13	28	14
0.12	20	5	19	4

<sup>a</sup> Intensity based upon 15-minute increments.

The estimated mean SSC and TSS removal efficiency of the StormFilter, when analyzing the data in Table 1 using regression of EMC, was 84% and 80%, respectively. The aggregate load reduction for SSC and TSS were 80% and 77%. The median effluent concentration for SSC and TSS were 11 mg/L and 13 mg/L.

Final Verification Claim

**The Stormwater Management StormFilter® system operating at a specific flow rate of 2.05 gpm/ft<sup>2</sup> per cartridge (15 gpm, 57 L/m) using perlite media has demonstrated a TSS (EPA Method 160.2) removal efficiency of 80% with 95% confidence limits of 76% and 84% for a sandy loam texture sediment (or finer) in the field using the NJDEP TARP/Tier II Protocol.**

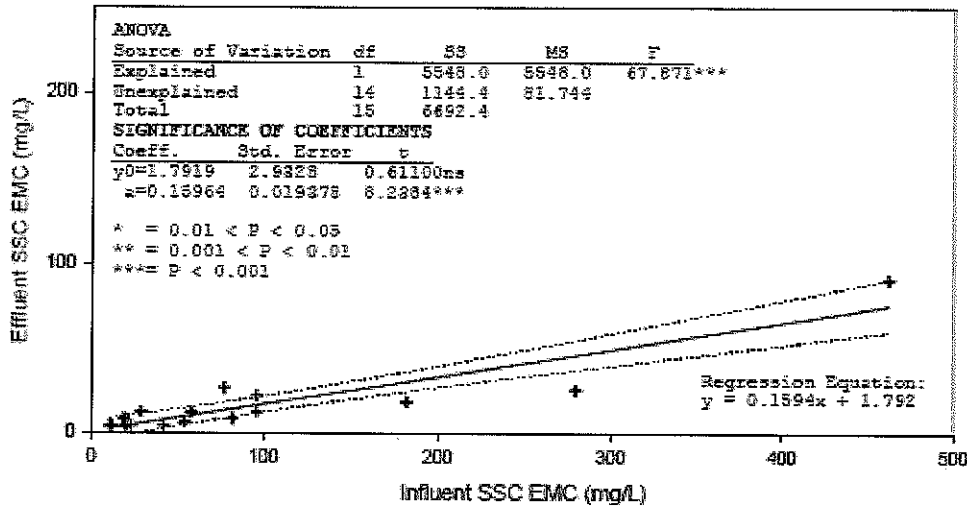
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<sup>1</sup> For a complete description of final verification testing and results, see “NJCAT Technology Verification - Stormwater Management StormFilter® - CONTECH Stormwater Solutions, Inc.” report.

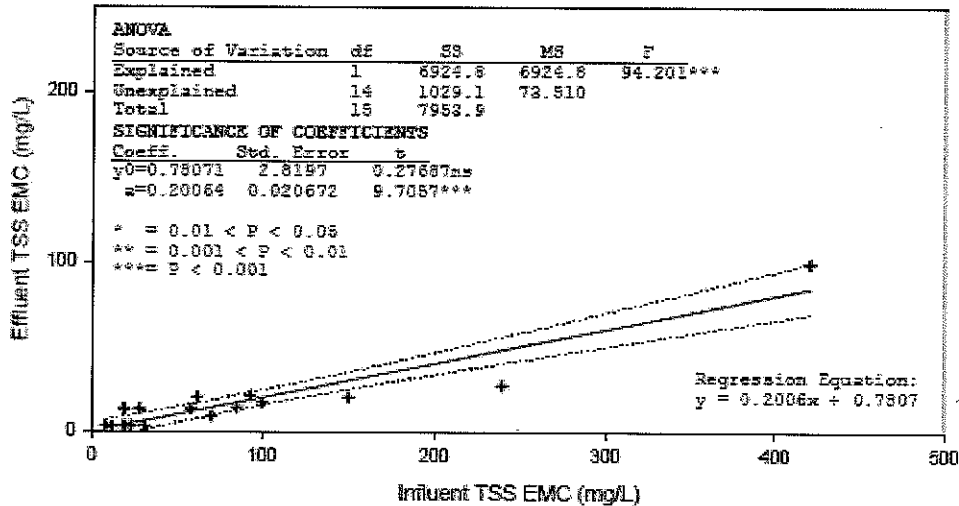
# Final Certification

## Additional Certification Criteria

1. Statistical Analysis – Regression analysis examining the influent and effluent removal relationship, as shown in Figures 2 and 3 below, is used to estimate the mean TSS removal efficiency according to the EPA 160.2 method and SSC method. The results were shown to be within a 95% confidence limit with a P value of less than 0.001.



**Figure 2. Regression Analysis of Observed SSC Data**  
(Reproduced from NJCAT Report)



**Figure 3. Regression Analysis of Observed TSS Data**  
(Reproduced from NJCAT Report)

- a. The NJDEP inquired about the high leverage points, as shown as outliers in the figures above, corresponding to the highest influent EMC value (462 mg/L SSC and 420 mg/L TSS) in Table 1, which is presumed to exert a strong influence on the slope. The response from CONTECH is that, although it would have been to their advantage to omit this data point as a potential outlier, the inclusion of this storm event resulted in a more conservative removal efficiency value for the device.
  - b. The NJDEP inquired about using the regression of EMC with a constrained origin ( $y = 0$ ), rather than an unconstrained origin. CONTECH feels that it may be inappropriate to constrain the linear regression to the origin as this suggests that removal can be achieved below the non-detection limit. Allowing the y-intercept to be unconstrained eliminates assumptions, which in turn allows the raw data to be fully expressed and error to be properly represented. In addition, the unconstrained origin allows for a median EMC effluent estimate and 95% confidence intervals for the median effluent EMC estimate.
2. Environmental Benefits – The StormFilter improves the quality of stormwater runoff by removing various pollutants associated with it. During the field-testing period of approximately 18 months, the StormFilter manufactured treatment device was able to capture materials from storm water runoff weighing almost 2750 pounds. Chemical analysis of the captured materials confirmed the presence of contaminants such as metals, hydrocarbons, and nutrients.

#### Certification Statement

Based on the information contained in the NJCAT Final Verification Report, the NJDEP hereby issues a final certification to the StormFilter manufactured treatment device as follows:

**“The Stormwater Management StormFilter<sup>®</sup> system while operating at a specific flow rate of no greater than 2.05 gpm/ft<sup>2</sup> per cartridge using perlite media is certified by the NJDEP to achieve a removal rate of 80% Total Suspended Solids (TSS) from storm water runoff.”**

#### Certification Conditions

1. Design Storm – Since the StormFilter certification is based on a specific flow rate, the unit should be sized to treat the peak flow of a design storm as it passes through the system - the peak flow as determined by the requirements of the NJDEP stormwater regulations. Whether the StormFilter is designed to treat a storm as calculated by the Rational Method, TR-55 Method, HEC-1 Method, etc., the maximum treatment specific flow rate to a single cartridge must not exceed 2.05 gpm/ft<sup>2</sup>. Any storm water runoff flow greater than the certified specific flow rate must be bypassed in a manner to avoid re-suspension of sediments captured within the device.
2. Maintenance Requirements - As recommended in the Best Management Practices (BMP) Manual, the StormFilter stormwater treatment device should be inspected

and maintained in accordance with both the NJDEP's and the manufacturer's instructions as follows:

- a. NJDEP recommends that all stormwater treatment systems be inspected quarterly and after storms exceeding one (1) inch of rainfall.
- b. CONTECH recommends that maintenance may be necessary if sediment accumulations are 2 inches or more on the system floor or the cartridges are in standing water.
- c. Disposal of debris, trash, sediment, and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state, and federal waste regulations.

January 17, 2007

Addendum to the Stormfilter<sup>®</sup> Conditional Interim Certification

The New Jersey Department of Environmental Protection (NJDEP) is in receipt of, and presently reviewing, the Stormfilter<sup>®</sup> manufactured treatment device's Final Verification Report dated December 2006 from New Jersey Corporation for Advanced Technology (NJCAT). The review and evaluation of this verification report serves as a basis for the NJDEP final certification for this device. Therefore, the deadline for the current Stormfilter<sup>®</sup> Conditional Interim Certification has been extended until the NJDEP review of the Final Verification Report has been completed and a Final Certification is issued. Any inquiries regarding the review process can be made through the contact information given in the Conditional Interim Certification letter.

## Conditional Interim Certification Findings

**NJDEP Stormwater  
Management  
Technology Project  
Management Team  
(PMT):**

Manny Patel, Office of Innovative Technology & Market Develop  
Brian McLendon, Division of Water Quality  
Madhu Guru, Land Use Regulation, Compliance & Enforcement  
Sandra Blick, Division of Watershed Management

**Treatment Technology:** StormFilter developed by Stormwater Management, Inc. (SMI)

**Applicant Information:** Stormwater Management, Inc. (SMI)  
12021-B NE Airport Way, Portland, OR 97220  
800-548-4667  
[www.stormwaterinc.com](http://www.stormwaterinc.com)  
[www.njcat.org](http://www.njcat.org)  
[www.state.nj.us/dep/dsr/](http://www.state.nj.us/dep/dsr/)

**Description:** Stormwater Management Inc. (SMI) has developed an innovative stormwater treatment system called StormFilter. The StormFilter is a passive, flow through, storm water filtration system, improving the quality of stormwater runoff by removing non point source pollutants, including total suspended solids (TSS), oil and grease, soluble metals, nutrients, organics, and trash and debris.

The StormFilter is typically comprised of a vault that houses rechargeable, media-filled filter cartridges. Stormwater from storm drains is percolated through media-filled cartridges, which removes particulates and adsorbs materials such as dissolved metals and hydrocarbons. Surface scum, floating oil and grease are also removed. After passing through the filter media, the storm water flows into a collection pipe or discharges to an open channel drainage way. Inherent in the design of the StormFilter is the ability to control the individual cartridge flow rate with an orifice disk placed at the base of the cartridge. The maximum flow rate through each cartridge can be adjusted to between 5 and 15 gpm.

**NJCAT Verified Claims:**

**Claim 1** - The StormFilter cartridge at 15 gallons per minute (gpm) using a coarse perlite media has been shown to have a TSS removal efficiency of 79% with 95% confidence limits of 78% and 80%, respectively for a sandy loam comprised of 55% sand, 40% silt, 5% clay (USDA) in laboratory studies using simulated storm water.

**Claim 2** - The StormFilter cartridge at 7.5 gallons per minute (gpm) using a combination of fine and coarse perlite media has been shown to have a TSS removal efficiency of 71% with 95% confidence limits of 68% and 75%, respectively for a silt loam comprised of 15% sand, 65% silt, 20% clay (USDA) in laboratory studies using simulated storm water.

**Claim 3** - The StormFilter cartridge at 15 gpm using CSF<sup>®</sup> leaf media has a TSS removal efficiency of 73% with 95% confidence limits of 68% and 79%, respectively when evaluating field and laboratory data.

**Technology Limitations:**

- StormFilter is best utilized for the removal of suspended solids in storm water. The StormFilter uses filter cartridges housed in concrete vaults to produce a self-contained storm water filtering system. The design life of the structure is typically 50 years. Cartridge life is guaranteed as long as the maintenance contract is upheld. Typical life of a cartridge has been budgeted at 20 years. Each cartridge is designed



to treat a peak flow of 5 to 15 gpm. Since storm water flows by gravity, the StormFilter typically requires 2.3 feet of head differential between the invert of the inlet and the invert of the outlet.

- Backwater can be a problem if downstream hydraulic calculations are not performed properly. Backwater will reduce the hydraulic potential across the filter reducing flow rate through the cartridge. Backwater may also saturate media for long periods of time.
- Baseflows should be bypassed to ensure proper functioning of the cartridges and the filtration media. If baseflows occur, the filtration media may become exhausted prematurely. This will affect the life of the cartridges and maintenance may be required more often. Low flow bypasses can be installed retroactively.
- Excessive solids loading, hydrocarbon loading, and/or debris should be addressed during the design phase to assess if pretreatment is needed. Heavy solids loading without pretreatment can cause clogging of the cartridges. Maintenance frequency increases if this occurs.
- The StormFilter design incorporates some ponding of water which can be a breeding site for mosquitoes. Also, if the cartridges plug due to inadequate maintenance, additional standing water will result.
- Inspections should be performed during mid-season to determine sediment loading on the system. This involves mobilization to the site, documentation of media and vault conditions and measurements of accumulated sediments. Other inspections are performed during the year if a field crew is in the area of the filter and as time permits.

**NJDEP Stormwater Management Technology PMT Recommended Interim Certification Conditions:**

Based on NJCAT's verification report entitled "NJCAT Technology Verification, Stormwater Management, Inc., June 2002 the Stormwater Management Technology PMT finds that the StormFilter system, with influent concentrations of 300 mg/l or less and where TSS particle sizes are expected to be similar to those tested, would probably be able to meet the basic treatment goal of 80% removal of Total Suspended Solids (TSS). However, since majority of the performance data was collected in the lab and does not meet Stormwater Best Management Practice Demonstration Tier II Protocol, the following conditions will apply to the interim certification:

1. The StormFilter system will only be approved as part of a treatment train for most projects but allowed as a stand alone structure on some projects if it is proven that no other conventional water quality feature can be incorporated into the design.
2. StormFilter systems shall be designed in accordance with New Jersey's water quality standards and SMI's *Product Design Manual Version 3.0 (April 2002)*, or current edition, unless otherwise specified.
3. A Quality Assurance Project Plan supporting Stormwater Best Management Practice Demonstration Tier II Protocol shall be submitted to OITMD and/or NJCAT within six (6) months from the date of state's interim approval letter.
4. Field evaluation data that is consistent with the Tier II protocol shall be submitted to OITMD and NJCAT by August 2004.
5. The approval letter shall expire by December 2004 unless extended by OITMD.



## State of New Jersey

Department of Environmental Protection

Division of Science, Research and Technology  
Bureau of Sustainable Communities and Innovative Technologies  
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Trenton, NJ 08625-0409  
Tel: 609-292-9692  
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Richard J. Codey  
Acting Governor

Bradley M. Campbell  
Commissioner

December 22, 2004

James H. Lenhart, P.E.  
Senior Vice President  
Stormwater Management, Inc. (SMI)  
12021-B NE Airport Way  
Portland, OR 97220

Re: Extension Approval to Conditional Interim Certification for the Stormwater Management StormFilter<sup>®</sup>.

Dear Mr. Lenhart:

The New Jersey Department of Environmental Protection (NJDEP) received your correspondence requesting an extension to the conditional interim certification of the Stormwater Management StormFilter<sup>®</sup> (StormFilter). The expiration date for the current interim certification is December 31, 2004. This interim conditional certification was given in accordance with the Energy and Environmental Technology Verification (EETV) Act at N.J.S.A. 13:1D-134 et seq. After careful consideration, the NJDEP approves the request to extend the conditional interim certification, which will now expire on December 30, 2006.

The conditional interim approval was based on the New Jersey Corporation for Advanced Technology (NJCAT) verification report. According to the report, the StormFilter System, with influent concentrations of 300 mg/l or less and where Total Suspended Solids (TSS) particle sizes are expected to be similar to those tested, should be able to meet the basic treatment goal of 80% removal of TSS. Based on the NJCAT verification report and the recent information submitted by Stormwater Management regarding the analyses from the treatment of four storm events at Greenville Yards, the NJDEP has decided on the following:

- 1) The StormFilter can be used as a stand alone unit for the period of time that the interim certification remains in effect.
- 2) This conditional interim certification is for the current design of the StormFilter, and any modification will require a new review before use.

- 3) All maintenance requirements must be implemented, and any training must be provided for personnel assigned to perform the maintenance, to ensure that the technology functions in accordance with the conditions of this conditional interim certification.
- 4) The StormFilter shall be designed in accordance with New Jersey's water quality standards and SMI's *Product Design Manual Version 3.0 (April 2002)*, or current edition, unless otherwise specified. The design, pretreatment, land use application, and maintenance criteria in SMI's Design Manual must be closely followed.

As part of the interim conditional approval, the StormFilter is currently being field tested, and the results will be analyzed and submitted for consideration in order to receive a final certification from the NJDEP. This phase of testing must satisfy the requirements of the Technology Acceptance and Reciprocity Partnership (TARP) Stormwater Best Management Practice Demonstration Tier II Protocol. For any questions regarding this correspondence, please contact Ravi Patraju of my staff at (609) 292-0125.

Marty Rosen,



Chief, Bureau of Sustainable Communities  
and Innovative Technologies

Enclosure

- c: Ernest Hahn, Assistant Commissioner, Land Use Management  
Sam Wolfe, Assistant Commissioner, Environmental Regulation  
Jeanne Herb, Director, Policy, Planning, and Science  
Larry Baier, Director, Watershed Management Program  
Narinder Ahuja, Director, Division of Water Quality  
Mark Mauriello, Director, Land Use Regulations  
Eileen Murphy, Director, Division of Science, Research, and Technology  
Rhea Brekke, Executive Director, New Jersey Corporation for Advanced Technology



State of New Jersey

Department of Environmental Protection

Division of Science, Research and Technology

Office of Innovative Technology & Market Development

PO Box 409

Trenton, NJ 08625-0409

Tel: 609-984-5418

FAX: 609-292-7740

James E. McGreevey  
Governor

Bradley M. Campbell  
Commissioner

September 20, 2002

James H. Lenhart, P.E., V.P. of Engineering and Research  
Stormwater Management, Inc. (SMI)  
12021-B NE Airport Way  
Portland, OR 97220

Re: Interim Certification for SMI - StormFilter

Dear Mr. Lenhart:

In accordance with the Energy and Environmental Technology Verification (EETV) Act at N.J.S.A. 13:1D-144, the Office of Innovative Technology & Market Development (OITMD) is pleased to issue a conditional interim certification for Stormwater Management, Inc., (SMI)-StormFilter, a self-contained manufactured stormwater filtering system. This conditional interim certification is being issued based on the New Jersey Corporation for Advanced Technologies' (NJCAT) initial verification report entitled "NJCAT Technology Verification, Stormwater Management, Inc., June 2002.

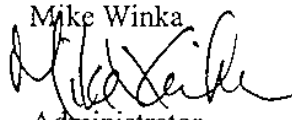
Based on NJCAT's initial verification report and the recommendations made in the attached Conditional Interim Certification - Findings, OITMD finds that the SMI StormFilter system, with influent concentrations of 300 mg/l or less and where TSS particle sizes are expected to be similar to those tested, should be able to meet the basic treatment goal of 80% removal of Total Suspended Solids (TSS) as recommended by the 1993 issued United States Environmental Protection Agency (EPA) 6217(g) Coastal Zone management measures guidance.

However, since the majority of the performance data that formed the basis of the findings in the initial NJCAT verification was collected in the lab, it would not currently meet the provisions of the Technology Acceptance and Reciprocity Partnership (TARP) Stormwater Best Management Practice Demonstration Tier II Protocol, which is required for final NJCAT verification, NJDEP certification and interstate reciprocity.

Therefore, the following conditions based on the recommendations made by the stormwater management technology Project Management Team (PMT) will apply to this interim certification:

1. The Conditional Interim Certification Findings, which highlights the NJCAT verified claims and StormFilter's limitations shall always be included with this approval letter.
2. The StormFilter system will only be approved for use as part of a stormwater system treatment train. The StormFilter can be used as a stand-alone structure if it is proven that no other conventional water quality features can be incorporated into the design.
3. StormFilter systems shall be designed in accordance with New Jersey's water quality standards and SMI's *Product Design Manual Version 3.0 (April 2002)*, or current edition, unless otherwise specified. The design, pretreatment, land use application, and maintenance criteria in SMI's Design Manual must be closely followed.
4. A Quality Assurance Project Plan supporting Stormwater Best Management Practice Demonstration Tier II Protocol shall be submitted to OITMD and/or NJCAT within six (6) months from the date of state's interim approval letter.
5. Field evaluation data that is consistent with the Tier II protocol shall be submitted to OITMD and NJCAT by August 2004.
6. The approval letter shall expire by December 2004 unless extended by NJDEP.
7. OITMD reserves the right to revoke this interim approval if it deems that one or more of the above conditions are not being met by SMI.

OITMD will issue a final approval for certification of the SMI- StormFilter system based on the verified data generated by a full scale field demonstration utilizing the TARP Tier II Stormwater Protocol.

Mike Winka  
  
Administrator  
OITMD

Enclosure

- c: Sam Wolfe, Assistant Commissioner, Environmental Regulation  
Narinder Ahuja, Director, Division of Water Quality  
Ernest Hahn, Assistant Commissioner, Land Use Management  
Mark Mauriello, Director Land Use regulations  
Debra Hammond, Acting Director, Watershed Management Program  
Jeanne Herb, Assistant Commissioner, Office of Policy, Planning, and Science  
Martin Rosen, Director, Division of Science, Research, and Technology  
Rhea Brekke, Executive Director, New Jersey Corporation for Advanced Technology  
TARP State Contacts



## Conditional Interim Certification Findings

**NJDEP Stormwater  
Management  
Technology Project  
Management Team  
(PMT):**

Manny Patel, Office of Innovative Technology & Market Develop  
Brian McLendon, Division of Water Quality  
Madhu Guru, Land Use Regulation, Compliance & Enforcement  
Sandra Blick, Division of Watershed Management

**Treatment Technology:** StormFilter developed by Stormwater Management, Inc. (SMI)

**Applicant Information:** Stormwater Management, Inc. (SMI)  
12021-B NE Airport Way, Portland, OR 97220  
800-548-4667  
[www.stormwaterinc.com](http://www.stormwaterinc.com)  
[www.njcat.org](http://www.njcat.org)  
[www.state.nj.us/dep/dsr/](http://www.state.nj.us/dep/dsr/)

**Description:** Stormwater Management Inc. (SMI) has developed an innovative stormwater treatment system called StormFilter. The StormFilter is a passive, flow through, storm water filtration system, improving the quality of stormwater runoff by removing non point source pollutants, including total suspended solids (TSS), oil and grease, soluble metals, nutrients, organics, and trash and debris.

The StormFilter is typically comprised of a vault that houses rechargeable, media-filled filter cartridges. Stormwater from storm drains is percolated through media-filled cartridges, which removes particulates and adsorbs materials such as dissolved metals and hydrocarbons. Surface scum, floating oil and grease are also removed. After passing through the filter media, the storm water flows into a collection pipe or discharges to an open channel drainage way. Inherent in the design of the StormFilter is the ability to control the individual cartridge flow rate with an orifice disk placed at the base of the cartridge. The maximum flow rate through each cartridge can be adjusted to between 5 and 15 gpm.

**NJCAT Verified Claims:**

**Claim 1** - The StormFilter cartridge at 15 gallons per minute (gpm) using a coarse perlite media has been shown to have a TSS removal efficiency of 79% with 95% confidence limits of 78% and 80%, respectively for a sandy loam comprised of 55% sand, 40% silt, 5% clay (USDA) in laboratory studies using simulated storm water.

**Claim 2** - The StormFilter cartridge at 7.5 gallons per minute (gpm) using a combination of fine and coarse perlite media has been shown to have a TSS removal efficiency of 71% with 95% confidence limits of 68% and 75%, respectively for a silt loam comprised of 15% sand, 65% silt, 20% clay (USDA) in laboratory studies using simulated storm water.

**Claim 3** - The StormFilter cartridge at 15 gpm using CSF<sup>®</sup> leaf media has a TSS removal efficiency of 73% with 95% confidence limits of 68% and 79%, respectively when evaluating field and laboratory data.

**Technology Limitations:**

- StormFilter is best utilized for the removal of suspended solids in storm water. The StormFilter uses filter cartridges housed in concrete vaults to produce a self-contained storm water filtering system. The design life of the structure is typically 50 years. Cartridge life is guaranteed as long as the maintenance contract is upheld. Typical life of a cartridge has been budgeted at 20 years. Each cartridge is designed

to treat a peak flow of 5 to 15 gpm. Since storm water flows by gravity, the StormFilter typically requires 2.3 feet of head differential between the invert of the inlet and the invert of the outlet.

- Backwater can be a problem if downstream hydraulic calculations are not performed properly. Backwater will reduce the hydraulic potential across the filter reducing flow rate through the cartridge. Backwater may also saturate media for long periods of time.
- Baseflows should be bypassed to ensure proper functioning of the cartridges and the filtration media. If baseflows occur, the filtration media may become exhausted prematurely. This will affect the life of the cartridges and maintenance may be required more often. Low flow bypasses can be installed retroactively.
- Excessive solids loading, hydrocarbon loading, and/or debris should be addressed during the design phase to assess if pretreatment is needed. Heavy solids loading without pretreatment can cause clogging of the cartridges. Maintenance frequency increases if this occurs.
- The StormFilter design incorporates some ponding of water which can be a breeding site for mosquitoes. Also, if the cartridges plug due to inadequate maintenance, additional standing water will result.
- Inspections should be performed during mid-season to determine sediment loading on the system. This involves mobilization to the site, documentation of media and vault conditions and measurements of accumulated sediments. Other inspections are performed during the year if a field crew is in the area of the filter and as time permits.

**NJDEP Stormwater Management Technology PMT Recommended Interim Certification Conditions:**

Based on NJCAT's verification report entitled "NJCAT Technology Verification, Stormwater Management, Inc., June 2002 the Stormwater Management Technology PMT finds that the StormFilter system, with influent concentrations of 300 mg/l or less and where TSS particle sizes are expected to be similar to those tested, would probably be able to meet the basic treatment goal of 80% removal of Total Suspended Solids (TSS). However, since majority of the performance data was collected in the lab and does not meet Stormwater Best Management Practice Demonstration Tier II Protocol, the following conditions will apply to the interim certification:

1. The StormFilter system will only be approved as part of a treatment train for most projects but allowed as a stand alone structure on some projects if it is proven that no other conventional water quality feature can be incorporated into the design.
2. StormFilter systems shall be designed in accordance with New Jersey's water quality standards and SMI's *Product Design Manual Version 3.0 (April 2002)*, or current edition, unless otherwise specified.
3. A Quality Assurance Project Plan supporting Stormwater Best Management Practice Demonstration Tier II Protocol shall be submitted to OITMD and/or NJCAT within six (6) months from the date of state's interim approval letter.
4. Field evaluation data that is consistent with the Tier II protocol shall be submitted to OITMD and NJCAT by August 2004.
5. The approval letter shall expire by December 2004 unless extended by OITMD.