State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
401-02B
Bureau of Nonpoint Pollution Control
Division of Water Quality
Post Office Box 420
Trenton, New Jersey 08625-0420
609-633-7021 Fax: 609-777-0432
http://www.state.nj.us/dep/dwq/bnpc_home.htm

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

August 31, 2011

Gene LaManna
Terre Hill Stormwater Systems
P.O. Box 10
Terre Hill, PA 17581

Re: MTD Laboratory Test Certification for the TerreKleen Stormwater Device by Terre Hill Stormwater Systems

Effective Date: September 1, 2011
Expiration Date: September 1, 2013
TSS Removal Rate: 50%

Dear Mr. LaManna:

The Stormwater Management Rules at N.J.A.C. 7:8 allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards provided that the pollutant removal rates have been verified by New Jersey Corporation for Advanced Technology, NJCAT, and certified by the New Jersey Department of Environmental Protection (NJDEP).

The certification process was revised through the "Transition for Manufactured Treatment Devices," dated July 15, 2011. NJDEP has determined that TerreKleen Stormwater Device by Terre Hill Stormwater Systems is consistent with the criteria under *A. Manufactured Treatment Devices with Interim Certifications*. Therefore, **NJDEP certifies the use of the TerreKleen Stormwater Device by Terre Hill Stormwater Systems with a 50% TSS removal rate, provided that the project design is consistent with the following conditions:**

1. The model selected for the project design must be sized in accordance with Table 1 and based on the peak flow of the New Jersey Water Quality Design Storm as specified in N.J.A.C. 7:8-5.

2. The TerreKleen Stormwater Device can be used on-line or off-line.

3. A hydrodynamic separator, such as the TerreKleen Stormwater Device, cannot be used in series with another hydrodynamic separator to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.

4. The maintenance plan for the sites using this device shall incorporate at a minimum, the maintenance requirements for the TerreKleen Stormwater Device, attached.

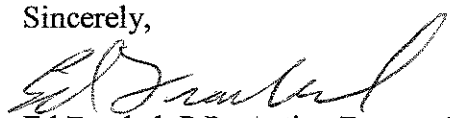
Table 1

Terre Klean Model	Effective Treatment Area W	L	Sedimentation Surface Area	Maximum Treatment Flow (18gpm/ft² x SSA)	Depth Pipe Invert	Total
2	3.25 ft	4 ft	13.0 ft²	0.52 cfs	6.25 ft	8.83 ft
3	4.80 ft	4 ft	19.2 ft²	0.77 cfs	6.25 ft	8.83 ft
5	5.40 ft	6 ft	32.4 ft²	1.28 cfs	6.25 ft	8.83 ft
	# Inclined Plates (6.4 ft²)		(6.4 ft x # inclined plates)			
9	9		57 ft²	2.29 cfs	6.25 ft	8.83 ft
18	18		115 ft²	4.61 cfs	6.25 ft	8.83 ft
27	27		172 ft²	6.90 cfs	6.25 ft	8.83 ft
36	36		230 ft²	9.22 cfs	6.25 ft	8.83 ft
45	45		288 ft²	11.55 cfs	6.25 ft	8.83 ft
54	54		346 ft²	13.88 cfs	6.25 ft	8.83 ft
63	63		403 ft²	16.19 cfs	6.25 ft	8.83 ft

In addition to the attached, any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8, must include a detailed maintenance plan. The detailed maintenance plan must include all of the items identified in Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance of the New Jersey Stormwater Best Management Manual.

NJDEP anticipates proposing further adjustments to this process through the readoption of the Stormwater Management Rules. Additional information regarding the implementation of the Stormwater Management Rules N.J.A.C. 7:8 are available at www.njstormwater.org. If you have any questions regarding the above information, please contact Ms. Sandra Blick of my office at (609) 633-7021.

Sincerely,



Ed Frankel, P.P., Acting Bureau Chief
Bureau of Nonpoint Pollution Control

C: Richard S. Magee, NJCAT
Chron file

TERRE HILL
STORMWATER SYSTEMS
IMPROVING YOUR WORLD.

Maintenance Procedures

Maintenance Record

When a Terre Kleen™ unit is newly installed, frequent inspection is highly recommended. The design of the Terre Kleen™ unit permits easy inspection. It is recommended that during the first two years after installation, inspections be performed at least quarterly for the purpose of noting the rate of sediment and floatable accumulation.

Attached is a form that may be used for recording information resulting from the inspections. Maintaining accurate records provides a history of the pollutant accumulation for this unit and can be used as a comparison to other Terre Kleen™ units that are in use in your region.

To determine sediment accumulation, a stadia rod or similar measuring device may be used. Cleaning is recommended when the sediment is found to be at the level shown in the Terre Kleen™ flow diagram. To avoid underestimating the volume of sediment in the chamber, care must be exercised in lowering the measuring device to the top of the sediment pile. The clean-out procedure may occur anytime after a rain event. It is not necessary to wait for particles to settle due to the high sedimentation efficiency of the device.

Maintenance Cleaning

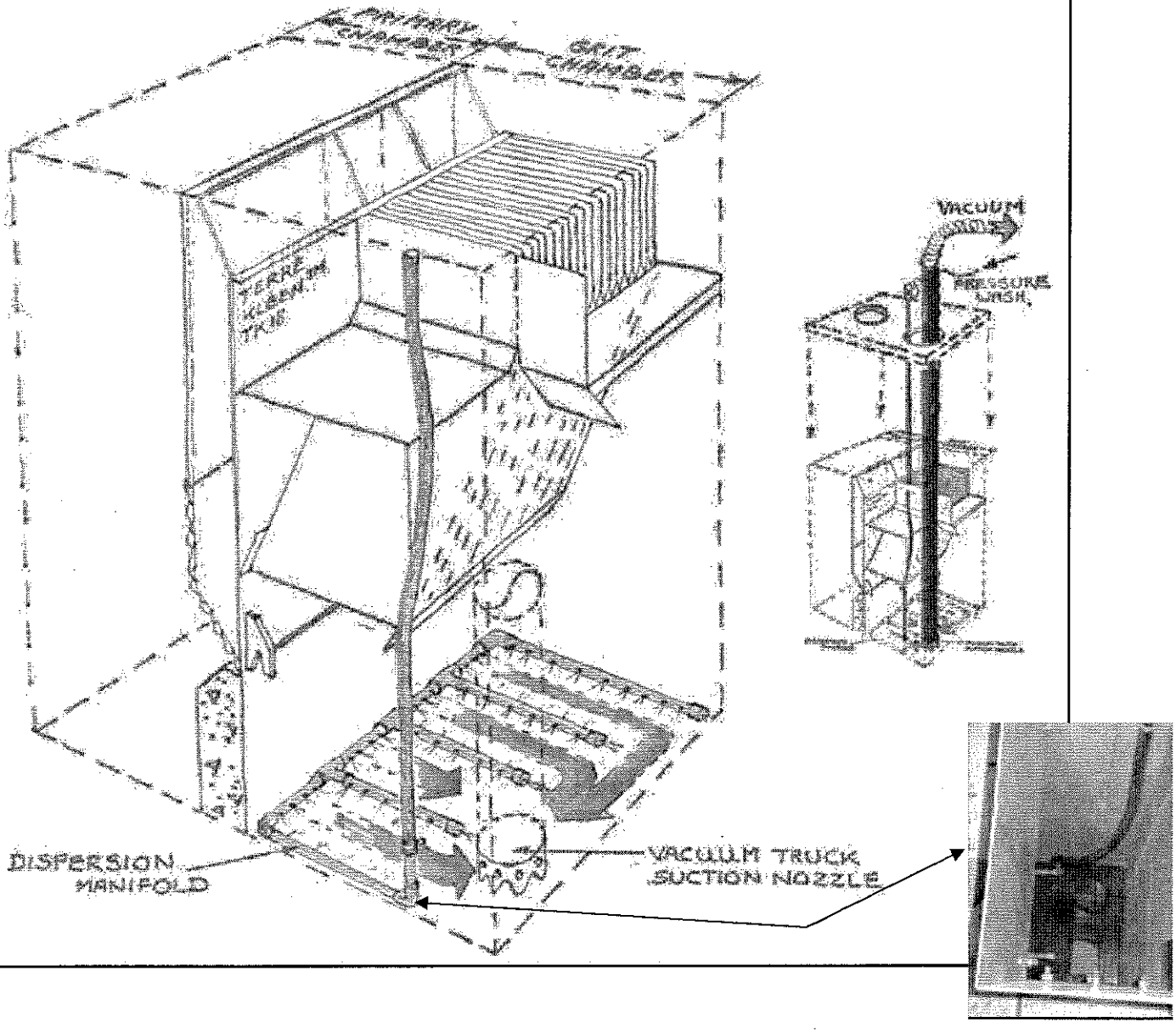
The Terre Kleen™ is designed with clear access to the primary and grit chambers. A vacuum truck, or similar trailer mounted equipment, can be used to clean both chambers by lowering the suction hose through the openings. The oil and litter in the primary chamber should be removed first. Depending on the equipment used, it may be necessary to remove floating trash and debris with a net or rake. To further prevent discharge of hydrocarbons, "oil absorption booms" were added to the primary chamber during installation. They will float among the litter and begin to sink as they absorb oil. The boom size 2¼" Ø x 12" will absorb about a quart of oil and solidify it within the boom. These booms should be replaced when they become saturated with oil and no longer appear above the water surface. Depending on the site conditions, the number of booms can be adjusted up or down. Additional booms can be purchased from Terre Hill Concrete Products. *(The sorbent booms are placed in the primary chamber for the absorption of gasoline; diesel fuel, lube oil, jet fuel, transformer oils, chlorinated solvents, aromatic solvents, hydraulic oils, and light crude. The sorbent boom is Rubberizer® boom manufactured by Haz-Mat Response Technologies Inc. A standard TerreKleen™ TK09 has 4 booms, TK18 has 8 booms, TK27 has 12 booms, TK36 has 16 booms, TK45 has 20 booms, and TK54 has 25 booms.)*

After the oil and litter is removed, the grit chamber can be cleaned out. Finally, switch

back to the primary chamber to remove remaining debris. Water can be sprayed into the chambers as necessary to loosen debris.

Sludge dispersion manifold

Each Terre Kleen™ water quality device contains a "Sludge Dispersion Manifold". The manifold pipes are mounted to the floor underneath the inclined plate settler and connect to a hose that leads to the clean out opening at grade level. This hose is pressurized by the vacuum truck's spray nozzle. While the suction nozzle removes the captured pollutants, the pressurized manifold sprays water through the small horizontal holes in the manifold pipes. This water lifts and disperses the sludge blanket causing it to drain to the suction nozzle.



Disposal

Disposal of removed material will depend on the nature of the drainage area. For example, sediment collected from a system of stormwater inlets may possibly be disposed at a landfill after the liquid fraction is decanted at a sewage treatment facility. Material removed from the Terre Kleen™ must be handled according to local, state, and federal regulations. Some materials, such as sediment and detritus from lawn areas may be reused on site, which is often recommended by the local authorities. After the clean-out procedure is complete, replace the manhole covers securely to the frames for safety purposes.

Cold Weather Concerns

There is limited data concerning cold weather effects on a properly maintained Terre Kleen™ device. The depth of the structure in the soil insulates it from freezing which is similar to exposure conditions of septic tanks. When inlets are integrated into the Terre Kleen™, exposure to freezing may become an issue and may result in more runoff bypassing the treatment system due to a build-up of snow and ice. Saltwater stratification in the water may also reduce detention time. Colder temperatures reduce the settling velocity of particles, which can result in fewer particles being "trapped". The amount of grit and sand in the runoff from paved areas may be significantly increased in the winter, which may warrant more frequent maintenance. Access to the device for maintenance may be more difficult.

Confined Space Entry

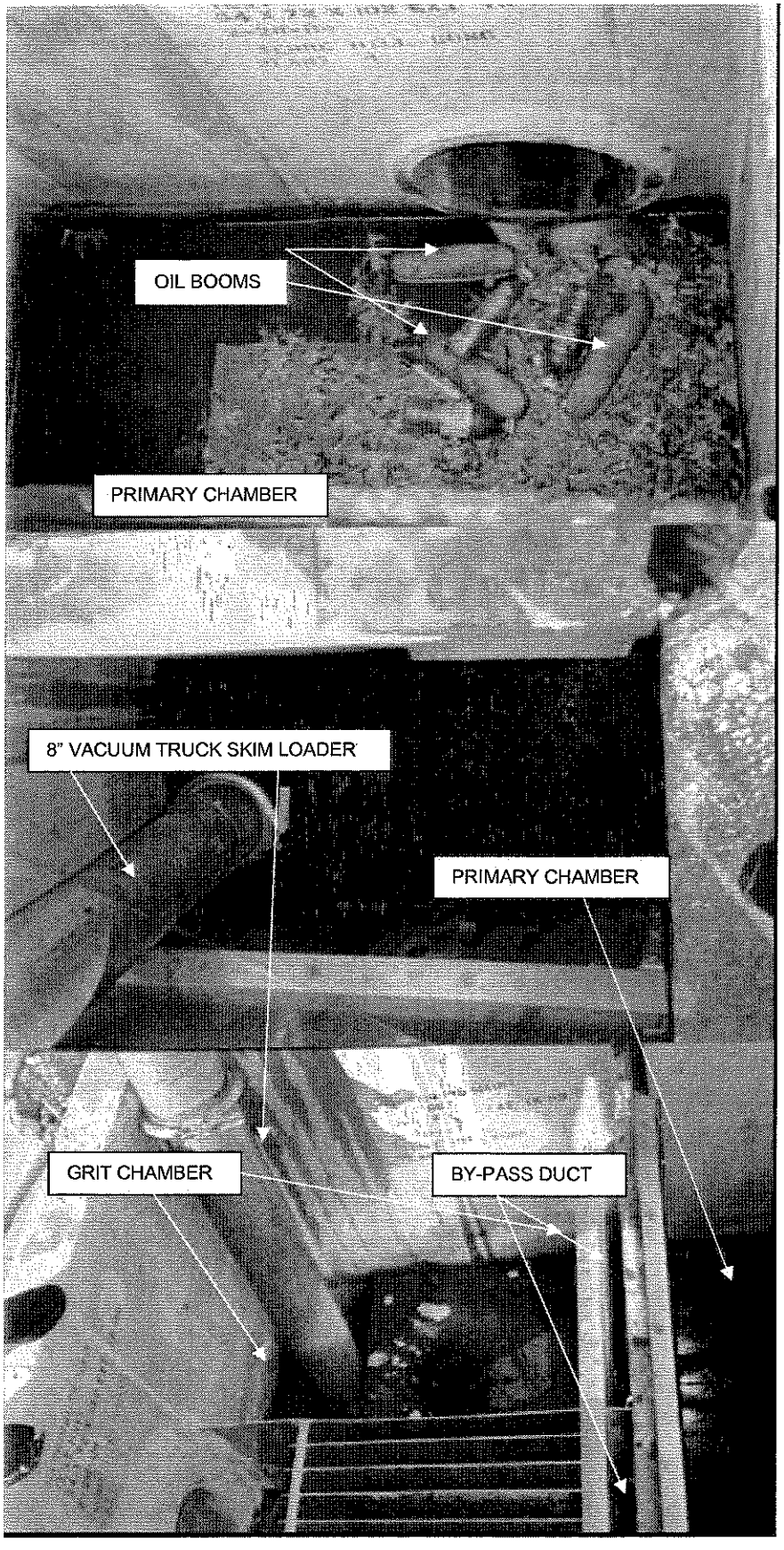
Regular maintenance and clean out does not require confined space entry into the Terre Kleen™ unit. If confined entry is required, it will need to be performed by qualified personnel who are properly trained for confined space activity using proper equipment as per the latest OSHA regulations.

The Terre Kleen™ will trap floatable litter and oils that are not emulsified in the stormwater runoff. **Keep sparks and open flames away when working around a Terre Kleen™ unit that may contain flammable material.**

Information is subject to change without notice.

Attachments:
Appendix A - Clean-out sequence
Appendix B - Terre Kleen™ Maintenance Chart

Appendix A – Clean out sequence



The Primary Chamber is where the stormwater enters. The water may enter through pipes or an inlet grate in the lid.

Gross pollutants, oils, and course sediment is collected in this chamber. Oil booms may be used to absorb hydrocarbons.

First: Remove trash and oil until the sheen is largely reduced to a rainbow colored reflection of the light on the oil.

Second: Move the skim-loader to the Grit Chamber and draw the water down to the sediment and sludge layer. Water will drain from both chambers and drag sludge to the vacuum nozzle.

Third: Move back to the Primary Chamber and remove the remaining sediment.

Fourth: Activate the dispersion manifold and spray water on the soiled areas and complete removal of loosened debris.

Fifth: Drop new oil booms into the Primary Chamber and reinstall the lids of the manholes and/or grates.

Appendix B

Terre Kleen™ Maintenance Chart					
Model:			Water Depth Empty:		
Date	Water Depth	Sediment Depth	Floatable Layer Thickness	Maintenance Performed	Comments

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

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http://www.state.nj.us/dep/dwq/bnpc_home.htm

BOB MARTIN
Commissioner

June 7, 2011

Gene LaManna
P.O. Box 10
Terre Hill, PA 17581

Re: On-line Conditional Interim Certification for the for Terre Kleen Separator by Terre Hill Stormwater Systems

Expiration Date: July 15, 2011

Dear Mr. LaManna:

This letter is in response to your request for the Terre Kleen Separator by Terre Hill Stormwater Systems to be used as an on-line device. The Department has reviewed your verification report supplied by NJCAT and has received the required signed statement from the verification entity, manufacturer and testing entity, which listed the protocol requirements and indicated that all of the requirements of the protocol were met or exceeded. Based on a review of the information received the Terre Kleen Separator by Terre Hill Stormwater Systems can be used as an off-line or on-line device.

Additional information regarding the implementation of the Stormwater Management Rules, N.J.A.C. 7:8, are available at www.njstormwater.org. If you have any questions regarding the above information, please contact Ms. Sandra Blick of my office at (609) 633-7021.

Sincerely,

Ed Frankel, P.P., Section Chief
Bureau of Nonpoint Pollution Control

C: Chron File
Richard Magee, NJCAT
Mark Pedersen, DLUR
Elizabeth Dragon, BNPC

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Acting Commissioner

Bureau of Nonpoint Pollution Control
Division of Water Quality
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February 24, 2010

Hans de Bruijn
P.O. Box 10
Terre Hill, PA 17581

Re: Conditional Interim Certification for the TerreKleen Stormwater Device by Terre Hill Stormwater Systems

Expiration Date: May 15, 2011
TSS Removal Rate: 50%

Dear Mr. de Bruijn:

The Stormwater Management Rules under N.J.A.C. 7:8-5.5(b) and 5.7(c) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by New Jersey Corporation for Advanced Technology and have been certified by the New Jersey Department of Environmental Protection (NJDEP).

The certification process has been revised. The revised process places MTDs into five categories. The TerreKleen Stormwater Device by Terre Hill Stormwater Systems has been qualified for Category III, MTDs within Testing Portion of the NJCAT Verification Process as of May 15, 2009.

The TerreKleen Stormwater Device, shown in figure 1, is a hydrodynamic treatment system comprised of laminar plates to remove sediments from runoff.

The NJDEP received the submitted data demonstrating the above approved TSS Removal Rate, a maintenance plan required under Category III, and a signed statement indicating that the 2009 NJDEP Testing Protocols as amended and supplemented (Hydrodynamic, Filter, or Field requirements in accordance with NJ Amendments of TARP) are unincorporated into the maintenance plan. This certification is based solely on the documentation submitted and the verification of such documentation by NJCAT.

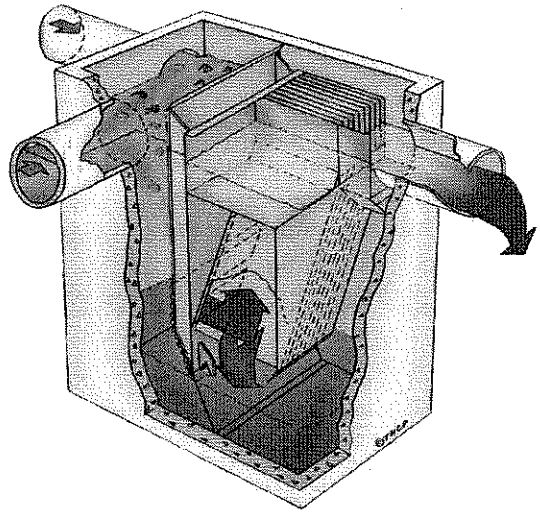


Figure 1 Schematic of the Terre Kleen™ TK09

The NJDEP certifies the use of the TerreKleen Stormwater Device by Terre Hill Stormwater Systems at a TSS removal rate of 50%, subject to the following conditions:

1. The TerreKleen Stormwater Device is designed according to the NJ Water Quality Design Storm in N.J.A.C. 7:8-5.5.

2. The various models and associated water quality flow capacities shall be sized for the peak flow of the New Jersey water quality design storm per N.J.A.C. 7:8-5, as shown in Table 1.

Table 1 Terre KleenTM Treatment Flow Rates

Terre Kleen™ Model	Number of sedimentation cells in the Grit-Chamber	Horizontally Projected Sedimentation Area (ft^2)	Design Flow Rate (cfs)
TK01	1	8	0.32
TK02	2	13	0.52
TK05	5	32	1.28
TK09	9	57	2.29
TK18	18	115	4.61
TK27	27	172	6.90
TK36	36	230	9.22
TK45	45	288	11.55
TK54	54	346	13.88
TK63	63	403	16.19

3. The TerreKleen Stormwater Device is certified as an off-line system only. Any flow above the New Jersey water quality design storm must be bypassed around the system.

4. A hydrodynamic separator, such as TerreKleen Stormwater Device, cannot be used in series with another settling device to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.

5. The maintenance plan for sites using this device shall incorporate, at a minimum, the maintenance requirements for the TerreKleen Stormwater Device shown in the attachment entitled "Maintenance Procedures' and the attached letter entitled "Sediment Removal Interval Terre Kleen model TK18".

In addition to the attached, the detailed maintenance plan must include all of the items identified in Chapter 8: Maintenance of the New Jersey Stormwater Best Management Manual. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional operation and maintenance information associated with this manufactured treatment device is available from the vendor to assist in the development of a complete maintenance plan.

Additional information regarding the implementation of the Stormwater Management rules N.J.A.C. 7:8 are available at www.njstormwater.org.

Sincerely,

Nancy Wittenberg
Assistant Commissioner

Attachments

c: Tom Micai, NJDEP
Mary Beth Brenner, NJDEP
Rhea Weinberg Brekke, NJCAT
Barry Chalofsky, NJDEP

TERRE HILL
STORMWATER SYSTEMS
Improving your world.

Maintenance Procedures

Maintenance Record

When a Terre Kleen™ unit is newly installed, frequent inspection is highly recommended. The design of the Terre Kleen™ unit permits easy inspection. It is recommended that during the first two years after installation, inspections be performed at least quarterly for the purpose of noting the rate of sediment and floatable accumulation.

Attached is a form that may be used for recording information resulting from the inspections. Maintaining accurate records provides a history of the pollutant accumulation for this unit and can be used as a comparison to other Terre Kleen™ units that are in use in your region.

To determine sediment accumulation, a stadia rod or similar measuring device may be used. Cleaning is recommended when the sediment is found to be at the level shown in the Terre Kleen™ flow diagram. To avoid underestimating the volume of sediment in the chamber, care must be exercised in lowering the measuring device to the top of the sediment pile. The clean-out procedure may occur anytime after a rain event. It is not necessary to wait for particles to settle due to the high sedimentation efficiency of the device.

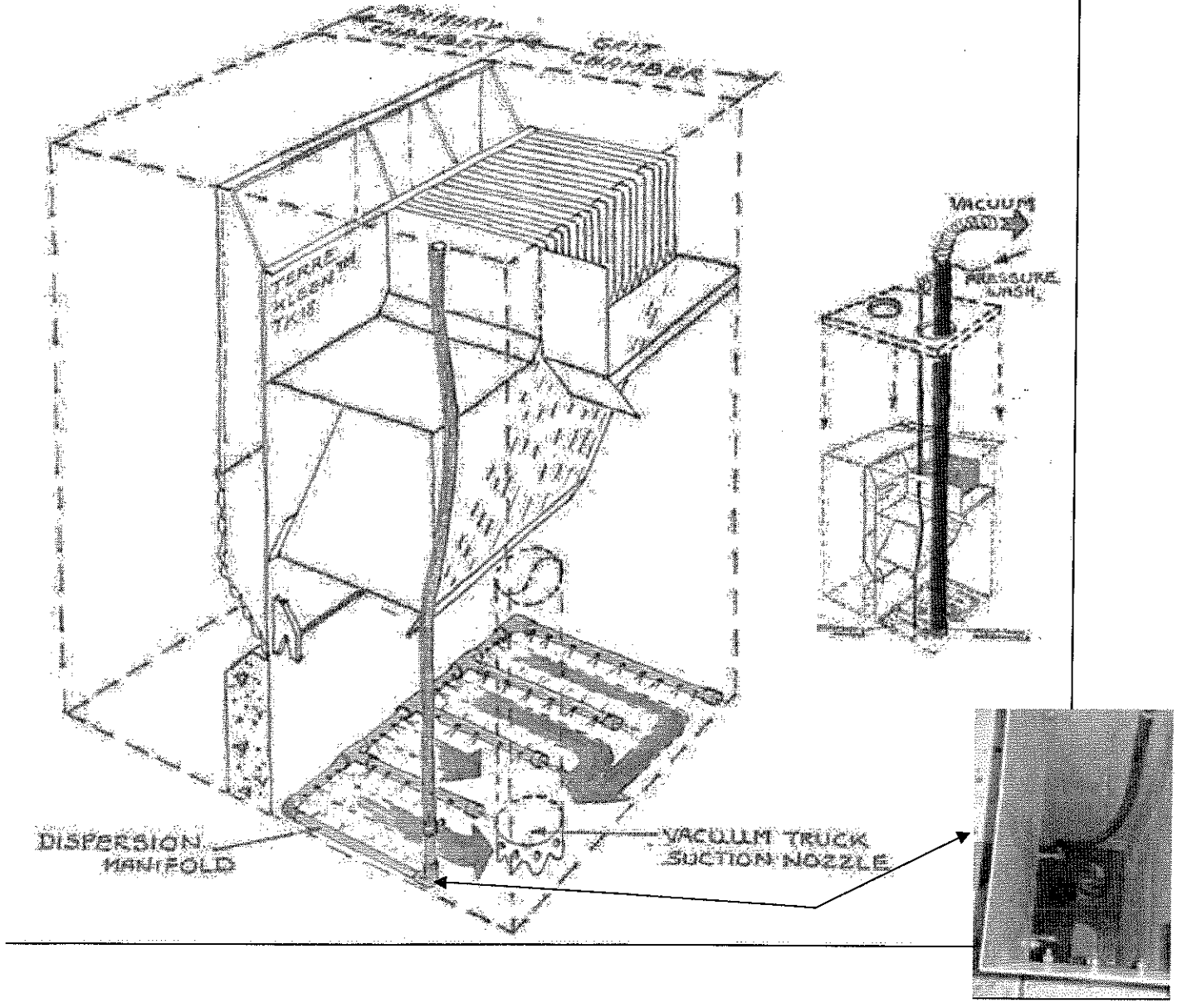
Maintenance Cleaning

The Terre Kleen™ is designed with clear access to the primary and grit chambers. A vacuum truck, or similar trailer mounted equipment, can be used to clean both chambers by lowering the suction hose through the openings. The oil and litter in the primary chamber should be removed first. Depending on the equipment used, it may be necessary to remove floating trash and debris with a net or rake. To further prevent discharge of hydrocarbons, "oil absorption booms" were added to the primary chamber during installation. They will float among the litter and begin to sink as they absorb oil. The boom size 2¼" Ø x 12" will absorb about a quart of oil and solidify it within the boom. These booms should be replaced when they become saturated with oil and no longer appear above the water surface. Depending on the site conditions, the number of booms can be adjusted up or down. Additional booms can be purchased from Terre Hill Concrete Products. *(The sorbent booms are placed in the primary chamber for the absorption of gasoline; diesel fuel, lube oil, jet fuel, transformer oils, chlorinated solvents, aromatic solvents, hydraulic oils, and light crude. The sorbent boom is Rubberizer® boom manufactured by Haz-Mat Response Technologies Inc. A standard TerreKleen™ TK09 has 4 booms, TK18 has 8 booms, TK27 has 12 booms, TK36 has 16 booms, TK45 has 20 booms, and TK54 has 25 booms.)*

After the oil and litter is removed, the grit chamber can be cleaned out. Finally, switch back to the primary chamber to remove remaining debris. Water can be sprayed into the chambers as necessary to loosen debris.

Sludge dispersion manifold

Each Terre Kleen™ water quality device contains a "Sludge Dispersion Manifold". The manifold pipes are mounted to the floor underneath the inclined plate settler and connect to a hose that leads to the clean out opening at grade level. This hose is pressurized by the vacuum truck's spray nozzle. While the suction nozzle removes the captured pollutants, the pressurized manifold sprays water through the small horizontal holes in the manifold pipes. This water lifts and disperses the sludge blanket causing it to drain to the suction nozzle.



Disposal

Disposal of removed material will depend on the nature of the drainage area. For example, sediment collected from a system of stormwater inlets may possibly be disposed at a landfill after the liquid fraction is decanted at a sewage treatment facility. Material removed from the Terre Kleen™ must be handled according to local, state, and federal regulations. Some materials, such as sediment and detritus from lawn areas may be reused on site, which is often recommended by the local authorities. After the clean-out procedure is complete, replace the manhole covers securely to the frames for safety purposes.

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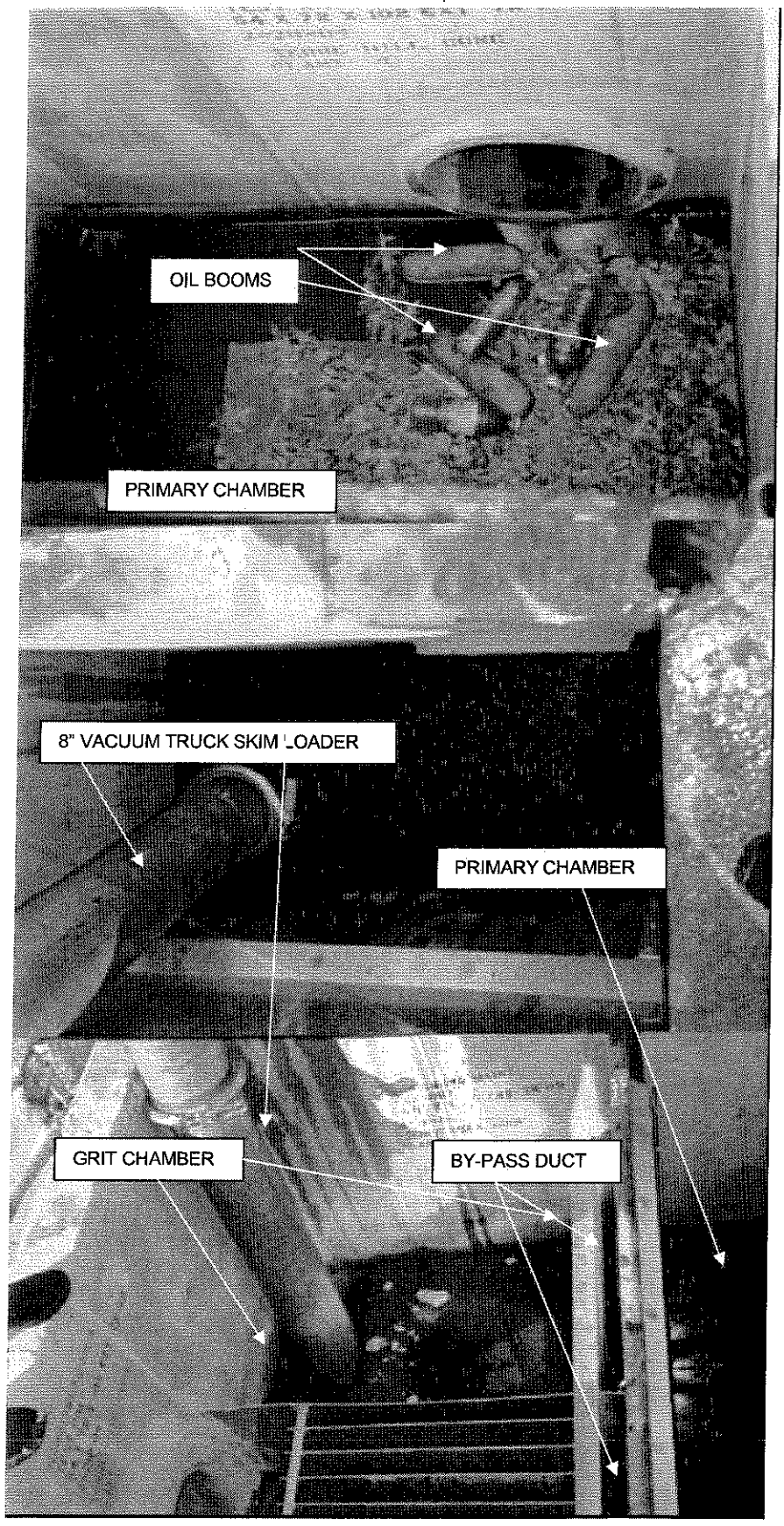
Regular maintenance and clean out does not require confined space entry into the Terre Kleen™ unit. If confined entry is required, it will need to be performed by qualified personnel who are properly trained for confined space activity using proper equipment as per the latest OSHA regulations.

The Terre Kleen™ will trap floatable litter and oils that are not emulsified in the stormwater runoff. **Keep sparks and open flames away when working around a Terre Kleen™ unit that may contain flammable material.**

Information is subject to change without notice.

Attachments:
Appendix A - Clean-out sequence
Appendix B - Terre Kleen™ Maintenance Chart

Appendix A – Clean out sequence



The Primary Chamber is where the stormwater enters. The water may enter through pipes or an inlet grate in the lid.

Gross pollutants, oils, and course sediment is collected in this chamber. Oil booms may be used to absorb hydrocarbons.

First: Remove trash and oil until the sheen is largely reduced to a rainbow colored reflection of the light on the oil.

Second: Move the skim-loader to the Grit Chamber and draw the water down to the sediment and sludge layer. Water will drain from both chambers and drag sludge to the vacuum nozzle.

Third: Move back to the Primary Chamber and remove the remaining sediment.

Fourth: Activate the dispersion manifold and spray water on the soiled areas and complete removal of loosened debris.

Fifth: Drop new oil booms into the Primary Chamber and reinstall the lids of the manholes and/or grates.

Appendix B

Terre Kleen™ Maintenance Chart					
Model:			Water Depth Empty:		
Date	Water Depth	Sediment Depth	Floatable Layer Thickness	Maintenance Performed	Comments

TERRE HILL STORMWATER SYSTEMS

Wednesday, February 24, 2010

THSS File: 704928-TK18-Alden-NJDEP Certification.

Subject: Sediment Removal Interval[1] Terre Kleen model TK18

Annual Sediment Volume Captured = (9.70 CF/Acre)(0.347)(MTFR)(TSS Removal Efficiency)
= (3.366)(MTFR)(TSS Removal Efficiency)

Required Sediment Removal Interval (Years) =

$$= \frac{(50\% \text{ of MTD's Maximum Sediment Storage Volume})}{(3.366)(\text{MTFR})(\text{TSS Removal Efficiency})}$$

Required Sediment Removal Interval (Months)

$$= \frac{(50\% \text{ of MTD's Maximum Sediment Storage Volume})(12)}{(3.366)(\text{MTFR})(\text{TSS Removal Efficiency})}$$

Given:

MTFR of a Terre Kleen TK18	= 4.61 cfs[2]
(Certified) TSS Removal Efficiency	= 50%
Maximum Sediment Storage Volume	= 36 cf[3]

Conclusion:

Certified Sediment Storage in CF	NJDEP Certified MTFR in CFS	Certified Removal Efficiency	Annual Sediment Volume Captured in CF	Required Sediment Removal Interval in (Years)	Required Removal Interval (Months)
Sediment depth 16.5 Inch					
36	4.61	50%	7.76	2.30	28

[1] Calculation according to Appendix A: NJDEP Protocol for Hydrodynamic Devices December 15, 2009
[2] Table 4 of NJCAT Technology verification report.
[3] Table 1 of NJCAT Technology verification report.

TERRE HILL STORMWATER SYSTEMS

Following is the relative storage data for all Terre Kleen models.

	Certified Sediment Storage in CF	NJDEP Certified MTFR in CFS	Certified Removal Efficiency	Annual Sediment Volume Captured in CF	Required Sediment Removal Interval in (Years)	Required Removal Interval (Months)
	depth					
Model	16.5 Inch					
TK 1	11	0.32	50%	0.54	10.19	122
TK 2	18	0.52	50%	0.88	10.19	122
TK 5	44	1.28	50%	2.16	10.19	122
TK 9	25	2.29	50%	3.85	3.21	39
TK 18	36	4.61	50%	7.76	2.30	28
TK 27	47	6.90	50%	11.61	2.01	24
TK 36	58	9.22	50%	15.52	1.86	22
TK 45	69	11.55	50%	19.44	1.77	21
TK 54	80	13.88	50%	23.36	1.71	20
TK 63	91	16.19	50%	27.25	1.67	20

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Nonpoint Pollution Control
Division of Water Quality
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JON S. CORZINE
Governor

MARK N. MAURIELLO
Acting Commissioner

May 27, 2009

Hans de Bruijn
P.O. Box 10
Terre Hill, PA 17581

Re: Extension of Conditional Interim Certification for the TerreKleen Stormwater Device by Terre Hill Stormwater Systems

Expiration Date: May 15, 2011

Dear Mr. de Bruijn:

The Stormwater Management Rules under N.J.A.C. 7:8-5.5(b) and 5.7(c) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by New Jersey Corporation for Advanced Technology and have been certified by the New Jersey Department of Environmental Protection (NJDEP).

The certification process has been revised. The revised process places MTDs into five categories. The TerreKleen Stormwater Device by Terre Hill Stormwater Systems has been qualified for Category II, MTDs with Interim Certifications.

The NJDEP received the maintenance plan required under Category II and acknowledges that the requirements for this category are met; therefore, the expiration of the interim certification letter dated March 19, 2007 has been extended until May 15, 2011.

The Department anticipates proposing further adjustments to this process through the readoption of the Stormwater Management Rules. Additional information regarding the implementation of the Stormwater Management Rules N.J.A.C. 7:8 are available at www.njstormwater.org. If you have any questions regarding the above information, please contact Ms. Sandra Blick of my office at (609) 633-7021.

Sincerely,

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

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JON S. CORZINE
Governor

Division of Watershed Management
Office of the Director
401 East State Street, P.O. Box 418
Trenton, NJ 08625-0418
Telephone: (609) 984-0058
Fax: (609) 633-0750

LISA P. JACKSON
Commissioner

October 3, 2008

Hans De Bruijn, Sales Engineer
Terre Hill Concrete Products
P.O. Box 10
Terre Hill, PA 17581

Dear Mr. De Bruijn:

This is regarding the interim certification issued by the New Jersey Department of Environmental Protection on March 19, 2007, copy enclosed, regarding the Terre Kleen stormwater treatment device. Due to a typographical error, the expiration date was incorrectly stated as March 31, 2008. The correct expiration date is March 31, 2009. All the conditions of the original certification remain in effect.

Please attach this letter to your copy of the interim certification. If you have any questions regarding the above, please contact Sandra Blick of my staff at (609) 633-1441.

Sincerely,

Barbara Hirst

for Lawrence J. Baier, Director
Division of Watershed Management

Enclosure

c: Rhea Weinberg Brekke, NJCAT
Tom Micai, NJDEP
Mary Beth Brenner, NJDEP

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Science, Research and Technology
Bureau of Sustainable Communities & Innovative Technologies
PO Box 409
Trenton, NJ 08625-0409
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JON S. CORZINE
Governor

LISA P. JACKSON
Commissioner

March 19, 2007

Hans De Bruijn
Sales Engineer
Terre Hill Concrete Products
P.O. Box 10
Terre Hill, PA 17581

RE: Terre Kleen™ Storm Water Treatment Device by Terre Hill Concrete Products.

Dear Mr. De Bruijn:

In accordance with the Energy and Environmental Technology Verification (EETV) Act at N.J.S.A. 13:1D-134, the New Jersey Department of Environmental Protection (NJDEP) is pleased to issue a **Conditional Interim Certification** for the Terre Kleen™ storm water treatment device by Terre Hill Concrete Products. This Conditional Interim Certification is being issued pursuant to this program's receipt and review of the New Jersey Corporation for Advanced Technology (NJCAT) verification report for the Terre Kleen™ storm water treatment device, dated December 2006.

According to the NJCAT's verification, the Terre Kleen™, Model TK18, at a flow rate of 288 gpm (0.64 ft^3/s), has been shown to have a 78% total suspended solids (TSS) removal efficiency, as measured as suspended solids concentration (SSC) (as per the NJDEP methodology for calculation of treatment efficiency) for a mixture of sand and Sil-Co-Sil 250 with an average d_{50} particle size of 86 microns, an average influent concentration of 228 mg/L and 50% initial sediment loading in laboratory studies using simulated storm water.

Based on the demonstrated and NJCAT verified laboratory performance, NJDEP has confidence that the Terre Kleen™ storm water treatment system has the capability of achieving, in field applications, a TSS removal efficiency of 50%. Therefore, **NJDEP certifies that the Terre Kleen™ Model TK18, is capable of achieving a 50% TSS removal rate while operating at a flow rate not to exceed 288 gpm (0.64 cfs).** In addition, the various models of the Terre Kleen™ storm water treatment system, as presented in **Table 1**, are also approved for use to achieve the same TSS removal efficiency of 50% from storm water runoff, while operating at or below the respective designed treatment flow rates.

Terre Kleen™ Models	Treatment Flow Rate
TK09	143 gpm (0.32 cfs)
TK18	288 gpm (0.64 cfs)
TK27	430 gpm (0.96 cfs)
TK36	575 gpm (1.28 cfs)

Table 1. Additional Terre Kleen™ Models

The enclosed Conditional Interim Certification Findings contains additional conditions to this Interim Certification of the Terre Kleen™ storm water treatment system such as maintenance requirements, designated use, and field-testing requirements. Therefore, this **Interim Certification letter must always be used in conjunction with the enclosed Conditional Interim Certification Findings document**.

Please note that this approval letter shall expire on March 31, 2008, unless extended by the NJDEP. For final certification of the Terre Kleen™ storm water treatment system, verified data must be generated from a full-scale field demonstration utilizing the TARP Tier II Protocol and additional NJDEP field testing requirements. If you have any questions about this Conditional Interim Certification, please contact Ravi Patraju of my staff at (609) 292-0125.

Sincerely,

Martin Rosen
Chief - Bureau of Sustainable Communities
and Innovative Technologies, DSRT

Enclosure

c: Mark Mauriello, Assistant Commissioner, Land Use Management
Larry Baier, Director, Division of Watershed Management
Tom Micai, Director, Land Use Regulation Program
Eileen Murphy, Director, Division of Science, Research, and Technology
Narinder Ahuja, Director, Division of Water Quality
Rhea Brekke, Executive Director, New Jersey Corporation for Advanced Technology

Conditional Interim Certification Findings

NJDEP Technology Certification Program:

Bureau of Sustainable Communities & Innovative Technologies
Division of Science, Research & Technology
401 E State Street, P.O. Box 409
Trenton, NJ 08625
(609) 292-9692

Manufactured Treatment Device:

Terre Kleen™ Storm Water Treatment Device by Terre Hill Concrete Products.

Applicant Information:

Hans De Bruijn
Sales Engineer
Terre Hill Concrete Products
P.O. Box 10
Terre Hill, PA 17581
(717) 445-3100

Technology Description:
A schematic diagram of the Terre Kleen™ as shown in Figure 1 is constructed with inclined cells stacked in the grit chamber to operate in parallel. The primary chamber collects coarse sediment, litter, and oil. Removal of the oil is further enhanced by the use of sorption socks that float in the primary chamber.

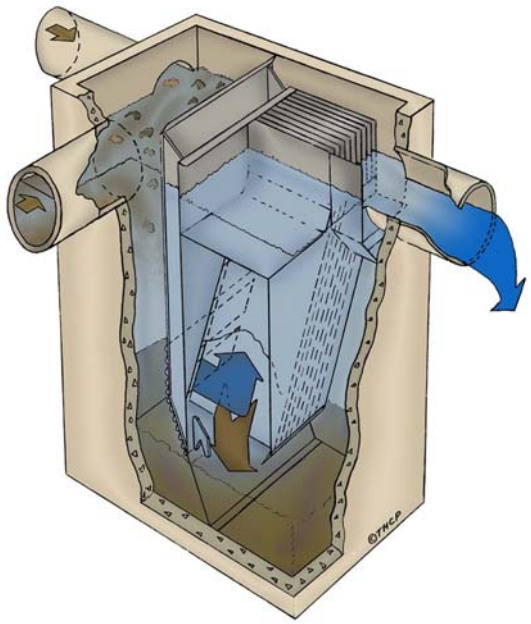

Figure 1. Schematic of the Terre Kleen™

Flow from the primary chamber enters the grit sedimentation chamber at the bottom of the inclined plates where the small particles settle out and accumulate into a separate storage hopper away from the flow path. The unit has inclined plate cells, and the grit chamber below the plates minimizes re-suspension of sediments through successive storms. Figure 2 shows the sectional views of the Terre Kleen™.

If the flow to the device exceeds the design flow, all of the water will be screened to remove gross pollutants. This will be achieved through a screen with ¾-inch openings between the primary and grit chamber. Between the screen and grit chamber is a 6-inch bypass channel over the full width of the device for excess flow to reach the outlet pipe. Bypass provisions are included to provide some treatment for the water entering the device without creating a bottleneck in the system.

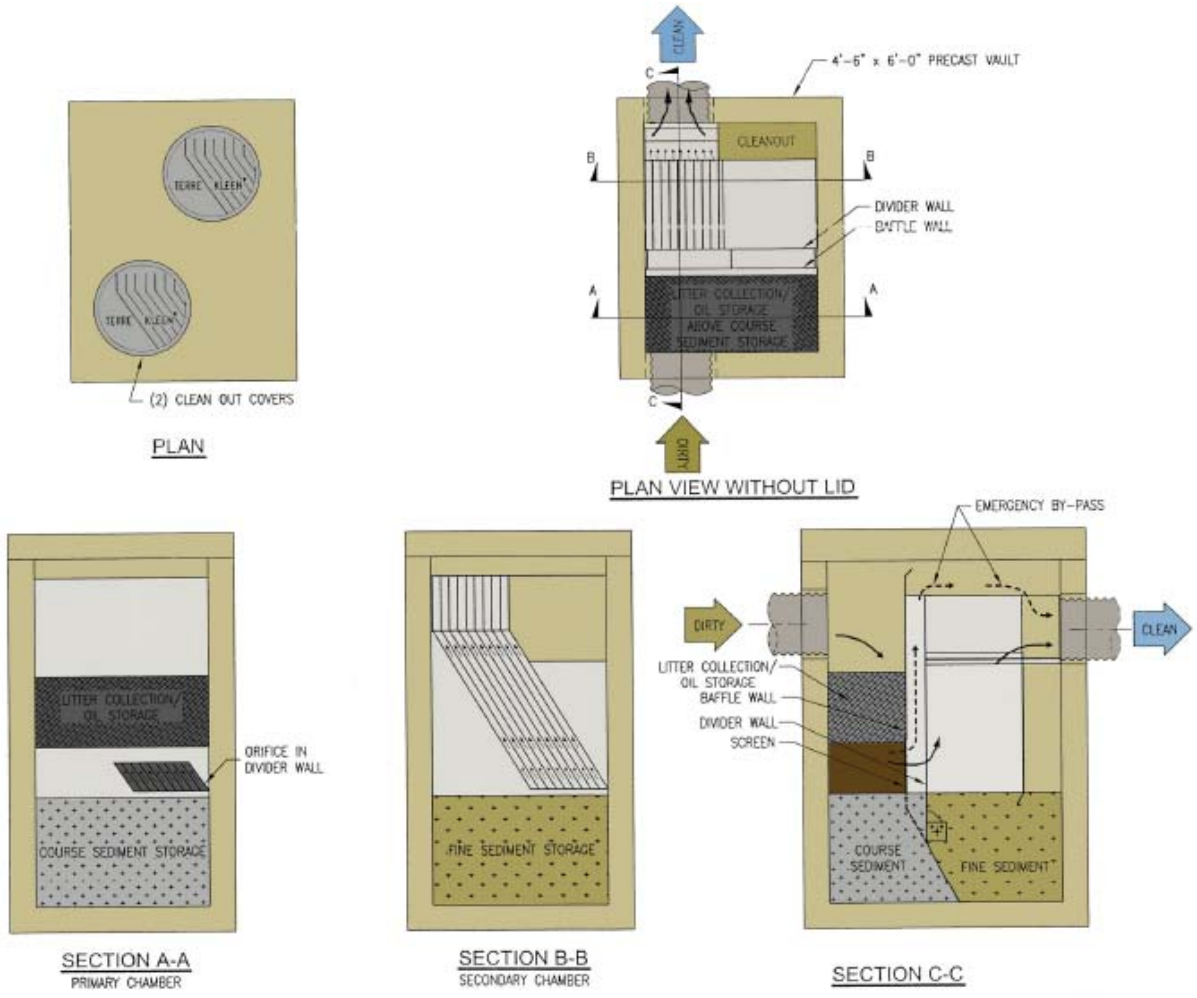

Figure 2. Plan and Section Views of the Terre Kleen™

NJCAT Verified Claim:

"The Terre Kleen™, Model TK18, at a flow rate of 288 gpm (0.64 ft^3/s), has been shown to have a 78% total suspended solids (TSS) removal efficiency, as measured as suspended solids concentration (SSC) (as per the NJDEP methodology for calculation of

treatment efficiency) for a mixture of sand and Sil-Co-Sil 250 with an average d_{50} particle size of 86 microns, an average influent concentration of 228 mg/L and 50% initial sediment loading in laboratory studies using simulated stormwater."

Technology Limitations/Concerns:

- Heavy loads of sediment will increase the needed maintenance frequency. Lack of maintenance may cause the system to operate at a reduced efficiency, and it is possible that eventually the system will become filled with sediment up to the lower edge of the inclined plates thus blocking flow.
- The Terre Kleen™ will not increase the net pollutant load to the downstream environment. However, pollutants may be transformed within the unit. For example, organic matter may decompose and release nitrogen in the form of nitrogen gas or nitrate.
- Although the Terre Kleen™ is a self-contained unit, the design does incorporate standing water in the lower chamber, which can be a breeding site for mosquitoes. The technology has not been tested to identify mosquito related effects.

Maintenance Recommendations

- As recommended in the BMP Manual, the device should be inspected and maintained in accordance with the manufacturer's instructions, and all components of the device that are expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation at least four times annually as well as after every storm exceeding 1 inch of rainfall.
- 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.

NJDEP Conditional Interim Certification:

Based on the demonstrated and NJCAT verified laboratory performance, NJDEP has confidence that the Terre Kleen™ storm water treatment system has the capability of achieving, in field applications, a TSS removal efficiency of 50%. Therefore, **NJDEP certifies that the Terre Kleen™ Model TK18, is capable of achieving a 50% TSS removal rate while operating at a flow rate not to exceed 288 gpm (0.64 cfs).** In addition, the various models of the Terre Kleen™ storm water treatment system, as presented in **Table 1**, are also approved for use to achieve the same TSS removal efficiency of 50% from stormwater runoff, while operating at or below the respective designed treatment flow rates.

Terre Kleen™ Models	Treatment Flow Rate
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Table 1. Additional Terre Kleen™ Models

The following conditions shall also apply to the Conditional Interim Certification:

1. If used as part of a treatment train, the Terre Kleen™ storm water treatment system can be located downstream of BMPs that have lower TSS removal ratings, but should never be the last device of the treatment train. Also, use of this device in series with other manufactured treatment devices can only be approved by the Land Use Regulation Program and/or the Division of Watershed Management.
2. The Terre Kleen™ storm water treatment system shall be designed in accordance with New Jersey's water quality design storm, as defined in the Stormwater Management Rules (N.J.A.C. 7:8).
3. A Quality Assurance Project Plan (QAPP) supporting the Technology Acceptance and Reciprocity Partnership (TARP) Tier II Protocol for Stormwater Best Management Practice Demonstration (July, 2003), and New Jersey Tier II Stormwater Test Requirements, shall be submitted to the NJDEP and NJCAT within six (6) months from the date of the Conditional Interim Certification letter.
4. Field evaluation data that are consistent with the TARP Tier II Protocol and New Jersey Tier II Stormwater Test Requirements, which are available from NJCAT or www.state.nj.us/dep/dsr/bscit/Documents.htm, shall be submitted to the NJDEP and NJCAT by September 30, 2008.