

# ***THE CLEAN SOLUTION™***

## **AN ALTERNATIVE SEPTIC SYSTEM**

### **AN AEROBIC ALTERNATIVE DESIGNED SPECIFICALLY FOR SMALL TO MID-SIZED SYSTEMS**

The CLEAN SOLUTION is protected by patents # 5,674,399 and 5,788,836

The CLEAN SOLUTION and BioCon are trademarks of Wastewater Alternatives, Inc.



**WASTEWATER ALTERNATIVES, INC.**  
**The Clean Solution**

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**<http://www.thecleansolution.com>**

March 03



# WASTEWATER ALTERNATIVES, INC.

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## THE CLEAN SOLUTION™

There is now an affordable, ecologically sound alternative system available to replace the leach field currently required with septic systems. Developed in Jaffrey, N.H. by WASTEWATER ALTERNATIVES INC. *THE CLEAN SOLUTION* accomplishes the biological functions of a leach field in a subterranean tank the size of a septic tank. The discharge is a treated, odorless liquid which is cleaner than typical treated municipal sewage. Since the effluent is almost as clear as rain water, it can be dispersed into the ground via a field that is 5-10% the size of a conventional leach field. There are currently over 120 *CLEAN SOLUTION SYSTEMS* operating in New Hampshire that range in size from single houses to large systems treating flows 50 times greater than that from a house. It is approved for use in New Hampshire by NHDES.

In the typical *CLEAN SOLUTION* application, the effluent from the septic tank flows into the *BioCon*™ - a tank containing plastic media that provide an extended surface contact area for the bacteria to collect and decontaminate the dissolved solids in the effluent. A continuously operating air pump provides oxygen to the bacteria by means of an efficient air lift. The output from the *BioCon* flows by gravity into settling and pump tanks where any remaining sludge is settled, and the clear liquid either flows by gravity or is pumped to the dispersal field.

The attached drawings and specifications provide details on a few *CLEAN SOLUTION* models. Custom system designs are also available for specific difficult applications.

### WHEN TO USE THE CLEAN SOLUTION

- **Expensive applications**

If the total septic system cost is going to exceed \$10,000, whether it's a 60 unit condominium or a house on a hillside lot next to a lake, *THE CLEAN SOLUTION* should be considered.

- **Difficult applications**

Designed specifically for use in applications where installation of a standard leach field would be difficult. Examples include homes on shorelines and lake fronts, high water tables, ledge, small lots, slopes or next to wetlands. The *CLEAN SOLUTION* is an affordable completely in-ground system that is ideal for failed systems or new installations.

### ADVANTAGES OF THE CLEAN SOLUTION

- **Environment friendly**

- ◇ *THE CLEAN SOLUTION*, a tank that is installed after the septic tank, provides the same aerobic treatment that a leach field is supposed to. This means only a small field is required to disperse the clean, odorless water into the ground.

- **User friendly**

- ◇ Garbage disposer and dish washer compatible
- ◇ Simple - the only moving part is the air pump
- ◇ Accommodates vacations, low flows and peak loads
- ◇ Landscape friendly - completely in ground
- ◇ Comprehensive 2 year warranty

- **Dispersal field - no leach field**

- ◇ Since pollution is removed prior to discharge, only a dispersal method is required to prevent surface discharges. A field as small as 3' wide x 25' long can meet the disposal needs of a single house in all soils with percolation rates of 1" in 40 minutes or better. This is less than 5-10% of the area of a conventional leach field.

- **Low maintenance**

- ◇ In most applications, simple maintenance is required only approximately every 2 1/2 years. Maintenance consists mainly of pumping the septic and settling tanks, rebuilding the air pump, and inspecting the system. This can all be accomplished in less than a day.

**THE CLEAN SOLUTION™**

**An Alternative Septic System 1**

## **THEORY of THE CLEAN SOLUTION**

Conventional small to mid- size sewage systems normally use a septic tank followed by a leach field to first provide anaerobic (without air) and then aerobic (with air) treatment of the effluent. Septic tanks work well for capturing and digesting the solids which are anaerobically fermented over a long period of time, dissolving the solids into the liquid waste. However, a septic tank is not designed to treat the contaminants which dissolve in the liquids. These are treated aerobically in the leach field. Municipal systems, which handle very large volumes of wastes, use much different equipment to accomplish the same biological functions: primary sedimentation tanks remove solids, and a subsequent aerobic system treats the contaminants dissolved in the liquids. Settled solids are removed from municipal primary and secondary facilities for further treatment.

All aerobic treatment systems, whether a conventional leach field, a municipal treatment plant, or *THE CLEAN SOLUTION*, depend on bacteria to purify the effluent from a solids settling system. In order for bacteria to reproduce, they require energy (food) and air. By using the contaminants in the effluent as food and atmospheric air, the bacteria metabolize the dissolved solids to carbon dioxide, water and sludge (colonies of bacteria). The aerobic bacteria also convert ammonia compounds to nitrates.

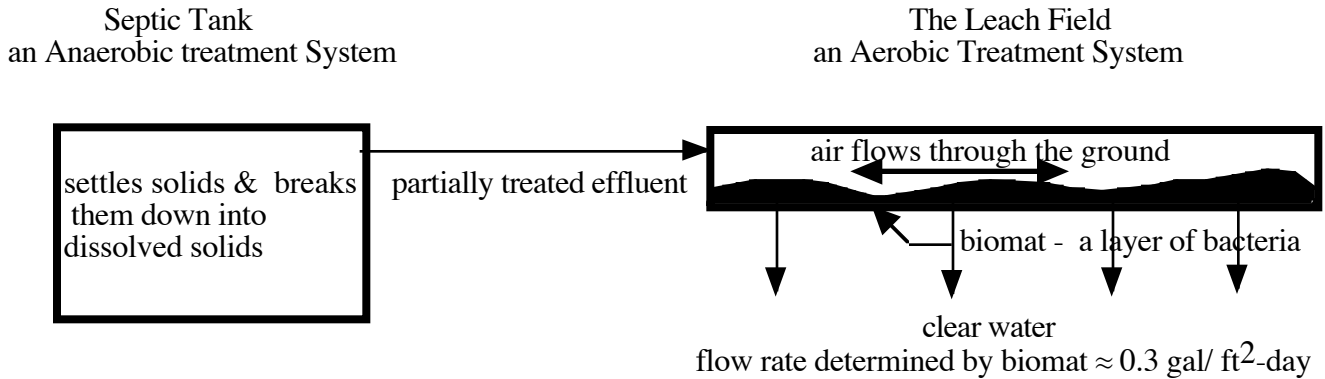
A large number of bacteria need to come in contact with the food sources in order to purify an effluent. Treatment systems utilize different methods to provide the large necessary population. A municipal system mechanically stirs up the bacteria in the secondary treatment process so that they will contact their food and not settle out of the effluent. In a leach field, the sludge (biomat) that forms at the ground interface is a large colony of bacteria through which the dissolved solid stream flows. In the *THE CLEAN SOLUTION* the bacteria collect in a thin film on the plastic media in **WAI'S** proprietary *BioCon*<sup>™</sup> biological contactor, and the effluent is recirculated over them several times.

*THE CLEAN SOLUTION* uses the same biological process as a municipal secondary treatment plant using the activated sludge process. Solids are settled out, air is added for respiration for bacteria in the *BioCon*. This allows the bacteria to convert the carbonaceous dissolved solids to carbon dioxide, water and sludge and the urea and ammonia to nitrates and sludge. The sludge created is settled for periodic removal from the system, and a clean, odorless effluent is discharged to the dispersal field.

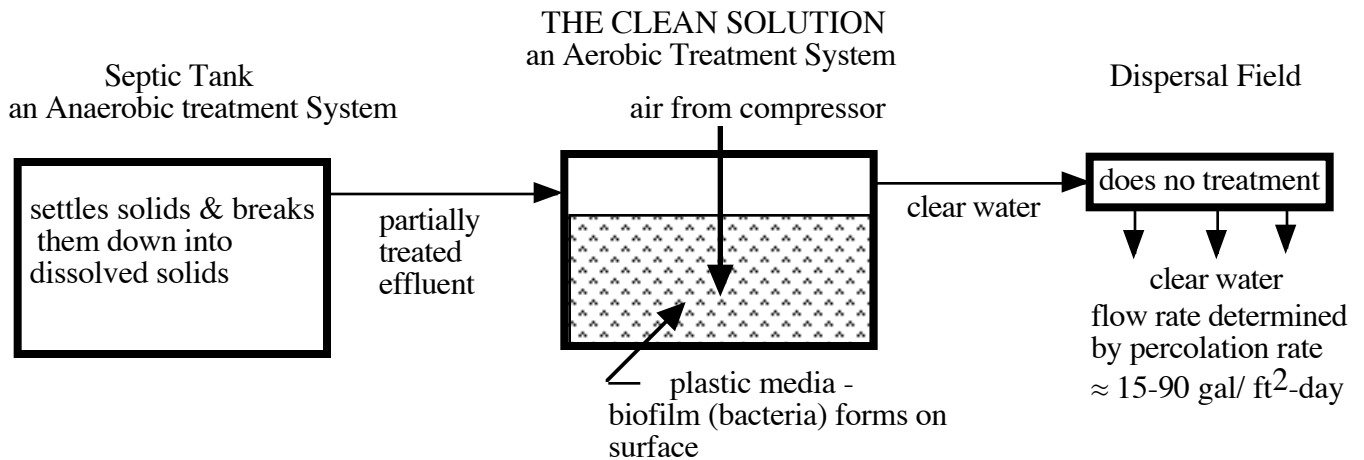
The major difference between a septic system and *THE CLEAN SOLUTION* is where the bacteria(sludge) collect. In a conventional system, the sludge forms in the bottom of the leach field and restricts the effluent flow enough so that the bacteria has time to act, This flow rate through the sludge determines the required field size. In *THE CLEAN SOLUTION*, the sludge is formed in the *BioCon*, and a clean effluent is discharged to the dispersal field. This field can be very small because there is no need for it to provide further treatment.

## SIMPLIFIED OPERATIONAL SCHEMATIC OF IN-GROUND AEROBIC TREATMENT SYSTEMS

### Conventional System



### THE CLEAN SOLUTION System



In all aerobic treatment systems, bacteria does the cleansing of the effluent by using the carbon sources as food and air for oxidization thereby producing carbon dioxide, water and more bacteria. You see groups of this new bacteria as biomat or sludge. THE CLEAN SOLUTION™ performs exactly the same functions as the leach field - except it accomplishes them mechanically in a tank. The square footage of plastic media in THE CLEAN SOLUTION pretty much equals the square footage of a leach field for the same flow. Since THE CLEAN SOLUTION discharges clear water, just like the bottom of a leach field, the only purpose of the dispersal field is to disperse it into the ground for final pathogen removal.

# CLEAN SOLUTION™ SYSTEM SPECIFICATIONS

Model	Max daily flow per NHDES(1) gal/day	Max o2 req'd(3) #/day	Compressor rating - free flow scfm	Compressor flow @ 3.5' head scfm	Max o2 transferred @5% eff(4) #/day	Power consumption watts	Volume of plastic media in BioCon cu ft	Approx area of media in BioCon sq ft	Minimum dispersal field size sq ft
<b>1,2, or 3 BEDROOM HOUSE</b>									
<b>250</b>	450	0.33	3.0	2.8	3.0	80	30	900	75
	uses a 1000 gal 2 compartment cement tank								
<b>250PT</b>	450	0.33	3.0	2.8	3.0	80	30	900	75
	uses a 1050 gal 2 compartment plastic tank								
<b>250ST3</b>	450	0.33	3.0	2.8	3.0	80	30	900	75
includes septic tank	<b>uses a uses a 3 compartment cement tank that includes a 1250 gal septic tank, a 350 gal BioCon and a 500 gal pump/settling tank</b>								
<b>4 BEDROOM HOUSE</b>									
<b>250</b>	600	0.50	3.0	2.8	3.0	80	30	900	100
	uses a 1000 gal 2 compartment cement tank								
<b>250PT</b>	600	0.50	3.0	2.8	3.0	80	30	900	100
	uses a 1050 gal 2 compartment plastic tank								
<b>250ST4</b>	600	0.50	3.0	2.8	3.0	80	30	900	100
includes septic tank	<b>uses a uses a 3 compartment cement tank that includes a 1600 gal septic tank, a 450 gal BioCon and a 500 gal pump/settling tank</b>								
<b>TYPICAL LARGE SYSTEM DESIGNS</b>									
<b>600</b>	1200	1.00	3.0	2.8	3.0	80	35	1050	200
	uses a 1000 gal 2 compartment cement tank plus a 500 gal pump tank [if required]								
<b>2000</b>	4000	3.30	3@3.0	8.4	9.6	240	150	4500	700

**NOTES:**

- [1] Models 250 & 250PT are identical for 3 & 4 bedroom homes except for the dispersal field size
- [2] Specifications for Models 500 and 2000 are only typical values. All models larger than Model 250 will be proposed on an individual basis - based on both flow and BOD. WAI has provided single systems capable of accommodating over 60 houses.
- (3) Assumes typical effluent from septic tank is 200ppm BOD.
- (4) Assumes that 5% of the O2 available in the air input is transferred into the water.



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## PRICES

Model	without sump pump	with sump pump (2)	comments
<b>250</b>	<b>\$4,600</b>	<b>\$5,600</b>	
<b>250PT</b>	<b>\$4,900</b>	<b>\$5,900</b>	<b>plastic tank</b>
<b>250ST3</b>	<b>\$5,700</b>	<b>\$6,700</b>	<b>integral septic tank</b>
<b>250ST4</b>	<b>\$5,900</b>	<b>\$6,900</b>	<b>integral septic tank</b>
<b>600 (1)</b>	<b>\$4,800</b>	<b>\$6,400</b>	<b>uses separate pump tank</b>
<b>2000 (1)</b>	<b>\$13,500</b>	<b>\$14,900</b>	<b>uses separate pump tank</b>

(1) These are typical prices for reference. Any system larger than a Model 250 is custom designed and priced.

(2) Prices include a standard sump pump - high head pumps for severe elevations are extra.

### Prices include:

1. A BioCon aeration tank with plastic media, settling tank, tanks set in holes provided by the installer, all internal plumbing, and an installed air supply system,
2. If a sump pump is specified, an installed sump pump with necessary floats and alarms is provided. This includes wiring up to 50' to 2 empty circuit breakers in the existing house service. All wiring will be done by a NH licensed electrician.

### Prices do not include:

The services of a designer or installer, a septic tank [unless integral to the system], excavation, dispersal field, connections from the septic tank to THE CLEAN SOLUTION and to the dispersal field, additional wiring, and drive on installations.

## MAINTENANCE

**The following maintenance is required every 2 1/2 years:**

- 1. Pump out both the settling and septic tanks**
- 2. Rebuild compressor**
- 3. Inspect and take corrective action, if necessary:**

<b>a] media</b>	<b>if plugged, backwash with air</b>
<b>b] sludge in BioCon</b>	<b>pump BioCon tank if excessive</b>
<b>c] diffuser</b>	<b>replace if pressure drop too great</b>

A maintenance agreement is available for performing items 2 and 3 from PUMP SYSTEMS INC. POB 6101, WEST FRANKLIN, NH 03235, TEL# 603-934-7100. You can obtain a sample agreement by contacting them directly. Their service will include a detailed inspection of your system, replacement of any failed items and either a new rebuilt compressor or an on site rebuild of yours [their option]. Tank pumping is not included in the price and must be arranged by you just prior to the scheduled maintenance appointment.

Based on the inspection findings at the first scheduled maintenance, the maintenance schedule may be modified by mutual consent and any changes will be reduced to writing. In the absence of a written modified maintenance schedule, the above schedule must continue to be performed by the buyer.

## COMPREHENSIVE WARRANTY

For a period of 2 years, WAI will warrant the system and repair any malfunction, including parts and labor, at no cost to you. Your responsibility during this period is to perform the required maintenance and to notify WAI of any failure.

## **INSTALLATION RESPONSIBILITIES**

The responsibilities for a *CLEAN SOLUTION* installation rest in a partnership between the owner, the installer, and Wastewater Alternatives.

### **The owner:**

1. Retains a licensed designer to prepare a plan
2. Obtains all necessary permits and approvals
3. Executes a sales agreement with **WAI** at least 3 weeks prior to installation
4. Provides an electrical service panel with at least 2 circuits available
5. Hires a licensed installer

### **The installer:**

1. Contacts **WAI** at least 3 weeks prior to installation to set date and discuss details
2. Provides the septic tank, if called for and not provided by the owner
3. Excavates for the septic tank and all *CLEAN SOLUTION* tanks
4. Constructs the dispersal field in accordance with the approved design
5. Installs the piping from the septic tank to *THE CLEAN SOLUTION*
6. Installs the piping from *THE CLEAN SOLUTION* to the dispersal field.
7. Seals all piping holes in all tanks
8. Digs a trench for the electrical conduit
9. Back fills
10. Covers up and cleans up the site
11. Obtains NHDES inspection

### **WAI:**

1. Sets all *CLEAN SOLUTION* tanks in holes excavated by the installer
2. Installs plastic media in the BioCon tank
3. Provides an installed air supply system
4. Installs sump pump if specified
5. Provides necessary alarms
6. Does all electrical wiring including that from the customer's service to the tanks
7. Does all internal piping
8. Starts up and checks out the system
9. Performs any necessary repairs and/or maintenance of *THE CLEAN SOLUTION*

Typically, installation of a *CLEAN SOLUTION* takes 2 days. The 1st day the holes are dug, and the tanks set and back filled to the inverts. The 2nd day we install all *THE CLEAN SOLUTION* components and complete the wiring.

## **FOR ADDITIONAL INFORMATION**

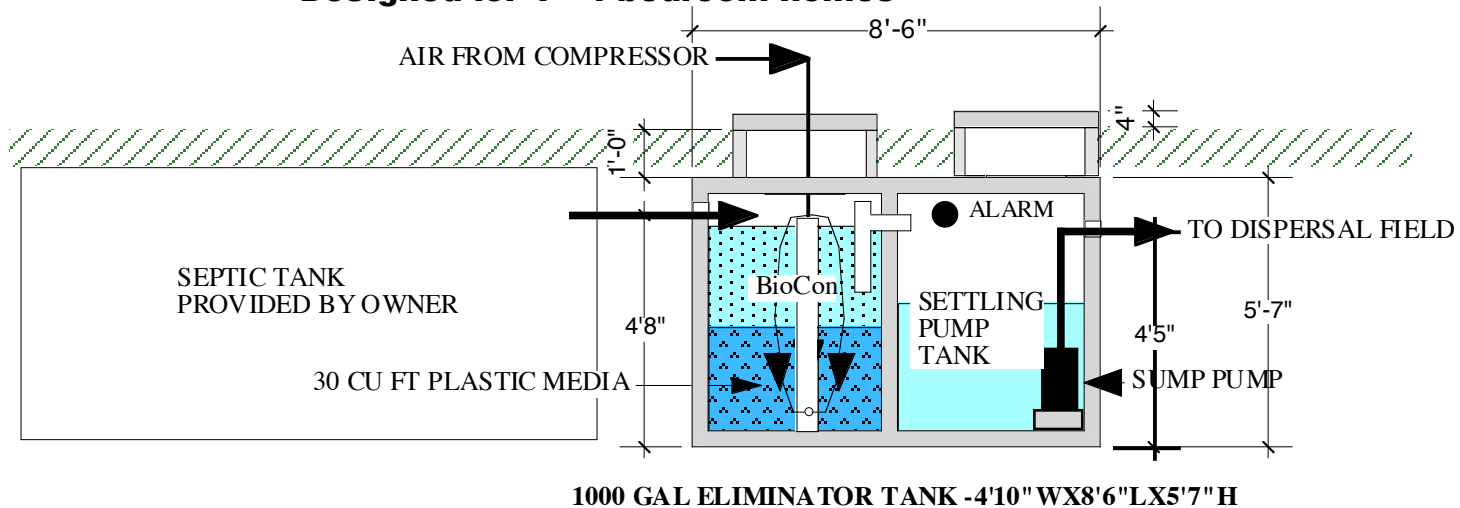
**HAROLD DAVIS, WASTEWATER ALTERNATIVES, INC.  
37 CHAMPNEY ST. GROTON, MA 01450**

Tel No: (978) 448-2415    Fax No: (978) 448-2911    E-mail: harolddavis@mac.com

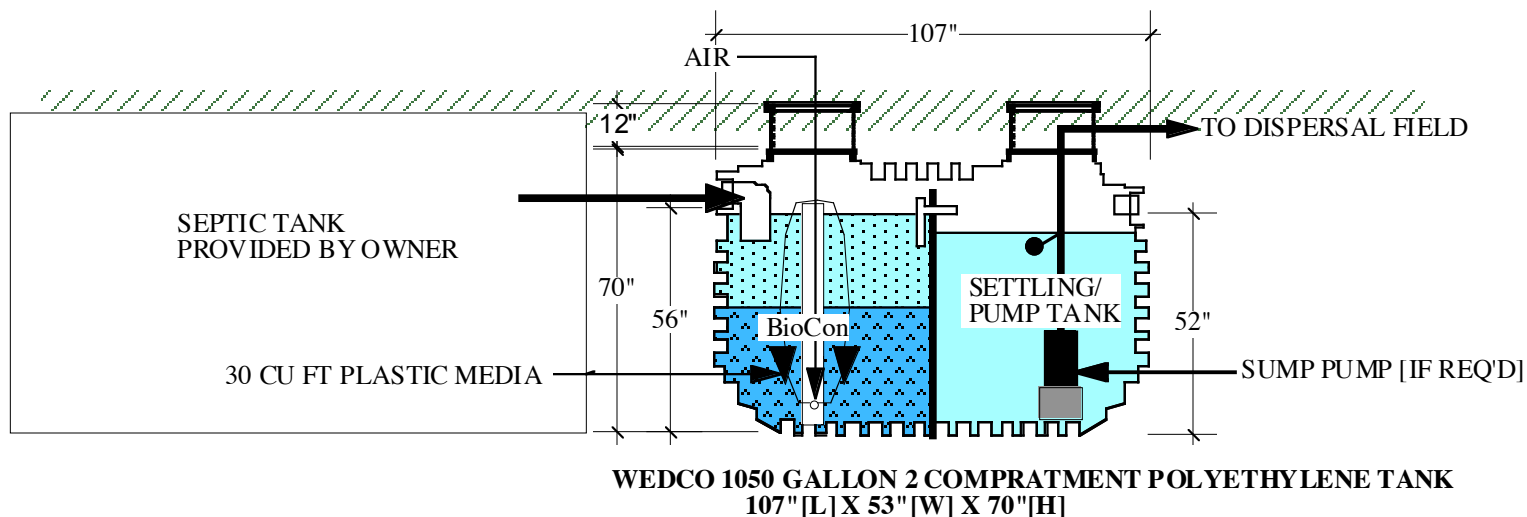
<http://www.thecleansolution.com>

## SINGLE HOME CLEAN SOLUTION™ SYSTEM - MODEL 250

Designed for 1 - 4 bedroom homes



## CLEAN SOLUTION™ SYSTEM - MODEL 250PT



**SINGLE HOME CLEAN SOLUTION™ SYSTEMS**

**Designed for 1 - 4 bedroom homes**

date 6/20/02

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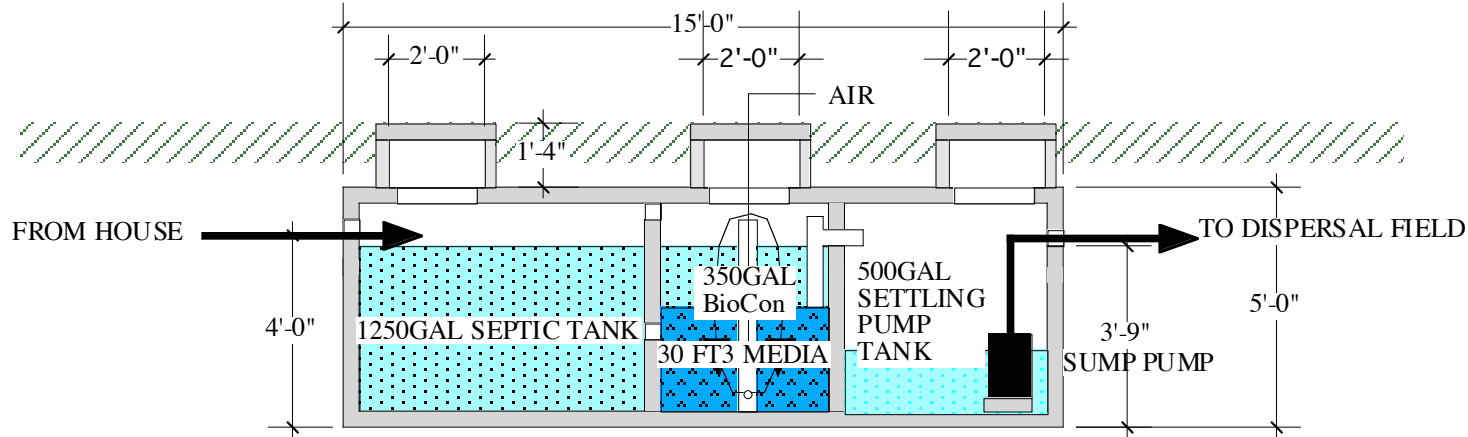


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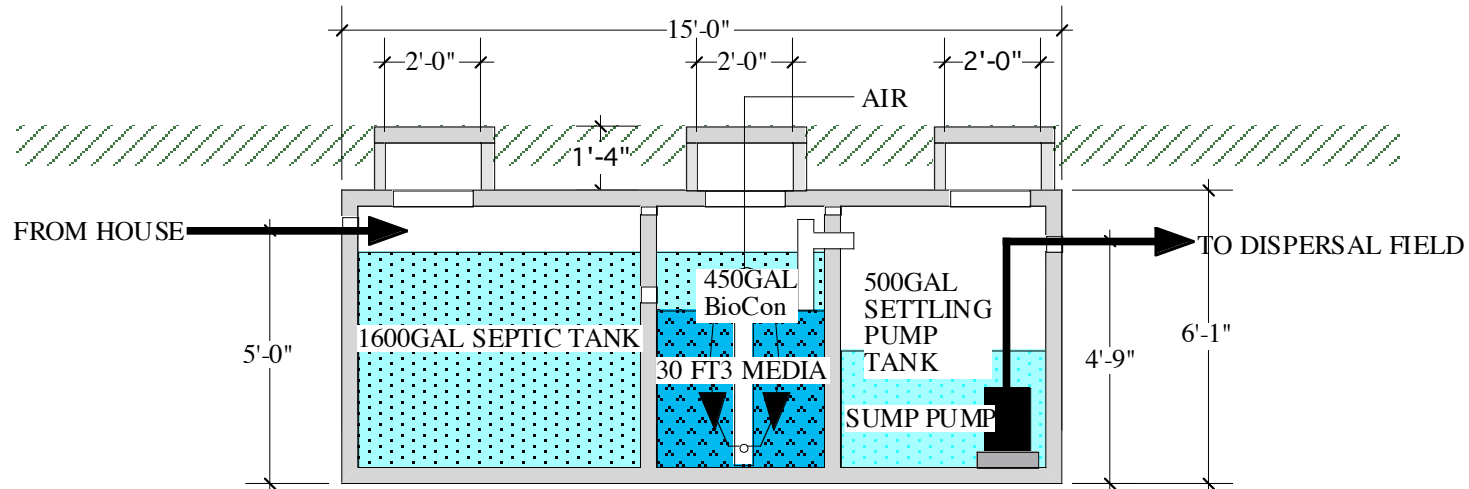
# SINGLE HOME CLEAN SOLUTION™ SYSTEMS WITH INTREGAL SEPTIC TANKS

## MODEL 250ST3 CLEAN SOLUTION™ SYSTEM - Designed for 1-3 bedrooms



USES FOSS 3 COMPARTMENT TANK - 15'LX6'6" WX5'H

## MODEL 250ST4 CLEAN SOLUTION™ SYSTEM - Designed for 4 bedrooms



USES PHOENIX 3 COMPARTMENT 2600GAL TANK - 15'LX6'6" WX6'1"H

**SINGLE HOME CLEAN SOLUTION™ SYSTEMS  
WITH INTREGAL SEPTIC TANKS**

date 6/20/02

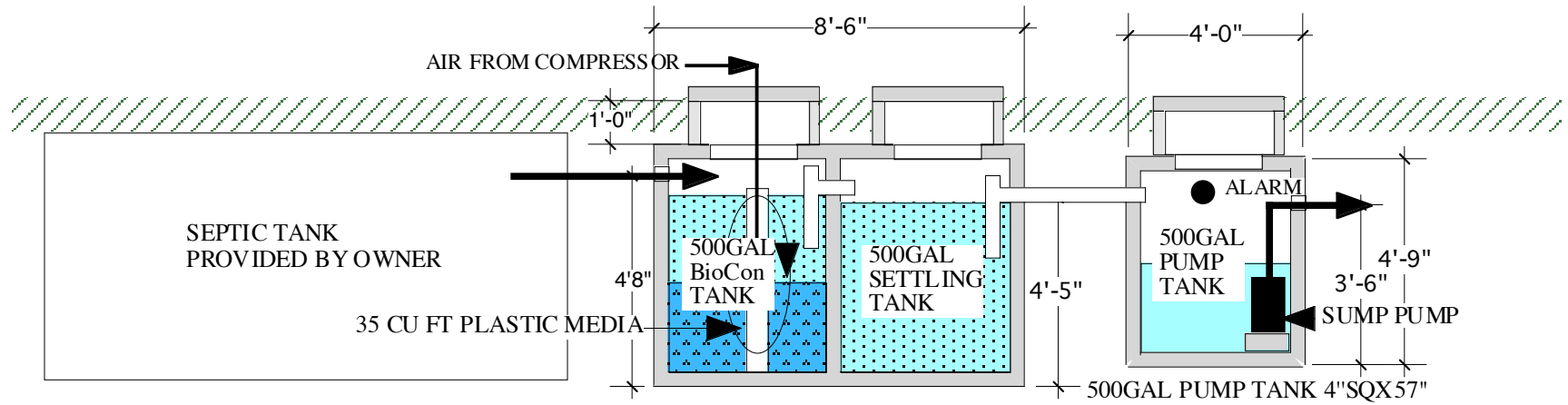
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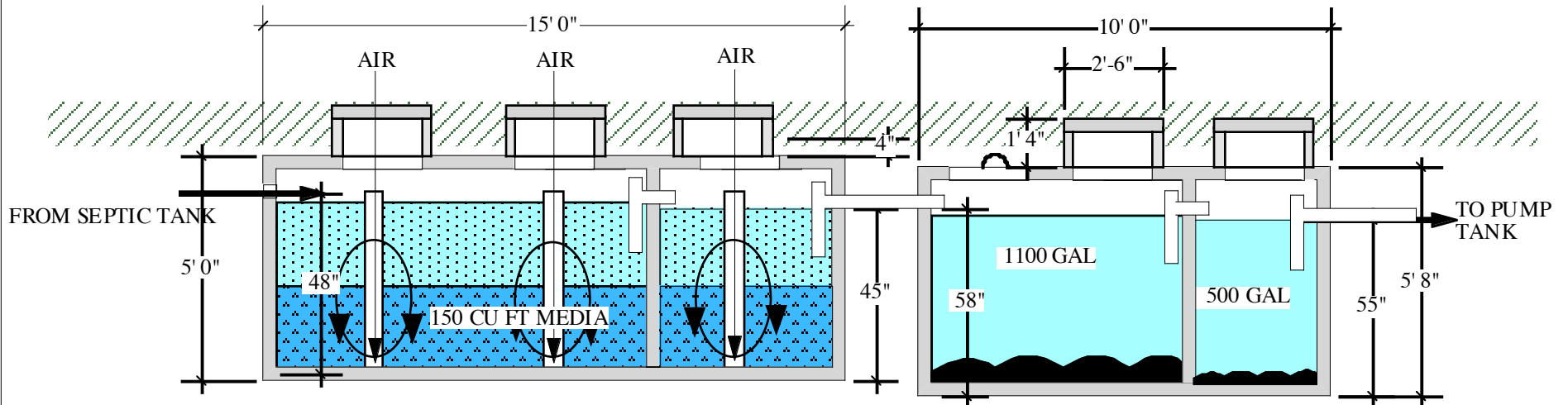
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### 6 BEDROOM SINGLE HOME SYSTEM – MODEL 600



1000 GAL ELIMINATOR TANK -4'10" WX8'6" LX5'7" H

### MODEL 2000 DESIGNED FOR 4000GPD NHDES FLOWS



2500 GAL 2 COMPARTMENT TANK -7'WX14'3" LX5'6" H

BioCon TANK

1600 GAL 2 COMPARTMENT TANK -6'4" WX10'0" LX5'8" H

SETTLING TANK

#### LARGER CLEAN SOLUTION™ SYSTEMS

Note: These are only typical designs. Any application larger than a 4 bedroom house is custom designed.

date 6/20/02

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## CLEAN SOLUTION INSTALLATIONS - FEB 03

TYPE	LOCATION	DAILY CAP
capacity is per NHDES standards		GPD
HOME	RINDGE	450
HOME	JAFFREY	450
RESTAURANT	WINCHESTER	2000
COMMERCIAL BLDG	ELKINS	600
LAKESIDE HOME	GRAFTON	450
APARTMENT HOUSE	RINDGE	1600
LAKESIDE HOME	SWANZEY	600
LAKESIDE COMPLEX	ELKINS	1250
LAKESIDE HOME	HARRISVILLE	600
TRUCK STOP	BOW	4000
RENTAL CABINS	KEENE	1600
OCEANSIDE HOME	DURHAM	600
HOME	DUBLIN	1000
LAKESIDE COMPLEX	SWANZEY	1000
NEW HOME	DURHAM	600
LAKESIDE HOME	SWANZEY	750
OCEANSIDE HOME	GREENLAND	600
LAKESIDE HOME	LAKE SUNAPEE	600
OCEANSIDE HOME	GREENLAND	600
HOME	NORTH HAMPTON	600
COMMERCIAL BLDG	GREENLAND	3000
CAMP	SWANZEY	12000
LAKESIDE COMPLEX	MUNSONVILLE	1500
APARTMENTS	NEWMARKET	6000
REHABILITATION CENTER	KEENE	6000
RESTAURANT	NORTH HAMPTON	2000
LAKESIDE HOME	RINDGE	450
HOME	RINDGE	450
LAKESIDE HOME	LAKE SUNAPEE	450
LAKESIDE HOME	SPOFFORD LAKE	450
LAKESIDE HOME	BLAISDELL LAKE	600
LAKESIDE HOME	NEWFOUND LAKE	450
TRAILER PARK	ALTON	7600
CAMPGROUND	BARRINGTON	5000
CAMP	ALTON	4000
COMMERCIAL BLDG	NEW IPSWICH	1200
HOME	RYE	450
OCEAN HOME	RYE	600
LAKESIDE HOME	BRADFORD	450
HOME	DURHAM	450
HOME	MEREDITH	450
LAKESIDE HOME	SWANZEY	1000
ISLAND HOME	SQUAM LAKE	1000
ISLAND HOME	BEAR ISLAND	450

TYPE	LOCATION	DAILY CAP
capacity is per NHDES standards		GPD
HOME	DURHAM	450
LAKESIDE HOME	LAKE SUNAPEE	450
LAKESIDE HOME	ALSTEAD	450
HOME	RYE	450
LAKESIDE HOME	NORTHFIELD	450
CAMPGROUND	CLARKSVILLE	4000
LAKESIDE HOME	LAKE SUNAPEE	600
LAKESIDE HOME	LAKE WINNIPESAUKEE	450
LAKESIDE HOME	LAKE WINNIPESAUKEE	600
HOME	WOODSTOCK, VT	450
HOME	SUTTON MILLS	450
LAKESIDE HOME	BRADFORD	450
CABIN COMPLEX	LAKE SPOFFORD	4300
LAKESIDE HOME	BRADFORD	600
LAKESIDE HOME	LAKE WINNIPESAUKEE	450
HOME	DURHAM	450
HOME	LAKE WINNIPESAUKEE	450
BROOKSIDE HOME	HARRISVILLE	450
HOME	LAKE SPOFFORD	450
HOME	LAKE SUNAPEE	450
ISLAND HOME	LAKE WINNIPESAUKEE	450
SCHOOL	DUBLIN	12000
HOME	KEENE	600
DOUGHNUT SHOP	MEREDITH	6000
LAKESIDE HOME	GRANITE LAKE	600
APARTMENTS	NEW IPSWICH	2000
LAKESIDE HOME	LAKE WINNIPESAUKEE	450
LAKESIDE HOME	STODDARD	450
ISLAND HOME	LAKE WINNIPESAUKEE	450
LAKESIDE HOME	NOTTINGHAM	450
CAMPGROUND	BARRINGTON	6200
HOME	FAIRLEE, VERMONT	450
HOME	GONIC	450
LAKESIDE HOME	LAKE WINNIPESAUKEE	450
LAKESIDE HOME	LAKE WINNIPESAUKEE	600
LAKESIDE HOME	LAKE WINNISQUAM	450
HOME	STRATHAM	450
MOTEL	MOULTONBOROUGH	7200
LAKESIDE HOME	LAKE WINNIPESAUKEE	450
LAKESIDE HOME	PELHAM	450
NEW HOME	STRATHAM	600
NEW HOME	STRATHAM	600
HOUSING COMPLEX	DURHAM	25000
HOUSE	ALSTEAD	600

## CLEAN SOLUTION INSTALLATIONS - FEB 03

TYPE capacity is per NHDES standards	LOCATION	DAILY CAP GPD
LAKESIDE HOME	LAKE SPOFFORD	600
LAKESIDE HOME	ACKWORTH	450
COMMERCIAL SITE	NEWMARKET	2000
ISLAND HOME	WINNIPESAUKEE	450
LAKESIDE HOME	ENFIELD	450
COMMERCIAL SITE	NOTTINGHAM	2000
HOUSE	TAMWORTH	450
COMMERCIAL SITE	GREENLAND	600
LAKESIDE HOME	LAKE SPOFFORD	600
HOME	GREENLAND	450
HOME	DURHAM	750
LAKESIDE HOME	WINNISQUAM	600
NEW HOME	STRATHAM	600
NEW HOME	STRATHAM	600
NEW HOME	STRATHAM	600
LAKESIDE HOME	SILVER LAKE	450
NEW HOME	NEWBURY	600
LAKESIDE HOME	PELHAM	450
LAKESIDE HOME	SUNAPEE	450
LAKESIDE HOME	SWANZEY LAKE	450
LAKESIDE HOME	ALSTEAD	450
LAKESIDE HOME	WAKEFIELD	450
LAKESIDE HOME	NEWFOUND LAKE	450
NEW HOME	STRATHAM	600
NEW HOME	STRATHAM	600
HOME	NEW LONDON	1000
SEASIDE HOME	RYE	600
ISLAND HOME COMPLEX	WINNIPESAUKEE	750