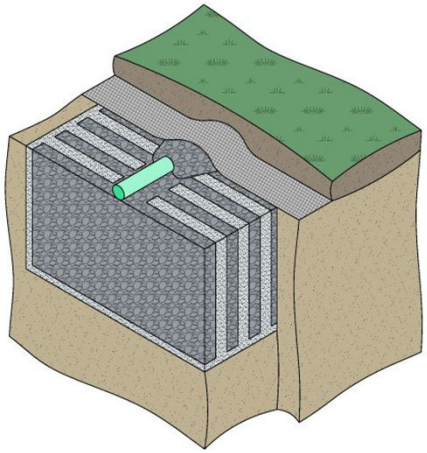

GST™ Design Review

This presentation should help the designer become familiar with requirements specific to GST™ Leaching Systems.

Presented by;

F. Bruce Fillmore, Septic Assistant LLC

DES approved system

NH-DES approved the GST system for use in May 2020.

The system became available in NH on July 1st 2021.

The design manual has subsequently been updated in January 2024.

To date over 400 plans have been approved, with over 350 installed and currently operational.

Current system usage in NH ranging from 2-bedroom residential designs to a 29 unit single family detached condominium using a common effluent disposal area.

There are over 60 active certified NH installers.

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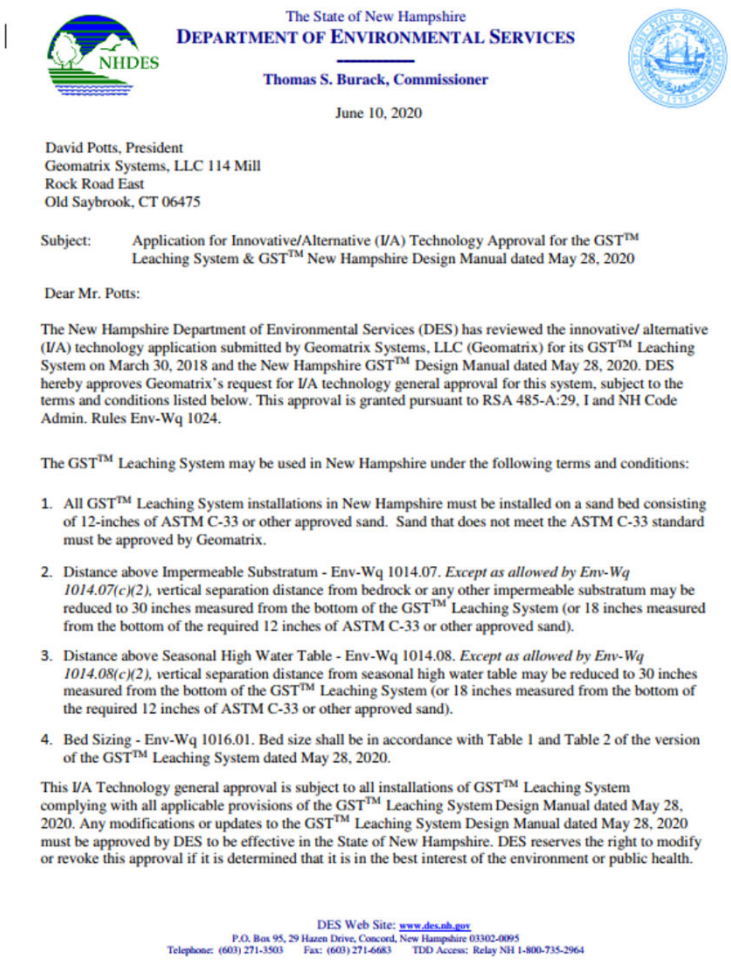

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES
Thomas S. Burack, Commissioner

June 10, 2020

David Potts, President
Geomatrix Systems, LLC 114 Mill
Rock Road East
Old Saybrook, CT 06475

Subject: Application for Innovative/Alternative (I/A) Technology Approval for the GST™ Leaching System & GST™ New Hampshire Design Manual dated May 28, 2020

Dear Mr. Potts:

The New Hampshire Department of Environmental Services (DES) has reviewed the innovative/ alternative (I/A) technology application submitted by Geomatrix Systems, LLC (Geomatrix) for its GST™ Leaching System on March 30, 2018 and the New Hampshire GST™ Design Manual dated May 28, 2020. DES hereby approves Geomatrix's request for I/A technology general approval for this system, subject to the terms and conditions listed below. This approval is granted pursuant to RSA 485-A:29, I and NH Code Admin. Rules Env-Wq 1024.

The GST™ Leaching System may be used in New Hampshire under the following terms and conditions:

1. All GST™ Leaching System installations in New Hampshire must be installed on a sand bed consisting of 12-inches of ASTM C-33 or other approved sand. Sand that does not meet the ASTM C-33 standard must be approved by Geomatrix.
2. Distance above Impermeable Substratum - Env-Wq 1014.07. *Except as allowed by Env-Wq 1014.07(c)(2),* vertical separation distance from bedrock or any other impermeable substratum may be reduced to 30 inches measured from the bottom of the GST™ Leaching System (or 18 inches measured from the bottom of the required 12 inches of ASTM C-33 or other approved sand).
3. Distance above Seasonal High Water Table - Env-Wq 1014.08. *Except as allowed by Env-Wq 1014.08(c)(2),* vertical separation distance from seasonal high water table may be reduced to 30 inches measured from the bottom of the GST™ Leaching System (or 18 inches measured from the bottom of the required 12 inches of ASTM C-33 or other approved sand).
4. Bed Sizing - Env-Wq 1016.01. Bed size shall be in accordance with Table 1 and Table 2 of the version of the GST™ Leaching System dated May 28, 2020.

This I/A Technology general approval is subject to all installations of GST™ Leaching System complying with all applicable provisions of the GST™ Leaching System Design Manual dated May 28, 2020. Any modifications or updates to the GST™ Leaching System Design Manual dated May 28, 2020 must be approved by DES to be effective in the State of New Hampshire. DES reserves the right to modify or revoke this approval if it is determined that it is in the best interest of the environment or public health.

DES Web Site: www.des.nh.gov
P.O. Box 95, 29 Hazen Drive, Concord, New Hampshire 03302-0095
Telephone: (603) 271-3503 Fax: (603) 271-6683 TDD Access: Relay NH 1-800-735-2964

Current Installed Uses

- Gas station, under parking lot.
- Starbucks Coffee Shop.
- Restaurants.
- Residential, Multi & Single Family.
- Warehouses (including NH liquor distribution warehouse).
- Convenience Stores.
- Mixed use applications.
- Placed under driveways/parking lots.
- Manufacturing facilities.
- Condominium Developments
- Pressure Distribution Systems.
- Gravity fed systems
- Pump to Gravity Systems.

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For illustration purposes only, this is not a complete installation.

Sighting Requirements

- Minimum width 5’6”
- Distance to ESHWT 30” new construction
- Distance to Impermeable 30” new const.
- Max. Length 50’/row or 100’ butterfly.
- Typical footprint reduction **50%** for GST6206 and up to **89%** for GST6236 forms
- ELA (effective leaching area) reduction **0%**, same ELA as conventional Stone & Pipe Leaching Area.

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NEW HAMPSHIRE

GST™ Leaching Systems

Design Manual for
Pressure and Gravity Applications

Distributed by:

Septic Assistant LLC

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Weare, NH 03281
(603) 660-1603
bruce@septicassistant.net

on the web:
GST603.com

Form Rentals, Training & Technical Assistance

January 2024

GEOMATRIX

Intro to the GST System

- Sand needs to be ASTM c-33 with 3% max. fines (#200 sieve)
- Stone is ½" – ¾" washed, either crushed or natural.
- Approved for Pressure Distribution, Gravity, Time Dosed or Pump to Gravity.
- Multiple configurations from 6" to 36" tall, allowing for multiple configuration options to best git the site.
- Standard construction methods with an additional 6" of suitable loadbearing aggregate fill cover creates an H-20 rated system,
- No Venting required or recommended unless over 18" of cover or under impervious surfaces, even pumped systems.

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Introduction

The GST™ Leaching System (GST), is an adaptation of the time proven stone leaching system. This traditional leaching system has been improved with the use of a removable form to accurately shape and construct leaching fingers along the sides of a central distribution channel. The fingers are typically constructed with ½" – ¾" washed stone and are surrounded with ASTM C-33 sand. These fingers serve to increase the sidewall surface area by more than six times that of a traditional stone leaching trench. Additionally, the narrow profile of the leaching fingers and central distribution channel, combined with the uniform profile of the sand treatment media, serve to enhance oxygen transfer efficiencies. Enhanced oxygen transfer results in better treatment of the wastewater pollutants and a leach field with a longer lifespan. GST can be configured with standard gravity, pressure and/or time dosed distribution

The GST is available 6", 12", 18", 24", 30", and 36" tall, 37" or 62" wide.

Geomatrix products are the result of intensive research and development, including in-house and third-party testing. Test reports are available by contacting Geomatrix.

While some codes do not require the use of pressure distribution(PD), treatment units, flow equalization or SoilAir, Geomatrix, highly recommends the use of these features to enhance treatment and system lifespan, especially where high flows and challenging waste streams are present.

First Design Steps

- Sizing is based on NH-DES Table 1016-1 for residential and commercial applications.
- Lineal Ft of GST required is then calculated using Table 2 of the approved design manual.
- Simply divide the NH-Based required area by the “Total Surface Area” of the product selected.
- To complete the EDA sizing simply divide the lineal feet required by the number of ROWS using the row spacing also listed in Table 2.
- This chart also includes the storage volume per lineal foot of the product used, it is not recommended to pump dose more than 50% of that storage volume.

Table 2

GST Surface Area / Linear Foot

Product Name	Dimensions (W x H)	Total Surface Area (SF/LF)	Edge to Edge Spacing (inches)	Storage Volume Gallons per LF
GST 6206	62" x 6"	10.3	12	4.52
GST 6212	62" x 12"	17.5	12	9.23
GST 6218	62" x 18"	24.8	12	13.84
GST 6224	62" x 24"	32.1	12	18.45
GST 6230	62" x 30"	39.3	24	23.06
GST 6236	62" x 36"	46.6	24	27.68
GST is also available in 37” width if considering this size please consult Geomatrix for more information				
GST 3706	37" x 6"	6.2	12	3.05
GST 3712	37" x 12"	10.3	12	6.11
GST 3718	37" x 18"	14.4	12	9.16
GST 3724	37" x 24"	18.5	12	22.22
GST 3730	37" x 30"	22.7	24	15.27
GST 3736	37" x 36"	26.8	24	18.32

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Additional Design Steps

- Calculate material usage requirements this helps Installer estimate material requirements for the installation.
- Table 3 in the design manual list how many yards of Stone & Sand is required per lineal foot of GST used.
- We highly recommend that the designer include these quantities on the plan for the installer.
- The stone calculation is very accurate as all stone is encased in the forms.
- The sand calculation includes the 12" under the forms, and 2" around the perimeter. This is highly dependent on the quality and accuracy of the excavation.

Table 3

Sand and Stone Volume Guide

62" series

Product Name	Amount of ¾" Stone Required	Amount of ASTM C-33 Sand Required
	Yards per Linear Foot	
GST 6206	0.20	0.25
GST 6212	0.27	0.35
GST 6218	0.35	0.46
GST 6224	0.43	0.56
GST 6230	0.50	0.66
GST 6236	0.58	0.76

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Final Design Steps

- The distribution line can be 2” – 4” perforated SDR 35 or Schedule 40PVC pipe.
- Each ROW of GST shall have an inspection port installed at the end of the ROW. The material including the identifying CAP is supplied to the installer at time of form delivery.
- The inspection port kit also includes a section of rebar to be installed alongside the port for ease of locating.
- There is also a weatherproof sticker for the installer to place in the meter socket, so a system evaluator can easily identify if there is a GST system on site.
- The inspection port is **NOT TO BE** tied into the distribution lines in any manner, just cap off the distribution line at the inspection port.

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Design Considerations

- Consideration needs to be made for form removal from the EDA during construction of the EDA.
- The excavator size (reach) and weight need to be taken into account. The system shown here is a three ROW system of 12” tall forms. From the chart on the next slide requires nearly 8,000lbs of breakout force at a minimum reach of 14’ to reach the 3rd ROW from one side.
- An alternative is to construct the system from within and work your way out, as this one was. This system took the installer approximately 4 hours to construct, it’s an 1800GPD system for an apartment building.
- Bing a multiple row system this required a d-box. Single row systems do not require a d-box. Single row butterfly systems can be constructed using a Tee in the center instead of a d-box.

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TABLE 10.1 – GST WEIGHT

GST Model	Form Dimensions		Form Weight (lbs.)		Weight of Material in Form (lbs.)		Calculated Weight of Material Around System	Total Calculated Weight (lbs.)		Total Calculated Weight (lbs.) with Safety Factor	
	Width	Height	Form Length (in)		Form Length (in)			Form Length (in)		Form Length (in)	
	(in)	(in)	24	48	24	48	Total	24	48	24	48
3706	37	6	115	230	395	789	523	1018	1620	1528	2430
3712	37	12	157	314	789	1579	1301	2042	3272	3063	4908
3718	37	18	205	410	1184	2368	2336	3199	5192	4799	7788
3724	37	24	255	510	1579	3157	3627	4486	7372	6730	11058
3730	37	30	300	600	1973	3947	5173	5897	9798	8845	14697
3736	37	36	340	680	2368	4736	6976	7430	12470	11145	18705
6206	62	6	175	350	661	1323	789	1646	2587	2469	3881
6212	62	12	255	510	1323	2645	1835	3240	5115	4861	7673
6218	62	18	342	684	1984	3968	3136	4970	7913	7455	11870
6224	62	24	422	844	2645	5291	4693	6821	10953	10231	16430
6230	62	30	507	1014	3307	6613	6507	8804	14259	13207	21389
6236	62	36	590	1180	3968	7936	8576	10914	17817	16371	26726

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Commercial Uses

- Here is a large pressure distribution system (photo shows ½ the system).
- Where you expect high strength wastewater, we require that the plan be review by us prior to submittal to NH-DES for review. Please consider any waste other than residential waste to be high strength wastewater.
- We may recommend any of the following;
  - Timed Dosing.
  - Pressure Distribution.
  - Inclusion of Soil Air units.
  - Larger EDA or Tanks.

- See the last sentence of Page 2 in the design manual.

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Wrap Up

- We have alternative construction methods in the event the installer only has small equipment. See photo.
- This is also the construction method we use in the winter during freezing conditions.
- This systems fit in very tight spaces, requiring less material than most alternatives.
- Using the taller forms GST is the most compact system available in NH.
- It is also possible to construct with a skid steer and small excavator for remote sites, where dump trucks can't get close.

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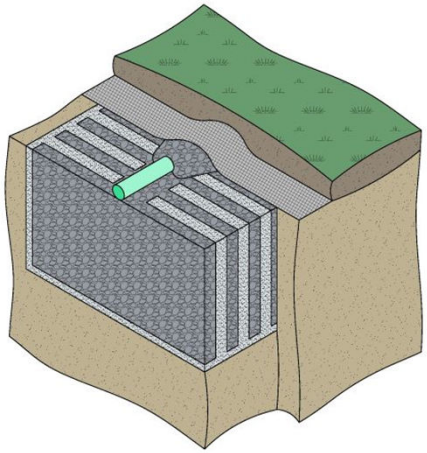

GST™ Design Review Completion

We hope you enjoyed this review, sould you have any further question, please feel free to contact me at:

Call/Text **603-660-1603**

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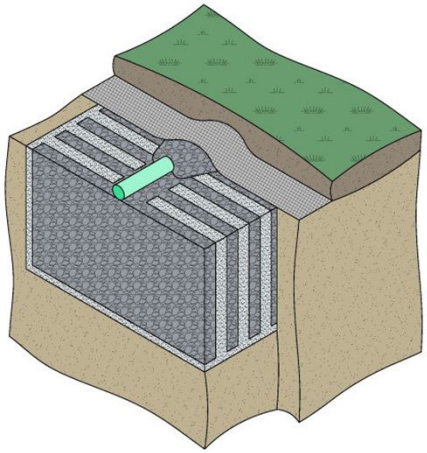
Presented by;

F. Bruce Fillmore, Septic Assistant LLC



gst603.com

Here is our website that also has the Design Manual to download.

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