SAU-70/NORWICH SCHOOL DISTRICT
REQUEST FOR PROPOSALS FOR
RFP 01-2023 Septic Pre-Treatment System
At Marion Cross School
October 20, 2022

PURPOSE:

The Norwich School District - Marion Cross School ("School District") is seeking proposals from qualified, interested parties to provide detailed costs for the replacement and installation of a pre-treatment system for the on-site septic plant.

Proposal Instructions:

- Vendors may schedule a walk-through of the property with the Maintenance Department prior to proposal submission.
- Vendors must complete and submit their proposal on or before **Tuesday, November 1st by 10:00 am**.

Award Process:

All responses shall be reviewed by the Septic Project Committee. The Committee shall evaluate the proposals and shall be at minimum composed of a School Board Member, Facilities Director and Business Administrator and/or Principal.

Interested Contractors shall provide a detailed cost proposal of the project. All proposals shall be reviewed by the committee based on total cost, completeness of the proposal and plan submitted. The committee will share proposal information with the Norwich School District School Board. Contractors may be invited to attend a Board meeting to present and answer questions. A pretreatment system will be chosen by January. Depending on project costs and financing, the proposal may need to be placed on the official school district warrant for voting in March of 2023. The selected proposal will not be solely based on the lowest total price.

Norwich School District reserves the right to accept or reject all or any portion of any or all proposals submitted, to waive informalities, irregularities or technicalities on any proposal, to examine all aspects of the proposal, tangible and intangible, and to make the award which appears to be in the best interest of Norwich School District.

The schedule of events shall occur as such:
• Walk through of the property can be scheduled with the Maintenance Department
• RFP response due Tuesday, November 1st by 10:00 am and may be emailed
• Notice to Proceed/Contract - TBD – may be dependent upon successful public vote
• Tentative Project schedule – Permitting Start Date: TBD – no later than March 13, 2023,
• Proposed Construction Start Date: July 3, 2023 with completion by August 25, 2024

Proposal Inquiries: All inquiries concerning this request shall be made in writing via email to: Jamie Teague, Business Administrator, e-mail jteague@sau70.org – telephone at (603) 643-6050, ext. 2008. Project information, including addendums, shall be posted to the SAU70 website: www.sau70.org.

PROJECT CRITERIA:

The following information is provided with the best information available. Any omissions or deficiencies should be brought to the attention of the Business Administrator. Clarifications and/or amendments shall be posted to the website.

Location: 22 Church Street, Norwich, VT 05055

The Marion Cross School (referred to as MCS) is a Vermont public school which includes Pre-Kindergarten through Sixth Grade. The main building was erected in 1898, with additional space added over 4 decades spanning 1950-1989. During the 1989 addition, many of the existing spaces and systems were also renovated. The present building is 57,250 square feet on sitting on 10+ acres of land. The 2-story school has many different areas of use for both educational and administrative purposes. Educational space includes twenty-six classrooms, a gymnasium, a multi-purpose room and library. Administrative and maintenance space includes ten offices/meeting spaces, a small kitchen, a staff-room, two custodial rooms, six small storage closets, basement storage and two boiler rooms.

System Background Information:

The Marion Cross School currently operates under Permit WW-3-0026-R for water and wastewater system use, supporting materials for which are available from the Vermont Agency of Natural Resources (VANR) District 3 permit search web site. The permit currently allows for flows up to 5,460 gallons per day (gpd) for 364 students and staff. Daily water meter data indicate that actual flows are considerably less than permitted flows. As a result, MCS would like to increase the number of staff and students using existing facilities with a permit amendment within the current permitted flow. MCS would like to add a kitchen at a later date, which will require another amendment with facility improvements (including a properly sized grease trap and likely additional appurtenances). Although the original system was designed in accordance with contemporaneous regulations and recent observation of leach field components indicate that they are in very good condition, MCS has continued to experience effluent breakout during winter months. Consequently, MCS has not been using the system for the last two school years choosing a "store and dose" approach in consideration of health and safety from December 1 through March 31. During this time, the VANR has indicated that it is likely possible to include pre-treatment to achieve "swimming water quality" so that MCS may use the system throughout the school year (knowing that any future breakout from the MCS will not impact public health and safety).

Proposal Content:
Summarize your proposal and your firm's qualifications. Additionally, you may articulate why your firm is pursuing this work and how it is uniquely qualified to perform it. Include any other pertinent information that may help the Committee determine your overall qualifications.

Proposals must include a detailed description of pre-treatment components, how proposed components will impact the existing system, detailed costs for each component by cost center and a projection of annual operation/maintenance costs. MCS is looking for an itemized proposal format in order to optimize proposal comparison across different Innovative Alternative designs. At the present time, proposals should assume no changes to the existing system including septic and mechanical control tanks and the leach field. Rather, proposals should indicate how pre-treatment facilities will be

"plugged" into the existing system to provide "swimming pool" water quality for the flows currently permitted including integration of a kitchen at a future date.

Proposal Recap:

1. A detailed and comprehensive description of proposed pre-treatment components.
2. Itemized and detailed costs for procurement, installation, operation and maintenance of the system.
3. A conceptual plan(s) showing the location of proposed pre-treatment components so MCS may understand how each option will affect the existing campus.

In addition to itemized components, costs and conceptual plan, proposals should include:

- a cover letter highlighting relevant experience in this area including VANR regulatory experience and the firm's Vermont's State license number(s) along with the official name of the company, address, and telephone number
- a list of key personnel who will be involved in the project
- a list of in-house services normally provided by your company
- any outside consultants planned to be used to complete the project and their pertinent Vermont State licenses
- at least three references for whom you have performed similar types of work including names, phone numbers, and site addresses
- promotional literature, manuals and/or other documents which will be used as backup data for your company's/consultant's recommendation for this project

Existing Information

In addition to the plans used to obtain the original system approval, MCS has conducted additional analyses that are included in this RFP packet:

1. Existing conditions generated using LiDAR from the Vermont Center for Geographic Information (VCGI).
2. Daily water meter data.
3. Recent wastewater "strength" test results.
4. Hydrological analysis of the existing system.
5. Original plans and permit for existing system 1988.
6. Revised 2008 permit for existing system.

Evaluation of Proposals:

Each proposal shall be reviewed to determine whether:

- all evaluative criteria have been met
- the firm has adequate staff and resources to perform the specified tasks required to meet the tentative project schedule
- a senior member of the firm is designated as the contact/project manager who will be responsible for providing project schedule and progress information on a weekly basis to a representative of the SAU-70/Marion Cross School
- the firm has depth of knowledge and experience in the process of installing pretreatment/septic systems in commercial buildings or public school settings and will be able to meet the requirements of the approval for permit by the Vermont Agency of Natural Resources
- quality of products proposed and overall project costs

Proposals shall be evaluated based on responsiveness to the criteria, terms and conditions contained in the RPF. Failures to follow instructions, meet the criteria, or agree to the terms and conditions contained in this RPF may be cause for rejection of the proposal as non-responsive.

All prices quoted shall be exclusive of Sales Tax and Federal Excise Tax, from which the Norwich School District is exempt. Exemption certificates, if required, will be furnished by the Norwich School District at the request of the proposer.

Permitting:
The firm chosen to provide pre-treatment will work with the District's design team to assist with the development of plans, permit applications, interaction with regulators, and construction documents. Proposals should include anticipated costs for plan development and permitting assistance.

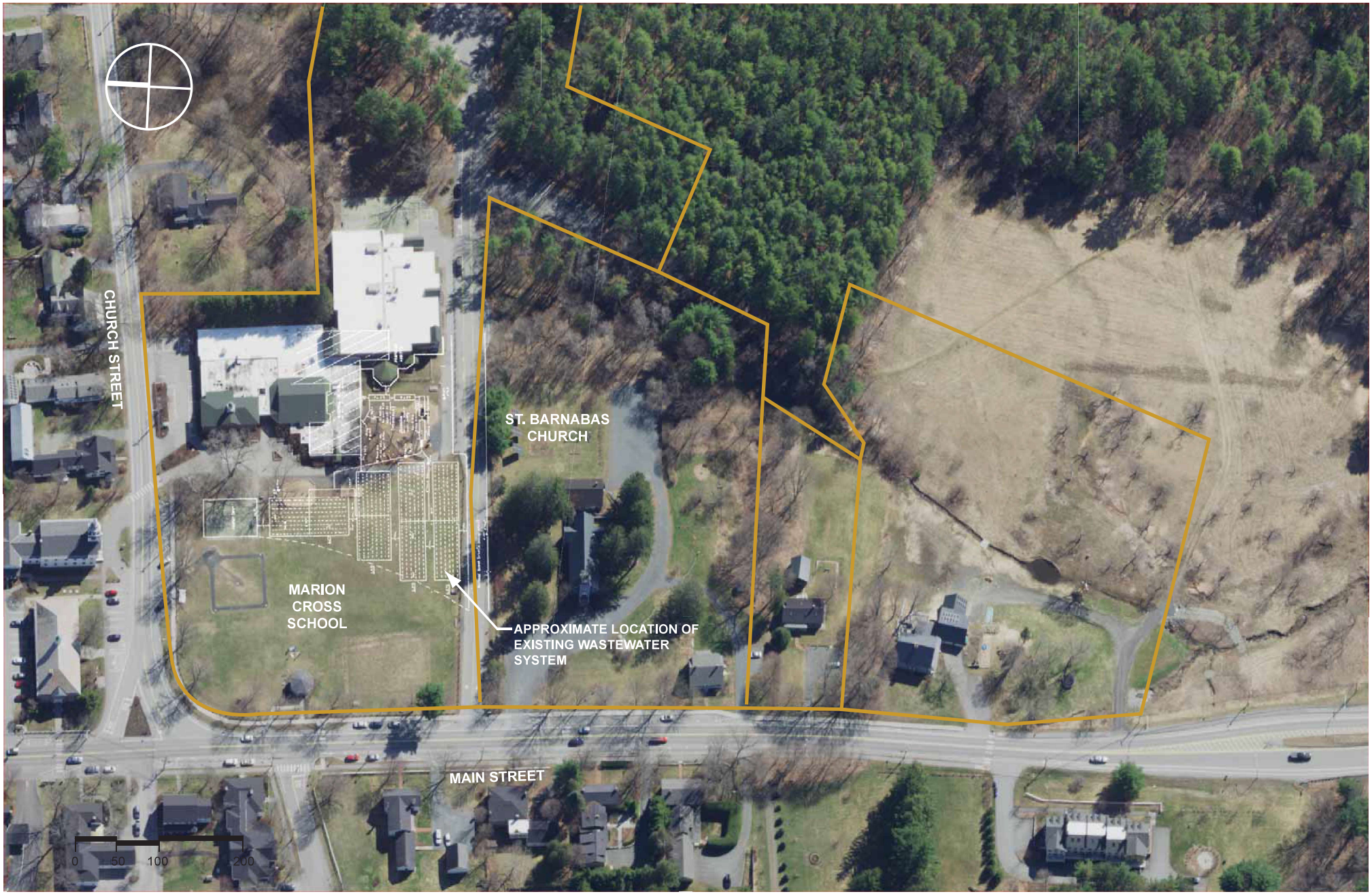
Incurred Costs:
The Norwich School District will not be liable for any costs incurred by the proposers in preparing or submitting proposals for the installation of a septic pre-treatment system at the Marion Cross School.

Insurance and Indemnification:
Once a Contractor is chosen a formal contract will be issued. The insurance section shall read as follows:
The Contractor shall be solely responsible for all loss, expense (including attorney's fees), and damage and shall indemnify the Norwich District against and save the Norwich School District harmless from all claims, demands and judgments made or recovered against Norwich School District because of personal injuries, including death at any time resulting there from, and/or because of damage to property, from any cause whatsoever, arising out of, incidental to, or in connection with the project, whether or not caused by negligence of the Contractor, any subcontractor or his or their employees, servants or agents; provided that said indemnification and save harmless obligation shall not apply to circumstances resulting solely from negligence of the Norwich School District, its employees or servants, as finally so determined by a court of competent jurisdiction. Compliance by the Contractor with the following insurance provisions shall not relieve the Contractor from liability under this provision.

Prior to commencement of the Work, Contractor shall furnish District with an acceptable insurance certificate from Contractor's insurer naming Norwich School District as an additional insured evidencing that Contractor has the following coverage and liability limits:

- ***Workmen's Compensation:*** Statutory requirements apply.
- ***Employer's Liability Insurance:*** $100,000 each accident, $500,000 disease policy limit, $100,000 each employee.
- ***Commercial General Liability:*** $1,000,000 each occurrence bodily injury and property damage, $2,000,000 general aggregate - include per project endorsement, $2,000,000 projects/completed operations aggregate.
- ***Owner's Protective Liability:*** $2,000,000 aggregate.
- ***Comprehensive Automotive Liability:*** $1,000,000 combined single limit for bodily injury and property damage.
- ***Commercial Umbrella Liability:*** $1,000,000 each occurrence, $1,000,000 aggregate.

1. Existing Conditions Maps - LiDAR/VCGI



1. Existing Conditions Map-2

2.A. Water Meter Data

December 2021				January 2022				February 2022				March 2022				April 2022				May 2022				June 2022			
1	W	13727142	1373	1	S	Weekend	-	1	Tu	13783738	1505	1	Tu	13806718	2504	1	Fr	13853560	2020	1	Su	Weekend	-	1	W	13917202	1216
2	Th	13728725	1583	2	Su	Weekend	-	2	W	13785225	1487	2	W	13810730	4012	2	S	Weekend	-	2	M	13884633	2522	2	Th	13918626	1424
3	Fr	13730115	1390	3	M	13752347	93	3	Th	13786952	1727	3	Th	13814804	4074	3	Su	Weekend	-	3	Tu	13886641	2008	3	F	13920220	1594
4	S	Weekend	-	4	Tu	13753788	1441	4	Fr	13788312	1360	4	Fr	13817018	2214	4	M	13855882	2322	4	W	13888424	1783	4	S	Weekend	-
5	Su	Weekend	-	5	W	13755429	1641	5	S	Weekend	-	5	S	Weekend	-	5	Tu	13857998	2116	5	Th	13889882	1458	5	Su	Weekend	-
6	M	13732273	2158	6	Th	13757041	1612	6	Su	Weekend	-	6	Su	Weekend	-	6	W	13859529	1531	6	F	13891442	1560	6	M	13922098	1878
7	Tu	13733307	1034	7	Fr	No Reading	-	7	M	No Reading	-	7	M	13817930	912	7	Th	13861086	1557	7	S	Weekend	-	7	Tu	13923507	1409
8	W	13734821	1514	8	S	Weekend	-	8	Tu	13789953	1641	8	Tu	13819698	1768	8	Fr	13863342	2256	8	Su	Weekend	-	8	W	13925028	1521
9	Th	13736470	1649	9	Su	Weekend	-	9	W	13791763	1810	9	W	13821315	1617	9	S	Weekend	-	9	M	13893288	1846	9	Th	13926436	1408
10	Fr	13737894	1424	10	M	13760646	3605	10	Th	13792928	1165	10	Th	13822951	1636	10	Su	Weekend	-	10	Tu	13894771	1483	10	F	13928064	1628
11	S	Weekend	-	11	Tu	13763697	3051	11	Fr	13794837	1909	11	Fr	13824420	1469	11	M	13863992	650	11	W	13896088	1317	11	S	Weekend	-
12	Su	Weekend	-	12	W	13764802	1105	12	S	Weekend	-	12	S	Weekend	-	12	Tu	13864060	68	12	Th	13897466	1378	12	Su	Weekend	-
13	M	13739430	1536	13	Th	13766498	1696	13	Su	Weekend	-	13	Su	Weekend	-	13	W	13864090	30	13	F	13898841	1375	13	M	13929580	1516
14	Tu	13741030	1600	14	Fr	13768268	1770	14	M	13796639	1802	14	M	13826614	2194	14	Th	13864245	155	14	S	Weekend	-	14	Tu	13931346	1766
15	W	13742934	1904	15	S	Weekend	-	15	Tu	13796722	83	15	Tu	13828165	1551	15	Fr	13864291	46	15	Su	Weekend	-	15	W	13932965	1619
16	Th	13744551	1617	16	Su	Weekend	-	16	W	13796932	210	16	W	13830062	1897	16	S	Weekend	-	16	M	13900749	1908	16	Th	13934961	1996
17	Fr	13746363	1812	17	M	Holiday	-	17	Th	13797157	225	17	Th	13831744	1682	17	Su	Weekend	-	17	Tu	13902281	1532	17	F	13935897	936
18	S	Weekend	-	18	Tu	13769977	3479	18	Fr	13797213	56	18	Fr	13833896	2152	18	M	13864446	155	18	W	13903850	1569	18	S	Weekend	-
19	Su	Weekend	-	19	W	13771306	1329	19	S	Weekend	-	19	S	Weekend	-	19	Tu	13866186	1740	19	Th	13905121	1271	19	Su	Weekend	-
20	M	13748084	1721	20	Th	13772607	1301	20	Su	Weekend	-	20	Su	Weekend	-	20	W	13868388	2202	20	F	13906736	1615	20	M	not read	
21	Tu	13749428	1344	21	Fr	13774325	1718	21	M	no reading	-	21	M	13836088	2192	21	Th	13869607	1219	21	S	Weekend	-	21	Tu	not read	
22	W	13751029	1601	22	S	Weekend	-	22	Tu	13797426	313	22	Tu	13839007	2919	22	Fr	13871485	1878	22	Su	Weekend	-	22	W	13936427	530
23	Th	Holiday	-	23	Su	Weekend	-	23	W	13799269	1843	23	W	13841035	2028	23	S	Weekend	-	23	M	13908302	1566	23	Th	13936501	74
24	Fr	Holiday	-	24	M	13775763	1438	24	Th	13802085	2816	24	Th	13842769	1734	24	Su	Weekend	-	24	Tu	13909878	1576	24	F	13936787	286
25	S	Weekend	-	25	Tu	13777351	1588	25	Fr	13803813	1728	25	Fr	13844572	1803	25	M	13873820	2335	25	W	13911395	1517	25	S	Weekend	-
26	Su	Weekend	-	26	W	13778814	1463	26	S	Weekend	-	26	S	Weekend	-	26	Tu	13875647	1827	26	Th	13912860	1465	26	Su	Weekend	-
27	M	13751496	467	27	Th	13780243	1429	27	Su	Weekend	-	27	Su	Weekend	-	27	W	13877490	1843	27	F	13914384	1524	27	M	13936979	192
28	Tu	13751638	142	28	Fr	13781888	1645	28	M	13804214	401	28	M	13846436	1864	28	Th	13879473	1983	28	S	Weekend	-	28	Tu	13937186	207
29	W	13752028	390	29	S	Weekend	-					29	Tu	13848333	1897	29	Fr	13882111	2638	29	Su	Weekend	-	29	W	13937358	172
30	Th	13752254	226	30	Su	Weekend	-					30	W	13849934	1601	30	S	Weekend	-	30	M	no reading		30	Th	13938405	1047
31	Fr	Holiday	-	31	M	13782233	345					31	Th	13851540	1606					31	Tu	13915986	1602				
		December Total Use	25205			January Total Use	31391			February Total Use	22980			March Total Use	46842			April Total Use	31073			May Total Use	32569			June Total Use	21402

2.B. Water Meter Data

July 2021				August 2021				September 2021				October 2021				November 2021			
1	Th	13596254	189	1	Su	Weekend	-	1	W	13631248	1871	1	Fr	13667764	1138	1	M	No Reading	-
2	Fr	13596373	119	2	M	13621139	143	2	Th	13632820	1572	2	S	Weekend	-	2	Tu	13705040	3125
3	S	Weekend	-	3	Tu	13621413	274	3	Fr	13634582	1762	3	Su	Weekend	-	3	W	13706742	1702
4	Su	Weekend	-	4	W	13621754	341	4	S	Weekend	-	4	M	13669852	2088	4	Th	13708450	1708
5	M	No Reading	-	5	Th	13622006	252	5	Su	Weekend	-	5	Tu	13671520	1668	5	Fr	13709971	1521
6	Tu	13596493	120	6	Fr	13622392	386	6	M	No Reading	-	6	W	13673465	1945	6	S	Weekend	-
7	W	13596629	136	7	S	Weekend	-	7	Tu	13639648	5066	7	Th	13675272	1807	7	Su	Weekend	-
8	Th	13597443	814	8	Su	Weekend	-	8	W	13639143	-505	8	Fr	13677272	2000	8	M	13711068	1097
9	Fr	13597738	295	9	M	13622983	591	9	Th	13641025	1882	9	S	Weekend	-	9	Tu	13712136	1068
10	S	Weekend	-	10	Tu	13623156	173	10	Fr	13642809	1784	10	Su	Weekend	-	10	W	13713476	1340
11	Su	Weekend	-	11	W	13623399	243	11	S	Weekend	-	11	M	No Reading	-	11	Th	No Reading	-
12	M	13614880	17142	12	Th	13623687	288	12	Su	Weekend	-	12	Tu	13680199	2927	12	Fr	13714506	1030
13	Tu	13615324	444	13	Fr	13623972	285	13	M	No Reading	-	13	W	13681864	1665	13	S	Weekend	-
14	W	13615622	298	14	S	Weekend	-	14	Tu	13646166	3357	14	Th	13683404	1540	14	Su	Weekend	-
15	Th	13616039	417	15	Su	Weekend	-	15	W	13647937	1771	15	Fr	13685102	1698	15	M	No Reading	-
16	Fr	13616596	557	16	M	13624206	234	16	Th	13649539	1602	16	S	Weekend	-	16	Tu	No Reading	-
17	S	Weekend	-	17	Tu	13624566	360	17	Fr	13651619	2080	17	Su	Weekend	-	17	W	13717674	3168
18	Su	Weekend	-	18	W	13624751	185	18	S	Weekend	-	18	M	13686970	1868	18	Th	13718316	642
19	M	13616975	379	19	Th	13624922	171	19	Su	Weekend	-	19	Tu	13688479	1509	19	Fr	13719392	1076
20	Tu	13618556	1581	20	Fr	13625279	357	20	M	13653796	2177	20	W	13690128	1649	20	S	Weekend	-
21	W	No Reading	-	21	S	Weekend	-	21	Tu	13655893	2097	21	Th	13691645	1517	21	Su	Weekend	-
22	Th	13618988	432	22	Su	Weekend	-	22	W	13657431	1538	22	Fr	13693523	1878	22	M	13720740	1348
23	Fr	13619103	115	23	M	13625473	194	23	Th	13659093	1662	23	S	Weekend	-	23	Tu	13722229	1489
24	S	Weekend	-	24	Tu	No Reading	-	24	Fr	13660748	1655	24	Su	Weekend	-	24	W	13724348	2119
25	Su	Weekend	-	25	W	No Reading	-	25	S	Weekend	-	25	M	13695451	1928	25	Th	Holiday	-
26	M	13619455	352	26	Th	13626307	834	26	Su	Weekend	-	26	Tu	13697031	1580	26	Fr	Holiday	-
27	Tu	13619698	243	27	Fr	13626541	234	27	M	13661247	499	27	W	13698789	1758	27	S	Weekend	-
28	W	13619838	140	28	S	Weekend	-	28	Tu	13662823	1576	28	Th	13700463	1674	28	Su	Weekend	-
29	Th	13620220	382	29	Su	Weekend	-	29	W	13664411	1588	29	Fr	13701915	1452	29	M	13724316	-32
30	Fr	13620996	776	30	M	13627604	1063	30	Th	13666626	2215	30	S	Weekend	-	30	Tu	13725769	1453
31	S	Weekend	-	31	Tu	13629377	1773					31	Su	Weekend	-				
	July Total Use		24885		August Total Use		10109		September Total Use		36516		October Total Use		37276		November Total Use		22102

2.C. Water Meter Data

February 2021				March 2021				April 2021				May 2021				June 2021			
1	M	13449007	1883	1	M	13471594	1422	1	Th	13504373	1278	1	S	Weekend	-	1	Tu	13564962	2472
2	Tu	13450554	1547	2	Tu	13473396	1802	2	Fr	13505933	1560	2	Su	Weekend	-	2	W	13567451	2489
3	W	13450614	60	3	W	13474992	1596	3	S	Weekend	-	3	M	13531464	2341	3	Th	13569236	1785
4	Th	13452183	1569	4	Th	13476585	1593	4	Su	Weekend	-	4	Tu	13532921	1457	4	Fr	13572405	3169
5	Fr	13453956	1773	5	Fr	13478175	1590	5	M	13507535	1602	5	W	13534766	1845	5	S	Weekend	-
6	S	Weekend	-	6	S	Weekend	-	6	Tu	13509172	1637	6	Th	13536643	1877	6	Su	Weekend	-
7	Su	Weekend	-	7	Su	Weekend	-	7	W	13510535	1363	7	Fr	13538326	1683	7	M	13574288	1883
8	M	13455656	1700	8	M	13478636	461	8	Th	13512605	2070	8	S	Weekend	-	8	Tu	13575871	1583
9	Tu	13456926	1270	9	Tu	13479034	398	9	Fr	13514170	1565	9	Su	Weekend	-	9	W	13577577	1706
10	W	13458215	1289	10	W	13480571	1537	10	S	Weekend	-	10	M	13539928	1602	10	Th	13579034	1457
11	Th	13459962	1747	11	Th	13481814	1243	11	Su	Weekend	-	11	Tu	13541572	1644	11	Fr	13580996	1962
12	Fr	13461393	1431	12	Fr	13483333	1519	12	M	13514996	826	12	W	13543081	1509	12	S	Weekend	-
13	S	Weekend	-	13	S	Weekend	-	13	Tu	13515047	51	13	Th	13544484	1403	13	Su	Weekend	-
14	Su	Weekend	-	14	Su	Weekend	-	14	W	13515102	55	14	Fr	13546022	1538	14	M	13582717	1721
15	M	No Reading	-	15	M	13484996	1663	15	Th	13515261	159	15	S	Weekend	-	15	Tu	13583811	1094
16	Tu	13462738	1345	16	Tu	13486321	1325	16	Fr	13515295	34	16	Su	Weekend	-	16	W	13585522	1711
17	W	13462910	172	17	W	13487961	1640	17	S	Weekend	-	17	M	13547697	1675	17	Th	13586219	697
18	Th	13463482	572	18	Th	13489218	1257	18	Su	Weekend	-	18	Tu	13549241	1544	18	Fr	13587510	1291
19	Fr	13463509	27	19	Fr	13490878	1660	19	M	13515360	65	19	W	13550836	1595	19	S	Weekend	-
20	S	Weekend	-	20	S	Weekend	-	20	Tu	13516872	1512	20	Th	13552329	1493	20	Su	Weekend	-
21	Su	Weekend	-	21	Su	Weekend	-	21	W	13518334	1462	21	Fr	No Reading	-	21	M	No Reading	-
22	M	13463801	292	22	M	13492313	1435	22	Th	13520067	1733	22	S	Weekend	-	22	Tu	13595184	7674
23	Tu	13465613	1812	23	Tu	13493741	1428	23	Fr	13521660	1593	23	Su	Weekend	-	23	W	13595384	200
24	W	13467271	1658	24	W	13495319	1578	24	S	Weekend	-	24	M	13555699	3370	24	Th	13595465	81
25	Th	13468698	1427	25	Th	13496880	1561	25	Su	Weekend	-	25	Tu	13557136	1437	25	Fr	No Reading	-
26	Fr	13470172	1474	26	Fr	13498482	1602	26	M	13523289	1629	26	W	No Reading	-	26	S	Weekend	-
27	S	Weekend	-	27	S	Weekend	-	27	Tu	13524698	1409	27	Th	13560190	3054	27	Su	Weekend	-
28	Su	Weekend	-	28	Su	Weekend	-	28	W	13526129	1431	28	Fr	13562490	2300	28	M	No Reading	-
				29	M	13500004	1522	29	Th	13527544	1415	29	S	Weekend	-	29	Tu	No Reading	-
				30	Tu	13501880	1876	30	Fr	13529123	1579	30	Su	Weekend	-	30	W	13596065	600
				31	W	13503095	1215					31	M						
		February Total Use	22587			March Total Use	32779			April Total Use	27091			May Total Use	33498			June Total Use	31103

Laboratory Report

DATE REPORTED: 06/23/2022

CLIENT: SAU-70
PROJECT: Marion Cross School Wastewater

WORK ORDER: **2206-15023**
DATE RECEIVED: 06/08/2022

001 Site: Septic Effluent Composite — Date Sampled: 6/8/22 Time: 15:15

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
BOD-5day	< 20	mg/L	SM20 5210B	6/9/22 15:59	R RBM	A	
Solids, Total Suspended	81	mg/L	SM20 2540D	6/10/22 15:57	R RBM	A	

002 Site: Septic Effluent Grab — Date Sampled: 6/8/22 Time: 12:15

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Oil & Grease Total Recoverable	< 2.0	mg/L	EPA 1664A	6/20/22	W ECM	A	AN1

Report Summary of Qualifiers and Notes

AN1: The Laboratory Fortified Blank (LFB/LCS) recovery for this parameter was 73% of the expected target. The sample result may be biased low.

Do Not use this form for WSID Samples or
Residential Drinking Water Samples

ENDYNE Inc.

160 James Brown Dr
Williston Vermont 05495
Ph 802-879-4333

Chain-of-Custody-Record

*Required Fields

PO#_____ *EMAIL anthonydaigle@sau70.org

*Project Name: Marion Cross School Wastewater System	*Company Name: Norwich School District Marion Cross School 21 Church Street Norwich VT *Phone # 603-643-3810	*Sampler Name: Tony Daigle / Tim Fernandes *Phone # 603-643-3810
*State of Origin (VT) NY NH Other	*Mailing Address: SAU-70 41 Lebanon Street Hanover NH 03755	*Billing Address: SAU-70 41 Lebanon Street Hanover NH 03755

*Sample Location Please Print Clearly	*Matrix	GRAB	COMP	*Date/Time Sampled	# of Containers	Sample Preservation	*Analysis Required: Enter Number from Choices Below	Field Results/Remarks
(1) Septic Effluent BOD/TSS	WW		X	Start: 8:35 am	1	None	9/12 (BOD/TSS)	Hand Composite
#1 8:15 am #2 9:15 am #3 10:15 am #4 11:15 am				6/8	(1)(2)(3)(4) (5)(6)(7)(8)			8 Hrs.
#5 12:15 pm #6 1:15 pm #7 2:15 pm #8 3:15 pm				End: ~~4:15 pm~~				
				6/8 3:15 pm				
(2) Septic Effluent FOG		X		12:15	2	HCL	21 (F.O.G)	
				6/8				

*Relinquished By:	Date/Time	Received By:	Date/Time	Received By:	Date/Time
				10.3 C ice	AS 6/8/22 1533

1. pH	6. TKN	11. Total Solids	16. Sulfate	(21) F.O.G	26. 8270 B/N only 827B-W	31. PP13 Metals PP13-W	Lab Use Only
2. Chloride	7. TP	(12.) TSS	17. *E. coli*	22. 8015 GRO	27. 8270 Acid only 827A-W	32. Total RCRA 8 Metals RCRA8-W	Delivery:
3. Ammonia N	8. TDP	13. TDS	18. COD	23. 8015 DRO	28. 8270 PAH Only 827P	33	
4. Nitrate N	(9.) BOD	14. Turbidity	19. VOC 8021B VT21-W	24. Full 8260 NH60-W	29. 8081 Pest 881-W	34	
5. Nitrite N	10. Alkalinity	15. Conductivity	20. 8260 Halocarbons HAL60-W	25. Full 8270 827-W	30. 8082 PCB 882-W	35	

Metals Total or Diss. Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sn Tl

TCLP (circle) Metals, Volatiles, Semi-volatiles, Pesticides, Hericides | Other:

Other:

2206-15023

2206-15023

SAU-70
Marion Cross School Wastewater

Laboratory Report

DATE REPORTED: 06/23/2022

CLIENT: Norwich School District
PROJECT: Marion Cross School Wastewater

WORK ORDER: **2206-15205**
DATE RECEIVED: 06/09/2022

001 Site: Septic Effluent Composite — Date Sampled: 6/9/22 Time: 13:15

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
BOD-5day	110	mg/L	SM20 5210B	6/9/22 17:28	R RBM	A	BL
Solids, Total Suspended	51	mg/L	SM20 2540D	6/10/22 15:57	R RBM	A	

002 Site: Septic Effluent Grab — Date Sampled: 6/9/22 Time: 9:15

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Oil & Grease Total Recoverable	< 2.0	mg/L	EPA 1664A	6/20/22	W ECM	A	AN1

Report Summary of Qualifiers and Notes

BL: The blank dilution water dissolved oxygen (DO) decreased by 0.32 mg/L. The maximum dilution water depletion should be 0.20 mg/L.

AN1: The Laboratory Fortified Blank (LFB/LCS) recovery for this parameter was 73% of the expected target. The sample result may be biased low.

Do Not use this form for WSID Samples or
Residential Drinking Water Samples

Chain-of-Custody-Record

*Required Fields

ENDYNE Inc.
160 James Brown Dr
Williston Vermont 05495
Ph 802-879-4333

*EMAIL anthonydaigle@sau70.org

D#

*Company Name: Norwich School District
Marion Cross School
22 Church Street Norwich VT
*Phone # 603-643-3810

*Sampler Name: Tony Daigle / Tim Fernandes

*Phone # 603-643-3810

*Billing Address: Same as mailing

Project Name: Marion Cross School Wastewater System

*Mailing Address: SAU-70 Suite 2 41 Lebanon Street Hanover NH 03755

State of Origin VT NY NH Other

*Sample Location Please Print Clearly	*Matrix	GRAB	COMP	*Date/Time Sampled	# of Containers	Sample Preservation	*Analysis Required Enter Number from Choices Below	Field Results/Remarks
(1) Septic Effluent BOD/TSS	WW		X	Start: 6:15	1	None	9/12 (BOD/TSS)	Hand Composite
1 6:15 2 7:15 3 8:15 4 9:15								8 Hrs.
5 10:15 6 11:15 7 12:15 8 1:15				End: 1:15	6/9/22			
(2) Septic Effluent FOG		X		6/9/22 9:15	2	HCL	21 (F.O.G)	

2206-15205

2206-15205

Norwich School District
Marion Cross School Wastewater

*Relinquished By: Date/Time 1:35 6/9

Received By: Date/Time

Received By: DGJ 6/9/22 1340 12.9 cooler

1. pH	6. TKN	11. Total Solids	16. Sulfate	(21) F.O.G	26. 8270 B/N only 827B-W	31. PP13 Metals PP13-W	Lab Use Only
2. Chloride	7. TP	(12.) TSS	17. *E. coli*	22. 8015 GRO	27. 8270 Acid only 827A-W	32. Total RCRA 8 Metals RCRA8-W	Delivery:
3. Ammonia N	8. TDP	13. TDS	18. COD	23. 8015 DRO	28. 8270 PAH Only 827P	33. Corrosivity	Temp:
4. Nitrate N	(9.) BOD	14. Turbidity	19. VOC 8021B VT21-W	24. Full 8260 NH60-W	29. 8081 Pest 881-W	34. Ignitability	Comments:
5. Nitrite N	10. Alkalinity	15. Conductivity	20. 8260 Halocarbons HAL60-W	25. Full 8270 827-W	30. 8082 PCB 882-W	35. Reactivity	

Metals Total or Diss. Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sn Tl U V Zn (circle)

TCLP (circle) Metals, Volatiles, Semi-volatiles, Pesticides, Hericides

Other:

Other:

(6) other information the Secretary deems necessary based on the specific proposed use and request.

(b) An applicant or prospective applicant may submit a written request prepared by a designer that the Secretary determine that the quantity of water necessary for a proposed non-residential use of a building or structure does not require the design flows specified in Table 8-3 for individual components of a sanitary sewer service line that conveys wastewater to a wastewater treatment facility and individual components of a potable water supply and that the Secretary assign a design flow for the use based on the following factors:

(1) the nature and design of the proposed use, including equipment that may be part of the use and any manufacturing process;
(2) daily water use data, as further described in Subsection (c);
(3) daily wastewater discharge collected and recorded using a method approved by the Secretary prior to collection;
(4) seasonal variations known or anticipated in occupancy or water usage of the building or structure; and
(5) other information the Secretary deems necessary based on the specific proposed use and request.

(c) The burden shall be on the applicant or prospective applicant requesting the determination pursuant to Subsection (a) or (b) to satisfy the following requirements with information from a designer:

(1) Propose a design flow for the wastewater system based on:
  (A) the 90th percentile of all daily water meter readings; and
  (B) a proposed safety factor that accounts for fluctuations in metered flows. Considerations for determining a safety factor include:
    (i) the number of days the water meter readings exceeds the average flow calculated based on the water meter readings for the year;
    (ii) the number of days the water meter readings exceed the average flow calculated based on the water meter readings during the 3 consecutive months representing the highest water usage; and
    (iii) the 90th percentile of the water meter readings representing the highest water usage for 3 consecutive months.
(2) Propose a design flow for the potable water supply based on the peak recorded daily water meter reading.
(3) Demonstrate that the wastewater system and potable water supply comply with technical standards in this Subchapter and Subchapters 9, 10, 11, and 12;
(4) Provide information that addresses each factor in Subsection (a) or (b) and enables the Secretary to reach a determination and assign a design flow.

(d) Water use data shall include the following:

(1) A minimum of daily water meter readings for a year, unless:
  (A) the wastewater system and potable water supply will be operated for less than 180 days of days, in which case, daily water meter readings shall be taken for each day in operation; or

(B) the wastewater system and potable water supply will be operated for 180 days or more and the Secretary concludes that 1 year of daily water meter readings is not necessary to demonstrate the wastewater strength and quantity of water necessary for the proposed use and the Secretary provides approval, prior to the collection of water meter readings, for daily water meter readings to be taken for 180 consecutive days. An applicant seeking such approval shall submit the following information:

(i) the nature the existing use of the building or structure, including equipment that may be part of the use and any manufacturing process, that will be in use when meter readings will not be taken;

(ii) seasonal variations in occupancy or water usage of the building or structure demonstrating that all variations will be recorded during the 180 days;

(iii) wastewater strength and characteristics, including BOD and TSS, that may be required to adjust the sizing of the leachfield according to § 1-904 and as further described in Subsection (e), for the days when meter readings will not be taken; and

(iv) other information the Secretary deems necessary based on the specific proposed use and request.

(2) Daily record of the number of occupants, employees, or other users of the building or structure, unless approval is provided by the Secretary, prior to collection of water meter readings and based in information submitted by the applicant, of an alternative basis for recording the intensity of the daily use of the building or structure.

(3) The quantity of process water used for industrial or manufacturing facilities.

(4) The quantity of water for domestic type use.

(5) The quantity of water that comes from the potable water supply serving the building or structure that will not discharge to the wastewater system.

(e) Wastewater strength and characteristics analysis data shall include 8-hour composite samples or other sampling method approved by the Secretary during the period of recording the water meter readings, taken at the following intervals:

(1) 1 sample during each 3-month period of use of the building or structure, provided that, if the building or structure is in use for fewer than 6 months, a minimum of 2 samples are taken;

(2) at least 2 of the samples shall be taken during the normal peak use of the building or structure or campground; and

(3) more frequent sampling when the Secretary determines that the sampling results may not be representative of the use of the building or structure.

(f) The approval by the Secretary of a design flow different than that specified in Table 8-3 shall not be used for the purposes of determining, pursuant to § 1-301(a), whether an action will result in an increase in design flow of any component of a wastewater system or potable water supply.

(g) The approval by the Secretary of a design flow different than that specified in Table 8-3 for a proposed non-residential use of a building or structure shall:

(1) be issued in writing in the permit for the wastewater system or potable water supply that will serve the building or structure; and
(2) state that a reduction from the design flow specified in Table 8-3 was approved and identify the approved design flow.

§ 1-805 Wastewater Strength

(a) A leachfield for which design flow is determined pursuant to § 1-803(f)(2) or (3) or that will dispose of food processing waste, including a leachfield that will serve a building or structure with a use as a brewery, shall comply with the following requirements:
(1) Septic tank effluent that is low strength may be discharged to the leachfield.
(2) Septic tank effluent that is high strength but treated to reduce the strength to low strength may be discharged to the leachfield after such treatment.
(3) Septic tank effluent that is high strength is prohibited from being discharged to the leachfield unless the leachfield is sized pursuant to Subsection (d).

(b) Wastewater strength of septic tank effluent shall be categorized based on the following standards:
(1) Septic tank effluent is low strength when it meets the following standards:
(A) $BOD_5 \leq 300$ mg/L;
(B) TSS $\leq$ 150 mg/L; and
(C) Fats, Oil & Grease (FOG) $\leq$ 50 mg/L.
(2) Septic tank effluent that exceeds any one of the standards for BOD_5, TSS, or FOG specified in Subsection (b)(1) is high strength.

(c) When wastewater strength is determined for septic tank effluent, it shall be determined using one of the following methods:
(1) sampling of BOD_5, TSS, and Fats, Oil, & Grease as an 8-hour composite or other sampling method approved by the Secretary;
(2) sampling of BOD_5, TSS, and Fats, Oil, & Grease from a wastewater system serving buildings or structures or campground with similar uses as an 8-hour composite or other sampling method approved by the Secretary; or
(3) literature review of BOD_5, TSS, and Fats, Oil, & Grease from buildings or structures, or campgrounds with similar uses, using the highest strength value identified for the particular uses.

(d) When a leachfield is proposed to dispose of high strength wastewater and is proposed using a Secretary-assigned design flow based on the submission of water use data and wastewater strength calculations pursuant to § 1-803(f)(3)(A) or § 1-804, the leachfield shall be sized using one of the following formulas in lieu of any formula or method for sizing the particular type of leachfield specified in Subchapter 9 that would otherwise apply:
(1) The formula SQLF = ($BOD_5 \div$ 300 mg/L) x (DF $\div$ AR) where:
(A) SQLF = the minimum required square footage of leachfield in square feet;
(B) DF = the design flow in gallons per day; and
(C) AR = the application rate for the soil in gallons per square foot per day identified in § 1-911.

(2) Another formula proposed by an applicant's designer and accepted by the Secretary.

§ 1-806 Determining Baseline Design Flow for Increases in Design Flow

(a) For the purpose of this Section, the term "bedroom" means:
  (1) a room identified as a bedroom on a lister card applicable between January 1, 2006 and December 31, 2006; or
  (2) a room the owner of the building or structure between January 1, 2006 and December 31, 2006 certifies under oath was:
    (A) occupied as sleeping quarters for a minimum of 90 days between January 1, 2006 and December 31, 2006; and
    (B) contained one window or door that leads directly to the outside and one door that separates the room from the other living space.

(b) For the purpose of determining, pursuant to § 1-301(a), whether an action will result in an increase in design flow of any component of a wastewater system or potable water supply for which the clean slate permit exemption in § 1-303 is in effect, the baseline design flow from which a potential increase is measured shall be calculated according to the following:
  (1) For living units:
    (A) The maximum number of bedrooms in the living unit between January 1, 2006 and December 31, 2006, and the following standards:
      (i) that the first 3 bedrooms in a living unit contains 2 persons per bedroom, unless Subsection (B) or (C) applies;
      (ii) that each additional bedroom beyond 3 contains 1 person per bedroom, unless Subsection (B) or (C) applies; and
      (iii) that each person uses 70 gallons of water per day.
    (B) If a bedroom contains built-in beds providing sleeping space for more than 2 persons, the number of persons assumed for that bedroom shall be based on the number of sleeping spaces.
    (C) If an applicant certifies under oath that more than 2 persons were living in a bedroom at the same time between January 1, 2006 and December 31, 2006, the number of persons assumed for that bedroom shall be based on the number certified to.
  (2) For campsites, the maximum number and the use of campsites that existed between January 1, 2006 and December 31, 2006, and the design flow specified in Table 8-2.
  (3) For buildings or structures or portions of building or structure other than living units, the use, or combination of uses in a 24-hour period, of the building or structure between January 1, 2006 and December 31, 2006 with the highest design flow, and the design flow specified in Table 8-3.

(c) For the purpose of determining, pursuant to § 1-301(a), whether an action will result in an increase in design flow of any component of a wastewater system or potable water supply for which the clean slate permit exemption in § 1-303 is not in effect, the baseline design flow from which a potential increase is measured shall be calculated by reference to the

permit authorizing the operation of the component, the approved site plan, and the design flows specified in § 1-803.

(d) A baseline design flow shall not be calculated using a Secretary approved design flow authorized pursuant to § 1-804 except pursuant to § 1-803(f)(3) for uses not appearing in Table 8-3.

LINCOLN APPLIED GEOLOGY, INC.
ENVIRONMENTAL CONSULTANTS

1984 - 2020 36 YEARS OF EXCELLENCE LINCOLN APPLIED GEOLOGY, INC.

May 6, 2020

Ms Jamie Teague, Business Administrator
Dresden School District/SAU7O
44 Lebanon St., Suite 2
Hanover, NH 03775

RE: Marion Cross School, Wastewater Disposal System – Hydrogeologic Evaluation of a Failed Wastewater Disposal System and the Overall Norwich Town Green

Dear Ms Teague:

When what are described as colored surface discharges began appearing on the ice and snow covered surface of the Town Green (the Green) west of the Marion Cross School's (MCS) four (4) disposal areas, there was of course, a concern that they were failing or had failed. Pathways Consulting, LLC (PC) conducted a reconnaissance on January 26, 2018 to take photographs to locate, characterize and collect representative samples of four (4) of them for fecal coliform analysis. The February 2, 2019 PC letter report, the Figure 1 Sampling Diagram, seventeen (17) photographs and the fecal coliform laboratory results are attached as Attachment A. The letter report clearly shows the wide spread presence of colored surface discharges on the Green west of the 4 disposal areas, as well as their appearance. Four frozen samples were collected for analysis, the results of which suggested very low level fecal coliform presence. There is enough evidence of fecal impact to understand that the surface discharges form seasonally, driven by the dynamics of the current system. The facts that were defined are that the colored surface discharges only appear during periods of very cold weather enhanced by snow and ice conditions and they appear north and west of the 4 disposal areas. Based on the definition of a failed wastewater system in the current State wastewater regulations, systems that have recurring, continuing, or seasonal failures are considered to be failed systems. In this regard, the Marion Cross School wastewater disposal system is a failed system.

In response to their findings, the reoccurrence of the problem in 2019 and concerns of widespread disposal system failure, Lincoln Applied Geology, Inc. (LAG) in concert with PC was contracted by Norwich School District to conduct a four (4) task Hydrogeologic Analysis to define the nature and cause of the problem, as well as a possible solution. The four tasks include:

Task 1 – A site and soil evaluation was conducted in the current disposal area and the Green using reconnaissance and test pit methods. Several pits were precisely placed to evaluate if and why the existing disposal areas are failed given that they are located in a permeable sand deposit. The other test pits were be placed in the Green to define conditions that could cause seasonal failures, as well as to define potential solutions to the problem beyond the limits of the current disposal area.

Task 2 – Three (3) borings (with continuous macrocore samples) were placed and converted to monitoring wells finished off below grade to be used for hydraulic conductivity testing and water table monitoring. This included oversight by a geologist/hydrogeologist, the boring contractor (T&K Drilling) and all required materials.

Task 3- Hydraulic conductivity tests on the 3 monitoring wells were conducted to define the ability of the sand deposit to transmit effluent from the disposal areas.

Task 4- The analysis of the overall database was conducted to define the cause of the colored surface discharges, to define a basis of design for handling +/- 5000 gallons per day (gpd) and to define solutions for remediating the process causing the colored surface discharges.

As a result of a summary meeting on November 11, 2019 with the State of Vermont Regional Engineer, Terry Shearer; Pathways Consulting, LLC; Ms Jamie Teague, Business Administrator for Dresden School District/SAU70 and Tom Candon, School Board Chair of Norwich School District, the tasks were expanded to include Task 5- Altering disposal system operations as soon as possible and groundwater system monitoring (which was authorized in early March 2020).

Preliminary to conducting the analysis, a comprehensive review of the soil and hydrogeologic evaluation that was conducted by Wagner, Heindel and Noyes(WHN) to provide a basis of design for the current 10,000 gpd system that was designed, permitted and installed in 1988 – 1989 timeframe was reviewed. The 10,000 gpd system design was also reviewed to define the specific details of the distribution system along with its adequacy and functionality in terms of defining how the distribution system may have contributed to the appearance of the colored surface discharges. This review was ultimately conducted to define potential ways of remediating the system (if possible) to prevent the seasonal formation of the colored surface discharges.

A series of seven (7) test holes shown on Figure 1 were excavated and evaluated by Tim McCormick of PC and Stephen Revell, CPG of LAG on June 13, 2019 with Terry Shearer, State Regional Engineer in attendance. Formal descriptions were compiled by Tim McCormick, Soil Scientist which are presented in Attachment C. The test hole locations are shown on the attached Figure 1 – Existing Conditions Wastewater Plan prepared by PC. Four test holes (TH-1 through TH-4) were placed adjacent to each of the 4- 4200 sq. ft. disposal fields to define soil conditions and evidence of failure or proper function. Three additional test pits were excavated and evaluated on the western half of the Green (TH-5, 6 and 7) to define native soil conditions and water table limitations beneath the overall Green.

The test holes placed adjacent to each disposal area identified clean disposal area stone and no evidence of clogging or the presence of black organic deposits that would suggest malfunction or failure. Following their placement, the effluent pump was activated to evaluate distribution to all four disposal areas and they all passed with flying colors. The native soils beneath each disposal area were evaluated and fine to coarse sands and some loamy fine sands were identified with no indication of a water table noted to a depth of at least 48 to 65”. The soil descriptions defined by WHN in 1988 were generally confirmed.

The native soil profiles beneath the overall Green were defined as sandy loams to loamy sands over gravelly coarse sands with no real evidence of a water table to a depth of 72”. Evidence of a seasonal high water table and saturation were noted at a depth of 72 to 84”. This mimiced the depth to water table indicators noted by WHN in 1988. The overall soil data indicated the presence of permeable sands which were thought to be capable of handling either 10,000 gpd in 1988 or +/- 5000 gpd in 2019 generated by MCS.

To define the soil characteristics at depth, 3 borings/ monitoring wells shown on Figure 1 were installed and evaluated to a depth of 12 to 15’, directly adjacent to test holes 1, 3 and 4. The boring/ monitoring well descriptions are included in Attachment C. They indicated the presence of fine to coarse sands with minor gravel to a depth of 11 to 12’, underlain by fine sand to silt. They were found to be saturated at a depth of 6 to 7’’. The boring/monitoring well descriptions indicate the presence of permeable well drained sands which preliminarily appeared capable of handling the current wastewater flows (+/- 5000 gpd) from MCS. The boring/ monitoring wells were also placed to define the water table and direction of groundwater flow in the area of the 4 disposal areas, as well as to allow the hydraulic conductivity/ permeability of the native sand deposits to be defined.

Saturated hydraulic conductivity tests were conducted on July 30, 2019 in the 3 monitoring wells and analyzed using Hvorslev’s Method. Prior to the testing, the depth to water table was defined between 7.3’ and 8.2’ below ground surface. Utilizing the monitoring well elevations shown on the Figure 1 Existing

Conditions Wastewater Plan, groundwater elevations were calculated. As shown, they are 514.56'(MW-1), 514.90'(MW-2) and 515.59'(MW-3). A single groundwater contour (515') is shown which describes general groundwater flow to the south – southeast at a low (not flat) groundwater gradient of 0.0068 feet/feet which discharges into one or more tributaries of the Connecticut River. Depending on groundwater conditions at different times of the year, as well as cold weather related perturbations, I believe that flow components could be radial to the west, southwest, south and southeast. The results of the hydraulic conductivity analysis are contained in Attachment D. Three tests were conducted with hydraulic conductivities ranging from 40.48 ft./day to 40.94 ft./day to 42.70 ft./day. They are somewhat higher than the results generated by WHN. The average value is 41.37 feet/day which was used in the Site Specific Effluent Mounding Analysis utilizing Darcy's Law. This is an overall effects analysis which relates to all 4 disposal areas operating simultaneously. The results of this analysis indicate that a 8.48' effluent mound would develop beneath the disposal area in response to a maximum potential daily flow of 5000 gpd. It is important to note that the way the current system was operated through December 2019 with very limited alternation of the disposal areas, the mounding could be higher. As Attachment D shows, the Darcy's Law analysis was also conducted with literature values of 50 feet/day and 100 feet/day because 41.37 feet/day did not seem high enough for the underlying sands. The results indicate an effluent mound 7' and 3.5' will form.

An attempt at calibrating the Darcy's Law model using the Hantush model was made using 41.37 feet/day, 50 feet/day and 100 feet/day. The results indicate effluent mounds of 2.14', 1.86' and 1.08' would form. The use of the model suggests that the mounding associated with the simultaneous use of the disposal fields will be much less than that calculated using Darcy's Law, so the use of Hantush to calibrate Darcy's Law is not considered to be applicable because there is not flow in all directions throughout the year. The use of the Hantush Model does confirm to the greatest degree the analysis conducted by WHN in 1988 which showed a 1.5' mound resulting beneath the 2- 2500 gpd beds of each 5000 gpd system. To continue with the attempt to calibrate the current Darcy's Law model, the WHN data was used to calculate a groundwater gradient (in 1988) of 0.0042 feet/feet. This gradient was used to calculate mounding of 13.7', 11.4'and 5.68'. Although the effluent mounding was greater using WHN data, the results compare favorably with the effluent mounding calculated in 2020. This calibration/comparison indicates that if an active groundwater gradient in a specific direction can be calculated from groundwater elevation data, Darcy's Law should be used because the Hantush Model is based on effluent flow in 4 directions from the disposal field. In short, modeling using Hantush significantly underestimates effluent mounding associated with a sloping one dimensional groundwater flow system.

Based on the effluent mounding results generated from Darcy's Law, it is difficult to understand why the four disposal areas are not failing all the time. It is my belief that as the effluent mound grows effluent flow goes from being one dimensional to the south-southeast to being multi-dimensional to the southeast-south-southwest-west-northwest. This results in the zone of effluent transmission expanding to the point that results in effluent mounding being much less than that calculated in Attachment D. This answers the question about the impact of effluent from the disposal areas remaining subsurface most of the year but it doesn't explain what takes place during very cold periods of the year.

In order to define the process by which the cold weather colored surface discharges form, the way the disposal system is currently operated and related earth processes must be taken into account. In this regard, during cold (below freezing consistently) weather, the roads and walkways bounding 4 sides of the Green freeze to variable depths normally approximating 6' with all other ground surfaces freezing to variable depths depending on their use which includes the playground use, other Green uses, the ice rink use, and the disposal area use. In this regard, there is a variable layer of frost and ice/snow cover over the complete area of the Green which includes the disposal areas. This sets up the cold weather existence of a box bounded by four sides of frozen soil to a depth of 6' with a variable thickness of frozen ground on the top and a water table on the bottom. The presence of the frozen soil box, the correctly calculated effluent mounding, the distribution system design and the current operation of the system results in excessive distribution to a limited area (flooding) causing excessive effluent mounding and causing effluent and comingled groundwater to be compressed between the water table, the frozen ground on three sides and the variable thickness of frost and snow/ ice ground cover. This results in the migration of effluent to the north and west, the least impacted area of the frozen box. In short, the colored

surface discharges form at random locations based on random westerly and northerly paths of least resistance to the surface. It is a bit difficult to comprehend but it is real. This relates to understanding that the historic system operations revolved around a 850 gpm pump which doses 2500 gallons to 2 of the 4 disposal fields (at a time) in 3 minutes. In other words the 2 disposal fields are being flooded and in winter weather the related effluent is compressed by ice and the underlying effluent related mounded water table resulting in the colored surface discharges expressing themselves at ground surface. Even without the Girard Way frozen side of the box blocking the south flowing groundwater system, a review of the St. Barnabas Church soil and groundwater data indicates restrictive conditions downgradient of the school with both a very shallow water table and a very flat groundwater gradient.

Task 5 was initiated after the November 11, 2019 summary meeting by reducing the total flow during each pumping event and opening valves to allow effluent to be distributed simultaneously to all four disposal areas at the same time. As cold weather set in, the system showed no signs of failure or the formation of the colored surface discharges to the west of it. Unfortunately, when consistently very cold conditions set in and ice and snow began covering the overall Green, the colored surface discharges again began to form. In response, at the end of February, LAG was asked to install pressure transducers to continuously monitor the water table during the simultaneous operation of all 4 disposal areas.

The transducers were installed in monitoring wells MW-1 and MW-3(shown on Figure 1) located on the west side of the overall disposal area on March 9, 2020 during what looked to be the meltdown of the snow and ice conditions on the surface of the Green and probably the frozen soil sides of the box. During the first week of monitoring, the school was in operation but after that the school was shut down for the mid-winter break and then was closed due to Covid-19. The school has remained closed to date. Because the school was shutdown, the transducers were removed on March 31, 2020 to evaluate water table impacts during the one week of school operation.

The graphical results of groundwater monitoring are presented in Attachment E as Figures 1 through 6. A water table data set was collected when the transducers were removed in order to define the groundwater flow direction and the groundwater gradient. To the greatest degree, they were the same as that shown on the Figure 1 Existing Conditions Wastewater Plan, with groundwater flow to the south at a gradient of 0.0068 feet/feet. Monitoring Figure 1 and 3 describe groundwater conditions between March 9 and March 31 in MW-1 (located on the Girard Way side of the disposal area) and MW-2 (located on the ballfield side of the system). The peaks represent system pumping events with the school in operation during the first week and without the school in operation during the remaining period although normal maintenance was being conducted and possibly staff related activities were being conducted in response to Covid-19. Since the disposal areas were installed at an approximate depth of 2.5', the minimum separation of the groundwater system from the bottom of the disposal areas can be calculated. Relative to MW-1, the minimum calculated separation was 3.71'. For MW-3, the minimum separation was 3.54'. The required minimum separation from the groundwater system is 3'. The monitored separation is concerning given only one week of the school operating and the fact that the seasonally high groundwater period had not been completely reached.

Monitoring Figures 2 and 4 describe groundwater conditions between March 9 and March 14 when the school was in operation. These graphs (Monitoring Figures 2 and 4) show nothing different than Monitoring Figures 1 and 3, they just allow a focus on the groundwater conditions when the school was operating. Based on the fact that the monitoring was conducted just after frost left the ground and now the school is no longer operating, the monitoring was suspended because the necessary data was already collected and the collection of additional data would not show anything more that would aid the evaluation.

In summary, the five task hydrogeologic evaluation describes the presence of well drained sands with a high enough permeability to transmit effluent and groundwater but with very difficult one dimensional flow to the south at a low gradient of 0.0068 ft/ft. When modeled properly using Darcy's Law, effluent mounding can be shown to be prohibitively high and in direct conflict with State wastewater regulations. While the groundwater flow system expands in width due to radial flow in a southeast-south-southwest-west-northwest direction to dissipate the effluent mounding during most of the year, it cannot be

expanded at all when frozen ground conditions are present. In this regard, comingled groundwater and effluent flows to the north and west, the least impacted area in the frozen box. What this suggests is that the disposal areas may be sized large enough to accept 5000 gpd in warmer conditions but during very cold weather when the frozen soil box is present there is nowhere for the effluent to go but up to the surface on the north and west side of the Green. Based on the results of the evaluation, it is my professional opinion that regardless of the size, dimension or orientation of an up to 5000 gpd system, the presence of the frozen ground barriers will not allow a system of this size to function properly year-round.

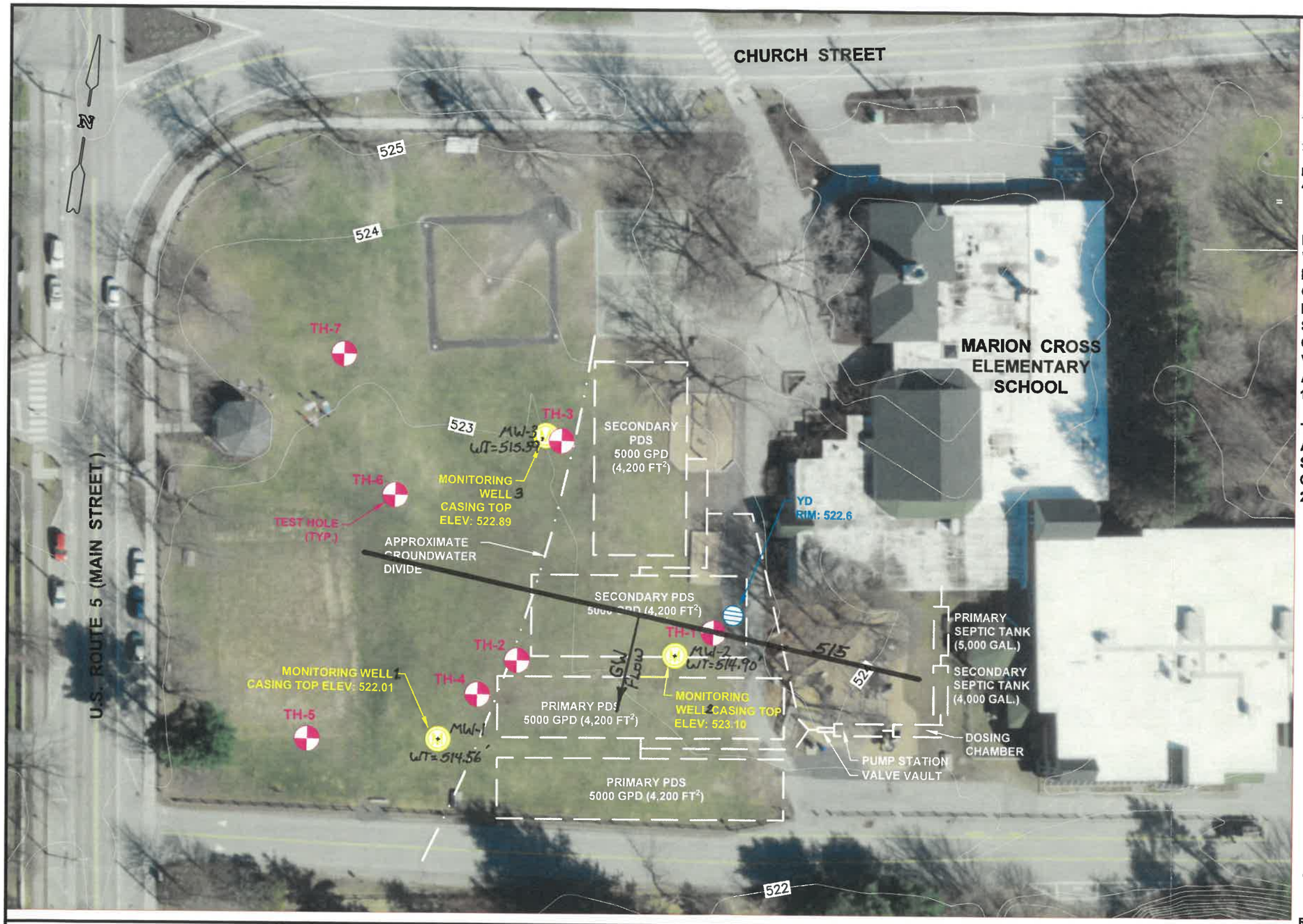
If you have any questions, please don't hesitate to call me at 802-453-4384 or email me at srevell@lagvt.com

Very truly yours,
Lincoln Applied Geology, Inc.

Stephen Revell, CPG
Senior Hydrogeologist

SR/KC
Cc Jeff Goodrich
Tom Candon
Tony Daigle

F:\CLIENTS\2019\19021\Marion Cross School letter.docx



EXISTING SYSTEM

500 STUDENTS WITH KITCHEN=10,000 GPD

10,000 GPD / 1.2 GAL./FT² = 8,333 FT²

DUAL ALTERNATING SYSTEMS
4-4,200 FT² BEDS

NOTE:
WASTEWATER SYSTEM INFORMATION SHOWN ON PLAN OBTAINED FROM PLAN ENTITLED "SEWAGE DISPOSAL SYSTEM DESIGN FOR MARION CROSS SCHOOL, NORWICH, VERMONT", BY K.A. LECLAIR ASSOC. INC., DATED JUNE 30, 1988. PROJECT NO. 112987A.

TEST HOLE, MONITORING WELL, AND YARD DRAIN LOCATIONS SURVEYED BY PATHWAYS CONSULTING, LLC AUGUST 21, 2019.

0 50 100
IN FEET

REV: 08/21/19

Pathways Consulting, LLC
240 Mechanic Street, Suite 100
Lebanon, New Hampshire 03766
(603) 448-2200 FAX: (603) 448-1221

EXISTING CONDITIONS WASTEWATER PLAN

MARION CROSS SCHOOL

22 CHURCH STREET – NORWICH, VERMONT

SCALE:	AS SHOWN
DESIGNED BY:	
DRAWN BY:	CRM
CHECKED BY:	
DATE:	04/05/19
PROJ. NO.	11647

FIGURE
1

Attachment A

Marion Cross School Hydrogeologic Analysis

1/26/18 Wastewater Sampling Report

By Pathways Consulting, LLC

PATHWAYS CONSULTING, LLC
Planning • Civil & Environmental Engineering • Surveying • Construction Assistance
240 Mechanic Street • Suite 100
Lebanon, New Hampshire 03766
(603) 448-2200 • Fax: (603) 448-1221

February 2, 2018

Anthony Daigle, Director of Facilities
School Administrative Unit #70
41 Lebanon Street, #2
Hanover, New Hampshire 03755

RE: WASTEWATER SAMPLING REPORT, MARION CROSS SCHOOL, 22 CHURCH STREET, NORWICH, VERMONT (Project No. 11647)

Dear Mr. Daigle:

Please find enclosed the monitoring data from wastewater sampling that I conducted at the Marion Cross School on January 29, 2018 at the approximate four locations shown on Figure 1, which is attached. Figure 1 also presents January 26, 2018 approximate photo locations on the attached photo log. Endyne Inc., located in Lebanon, New Hampshire, analyzed the samples.

Sampling point PT- 4 tested positive for fecal coliform bacteria by the multiple tube fermentation technique (SM20 9221E) at a concentration of 2 MPN/g, which is a concentration level at the lowest laboratory detection limit. MPN, or Most Probable Number, is a quantification of bacterial density in a sample and is representative of a bacteria colony. In other words, the mixture of soil and ice sampled at PT-4 had the potential to harbor two fecal coliform colonies per gram of ice/soil mixture.

Sampling points PT-1 and PT-2 were taken from the presumed location of the leachfields, and what appeared to me to be the most heavily contaminated area of the playground. PT-1 and PT-2 sampling locations required significant ice chipping in order to collect surface water samples. These samples were negative for fecal coliform bacteria.

All wastewater samples provided to Endyne were partially frozen and required overnight thawing before the fermentation process could begin, which consequently caused the samples to exceed "hold time" and may have affected the lab results (i.e., the less frozen PT-1 and PT-2 samples would have been more dramatically affected by the thaw time than the more frozen PT-3 and PT-4 samples).

Please feel free to contact us if you have any questions regarding this report.

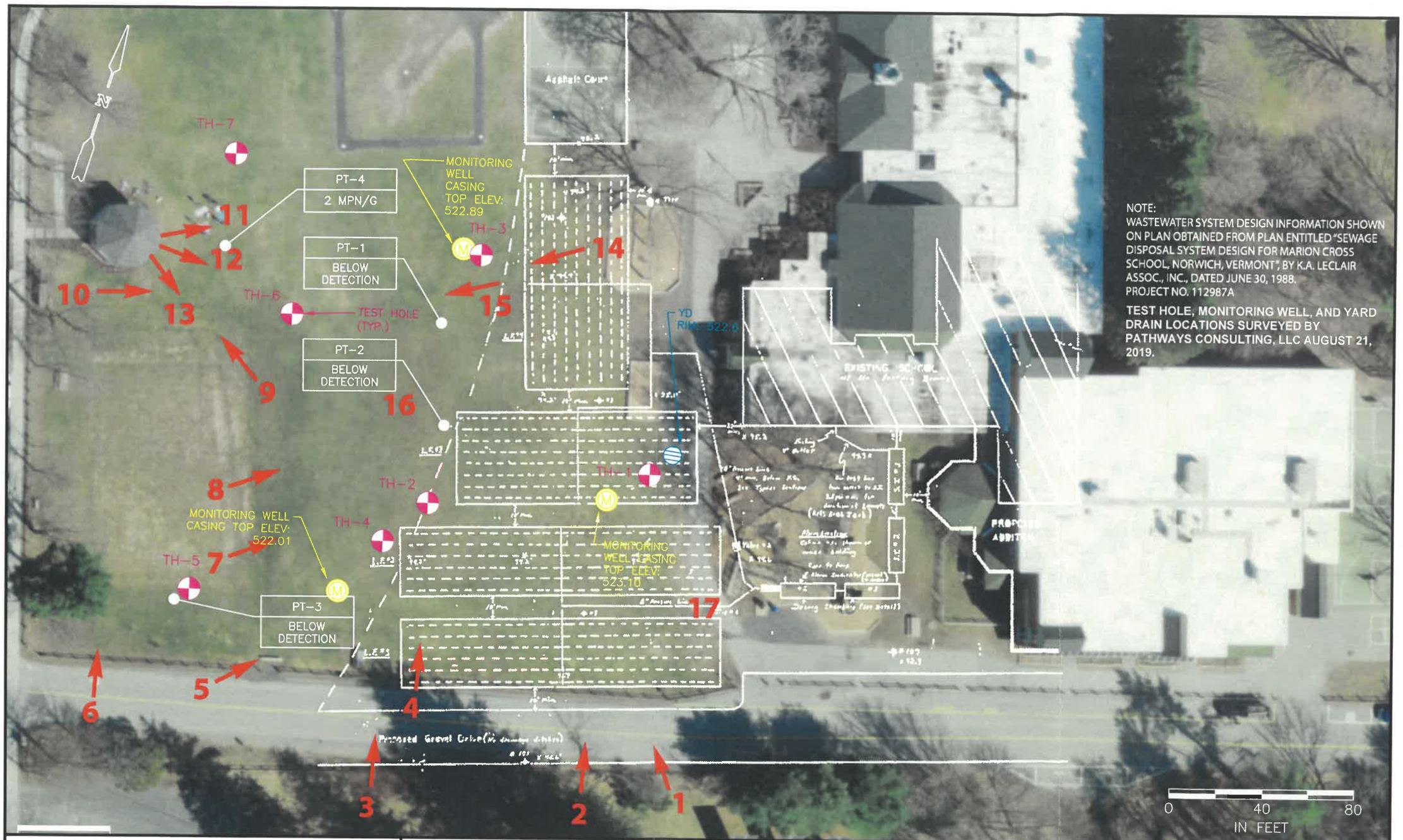
Sincerely,

PATHWAYS CONSULTING, LLC

Thomas H. Philbin
Environmental Engineer

THP:sef
Enclosures

11647.MCSWWSamplingRpt.20180202.thp



NOTE:
WASTEWATER SYSTEM DESIGN INFORMATION SHOWN ON PLAN OBTAINED FROM PLAN ENTITLED "SEWAGE DISPOSAL SYSTEM DESIGN FOR MARION CROSS SCHOOL, NORWICH, VERMONT", BY K.A. LECLAIR ASSOC., INC., DATED JUNE 30, 1988. PROJECT NO. 112987A

TEST HOLE, MONITORING WELL, AND YARD DRAIN LOCATIONS SURVEYED BY PATHWAYS CONSULTING, LLC AUGUST 21, 2019.

Pathways Consulting, LLC

240 Mechanic Street, Suite 100
Lebanon, New Hampshire 03766
(603) 448-2200 FAX: (603) 448-1221

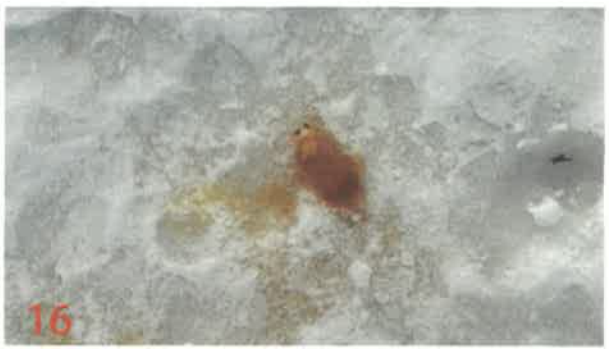
SAMPLING DIAGRAM FOR

MARION CROSS SCHOOL

ROUTE 5 – NORWICH, VERMONT

SCALE: AS SHOWN	FIGURE
DESIGNED BY:	1
DRAWN BY: CRM	
CHECKED BY: JSG	
DATE: 02/02/18	
PROJ. NO. 11647	

01-26-18 PHOTOLOG



01-26-18 PHOTOLOG

Endyne Inc.
Environmental Laboratories

Laboratory Report

Pathways Consulting, LLC
240 Mechanic Street
Suite 100
Lebanon, NH 03766

090570

PROJECT: Pathways Fecal Coliform
WORK ORDER: **1801-02074**
DATE RECEIVED: January 29, 2018
DATE REPORTED: February 01, 2018
SAMPLER: Thomas Philbin

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody located at the end of this report.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

This NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers.

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Alexander J Rakotz
Laboratory Director Lebanon, NH

Laboratory Report DATE REPORTED: 02/01/2018

CLIENT: Pathways Consulting, LLC
PROJECT: Pathways Fecal Coliform

WORK ORDER: **1801-02074**
DATE RECEIVED: 01/29/2018

001 Site: Pt. 1 Date Sampled: 1/29/18 Time: 13:33

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Fecal Coliform	< 2	MPN/g wet	SM20 9221E	1/30/18 14:12	R SMY	U	AN1

002 Site: Pt. 2 Date Sampled: 1/29/18 Time: 13:45

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Fecal Coliform	< 2	MPN/g wet	SM20 9221E	1/30/18 14:12	R SMY	U	AN1

003 Site: Pt. 3 Date Sampled: 1/29/18 Time: 13:56

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Fecal Coliform	< 2	MPN/g wet	SM20 9221E	1/30/18 14:12	R SMY	U	AN1

004 Site: Pt. 4 Date Sampled: 1/29/18 Time: 14:00

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Fecal Coliform	2	MPN/g wet	SM20 9221E	1/30/18 14:12	R SMY	U	AN1

Report Summary of Qualifiers and Notes

AN1: Samples received partially frozen. Samples were thawed and run past method specified holding time. Results may be affected by sample conditions.

Endyne, Inc.
36 ETNA ROAD
LEBANON, NH 03766-1446
Phone: 603-678-4891 Fax 603-678-4893
Email: arakotz@endynelabs.com

LAB USE:
Sample Logged In By: _____
Anomaly Sheet: Y____ N____
Temperature Check: 1.1

Client: Pathways consulting,
Address:

Contact:
Email: Tom.Philbin@Pathways-Consult.com.
Phone No:
Fax No:

LAB USE:
Customer Nos:
Project or WSID#:
Job Template:

CHAIN OF CUSTODY

	Date	Time	Print Name Here:*	Date	Time
Sampled by:* Thomas Philbin					
Relinquished by:	1/29/18	2:50 pm	Accepted by:		
Relinquished by:			Received by Endyne: Kristi Bakarjian	1/29/18	14:53

Sample No:	Sample Location	Sample Date	Sample Time	Matrix	Preservative	Container Material	Container Volume	Containers per Sample	Parameters
-001	Pt. 1	1/29/18	1:33 a.m. p.m.						Fecal coliform
	Pt. 2	1/29/18	1:45						
	Pt. 3	1/29/18	1:56						
	Pt 4	1/29/18	2:00						

Received Partially Frozen.
To be thawed + Run past holding time - KJK 1/29/18
THP

Please return samples within

1801-02074

1801-02074

Pathways Consulting, LLC
Pathways Fecal Coliform

ENDYNE Work Order:

Attachment B

Marion Cross School

6/13/19 Test Hole Information

By Tim McCormick, Soil Scientist

Pathways Consulting, LLC

TEST HOLE #1

TEST HOLE #2

0-18"	VERY DARK GRAYISH BROWN 10YR 3/2; LOAMY SAND; FRIABLE, FIRM IN PLACES; WEAK PLATY (FILL MATERIAL)
18-26"	DARK BROWN 10YR 3/3; LOAMY SAND; FRIABLE; MASSIVE (FILL MATERIAL).
26"-38"	1 ½" STONE AND LEACH FIELD WITH FILTER FABRIC
38– 40"	DARK BROWN 7.5YR 3/2; LOAMY SAND; FRIABLE; MASSIVE.
40- 52"	VERY DARK GRAYISH BROWN 2.5Y 3/2; MEDIUM SAND; LOOSE; SINGLE GRAIN.
52-60"	DARK GRAYISH BROWN 2.5Y 4/2; LOAMY VERY FINE SAND; FRIABLE; MASSIVE (REDOXIMORPHIC FEATURES IN THIS LAYER DUE TO THE CHANGE IN TEXTURE).
60-65"	DARK OLIVE BROWN 2.5Y 3/3; MEDIUM SAND; LOOSE; SINGLE GRAIN

TEST HOLE #3

12-26”	DARK YELLOWISH BROWN, 10YR 3/3 LOAMY SAND; FRIABLE; MASSIVE (FILL MATERIAL). NOTE, LEACH FIELD AT THE SIDE OF THIS HOLE. STONE WAS CLEAN.
26”-28”	DARK GRAYISH BROWN 2.5Y 4/2; LOAMY SAND; FRIABLE, FIRM IN PLACES, MASSIVE
28– 54”	VERY DARK BROWN 2.5Y 3/2; MEDIUM SAND; LOOSE; SINGLE GRAIN

TEST HOLE #4

0-12"	VERY DARK GRAYISH BROWN 10YR 3/2; LOAMY SAND; FRIABLE, GRANULAR (FILL MATERIAL)
12-18”	DARK GRAYISH BROWN, 10YR 4/2 AND DARK BROWN 10YR 3/3; MIX OF LOAMY SAND AND FINE SANDY LOAM; FRIABLE; MASSIVE (FILL MATERIAL).
18”-28”	1 ½” STONE AND LEACH FIELD WITH FILTER FABRIC
28– 32”	DARK GRAYISH BROWN 2.5Y 4/2; LOAMY FINE SAND; FRIABLE; MASSIVE.
32- 48”	ALTERNATING LAYERS OF DARK OLIVE BROWN 2.5Y 3/3; AND DARK GRAYISH BROWN 2.5Y 4/2 FINE SANDS AND MEDIUM SAND; LOOSE AND SINGLE GRAIN TO FRIABLE AND MASSIVE

TEST HOLE #5

0-6"	VERY DARK GRAYISH BROWN 10YR 3/2; LOAMY SAND; FRIABLE, GRANULAR
6-12”	OLIVE BROWN 10YR 3/3; MEDIUM SAND; LOOSE; SINGLE GRAIN;

12"-28" DARK BROWN 10YR 3/3; GRAVELLY LOAMY SAND; FRIABLE; MASSIVE

28– 72" VERY DARK BROWN 2.5Y 3/2 AND DARK GRAYISH BROWN 2.5Y 4/2; ALTERNATING LAYERS OF MEDIUM SAND AND GRAVELLY COARSE SAND; LOOSE; SINGLE GRAIN, REDOXIMORPHIC FEATURES 5.5 FEET FROM THE SURFACE.

72- 84" DARK GRAY BROWN 2.5Y 4/1; MEDIUM TO COARSE SAND; LOOSE; SINGLE GRAIN. (SATURATED)

TEST HOLE #6

0-6" VERY DARK GRAYISH BROWN 10YR 3/2; LOAMY SAND; FRIABLE, GRANULAR (FILL MATERIAL)

6-16" BROWN, 10YR 4/3; LOAMY SAND; FRIABLE; MASSIVE

16"-36" VERY DARK GRAYISH BROWN 10YR 3/2; GRAVELLY COARSE SAND; LOOSE; SINGLE GRAIN

36– 60" ALTERNATE LAYERS OF VERY DARK GRAYISH BROWN 2.5Y 4/2 AND BROWN 10YR 4/3; COARSE TO FINE SANDS; LOOSE; SINGLE GRAIN

60- 96" DARK GRAYISH BROWN 2.5Y 4/2; GRAVELLY COARSE SAND; LOOSE; SINGLE GRAIN. (Mn staining up to 78 inches from the surface).

NOTE: THERE WAS BUILDING DEBRIS (CHARCOAL AND DECAYED BRICK DOWN TO A DEPTH OF 48 INCHES ON THE EAST SIDE OF THIS HOLE).

TEST HOLE #7

0-7" VERY DARK GRAYISH BROWN 10YR 3/2; VERY FINE SANDY LOAM; FRIABLE, GRANULAR

7-21" DARK BROWN 7.5YR 3/3 GRAVELLY COARSE SAND; LOOSE; SINGLE GRAIN

21"-36" OLIVE BROWN 2.5Y 4/3; MEDIUM SAND; LOOSE; SINGLE GRAIN

36– 48" LIGHT OLIVE BROWN 2.5Y 5/3; FINE SAND; FRIABLE; MASSIVE

48- 55" OLIVE GRAY 5Y 4/2; FINE SAND; FRIABLE; MASSIVE (redoximorphic features in this layer to a change in texture).

55- 84" DARK GRAYISH BROWN 2.5Y 4/2; MEDIUM TO COARSE SAND; LOOSE; SINGLE GRAIN REDOXIMORPHIC FEATUERS DUE TO THE SEASONAL HIGH WATER TABLE UP TO 72 INCHES. SOIL SATURATED AT 84 INCHES.

Attachment C

Marion Cross School

7/03/19 Boring/Monitoring Well Descriptions

By Beth Erickson, Senior Hydrogeologist

Lincoln Applied Geology, Inc.

LINCOLN APPLIED GEOLOGY, INC.

163 Revell Road, Lincoln, VT 05443 (802) 453-4384

Page____/____

Client: Marion Cross School		File Number:19021	Boring/Well MW-2
Project: Marion Cross School		**Well Construction Data**	
Date Started: 7/3/19	Date Completed:	Screen: 1.25" 10 slot	From: 3 -To: 10
Logged By: Beth Erickson	Checked By:	Pack: Sand	From: 2 -To: 10
Drilling Co.: T&K Drilling	Driller: Sean and Kevin	Seal: Bentonite	From: 1 -To: 2
Method: Direct Push	Equipment: Geoprobe	Grout:	From: -To:
Boring Depth: 10	Ground Surface Elevation:	Top of Casing Elevation: ground surface/flush mounted roadbox	
Initial GW Level: 6-7 ▽	GW Level: ▽ 7.55	Casing/Stick Up: / Casing Diameter:	

DEPTH	SAMPLE DESCRIPTION	DEPTH	%	RECOVERY	PID	Time
0-3	0-1' - Grass and organic top soil with roots. 1-3' fine sand, some angular gravel			3		
3-6	Medium sand with thin silt/fine sand lenses at 5' and 6'			3		
6-9	6-8' Higher energy coarse to medium sand and rounded gravel. 8-9' fine sand, few thin silt lenses. Wet at 6-7'			1.5		
9-12	Very wet coarse to medium sand and small angular gravel (very little recovery)			1		
12-15	12-14' Wet fine sand, few silt lenses. 14-15' coarse to medium sand			3		
	End of boring at 15 - hole collapsing in due to sands					
	Notes: Closest to building near force main, near TH-1					
	Developed until clear with peristaltic pump. Water at 7.55' BTOC 30 min. after installation					

	Soil Samples			Water Samples	
	Interval	Time	Analysis	Time	Analysis
Wet At 6-7					
Bottom of Boring At: 15					
Time At:					

6.8

	As above, wet			2.5		
9-12						
	9-11' as above. 11-12 fine sand to silt			3		
	Notes: In straight line with 3rd base/homeplate path near kickball field, near TH-3					

Wet At 6

Bottom of Boring At: 12

Time At:

LINCOLN APPLIED GEOLOGY, INC. Soil Environmental Consultants
163 Revell Road, Lincoln, VT 05443 (802) 453-4384

Client: Marion Cross School		File Number:19021	Boring/Well MW-1
Project: Marion Cross School		**Well Construction Data**	
Date Started: 7/3/19	Date Completed:	Screen: 1.25" 10 slot	From: 3 -To: 10
Logged By: Beth Erickson	Checked By:	Pack: Sand	From: 2 -To: 10
Drilling Co.: T&K Drilling	Driller: Sean and Kevin	Seal: Bentonite	From: 1 -To: 2
Method: Direct Push	Equipment: Geoprobe	Grout:	From: -To:
Boring Depth: 10	Ground Surface Elevation:	Top of Casing Elevation: ground surface/flush mounted roadbox	
Initial GW Level: 7 ▽	GW Level: ▽ 6.8	Casing/Stick Up: / Casing Diameter:	

DEPTH	SAMPLE DESCRIPTION	DEPTH	%	RECOVERY	PID	Time
0-3	Grass above sorted fine sand, trace gravel			3		
3-6	Fine to medium sand, some rounded gravel			2.5		
6-9	As above, wet at 7'			3		
9-12	as above, wet			2		
	Notes: Adjacent to TH-4, furthest from school					
	Developed until clear with peristaltic pump. Water at 6.8' BTOC 45 min. after installation					

	Soil Samples			Water Samples	
	Interval	Time	Analysis	Time	Analysis
Wet At 7					
Bottom of Boring At: 12					
Time At:					

Attachment D

Marion Cross School

7/30/19 Hydraulic Conductivity Test Results

And

Site Specific Mounding Analysis and Calibration

By Stephen Revell, CPG Senior Hydrogeologist

Lincoln Applied Geology, Inc.

Hydraulic Conductivity Test Results
Marion Cross School
Wastewater Disposal Area Hydrogeological Analysis
July 30, 2019
By Stephen Revell, CPG Senior Hydrogeologist

1. Test Description

Three falling head type hydraulic conductivity tests were conducted using monitoring well 1,2 and 3. Prior to conducting each test, the wells were pre-soaked by saturating the screen several times. Water levels were monitored with two electric tapes set at the top and bottom of the 7' well screens. Water was added to each well with a hose from a hose bib at the school. After pre-soaking, falling head tests were run on each well and the 5' drop in head from 2' to 7' was timed with a stop watch.

2. Test Method

The three monitoring wells (MW-1, MW-2 & MW-3) are shown on the Overall Site Plan prepared by Pathway Consulting. They are located within the effluent flow system directly adjacent to the disposal area. The three wells were utilized to conduct two falling head hydraulic conductivity/mean permeability tests on February 5, 2019 that were subsequently analyzed using Hvorslev's Method presented below:

$$K=\frac{(411)(D)}{\Delta t}\ln\frac{H1}{H2}$$ where,

K= hydraulic conductivity or mean permeability in feet/day
D= well diameter in feet
H1= water column at test start
H2= water column at test finish
Δt= elapsed time in minutes for the water column drop
411= conversation factor to generate units in feet/day

3. Test Analysis

MW-1

$$K=\frac{(411)(0.104')}{1.2\ minutes}\ln\frac{7'}{2'}$$

K= 42.7 feet/day

MW-2

$$K=\frac{(411)(0.08')}{1.1\ minutes}\ln\frac{7'}{2'}$$

K= 40.48 feet/ day

MW-3

$$K=\frac{(410)(0.083')}{1.1\ minutes}\ln\frac{7'}{2'}$$

K= 40.94 feet/day

Average Hydraulic Conductivity = 41.37 feet/day

Site Specific Mounding Analysis and Calibration
Marion Cross School
Wastewater Disposal Area Hydrogeologic Analysis
By Stephen Revell, CPG Senior Hydrogeologist

1. Site Specific Effluent Mounding Analysis

Using Darcy's Law for a sloping site or Q=kihl, where

Q= Daily Wastewater Discharge, in ft^3/day
k= Hydraulic Conductivity, in feet/day
i= Groundwater Gradient, in feet/foot calculated from the monitoring wells
h= Effluent Mound beneath the disposal area, in feet
l= Length of the disposal area, in feet

Using the data from the falling head test on MW-1, MW-2 and MW-3, where

Q= 5000 gpd or 668 ft^3/day
k= 41.37 feet/day
i= 0.0068 feet/foot
l= 280'
h= solve for h or 8.48' effluent mound

Using literature values for hydraulic conductivity, where

Q= 5000 gpd or 668 ft^3/day
k= 50 & 100 feet/day
i= 0.0068 feet/foot
l= 280'
h= solve for h or 7' and 3.5' effluent mound

2. Calibration of Darcy's Law Model using Hantush Model

The Darcy's Law modeling was reasonably calibrated using the Hantush model which is used to calculate mounding on a site with a flat to low gradient. It assumes flow from all sides of the application area. In the case of this wastewater disposal site, it assumes a flat gradient sand deposit. The Hantush model was run using the following input variables, where

Length of Field= 220'
Width of Field= 100'
Hydraulic Conductivity= 41.37, 50 and 100 feet/day
Specific Yield= 0.001
Time to Approximate Steady State= 10 years or 3650 days
Discharge Rate= 5000 gallons/day
Initial Saturated Thickness= 6 feet

The tabulated results of the Hantush Model are attached which indicate an effluent mound 2.14 feet, 1.86 feet and 1.08 feet will form beneath the application area. The use of the model suggests that the mounding associated with the simultaneous use of disposal fields will be much less than that calculated using Darcy's Law, so the use of Hantush to calibrate Darcy's

Law is not applicable because there is not flow in all directions. The use of the Hantush Model does confirm to the greatest degree the analysis conducted by Wagner, Heindel and Noyes(WHN) in 1988 which showed a 1.5' mound resulting beneath each 5000 gpd system.

3. Calibration of Darcy's Law Model using WHN Groundwater Gradient

The WHN gradient calculated in 1988 was 0.0042 feet/feet. This gradient was used to calculate effluent mounding using Darcy's Law with the same input values that were used in 1. Site Specific Effluent Mounding Analysis.

Q= 5000 gpd or 668 cuft/day
k= 41.37 feet/day, 50 feet/day and 100 feet/day
i= 0.0042 feet/feet
l= 280'
h= solve for h or 13.7', 11.4', and 5.68'

Using the 1988 WHN gradient data, Darcy's Law calculated an effluent mounding of 13.7', 11.4' and 5.68'. Although the effluent mounding was greater using WHN data(which was less than that calculated in #1 above), the results compare favorably with the effluent mounding calculated in #1 above. This comparison suggests that if an active groundwater gradient in a specific direction can be calculated from groundwater elevation data, Darcy's Law or another method for a sloping site should be used because the Hantush Model is based on effluent flow in 4 directions from a disposal field.

Water Table Mounding calculated based on Hantush 1967, WRR

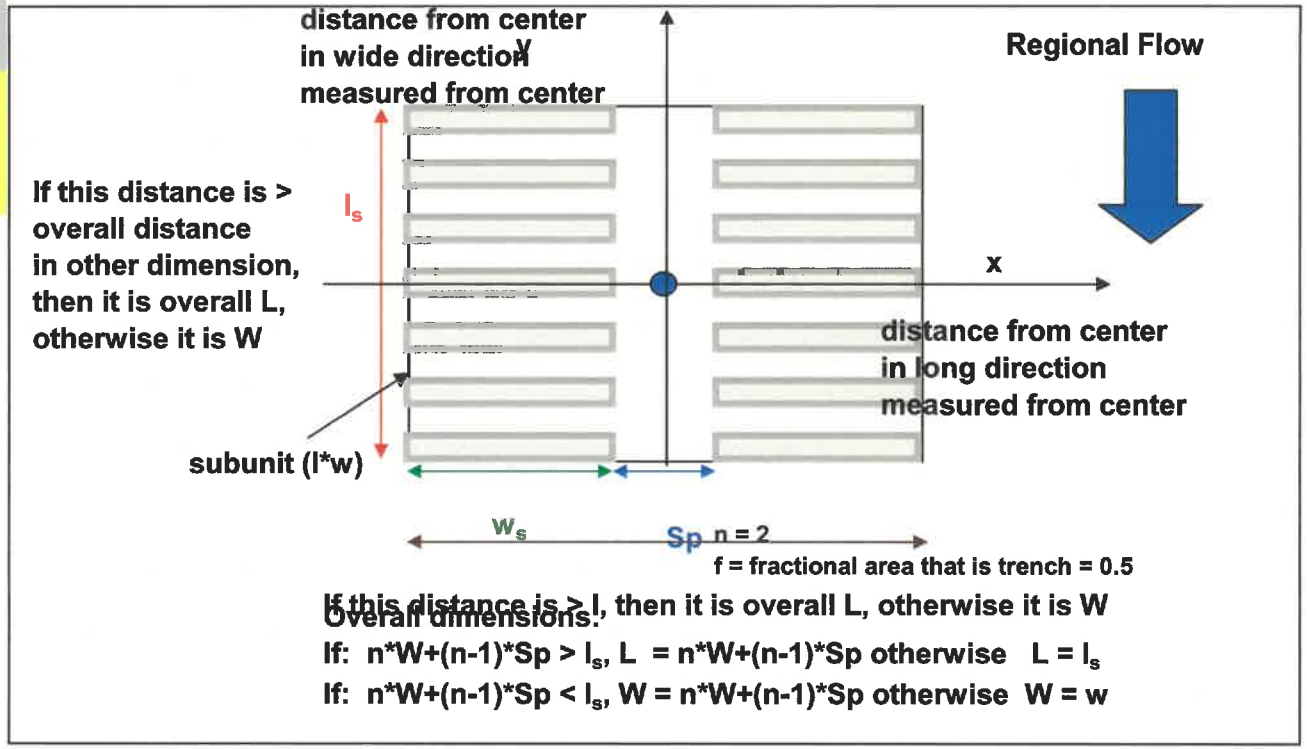
Enter data in green cells as per their yellow labels, other values will be computed from those entr

Results are highlighted in pink.

Zmax Beneath Center of Entire Drain Field (L*W)

Meters and Days	Length of Drain Field Subunit	Width of Drain Field Subunit		Separation between Drain Field Subunits	Fraction of Drain Field Subunit that is Trench Area	Horizontal Hydraulic Conductivity	Specific Yield use 0.001 to approximate steady state at 10 years	time use 10 years to approximate steady state
	l_s	w_s		Sp	f	Kh	Sy	time
	ft	ft		ft		ft/days	none	days
	220	100		0	1	41.37	0.001	3650
Number of subunits, n	L	W	q effective in subunit ls x ws	q in trenches	q' effective on LxW	Q	Zmax 12 iterations	Initial Saturated Thickness
	220	100	ft/day	ft/day	ft/day	gallons/day	ft	ft
1	220	100	0.0304	0.0304	0.0304	5000	2.140	6

ries.



alpha	beta	a2+b2	W part1	W(a2+b2)	S*	z1	hiter	alpha	beta
		NOTE: if a2+b2>0.04, solution is inaccurate							
0.00182725	0.000830568	4.02868E-06	11.84486	11.84485976	2.58667E-05	2.392	7.195948246	0.001668513	0.000758415

Water Table Mounding calculated based on Hantush 1967, WRR

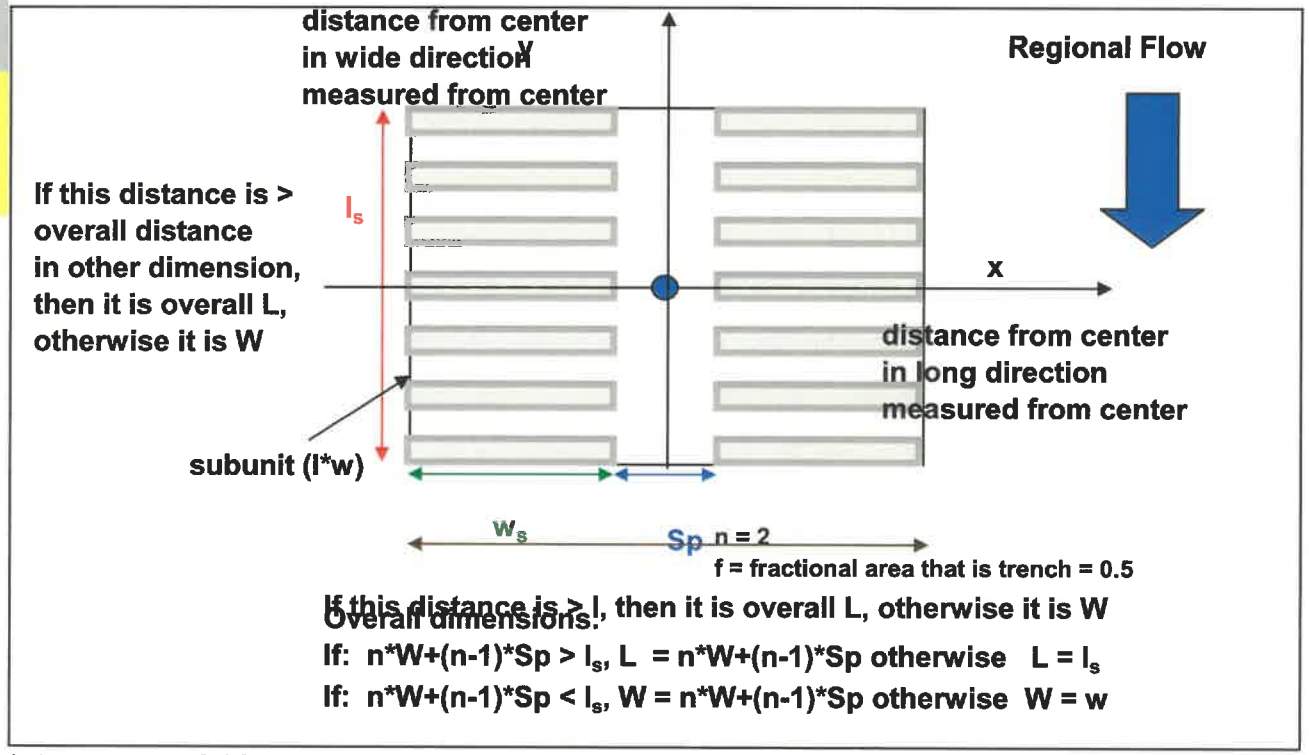
Enter data in green cells as per their yellow labels, other values will be computed from those ent

Results are highlighted in pink.

Zmax Beneath Center of Entire Drain Field (L*W)

Meters and Days	Length of Drain Field Subunit	Width of Drain Field Subunit		Separation between Drain Field Subunits	Fraction of Drain Field Subunit that is Trench Area	Horizontal Hydraulic Conductivity	Specific Yield use 0.001 to approximate steady state at 10 years	time use 10 years to approximate steady state
	l_s	w_s		Sp	f	Kh	Sy	time
	ft	ft		ft		ft/days	none	days
	220	100		0	1	50	0.001	3650
Number of subunits, n	L	W	q effective in subunit ls x ws	q in trenches	q' effective on LxW	Q	Zmax 12 iterations	Initial Saturated Thickness
	220	100	ft/day	ft/day	ft/day	gallons/day	ft	ft
1	220	100	0.0304	0.0304	0.0304	5000	1.858	6

ries.



alpha	beta	a2+b2	W part1	W(a2+b2)	S*	z1	hiter	alpha	beta
		NOTE: if a2+b2>0.04, solution is inaccurate							
0.001662094	0.000755497	3.33333E-06	12.034326	12.03432609	2.1705E-05	2.055	7.027576568	0.001535778	0.000698081

Water Table Mounding calculated based on Hantush 1967, WRR

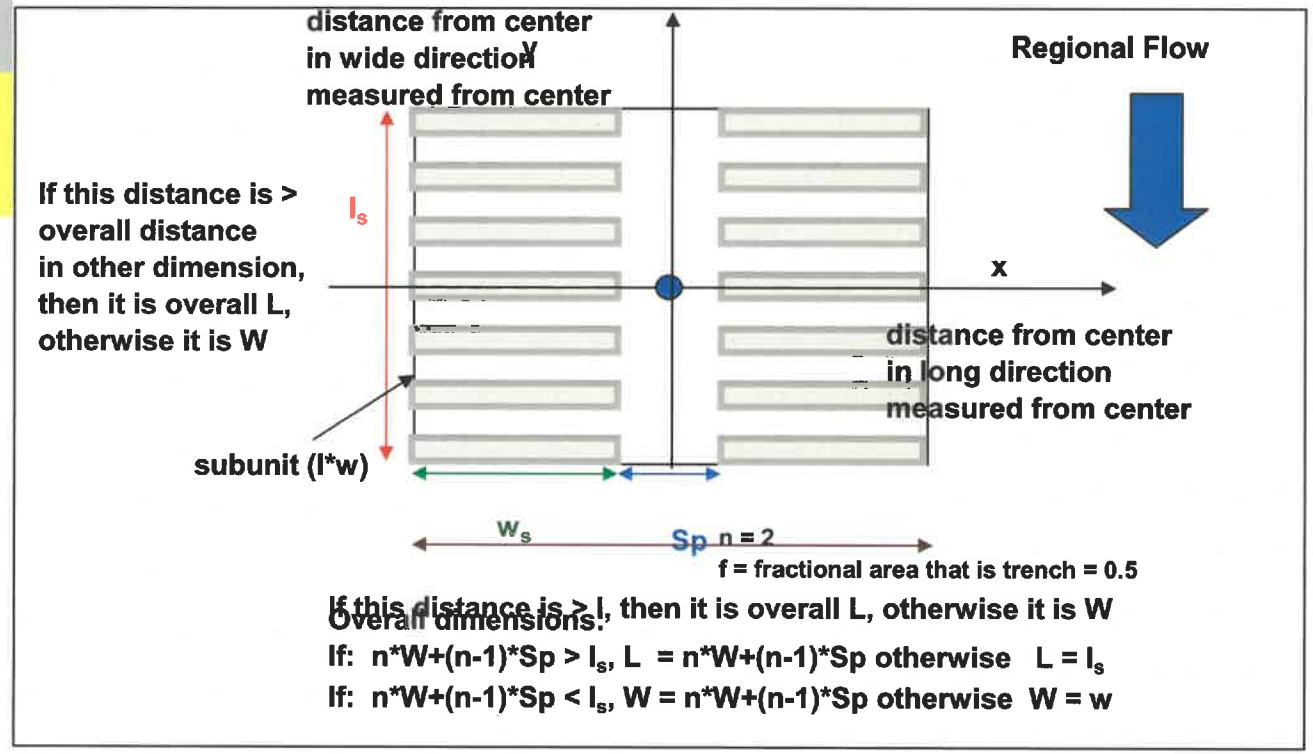
Enter data in green cells as per their yellow labels, other values will be computed from those entr

Results are highlighted in pink.

Zmax Beneath Center of Entire Drain Field (L*W)

Meters and Days	Length of Drain Field Subunit	Width of Drain Field Subunit		Separation between Drain Field Subunits	Fraction of Drain Field Subunit that is Trench Area	Horizontal Hydraulic Conductivity	Specific Yield use 0.001 to approximate steady state at 10 years	time use 10 years to approximate steady state
	l_s	w_s		Sp	f	Kh	Sy	time
	ft	ft		ft		ft/days	none	days
	220	100		0	1	100	0.001	3650
Number of subunits, n	L	W	q effective in subunit ls x ws	q in trenches	q' effective on LxW	Q	Zmax 12 iterations	Initial Saturated Thickness
	220	100	ft/day	ft/day	ft/day	gallons/day	ft	ft
1	220	100	0.0304	0.0304	0.0304	5000	1.079	6

ries.



alpha	beta	a2+b2	W part1	W(a2+b2)	S*	z1	hiter	alpha	beta
		NOTE: if a2+b2>0.04, solution is inaccurate							
0.001175278	0.000534217	1.66667E-06	12.727472	12.7274716	1.14066E-05	1.154	6.57701561	0.00112254	0.000510245

Attachment E

Marion Cross School

03/09/2020 – 03/31/2020

Monitoring Well Figures 1 - 4

Figure 1. Marion Cross School, MW-1, March 9 - 31 Water Elevation (ft)
(Driveway Side of System)

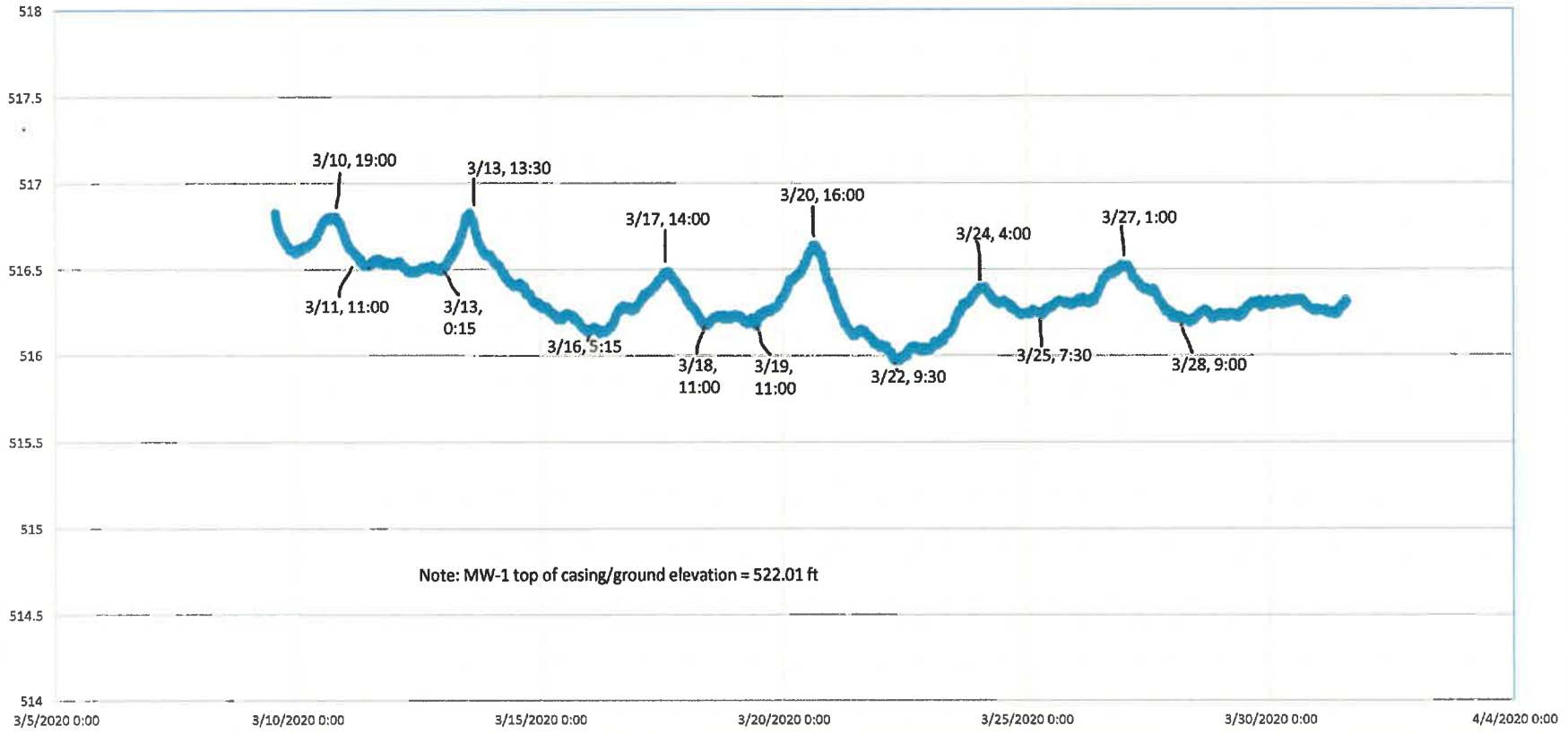
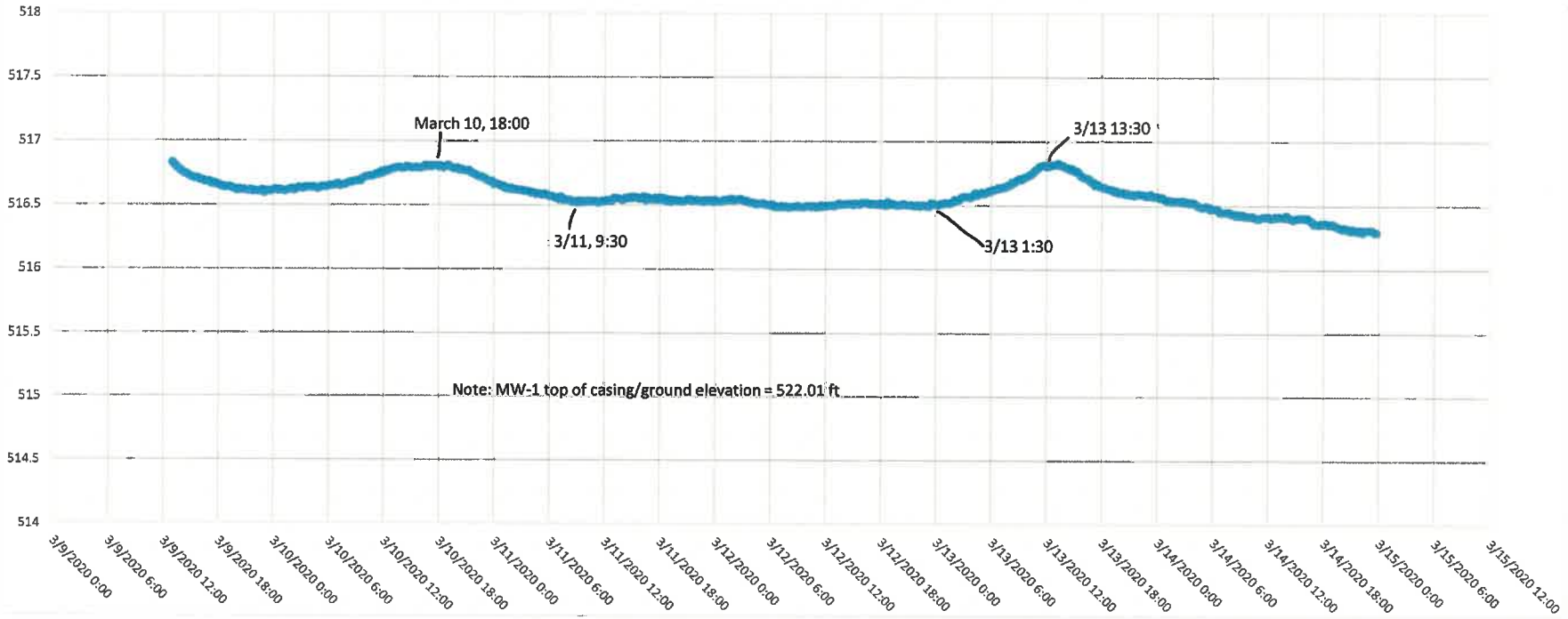


Figure 2. Marion Cross School, MW-1, March 9 - 14, Water Elevation (ft)
(Driveway Side of System)



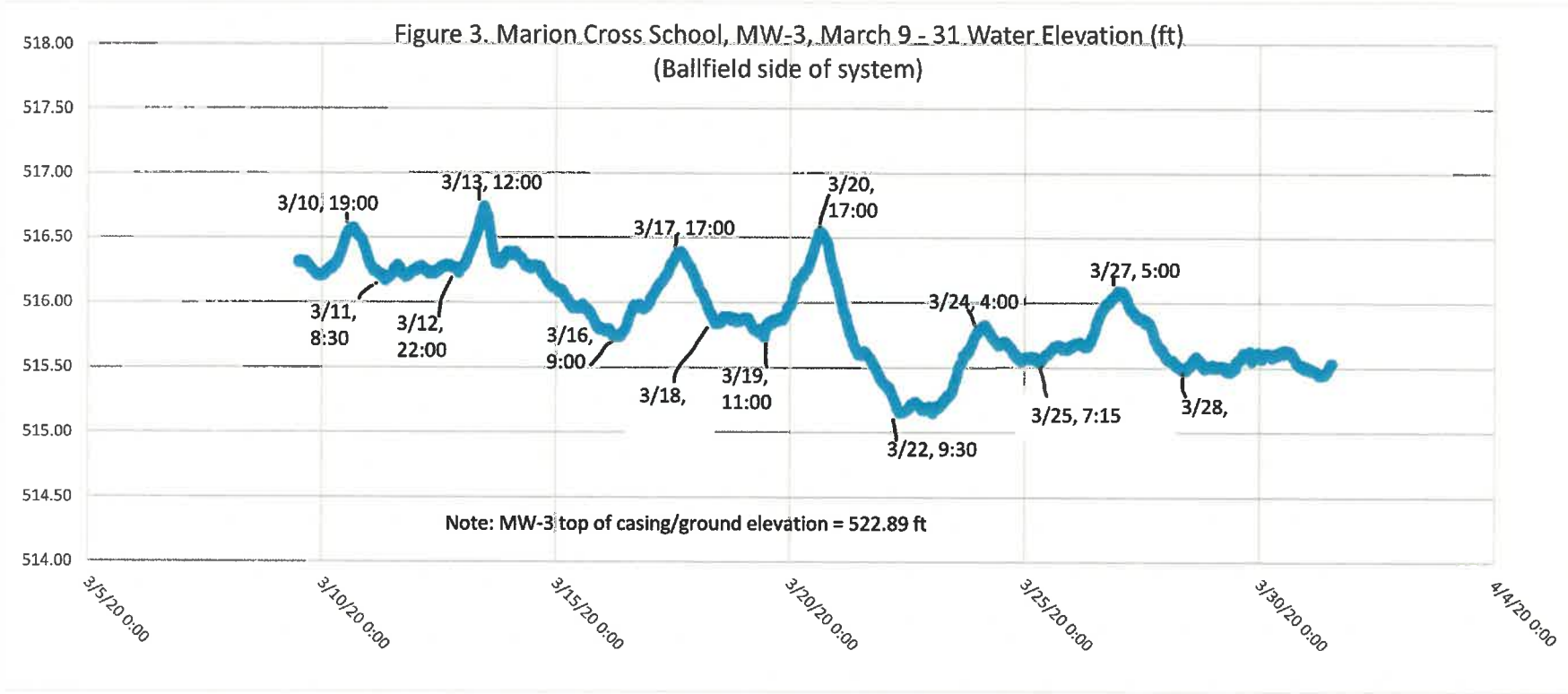
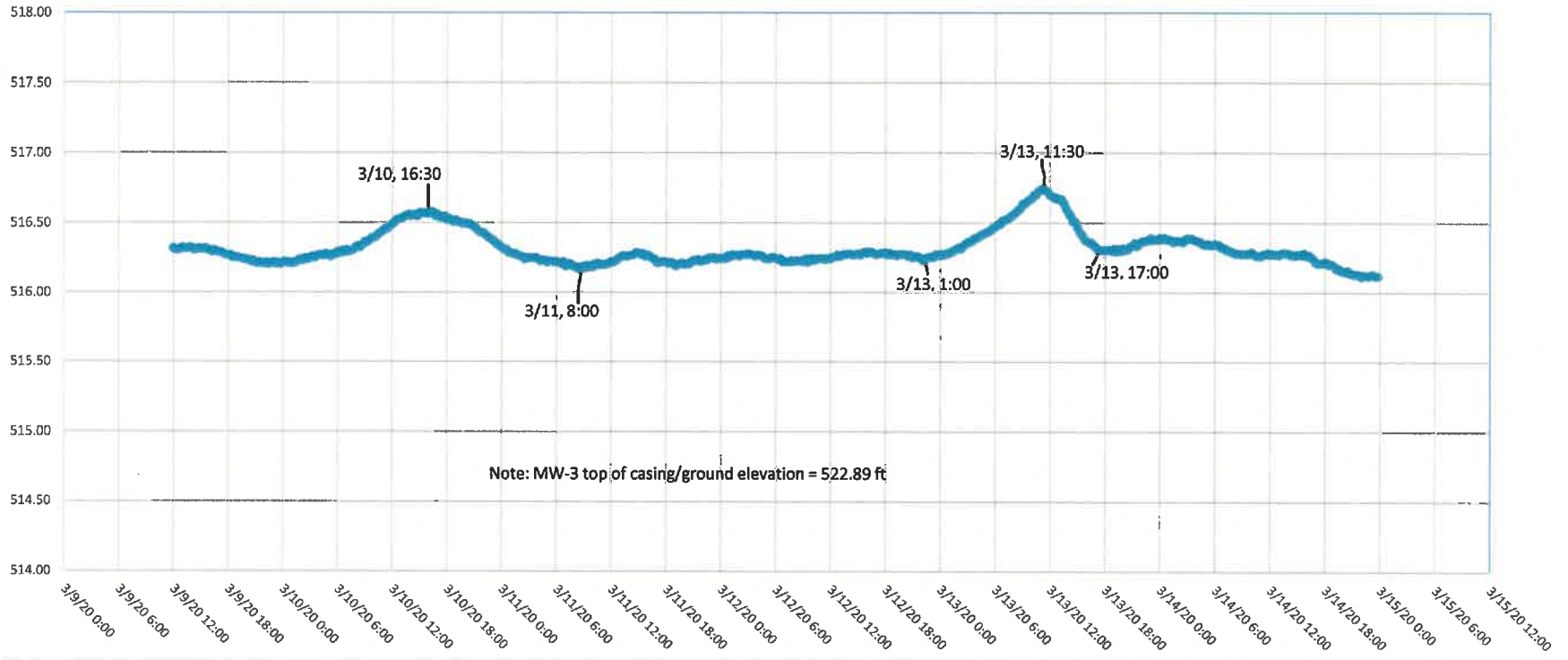
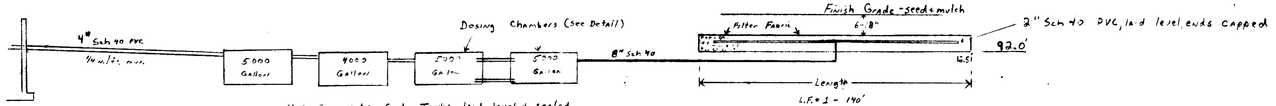


Figure 3. Marion Cross School, MW-3, March 9 - 31 Water Elevation (ft)
(Ballfield side of system)
518.00
517.50
517.00
516.50
516.00
515.50
515.00
514.50
514.00
3/10, 19:00
3/13, 12:00
3/20, 17:00
3/17, 17:00
3/27, 5:00
3/24, 4:00
3/11, 8:30
3/12, 22:00
3/16, 9:00
3/18,
3/19, 11:00
3/22, 9:30
3/25, 7:15
3/28,
Note: MW-3 top of casing/ground elevation = 522.89 ft
3/5/20 0:00
3/10/20 0:00
3/15/20 0:00
3/20/20 0:00
3/25/20 0:00
3/30/20 0:00
4/4/20 0:00

Figure 4. Marion Cross School, MW-3, March 9-14 Water Elevation (ft)
(Ballfield side of system)



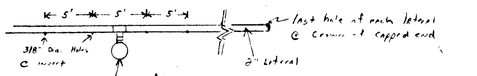


Use Concrete Septic Tanks, laid level + sealed
Use Link-seals or custom-place rubber boots over pipe connections to tanks

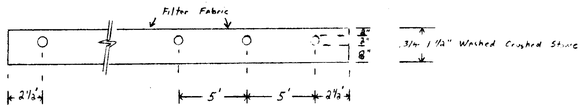
Min. invert at Sill (Existing) - 89.9'
" S.T. #1 Inlet - 89.3'
" S.T. #2 " - 88.8
" Dosing Tank Inlet - 88.4'
" Bottom Pump - 83.5' (Pump off)
" Lateral inverts - 92.7

PROFILE (NTS)

✱ Grease Trap - use automatic grease removal unit on Kitchen sink - 1 @ 4 fixture Units
Suggest: Thermaco Model #200
20 gpm unit or equivalent
70 lb. min. net capacity for Grease
Maximum sink volume of 50 gallons

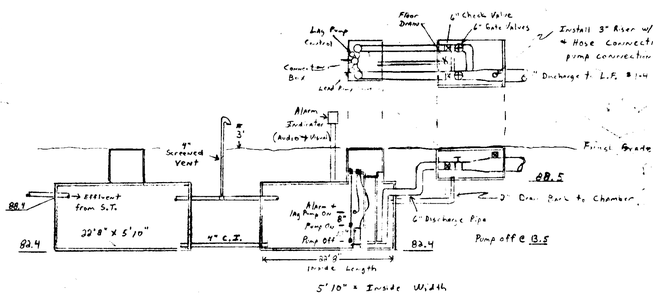


All Pipe Sch 40 or 80 PVC, Glued joints



✱ Rake excavated surface prior to stone placement

BED SECTION (NTS)



5'10" x Inside Width

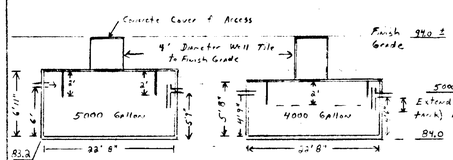
Dosing Chambers

Total Volume req'd: one day storage - 10,000 gallons
Use - two 5,000 gallon septic tanks
sealed + leak proof
Hydraulically connected
Vented to Atmosphere

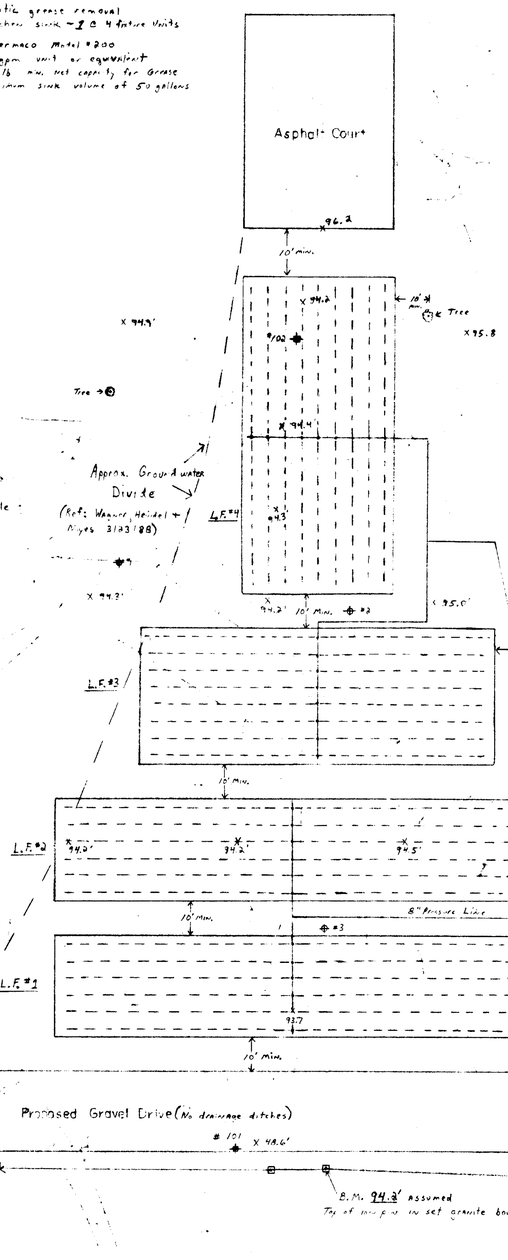
Dose Volume: 4 dose / day = 2500 gal./dose

Pump Criterion
Static head - 9.2
friction head - 2.3 @ 850 gpm
minor losses - 2.6
total 14.1'

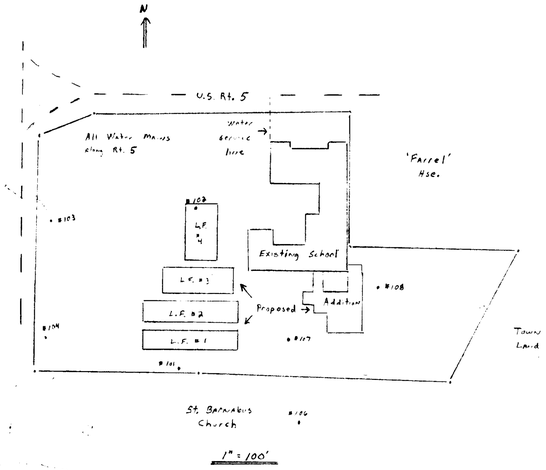
Pump must produce 850 gpm @ 14.1' total head
Use two effluent pumps - Myers 6 6 " or equivalent
Set on/off limits @ 15" for 930 gallon dose
Pumps to be wired such that they alternate doses
Use Alarm to indicate failure & Lamp on Lag Pump on @ Same elev. as Alarm
✱ Use Rail Lift-out System
Bottom of Pump @ Elev. 83.5



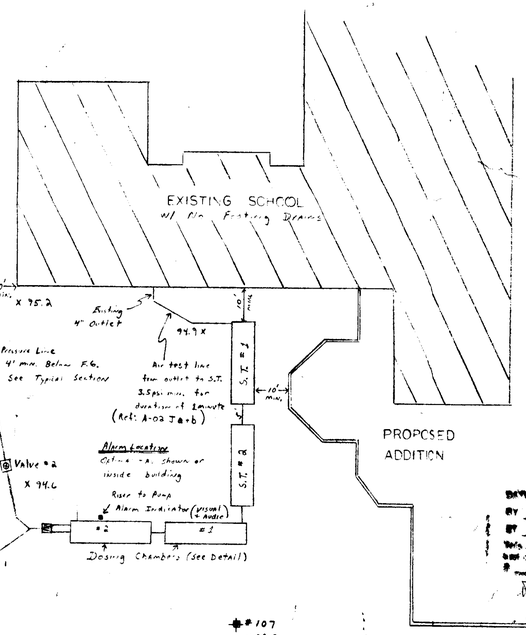
Septic Tank Detail (NTS)

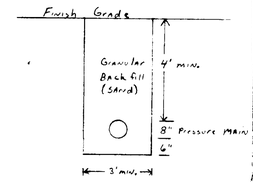


✱ Village has community water supply
Isolation req'd - 50' min. to water line + School Service line from any Septic System component



1" = 100'





Typical Trench Section (N.T.S.)
(Pressure Line)

STATE OF VERMONT
KENNETH A. LECLAIR
No. 2301
REGISTERED
PROFESSIONAL ENGINEER

DESIGN DATA

500 students w/ kitchen = 10,000 g.p.d.

Required: dosing, dual alternating systems, 4 leach fields - 5,000 g.p.d. each

⊕ Perc rate: # 1 - 4 min./in., #2-3 3 min./in. @ 36" depth
Loading: 1.2 g.p.d./ft²
Area required: 4167 ft² per system
Use 4200 ft²

L.F. #1 - 30' x 140'
#2 - 30' x 140'
#3 - 40' x 105'
#4 - 45' x 95'

Septic Tanks:
req'd volume = 1125 + .75 Q = 8625 gal.
S.T. #1 - 5000 gallon
#2 - 4000 "

✱ Use Leach Fields #3 & 4 on every Number years
" " #1 & #2 add

✱ Control is w/ 8" Butterfly valves ⊗ (Install in Concrete Box w/ access cover)
Example: Shut valve #1 on even years
Open " #2 " "

✱ Bottom of stone to be a maximum of 30" Below Original Grade @ uphill side

Soils: see Indirect Discharge Permit Application

✱ Hydrostatic Leakage test for 8" Pressure Line
50 psi min. for 2 hour duration
ref: Environ. Protection Rules Pg. A-14, A-18 & H
Allowable Leakage = $\frac{8NLP}{7400}$ (Gals./hr.) — P = Avg. test press. — No. Joints in tested length

APPROVED
DIVISION OF PROTECTION
DATE 7/26/88
BY Roger Thomson
This approval is subject to the terms and conditions of Land Use Permit #
PB-3-0867
OFFICE COPY

SEWAGE DISPOSAL SYSTEM DESIGN

MARION CROSS SCHOOL

NORWICH, VERMONT

SCALE 1":20'

APRIL 21, 1988
Revised 6/10/88
Revised 6/26/88
Revised 6/30/88
PROJECT NO. 112987A

K.A. LECLAIR ASSOC., INC.
CIVIL ENGINEERS
HANOVER, N.H.

5.A-ORIGINAL PERMIT INFORMATION
WW=3-0026

BM CONTROL
SET HORZ. SPIKE WITH CAP IN POLE # 2/2
ELEV. 97.88

ROUTE 5 (CHURCH STREET)

460' ± ALONG ROAD R.O.W.

350' ± ALONG R.O.W.

ROUTE 5 (MAIN STREET)

ELM ST.

BAND STAND

EXISTING SCHOOL
1st. floor-on conc. 96.35

PROPOSED ADDITION

PROPOSED ADDITION

FL. ELEV. 99.89

FERRELL

ROBICHAUD

ST. BARNABAS CHURCH

TOWN OF NORWICH

TOWN OF NORWICH

TOWN OF NORWICH

LEDGE OUTCROP

TRUE NORTH
BY SOLAR OBSERVATION

LOCUS MAP

SITE

Norwich

CONNECTICUT

INTERCHANGE

Yantic

N 82° 39' 30" E
248.4'

S 84° 46' 30" E
111.1'

S 81° 17' E
150.0'

S 08° 43' W
100.0'

S 08° 51' E
194.7'

S 82° 32' W
369.9'

S 81° 21' W
239.4'

N 18° 38' 30" E
215.0'

N 81° 17' W
170.4'

S 18° 19' W
181.2'

S 18° 38' 30" W
175.0'

N 71° 21' W
105.0'

MAP SYMBOLS

- EXISTING IRON PIPE
- EXISTING IRON ROD
- EXISTING GRANITE POST
- EXISTING BOUNDARY POINT
- STONEWALL
- WIRE FENCE

0 30 60 90 120 150

APPROVED
DIVISION OF PROTECTION
DATE 7/26/88
BY Roger Thorpe
BY
This approval is subject to the terms and conditions of Land Use Permit
Number
LUP-3-0867-1
OFFICE COPY

TOTAL AREA – 7.0 ACRES ±

TOPOGRAPHIC MAP AS REQUESTED

I HEREBY CERTIFY THAT I HAVE MADE A SURVEY OF THE TRACT SHOWN HEREON AND THAT THIS PLAT IS MADE IN ACCORDANCE WITH THE FIELD NOTES OF SAID SURVEY.

REVISED 6/14/88 - ELEV. CONTROL
REVISED 7/12/88 - BOUNDARY & PROPOSED BUILDINGS

MARION CROSS SCHOOL
CHURCH STREET NORWICH, VT.
Scale 1" = 30' Date JUNE 9, 1988
Proj. No 112987C

K. A. LECLAIR ASSOC., Inc. Civil Engineers
HANOVER, N.H.

BB-6-87

5.B ORIGINAL PERMIT INFO
TOPOGRAPHICAL MAP
WW-3-0026

State of Vermont

LAND USE PERMIT

CASE NO:	WW-3-0026	LAWS/REGULATIONS INVOLVED:
APPLICANT:	MARION CROSS SCHOOL	Environmental Protection
ADDRESS:	CHURCH STREET	Rules, effective
	NORWICH, VT 05055	September 10, 1982.

This project, consisting of renovations and additions to an existing school to accomodate a total of 500 students and staff on Route 5, Norwich, Vermont is hereby approved under the requirements of the regulations named above subject to the following conditions:

1. The project must be completed as shown on the plans prepared by Kenneth LeClair, P.E., two sheets entitled:
   A. "Sewage Disposal System, Marion Cross School" dated April 21, 1988, revised June 30, 1988;
   B. "Topographic Map As Requested, Marion Cross School" dated June 9, 1988;
   which have been stamped APPROVED by the Division of Protection. No alteration of these plans shall be allowed except where written application has been made to the Agency of Environmental Conservation and approval obtained.
2. A copy of the approved plans and the Land Use Permit shall remain on the project during all phases of construction and, upon request, shall be made available for inspection by State or Local personnel.
3. No alterations to the existing building other than those indicated on the approved plan, which would change or affect the interior waste plumbing, water supply, or wastewater disposal shall be allowed without prior review and approval from the Agency of Environmental Conservation.
4. This Land Use Permit does not relieve you, as applicant, from obtaining all applicable approvals that may be required from the Department of Labor and Industry, the Department of Health or the Town prior to construction.
5. This permit shall in no way relieve you of the obligations of Title 10 Chapter 48, Subchapter 4, for the protection of groundwater.
6. The project is approved for the existing connection to the municipal water system. No other means of obtaining water is permitted without prior review and written approval.
7. The wastewater disposal system shall be constructed as shown on the APPROVED plan and shall be operated at all times in a manner that will not permit the discharge of effluent onto the surface of the ground or into the waters of the State. No construction (buildings, roads, water lines, etc.) that might interfere with the installation or operation of the sewage disposal field or its replacement area is permitted. All isolation distances as set forth in Environmental Protection Rules, Chapter 8, Section 8-08, and Chapter 7, Appendix 7-D, shall be adhered to.
8. The installation of the wastewater disposal system shall be inspected by a registered engineer who shall report in writing prior to use, or occupancy, that the work has been done in accordance with the approved plans and the permit.
9. Prior to covering any interior plumbing the Department of Labor and Industries shall be notified at 828-2106 so that they may inspect the work.
10. The wastewater disposal system shall be constructed, maintained and operated as described in Indirect Discharge Permit #ID-9-0021 issued by Patrick Parenteau, Commissioner on August 2, 1988.
11. There shall be no siamese connection installed on the sprinkler system. No antifreeze or chemicals shall be added to the sprinkler line.

PATRICK A. PARENTEAU, COMMISSIONER
DEPARTMENT OF ENVIRONMENTAL
CONSERVATION

DATE: AUGUST 11, 1988

BY Daniel Wilcox for Roger Thompson
REGIONAL ENGINEER

cc: Norwich Town Planning & Board of Selectmen
Don Robisky, Chief of Engineering Services
Kenneth LeClair, P.E.
Department of Labor & Industry

State of Vermont

WASTEWATER SYSTEM AND POTABLE WATER SUPPLY PERMIT
WW-3-0026-R
(PIN#NS88-0037)

LAWS/REGULATIONS INVOLVED:
Environmental Protection Rules Chapter 1 and Chapter 21

LANDOWNER(s): Norwich School Board
Marion Cross School
ADDRESS: 22 Church Street
Norwich, VT 05055

This project, an amendment to reflect reduced design flows, located on Church Street in Norwich, Vermont is hereby approved under the requirements of the regulations named above subject to the following conditions:

1. The project shall be completed in accordance with the application submitted by Jonathan Brush. No changes shall be made to the project without prior written approval from the Wastewater Management Division.

2. This project is approved for the following uses and maximum design flows. No changes to these uses and design flows are allowed without prior written approval from the Division of Wastewater Management.

Use	Flow
Existing school with up to 364 students and staff	5460 gpd

3. Construction of additional buildings, including public buildings, single-family residences, duplexes and condominium units, is not allowed without prior review and approval by the Division of Wastewater Management, and such approval will not be granted unless the proposal conforms to the applicable laws and regulations.

4. This permit affects property referenced in a deed recorded in Book(s) 18, 9, 15, 30 Page(s) 492-493, 456-457, 393-394, 291 of the Norwich, Vermont land records. The conditions of this permit shall run with the land and will be binding upon and enforceable against the permittee and all assigns and successors in interest. **The permittee shall be responsible for recording this permit in the Norwich Land Records within 30 days of receipt of this permit and prior to the conveyance of any lot subject to the jurisdiction of this permit.**

5. The wastewater system(s) shall be shall be operated at all times in a manner that will not permit the discharge of effluent onto the surface of the ground or into the waters of the State. No construction (buildings, roads, water lines, etc.) that might interfere with the operation of the sewage disposal field is permitted. All isolation distances as set forth in Environmental Protection Rules shall be adhered to.

6. All previous permits and Certifications of Compliance issued by Division of Wastewater Management shall remain in full effect except where specifically modified or amended herein.

7. If a wastewater or water system serving a project fails, a revised permit shall be obtained from the Wastewater Management Division prior to installing any replacement system.

8. By acceptance of this permit, the landowner agrees to allow representatives of the State of Vermont access to the property subject to this permit, at reasonable times, for the purpose of ascertaining compliance with Vermont environmental/health statutes, regulations, and permit conditions, including performing an inspection of the wastewater disposal and water supply systems serving each structure.

9. A copy of the approved plans and this permit shall remain on the project during all phases of construction and, upon request, shall be made available for inspection by State or local personnel.

10. Each prospective purchaser of any portion of the approved project shall be shown a copy of the approved plan and the Wastewater System and Potable Water Supply Permit before any written contract of sale is entered into. In the event of a transfer of ownership (partial or whole) of this project, the transferee shall become permittee and subject to compliance with the terms and conditions of this permit.

11. This permit does not relieve you, as applicant, from obtaining all applicable approvals that may be required from the Act 250 District Environmental Commission, the Department of Public Safety, the Department of Health, the State Wetlands Program and other State Agencies or the Town prior to construction. This permit shall in no way relieve you of the obligations of Title 10 Chapter 48, Subchapter 4, for the protection of groundwater.

12. The Division's issuance of this Permit relies upon the data, designs, judgment and other information supplied by the applicant, his or her professional consultants and other experts who have participated in preparation of the application. The Division makes no assurance that the approved system(s) will meet performance objectives of the applicant and no warranties or guarantees are given or implied.

LAURA Q. PELOSI, COMMISSIONER
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

BY _____ DATE: JUNE 23, 2008
JEFF SVEC, ASSISTANT REGIONAL ENGINEER

Copies: Norwich Town Planning & Select Board
Jonathan Brush
Department of Public Safety
John Akielaszek, Indirect Discharge Section Chief