PATHWAYS CONSULTING, LLC

Planning • Civil & Environmental Engineering • Landscape Architecture • Surveying • Construction Assistance
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Wilder, Vermont 05088 — Lebanon, New Hampshire 03766
(802) 295-5101 — www.pathwaysconsult.com — (603) 448-2200

August 31, 2018

Jamie Teague, Business Administrator
Dresden School District
41 Lebanon Street #2
Hanover, New Hampshire 03755

RE: CONCEPTUAL ALTERNATIVES EVALUATION FOR DRESDEN RECREATION FIELDS AND MARION CROSS SCHOOL, NORWICH, VERMONT
(Project Nos. 10021 and 11647)

Dear Jamie:

In the context of our ongoing assistance for the Dresden School District (District), we offer this conceptual alternatives evaluation to build on our long-term efforts for the Dresden Recreation Fields (Fields) on Route 5 South in Norwich and monitoring of the Marion Cross School (MCS) on-site wastewater disposal system (System).

Recent Fields Assistance

Our recent assistance with respect to the fields relates to water quality observations and reporting in support of existing permits.

Fields History

As part of our long-term assistance, members of our staff provided the District with a February 12, 2001 report, which was submitted to Ken Greenbaum, Superintendent, concerning options for water and sewer service for placement of a Middle School or a High School on the Fields property on Route 5 (Figure 2 from this report is attached as Attachment 1). This report presented general water and wastewater options for the District's land on Route 5. The District subsequently requested assistance with recreation complex planning, as shown on the Attachment 2 master plan entitled "Norwich Athletic Fields," dated March 11, 2003 under project number 10021. Following public votes and District planning, we prepared refined plans and assisted with Act 250 and local permitting for the Fields (generally shown on Attachment 3, a plan entitled, "Overall Site Plan," dated October 2005, project number 10021). Whereas initial Fields planning included restroom, shower, changing, and team facilities, Act 250 permitting excluded this amenity and the District did not pursue water and sewer alternatives further at the time.

Recent MCS Assistance

In concert with Tony Daigle and District staff, we assisted with documenting and testing the emergence of effluent on the MCS Green. Testing confirmed that effluent emanated from the System beneath the Green. Our observations and findings were summarized in our February 2, 2018 letter report to Tony. Additionally, given the condition of the System, we assisted with soliciting an updated Vermont Department of Environmental Conservation & Natural Resources

Board Project Review Sheet (PRS) to accommodate a Pre-K program for the current school year. Terry Shearer, Vermont Agency of Natural Resources (VANR) District 3 Regional Engineer, signed the PRS on June 20, 2018 including conditional notes related to the need to repair the MCS System. Additionally, we have discussed the pursuit of repair options with members of the District staff and members of the Town of Norwich (Town) staff.

MCS System History

In general terms, K.A. LeClair Associates, Inc. prepared new System plans in 1988 for MCS in support of significant building and site renovations implemented at that time. The plans were approved on July 26, 1988 by VANR District 3 for a system capacity of approximately 10,000 gallons per day (gpd) with effluent treatment in 5,000-gallon leachfields to be managed in a dual alternating context using four beds (please see Attachments 4A and 4B). The system was subsequently approved later in 1988 for an Indirect Discharge Permit (IDP), which is required for flows greater than 6,499 gpd, under Permit No. ID-9-0021. To reduce monitoring efforts and other regulatory considerations, we understand that the District revised the permit, as summarized in the referenced PRS, on March 23, 2008 under permit number WW-3-0026-R to accommodate 5,460 gpd for 364 students and staff. In other words, the District received approval for nearly a 50% reduction in flow and eliminated the need for an IDP.

We understand that MCS began addressing concerns about the System beneath the Green as early as 1998 and attempted various maintenance endeavors then and over ensuing years to address what appeared to be the emergence of effluent at the ground surface during winter months. We understand that the District has provided general updates to VANR representatives while seeking to manage each recurrence of effluent emergence; the VANR would now like to see the System repaired as soon as practicable. Our experience with many systems throughout the region suggests that the unique circumstances associated with the MCS Green contributed to System problems and that these problems are likely to persist over time even if the system is replaced. Our general thoughts in this regard:

1. Our experience with K.A. LeClair Associates, Inc. over many years is that the firm provided diligent work on behalf of its clients (the last principal of the firm retired and the firm is no longer in business).
2. The original design was for 10,000 gpd.
3. Although we expect Systems to last more than 10 years, it appears that System problems developed within 10 years of construction. Our concerns about this timeframe are compounded when the actual use of approximately half of the permitted capacity is considered. In other words, although the System was permitted for 10,000 gpd, it was actually receiving approximately 5,000 gpd and began to exhibit problems within 10 years, even with the reduced use.
4. While we cannot definitively say what caused the emergence of System problems so quickly, it seems reasonable to conclude that the System was properly designed and installed, but realized problems from:

    a. The green is used as a playground and for public gatherings. While pedestrian use of the green may not impose weight-related impacts on the System, constant use in winter months results in the elimination of snow, or compaction of snow to

an ice layer, which reduces protection of the System during periods of frost susceptibility.

b. The green has been used on and off for many years for the Norwich Fair and other public events that induce vehicle loads on the System.

c. Considering the preceding and other likely System impacts (e.g., the removal of a maple tree and its large root system, the installation of water lines after System construction, use of the green for a skating rink, etc.), it is no surprise that the original System began to exhibit problems well before expected. These considerations also suggest that any replacement System will likely realize similar problems sooner than expected.

d. The problems evidenced suggest a likely System replacement schedule of 10 years for capital planning and budgeting.

5. Since the green is a treasure, gathering place, and focal point for the Town, we have been asked to look at conceptual planning and budgeting alternatives to replace the existing MCS System.
6. We understand that the District has implemented a water meter reading plan, which may be used for future permitting.

MCS Replacement Options

The District would like to understand general options to replace the existing MCS System. In this context, we present the following pursuant to a meeting with District staff on June 5 of this year.

Option 1 – Replacement on the Green (see Attachment 5)

Technology and regulatory provisions have changed since the time of the original System permit in 1988. While it may be possible to replace the existing System to include structural protection from vehicles on the green (we would need to evaluate soil conditions, seasonal high water table, and System replacement depths to ascertain the viability of chambers/structural protection), pedestrian use of the green in the winter will likely continue to make any new System susceptible to frost, particularly in winter break periods when effluent is not injected into dual alternating leachfields.

While there are many unknowns about the existing System (from current regulatory constraints to soil and tank conditions, including mechanical appurtenances), replacement of the System will lock MCS into current use levels of 5,460 gpd for 364 students and staff. Assuming in-kind replacement is possible on the Green, MCS and the District should consider future needs before planning, design, and permitting for a new System, including the potential for seeking an IDP, based on water meter data.

For the purpose of order of magnitude budgeting, we would recommend use of $50/gallon to replace the existing system, or approximately $275,000. Although this macro budget considers only System replacement, it is helpful to understand the scale of repair needs, particularly if the 10 year cycle of repair continues.

Option 2 – Replacement on the Town/Peisch Property (Attachment 6)

As a result of interaction with District and Town staff, we conducted auger probes on the Peisch property after the growing season began in May to evaluate soil conditions. While it appears possible to use the Peisch property to treat MCS wastewater needs, further field analyses will be required to establish actual System requirements and viability. As we have discussed, the Peisch property is owned by the Town and has a conservation easement with the Upper Valley Land Trust, which we provided for your use, along with St. Barnabas site information (Attachment 7), on February 16, 2018. Additionally, we have met and followed up with Rebecca Chalmers, VANR District Wetlands Ecologist, to evaluate wetlands on MCS and Peisch properties, which we understand are Class II and will require a 50-foot buffer for permitting considerations.

Although there are many unknowns relative to the use of the Peisch parcel for MCS wastewater needs, like the existing Green site, we would recommend use of $50/gallon for the purpose of order of magnitude budgeting with an additional $100,000 for a new pump station and forcemain to the site, or approximately $375,000. Like the Green site, this macro budget only considers current MCS uses, but this site may accommodate higher flows for more students and staff. Unlike the Green site, the system should not need repair or replacement at the same frequency.

Option 3 – Municipal Connection

The attached graphic (Attachment 8) builds on information presented in our 2001 analysis for the District, which included work by members of our staff a number of years ago to assist the Town of Hartford and various private clients with implementing Olcott Park. In short, Olcott Park is served by municipal water and sewer supplied by the Town of Hartford. The sewer system includes a gravity line to a pump station, and then a forcemain south along Route 5. We understand through recent interaction with the Hartford Town Manager that the Hartford sewer system has the capacity to accommodate potential District needs. Strategic considerations for a municipal connection include:

1. Placing the District in a position to manage costs for implementation and reimbursement over time. In this context, it makes sense for the District to develop an agreement with the Town of Hartford if this alternative is chosen.

    a. The District may be eligible for loans and grants for a municipal connection (e.g., USDA RD, VEDA, SRF, and CDBG).
    b. The District could manage loans and grants for other eligible participants in the context of reimbursement. In other words, if the District invests in a potential long-term solution for MCS wastewater needs, the District should manage reimbursement as others along the corridor tie-in (e.g., The Family Place, the Fogg's complex, King Arthur Flour, The Car Store, and others).
    c. Receipt of public funds are likely to be predicated on the environmental benefits of connecting existing businesses along the Route 5 corridor.

2. The distance from Olcott Drive to MCS is approximately 7,000 linear feet (LF). A MCS connection to Hartford would likely need to be along the Route 5 corridor to optimize the potential for public loans and grants so that others can connect.

a. King Arthur Flour (KAF) contemplated a municipal connection to Hartford with its most recent addition to the Camelot master plan. Our historical master planning assistance on behalf of the Sands (previous owners) suggests that KAF could greatly benefit from a municipal connection. Assuming KAF may have interest in a connection, a connection from KAF to the Hartford wastewater system is approximately 3,200 LF, leaving approximately 3,800 feet to connect MCS.

b. Our recent experience with a similar project using SRF and USDA RD funds suggests that directional drilling, at an approximate unit cost of approximately $210/LF, would be appropriate for a Route 5 municipal connection (this approach eliminates the need for road trench excavation and pavement impacts).

c. Pump station and pipe sizing considerations will vary depending on only a District connection or whether others connect, which would require individual pumping and mechanical needs.

d. Order of magnitude budget considerations include:

   - $798,000 from MCS to KAF.
   - $672,000 from KAF to the Hartford sewer system.
   - $250,000 in consideration of pumping and mechanical needs.

3. Our 2001 analysis on behalf of the District contemplated interconnecting with the Town of Hartford water and sewer systems across land that is now the baseball field. Our subsequent work to develop a recreational complex contemplated on-site water and wastewater for locker room and restroom facilities. Our knowledge of site conditions, including ledge, on the Fields property does not lead us to suggest a municipal connection for locker room and restroom facility unless service comes from Route 5, possibly through the COOP parcel.

4. We did not reevaluate a Hanover connection because of the need to "hang" utilities on Ledyard Bridge and to upgrade the pump station on the Hanover side of the Bridge (members of our staff assisted the Town of Hanover, the Town of Norwich, and the NHDOT with replacing Ledyard Bridge and related corridor improvements).

In closing, our conceptual efforts have only considered so-called "hard" costs for a physical system. Each option will require further "soft" costs in terms of exploring site conditions, regulator interaction, design, permitting, and implementation. Please let me know if you have any questions about our approach.

Sincerely,

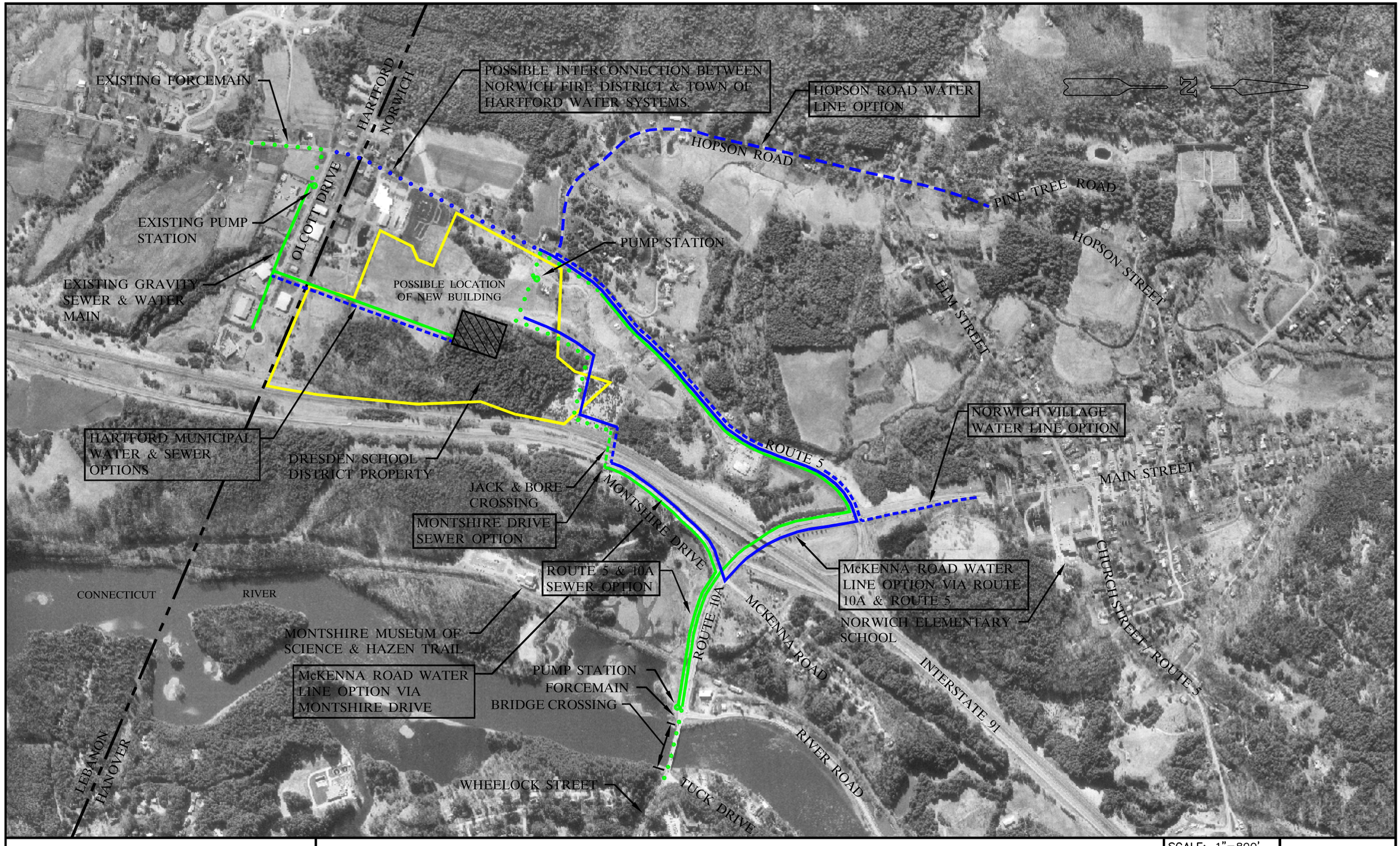
PATHWAYS CONSULTING, LLC

Jeffrey S. Goodrich, P.E.
President

JSG:sef
Enclosures
10021-11647.Conceptual_Alternatives_Eval_DRAFT20180831.jsg

ATTACHMENTS

ATTACHMENT 1



Pathways Consulting, LLC

12 Great Hollow Road
Hanover, New Hampshire 03755
(603) 643–3511 FAX: (603) 643–3533

CONCEPTUAL WATER AND SEWER CONNECTION OPTIONS FOR

DRESDEN SCHOOL DISTRICT - NORWICH PROPERTY

ROUTE 5 – NORWICH, VERMONT

SCALE:	1"=800'
DESIGNED BY:	JSG
DRAWN BY:	JSH
CHECKED BY:	AGK
DATE:	02/13/01
PROJ.NO.	10021

FIGURE

2

ATTACHMENT 2

Pathways Consulting, LLC
3 Schoolhouse Lane, P.O. Box 600
Etna, New Hampshire 03750
(603) 643-3511 FAX: (603) 643-3533

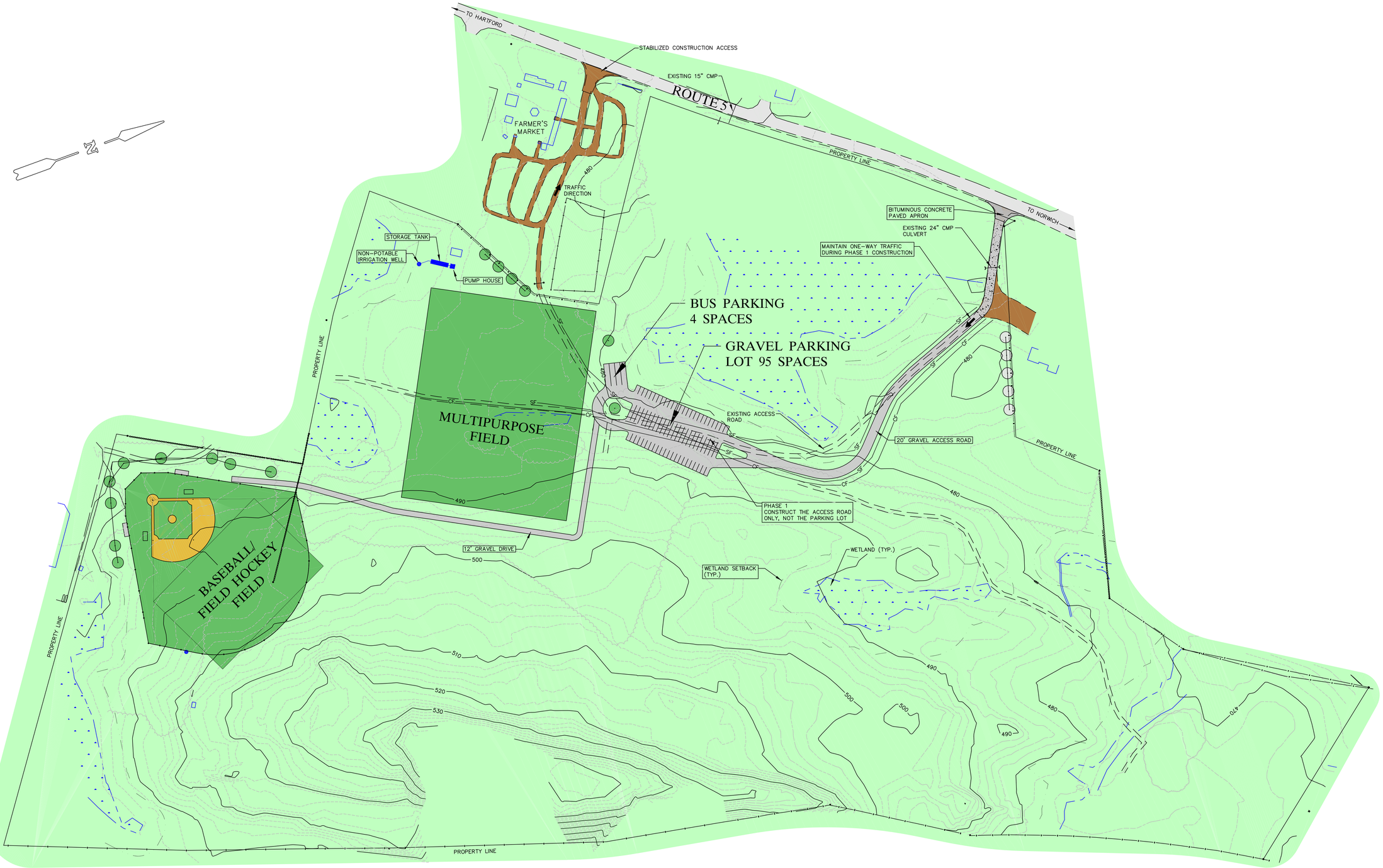
NORWICH ATHLETIC FIELDS

MARCH 11, 2003

SCALE: 1" = 80'

PROJECT NO. 10021

ATTACHMENT 3



REVISION NO.	DATE	DESCRIPTION	MADE BY	CHECKED BY	APPROVED BY

OVERALL SITE PLAN FOR

DRESDEN SCHOOL DISTRICT, SAU #70

VT. ROUTE 5 – NORWICH, VERMONT

PATHWAYS CONSULTING, LLC

3 SCHOOLHOUSE LANE, P.O. BOX 600
ETNA, NEW HAMPSHIRE 03750
(603) 643-3511

SCALE:	1"= 100'
DESIGNED BY:	PAB
DRAWN BY:	JSH
CHECKED BY:	PAB
DATE:	10/05
PROJ. NO.	10021

1

SHEET 1 OF 1

ATTACHMENT 4A

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

ROUTE 5 (CHURCH STREET)

460' ± ALONG ROAD R.O.W.

ROUTE 5 (MAIN STREET)

350' ± ALONG R.O.W.

ELM ST.

BAND STAND

EXISTING SCHOOL
1st. floor-on con. 96.35

PROPOSED ADDITION
FL. ELEV. 99.49

PROPOSED ADDITION

FERRELL

ROBICHAUD

TRUE NORTH
BY SOLAR OBSERVATION

LOCUS MAP

Norwich
SITE
CONNECTICUT
HANOVER

N 82° 39' 30" E
248.4'

S 84° 46' 30" E
111.1'

S 81° E
150.0'

S 08° 45' W
100.0'

S 18° 19' W
181.5'

N 81° 17' W
170.4'

S 18° 38' 30" W
175.0'

N 71° 21' W
105.0'

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'

TOWN OF NORWICH

ST. BARNABAS CHURCH

ROAD LINE

iron pipe

iron rod

twin 6" chert

Monite post

2'x3' brick monument

ledge outcrop

wood line

stone wall

wire fence

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 Thompson
BY
This approval is subject to the terms and conditions of Land Use Permit # PB-3-0867-1 issued herewith.
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.

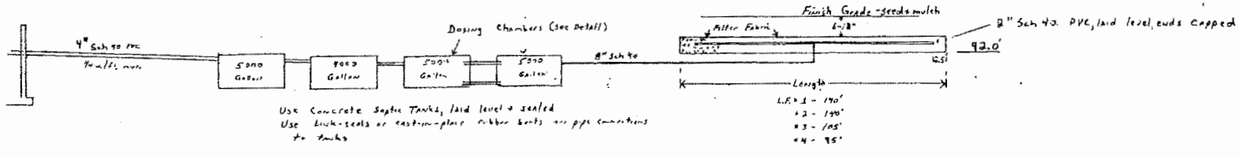
REVISED 6/14/88 - ELEV. CONTROL
REVISED 7/12/88 - BOUNDARY & PROPOSED BUILDINGS

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.

88-6-87

ATTACHMENT 4B

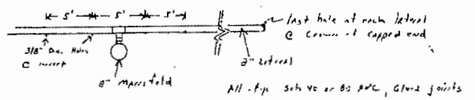


Use Concrete Septic Tanks, laid level & sealed
Use Lock-seals or equivalent-place rubber boots on pipe connections to tanks

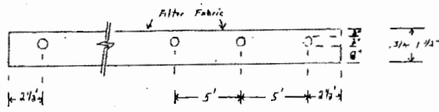
Min. invert at Still (Existing) - 89.7'
" S.T. #1 inlet - 89.2'
" S.T. #2 " - 88.8'
" Dosing Tank inlet - 88.4'
" Bottom Pump - 83.5' (Temp off)
" Lateral inverts - 92.7

PROFILE (N.T.S.)

* Grease Trap - use automatic grease removal unit on kitchen sink - if @ 4 fixture units
Suggest: Thermaco Model #200
20 gpm unit or equivalent
70 lb. min. wet capacity for grease
Maximum sink volume of 50 gallons

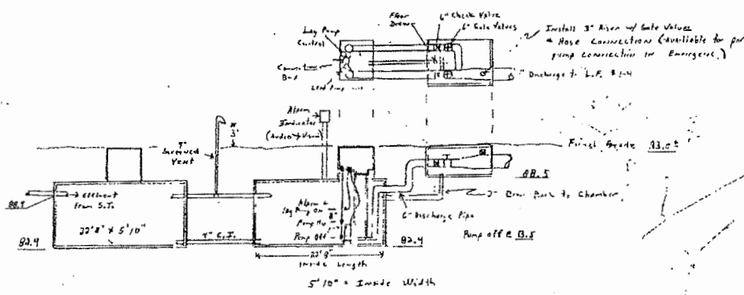


All - Typ. Sch 40 or 80 PVC, Glued joints



* Make excavated surface prior to stone placement

BED SECTION (N.T.S.)



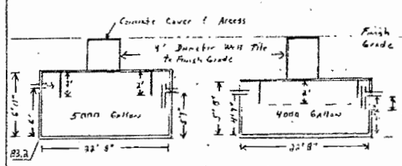
Dosing Chambers

Total Volume req'd: one day storage - 10,000 gallons
Use - two 5 man gallon septic tanks
Sealed & leak proof
Hydraulically connected
Vented to atmosphere

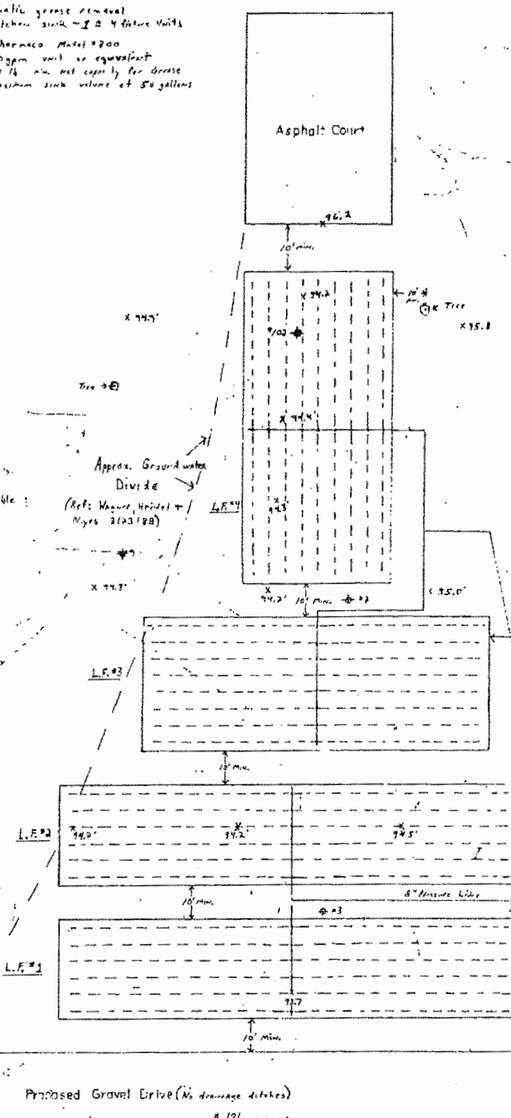
Dose Volume: 4 doses / day = 2500 gal./dose

Pump Curves:
Static head - 9.2'
Friction head - 2.7 @ 850 gpm
Minor losses - 2.6
Total 14.5'

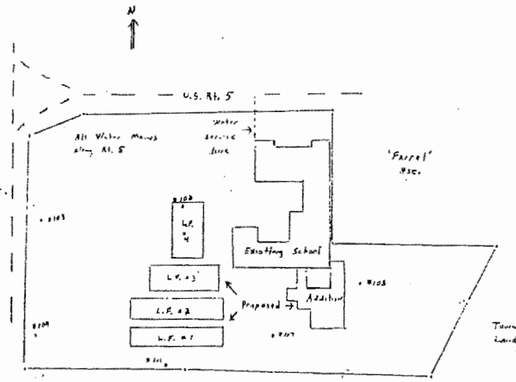
Pump must produce 850 gpm @ 14' total head
Use two effluent pumps - Myers 6x6 " or equivalent
Set on/off limits @ 15" for 930 gallon dose
Pumps to be wired such that the alternate doses
Use alarm to indicate failure & pump on
Lag Pump on 2 Separate Circ. AS Alarm
* Use Anti Lift-out System
Bottom of Pump @ Elev. 83.5



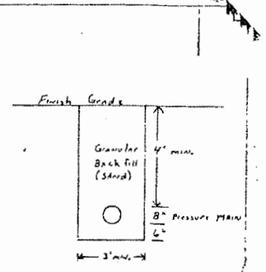
Septic Tank Detail (N.T.S.)



* 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)

DESIGN DATA

100 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 = 8,625 gals
S.T. # 1 - 5000 gallon
2 - 4000 "

* Use Leach Fields # 3 & 4 on Direct Numbers 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 6" Pressure Line
50 psi min. for 2 hour duration
Ref: Environ. Protection Rules Ch A-14, A-08 & 08
Allowable Leakage = $\frac{8N\sqrt{P}}{7400}$ (Gals/hr) P = Avg. test press. N = No. of Dia. Joints in Tested Length

APPROVED
DIVISION OF PROTECTION
DATE 7/26/88
BY Roger Thompson
BY
This approval is subject to the terms and conditions of Land Use Permit No. PB-3-0867
OFFICE COPY

SEWAGE DISPOSAL SYSTEM DESIGN

MARION CROSS SCHOOL

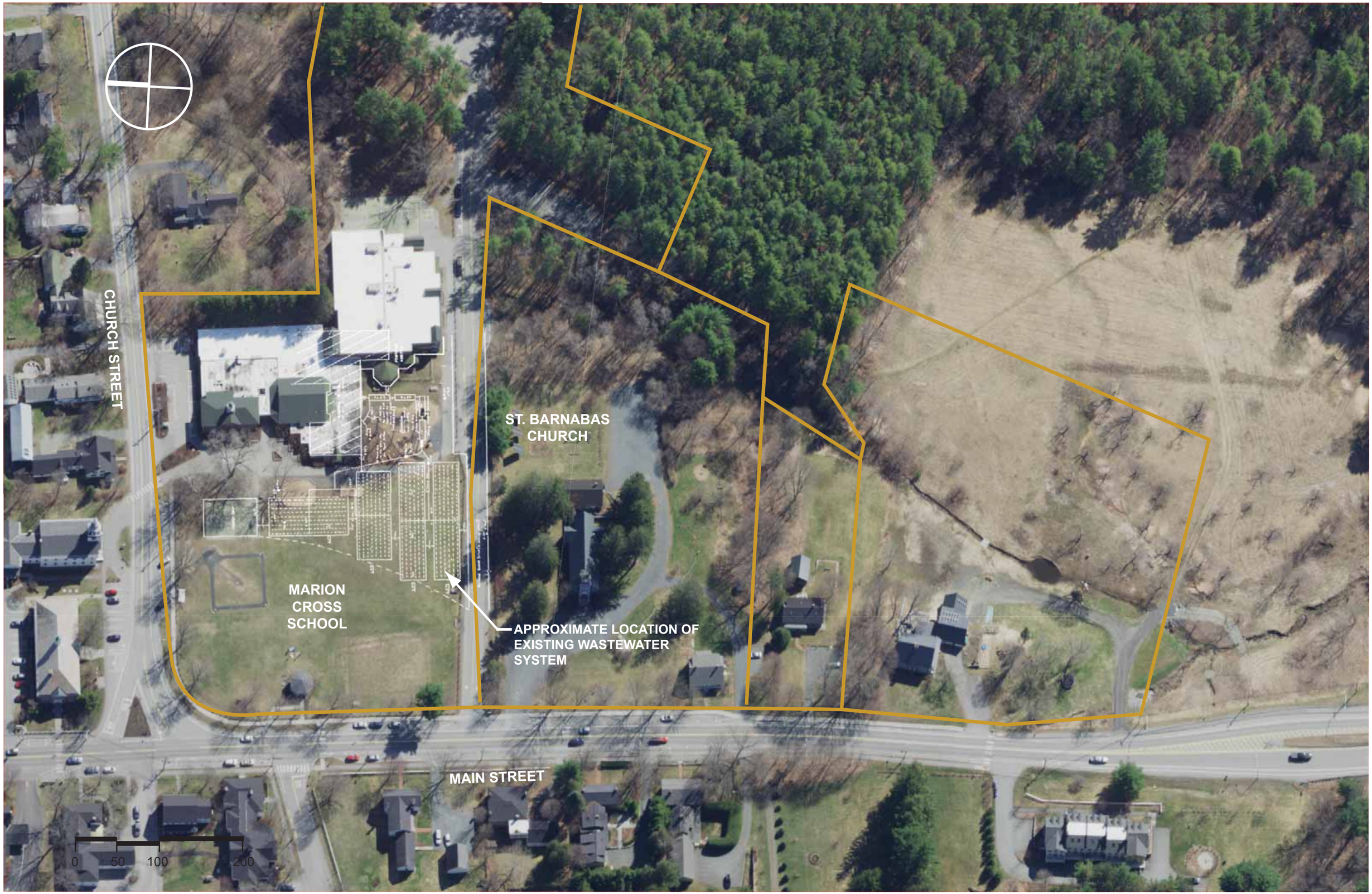
NORWICH, VERMONT

SCALE 1":20'

APRIL 21, 1988
Revised 6/10/88
Revised 6/28/88
Revised 8/30/88

K.A. LECLAIR ASSOC., INC. CIVIL ENGINEERS
HANOVER, N.H.
PROJECT NO. 112987A

ATTACHMENT 5

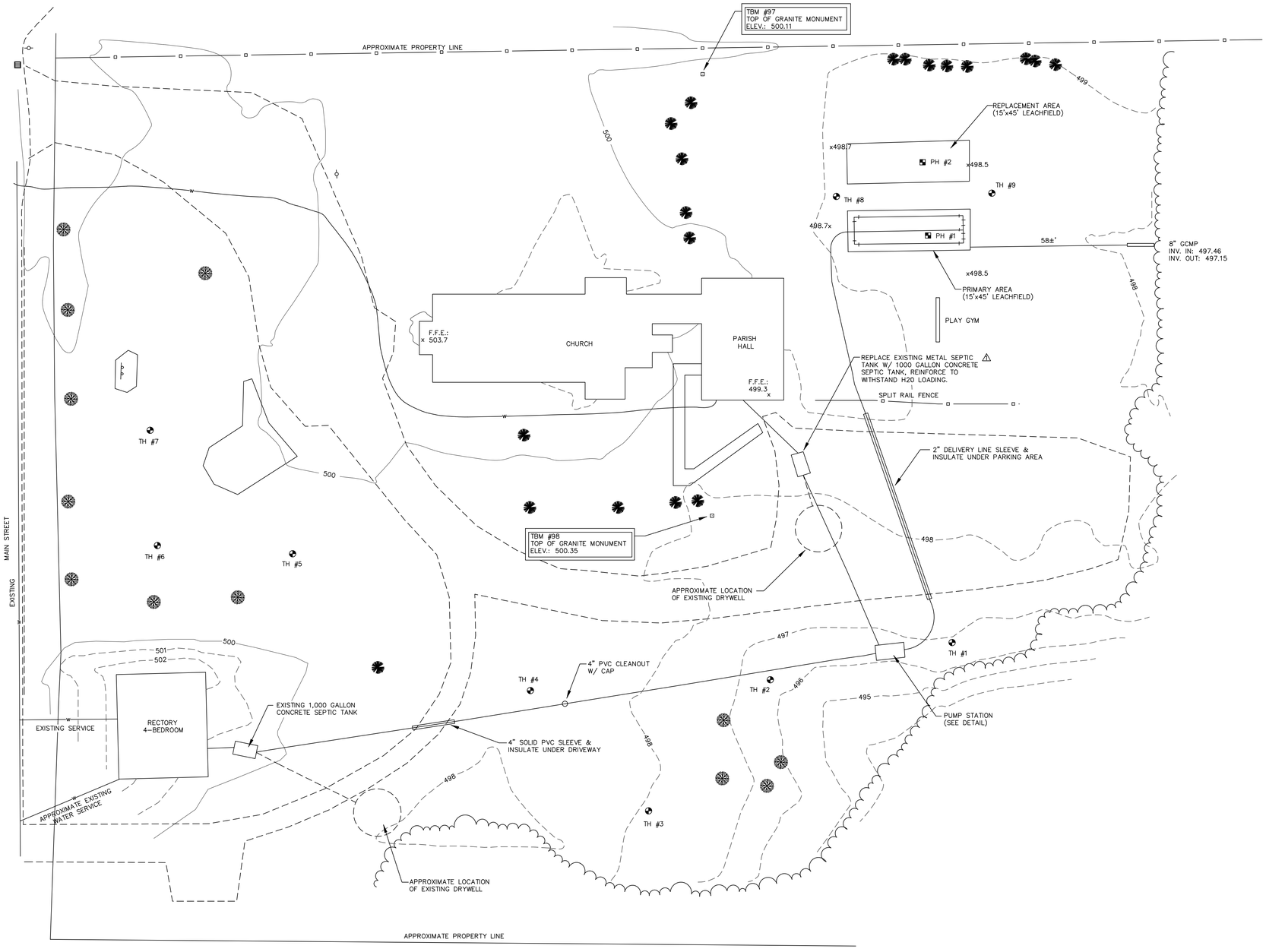

CHURCH STREET
ST. BARNABAS
CHURCH
MARION
CROSS
SCHOOL
APPROXIMATE LOCATION OF
EXISTING WASTEWATER
SYSTEM
MAIN STREET
0
50
100
200

ATTACHMENT 6


INTERSTATE 91
TOWN / PEISCH
PROPERTY
CHURCH STREET
ST. BARNABAS
CHURCH
MARION
CROSS
SCHOOL
MAIN STREET
ROUTE 10A
ROUTE 5
0
100
200
400

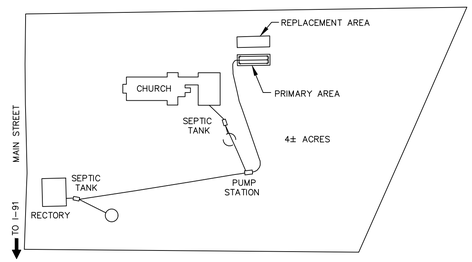
ATTACHMENT 7

P:\10217-ST BARNABAS\SHT1



N

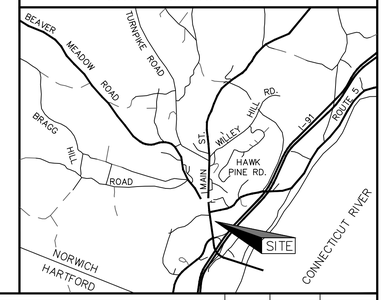
15'±



SKETCH PLAN

N.T.S.

SITE LOCATION PLAN



REV. NO.	DATE	DESCRIPTION	MADE BY	CHKD BY	APP'D BY
1	12/17/01	REVIEW COMMENTS	SMC	PAB	TFM

WASTEWATER DISPOSAL SYSTEM FOR

ST. BARNABAS CHURCH

MAIN STREET – NORWICH, VERMONT

1

PATHWAYS CONSULTING, LLC

12 GREAT HOLLOW ROAD
HANOVER, NEW HAMPSHIRE 03755
(603) 643-3511

SHEET:	1 OF 2
SCALE:	1"= 20'
DES. BY:	EPF
DRAWN BY:	APJ
CHKD. BY:	
DATE:	08/01
PROJ.NO.	10217

P:\10217-ST BARNABAS\SHT2

GENERAL NOTES

1. SYSTEM DESIGNED ONLY TO ACCOMMODATE SANITARY SEWER ASSOCIATED WITH NORMAL DOMESTIC USE.
2. TEST HOLE AND PERCOLATION TEST LOCATIONS ARE APPROXIMATE.
3. NO KNOWN SURFACE WATER WITHIN 50' OF PROPOSED SEWAGE DISPOSAL SYSTEM.
4. SYSTEM MUST BE INSTALLED IN STRICT ACCORD WITH APPROVED PLAN, ANY CHANGES MUST BE APPROVED BY THE DESIGNER BEFORE ANY CONSTRUCTION BEGINS.
5. ANY DISCREPANCIES IN APPROVED PLANS AND ACTUAL SITE CONDITIONS MUST BE REPORTED TO THE DESIGNER BY THE INSTALLER PRIOR TO CONSTRUCTION.
6. NO VEHICULAR TRAFFIC IS ALLOWED OVER THE WASTEWATER SYSTEM.
7. PROVIDE READY ACCESS TO SEPTIC TANK FOR PUMPING AND OTHER MAINTENANCE.
8. SURVEY CONTROL POINTS TO BE SET NEAR SEWAGE DISPOSAL SYSTEM PRIOR TO CONSTRUCTION, AS REQUESTED BY OWNER.
9. FOUNDATION DRAINS WILL NOT BE USED. MAINTAIN SEPTIC TANK 10' FROM FOUNDATION. MAINTAIN DISPOSAL AREA 25' FROM FOUNDATION.
10. ALL PVC SEWER PIPE SHALL BE ASTM D2665, SCHEDULE 40 OR EQUAL UNLESS OTHERWISE NOTED. ALL 4" PERFORATED PVC PIPE SHALL BE ASTM D2729. ALL PVC SHALL BE JOINED TO CONCRETE STRUCTURES BY BUTYL RUBBER OR AN EQUIVALENT SEALANT.
14. DESIGN LOADINGS FOR STRUCTURES TO BE H20.

DESIGN NOTES

1. DESIGNER: EDWARD P. FOLTYN PERMIT NO.: PE 5471
2. U.S.D.A. SOIL CONSERVATION SERVICE CLASSIFICATION:
3. PERCOLATION RATE: 3 MIN./IN. DATE: 09/17/00 Q= 3/15 =1.2
4. DEPTH OF PERCOLATION HOLE: 30 ",
5. DEPTH OF SEASONAL HIGH WATER MARK (MOTTLING LINE): 48"
6. DEPTH OF GROUND WATER: N/A
7. DEPTH OF LEDGE OR IMPERMEABLE SUBSTRATUM ENCOUNTERED: N/A "
8. DESIGN INTENT: BED BOTTOM TO BE SET;
   (X) NO MORE THAN 12 " BELOW ORIGINAL GROUND AT HIGH SIDE ELEV.: 498.70
   ( ) NO LESS THAN ___ " ABOVE ORIGINAL GROUND AT HIGH SIDE ELEV.: ___
9. ESTIMATED SEWAGE LOADING: RECTORY: 4 BEDROOMS AT 150 GPD/BEDROOM = 600 GPD
   CHURCH: 120 PEOPLE AT 5 GPD X 0.25 = 150 GPD
   750 GPD
10. LEACH FIELD AREA REQUIRED: 750 GPD ÷ 1.2 = 625 SQ. FT.
11. LEACHFIELD AREA PROVIDED: 15' X 45' LEACHFIELD = 675 SQ. FT.

CONSTRUCTION NOTES

1. EROSION CONTROL: EROSION CONTROL WILL BE FACILITATED BY THE USE OF HAY BALES AT TOE OF SLOPE AND EDGE OF ALL DISTURBED AREAS. CARE SHOULD BE TAKEN TO ASSURE INTEGRITY OF HAY BALES AFTER MAJOR STORM EVENTS. ALL DISTURBED SURFACES SHOULD BE SEEDED AS QUICKLY AS POSSIBLE TO MINIMIZE SEDIMENT TRANSPORT.
2. TANK DESIGN SPECIFICATIONS: (a) MINIMUM CONCRETE STRENGTH–5000 PSI AT 28 DAYS, (b) STEEL REINFORCEMENT–ASTM A–615–79, GRADE 60, 1' MIN. COVER, (c) EARTH COVER 0' TO 5', (d) WATER TABLE–5' BELOW FINISHED GRADE, (e) CONSTRUCTION JOINT–SEALED WITH 1' DIAMETER BUTYL RUBBER OR EQUIVALENT, AND (f) DESIGN LOAD–AASHTO H20.
3. TANK EXCAVATION: THE CONTRACTOR WILL PROVIDE AN EXCAVATION FREE OF OBSTRUCTIONS FOR A MIN. CLEARANCE OF 18" AROUND THE OUTSIDE PERIMETER OF TANK. A 6" COMPACTED GRAVEL BASE MUST BE PLACED. WHEN PLACING THIS BEDDING MATERIAL, IT SHOULD BE NOTED THAT THE BED WILL BE OF A UNIFORM THICKNESS AND LEVEL. PREPARING A PROPER BASE WILL ENSURE THAT NO SETTLEMENT WILL OCCUR. ACCESS TO THE EXCAVATION SHOULD BE FREE OF WATER AND STABLE, TO ALLOW DELIVERY EQUIPMENT TO SET UP THE NECESSARY DISTANCE AWAY.
4. TANK ASSEMBLY: THE TANK IS ASSEMBLED BY LOWERING EACH SECTION INTO THE EXCAVATION. THE BASE SECTION IS LOWERED FIRST, SET LEVEL AND FIRMLY POSITIONED BEFORE PLACING INTERMEDIATE (IF ANY) AND TOP SECTIONS. THE JOINT SURFACE OF EACH PIECE WILL BE CLEANED AND AN APPLICATION OF GASKET AND SEALER WILL BE MADE BEFORE ASSEMBLY OF NEXT PIECE. THE ENTIRE SETTING AND ASSEMBLY PROCEDURES SHALL BE THE RESPONSIBILITY OF THE TANK MANUFACTURER.
5. TANK BACKFILL: BACKFILL AROUND ALL VAULTS SHOULD CONSIST OF GOOD COMPACTABLE MATERIAL SUCH AS PEA GRAVEL, SAND OR CLEAN EARTH FILL SO THAT NO VOIDS REMAIN BETWEEN TANK WALLS AND NATIVE SOIL OF EXCAVATION. BACKFILLING SHOULD BE DONE MAKING CERTAIN TO COMPACT THE BACKFILL PROGRESSIVELY FROM THE BOTTOM TO TOP SURFACE. ALL BACKFILLING IS THE RESPONSIBILITY OF THE CONTRACTOR.
6. ALL UNUSED KNOCK–OUTS IN THE SEPTIC TANK AND DISTRIBUTION BOX SHALL BE MORTARED AND SEALED TO PREVENT LEAKAGE.
7. THE CONTRACTOR SHALL PERFORM A LEAKAGE TEST ON PUMP CHAMBERS, SEPTIC TANKS AND ALL OTHER CONCRETE STRUCTURES WITNESSED BY THE ENGINEER, BY THE FOLLOWING METHOD:
   EXFILTRATION TEST: LOWER GROUNDWATER TABLE AFTER PLUGGING INLET/OUTLET PIPES AND MAINTAIN DURING TEST. PROVIDE MEANS TO MONITOR GROUNDWATER TABLE. FILL STRUCTURE TO TOP WITH WATER. ALLOW A PERIOD OF TIME FOR ABSORPTION (30 MIN. – 1 HR.) REFILL TO TOP. DETERMINE VOLUME OF LEAKAGE IN AN 8 HR. (MIN.) TEST PERIOD AND CALCULATE RATE. THERE SHALL BE NO MEASURABLE LEAKAGE DURING THE TEST.

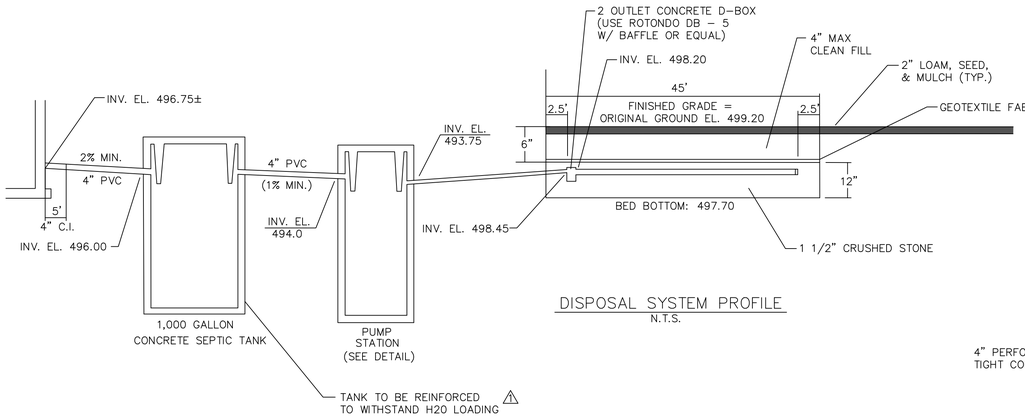
TH #1

0–12" DARK BROWN, FINE SANDY LOAM, FRIABLE, GRANULAR
12"–13" DARK YELLOWISH BROWN, MEDIUM SAND, LOOSE, SINGLE GRAINED
13"–32" GRAYISH BROWN, MEDIUM SAND, LOOSE, SINGLE GRAINED
32"–6' GRAY & BROWN, MEDIUM & VERY FINE SANDS, SATURATED, LOOSE SINGLE GRAINED, MOTTLES AT 32"

TH #2

0–36" VERY DARK BROWN, VERY FINE SANDY LOAM, FRIABLE SUB–ANGULAR BLOCKY
36"–40" BLACK, VERY FINE SANDY LOAM, FRIABLE, MASSIVE, OLD "A" HORIZON
40"–42" GRAY, OLD "E" HORIZON
40"–7' BROWN TO GRAYISH BROWN, FINE SANDY LOAM, MASSIVE, SATURATED, WATER IN AT 5', MOTTLES UP TO 36"

ALL JOINTS & CONNECTIONS SHALL BE SOLVENT CEMENTED



DISPOSAL SYSTEM PROFILE
N.T.S.

TH #3

0–12" DARK BROWN, FINE SANDY LOAM, FRIABLE, GRANULAR
12"–17" DARK YELLOWISH BROWN, LOAMY SAND, FRIABLE GRANULAR
17"–42" DARK GRAYISH BROWN, MEDIUM SAND, LOOSE SINGLE GRAINED
42"–8' BROWN TO GRAYISH BROWN, LAYERS OF MEDIUM TO FINE SANDS, SATURATED AT 48", MOTTLES AT 48"

TH #4

0–12" DARK BROWN, FINE SANDY LOAM, FRIABLE, GRANULAR
12"–17" DARK YELLOWISH BROWN, LOAMY SAND, FRIABLE, GRANULAR
17"–42" DARK GRAYISH BROWN, MEDIUM SAND, LOOSE SINGLE GRAINED
42"–8' BROWN TO GRAYISH BROWN, LAYERS OF MEDIUM TO FINE SANDS, SATURATED AT 48", MOTTLES AT 48"

TH #5

0–12" VERY DARK BROWN, VERY FINE SANDY LOAM, FRIABLE, GRANULAR
12"–18" YELLOWISH BROWN, MEDIUM SAND, LOOSE SINGLE GRAINED
18"–48" GRAYISH BROWN, MEDIUM SAND, LOOSE, SINGLE GRAINED
48"–8' VERY FINE SANDS AND MEDIUM SANDS, MASSIVE, FRIABLE, MOTTLES AT 48", N.L.T.D.

TH #6

0–14" VERY DARK BROWN, FINE SANDY LOAM, FRIABLE, GRANULAR
14"–24" DARK YELLOWISH BROWN, LOAMY SAND, FRIABLE, GRANULAR
24"–48" DARK GRAYISH BROWN, MEDIUM SAND, MASSIVE, SINGLE GRAINED
48"–54" GRAYISH BROWN, LAYER OF FINE SANDS, FRIABLE, MOTTLED
54"–8' MEDIUM TO COARSE SAND, LOOSE SINGLE GRAINED, MOTTLES AT 45"

TH #7

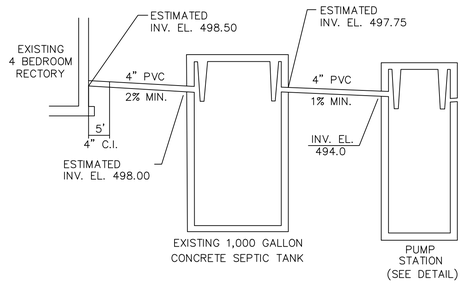
0–14" VERY DARK BROWN, FINE SANDY LOAM, FRIABLE, GRANULAR
14"–24" DARK YELLOWISH BROWN, LOAMY SAND, FRIABLE, GRANULAR
24"–48" DARK GRAYISH BROWN, MEDIUM SAND, MASSIVE, SINGLE GRAINED
48"–54" GRAYISH BROWN, LAYER OF FINE SANDS, FRIABLE, MOTTLED
54"–8' MEDIUM TO COARSE SAND, LOOSE SINGLE GRAINED, MOTTLES AT 42"

TH #8

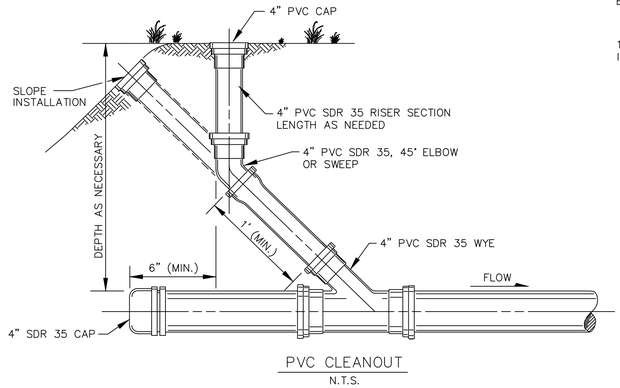
0–12" VERY DARK BROWN, VERY FINE SANDY LOAM, FRIABLE, GRANULAR
12"–28" DARK YELLOWISH BROWN, LOAMY SAND, FRIABLE, SUB ANGULAR BLOCKY
28"–48" DARK GRAYISH BROWN, MEDIUM SAND, LOOSE, SINGLE GRAINED
48"–8' DARK GRAYISH BROWN, MEDIUM & COARSE SAND, LOOSE, SINGLE GRAINED, MOTTLES AT 48"

TH #9

0–8" DARK BROWN, VERY FINE SANDY LOAM, FRIABLE, GRANULAR
8"–18" DARK YELLOWISH BROWN, LOAMY SAND, FRIABLE, GRANULAR
18"–36" GRAY, MEDIUM TO COARSE SAND, LOOSE SINGLE GRAINED
36"–6' GRAYISH BROWN, COARSE SAND, LOOSE SINGLE GRAINED, MOTTLES AT 48", N.L.T.D.

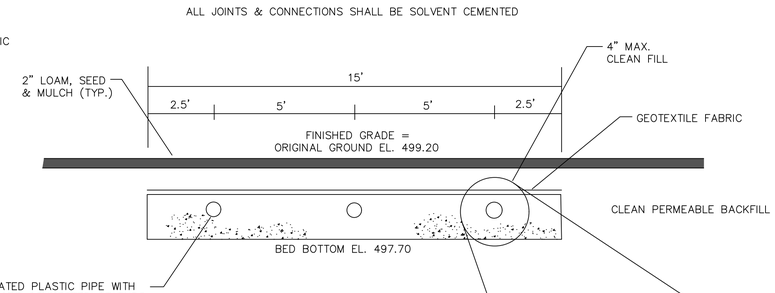


DISPOSAL SYSTEM PROFILE
N.T.S.

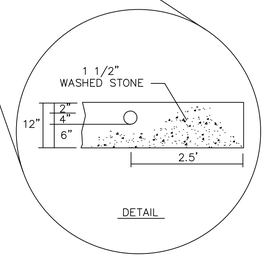


PVC CLEANOUT
N.T.S.

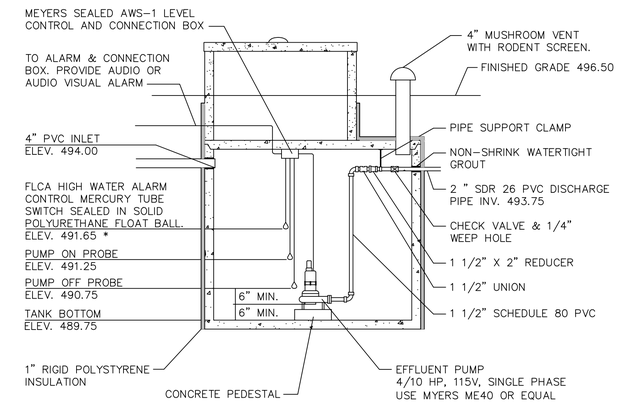
ALL JOINTS & CONNECTIONS SHALL BE SOLVENT CEMENTED



LEACH BED SECTION
N.T.S.



DETAIL



PUMP CHAMBER
N.T.S.

NOTE: USE 1500 GALLON CONCRETE SEPTIC TANK (ROTONDO & SONS OR EQUAL)

PUMP SPECIFICATIONS:

750 GPD ÷ 4 DOSES = 187.5 GAL./DOSE 7.70 ELEVATION HEAD
HEAD + 11.40' FRICTION LOSS IN DELIVERY LINE = 19.10'
PUMP REQUIRED: MYERS MODEL ME33D OR EQUAL
(80 GPM @ 19.10' HEAD)

* NOTE: THERE IS 385 GALLONS OF STORAGE PER LINEAR FOOT IN A 1500 GALLON TANK. THERE IS 2.1 LINEAR FEET BETWEEN THE HIGH WATER ALARM AND THE OUTLET. THERE IS 808.5 GALLONS OF STORAGE ABOVE THE ALARM.

NOTE: REMOVAL OF ANY WASTEWATER DISPOSAL COMPONENTS REQUIRES DISPOSAL INTO A CERTIFIED LANDFILL OR GETTING A PERMIT FROM THE DEPARTMENT OF SOLID WASTE FOR ON–SITE DISPOSAL.

REVISION NO.	DATE	DESCRIPTION	MADE BY	CHECKED BY	APPROVED BY
⚠1	12/17/01	REVIEW COMMENTS	SMC	PAB	TFM

WASTEWATER DISPOSAL SYSTEM FOR

ST. BARNABAS CHURCH

MAIN STREET – NORWICH, VERMONT

PATHWAYS CONSULTING, LLC
12 GREAT HOLLOW ROAD
HANOVER, NEW HAMPSHIRE 03755
(603) 643–3511

SCALE: 1"= N.T.S.	
DESIGNED BY: EPF	
DRAWN BY: JSH	
CHECKED BY: TWR	
DATE: 08/01	
PROJ. NO. 10217	SHEET 2 OF 2

2

ATTACHMENT 8


CONNECTICUT RIVER
INTERSTATE 91
MONTSHIRE MUSEUM
TOWN / PEISCH PROPERTY
ROUTE 10A
THE CAR STORE
KING ARTHUR FLOUR
ROUTE 5
CHURCH STREET
MARION CROSS SCHOOL
EXISTING GRAVITY SEWER
DRESDEN RECREATION FIELDS
OLCOTT DRIVE
EXISTING PUMP STATION
EXISTING FORCEMAIN
0
300
600
1200