
DIG SAFE
1-888-344-7233
WELL HEAD PROTECTION AREA LIMITS, PRESUMPTIVE METHOD
T.B.M. NO. 1000 (NAIL IN 24" SOFTWOOD) ELEV. 503.16'
T.B.M. NO. 1001 (NAIL IN 24" SOFTWOOD) ELEV. 501.06'
T.B.M. NO. 96 (NAIL IN 24" HARDWOOD) ELEV. 505.70'
GeB
GEORGIA STONEY LOAM
MoC
MESSENA EXTREMELY STONEY SILTY LOAM
VeB
VERGENNES CLAY
HINESBURG ROAD
TO CHARLOTTE
TO HINESBURG
100' MIN. DOWNHILL
200' MIN. UPHILL
660'± VOL. 27/ PG. 296
660'± VOL. 27/ PG. 296 TOTAL
210'± LIMITED USE LIMITS
198'± LIMITED USE LIMITS
198'± VOL. 27/ PG. 296
LOT 2-29-1
LOT 2-28
LOT 2-26
LOT 2-27
3± ACRES
DRILLED WELL
DRILLED WELL "A"
DRILLED WELL "B"
DRILLED WELL "C"
BUILDING "D" 2 BEDROOM SINGLE FAMILY DWELLING
SYSTEM D APPROXIMATE LEACH FIELD (PER OWNER)
BARN
DRIVEWAY
BUILDING "C" 6 BEDROOM TRIPLEX (RECENTLY DEMOLISHED)
SYSTEM C APPROXIMATE LEACH FIELD (PER OWNER)
GARAGE
BUILDING "B" SINGLE FAMILY DWELLING
1,000 GALLON SEPTIC TANK
SYSTEM B APPROXIMATE LEACH FIELD (PER OWNER)
BUILDING "A" SINGLE FAMILY DWELLING
1,000 GALLON SEPTIC TANK (PER OWNER)
SYSTEM A APPROXIMATE LEACH FIELD (PER OWNER)
SHELBURNE
ST. GEORGE
HINESBURG
CHARLOTTE
SITE
SYMBOL LEGEND
APPROXIMATE BOUNDARY POINT
UTILITY POLE
DRILLED WELL
DRILLED WELL
TRAVERSE POINT
TEST HOLE
SIEVE ANALYSIS
PERC TEST
BENCMARK
CONIFEROUS TREE
DECIDUOUS TREE
LINE LEGEND
APPROXIMATE BOUNDARY LINE
APPROXIMATE LIMITED USE LIMITS
APPROXIMATE RIGHT OF WAY
CONTOUR LINE
APPROXIMATE SOILS BOUNDARY
WELL HEAD PROTECTION AREA LIMITS
TREE LINE
GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft.

GENERAL NOTES

1. ELEVATIONS ARE REFERENCED TO AN ASSUMED DATUM.
2. THE TEST HOLES, PERCOLATION TEST, AND SIEVE ANALYSIS LOCATIONS ARE APPROXIMATE.
3. TEST PIT DATA BY:CHRISTOPHER D. HOLZWARTH, CST 410 .
4. ANY DISCREPANCIES IN THE APPROVED PLANS AND SITE CONDITIONS MUST BE REPORTED TO THE ENGINEER BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
5. ANY LOCAL OR STATE DRIVEWAY ACCESS PERMITS ARE THE RESPONSIBILITY OF THE OWNER.
6. ANY STATE OR FEDERAL PERMITS ARE THE RESPONSIBILITY OF THE OWNER.
7. APPROXIMATE BOUNDARY LINES AND LIMITED USE LIMITS AS SHOWN BY OWNER OF RECORD.
8. THIS PLAN IS NOT A BOUNDARY SURVEY AND SHOULD NOT BE UTILIZED FOR BOUNDARY OR LAND TRANSFER PURPOSES.

REV. NO.	DATE	DESCRIPTION	BY	CHECKED BY
1	4/30/08	APPROX. BOUNDARY LINES & ADDITIONAL DATA	CDH	

EXISTING CONDITIONS PLAN FOR

STEVEN DAVIS & ELIZABETH LEONARD

HINESBURG ROAD – TOWN OF CHARLOTTE – VERMONT

STATE OF VERMONT – CHRISTOPHER D. HOLZWARTH No. 410 – LICENSED DESIGNER – TYPE B

STATE OF VERMONT – CHARLES ... REGISTERED PROFESSIONAL ENGINEER

HATHORN SURVEYS
2060 HARTFORD AVENUE
POST OFFICE BOX 1942
WILDER, VERMONT 05088
PHONE: (802) 295-5101
FAX: (802) 295-5289

SCALE: 1" = 20'
DESIGNED BY: C.D.H.
DRAWN BY: C.D.H.
CHECKED BY: C.J.B.
DATE: 7/05/07
PROJ. NO. 11498

SHEET NO. 1

SYMBOL LEGEND

- APPROXIMATE BOUNDARY POINT
- UTILITY POLE
- DRILLED WELL
- DRILLED WELL
- PROPOSED GATE VALVE
- TRAVERSE POINT
- TEST HOLE
- SIEVE TEST
- PERC TEST
- BENCHMARK
- CONIFEROUS TREE
- DECIDUOUS TREE

LINE LEGEND

- PROPOSED WATER LINE (W)
- PROPOSED BUILDING SEWER LINE (S)
- PROPOSED CONDUIT (C)
- PROPOSED EFFLUENT LINE (E)
- PROPOSED FILTERED EFFLUENT LINE (F)
- PROPOSED FORCE MAIN (FM)
- PROPOSED CURTAIN DRAIN (CD)
- PROPOSED DRAIN LINE (D)
- APPROXIMATE BOUNDARY LINE
- APPROXIMATE LIMITED USE LIMITS
- APPROXIMATE RIGHT OF WAY
- CONTOUR LINE (500)
- WELL HEAD PROTECTION AREA LIMITS
- TREE LINE

GENERAL NOTES

1. THE SYSTEM MUST BE INSTALLED IN STRICT ACCORD WITH THESE APPROVED PLANS. ANY CHANGES MUST BE APPROVED BY THE ENGINEER BEFORE ANY CONSTRUCTION BEGINS.
2. THE SYSTEM IS DESIGNED TO ACCOMMODATE ONLY SANITARY WASTEWATER ASSOCIATED WITH NORMAL DOMESTIC USE.
3. THE TEST HOLES AND PERCOLATION TEST LOCATIONS ARE APPROXIMATE.
4. THERE ARE NO KNOWN SURFACE WATER OR SEASONAL WET AREAS WITHIN 50' OF THE PROPOSED WASTEWATER DISPOSAL SYSTEM.
5. ANY DISCREPANCIES IN THE APPROVED PLANS AND SITE CONDITIONS MUST BE REPORTED TO THE ENGINEER BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
6. ANY LOCAL OR STATE DRIVEWAY ACCESS PERMITS ARE THE RESPONSIBILITY OF THE OWNER.
7. ANY STATE OR FEDERAL PERMITS ARE THE RESPONSIBILITY OF THE OWNER.
8. NO VEHICULAR TRAFFIC IS ALLOWED OVER THE WASTEWATER SYSTEM UNLESS SPECIFIC PROVISIONS ARE PROPOSED ON THIS PLAN TO SUPPORT THE WEIGHT.
9. THE CONTRACTOR SHALL PROVIDE ACCESS TO THE SEPTIC TANK FOR PUMPING AND OTHER MAINTENANCE.
10. ALL PVC GRAVITY SEWER PIPE SHALL BE ASTM D3034 SDR 35 OR EQUAL UNLESS OTHERWISE NOTED.
11. THE DESIGN LOADING FOR ALL CONCRETE STRUCTURES SHALL BE H10.
12. IT IS RECOMMENDED THAT THE OWNER PUMP OUT THE SEPTIC TANK AND PUMP CHAMBER SOLIDS EVERY TWO YEARS OR LESS, AS NEEDED.
13. ELEVATIONS ARE REFERENCED TO AN ASSUMED DATUM.
14. HATHORN SURVEYS ASSUMES NO RESPONSIBILITY FOR THE CONSTRUCTION OF THIS WASTEWATER DISPOSAL SYSTEM UNLESS RETAINED FOR CONSTRUCTION OBSERVATION SERVICES.
15. TEST PIT DATA BY:CHRISTOPHER D. HOLZWARTH, CST 410 .
16. APPROXIMATE BOUNDARY LINES AND LIMITED USE LIMITS AS SHOWN BY OWNER OF RECORD.
17. THIS PLAN IS NOT A BOUNDARY SURVEY AND SHOULD NOT BE UTILIZED FOR BOUNDARY OR LAND TRANSFER PURPOSES.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

REV. NO.	DATE	DESCRIPTION	BY	CHECKED BY
1	4/30/08	APPROX. BOUNDARY LINES & PROPOSED LAYOUT	CDH	

"BEST FIX" WASTEWATER DISPOSAL & WATER SUPPLY PLAN FOR

STEVEN DAVIS & ELIZABETH LEONARD

HINESBURG ROAD – TOWN OF CHARLOTTE – VERMONT

THE STATE OF VERMONT – CHRISTOPHER D. HOLZWARTH No. 410 – TYPE B LICENSED DESIGNER

STATE OF VERMONT – CHARLES B. ... No. 2... – REGISTERED PROFESSIONAL ENGINEER

HATHORN SURVEYS
2060 HARTFORD AVENUE
POST OFFICE BOX 1942
WILDER, VERMONT 05088
PHONE: (802) 295-5101
FAX: (802) 295-5289

SCALE: 1" = 20'
DESIGNED BY: C.D.H.
DRAWN BY: C.D.H.
CHECKED BY: C.J.B.
DATE: 7/05/07
PROJ. NO. 11498

SHEET NO. 2


SEE SHEET 4
SEE SHEET 5
EXISTING DRILLED WELL
2" TYPE "k" COPPER OR POLYETHYLENE WATER SERVICE LINE
INVERT OUT 501.25', TYP.
4" EXTERIOR CLEAN-OUT, TYP.
(11') 4" SDR 35 PVC BUILDING SEWER, SLOPE = 1/4"/ FT. MIN., TYPICAL
1,000 GALLON LOW RISE/ WATERTIGHT SEPTIC TANK BY CAMP PRECAST CONCRETE PRODUCTS
INVERT IN = 501.00' TYPICAL
INVERT OUT = 500.75' TYPICAL
(50') 4" SDR 35 PVC EFFLUENT LINE, SLOPE = 1/8"/ FT. MINIMUM
STB-650 EFFLUENT FILTER
INV. IN = 500.20' TYP.
INV. OUT = 496.11' TYP.
(9') 4" SDR 35 PVC FILTRATE LINE, SLOPE = 1/8"/ FT. MINIMUM
1,000 GALLON LOW RISE/ WATERTIGHT PUMP TANK BY CAMP PRECAST CONCRETE PRODUCTS
TOP TNK. = 498.33'
INV. IN = 496.00' (SPECIAL ORDER)
TOP STORAGE = 497.03'
ALARM = 495.7'
PUMP ON = 495.6'
PUMP OFF = 495.2'
TOP CONC. PAD = 494.7'
BOT. I.S. TNK. = 494.37'
BOT. O.S. TNK. = 494.08'
(4') 4" SDR 35 PVC FILTRATE LINE, SLOPE = 1/8"/ FT. MINIMUM
STB-650 EFFLUENT FILTER
INV. IN = 500.20' TYP.
INV. OUT = 496.11' TYP.
(17') 4" SDR 35 PVC EFFLUENT LINE, SLOPE = 1/8"/ FT. MINIMUM
1,000 GALLON LOW RISE/ WATERTIGHT SEPTIC TANK BY CAMP PRECAST CONCRETE PRODUCTS
INVERT IN = 501.00' TYPICAL
INVERT OUT = 500.75' TYPICAL
(230.5') 2" SCH 40 PVC FORCE MAIN
UNIT 3
UTILITY
UNIT 4
PORCH
UNIT 5
UNIT 6
3A
4A
5A
6A
3B
4B
5B
6B
TP 1
TP 2
TP 5
FM
CD
W
S
C
E
F
501
502
503
504
N
GRAPHIC SCALE
(IN FEET)
1 inch = 10 ft.

REV. NO.	DATE	DESCRIPTION	BY	CHECKED BY
1	4/30/08	PROPOSED LAYOUT	CDH	

"BEST FIX" WASTEWATER DISPOSAL AND WATER SUPPLY PLAN FOR

STEVEN DAVIS & ELIZABETH LEONARD

HINESBURG ROAD – TOWN OF CHARLOTTE – VERMONT

THE STATE OF VERMONT – CHRISTOPHER D. HOLZWARTH No. 410 – TYPE B LICENSED DESIGNER

STATE OF VERMONT – CHARLES ... – REGISTERED PROFESSIONAL ENGINEER

HATHORN SURVEYS
2060 HARTFORD AVENUE
POST OFFICE BOX 1942
WILDER, VERMONT 05088
PHONE: (802) 295-5101
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DESIGNED BY: C.D.H.
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CHECKED BY: C.J.B.
DATE: 7/05/07
PROJ. NO. 11498

SHEET NO. 3

STONE LINED TRANSITION

SOLID 4" PVC DRAIN PIPE TO DAYLIGHT

WASTEWATER DISPOSAL SITE "A"
FILTRATE EFFLUENT, MOUND TYPE DISPOSAL SYSTEM
STONE BED: 5'x60' = 300 SQ. FT.
MINIMUM SAND FILL: 2'–4"
HIGHEST EXISTING GRADE: 503.25'
BOTTOM STONE BED: 505.6'
TOP MOUND: 507.6 – 508.1'

EXISTING DRILLED WELL TO BE ABANDONED IN ACCORDANCE WITH CURRENT WATER SUPPLY RULES

WASTEWATER DISPOSAL SITE "B"
FILTRATE EFFLUENT, MOUND TYPE DISPOSAL SYSTEM
STONE BED: 5'x60' = 300 SQ. FT.
MINIMUM SAND FILL: 1'–3"
HIGHEST EXISTING GRADE: 501.75'
BOTTOM STONE BED: 503.0'
TOP MOUND: 505.0 – 505.5'

EFFLUENT DISPERSAL AREA

EFFLUENT DISPERSAL AREA

(46') 2" SCH 40 PVC FORCE MAIN

2" GATE VALVE, TYPICAL

2"x2"x2" SCH 40 PVC TEE

(46') 2" SCH 40 PVC FORCE MAIN

(230.5') 2" SCH 40 PVC FORCE MAIN

4" PVC CLEAN OUT, TYP.

4" PERFORATED CURTAIN DRAIN/ SURFACE WATER DIVERSION DITCH

SEE SHEET 3

N

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

REV. NO.	DATE	DESCRIPTION	BY	CHECKED BY
1	4/30/08	PROPOSED LAYOUT	CDH	

"BEST FIX" WASTEWATER DISPOSAL AND WATER SUPPLY PLAN FOR

STEVEN DAVIS & ELIZABETH LEONARD

HINESBURG ROAD – TOWN OF CHARLOTTE – VERMONT

THE STATE OF VERMONT
CHRISTOPHER D. HOLZWARTH No. 410
LICENSED ENGINEER

HATHORN SURVEYS
2060 HARTFORD AVENUE
POST OFFICE BOX 1942
WILDER, VERMONT 05088
PHONE: (802) 295–5101
FAX: (802) 295–5289

SCALE:	1" = 10'
DESIGNED BY:	C.D.H.
DRAWN BY:	C.D.H.
CHECKED BY:	C.J.B.
DATE:	7/05/07
PROJ. NO.	11498

4
SHEET NO.

SEE SHEET 4

UNIT 3

UTILITY

UNIT 4

UNIT 5

UNIT 2

UNIT 1

504

503

502

501

500

499

498

EXISTING DRILLED WELL

EXISTING BUILDING SEWER

EXISTING SEPTIC TANK

EXISTING EFFLUENT LINE

4" SDR 35 PVC EFFLUENT LINE
SLOPE = 1/8"/ FT. MIN., TYPICAL

STB-650 EFFLUENT FILTER
INV. IN = TO BE DETERMINED
INV. OUT = TO BE DETERMINED

4" SDR 35 PVC FILTRATE LINE
SLOPE = 1/8"/ FT. MIN., TYPICAL

1,000 GALLON LOW RISE/ WATERTIGHT PUMP TANK BY CAMP PRECAST CONCRETE PRODUCTS

TOP TNK. = TO BE DETERMINED
INV. IN = TO BE DETERMINED
TOP STORAGE = TO BE DETERMINED
ALARM = TO BE DETERMINED
PUMP ON = TO BE DETERMINED
PUMP OFF = TO BE DETERMINED
TOP CONC. PAD = TO BE DETERMINED
BOT. I.S. TNK. = TO BE DETERMINED
BOT. O.S. TNK. = TO BE DETERMINED

WASTEWATER DISPOSAL SITE
FILTRATE EFFLUENT, MOUND TYPE DISPOSAL SYSTEM
STONE BED: 5'x45' = 225 SQ. FT.
MINIMUM SAND FILL: TO BE DETERMINED
HIGHEST EXISTING GRADE: TO BE DETERMINED
BOTTOM STONE BED: TO BE DETERMINED
TOP MOUND: TO BE DETERMINED

2" SCH 40 PVC FORCE MAIN

N

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)
1 inch = 10 ft.

REV. NO.	DATE	DESCRIPTION	BY	CHECKED BY

UNIT 2 "BEST FIX" WASTEWATER DISPOSAL PLAN FOR

STEVEN DAVIS & ELIZABETH LEONARD

HINESBURG ROAD – TOWN OF CHARLOTTE – VERMONT

THE STATE OF VERMONT – CHRISTOPHER D. HOLZWARTH No. 410 – LICENSED LAND SURVEYOR

HATHORN SURVEYS
2060 HARTFORD AVENUE
POST OFFICE BOX 1942
WILDER, VERMONT 05088
PHONE: (802) 295-5101
FAX: (802) 295-5289

SCALE:	1" = 10'
DESIGNED BY:	C.D.H.
DRAWN BY:	C.D.H.
CHECKED BY:	C.J.B.
DATE:	5/01/08
PROJ. NO.	11498

5
SHEET NO.

GRAVITY SEWER LEAKAGE TEST

LEAKAGE TESTS: WHEN TESTED, THE LEAKAGE INWARD AND OUTWARD OF A GRAVITY SEWER INCLUDING MANHOLES SHALL NOT EXCEED 200 GALLONS PER INCH OF PIPE DIAMETER PER MILE PER DAY. UPON COMPLETION OF CONSTRUCTION, A SEWER LINE SHALL BE TESTED IN ACCORDANCE WITH ONE OF THE FOLLOWING PROCEDURES.

(1) WATER TESTING: THIS PROCEDURE TAKES INTO ACCOUNT THE LEAKAGE FROM ONE MANHOLE IN THE TEST SECTION.

A. PLUG OR CAP ALL SERVICE LATERALS, STUBS, AND FITTINGS. PLACE ADEQUATE BRACING TO WITHSTAND THRUST FORCES.

B. A TAPPED PLUMBER'S PLUG SHOULD BE INSERTED IN THE DOWNSTREAM MANHOLE INLET SEWER. THE WATER SUPPLY CONNECTION IS MADE AT THIS POINT, BUT NEVER DIRECTLY FROM A PUBLIC WATER SYSTEM OR HYDRANT UNLESS A BACKFLOW PREVENTER IS USED.

C. A STAND PIPE IS TIGHTLY CONNECTED AT THE UPSTREAM END OF THE SEWER. THE HEIGHT OF THE STAND PIPE IN THE SEWER OR TWO FEET HIGHER THAN ANY POINT IN THE SEWER OR TWO FEET HIGHER THAN THE HIGHEST KNOWN GROUNDWATER TABLE, WHICHEVER IS HIGHER. A MANHOLE MAY BE USED AS A STANDPIPE, PROVIDING THE TOP OF THE MANHOLE IS MORE THAN 2 FEET ABOVE THE SURROUNDING GROUNDWATER LEVEL. OTHERWISE THE GROUNDWATER LEVEL SHALL BE LOWERED.

D. WATER IS ADDED AT THE DOWNSTREAM CONNECTION IN ORDER TO AVOID TRAPPING AIR BUBBLES OR POCKETS. THE LINE SHALL BE FILLED TO THE ELEVATION DESIGNATED IN THE STAND PIPE OR TO THE TOP OF THE MANHOLE CONE SECTION.

E. ALLOW THE LINE TO STAND WITH WATER FOR AT LEAST A TWO HOUR STABILIZATION PERIOD OR SUCH SHORTER PERIOD AS MAY BE REQUIRED TO ACHIEVE STABILIZED READINGS OF WATER LOSS OVER THREE CONSECUTIVE 15 MINUTE PERIODS. THIS ALLOWS AIR TO ESCAPE AND ABSORPTION TO TAKE PLACE.

F. FILL THE SEWER LINE TO THE REFERENCED MARK AND CONTINUE THE TEST FOR AT LEAST ONE HOUR. MAINTAIN THE MINIMUM HEAD THROUGHOUT THE TEST, ADDING ANY VOLUME OF REQUIRED AND INCLUDING THAT VOLUME IN THE LEAKAGE.

G. CONVERT THE LEAKAGE TO THE UNITS SPECIFIED.

(2) AIR TESTING: IF THE SECTIONS OF GRAVITY SEWER LINE ARE TESTED FOR LEAKAGE UTILIZING A LOW PRESSURE AIR TEST THE MANHOLES WILL NEED TO BE INDIVIDUALLY TESTED FOR LEAKAGE.

A. DETERMINE THE TEST TIME FOR THE SECTION OF LINE TO BE TESTED USING TABLE III OR IV OR THE FORMULAS LISTED UNDER FORMULAS AND ALLOWABLE AIR LOSS STANDARDS.

B. PLUG ALL OPENINGS IN THE TEST SECTION.

C. ADD AIR UNTIL THE INTERNAL PRESSURE OF THE LINE IS RAISED TO APPROXIMATELY 4 POUNDS/SQUARE INCH (PSI) GREATER THAN THE AVERAGE PRESSURE OF ANY GROUND WATER ABOVE THE PIPE. AFTER THIS PRESSURE IS REACHED, ALLOW THE PRESSURE TO STABILIZE. THE PRESSURE WILL NORMALLY DROP AS THE AIR TEMPERATURE STABILIZES. THIS USUALLY TAKES UP TO 5 MINUTES DEPENDING ON THE PIPE SIZE. THE PRESSURE MAY BE REDUCED TO 3.5 PSI BEFORE STARTING THE TEST.

D. WHEN THE PRESSURE HAS STABILIZED AND IS AT OR ABOVE THE STARTING TEST PRESSURE OF 3.5 PSI GREATER THAT THE AVERAGE PRESSURE OF GROUNDWATER ABOVE THE PIPE, START THE TEST. IF THE PRESSURE DROPS MORE THAN 1.0 PSI DURING THE TEST TIME, THE LINE IS PRESUMED TO HAVE FAILED THE TEST. IF A 1.0 PSI DROP DOES NOT OCCUR WITHIN THE TEST TIME, THE LINE HAS PASSED THE TEST.

E. TABLE III SHOWS THE REQUIRED TEST TIME, T, IN MINUTES/100 FEET OF PIPE FOR EACH NOMINAL PIPE SIZE. TEST TIMES ARE FOR A 1.0 PSI PRESSURE DROP FROM 3.5 TO 2.5 PSI. TABLE III HAS BEEN ESTABLISHED USING THE FORMULAS LISTED UNDER FORMULAS AND ALLOWABLE AIR LOSS STANDARDS.

F. IF THE SECTION OF LINE TO BE TESTED INCLUDES MORE THAN ONE PIPE SIZE, CALCULATE THE TEST TIME FOR EACH SIZE AND ADD THE TEST TIMES TO ARRIVE AT THE TOTAL TEST TIME FOR THE SECTION.

G. IT IS NOT NECESSARY TO HOLD THE TEST FOR THE WHOLE PERIOD WHEN IT IS CLEARLY EVIDENT THAT THE RATE OF AIR LOSS IS LESS THAN THE ALLOWABLE.

TABLE III. MINIMUM TEST TIME FOR VARIOUS PIPE SIZES

NOMINAL PIPE SIZE INCHES	T (TIME) MIN/100'	NOMINAL PIPE SIZE INCHES	T (TIME) MIN/100'
3	0.2	21	3.0
4	0.3	24	3.6
6	0.7	27	4.2
8	1.2	30	4.8
10	1.5	33	5.4
12	1.8	36	6.0
15	2.1	39	6.6
18	2.4	42	7.3

FORMULAS AND ALLOWABLE AIR LOSS STANDARDS

CALCULATE THE REQUIRED TEST TIME AT A GIVEN ALLOWABLE AIR LOSS AS FOLLOWS:

$$T = K \times \frac{D^2 L}{Q}$$

CALCULATE AIR LOSS WITH A TIMED PRESSURE DROP AS FOLLOWS:

$$Q = K \times \frac{D^2 L}{T}$$

SYMBOLS:

D = NOMINAL SIZE, INCHES

$K = 0.371 \times 10^{-3}$ FOR INCH–POUND UNITS

$K = 0.534 \times 10^{-6}$ FOR S.I. UNITS

L = LENGTH OF LINE OF ONE PIPE SIZE, FEET

Q = AIR LOSS, FT^3/MIN.

T = TIME FOR PRESSURE TO DROP 1.0 P.S.I., MINUTES

AN APPROPRIATE ALLOWABLE AIR LOSS, q, IN CUBIC FEET PER MINUTE, HAS BEEN ESTABLISHED FOR EACH NOMINAL PIPE SIZE. BASED ON FIELD EXPERIENCE, THE Q'S THAT HAVE BEEN SELECTED WILL ENABLE DETECTION OF ANY SIGNIFICANT LEAK. TABLE IV LIST THE Q ESTABLISHED FOR EACH PIPE SIZE.

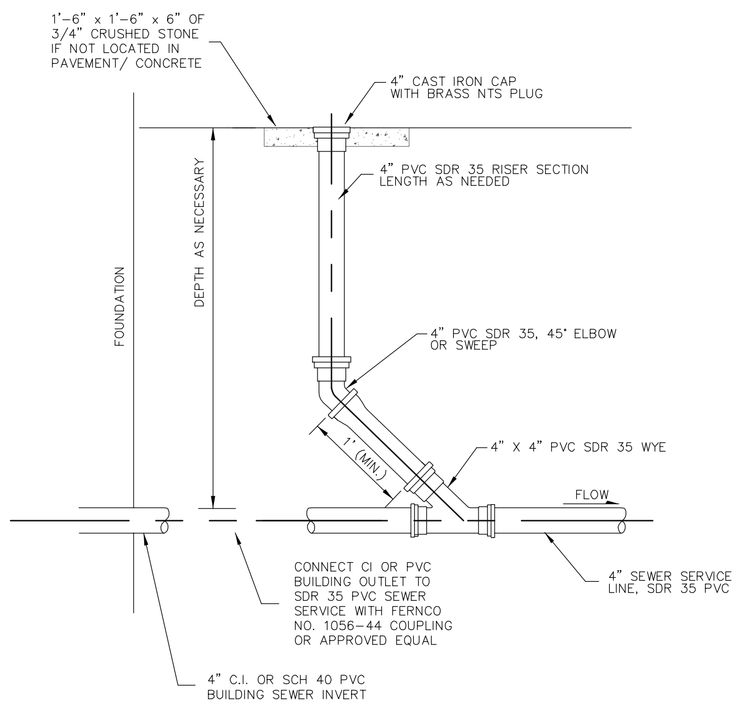
TABLE IV ALLOWABLE AIR LOSS FOR VARIOUS PIPE SIZES

NOMINAL PIPE SIZE	Q, FT^3/MIN	NOMINAL PIPE SIZE	Q, FT^3/MIN
3	2	21	5.5
4	2	24	6
6	2	27	6.5
8	2	30	7
10	2.5	33	7.5
12	3	36	8
15	4	39	8.5
18	5	42	9

FOR FURTHER INFORMATION REGARDING THE AIR TESTING PROCEDURES, REFER TO ASTM STANDARD C828–80.

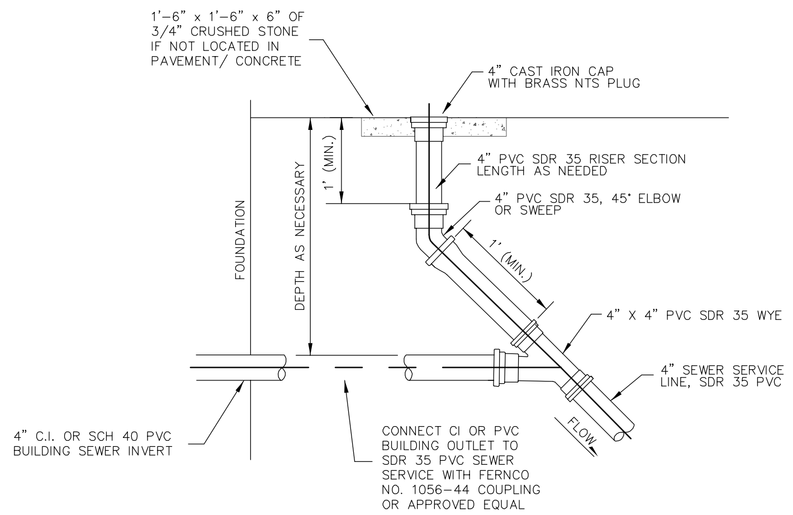
DEEP EXTERIOR CLEANOUT DETAIL

NO SCALE



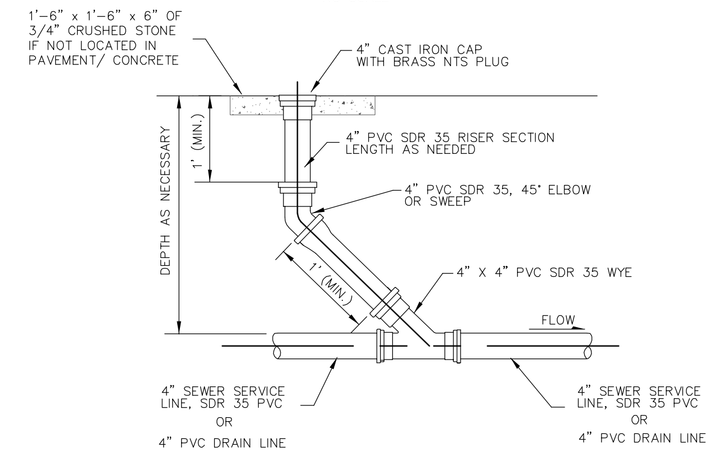
SHALLOW EXTERIOR CLEANOUT DETAIL

NO SCALE



THROUGH FLOW CLEANOUT DETAIL

NO SCALE



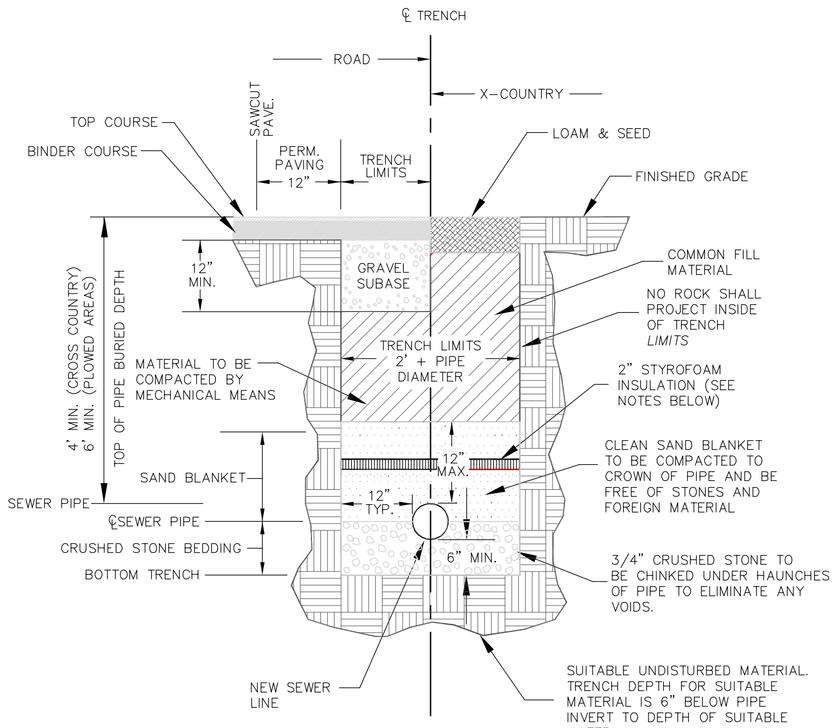
EFFLUENT FILTER ALARM DETAIL

NO SCALE

NOTE: ALL ELECTRICAL CONTROLS/SYSTEMS SHALL MEET APPLICABLE ELECTRICAL CODES.

TYPICAL SEWER PIPE TRENCH

NO SCALE



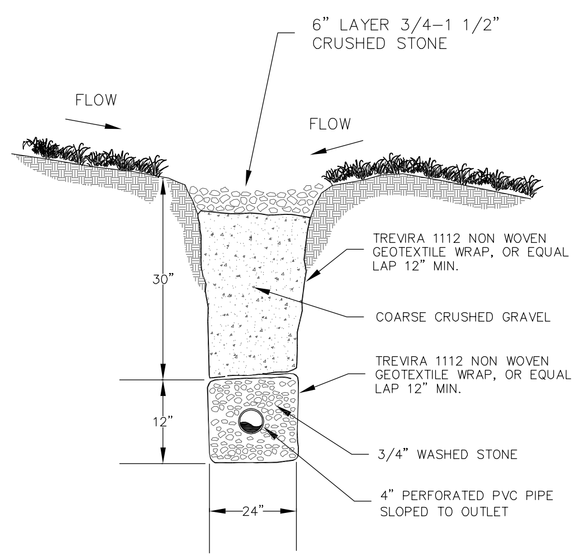
NOTES:

(A) WHERE MINIMUM BURIED DEPTHS CAN NOT BE MET, INSTALL 2" STYROFOAM TO A THICKNESS AS DIRECTED BY THE DESIGNER.

(B) WHERE MINIMUM BURIED DEPTHS CAN NOT BE MET, REPLACE SDR 35 PVC WITH SDR 21 OR 26 PVC, UNLESS DUCTILE IRON IS SPECIFIED.

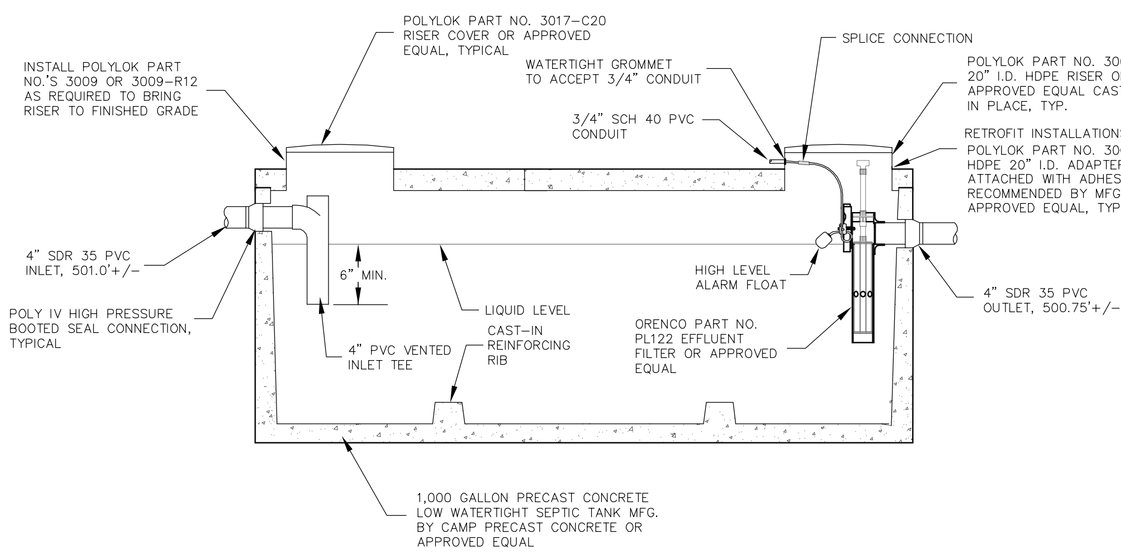
CURTAIN DRAIN/DITCH DETAIL

NO SCALE



1,000 GALLON LOW SEPTIC TANK DETAIL

NO SCALE



TANK NOTES

1. 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, SEAMLESS TANKS ARE PREFERRED. IF FIBERGLASS TANKS ARE USED, DOCUMENTATION FROM THE MANUFACTURER IS REQUIRED TO SUBSTANTIATE THE STRUCTURAL SOUNDNESS OF THE TANK.
   (f) DESIGN LOAD–AASHTO H10.
2. TANK EXCAVATION: THE CONTRACTOR SHALL PROVIDE AN EXCAVATION FREE OF OBSTRUCTIONS FOR A MINIMUM CLEARANCE OF 18" AROUND THE OUTSIDE PERIMETER OF THE TANK(S). A MINIMUM OF 6" OF COMPACTED GRAVEL IS REQUIRED BENEATH THE TANK(S). THE GRAVEL BEDDING SHALL BE UNIFORM THICKNESS AND LEVEL. FILTER FABRIC MAY BE REQUIRED BENEATH THE TANK(S) TO ALLOW FOR PROPER SEPARATION OF BEDDING IN CONDITIONS OF HIGH GROUNDWATER OR UNSUITABLE SOILS.
3. TANK BACKFILL: THE CONTRACTOR SHALL BACKFILL AROUND THE TANK(S) WITH SUITABLE SOIL SUCH AS PEA GRAVEL, SAND, OF CLEAN GRAVEL. THE BACKFILL MATERIAL SHALL BE COMPACTED IN LIFTS NOT TO EXCEED 12".
4. ALL UNUSED KNOCK–OUTS IN THE SEPTIC TANK AND SHALL BE SEALED TO PREVENT LEAKAGE.
5. THE CONTRACTOR SHALL PERFORM A SEPTIC TANK LEAKAGE TEST, WITNESSED BY THE ENGINEER, BY THE FOLLOWING METHOD:
   A. 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 30 MIN. – 1 HOUR FOR THE ABSORPTION OF THE WATER. REFILL TO TOP. DETERMINE VOLUME OF LEAKAGE IN AN 8 HR. (MIN.) TEST PERIOD AND CALCULATE RATE. ALLOWABLE LEAKAGE RATE: NONE
   LOSS IN EXCESS OF ALLOWABLE LEAKAGE REQUIRES REPAIR OF LEAKS.

REV. NO.	DATE	DESCRIPTION	BY	CHECKED BY

"BEST FIX" WASTEWATER DISPOSAL DETAILS FOR

STEVEN DAVIS & ELIZABETH LEONARD

HINESBURG ROAD – TOWN OF CHARLOTTE – VERMONT

THE STATE OF VERMONT – CHRISTOPHER D. HOLZWARTH No. 410 – LICENSED SURVEYOR

HATHORN SURVEYS
2060 HARTFORD AVENUE
POST OFFICE BOX 1942
WILDER, VERMONT 05088
PHONE: (802) 295–5101
FAX: (802) 295–5289

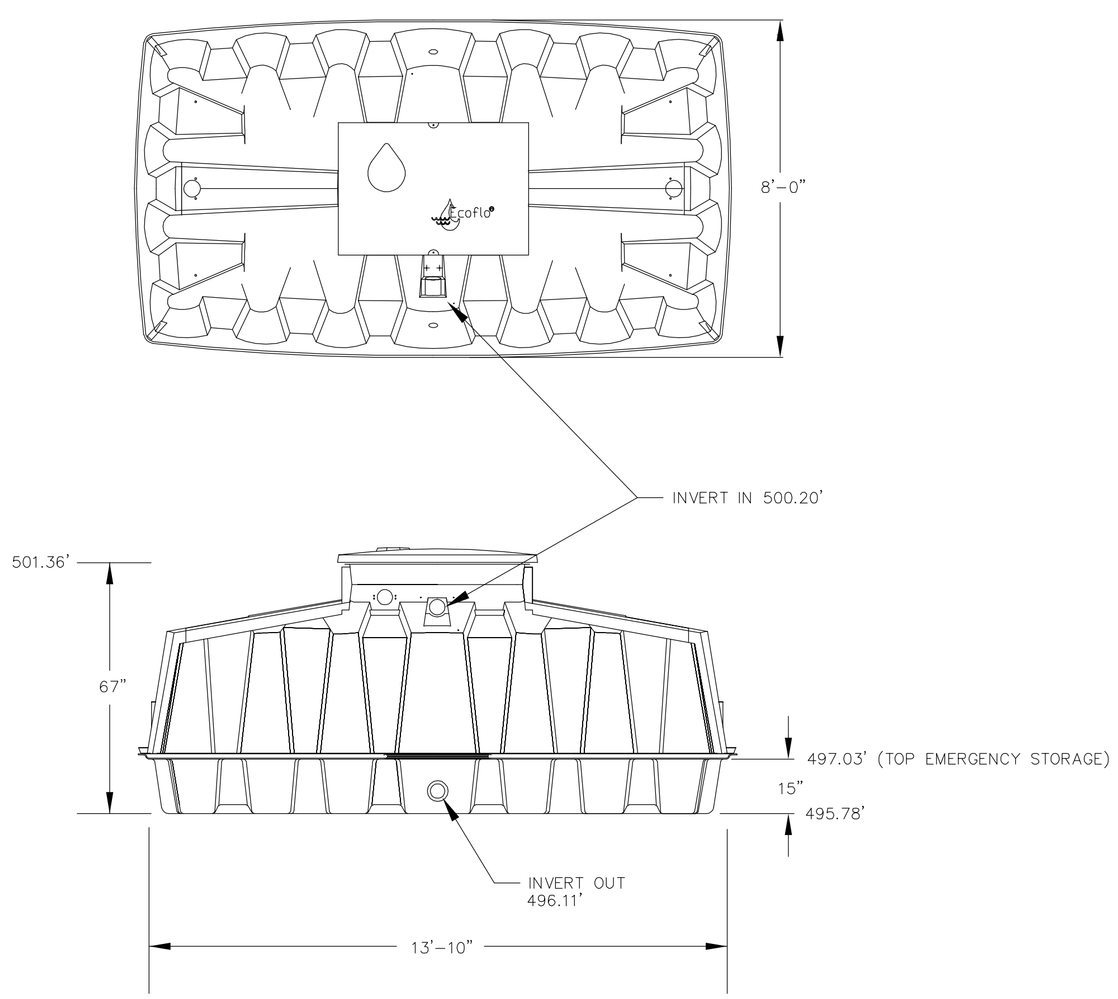
SCALE:	N/A
DESIGNED BY:	C.D.H.
DRAWN BY:	C.D.H.
CHECKED BY:	C.J.B.
DATE:	7/05/07
PROJ. NO.	11498

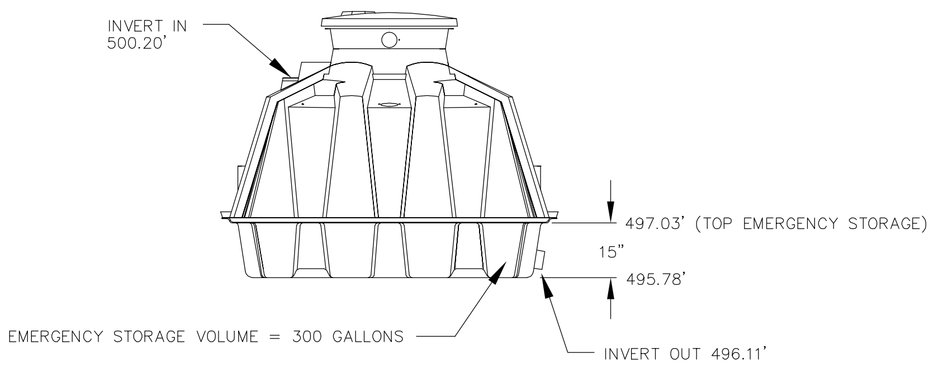
SHEET NO. 6

ECOFLO STB–650 BIOFILTER

(WITH SUBMERSIBLE COLLECTION BOTTOM)

NO SCALE





WASTEWATER DISPOSAL SYSTEM DESIGN BASIS

(1) DAILY FLOW PER § 1–504 (f) Table 1
- A. 8 BEDROOMS @ 140 G.P.D. EACH = 1,120 G.P.D.
- B. TOTAL DAILY FLOW = 1,120 G.P.D.

(2) PRETREATMENT SIZING
- A. INSTALL ECOFLO (2) STB–650 BIOFILTERS @ 560 GPD EACH

(3) FILTRATE EFFLUENT LEACH FIELD SIZING
- A. NATIVE SOIL PERCOLATION RATE @ 14" = 1" PER 40 MINUTES (BOTTOM ONLY TEST)
- B. EFFLUENT APPLICATION RATE PER § 1–517(d)(7) = 1.0 GALLON PER SQUARE FOOT
- C. FILTRATE APPLICATION RATE PER § 1–520(c)(2) = 2.0 GALLON PER SQUARE FOOT
- D. LEACH FIELD SIZE = 1,120 ÷ BY 2 = 560 SQ. FT.
- E. (2) 5 FT. BY 60 FT. = 600 SQ. FT. PROVIDED

(4) EFFECTIVE BASAL AREA
- A. MINIMUM EFFECTIVE BASAL AREA PER § 1–517(d)(9) = 1,120 ÷ BY 0.74 = 1,513.5 SQ. FT.
- B. PROVIDED BASAL AREA = 1,100 SQ. FT. (SYSTEM "A")
- C. PROVIDED BASAL AREA = 900 SQ. FT. (SYSTEM "B")
- B. TOTAL PROVIDED BASAL AREA = 2,000 SQ. FT.

(5) SEPTIC TANK(S)
- A. FLOW PER SEPTIC TANK = 560 G.P.D.
- B. MINIMUM SIZE PER § 1–508(a) FOR 560 G.P.D. = 1,000 GAL.
- C. (2) 1,000 GALLON TANKS PROVIDED

(6) PUMP AND DISTRIBUTION NETWORK
- A. LATERAL SIZE AND TYPE = 1 1/2" SCH 40 PVC
- B. LATERAL LENGTH = 27'–6"
- C. SYSTEM "A" ORIFICES = 5/16" DIAM. HOLES 5'–0" C–C
- D. SYSTEM "B" ORIFICES = 9/32" DIAM. HOLES 5'–0" C–C
- E. SYSTEM "A" AVERAGE HEAD PROVIDED = 4.9'
- F. SYSTEM "B" AVERAGE HEAD PROVIDED = 7.5'
- G. SYSTEM "A" AVERAGE FLOW PER HOLE = 2.55 G.P.M.
- H. SYSTEM "B" AVERAGE FLOW PER HOLE = 2.55 G.P.M.
- I. NUMBER HOLES PER LATERAL = 6
- J. FLOW PER LATERAL = 6 x 2.55 = 15.3 G.P.M.
- K. NUMBER OF LATERALS = 4
- L. TOTAL FLOW = 4 x 15.3 = 61.2 G.P.M.
- M. EXTERIOR FORCE MAIN TYPE AND SIZE = 2" SCH 40 PVC
- N. EXTERIOR FORCE MAIN LENGTH = 255' EQUIV. @ 61.2 GPM
- O. EXTERIOR FORCE MAIN LENGTH = (2) 60' EQUIV. @ 30.6 GPM
- P. INTERIOR FORCE MAIN TYPE AND SIZE = 2" SCH 80 PVC
- Q. INTERIOR FORCE MAIN LENGTH = 45.0' EQUIV.
- R. FRICTION LOSS IN EXTERIOR FORCE MAIN @ 61.2 G.P.M. = 17.8'+/–
- S. FRICTION LOSS IN EXTERIOR FORCE MAIN @ 30.6 G.P.M. = 1.1'+/–
- T. FRICTION LOSS IN INTERIOR FORCE MAIN @ 61.2 G.P.M. = 3.8'+/–
- U. SYSTEM "A" STATIC HEAD = 506.1' – 495.20' = 10.9'+/–
- V. SYSTEM "B" STATIC HEAD = 503.5' – 495.20' = 8.3'+/–
- W. SYSTEM "A" REQUIRED HEAD AT ENTRANCE TO MAINTAIN 4.9' AVG. HEAD = 5.0'+/–
- X. SYSTEM "B" REQUIRED HEAD AT ENTRANCE TO MAINTAIN 7.5' AVG. HEAD = 7.6'+/–
- Y. SYSTEMS "A" AND "B" TOTAL DYNAMIC HEADS = 38.6'+/– EACH
- Z. DISTRIBUTION NETWORKS VOLUME = 18+/– GALLONS
- A2. FORCE MAIN VOLUME = 54+/– GALLONS
- B2. MINIMUM DOSE VOLUME = 5 x 18 GAL. (D.N.V.) + 54 GAL. (F.M.V.) = 144+/– GALLONS
- C2. PROVIDED DOSE = 144+/– GAL. (12+ DOSES A DAY)
- D2. MINIMUM EMERGENCY STORAGE VOLUME ABOVE HIGH WATER ALARM = 1,120 GALLONS
- E2. ACTUAL STORAGE ABOVE HIGH WATER ALARM = 1,120+ GALLONS
- F2. USE ZOELLER MODEL # 185 EFFLUENT PUMP CAPABLE OF PUMPING 61.2 G.P.M. AGAINST A TOTAL DYNAMIC HEAD OF 38.5' OR APPROVED EQUAL

TEST PITS

NOTE: CONSERVATIVE FIELD OBSERVATION INDICATED SANDY CLAY LOAMS, HOWEVER COUNTY SOIL SURVEYS INDICATE SILT LOAM, AND PERCOLATION RATES AND SIEVE ANALYSIS INDICATE LOAMY SAND.

TEST HOLE #1
DATED: 06/20/07
OBSERVED BY: CHRISTOPHER D. HOLZWARTH
METHOD: BACKHOE

0–3"	IMPORTED GRAVELS
3–11"	VERY DARK BROWN 7.5Y 3/4 MEDIUM GRAVELLY, SANDY CLAY LOAM SOFT FEW DISTINCT MOTTLES
11–24"	STRONG BROWN 7.5Y 5/8 MEDIUM GRAVELLY, SANDY SILTY CLAY MANY DISTINCT MOTTLES RED/ BLACK
24–48"	BROWN 10YR 4/3 MEDIUM GRAVELLY/ STONEY, SANDY CLAY LOAM MANY DISTINCT MOTTLES WHITE/BLACK/ORANGE DECAYED ROCK
	MOTTLES TO SURFACE NO LEDGE TO DEPTH NO WATER TO DEPTH

TEST HOLE #2
DATED: 06/20/07
OBSERVED BY: CHRISTOPHER D. HOLZWARTH
METHOD: BACKHOE

0–3"	IMPORTED GRAVELS
3–11"	VERY DARK BROWN 7.5Y 3/4 MEDIUM GRAVELLY, SANDY CLAY LOAM SOFT FEW DISTINCT MOTTLES
11–24"	STRONG BROWN 7.5Y 5/8 MEDIUM GRAVELLY, SANDY SILTY CLAY MANY DISTINCT MOTTLES RED/ BLACK
24–48"	BROWN 10YR 4/3 MEDIUM GRAVELLY/ STONEY, SANDY CLAY LOAM MANY DISTINCT MOTTLES WHITE/BLACK/ORANGE DECAYED ROCK
	MOTTLES TO SURFACE NO LEDGE TO DEPTH NO WATER TO DEPTH

TEST HOLE #3
DATED: 06/20/07
OBSERVED BY: CHRISTOPHER D. HOLZWARTH
METHOD: BACKHOE

0–18"	VERY DARK BROWN 10YR 2/2 LOAMY SAND FRIABLE MANY ROOTS
18–35"	YELLOWISH BROWN 10YR 5/6 MEDIUM GRAVELLY, SANDY CLAY LOAM MANY DISTINCT MOTTLES RED/BLACK/ORANGE FEW ROOTS
35–52"	YELLOWISH BROWN 10YR 5/6 MEDIUM GRAVELLY/ STONEY, SANDY CLAY LOAM PROMINENT MOTTLES WHITE/BLACK/ORANGE DECAYED ROCK
	MOTTLES TO 18" NO LEDGE TO DEPTH NO WATER TO DEPTH

TEST HOLE #4
DATED: 06/20/07
OBSERVED BY: CHRISTOPHER D. HOLZWARTH
METHOD: BACKHOE

0–11"	VERY DARK BROWN 10YR 2/2 LOAMY SAND FRIABLE MANY ROOTS
11–35"	YELLOWISH BROWN 10YR 5/6 MEDIUM GRAVELLY, SANDY CLAY LOAM MANY DISTINCT MOTTLES RED/BLACK/ORANGE FEW ROOTS
35–52"	YELLOWISH BROWN 10YR 5/6 MEDIUM GRAVELLY/ STONEY, SANDY CLAY LOAM PROMINENT MOTTLES WHITE/BLACK/ORANGE DECAYED ROCK
	MOTTLES TO 11" NO LEDGE TO DEPTH NO WATER TO DEPTH

TEST HOLE #5
DATED: 06/20/07
OBSERVED BY: CHRISTOPHER D. HOLZWARTH
METHOD: BACKHOE

0–11"	VERY DARK BROWN 10YR 2/2 SANDY, GRAVELLY, SILTY LOAM FRIABLE MANY ROOTS
11–36"	YELLOWISH BROWN 10YR 5/6 MEDIUM GRAVELLY, SANDY CLAY LOAM MANY DISTINCT MOTTLES RED/BLACK/ORANGE FEW ROOTS
	MOTTLES TO 11" NO LEDGE TO DEPTH NO WATER TO DEPTH

WASTEWATER DISPOSAL SYSTEM DESIGN BASIS CONTINUED

(7) SYSTEM "A" PERFORMANCE BASED LINEAR LOADING RATE
- A. METHOD IS SIMPLIFIED METHOD FOR PRESCRIPTIVE DESKTOP MOUNDING ANALYSIS, FEB. 6, 2003
- B. SOIL TEXTURE = (VERYGRAVELY) LOAMY MED. SAND (FROM SIEVE ANALYSIS)
- C. NATURAL GROUND SLOPE = 2.9–3.8 %
- D. L.L.R. FACTOR = 22.4
- E. HEIGHT = 11" – 6" = 5" =0.42
- E. LINEAR LOADING RATE = 22.4 x 0.42 = 9.408 GAL. PER LN. FT.
- F. MINIMUM LENGTH = 560 ÷ BY 9.408 = 59.52'
- G. PROVIDED LENGTH = 60'

(8) SYSTEM "B" PERFORMANCE BASED LINEAR LOADING RATE
- A. METHOD IS SIMPLIFIED METHOD FOR PRESCRIPTIVE DESKTOP MOUNDING ANALYSIS, FEB. 6, 2003
- B. SOIL TEXTURE = (VERYGRAVELY) LOAMY MED. SAND (FROM SIEVE ANALYSIS)
- C. NATURAL GROUND SLOPE = 3.3–4.0
- D. L.L.R. FACTOR = 22.4
- E. HEIGHT = 11" – 6" = 5" =0.42
- E. LINEAR LOADING RATE = 22.4 x 0.42 = 9.408 GAL. PER LN. FT.
- F. MINIMUM LENGTH = 560 ÷ BY 9.408 = 59.52'
- G. PROVIDED LENGTH = 60'

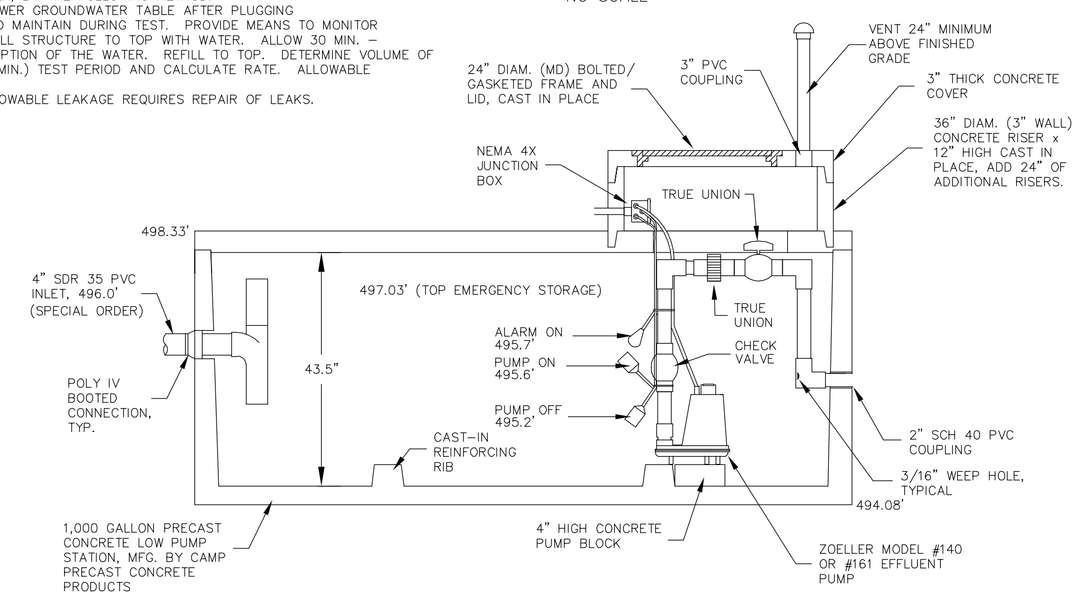
TANK NOTES

1. 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, SEAMLESS TANKS ARE PREFERRED. IF FIBERGLASS TANKS ARE USED, DOCUMENTATION FROM THE MANUFACTURER IS REQUIRED TO SUBSTANTIATE THE STRUCTURAL SOUNDNESS OF THE TANK.
   (f) DESIGN LOAD–AASHTO H10.
2. TANK EXCAVATION: THE CONTRACTOR SHALL PROVIDE AN EXCAVATION FREE OF OBSTRUCTIONS FOR A MINIMUM CLEARANCE OF 18" AROUND THE OUTSIDE PERIMETER OF THE TANK(S). A MINIMUM OF 6" OF COMPACTED GRAVEL IS REQUIRED BENEATH THE TANK(S).
3. THE GRAVEL BEDDING SHALL BE UNIFORM THICKNESS AND LEVEL. FILTER FABRIC MAY BE REQUIRED BENEATH THE TANK(S) TO ALLOW FOR PROPER SEPARATION OF BEDDING IN CONDITIONS OF HIGH GROUNDWATER OR UNSUITABLE SOILS.
4. TANK BACKFILL: THE CONTRACTOR SHALL BACKFILL AROUND THE TANK(S) WITH SUITABLE SOIL SUCH AS PEA GRAVEL, SAND, OF CLEAN GRAVEL. THE BACKFILL MATERIAL SHALL BE COMPACTED IN LIFTS NOT TO EXCEED 12".
5. ALL UNUSED KNOCK–OUTS IN THE PUMP STATION SHALL BE SEALED TO PREVENT LEAKAGE.

THE CONTRACTOR SHALL PERFORM A PUMP STATION LEAKAGE TEST, WITNESSED BY THE ENGINEER, BY THE FOLLOWING METHOD:
A. 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 30 MIN. – 1 HOUR FOR THE ABSORPTION OF THE WATER. REFILL TO TOP. DETERMINE VOLUME OF LEAKAGE IN AN 8 HR. (MIN.) TEST PERIOD AND CALCULATE RATE. ALLOWABLE LEAKAGE RATE: NONE
LOSS IN EXCESS OF ALLOWABLE LEAKAGE REQUIRES REPAIR OF LEAKS.

PUMP STATION

NO SCALE



ZOELLER. PUMP CO.

TEST HOLE #6
DATED: 06/20/07
OBSERVED BY: CHRISTOPHER D. HOLZWARTH
METHOD: BACKHOE

0–8"	VERY DARK BROWN 10YR 2/2 LOAMY SAND FRIABLE MANY ROOTS
8–18"	BROWN ORANGE MEDIUM GRAVELLY–STONEY, SANDY CLAY LOAM WITH FEW BOULDERS COMMON ROOTS
18–27'	BROWN SANDY CLAY LOAM DISTINCT MOTTLES WHITE/BLACK/ORANGE DECAYED ROCK
	MOTTLES TO 18" NO LEDGE TO DEPTH NO WATER TO DEPTH

TEST HOLE #7
DATED: 06/20/07
OBSERVED BY: CHRISTOPHER D. HOLZWARTH
METHOD: BACKHOE

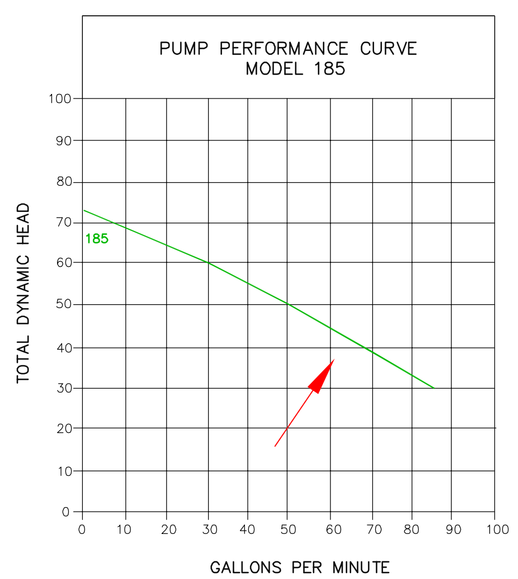
0–4"	VERY DARK BROWN 10YR 2/2 LOAMY SAND FRIABLE MANY ROOTS
4–14"	BROWN ORANGE MEDIUM GRAVELLY–STONEY, SANDY CLAY LOAM WITH FEW BOULDERS COMMON ROOTS
14–40"	BROWN SANDY CLAY LOAM DISTINCT MOTTLES WHITE/BLACK/ORANGE DECAYED ROCK
	MOTTLES TO 14" NO LEDGE TO DEPTH NO WATER TO DEPTH

TEST HOLE #8
DATED: 06/20/07
OBSERVED BY: CHRISTOPHER D. HOLZWARTH
METHOD: BACKHOE
EXISTING LEACH FIELD

SIEVE ANALYSIS #1
6–18" VERY GRAVELY LOAMY SAND

SIEVE ANALYSIS #2
6–18" VERY GRAVELY LOAMY SAND

SIEVE ANALYSIS #3
6–18" VERY GRAVELLY LOAMY SAND



FORCE MAIN PRESSURE AND LEAKAGE TEST

PRESSURE TEST

AFTER THE PIPE HAS BEEN LAID, ALL NEWLY LAID PIPE OR ANY VALVED SECTION THEREOF SHALL BE SUBJECTED TO A HYDROSTATIC PRESSURE OF AT LEAST 1.5 X THE HIGHEST WORKING PRESSURE IN THE SECTION.

TEST PRESSURE RESTRICTIONS. TEST PRESSURES SHALL:
1. NOT BE LESS THAN 50 P.S.I. AT THE HIGHEST POINT ALONG THE TEST SECTION.
2. NOT EXCEED PIPE OR THRUST RESTRAINT DESIGN PRESSURES.
3. BE AT LEAST 2 HOUR DURATION.
4. NOT VARY MORE THAN 5 P.S.I.
5. NOT EXCEED TWICE THE RATED PRESSURE OF THE VALVES WHEN THE PRESSURE BOUNDARY OF THE TEST SECTION INCLUDES CLOSED GATE VALVES.

PRESSURIZATION. EACH VALVED SECTION OF PIPE SHALL BE FILLED WITH WATER SLOWLY AND THE SPECIFIED TEST PRESSURE, BASED ON THE ELEVATION OF THE LOWEST POINT OF THE LINE OR SECTION UNDER TEST AND CORRECTED TO THE ELEVATION OF THE TEST GAUGE, SHALL BE APPLIED BY MEANS OF A PUMP CONNECTED TO THE PIPE.

AIR REMOVAL. BEFORE APPLYING THE SPECIFIED TEST PRESSURE, AIR SHALL BE EXPELLED COMPLETELY FROM THE PIPE AND VALVES.

EXAMINATION. ALL EXPOSED PIPE, FITTINGS, VALVES AND JOINTS SHALL BE EXAMINED CAREFULLY DURING THE TEST. ANY DAMAGED OR DEFECTIVE PIPE, FITTINGS OR VALVES THAT ARE DISCOVERED FOLLOWING THE PRESSURE TEST SHALL BE REPAIRED OR REPLACED WITH SOUND MATERIAL AND THE TEST REPEATED.

LEAKAGE TEST

A. LEAKAGE TEST SHALL BE CONDUCTED CONCURRENTLY WITH THE PRESSURE TEST.

LEAKAGE TEST DEFINED. LEAKAGE SHALL BE DEFINED AS THE QUANTITY OF WATER THAT MUST BE SUPPLIED INTO THE NEWLY LAID PIPE, OR ANY VALVED SECTION THEREOF, TO MAINTAIN PRESSURE WITHIN 5 PSI OF THE SPECIFIED TEST PRESSURE AFTER THE AIR IN THE PIPELINE HAS BEEN EXPELLED AND THE PIPE HAS BEEN FILLED WITH WATER.

ALLOWABLE LEAKAGE. NO PIPE INSTALLATION WILL BE ACCEPTED IF THE LEAKAGE IS GREATER THAN THAT DETERMINED BY THE FOLLOWING FORMULA.

$$L = \frac{ND\sqrt{P}}{7400}$$

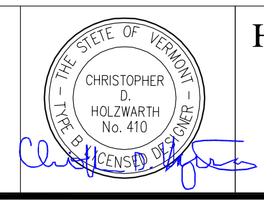
L IS THE ALLOWABLE LEAKAGE, IN GALLONS PER HOUR; N IS THE NUMBER OF JOINTS IN THE LENGTH OF PIPELINE TESTED; D IS THE NOMINAL DIAMETER OF THE PIPE, IN INCHES; AND P IS THE AVERAGE TEST PRESSURE DURING THE LEAKAGE TEST, IN POUNDS PER SQUARE INCH GAGE.

REV. NO.	DATE	DESCRIPTION	BY	CHECKED BY
1	5/01/08	WASTEWATER LAYOUT AND SUPPORT DATA	CDH	

"BEST FIX" WASTEWATER DISPOSAL DETAILS FOR

STEVEN DAVIS & ELIZABETH LEONARD

HINESBURG ROAD – TOWN OF CHARLOTTE – VERMONT



HATHORN SURVEYS
2060 HARTFORD AVENUE
POST OFFICE BOX 1942
WILDER, VERMONT 05088
PHONE: (802) 295–5101
FAX: (802) 295–5289

SCALE:	N/A
DESIGNED BY:	C.D.H.
DRAWN BY:	C.D.H.
CHECKED BY:	C.J.B.
DATE:	7/05/07
PROJ. NO.	11498

SHEET NO. 7

SPECIFICATION FOR MOUND DISPOSAL SYSTEM

1. GENERAL: THE CONTRACTOR SHALL SUPPLY ALL MATERIALS, TOOLS, LABOR AND EQUIPMENT NECESSARY TO CONSTRUCT THE MOUND TYPE SEWAGE DISPOSAL SYSTEM AS INDICATED ON THE CONTRACT DRAWINGS AND AS HEREIN SPECIFIED.

2. GRAVITY SEWER: THE SEWER LINE FROM THE BUILDING SEWER, INSTALLED BY OTHERS, TO THE SEPTIC TANK AND FROM THE SEPTIC TANK TO THE DOSING TANK OR PUMP CHAMBER SHALL BE SCH 40 PVC SEWER PIPE, OR AS INDICATED ON THE DRAWINGS.

3. PRESSURE PIPE: THE PRESSURE PIPE OR FORCED MAIN FROM THE DOSING TANK OR PUMP CHAMBER TO THE LEACH FIELD MANIFOLD SHALL BE PVC PRESSURE PIPE CONFORMING TO ASTM D 224 1, SPECIFICATION FOR PVC PRESSURE PIPE AND SHALL BE OF THE THICKNESS CLASS INDICATED ON THE DRAWINGS.

4. MANIFOLD AND DISTRIBUTION PIPES: THE LEACH FIELD MANIFOLD AND DISTRIBUTION PIPES AND FITTINGS SHALL BE RIGID SCHEDULE 40 PVC PRESSURE PIPE WITH SOLVENT WELD FITTINGS. THE DISTRIBUTION PIPE SHALL BE CAREFULLY DRILLED WITH A SINGLE ROW OF HOLES AT THE SPACING AND OF THE DIAMETER INDICATED ON THE DRAWINGS, WITH THE LAST HOLE IN THE BOTTOM OF THE END CAP.

5. FILL MATERIAL: THE FILL MATERIAL FROM THE PLOWED SURFACE TO THE TOP OF THE TRENCH OR BED SHALL BE SAND WHICH MEETS ONE OF THE MOUND FILL MATERIAL SIEVE ANALYSES. A CERTIFIED SIEVE ANALYSIS SHALL BE SUBMITTED TO THE DESIGNER PRIOR TO USE.

6. CONSTRUCTION SEQUENCE: PRIOR TO BEGINNING ANY CONSTRUCTION ON THE SITE THE ENGINEER SHALL BE CONTACTED. THE DISPOSAL SYSTEM CONSTRUCTION SCHEDULE SHALL BE REVIEWED AND APPROVED BY THE ENGINEER TO INSURE THAT THE NECESSARY INSPECTIONS ARE MADE AND THAT PROPER CONSTRUCTION PRACTICES ARE FOLLOWED.

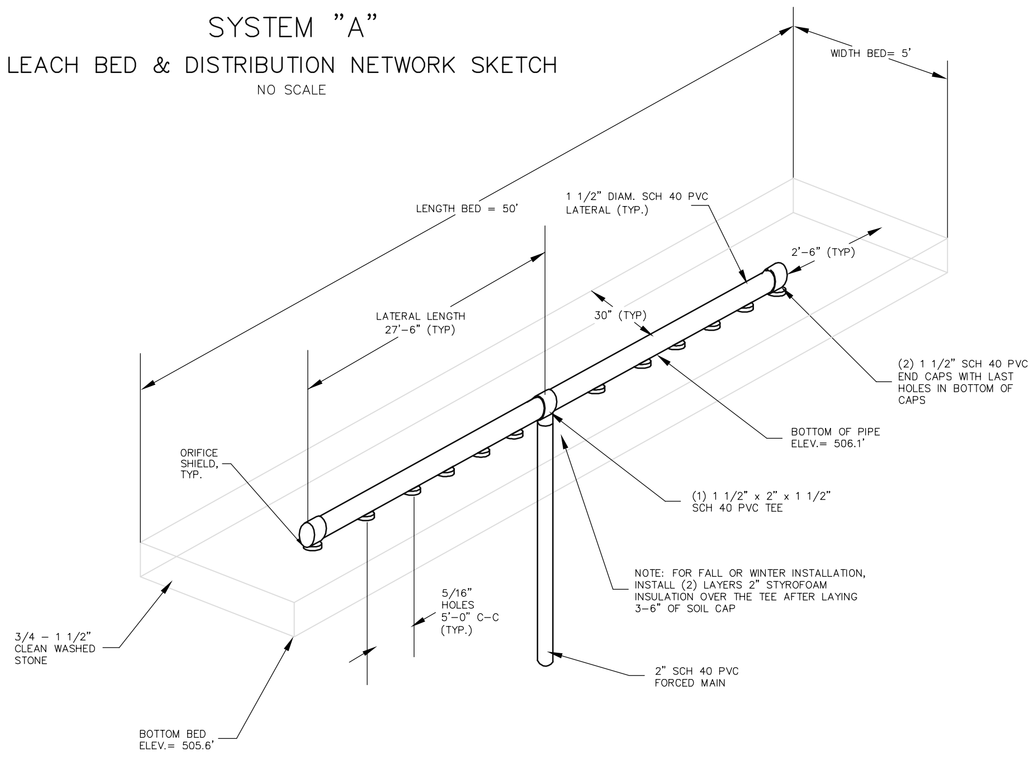
ABOVE GROUND VEGETATION SHALL BE CLOSELY CUT AND REMOVED FROM THE GROUND SURFACE THROUGHOUT THE AREA TO BE UTILIZED FOR THE PLACEMENT OF THE FILL MATERIAL. PRIOR TO PLOWING, THE DOSING PUMP DISCHARGE LINE FROM THE PUMP CHAMBER TO THE POINT OF CONNECTION WITH THE DISTRIBUTION PIPING HEADER SHALL BE INSTALLED. THE AREA SHALL THEN BE PLOWED TO A DEPTH OF SEVEN (7) TO EIGHT (8) INCHES, PARALLEL TO THE LAND CONTOUR WITH THE PLOW THROWING THE SOIL UP SLOPE TO PROVIDE A PROPER INTERFACE BETWEEN THE FILL AND NATURAL SOILS. TREE STUMPS SHOULD BE CUT FLUSH WITH THE SURFACE OF THE GROUND AND ROOTS SHOULD NOT BE PULLED. ONCE PLOWING OF THE MOUND IS COMPLETED, THE AREA SHALL BE FENCED TO PREVENT VEHICLES AND EQUIPMENT FROM ENTERING THE PLOWED AREA, AND THE ENGINEER SHALL BE NOTIFIED TO INSPECT THIS PORTION OF THE WORK.

THE AREA SURROUNDING THE MOUND SHALL BE GRADED TO PROVIDE DIVERSION OF SURFACE RUN-OFF WATERS.

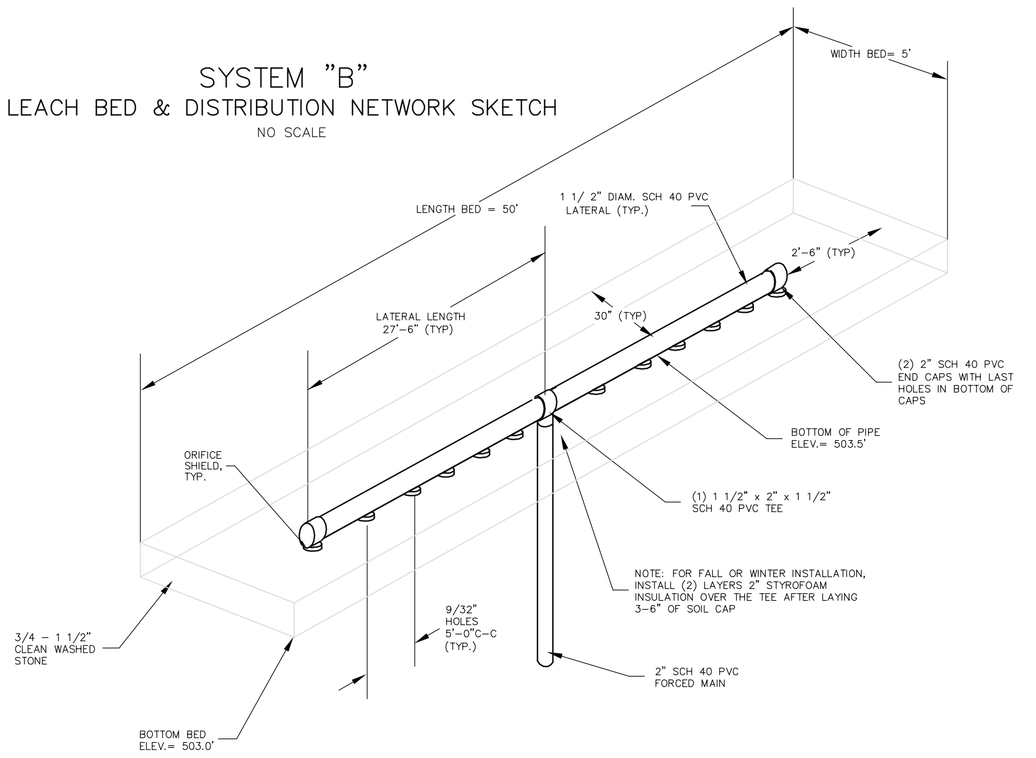
TO PREVENT COMPACTION, CONSTRUCTION EQUIPMENT SHALL NOT BE MOVED ACROSS THE PLOWED SURFACE OR THE EFFLUENT DISPERSAL AREA, HOWEVER, AFTER PLACEMENT OF A MINIMUM OF SIX (6) INCHES OF SAND FILL OVER THE PLOWED AREA, CONSTRUCTION EQUIPMENT MAY BE DRIVEN OVER THE PROTECTED SURFACE TO EXPEDITE CONSTRUCTION. CONSTRUCTION AND/OR PLOWING SHALL NOT BE INITIATED WHEN THE SOIL MOISTURE CONTENT IS HIGH. (IF A SAMPLE OF SOIL OBTAINED FROM APPROXIMATELY NINE (9) INCHES BELOW THE SURFACE CAN BE EASILY ROLLED INTO A WIRE THE SOIL MOISTURE CONTENT IS TOO HIGH FOR CONSTRUCTION PURPOSES.

CONSTRUCTION SHALL BE INITIATED IMMEDIATELY AFTER PREPARATION OF THE SOIL INTERFACE BY PLACING ALL OF THE SAND FILL NEEDED FOR THE MOUND TO A MINIMUM DEPTH OF TWENTY-ONE (12) INCHES ABOVE THE PLOWED SURFACE OR TO A HEIGHT AS DIRECTED TO MAINTAIN THE REQUIRED VERTICAL SEPARATION TO LIMITATIONS. AFTER HAND LEVELING OF THE ABSORPTION AREA, THE STONE SHALL BE PLACED INTO THE BED, HAND LEVELED AND THE DISTRIBUTION PIPE INSTALLED. THE DESIGNER SHALL DIRECT THE TESTING OF THE DISTRIBUTION SYSTEM. AFTER INSTALLATION OF THE DISTRIBUTION SYSTEM, THE TRENCHES OR BED SHALL BE COVERED WITH FILTER FABRIC AND THE ENTIRE MOUND COVERED WITH TOPSOIL NATIVE TO THE SITE, OR OF SIMILAR CHARACTERISTICS TO SUPPORT VEGETATION FOUND IN THE AREA. CROWN THE ENTIRE MOUND WITH COVER OF SOIL LESS PERMEABLE THAN THE MOUND FILL, COVERING TWELVE (12) INCHES ON THE SIDE SLOPES, AND A MINIMUM OF EIGHTEEN (18) INCHES OVER THE CENTER OF THE MOUND. NATIVE SOIL FROM THE SITE IS NORMALLY SUITABLE FOR THE COVER MATERIAL, THOUGH THE TOP 2" -4" OF THIS COVER SHOULD BE TOPSOIL. THE ENTIRE MOUND SHALL BE SEEDED, SODDED, OR OTHERWISE PROVIDED WITH VEGETATION COVER, TO ASSURE STABILITY OF THE INSTALLATION.

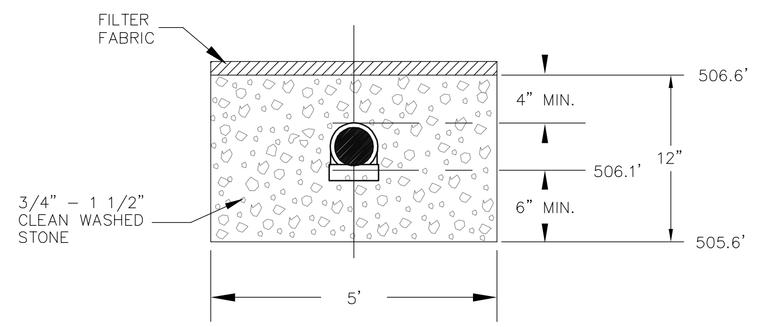
SYSTEM "A"
LEACH BED & DISTRIBUTION NETWORK SKETCH
NO SCALE



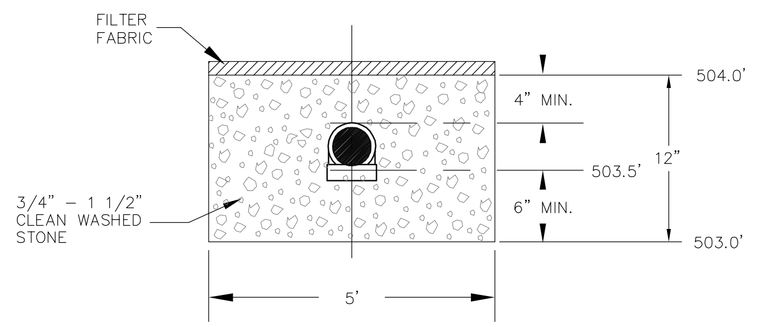
SYSTEM "B"
LEACH BED & DISTRIBUTION NETWORK SKETCH
NO SCALE



SYSTEM "A"
TYPICAL LEACH BED SECTION VIEW
NO SCALE



SYSTEM "B"
TYPICAL LEACH BED SECTION VIEW
NO SCALE

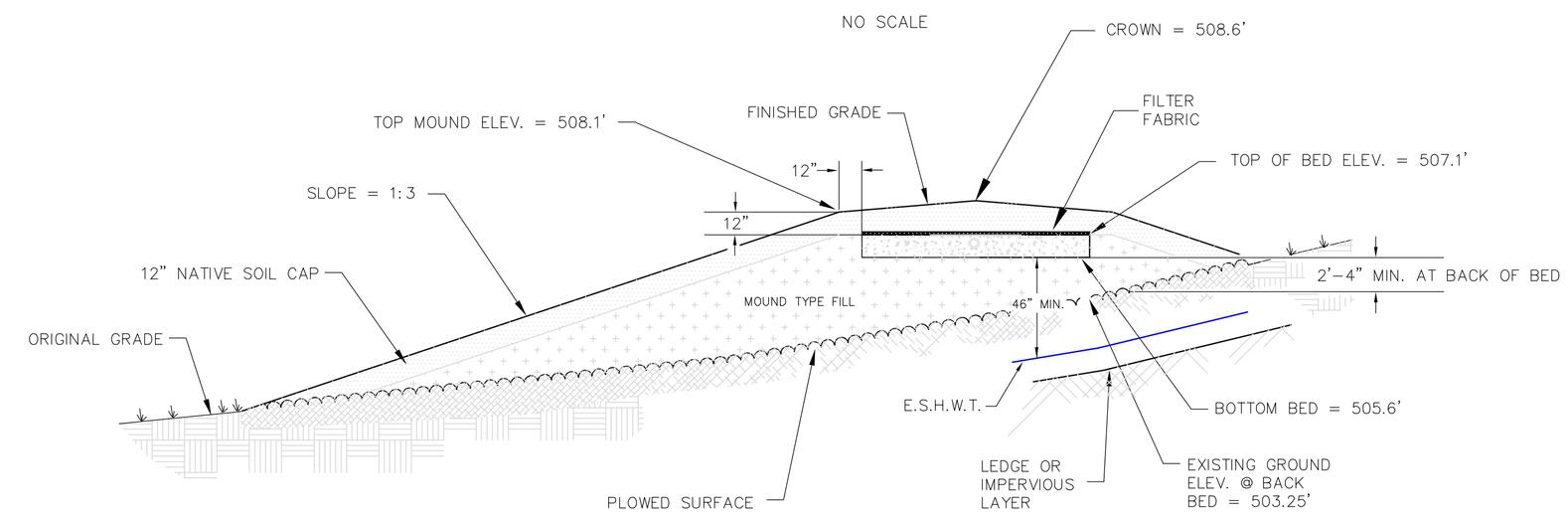


MOUND FILL MATERIAL
APPROVED SIEVE ANALYSIS

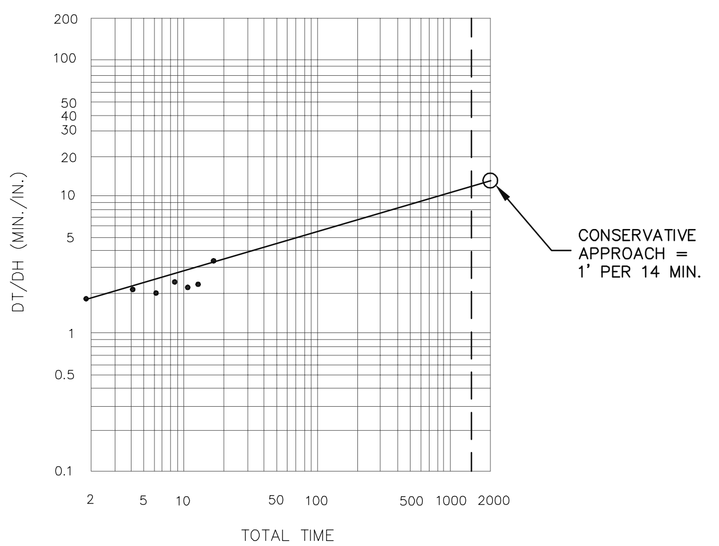
MATERIAL A.		MATERIAL B.		MATERIAL C.	
SIEVE SIZE	% PASSING BY WEIGHT	SIEVE SIZE	% PASSING BY WEIGHT	SIEVE SIZE	% PASSING BY WEIGHT
10	85-100	4	95-100	10	85-100
40	25-75	8	80-100	40	30-50
60	0-30	16	50-85	200	0-10
100	0-10	30	25-60		
200	0-5	50	10-30		
		100	2-10		

NOTE: A SIEVE ANALYSIS SHALL BE PROVIDED TO THE ENGINEER PRIOR THE FILL PLACEMENT.

SYSTEM "A"
TYPICAL MOUND CROSS SECTION VIEW
NO SCALE

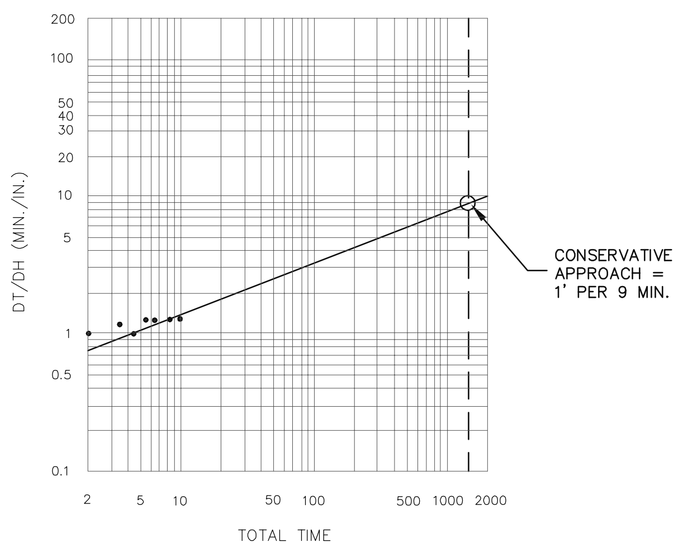


PERCOLATION TEST NUMBER 1



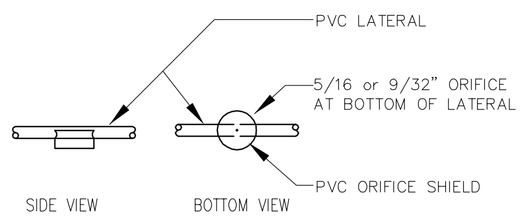
NOTE; THIS TEST WAS PERFORMED UTILIZING ONLY THE BOTTOM AREA OF THE PERCOLATION HOLE WITH 1" MAXIMUM REFILLS TO SIMULATE THE INFILTRATION CAPABILITIES OF THE BASAL AREA.

PERCOLATION TEST NUMBER 2



NOTE; THIS TEST WAS PERFORMED UTILIZING ONLY THE BOTTOM AREA OF THE PERCOLATION HOLE WITH 1" MAXIMUM REFILLS TO SIMULATE THE INFILTRATION CAPABILITIES OF THE BASAL AREA.

STANDARD ORIFICE SHIELD DETAIL
NO SCALE



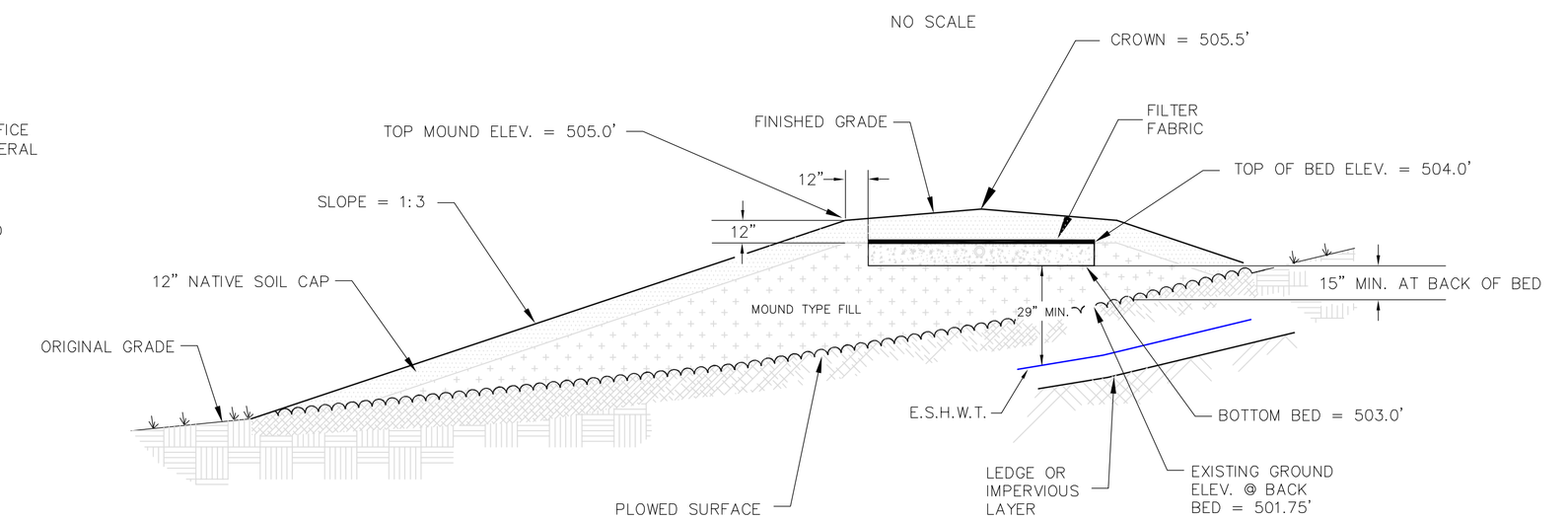
MINIMUM BASAL AREA

$Q = 3/\sqrt{T} \times 0.8$
$Q = 3/\sqrt{14} \times 0.8$
$Q = 3/\ 3.7416 \times 0.8$
$Q = 0.80178 \times 0.8$
$Q = 0.6414$

TREATED EFFLUENT BONUS

APPLICATION RATE = 0.6414 x 2 = 1.28 GAL. PER SQ. FT. PER DAY
DAILY FLOW =1,120 G.P.D.
MINIMUM BASAL AREA = 1,120/ 1.28 = 875 SQ. FT.
ACTUAL BASAL AREA = 2,000 SQ. FT.

SYSTEM "B"
TYPICAL MOUND CROSS SECTION VIEW
NO SCALE



REV. NO.	DATE	DESCRIPTION	BY	CHECKED BY
1	5/01/08	WASTEWATER LAYOUT AND SUPPORT DATA	CDH	

"BEST FIX" WASTEWATER DISPOSAL DETAILS FOR

STEVEN DAVIS & ELIZABETH LEONARD

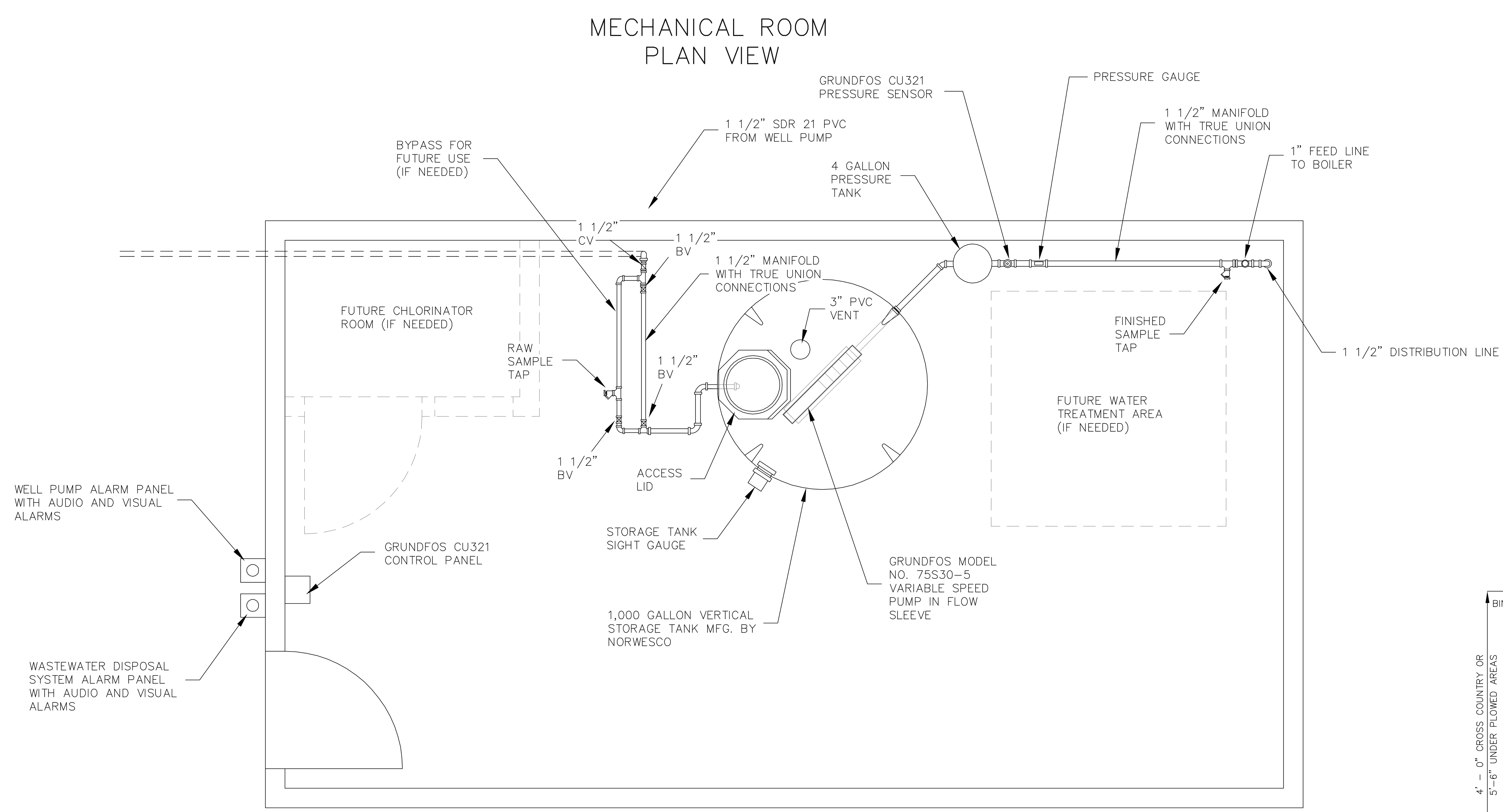
HINESBURG ROAD - TOWN OF CHARLOTTE - VERMONT

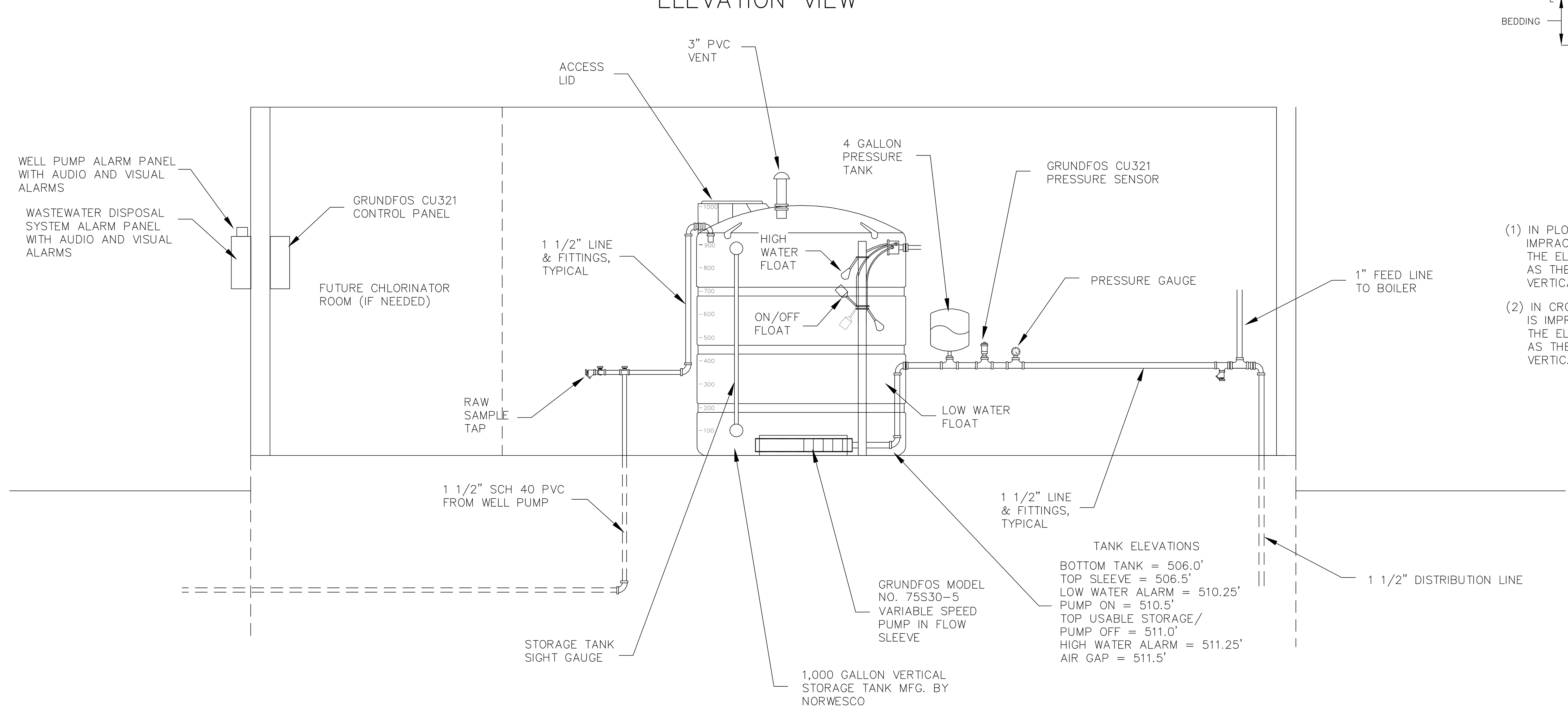
THE STATE OF VERMONT - CHRISTOPHER D. HOLZWARTH No. 410 - LICENSED LAND SURVEYOR

HATHORN SURVEYS
2060 HARTFORD AVENUE
POST OFFICE BOX 1942
WILDER, VERMONT 05088
PHONE: (802) 295-5101
FAX: (802) 295-5289

SCALE:	N/A
DESIGNED BY:	C.D.H.
DRAWN BY:	C.D.H.
CHECKED BY:	C.J.B.
DATE:	7/05/07
PROJ. NO.	11498

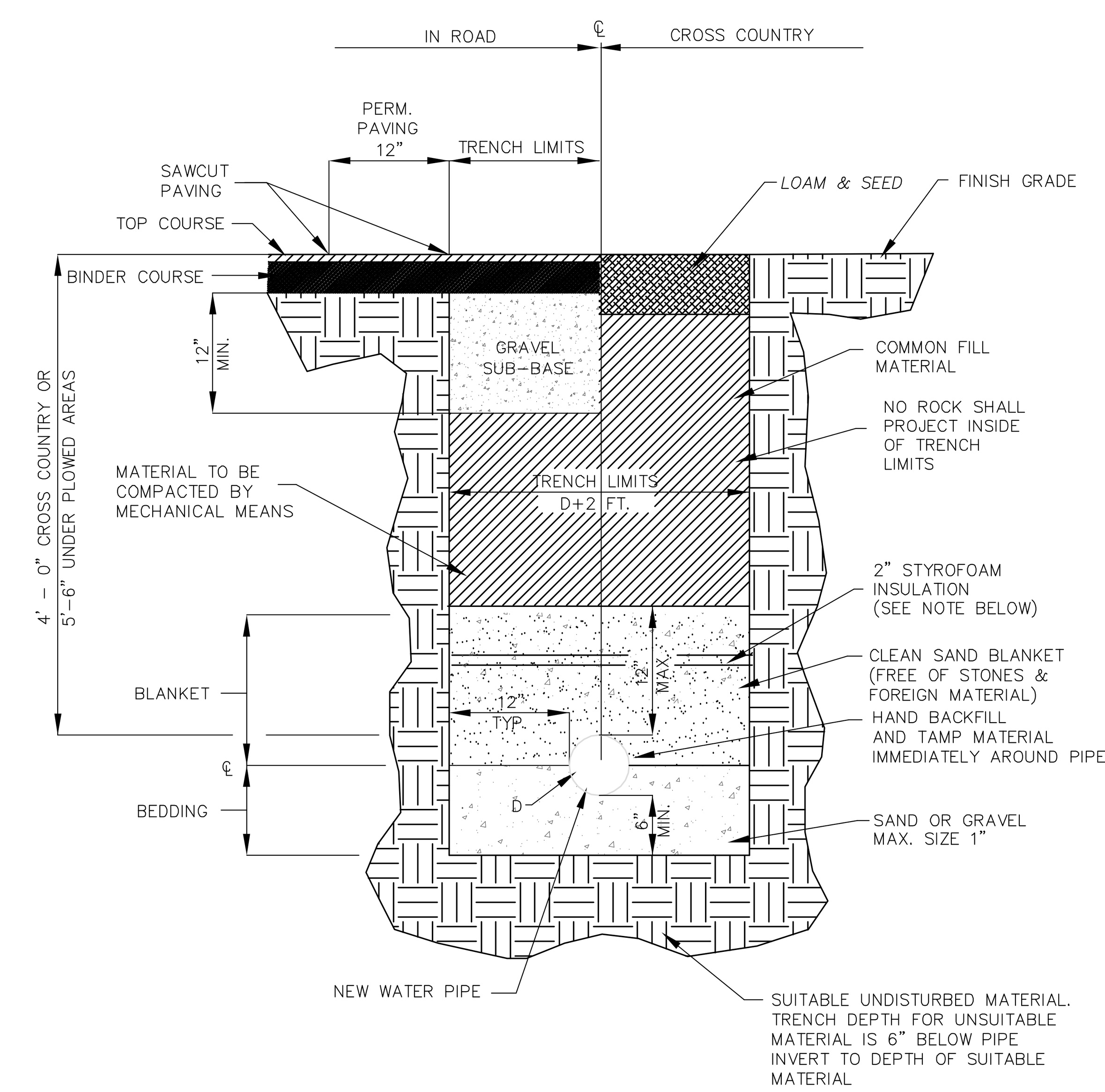
SHEET NO. 8





TYPICAL WATER PIPE TRENCH

SECTION VIEW – NOT TO SCALE



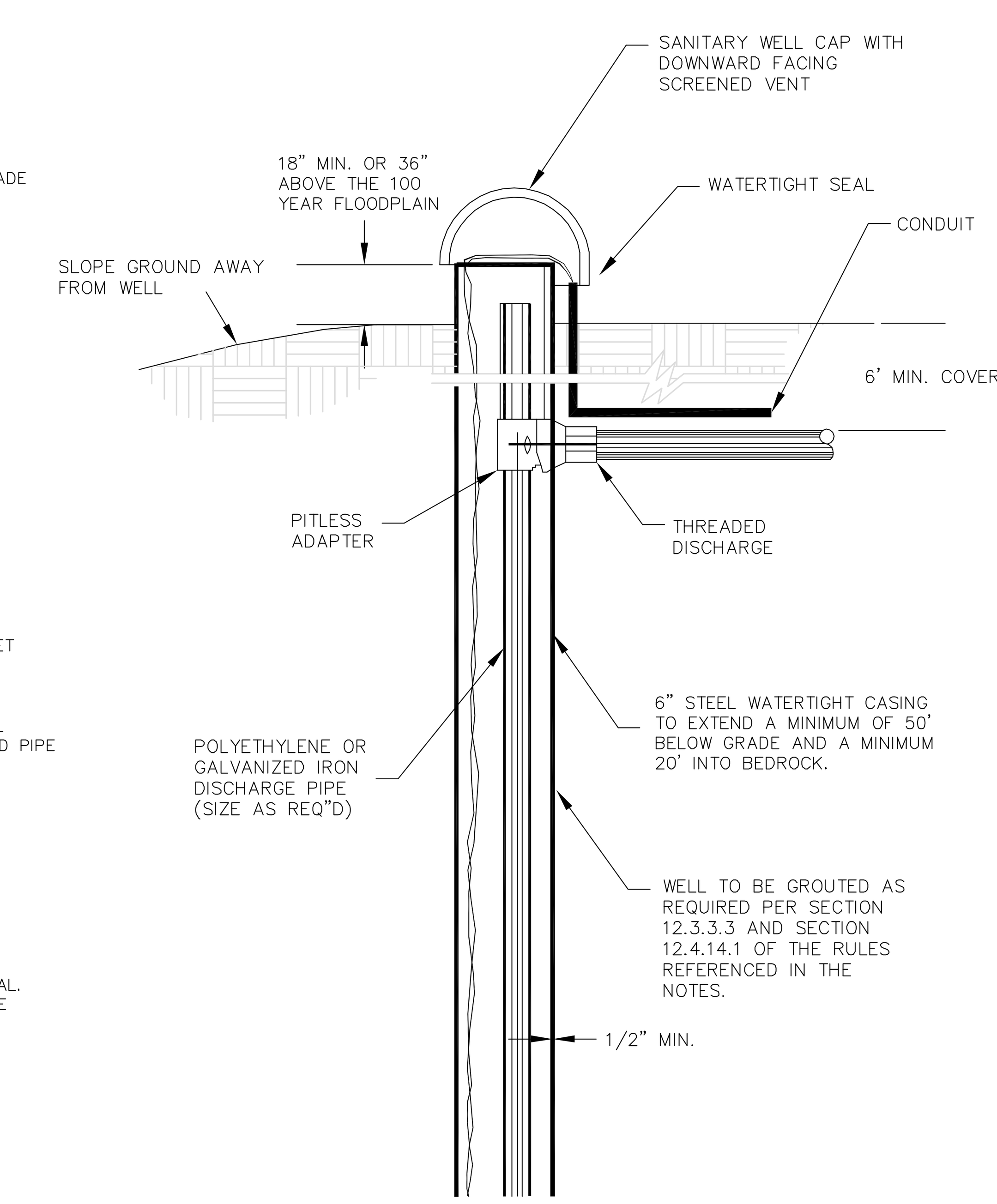
WATER TRENCH NOTES

(1) IN PLOWED AREAS WHERE COVER IS LESS THAN 5'-6" AND IT IS IMPRACTICABLE DUE TO LEDGE OR SEWER CROSSINGS TO LOWER THE ELEVATION, A LAYER OF 2" STYROFOAM INSULATION AS WIDE AS THE DITCH MAY BE INSTALLED, WITH 1 LAYER FOR EVERY 1 VERTICAL FOOT OF DISCREPANCY REQUIRED.

(2) IN CROSS COUNTRY AREAS WHERE COVER IS LESS THAN 4' AND IT IS IMPRACTICABLE DUE TO LEDGE OR SEWER CROSSINGS TO LOWER THE ELEVATION, A LAYER OF 2" STYROFOAM INSULATION AS WIDE AS THE DITCH MAY BE INSTALLED, WITH 1 LAYER FOR EVERY 1 VERTICAL FOOT OF DISCREPANCY REQUIRED.

TYPICAL DRILLED BEDROCK WELL

NO SCALE



WELL NOTES

(A) SUBJECT TO MINIMUM CONSTRUCTION STANDARDS AS SET FORTH IN THE VERMONT WATER SUPPLY RULES, CHAPTER 21 PART 12

(B) WELL PUMP IS TO BE EQUIPPED WITH A LOW WATER CUT-OFF SWITCH.

(C) CONTRACTOR IS TO PROVIDE LIGHTNING PROTECTION ON WELL CIRCUIT & SIGNAL CIRCUIT.

REV. NO.	DATE	DESCRIPTION	BY	CHECKED BY
1	5/01/08	MISCL.	CDH	

WATER SYSTEM DETAILS FOR

STEVEN DAVIS & ELIZABETH LEONARD

HINESBURG ROAD – TOWN OF CHARLOTTE – VERMONT

STATE OF VERMONT — CHARLES ... — No. ... — REGISTERED PROFESSIONAL ENGINEER

HATHORN SURVEYS
2060 HARTFORD AVENUE
POST OFFICE BOX 1942
WILDER, VERMONT 05088
PHONE: (802) 295-5101
FAX: (802) 295-5289

SCALE: N/A
DESIGNED BY: C.D.H.
DRAWN BY: C.D.H.
CHECKED BY: CJB
DATE: 10/17/07
PROJ. NO. 11498

9
SHEET NO.