

SEPTIC SYSTEM DESIGN CRITERIA: TOWN CAMPUS 7,073 s.f. / 200 s.f./person = 35 People35 people x 20 GPD/person = 700 GPD 50 people x 2 GPD/person = 100 GPD 3. PUBLIC WORKS: 15 people x 20 GPD/person = 300 GPD Total Daily Flow: 700 GPD + 100 GPD + 300 GPD = 1,100 GPD Effective Area Required: Application Rate: (Non- Problematic Sewage, Non-Residentail Bldg.): = 1.2 GPD/s.f.1,100 GPD / 1.2 GPD/s.f. = 917 s.f. Required Effective Leaching Area = 917 s.f. SIZE OF SYSTEM: 192 l.f. of 12" Leaching Galley $(192 \text{ l.f.} + 2 \text{ l.f.}) \times 5.9 \text{ s.f./l.f.} = 1,145 \text{ s.f.}$ 1,145 s.f. > 917 s.f., OK MINIMUM LEACHING SYSTEM SPREAD (MLSS): GRADE = Hydraulic Gradient (% of Slope) R.L. = Depth to Restrictive Layer

MLSS = Minimum Leaching System Spread S.F. = Square Feet of Effective Area Required P.S. = Proposed Spread of System							
GRADE	R.L.	H.F.	F.F.	P.F.	MLSS	S.F.	P.S.
6.1-8.0%	19"	34	3.7	1.5	189'	917	194'

= Flow Factor (1,100 GPD / 300 = 3.7)

System in Select Fill ("Fill System")

= Percolation Factor (1" in 10.1 to 20.0 min.)

SLOPE / GRADE NOTE:

= Hydraulic Factor

The B100 slope (6.1-8.0%) based upon mottling elevation in the existing original soil (non-fill).

DEEP TEST DATA

Soil Testing performed by the Office of Harkin Engineer, (Michael P. Harkin, P.E.). Witnessed / confirmed by Mr. Richard Leighton, of the Killingworth Health Dept.

TEST PIT: #1	(4/7/11)
0 - 46" 46 - 49" 49 - 60" 60 - 96"	Unsuitable fill material Top soil Org—brn sandy loam Gray sand w/ silt, mottled throughout w/ cobbles
RL=60"	•

TEST PI	T: #2	(4/7/11)
0 – 37 – 45 – 69 –	45" 69"	Unsuitable fill material Top soil Org—brn sandy loam Gray sand w/ silt, mottled throughou w/ cobbles

Groundwater @ 94"/ No Ledge / Mottling @ 60"

0 - 27" Unsuitable fill materia 27 – 35**"** Top soil *35 – 46"* Org-brn sandy loam

Groundwater @ 101"/ No Ledge / Mottling @ 69"

Gray sand w/ silt, mottled throughout w/ cobbles

No Groundwater / No Ledge / Mottling @ 46"

(4/7/11)0 - 19" Unsuitable fill materia 19 – 24" Top soil 24 - 41" Org-brn sandy loam Gray sand w/ silt, mottled throughout w/ cobbles

No Groundwater / No Ledge / Mottling @ 41"

PERCOLATION TEST DATA Percolation Testing conducted by the Office of

Harkin Engineering, LLC (Michael P. Harkin, P.E.) Date: 4/11/11 <u>Percolation Test: PA</u>

Locate	d Withi	'n TP #4						
Hole [Hole Dia. = 7", Hole Depth = 12"							
Top of	hole i	from exist. grad	de = 24"					
Pre-S	oaked							
Time		D. T. W.	Inc. Drop	Mir				
11:40	am	6 3/4"						
11:45	am	9 3/4"	<i>3"</i>	1.				
11:50	am	10 1/2"	3/4"	6.				
11:55	am	11 1/4"	3/4"	6.				

12:00 pm 11 3/4" 10.00 12:10 pm 12 3/4" 10.00 12:20 pm 13 3/4" 10.00 Báte: 4/11/13.33 <u> 126:730 lat19011 Test.14PB</u> /2" 12:40 pm Located Within 15"#1 1/2" 20.00

Hole Dia. = 7" Hole Depth = 12" Percolation Rate = 1 in 10.1 to 20,0 minutes Top of hole from exist. grade = 49" Pre-Soaked

116-Soukeu			
Time	D. T. W.	Inc. Drop	Min./In.
11:43 am	3 3/4"		
11:53 am	5 "	1 1/4"	8.00
12:03 pm	<i>6"</i>	1"	10.00
12:13 pm	6 3/4"	3/4"	13.33
12:23 pm	7 1/2"	3/4"	13.33
12:33 pm	8 "	1/2"	20.00
12:43 pm	8 1/2"	1/2"	20.00

Percolation Rate = 1" in 10.1 to 20.0 minutes

SEPTIC SYSTEM DESIGN CRITERIA: E.O.C. BUILDING & FUTURE MEETING / COMMUNITY ROOM

1. E.O.C. Building Addition - Office Flows: 1st Floor Addition (51'x24'). 1,224 s.f. / 200 s.f./person = 7 People 7 people x 20 GPD/person = 140 GPD

Lower Floor (24'x36'): 864 s.f. / 200 s.f./person = 5 People 5 people x 20 GPD/person = 100 GPD

2. Future Meeting / Community Room: $1.290 \text{ s.f. } \times 0.1 \text{ GPD/s.f.} = 129 \text{ GPD}$

> Total Daily Flow: 140 GPD + 100 GPD + 129 GPD = 369 GPD

Effective Area Required:

Application Rate: (Non- Problematic Sewage, Non-Residentail Bldg.): = 1.2 GPD/s.f.

369 GPD / 1.2 GPD/s.f. = 308 s.f. Required Effective Leaching Area = 308 s.f.

System for Addition & Future Meeting / Community Room

80 l.f. of 12" concrete leaching gallies (HS-20), placed in one (1) excavated row provides the following: 12" Leaching Galley = 5.9 s.f./l.f. $(80 \text{ l.f.} + 2 \text{ l.f.}) \times 5.9 \text{ s.f./l.f.} = 484 \text{ s.f.}$

MINIMUM LEACHING SYSTEM SPREAD

484 s.f. > 308 s.f., therefore O.K.

(MLSS): GRADE = Hydraulic Gradient (% of Slope) R.L. = Depth to Restrictive Layer

= Hydraulic Factor F.F. = Flow Factor (369 GPD / 300 = 1.2) P.F. = Percolation Factor (1" in 10.1 to 20.0 min.)

System in Select Fill ("Fill System") MLSS = Minimum Leaching System Spread S.F. = Square Feet of Effective Area Required P.S. = Proposed Spread of System

GRADE	R.L.	H.F.	F.F.	P.F.	MLSS	S.F.	P.S.
2.1-3.0%	29"	42	1.2	1.5	76'	308	82'

DEEP TEST DATA

Soil Testing performed by the Office of Harkin Engineer, (Michael P. Harkin, P.E.). Witnessed / confirmed by Mr. Paul Hutcheon of the Killingworth Health Dept.

TEST PIT: #H-1 (9/11/14) 0 – 55" Unsuitable fill material Trench for power, Power at 55", damaged No Groundwater / No Ledge / No Mottling

TEST PIT: #H-2 0 - 12" Unsuitable fill material 12 - 16" Original top soil 16 – 36" Org-brn sandy loam *36 – 48"* Gray med. coarse sand Gray sand w/ silt, compact,

mottled throughout No Groundwater / No Ledge / Mottling @ 48"

(9/11/14) 0 - 24" Unsuitable fill material *24 – 38"* Org-brn sandy loam *38 – 45"* Gray med. coarse sand Gray sand w/ silt, compact, mottled throughout

No Groundwater / No Ledge / Mottling @ 45"

(9/11/14) 0 - 16" Unsuitable fill material 16 – 22" Original top soil Org-brn sandy loam 22 - 43" 43 – 48" Gray med. coarse sand 48 – 94" Gray sand w/ silt, compact, mottled throughout

RL=48" Roots @ 40" No Groundwater / No Ledge / Mottling @ 48"

TEST PIT: #H-5 (9/11/14) Unsuitable fill material 21 - 27" Original top soil 27 – 45" Org-brn sandy loam *45 – 50"* Gray med. coarse sand 50 - 105" Gray sand w/ silt, compact, mottled throughout

No Groundwater / No Ledge / Mottling @ 50"

CONSTRUCTION NOTES:

1. All methods and materials used in the construction of the SSDS indicated on this plan shall conform to the latest provisions of the CT Public Health Code Regulations and Technical Standards for Subsurface Sewage Disposal Systems.

2. The sewer pipe from the house to the septic tank shall be 4" diameter Schedule 40 PVC pipe or approved equal in conformance with the latest Health

3. Solid PVC pipes and fittings shall conform to ASTM D-3034 SDR-35, perforated PVC pipes and fittings shall conform to ASTM D-3305 or in conformance with the latest Health Code.

4. Leaching field and system components shall be staked by a licensed land surveyor prior to construction.

5. Construction equipment is to stay off the area of system before and after 6. Existing topsoil and unsuitable fill materials are to be removed from system

area prior to placing fill. Existing ground shall be scarified to a minimum depth of 6" prior to placing fill. 7. Fill in area of the septic system shall be clean, bank-run sand or gravel

meeting the following criteria: a. The fill shall not contain any material larger than three (3) inches. b. Up to 45% of the dry weight of the representative sample may be

retained on the #4 sieve (This is the gravel portion of the sample). c. The material that passes the #4 sieve is then reweighed and the sieve analysis started.

d. The remaining sample shall meet the following gradation criteria: % Passing Sieve 100% 70% - 100% #40 10% - 50% (See note below) 0% - 20% #100

0% - 5% #200 Note: Percent passing the #40 Sieve can be increased to no greater than 75% if the percent passing the 100% Sieve does not exceed 10% and the 200% does not exceed 5%.

8. Installer shall provide the Health Dept. and design engineer with a Gradation Test Report on the fill material. The sample for the Gradation Test shall be taken from the material, which is brought to the site or as directed by the

9. Fill shall be placed in 6-8" lifts benched into the existing slopes and compacted to 90% of the optimum density.

10. Septic system shall be installed after necessary fill has been placed and

11. Installer of septic system shall be responsible for conformance of fill to aradation and compaction requirements.

12. All structures shall be clearly marked after construction. 13. Septic system shall be protected from siltation and erosion during and after construction.

14. Septic system shall shed surface water after completion. 15. Fill shall not be installed on frozen or muddy ground.

16. System shall not be installed in frozen fill. Installer shall protect fill at all 17. After the select septic system fill has been placed and compacted, percolation

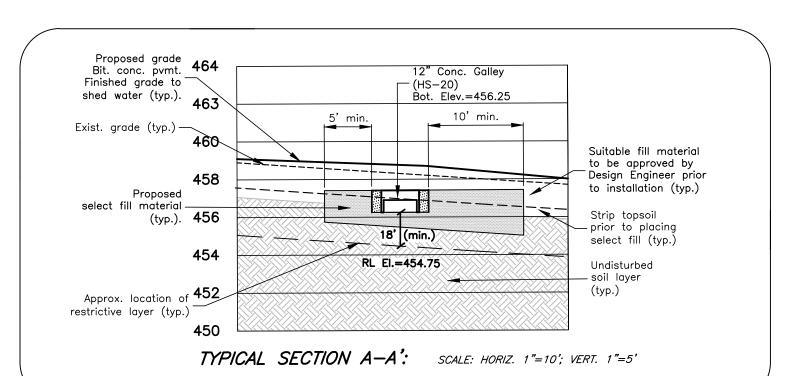
tests shall be performed by the design engineer in the select fill material. 18. The location of the improvements shown hereon shall be staked as directed by

the design engineer. A licensed land surveyor shall perform the stakeout. 19. An Engineered As-built drawing of the completed system shall be prepared by a licensed land surveyor, under the direction of the design engineer, prior to

20. The contractor shall notify the design engineer at least 48 hrs. in advance of leaching area preparation and septic system installation in order to allow

observation of the work. 21. Septic filter to be Zabel Model or approved equal.

22. Notify Call Before You Dig prior to any on-site activities (1-800-922-4455).



PROPOSED INVERT ELEVATIONS

DESCRIPTION	PROPOSED
Building outlet	458.75
Tank inlet	457.80
Tank outlet	457.55
D-Box inlet	457.20
D-Box outlet	457.00
Gallies inlet	456.67
Gallies bot.	456.25

PERCOLATION TEST DATA

<u>Percolation Test: P-1</u> Date: 9/11/14 Test Located Within TP #2 Top of hole from exist. grade = 20" to 38" Pre-Soaked: 11:36 am Readina 2:04 pm Dry – Fill 2:06 pm 4 1/4" 2:11 pm 4 3/4" 2:16 pm 2:21 pm 2:26 pm 5 1/2" 2:31 pm 5 3/4" 2:36 pm 5 7/8" 2:41 pm 2:46 pm 6 3/8"

1/4"

20.00

2:51 pm 6 1/2"

2:56 pm 6 3/4"

3:01 pm 6 7/8"

7 1/8"

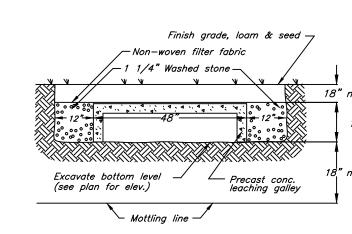
Percolation Rate = 1" in 10.1 to 20.0 minutes

3:06 pm

Percolation Testing conducted by the Office of

Killingworth Health Dept. (Paul Hutcheon)

Precast Concrete Box & Top DISTRIBUTION BOX



LEACHING GALLEY NOTES: 1. CONCRETE COMPRESSIVE STRENGTH: 4000 P.S.I.

@ 28 DAYS. 2. HEAVY DUTY GALLEYS SHALL BE CAPABLE OF 3. LEACHING AREA: 5.9 S.F./L.F. AS PER CONNECTICUT 12" HIGH LEACHING GALLEY (HS-20) DETAIL

A. DESIGN CRITERIA:

1. Erosion and sedimentation control measures have been located with consideration given to slopes, wetlands, watercourses and coastal resources, and in accordance with the Connecticut "Guidelines for Soil Erosion and Sediment Control", of the Connecticut Council of Soil and Water Conservation, Latest Edition.

6. Permanent vegetation:

F. DUST CONTROL:

sites sensitive location).

G. RESPONSIBLE PARTIES:

2, 2"X3" Stakes . in haybales

REVISIONS

P.E. #22625

Michael P. Harkin

1) CONTRACTOR

(NOT YET DETERMINED)

Angle 10°

A. Materials specifications for lawn areas:

The following general procedure shall be used:

graded areas and those areas to be protected.

c) Limit construction traffic to predetermined onsite routes.

WILL PROVIDE CONTACT INFORMATION PRIOR TO

self cleaning. Wind Windows Fer. 100° Fer. 12" min. depth

<u>Drainagew</u>ay

PLAN VIEW

PLACE

HAYBALES

TOGETHER

BUTT

AS NEED OR DIRECTED BY ENGINEER

STAKED HAY BALES

COMMENCEMENT OF CONSTRUCTION ACTIVITY

Soil: A minimum of 4" topsoil

(iv) Seed: Permanent Vegetation – Lawn

Common Name

Perennial Rye

Kentucky Bluegrass

Creeping Red Fescue

Lime: 90 lbs. of ground limestone per 1,000 s.f.

Control", of the Connecticut Council of Soil and Water Conservation, Latest Edition.

(iii) Fertilizer: 14 lbs. per 1,000 s.f. using a 10-20-10 analysis or an equivalent.

Dust control to be performed in accordance with the Connecticut "Guidelines for Soil Erosion and Sediment

(Note: Additional dust control measures may be required during construction and shall be applied as direct

by Design Engineer. The use of calcium chloride is prohibited due to the existing soils permeability and the

a) Limit the amount of exposed soil to reduce the area of land disturbance at any one time. Use

b) Maintain as much natural vegetation as practical. Apply the use of natural vegetative buffers between

d) Identify and address sources of dust being generated during construction on a regular basis. Use water

is assigned the responsibility for implementing the control measures of this plan. This responsibility includes

the installation and maintenance of control measures, informing all parties engaged on the construction site

2. Staple the wire

to end post

4. Backfill the

trench ana

2" or 3" crushed stone

FLOW ----

Ex<u>isting grad</u>e

mesh fencing (optional)

of the requirements and objectives of this plan, and notifying the Planning and Zoning Commission of the

transfer of responsibility, and for conveying a copy of this plan if title to the property is transferred.

1. Set posts and excavate a 6"x6" trench, set post downslope.

Fencing -

Compacted ¬
Backfill

Source: U.S. Department of Agriculture, Soil Conservation Service,

N. T. S.

AS NEED OR DIRECTED BY ENGINEER

PLACEMENT AND CONSTRUCTION OF A SYNTHETIC FILTER BARRIER

Points "A" should be higher

3. Attach filter fabric

to the wire fencing

the trench.

to keep all disturbed areas damp. The source of water to be used shall be identified prior to the

commencement of any onsite grading activities. Pumping from onsite wetland areas is prohibited.

stabilization measures (erosion control mats, temporary seeding, hay, mulch, etc.).

Lbs./Acre Lbs./1,000 s.f.

.45

B. INSTALLATION AND/OR APPLICATION PROCEDURES:

1. Erosion and sedimentation control devices shall be constructed in accordance with the project plans and specifications.

C. OPERATION. MAINTENANCE PROGRAM. INSPECTIONS:

1. Prior to any construction, a pre construction conference is to be held among the Design Engineer, the Owners, the Contractor, the Town Engineer and the Zoning Enforcement Officer to review the erosion and sedimentation control measures to be taken. The contractor shall be responsible for arranging the pre

2. All revisions after approval has been granted shall be forwarded to the appropriate commissions and the

3. The Town Zoning Departments shall receive written notification seventy-two hours before the start of any

4. All erosion control measures associated with the construction are to be installed and maintained in accordance with the schedule and requirements. Additional control measures shall be installed during the construction period as necessary and required.

5. All soil erosion and sediment control measures must be installed before any construction activities.

6. Filter fabric/silt fence will be installed along the toe of all critical cut and fill slopes.

7. Sediment removed from control measures must be disposed of at a location approved by the design engineer that will not cause additional sedimentation to the surrounding area.

8. Qualified personnel (provided by the contractor) shall inspect disturbed areas of the construction activity that have not been finally stabilized, structure control measures, and locations where vehicles enter or exit the site at least once every seven (7) calendar days within 24 hours of the end of a storm that is 0.1 inches or greater. Where sites have been stabilized, such inspection shall be conducted at least once every month for three (3) months.

9. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of off-site sediment tracking.

10. Based on the results of this inspection, the description of potential sources and pollution prevention measures identified in the plan shall be revised as appropriate or as soon as practicable after such inspection. Such modifications shall provide for timely implementation of any changes to the site within 24 hours and implementation of any changes to the plan within three (3) calendar days following the inspection. The plan shall be revised and the site controls updated in accordance with sound engineering practices, the Guideline and Subsections (4) and (6) (c) i 3) of the Storm Water General Permit.

11. A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Control Plan and actions taken shall be made and retained as part of the plan for at least three (3) years after the date of inspection. The report shall be signed by the contractor, or his authorizing representative.

D: BEST MANAGEMENT PRACTICES:

1. Construction shall proceed in accordance with the requirements of the general sequence of grading and construction activities, application of soil erosion and sediment control measures, and final stabilization of site as indicated on the plans.

resources shall be prohibited. 3. No materials resulting from construction activities shall be placed in or contribute to the degradation of

an adjacent wetland, watercourse or coastal resource. Disposal of any material shall be in accordance with Connecticut General Statutes including, but not limited to, Sections 22A-207 through 22A-209. 4. Fording of streams with equipment shall be prohibited, except where approved by the Engineer. Such

2. Refueling of equipment or machinery within seventy-five (75) feet of any wetland, watercourse or coastal

equipment travel shall be minimized. Where frequent equipment travel on stream banks and beds is necessary, washed stone shall be placed to minimize erosion, scour and turgidity, provided no significant grade change will occur and no significant environmental impact will result. Approval will be required for any haul road or temporary structure placed in wetlands or watercourses.

5. A construction sequencing plan and a water handling plan, including a contingency plan for flood events, must be submitted in writing to the Engineer and approved by the Engineer prior to the commencement of any construction in a waterway (requirement may be waived at digression of Design Engineer). 6. When dewatering is necessary, pumps shall not discharge directly into the wetlands or watercourse. Prior

to dewatering the contractor must submit to the Engineer a written proposal for specific methods and devices to be used, and obtain the Engineer's approval of such method and devices to be used for dewatering activities including, but not limited to, pumping the water into a temporary sedimentation trap providing surge protection at the inlet and outlet of pumps or floating the intake of the pump, or other methods to minimize and retain the suspended solids. If the Engineer determines that the pump operation is causing turgidity problems, said operation shall cease until such time as means of controlling turgidity is submitted by the contractor and approved by the Engineer and implemented by the contractor.

7. Work within and adjacent to watercourses shall be conducted during periods of low flow, whenever possible. The Engineer shall remain aware of flow conditions during the work, and shall cause such activity to cease should flow conditions threaten to cause excessive erosion, siltation or turgidity. The contractor shall make every effort to secure the work site before predicted major storms. A major storm shall be defined as a storm predisted by the NOAA Weather Service with warnings of flooding, severe thunderstorms, or similarly severe weather conditions or effects.

8. Dumping of oil, chemicals, or other deleterious materials on the ground is forbidden. The contractor

shall provide a means of catching, retaining and properly disposing of drained oil, removed oil filters, and other deleterious material. All spills of such materials shall be reported immediately by the contractor to

9. Application of Fertilizers, Herbicides or Pesticides must be done by a Connecticut licensed applicator. The contractor shall submit to the Engineer the proposed Applicator's name and license number, and must receive the Engineer's approval of the proposed applicator before such application is carried out.

10. During spawning seasons, discharges and construction activities in spawning area of the State waters shall be restricted so as not to disturb or inhibit aquatic species which are indigenous to the waters.

E. SOIL STABILIZATION MEASURES:

PARCEL INFORMATION:

Parcel I.D.: M: 24, L: 07

Zone: RR - Rural Residence

Deed: Volume: 57, Page: 211

#323 Route #81

Killingworth, CT 06419

Parcel Address:

1. All topsoil not to be used for final grading/landscaped areas shall be removed from the site immediately, in accordance with applicable State and Local laws. All topsoil to be used in landscaped areas shall be stored/stockpiled in accordance with applicable State and Local laws.

2. All areas within 500 feet of an inhabited dwelling shall be wetted as necessary to provide dust control. 3. Sediment disposal areas and topsoil stockpiles not scheduled for construction activities within thirty (30) days shall be stabilized as follows:

A. Ground limestone at a rate of 90 lbs. per 1,000 s.f. B. Fertilizer at a rate of 7.5 lbs. per 1,000 s.f. using a 10-10-10 analysis or an equivalent.

C. Annual Rye grass seeding applied at a rate of not less than 1 lb. per 1,000 s.f. D. Mulch all newly seeded areas with 80 lbs. of salt hay or small grain straw per 1,000 s.f.

4. All disturbed areas are to be provided with at least 4" of topsoil before final seeding.

OWNER / APPLICANT:

Town of Killingworth

Killingworth, CT 06419

#323 Route #81

5. Permanent vegetation is to be seeded or sodded on all exposed areas within ten (10) days after final grading. Mulching as necessary for seed protection and establishment. Lime and fertilize before permanent

MISC. CONSTRUCTION DETAILS "KILLINGWORTH E.O.C."

STONE CHECK DAM SECTION

PREPARED FOR TOWN OF KILLINGWORTH #323 ROUTE #81 (HIGGANUM ROAD)

KILLINGWORTH. CONNECTICUT

DATE 10/7/14 Health Dept. Comments DRAWING SCALE: AS-NOTED **Town Engineer Comments** 10/20/14 10 20 12/5/14 **Bidding Purposes** Gesick & Associates P.C. 2/10/15 Bidding Purposes SURVEYORS ♥ MAPPERS ♥ PLANNERS Mailing Address: 19 Cedar Island Ave., Clinton Connecticut 06413 COPYRIGHT © 8/26/14 ALL RIGHTS RESERVED Office: (860) 669-7799 Fax: (860) 669-5833 BY HARKIN ENGINEERING, LLC. NOT TO BE COPIED OR REPRODUCED WITHOUT WRITTEN PERMISSION. In Cooperation With HARKIN ENGINEERING, LLC CIVIL ENGINEERING CONSULTING

78 Wolf Hollow Lane - Killingworth, CT 06419 - Tel. (860) 663-4248

JOB NO. 14-33 DRAWN BY M.P.H. DATE 8/26/14 SHEET NO.