

Online Learning Academy



Installation Course Overview

The longevity and performance of decentralized wastewater treatment systems depends on proper siting, design, installation, and operation and maintenance. An error in any phase of this process produces a weak link and may result in premature system malfunction. Now, the online NOWRA Installer Academy addresses the critical need for outreach education and training specifically designed for the professional installer.

The curriculum discusses the various treatment and distribution technologies currently available for onsite wastewater management and establishes a benchmark for conducting installation. Data collection on these activities is facilitated through the use of detailed installation checklists developed in conjunction with industry stakeholders. The checklists describe proper installation techniques and steps for commonly used technologies. In addition to the installation checklists, a startup checklist is included for many of the technologies. The activities on the startup checklists help to verify proper installation and clear the system for operation.

The set of Installer Training Courses are designed to convey best practice standards for onsite wastewater treatment system installation processes as identified by industry stakeholders through an intensive national review process. The result is an integrated program of slide presentations, installation checklists, and quizzes. The Installer Training Program:

- ◆ Clarifies the responsibilities of professional installers.
- ◆ Familiarizes installers with standardized techniques and procedures for constructing or installing various onsite wastewater treatment system technologies.
- ◆ Promotes uniform communication between professional installers and their clientele through the use of standardized terminology.
- ◆ Establishes a benchmark for competency of installers and enhances the overall status of the onsite wastewater treatment profession.
- ◆ Supports initial credentialing and continued professional development of installation contractors.

Installation professionals who integrate best practice standards appropriately into their business models will have an advantage over their competition. This program serves as a mechanism to move the industry one step closer to the goal of uniform installation practices while raising the level of expertise and industry professionalism.

This online national training course contains various formats including audio guided PowerPoint presentations, videos, technical documents and internet links to associated materials. The students set their own pace for training and can either take the 8-hour overview class in its entirety, or break it into

smaller sections based on how many hours they need or their interest. The hours assigned for each section are based on the time it took others who piloted the material to take the course, and the theoretical time it should take to go through the materials. Even though everyone learns at a different pace, it should always take participants the amount of credit hours offered, and may take longer.

Students can choose the following courses from NOWRA Installer Academy from options:

1. Overview course full – 8 hours (contains all sections below)
2. Overview course – part 1 containing first 4 sections
3. Overview course – part 2 containing second 4 sections

For each section, attendees will get a separate certificate of completion.

Course Agenda

The details of each module are outlined below.

Module 1: Introduction and Safety (1 hour)

Learning Objectives

1. Describe why it is important to have a written safety policy.
2. List the primary reasons why accidents happen.
3. List the basic types of personal protective equipment needed to work safely on an installation job site.
4. Demonstrate proper lifting techniques.
5. Utilize proper lockout/tag-out procedures.
6. Identify site activities that require the presence of a competent person according to Occupational Health and Safety Administration (OSHA) standards.
7. Contrast the basic differences among soil types A, B, and C as referenced in OSHA standards for excavation safety.
8. List the manual and visual methods for measuring the compressive strength of a soil.
9. Describe the basics of OSHA-approved excavation sloping, shoring, and shielding; and dewatering processes, procedures, and equipment.
10. List the reasons why the atmosphere in a confined space might need to be monitored.
11. Implement proper response procedures when a ground surface spill of wastewater occurs during the course of a repair installation.

Section contains:

1. Reading: *System evaluation checklist (2 pages)*, CIDWT
2. Presentation: *Introduction to Septic Systems (33 minutes)*, Dr. Sara Heger. Provides learners a course overview, an overview of treatment with septic systems, the advantages of decentralized systems and the numbers of decentralized systems on a national level.
3. Reading: *Safety checklist (2 pages)*, CIDWT

4. Presentation: *Safety Overview* (18 minutes), Dr. Sara Heger. Presentation provides the basics of onsite wastewater treatment: source, collection, pretreatment and soil treatment.
5. Reading: *Unshored Trench Claims Life of Pennsylvania Plumber* (3 pages), Ed Wodalski, Onsite Installer, October 2015.
6. Reading: *Septic & Onsite Wastewater Systems*, Center for Disease Control, <https://www.cdc.gov/healthywater/emergency/sanitation-wastewater/septic.html>
7. Assessment: Fifteen questions with 75% passing rate required.

Module 2: Planning (1 hours)

Presentation Learning Objectives

1. Read and understand a design plan for an onsite wastewater treatment system including the components of a site plan: bench mark, existing and proposed contours, scale, system component details, system profile, cross section, and construction notes.
2. Compare a site plan with the existing conditions at the site.
3. Understand the value of an owner interview related to forming a bid and noting installation parameters of importance to the owner.
4. Transfer a bench mark from one location to another and transfer inverts or elevations to proposed components.
5. Intersect different slopes (such as daylight of an underground drainpipe to an existing or proposed grade).
6. Understand the components of a bid.
7. Understand the differences between construction planning, construction staging, job planning, and job staging.
8. Understand the components of construction planning, construction staging, job scheduling, and job staging.

Section contains:

1. Presentation: *Design Overview* (26 minutes), Dr. John Buchanan.
2. Video: Equipment showdown: wheeled excavator vs. backhoe loader (1 minute), <https://www.heavyequipmentguide.ca/article/31451/equipment-showdown-wheeled-excavator-vs-backhoe-loader>
3. Article and Video: *Ensure Safe, Effective Excavator Operation on Slopes*. (7 minutes), <https://www.forconstructionpros.com/equipment/earthmoving/excavators/article/12285554/ensure-safe-effective-excavator-operation-on-slopes>
4. Presentation: *Owner Interview and Erosion Control*, Dr. John Buchanan. (17 minutes)
5. Assessment – 15 questions with 75% passing rate required.

Module 3: Soil and Site Evaluation Concepts for Installers (1 hour)

Presentation Learning Objectives

Upon completion of this chapter, you should be able to:

1. Identify soil properties related to soil and site evaluation.
2. Discuss how soil and site properties relate to treatment of wastewater and water movement.
3. Discuss how and why installation processes must not alter key soil properties.
4. Discuss how and why installation processes must not alter key site conditions.
5. Relate long-term acceptance rate (LTAR) to soil and site conditions.

Section contains:

1. Reading: *Soils checklist (1 page)*
2. Presentation: *Key Soil Properties (28 minutes)*, Dr. Sara Heger.
3. Presentation: *Soils Overview (25 minutes)*, Dr. Sara Heger. Presentation discusses key aspects of a site evaluation including slope and drainage, soil horizons, texture, structure, color and limiting condition identification.
4. Video: *Water Movement in Soil (2 minutes)*, NRCS. With the help of sound management practices, water can move into the soil rather than running off. This video describes how and why soils transmit water at different rates.
5. Assessment: Fifteen questions with 75% passing rate required.

Module 4: Distribution of Effluent (1 hour)

Presentation Learning Objectives

1. Describe how uniform distribution influences treatment.
2. Identify the infiltrative surface or surfaces within a treatment train.
3. Explain the importance of hydraulic and organic loading rates in system performance.
4. Describe the rough configurations of gravity and pressure distribution systems.
5. Distinguish among parallel, sequential, and serial distribution.
6. Describe the components used in typical installations of gravity and pressure distribution systems.
7. Explain the importance of proper bedding materials and techniques for leveling and stabilizing system components.
8. Explain how changing system components can alter system curves and pump specifications.
9. Describe methods for providing access to system components for operation and maintenance activities.

Section contains:

1. Presentation – *Gravity distribution (23 minutes)*, Dr. John Buchanan. Provides learners with information on the types and goals of distribution and compares gravity versus. Provides learners with information how gravity flow works and the different types and management and installation keys.
2. Presentation: *Pressure distribution installation (45 minutes)*, Dr. John Buchanan. Presentation discusses pressure distribution applications, benefits, design, and management with a focus on installation.
3. Assessment: Fifteen questions with 75% passing rate required.

Module 5: Watertight Piping and Tanks (1 hour)

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Presentation Learning Objectives

1. Describe the various types of pipe used to construct wastewater treatment systems including type, material, color.
2. Explain how wall thickness and diameter affect flow in piping systems.
3. Explain the different methods to connect different pipe materials together.
4. Explain the impacts of gravity versus pressure flow from the facility on the piping in a wastewater treatment system.
5. Describe the purpose of cleanouts, the different types and where they should be installed.
6. Calculate loss of elevation in piping system.
7. Describe the proper handling, storage and loading of PVC pipe.
8. Demonstrate proper procedures for solvent welding PVC pipe.
9. Describe installation procedures when using pipe to connect treatment train components.
10. Describe the applications and procedures associated with threaded and gasketed pipe connections.
11. Explain what a thrust block is and when it may be applicable in wastewater treatment systems.
12. Contrast the various tanks used for decentralized wastewater treatment systems and describe the purpose of each.
13. Evaluate the equivalency of tanks based upon the relationship between tank dimensions, operating depth, and operating volume.
14. Implement proper measures for dewatering excavations based upon specific site conditions.
15. Determine the accurate elevation for a tank installation from a set of plans and rod readings.
16. Describe proper bedding and backfilling procedures for installing watertight tanks.

Course contains:

1. Reading: *Piping checklist (5 pages)*, CIDWT
2. Presentation: *Installation of Piping (19 minutes)*, Dr. Sara Heger.
3. Reading: *Tank checklist (3 pages)*, CIDWT
4. Presentation: *Septic Tanks (31 minutes)*, Dr. Sara Heger. Presentation discusses the different types of controls for pumps and overall system management including a discussion on demand versus time dosing.
5. Video: *Septic Tank Installation, (7 minutes)*, Infiltrator, Proper septic tank installation methods and procedures including excavation, bedding, backfilling, walking-in and compaction.
6. Assessment: Fifteen questions with 75% passing rate required.

Module 6: Dosing Systems and Controls (1 hour)

Presentation Learning Objectives

1. List the common types of pumps used for wastewater distribution and describe their appropriate applications.
2. Demonstrate knowledge of siphons.
3. Select a pump when a system curve is given.
4. Determine the gallons per inch available in a dosing chamber.
5. Determine the proper locations of pump controls to deliver design doses to the system using both demand and timer methodology.
6. Identify discharge assembly components and their function.
7. Adjust and verify control settings.

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Course contains:

1. Reading: *Dosing Systems Checklist* (2 pages), CIDWT.
2. Presentation: *Pump Overview and Dosing Controls* (28 minutes), Dr. John Buchanan
3. Presentation: *Pump Installation* (29 minutes), Dr. John Buchanan
4. Reading: *Troubleshooting Pumps and Controls*, Dr. John Buchanan
5. Video: *Homeowner Videos*, University of Minnesota. Videos provide short and long videos describing septic system functions, use, and maintenance geared towards property owners for future reference of learners.
6. Assessment: Fifteen questions with 75% passing rate required.

Module: Advanced Treatment Systems (1 hour)

Presentation Learning Objectives

1. List the basic types of media filters used in the decentralized wastewater field.
2. Identify and understand the commonly configured treatment trains for the various media filters.
3. Understand proper excavation and bedding procedures.
4. Understand the types of container or liners used and installation practices and precautions for each.
5. Understand how to install filter under-drainage systems, internal pump basins, and aeration piping.
6. Develop a sound understanding of the various media used.
7. Understand techniques that can be used to help insulate media filters used in cold climates.
8. Describe the components of an aerobic treatment unit.
9. Identify the various types of aerobic treatment units.
10. Understand proper excavation and bedding procedures.
11. Identify the different methods for introducing air into an aeration chamber.
12. Understand how to provide proper air exchange and venting for an ATU

Course contains:

1. Reading: *ATU Checklist* (2 pages), CIDWT.
2. Presentation: *Installing Aerobic Treatment Units* (34 minutes), Dr. Sara Heger
3. Reading: *Media Filter Checklist* (2 pages), CIDWT.
4. Presentation: *Media Filter Installation*, (15 minutes), Dr. John Buchanan
5. Presentation: *Installation Disinfection Systems*, (25 minutes) Dr. John Buchanan
6. Assessment: Fifteen questions with 75% passing rate required.

Module 8: Soil Treatment Systems (1.5 hours)

Presentation Learning Objectives

1. Explain the difference between below and above-grade systems.
2. Define the various types of wastewater treatment systems including: shallow-narrow-pressurized trench, low-pressure pipe, bed, trench, bottomless media filter, at-grade, mound and areal fill.
3. Define commonly used design terms which are commonly used with soil treatment systems including areal loading rate, absorption area, and basal area.

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4. Demonstrate the installation procedure common to all soil treatment systems: identifying type of system, preconstruction considerations, site preparation, fill materials trench or bed construction, distribution systems, and final cover
5. Understand how to install soil treatment areas using appropriate materials.
6. Describe how to install soil treatment areas at the proper elevation.
7. Understand how to install soil treatment areas while maintaining natural soil conditions.

Course contains:

1. Reading: *STA checklist* (2 pages), CIDWT.
2. Presentation: *Installing Soil Treatment Systems* (85 minutes), *Dr. John Buchanan*
3. Assessment: Fifteen questions with 75% passing rate required.

Assessments

Within each module there is a quiz the participant must pass with a score of >75% to obtain credit. If the student passes, they may move on. If they do not pass, they have the opportunity to review materials and take the quiz as many times as they need to pass. The presentations must be watched start to finish (no fast forwarding) and the student must complete the sections in sequential order.

Course Completion

Upon completion, the student is provided a certificate of completion (example attached).

Course Instructors

Dr. Sara Heger is an engineer, researcher and instructor in the Onsite Sewage Treatment Program in the Water Resources Center and is an Adjunct Assistant Professor in the Bioproducts and Biosystems Engineering Department at the University of Minnesota (UMN). Since 1998, she has been providing education and technical assistance to homeowners, small communities, onsite professionals and local units of government regarding onsite wastewater treatment. She leads the research program at the UMN, currently serving as the principle investigator on grants for evaluating rest stops, wastewater reuse, and the impact of water softeners. She presents at many local and national training events regarding the design, installation and management of septic systems and related research. Sara is a board member and Education Chair of the National Onsite Wastewater Recycling Association and has served on the board of the Minnesota Onsite Wastewater Association. Sara serves on the NSF International Committee on Wastewater Treatment Systems. She is also the chair of the Minnesota State Advisory Committee on Decentralized Systems. She has BS in Biosystems & Agricultural Engineering and a MS and a PhD in Water Resource Science.

Dr. John R. Buchanan is an Associate Professor and is on the faculty of the Biosystems Engineering and Soil Science Department at the University of Tennessee. He has 29 years of teaching, research, and outreach experience in the areas of onsite and decentralized wastewater management, water supply, water quality and storm water engineering. Dr. Buchanan has B.S. and M.S. degrees in Agricultural Engineering and a Ph.D. in Civil Engineering, all from The University of Tennessee. John is a member of the Water Environment Federation, Soil and Water Conservation Society, NOWRA, and the American Society of Agricultural and Biological Engineers. He is a registered professional engineer in Tennessee.

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CERTIFICATE OF COMPLETION



Sample Course

May 22, 2019

Johnny Certificate

10 Units, 25 Credits


Eric Casey, Executive Director, NOWRA

NOWRA
National Onsite Wastekeeper
Recycling Association