

A Guide to

Excavator Awareness & Damage Prevention

The background of the entire page is a silhouette image. On the left, the arm and bucket of an excavator are visible. On the right, two construction workers wearing hard hats are standing and facing each other. The scene is set against a bright, orange-hued sunset sky, which transitions into a solid blue sky at the top of the page.

EVERSOURCE

Our Commitment to Safety

Safety is Eversource's top priority. We are responsible for the safe and secure delivery of natural gas to our customers through more than 6,500 miles of gas pipe in Connecticut and Massachusetts. We invest millions of dollars each year to maintain the safety and integrity of the natural gas mains and services throughout our service territories. Eversource is committed to delivering natural gas — reliably, efficiently and safely — to 512,000 customers every single day.

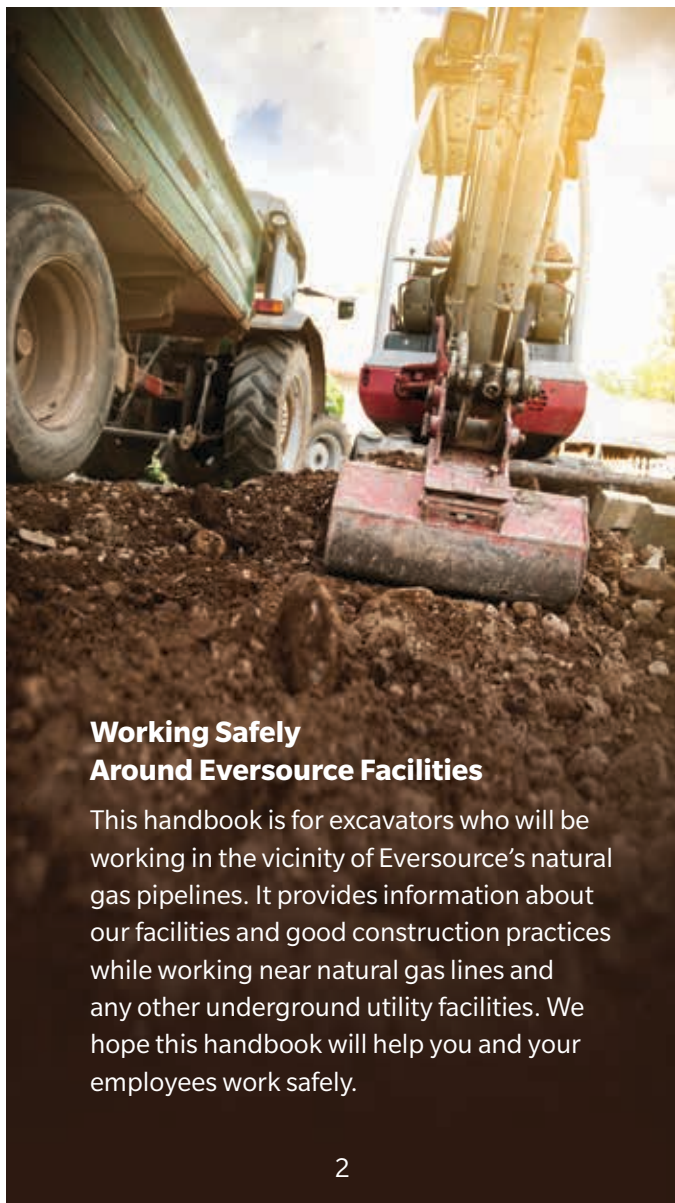
About Natural Gas

Natural gas is a safe, efficient fuel, and is the cleanest of the fossil fuels. Methane is the primary ingredient of natural gas. Natural gas in its natural state is odorless. For safety, we add an odorant called mercaptan to give natural gas that "rotten egg" odor.

Natural gas, when mixed with air in concentrations of 5 to 15 percent, will form a combustible or explosive mixture. The ignition point of natural gas is approximately 1,150° F.

Natural gas can be detected by trained technicians using natural gas detection equipment. If you smell gas or suspect a leak, immediately call 911 or Eversource at 877-944-5325 (CT) or 800-592-2000 (MA).

Please use this handbook only as a guide for how to prevent damage to Eversource natural gas mains. For Rules and Regulations about excavation, visit cybd.com (CT) or digsafe.com (MA).



Working Safely Around Eversource Facilities

This handbook is for excavators who will be working in the vicinity of Eversource's natural gas pipelines. It provides information about our facilities and good construction practices while working near natural gas lines and any other underground utility facilities. We hope this handbook will help you and your employees work safely.

Natural Gas Emergencies

If a gas odor is detected, or you suspect that a main or service has been damaged, **you must call 911 and Eversource immediately** at 877-944-5325 (CT) or 800-592-2000 (MA).

If your equipment contacts a natural gas main or service, even if there's no obvious damage, **you must call 911 and Eversource immediately** so that we can inspect our facilities to ensure they are safe, and don't require repair. Also, do not call from the facility where the gas leak is located; move to a safe place to call.

Natural gas emergencies can involve these basic situations:

- Gas escaping inside
- Gas escaping outside
- Gas burning outside

Gas Escaping Inside:

If natural gas is escaping to the inside of a building, this is the most serious of situations because gas can build up inside the structure to an explosive level. When a natural gas facility such as a service is damaged, sometime the greatest amount of damage does not occur in the excavation at the point of contact. The damage may occur someplace else, such as at a connection underground, or at the end of the gas facility inside a building.

Facility damage and leakage may allow gas to migrate along underground structures (pipes, utility lines, sewer line) and enter the building or cause the gas to escape directly into the building. If you damage any gas service or other gas facility in close proximity to the building, you should:

- Notify the building occupants that damage may have occurred and they should evacuate the building immediately.
- **Call 911.**
- **Call Eversource** at 877-944-5325 (CT) or 800-592-2000 (MA).

Gas Escaping Outside:

Natural gas that escapes an excavation, open pipe, manhole, sewer or vault will rise and diffuse in the air. You should take the following actions if natural gas is escaping outside:

- Shut down all machinery.
- Clear a safe area around the site.
- Remove all sources of ignition (smoking materials, open flames, etc.).
- **Call 911.**
- **Call Eversource** at 877-944-5325 (CT) or 800-592-2000 (MA).
- Do not attempt to block or stop the flow of natural gas by bending or plugging a broken or leaking pipe.
- Do NOT attempt to repair the pipe yourself.

Gas Burning Outside:

Natural gas that burns outside will not explode, and you should not attempt to extinguish such a fire. Spraying water on burning natural gas will fill the area around the leak with mud and water, making it much more difficult for Eversource crews to locate and repair the damage. Take precautions to ensure that surrounding materials do not catch fire. If natural gas is burning outdoors, you should take these actions:

- Shut down all machinery.
- Clear a safe area around the site.
- **Call 911.**
- **Call Eversource** at 877-944-5325 (CT) or 800-592-2000 (MA).
- Do not attempt to put out the fire.



Excavators' Responsibilities

Damage can result from direct contact with our facilities, soil movement from excavation, or as a result of vibration from loads imposed by heavy construction equipment traveling over our facilities. To complete your project safely, please work closely with Eversource to prevent damage to the pipelines. *See page 28 for more safety tips.*

Some of the excavation requirements are established by law while others are simply good construction practices. The Occupational Safety & Health Administration (OSHA) regulates trenching and shoring requirements for your safety. Eversource recognizes the safe practices that are required by law, but we are not an enforcement agent of these laws.

Provide Adequate Supervision:

The contractor must assure that a knowledgeable representative of the excavator is on site. The supervisor must show evidence that the One-Call System was notified of the job and that marks are present before excavation begins. Contact the One-Call System at 811, cbyd.com or digsafe.com.

The supervisor's role is to:

- Manage well-trained personnel who follow good construction practices and will assure that natural gas facilities are protected.
- Take prompt and appropriate action in the event of contact with a natural gas facility.
- Provide equipment that has been selected and is operated properly to minimize damage to natural gas facilities, for example, shovels or air lances.

Notify your State's One-Call Center:

In Connecticut, the law requires you to notify Call Before You Dig (CBYD) at least two full working days before you plan to begin your work. CBYD can be reached at 811 or cbyd.com. In Massachusetts, the law requires you to notify Dig Safe® at least 72 hours excluding holidays and weekends before you begin work. Dig Safe can be reached at 811 or digsafe.com.

Pre-mark of the Construction Area:

You are responsible for marking out the area of intended construction in white paint, in accordance with your state's law.

Maintain Facilities Markings:

You are responsible for maintaining all utility pipeline markings. You should avoid covering or removing surface markings or stakes/flags indicating underground facilities during construction activity, until you are ready to excavate. Remember: if at any time the marks become faded or you are unable to decipher them, call Eversource immediately for assistance: 877-944-5325 (CT) or 800-592-2000 (MA).

Hand Dig around Gas Facilities:

Once the road surface is removed, you must hand dig to expose Eversource's facilities.

Protect Exposed Natural Gas Facilities:

Once you expose Eversource's facilities, you must protect them from damage. Natural gas pipelines can be damaged by cave-ins, falling pavement, dropped construction materials and failure to support or improper support.

Proper support includes, but is not limited to, shoring, temporary bridging, suspension supports and proper backfilling under and around facilities. Contact Eversource for suggested methods to aid you in the design of support facilities.

Excavating outside Limits of Construction:

If your construction requires you to excavate outside the previously defined construction area or deeper than you had planned, you must notify your One-Call Center and Eversource immediately: 877-944-5325 (CT) or 800-592-2000 (MA).

Blasting:

In addition to excavation, if blasting is required, you must notify Eversource and your One-Call Center of your proposed blasting activities. Blasting specifications may be required to assess the effect on Eversource's natural gas facilities. Contact us for specific requirements at 877-944-5325 (CT) or 800-592-2000 (MA).

Facilities Not Found Where Marked:

If you do not find gas facilities where they are marked, you should call Eversource immediately at 877-944-5325 (CT) or 800-592-2000 (MA). If you have made a reasonable attempt to locate the facilities, Eversource will provide an on-site resource to provide assistance, possibly in the form of specialized detection equipment or technical advice. This may include the need for and advice concerning placement of test holes to be made to locate our equipment.

Unknown Facilities:

If you find a facility that has not been identified or marked, notify Eversource immediately at 877-944-5325 (CT) or 800-592-2000 (MA).

Odors:

If you smell natural gas, call 911 or Eversource immediately at 877-944-5325 (CT) or 800-592-2000 (MA).

Damage or Contact:

If you damage or contact a natural gas facility, you must notify Eversource immediately at 877-944-5325 (CT) or 800-592-2000 (MA). The damage at the point of contact may appear slight to you, but may place stresses on the facility, damage the protective coating or cause damage elsewhere along the facility. We need to know immediately if you come in contact with our facilities.

Backfill:

You must use suitable backfill material, free of all stones, around gas facilities. Further, all backfill in the area adjacent to gas facilities must be installed so as to achieve full compaction.

Broken Tracer Wire or Warning Tape:

You should notify Eversource of broken tracer wire or warning tape so that we may repair it. Call 877-944-5325 (CT) or 800-592-2000 (MA).

Charges for Damages:

You may be required to pay for damages that you cause to Eversource's natural gas facilities.



Eversource's Responsibilities

Marking Out Facilities:

We will mark out natural gas pipelines after notification from the One-Call Center. The mark-out is an approximate location, and the depth of a facility is not provided.

Pre-construction Meetings:

We will meet with you on site to explain our requirements for the protection of your employees, the general public and the natural gas facilities.

During Construction:

Eversource will work cooperatively with you to resolve any problems that arise during the course of construction.

Site Inspection:

We may inspect the construction site at any time to assure that you are performing the work in a manner that will ensure our gas facilities are not damaged. Eversource will work cooperatively with all code enforcement agencies to assure the safety and health of our employees and the public, and the protection of our equipment. If you are not adequately protecting natural gas facilities, we will institute prompt remedial action, including requesting a shutdown of the job by the proper enforcement agency.

Natural Gas Distribution System

Natural gas is transported to New England by interstate gas transmission companies. These interstate transmission mains typically operate at pressure between 350 and 1,400 pounds per square inch gauge (psig). The gas is transferred to Eversource at stations, which are equipped with metering and regulating equipment that reduce the pressure to less than 200 psig for distribution through Eversource gas mains and services to its customers. The pipes are located along streets and rights of way, and range in size from half-inch to 36 inches. Gas services are the smaller diameter pipes that carry gas from the mains to the gas meters.

Mains and services are typically made up of one of the following materials: cast iron, steel or plastic.
(See next section.)

While Eversource's facilities have been designed and constructed to meet all federal and state requirements, adjacent construction activities can create conditions that may be detrimental to these facilities, yourself and to the general public. Construction activities in the vicinity of the different main and service materials present different problems.

Materials in Gas Mains and Services

Plastic (PL): Softer and more susceptible to damage from punctures or scratches. Since plastic pipe is non-metallic, a tracer wire is installed to facilitate location of the pipe.

Steel (ST): Usually installed with a protective coating designed to prevent corrosion. Some older pipe may be uncoated. While steel pipe is the most resistant to damage, unrepaired damage to the coating and pipe may result in corrosion and deterioration of the pipe. Further denting or kinking of pipe may result in stress failure of the pipe.

Cast Iron (CI): Susceptible to cracking and joint leakage because it is less resistant to stresses imposed by impacts, changes in soil compaction and subsidence and lack of proper support.

Definition of Terms

Call Before You Dig (CBYD): Connecticut One-Call Center

Contact with gas facility: Includes, without limitation, the striking, scraping, denting (however slight) of any underground utility facility, including any protective coating and tracer wire.

Damage: Includes, but is not limited to, the substantial weakening of structural or lateral support of a utility line; and penetration or destruction of protective coating, tracer wire, housing or other protective device.

Dig Safe: Massachusetts One-Call Center

Eversource: The company that provides natural gas to customers in 123 Connecticut and Massachusetts communities. Eversource is New England's largest energy provider, proudly serving approximately 3.7 million electric and natural gas customers in Connecticut, Massachusetts and New Hampshire.

Excavator: The person or entity performing the excavation work.

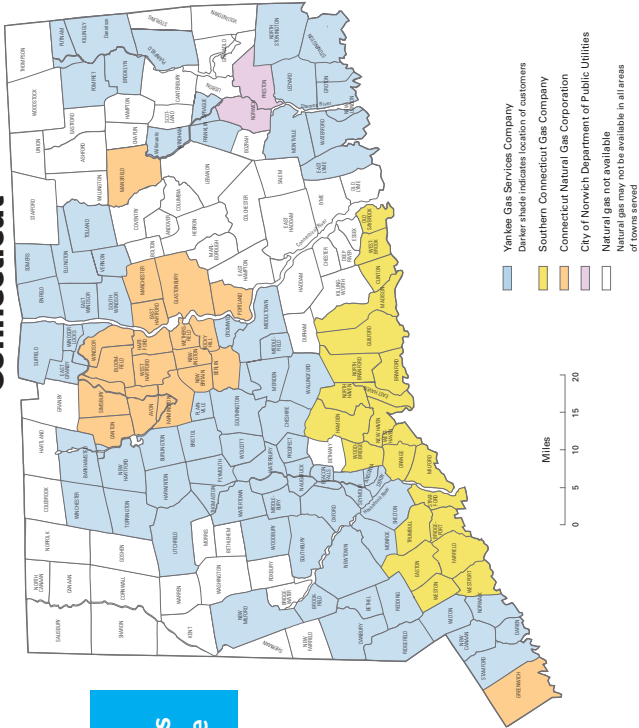
Main: Pipe that transports natural gas along streets and rights of way to the point of connection for service.

Odorant: The chemical added to natural gas to give it the distinctive "rotten egg" smell.

Service: Pipe that transports natural gas from the main to the customer's meter.

Connecticut and
Massachusetts Towns
Served by Eversource

Connecticut



Connecticut Towns Served by Eversource

Danielson Work Center

Brooklyn
Danielson
Franklin
Killingly
Mansfield
Plainfield
Putnam
Sprague
Windham

East Windsor Work Center

East Granby
East Windsor
Ellington
Enfield
Somers
South Windsor
Tolland
Vernon
Windsor
Windsor Locks

Meriden Work Center

Berlin
Bristol
Burlington
Cheshire
Cromwell
Meriden

Meriden Work Center, cont.

Middlefield
Middletown
Plainville
Plymouth
Southington
Terryville
Wallingford

Newtown Work Center

Ansonia
Bethel
Brookfield
Danbury
Derby
Monroe
New Milford
Newtown
Ridgefield
Shelton

Norwalk Work Center

Darien
New Canaan
Norwalk
Redding
Stamford
Wilton

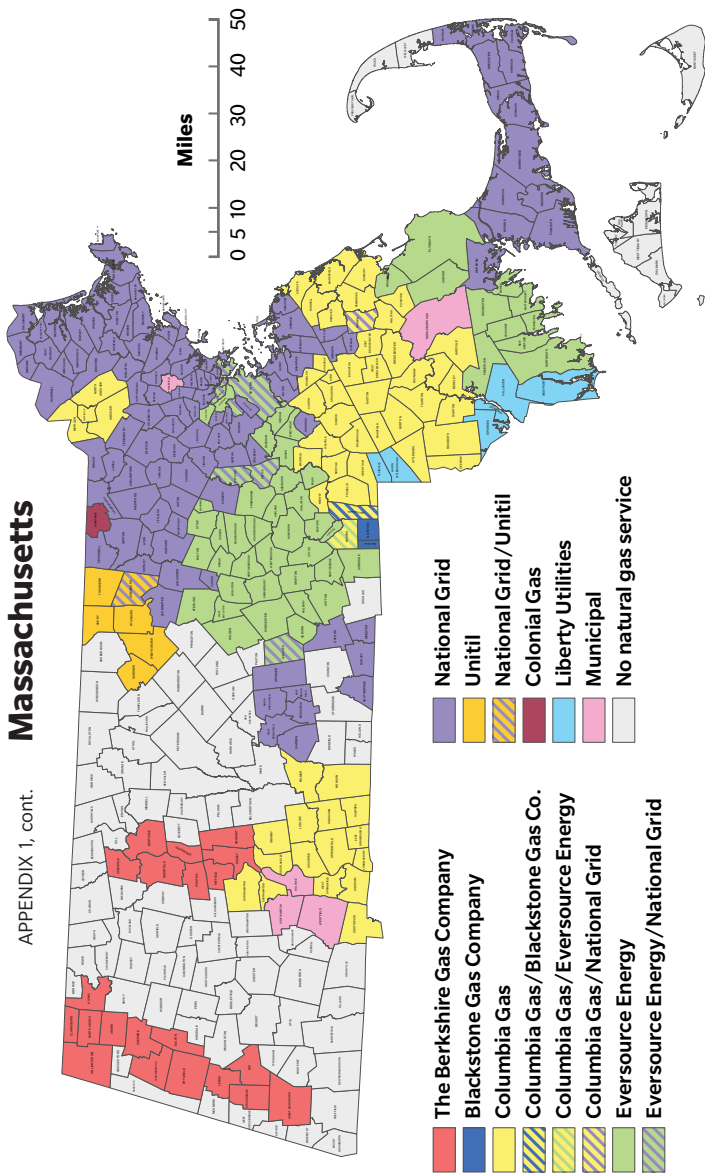
Waterbury Work Center

Barkhamsted
Beacon Falls
Middlebury
Naugatuck
New Hartford
Oxford
Prospect
Seymour
Southbury
Thomaston
Torrington
Waterbury
Watertown
Winchester
Winsted
Wolcott
Woodbury

Waterford Work Center

East Lyme
Groton
Ledyard
Montville
New London
North Stonington
Stonington
Waterford

Massachusetts



Massachusetts Towns Served by Eversource

Hyde Park Work Center

Dedham
Dover
Hyde Park
Mattapan
Milton
Needham
Westwood

New Bedford Work Center

Acushnet
Assonet
Dartmouth
Fairhaven
Freetown
Marion
Mattapoisett
New Bedford
Rochester

Plymouth Work Center

Carver
Duxbury
Kingston
Plymouth

Somerville Work Center

Belmont
Cambridge
Medford
Somerville

Southborough Work Center

Ashland
Berlin
Bolton
Boylston
Framingham
Grafton
Holliston
Hopedale
Hopkinton
Hudson
Marlborough
Maynard
Mendon
Milford
Millville
Natick
Northborough
Northbridge
Sherborn
Shrewsbury

Southborough Work Center, cont.

Southborough
Stow
Upton
Uxbridge
Wayland
Westborough

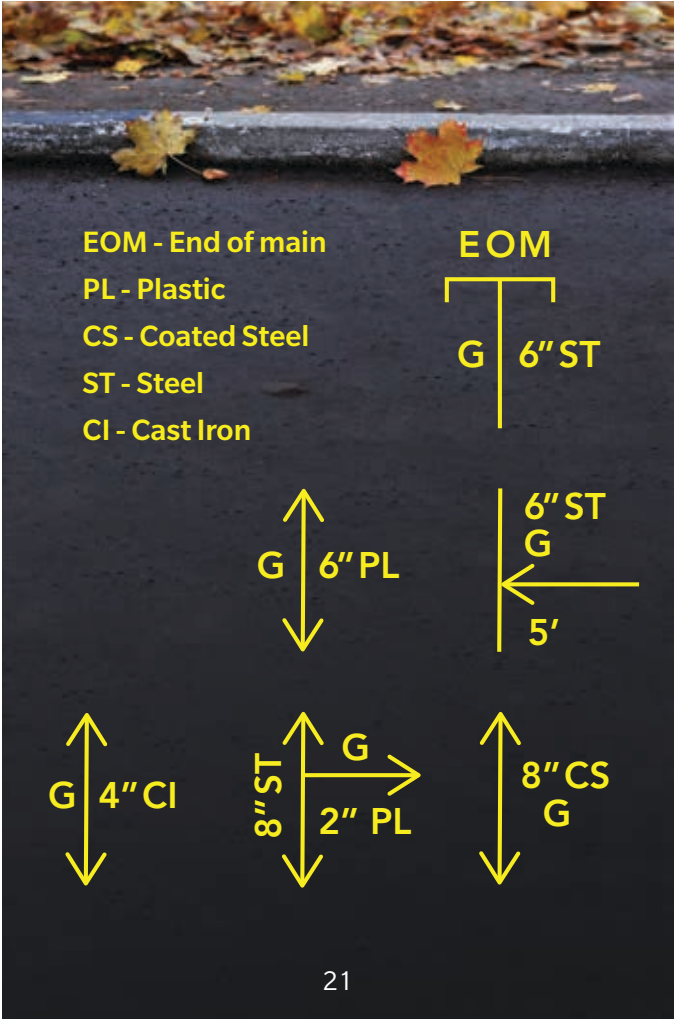
Worcester Work Center

Auburn
Holden
Leicester
Millbury
Sterling
Sutton
W. Boylston
Worcester

APPENDIX 2

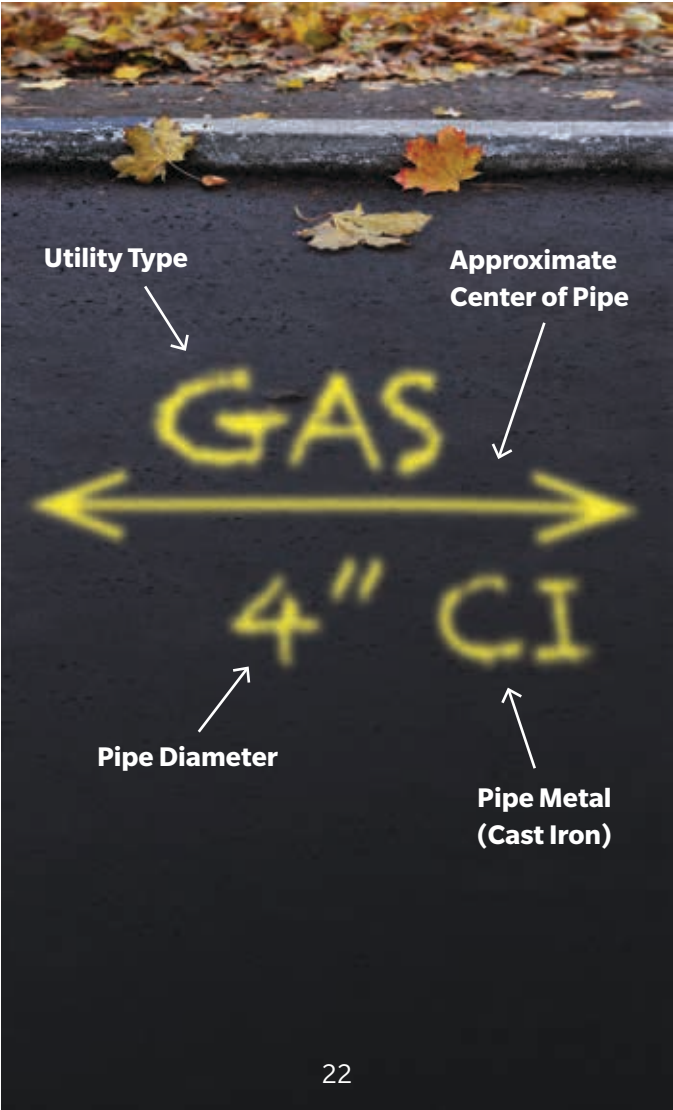
Marks

Centerline Mark:



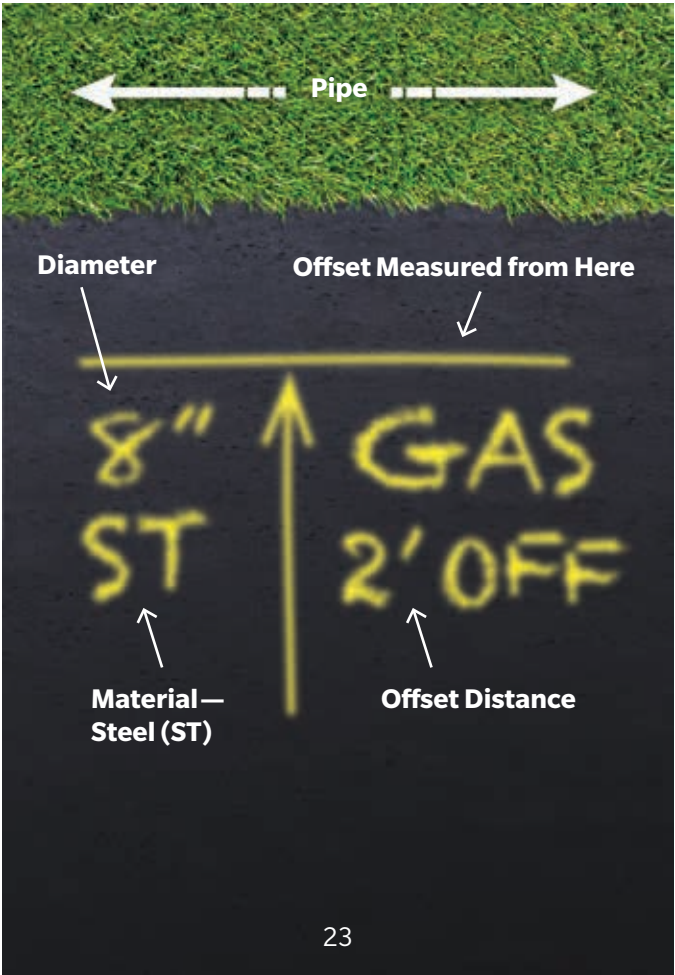
Gas Facility Markings

Diagram shows center of 4-inch cast iron gas line:



Offset Gas Marking

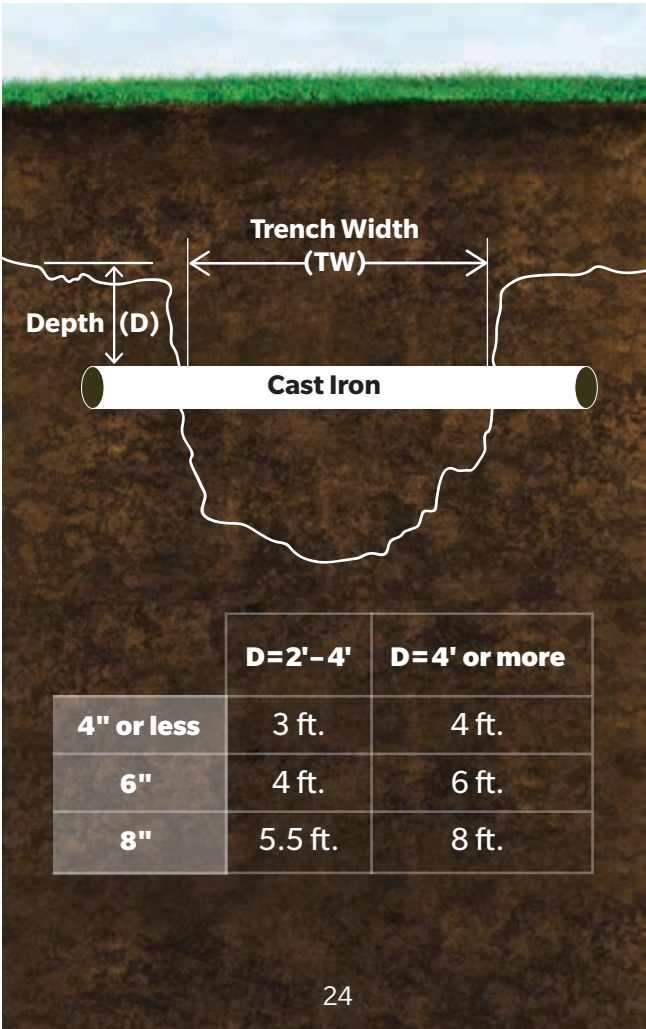
Diagram shows 8-inch steel (ST) gas line is located approximately 2 feet from end of arrow:



APPENDIX 3

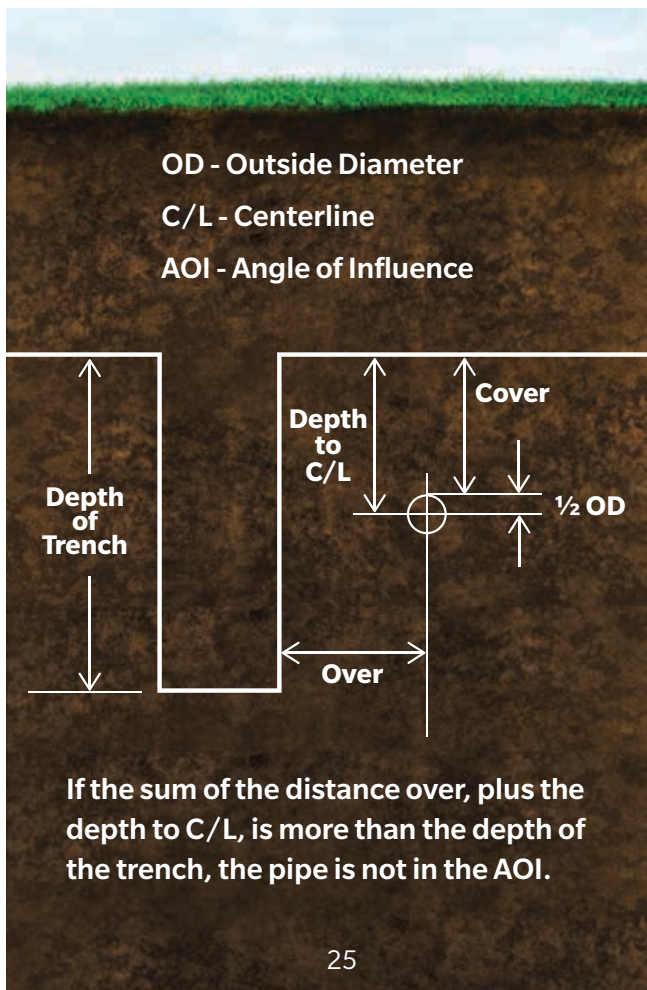
Cast Iron Encroachments

Cross Trench Illustration—
Maximum Allowed Trench Width:



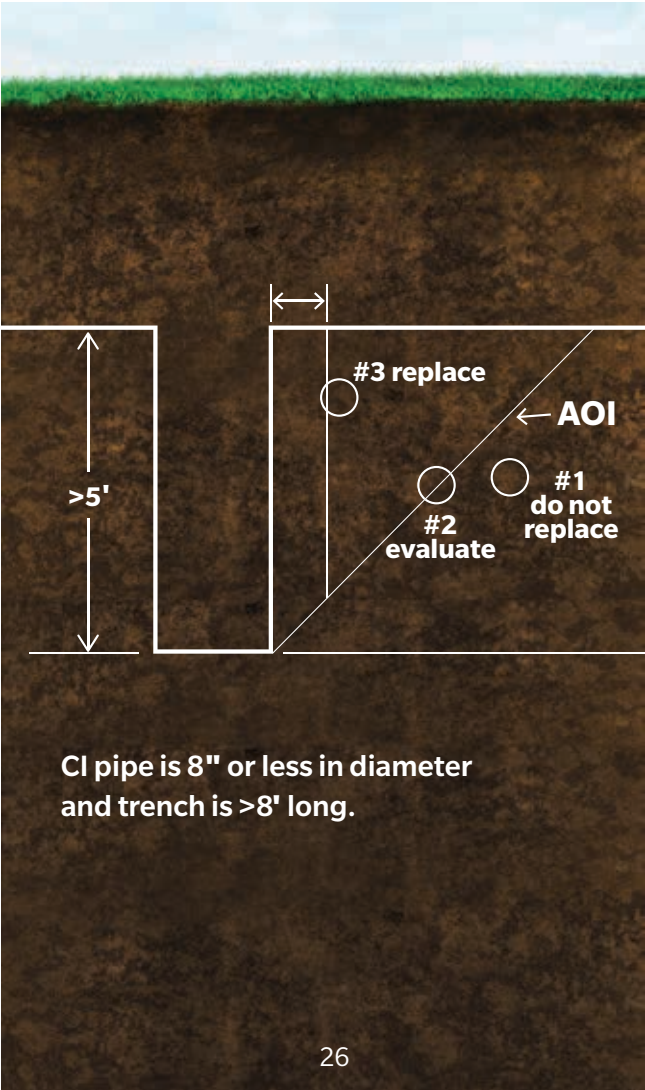
Cast Iron Encroachments

Angle of Influence (AOI):



Cast Iron Encroachments

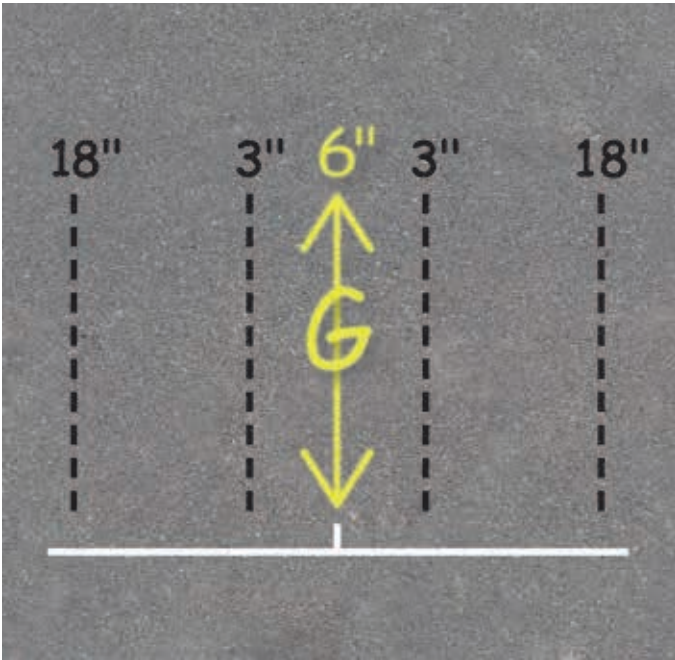
Parallel Deep Trench near Cast Iron (CI):



APPENDIX 4

Tolerance Zone

Centerline Marks (yellow "G" shows gas code)



Safety Tips: Excavating Near Natural Gas Facilities

- 1** Expect to find gas utilities during underground excavations and construction.
- 2** Identify the area of proposed excavation, as required by regulations, to assist the personnel who will be locating and marking the facilities in that area.
- 3** Notify your one-call center before excavating so underground facilities can be properly marked. Call 811 or visit cbyd.com (CT) or digsafe.com (MA).
- 4** Provide adequate training to employees and have supervisory personnel on site during excavations.
- 5** Make sure to properly maintain all underground facility markings.
- 6** Hand-dig the width of the facility, plus 18" on each side.
- 7** Provide adequate protection for underground gas facilities, such as shoring, temporary bridging and suspension supports.
- 8** When backfilling around or near natural gas facilities, use suitable backfill materials and compaction practices.
- 9** Notify Eversource immediately if an underground gas facility is uncovered or damaged so our trained technicians can make the area safe. These Eversource numbers are 24/7: 877-944-5325 (CT); 800-592-2000 (MA).

Color Coding System

Color coding is used to identify the type of underground facilities.

RED

Electric power lines, cables, conduit and lighting cables

YELLOW

Gas, oil, steam, petroleum or gaseous materials

ORANGE

Communication, alarm or signal lines, cables or conduit

BLUE

Potable water

GREEN

Sewers and drain lines

PURPLE

Reclaimed water, irrigation and slurry lines

PINK

Temporary survey markings

WHITE

Proposed excavation

Call Before You Dig (CT)

811 or 800-922-4455

cbyd.com

Dig Safe (MA)

811 or 1-888-DIG-SAFE

digsafe.com

EVERSOURCE

Eversource.com