

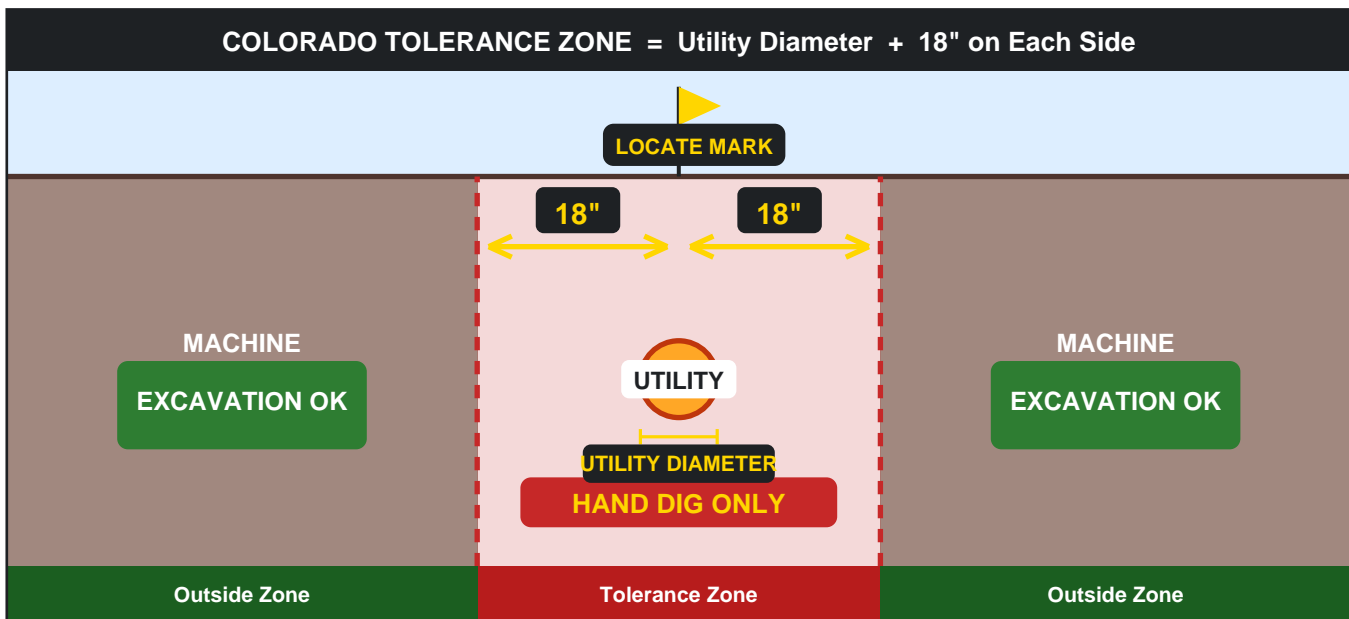
WHO THIS IS FOR: Every excavator, equipment operator, and crew supervisor working in Colorado. The Tolerance Zone is the single most important concept in excavation safety. Violating it is the #1 cause of utility strikes — and the #1 reason contractors lose claim defense protection.

LEGAL BASIS:

- CO Statute 9-1.5-103(4)
- CO UDP Best Practice — Locating & Marking
- CGA Best Practices 5-19 & 5-20
- OSHA 29 CFR 1926.651

SECTION 1 | WHAT IS THE TOLERANCE ZONE?

The Tolerance Zone is the area around every marked underground utility where **mechanized excavation equipment is prohibited** until the utility has been physically exposed and visually confirmed. In Colorado, the Tolerance Zone is defined as **18 inches on each side of the marked utility, plus the full width of the utility's diameter**. This is not a suggestion — it is a legal requirement under Colorado state law.



How to calculate the Tolerance Zone for any utility:

UTILITY DIAMETER KNOWN	UTILITY DIAMETER UNKNOWN
Tolerance Zone = 18" + ½ diameter on each side of the mark Example — 12" gas main: 18" + (12" ÷ 2) = 18" + 6" = 24" on each side of the center mark	Tolerance Zone = 18" on each side of the outside edge of the mark Example — small cable, diameter unknown: 18" from the edge of the paint mark on each side — do not assume a small diameter

SECTION 2 | THE RULE — WHERE YOU CAN AND CANNOT USE EQUIPMENT

■ OUTSIDE THE TOLERANCE ZONE	■ INSIDE THE TOLERANCE ZONE
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<p>Mechanized excavation equipment MAY be used freely outside the Tolerance Zone, provided locate marks are clearly visible and you are not approaching the zone. Always maintain awareness of nearby marks as you work.</p>	<p>NO mechanized equipment may be used inside the Tolerance Zone until the utility has been visually exposed and confirmed. This includes backhoes, trenchers, boring machines, augers, scrapers, and ALL power-operated digging equipment.</p>
<p>Allowed outside the zone: • Backhoe / trackhoe • Trencher • Boring machine • Excavator bucket • Auger • Grader / scraper</p>	<p>Required inside the zone: • Hand digging (shovel, spade) • Vacuum excavation / hydrovac • Air excavation tools • Pneumatic hand tools • Manual probing • Any non-invasive method</p>

■ The One Exception — Pavement Removal

- Colorado law allows mechanical equipment to be used for the initial penetration and removal of pavement or hard surface material **ONLY**
- This exception applies **ONLY** to the depth of the pavement — once pavement is removed, hand digging rules apply for anything below
- You cannot use this exception to justify mechanical digging in the soil beneath a paved surface within the Tolerance Zone
- When in doubt: hand dig — the pavement exception is narrow and is not a general permission to use machines near utilities

SECTION 3 | WHEN CAN MACHINES RE-ENTER THE TOLERANCE ZONE?

Once you have hand-dug or vacuum-excavated to expose the utility, machines may re-enter the Tolerance Zone — but only under specific conditions. Both conditions below must be met before any machine returns to the zone:

<p>Condition 1 — Visual Confirmation of the Exact Utility Location</p>	<p>You or a qualified crew member must physically see the utility — its pipe, conduit, cable, or line — and confirm its exact position. Seeing the locate marks on the surface is NOT sufficient. The actual underground facility must be visually exposed and confirmed. Photograph the exposed utility with a measuring tape showing depth and distance from the mark.</p>
<p>Condition 2 — Reasonable Precautions Are in Place</p>	<p>You must ensure that reasonable precautions are taken to avoid weakening the facility's structural or lateral support, penetrating the facility, destroying protective coatings, or damaging the facility in any way. A qualified spotter must be present whenever machines work near a confirmed utility location.</p>

SECTION 4 | SPECIAL SITUATIONS IN THE TOLERANCE ZONE

PARALLEL EXCAVATIONS (Trenching Along a Utility)

When your trench runs parallel to a marked utility — instead of crossing it — the Tolerance Zone rules still apply. You must:



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■	Visually expose the utility at regular intervals Pothole or hand-dig to physically expose the utility at intervals not exceeding every 50 feet along the line of excavation, or at any change of direction of the facility.
■	Never assume the utility holds a straight line Underground utilities do not always follow a perfectly straight path. Depths and lateral positions can shift significantly due to historical repairs, soil movement, or original installation practices. Verify at every 50-foot interval without exception.
■	Assign a dedicated spotter for the entire parallel run A spotter must monitor the bucket position relative to the utility marks throughout the entire length of the parallel excavation — not just at the pothole locations.
■	Exercise due care to protect exposed facilities at all times Once exposed, the utility must be supported, braced, and protected. Do not allow it to shift, bend, or become unsupported during backfill operations.

TRENCHLESS EXCAVATION (Boring, HDD, Directional Drilling)

Trenchless methods carry unique and elevated risks within the Tolerance Zone because the equipment operates underground and cannot be seen. Colorado law and CGA Best Practices 4-19 and 5-29 impose strict requirements for all trenchless work:

■	Expose ALL utility crossings before boring through them Every utility that your bore path will cross MUST be physically exposed and visually confirmed before the drill head passes through. This is a Colorado law requirement — it is not optional. Pothole every crossing. No exceptions.
■	Expose crossings AGAIN during pullback operations The utility must be visually confirmed safe during both the drilling pass AND the product pullback. Two exposures are required for each crossing.
■	Dig test holes every 25 feet when boring parallel to a utility When your bore path runs parallel to and within the Tolerance Zone of a utility, test holes must be dug at approximately every 25-foot interval to verify the bore path is not drifting toward the utility.
■	Track and record the bore path continuously Use electronic locating/guidance devices, pipe lasers, or other tracking methods to confirm and document the bore path depth and direction at all times. If the bore drifts unexpectedly, stop and re-evaluate before continuing.
■	Stop immediately if an abnormal condition or unknown substructure is encountered Any unexpected resistance, change in ground conditions, or discovery of an unknown facility requires an immediate stop. Do not proceed until positive identification of the obstruction is made. Pothole to investigate.



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SECTION 5 | VACUUM EXCAVATION — THE SAFE ALTERNATIVE TO HAND DIGGING

Colorado law and CGA Best Practice 5-32 recognize vacuum excavation as an acceptable and often preferred alternative to hand digging within the Tolerance Zone — when used correctly. Vacuum excavation uses pressurized water or air to break up soil, which is then removed by a powerful vacuum, exposing the utility without direct mechanical contact.

VACUUM EXCAVATION REQUIREMENTS	WHEN VACUUM EXCAVATION IS NOT ENOUGH
Equipment must be specifically designed and built for vacuum excavation — not a modified general-purpose vacuum. Operator must be trained and experienced — this is not equipment for an untrained worker. Must be operated in accordance with safe practices for public safety and facility protection. Must comply with all applicable Colorado laws and local ordinances. Some facility owners have specific restrictions on vacuum excavation near their facilities — check with the utility owner before proceeding.	Some facility owners do NOT accept vacuum excavation near their facilities. High-voltage electric and high-pressure gas lines may require hand tools only. Always check the Positive Response file attachments and contact the facility owner if Code 009 (Standby Required) is posted — the owner may have specific requirements. If a utility owner requests hand digging only, that requirement overrides the vacuum excavation option — comply with their requirements. Never use high-pressure water excavation directly against a facility — always work from the side and expose carefully.

SECTION 6 | PROTECTING EXPOSED FACILITIES DURING EXCAVATION

Exposing a utility is not the end of your obligation — it is the beginning of a new one. OSHA 29 CFR 1926.651(b)(4) and CGA Best Practice 5-22 require that all exposed underground facilities be supported, protected, and maintained throughout the excavation period.

■	Support and brace every exposed utility Exposed utilities lose their soil support. They can shift, bend, separate at joints, or crack under their own weight or under vibration from nearby equipment. Use shoring, timber supports, or hangers across the excavation to prevent movement.
■	Do not allow workers to climb on, strike, or attempt to move exposed facilities Workers must be instructed never to step on, lean against, or use an exposed utility as a handhold or step. Even brief contact can damage coatings, bend conduit, or separate joints.
■	Protect cathodic protection systems and coatings Many gas and liquid pipeline systems use cathodic protection to prevent corrosion. Do not scratch, nick, or damage the protective coating on any exposed pipe. Damaged coatings must be reported to the facility owner immediately.
■	Maintain marks throughout the excavation period If locate marks fade, are covered, or are destroyed during excavation, stop work in that area and request a remark from Colorado 811 before continuing. Working without visible marks in the Tolerance Zone is a violation of state law.
■	Delay backfilling until the facility is protected and authorized Never backfill over an exposed or damaged utility without the facility owner's authorization. Remove all sharp rocks, debris, and foreign material from the trench before backfilling. Large chunks of hard material can damage coatings or shift the facility position during compaction.



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SECTION 7 | READING LOCATE MARKS — WHAT THE FIELD MARKINGS TELL YOU

Locate marks are placed by the utility locator to show the approximate horizontal position of the underground facility. Understanding what the marks are telling you — and what they are NOT telling you — is critical to staying within the law.

WHAT MARKS TELL YOU	WHAT MARKS DO NOT TELL YOU
<ul style="list-style-type: none"> • The approximate horizontal location of the utility • The type of utility (by APWA color) • The facility owner (by company identifier code) • The approximate number of lines (if marked) • The approximate width of the corridor • The direction the utility is running 	<ul style="list-style-type: none"> • The EXACT location — marks have an accuracy tolerance • The DEPTH of the utility — never assume depth from marks • Whether additional utilities exist below the marked one • The exact number of conduits in a bundle • The condition or integrity of the facility • Whether the facility has shifted since the last locate

■ Depth Is Never Guaranteed

- Colorado 811 does not have depth information and locators are NOT required to provide depth
- Facility owners may share estimated depth data obtained during the locate, but this is informational only — excavators should NOT rely on depth estimates without potholing
- Depths vary due to original installation practices, soil erosion, past repairs, and human intervention — a pipe that was installed at 36" may now be at 18" or less
- Always pothole to verify depth before mechanical excavation — even if you think you know how deep it is
- Document the actual depth found during potholing — this is your evidence if a claim arises

SECTION 8 | COMMON TOLERANCE ZONE VIOLATIONS — DON'T MAKE THESE MISTAKES

X Using a backhoe to 'carefully' dig next to a marked utility without potholing first	VIOLATION. No matter how experienced the operator, mechanical equipment inside the Tolerance Zone without visual confirmation of the utility is a direct violation of Colorado law and CGA 5-19. Skill level does not override the legal requirement to hand dig or vacuum excavate first.
X Assuming the marks are exactly where the utility is and skipping potholing	VIOLATION. Locate marks indicate an approximate location. The utility can be offset from the mark by the full 18" tolerance in any direction. You must pothole to find the actual position.
X Skipping the 50-foot pothole intervals during a parallel trench	VIOLATION. Colorado law and CGA Best Practice 5-18 require visual identification at intervals not exceeding 50 feet for parallel excavations. Missing even one interval exposes you to full liability.
X Crossing a utility with a boring machine without exposing the crossing first	VIOLATION. Every crossing during trenchless work must be physically exposed before the drill head passes through. There are no exceptions — not even for small cables or shallow depths.
X Continuing to dig when locate marks are no longer visible	VIOLATION. If marks fade, are covered by equipment traffic, or are destroyed, you must stop and request a remark from Colorado 811. Proceeding without visible marks removes all legal protection.



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X Using the pavement exception to dig below pavement depth with a machine

VIOLATION. The pavement removal exception only applies to the depth of the pavement itself. Once through the pavement layer, hand dig rules immediately apply in the Tolerance Zone.

SECTION 9 | TOLERANCE ZONE FIELD CHECKLIST — RUN THIS BEFORE EVERY DIG

<input type="checkbox"/>	<p>Identified all locate marks in the excavation area</p> <p>Walk the entire site. Find every flag, paint mark, and stake. Map their locations mentally and physically before any equipment moves.</p>
<input type="checkbox"/>	<p>Calculated the Tolerance Zone for each marked utility</p> <p>For each mark: 18" + half the known diameter on each side. If diameter is unknown, use 18" from the outside edge of the mark. Mark or flag the zone boundaries if helpful.</p>
<input type="checkbox"/>	<p>Confirmed all Positive Response codes are Complete before entering the zone</p> <p>Code 025 or any Incomplete code means the locate is not done. Do not enter the Tolerance Zone of any utility that has not been fully located.</p>
<input type="checkbox"/>	<p>Assigned a spotter for all excavation near marked utilities</p> <p>The spotter watches the bucket or blade position and communicates with the operator. Spotter must be in position before equipment enters the zone area.</p>
<input type="checkbox"/>	<p>Pothled or hand-dug to expose utilities before mechanical equipment approaches</p> <p>For every utility your work will cross or run parallel to: hand dig or vacuum excavate to physically expose the utility before machines come within 18".</p>
<input type="checkbox"/>	<p>Checked depth and position of each exposed utility and documented with photos</p> <p>Measure depth with a tape measure. Photograph the exposed utility with the tape measure visible. Record: utility type, depth, width, and distance from the locate mark.</p>
<input type="checkbox"/>	<p>Dug below exposed utility to check for additional stacked utilities underneath</p> <p>Never stop at the first utility. Always excavate below and around to confirm no additional lines are stacked beneath or alongside the exposed facility.</p>
<input type="checkbox"/>	<p>Supported and protected every exposed utility before backfilling or moving on</p> <p>Shore, brace, or hang the exposed utility so it cannot shift. Remove all sharp objects from the trench. Do not backfill without facility owner authorization.</p>
<input type="checkbox"/>	<p>Requested a remark if any marks have faded or been destroyed</p> <p>Do not guess or proceed from memory. If you can't see the marks, you don't know the zone. Stop work and request a remark through Colorado 811 before continuing.</p>



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■ The Tolerance Zone Rule in Plain English

- If you see a paint mark, flag, or stake from a utility locate — stop your machine 18" away
- Pick up a shovel or call a hydrovac truck — expose the utility by hand first
- Once you can see the pipe, cable, or conduit with your own eyes — then and only then can a machine return
- Depth is never guaranteed — always pothole, always measure, always photograph
- Parallel trench: pothole every 50 feet along the run — no exceptions
- Boring or HDD: expose every crossing before you drill through it
- When in doubt — hand dig. It takes longer. But it is the law, and it saves lives.
- For guidance: 833-231-3222 (Toll Free) — Utility Strike Prevention