

Ask any seasoned excavator what scares them most on a jobsite and you will not hear “rock” or “rain” first. You will hear “unshored trenches” and “bad soil.” Cave-ins are fast, unforgiving, and almost always avoidable when people respect the rules.

If you work around trenches in the Sacramento region, or you are planning a project on your own property, you need to understand how deep you can dig without shoring, what OSHA and Cal/OSHA actually require, and when alternative methods like vacuum excavation make more sense. The answer is not just a single number like “5 feet.” It depends on soil, access, worker exposure, and local codes.

This guide breaks down the federal rules, how California and Sacramento apply them in practice, and where vacuum excavation fits into safe, efficient digging.

The core OSHA rule: 5 feet is the tipping point

Federal OSHA’s trenching and excavation standard (29 CFR 1926 Subpart P) is the foundation. The key threshold most contractors memorize is simple:

If a trench is 5 feet deep or more and a worker has to enter it, OSHA requires some form of protective system, unless the excavation is dug entirely in stable rock.

A protective system can be sloping, benching, shoring, or a trench box. The goal is the same: keep the walls from collapsing on workers. In typical Sacramento Valley soils, which are often mixed fill, clays, and silts, “stable rock” is basically never your reality.

There are a few related points that matter just as much as the 5 foot rule:

- Any depth can be hazardous. OSHA expects a “competent person” to inspect even shallower cuts and protect workers if there is a risk of cave-in. I have seen a 4 foot trench in loose fill collapse up to grade in less than a second.
- If the excavation is more than 20 feet deep, a registered professional engineer must design the protective system.
- Protective systems must match the soil type and configuration. What is safe in dense, dry clay may not be safe in saturated, layered fill.

So when people ask, “How deep can you dig without shoring?” a more honest answer is: you may be allowed to go to 5 feet in good conditions, but it does not mean it is smart, and it may be illegal if a competent person thinks the soil will not stand.

How deep can you excavate without shoring in practice?

On active sites, the question usually comes up in two scenarios: a quick utility trench, or footing excavations for small structures. The instinct is to push as far as possible without dragging in boxes or shoring panels.

In normal OSHA practice:

If workers are not entering the excavation, and can work from the surface, the shoring requirement is less rigid. For example, digging a 7 foot deep pit with a mini excavator strictly to set a precast vault, with rigging done from outside the cut, is treated differently than sending a laborer down to [Sacramento Vacuum Excavation](#) hand-trim and hook up a pipe.

As soon as a worker has to go down in the trench for any reason, the rules for depth and access apply. A few practical rules of thumb I use with crews:

First, anything approaching 4 feet is treated as “real” trenching. No jumping in the hole for “just a second.” Second, if we are near the 5 foot mark and the soil looks loose, layered, wet, or previously disturbed, we slope or use a box even if the inspector might not be standing over us. Third, heavy loads near the edge, like spoil piles, machinery, or traffic, effectively make the trench deeper in terms of pressure, so we protect earlier.

That mindset matters more than chasing exact inches.

The 4 foot rule in excavation: ladders and access

OSHA has another key number that often gets confused with the 5 foot rule: 4 feet. The 4 foot rule is about access and egress, not shoring.

If a trench is 4 feet deep or more, OSHA requires safe means of getting in and out, typically a ladder, ramp, or stairway. The ladder must be within 25 feet of lateral travel from any worker.

In Sacramento inspections, Cal/OSHA compliance officers watch this closely. They do not want to see workers scrambling up compacted spoil or bucket teeth to get out. A trench box without a ladder is a common citation.

So even if you are in a 4.5 foot deep trench and your competent person believes the soil is stable enough without shoring, you still need a proper access route.

How Sacramento and Cal/OSHA apply the federal rules

California operates its own OSHA plan, so contractors here work under Cal/OSHA rules, which generally match federal OSHA but with some additional teeth.

A few local realities if you are working in or around Sacramento:

Sacramento County and most cities in the region expect you to comply with Cal/OSHA’s trenching standards as a baseline. When you pull an encroachment or grading permit, the fine print usually references state safety laws.

Inspectors and utility owners in this area are trench-sensitive because of our soil and underground congestion. Older neighborhoods along the rivers have soft, saturated soils. Downtown and midtown have layers of fill, rubble, and abandoned utilities. It is not unusual to see inspectors insist on trench boxes even in the 4 to 5 foot range where the letter of the law might not absolutely demand it.

Public works and larger private projects often require a site-specific trench safety plan. For deeper or long-duration cuts, you may have to submit an engineer’s design for shoring or sloping. Cal/OSHA’s permitting requirements kick in for excavations 5 feet or deeper in which workers will occupy manholes, vaults, or confined spaces.

Homeowners usually do not deal with Cal/OSHA directly, but if you hire a contractor, that contractor is bound by these rules. If you dig yourself, the law still expects you not to create a recognized serious hazard. And if there is a serious accident, investigators will use OSHA and Cal/OSHA standards to assess negligence.

Other excavation “rules of thumb” you may have heard

People in the field throw around all kinds of rules like the “4 foot rule,” “19 inch rule,” “35 foot rule” and so on. Some are rooted in OSHA, others in roadwork or other disciplines.

Here are a few that relate to excavation and trucking safety, and how they actually apply:

The “19 inch rule” often refers to fall protection thresholds or steps, but in trenching it is more relevant around ladder rung spacing and access comfort. Trenches deep enough that a worker must climb more than 19 inches vertically to exit should have a secure step or ladder. It is less codified than the 4 and 5 foot rules, but inspectors look for awkward entries and exits.

The “35 foot rule” can show up in fall protection language: if the distance to the next safe access point or ladder exceeds a certain span, you need another. For trenches, the concrete OSHA requirement is that no worker shall have to travel more than 25 feet laterally to reach a ladder or other safe means of egress. Many supervisors keep 25 feet in their head and add a safety cushion in layout.

The “7 3 rule in trucking” and related time management rules are more about Hours-of-Service for drivers, not trenching. When you are hauling spoil from hydrovac work or excavation, those rules still matter. Hydrovac drivers are often under CDL and HOS rules, which affects scheduling and overtime costs.

The “5 4 3 2 1 rule for excavation” and the “3/4/5 rule for excavation” are informal training aids some safety trainers use to summarize depth thresholds, ladder requirements, and constraints. They are not official code language, so always go back to the written standard for enforcement.

The key numbers that are actually in OSHA for trenching are 4 feet (access and atmospheric testing in some cases), 5 feet (protection system), 20 feet (engineered system), and 25 feet (ladder spacing).

How deep can you vacuum excavate?

Vacuum excavation complicates the picture a bit, because it changes how we dig and how people work near the cut.

What is vacuum excavation? In construction, it means using high-pressure air or water to loosen soil, then vacuuming the slurry or spoils into a tank. Hydro excavation uses water. Air excavation uses compressed air. Both are “soft dig” methods compared to steel buckets or teeth.

In the Sacramento area, vacuum excavation is standard for potholing utilities, daylighting, and working around congested underground corridors where a mis-strike would be disastrous.

How deep can you vacuum excavation? Technically, hydrovac units can dig 20 feet or more, and some large units can reach 30 feet or beyond with the right boom and extension tubes. The limiting factors are hose length, pressure losses, spoil handling, and stability, not just suction.

But the same OSHA excavation rules still apply. The fact that you used water and vacuum to create the hole does not exempt you from shoring once a worker is exposed to a potential cave-in. If the sides are vertical and the excavation is 5 feet deep or more, you must provide a protective system unless the soil can be classified as stable rock.

For utility potholes that are small in diameter, the exposure is less. A 12 inch wide vacuum hole, 5 feet deep, usually does not allow full body entry, and workers typically do not climb down. Inspectors still want to see safe practices, like using a vacuum extension tool rather than leaning over unstable edges.

For larger hydrovac trenches, once workers need to hand expose a line or install conduit inside the excavation, you treat it the same as any mechanical trench.

What is the difference between hydro excavation and vacuum excavation?

People use the terms *Sacramento Vacuum Excavation* loosely, but there is a practical difference.

Hydro excavation uses high-pressure water to cut and liquefy soil, and a vacuum system to remove the slurry. It excels in tight soil, frozen ground, and spots where you must avoid damaging utilities. The water jet can be controlled to expose cables and pipes safely.

Air vacuum excavation uses compressed air to loosen soil, then vacuums the dry spoils out. It avoids introducing water, which can matter near electrical equipment, sensitive soils, or places where slurry disposal is expensive.

Both methods are “vacuum excavation.” Hydro excavation is a type of vacuum excavation that relies on water as the cutting medium.

In Sacramento’s clay soils, hydro is more common for deeper work because straight air excavation slows down dramatically in dense, moist clays.

Limitations of vacuum excavation

Vacuum methods are not magic, and they do not remove your responsibilities under OSHA or Cal/OSHA.

Some key limitations in real work:

Vacuum excavation slows down in rocky or cobbly soil. The water jet will not easily move large rock, and spoils can clog lines or wear components faster.

It needs access for the truck. In older Sacramento alleys, tight downtown sites, or backyards, you may not be able to get the hydrovac close enough. Long hose runs cut productivity and add safety concerns.

Spoil management can be expensive. Hydro excavation generates slurry that must be hauled and disposed of according to local regulations. You cannot just dump it anywhere. Disposal fees add up quickly in urban projects.

You still need shoring or shielding when people enter. A hydrovac trench deeper than 5 feet with vertical sides is not automatically safe to enter. I have seen hydrovac cuts “glaze” the sides, giving a false sense of stability, then peel off large sheets when the soil dries or vibrations hit.

Productivity plateaus with depth. How much can a vac ex excavate in a day depends heavily on soil and depth. For shallow potholing in soft soil, a good crew might pothole 40 to 60 utility holes in a 10 hour day. For deep slot trenching in clays, you may be looking at tens of feet per day, not hundreds.

How much does vacuum excavation cost?

Costs vary by region and market, but the structure is similar across the Sacramento area.

Contractors usually bill hydrovac work by the hour or by the day, with minimum call-out times. You will often see:

- Hourly rates in the range of a few hundred dollars per hour for a truck with crew, depending on size and disposal.
- Daily rates running into the low thousands, including a set number of disposal loads.
- Additional disposal or travel billed separately.

How much does it cost for a vac excavation on a small job, like exposing a handful of utilities? For a one-day mobilization, a realistic budget in Sacramento might be 8 to 10 hours at the going hourly rate, plus disposal fees. That could easily approach or exceed a thousand dollars for a single day, depending on your vendor.

On larger linear projects, you might look at cost per foot of trench. Deep or difficult work can run to several tens of dollars per linear foot or more.

Vacuum excavation trucks are capital intensive. How much is a vac ex to buy? Hydrovac trucks routinely cost hundreds of thousands of dollars, often into the mid or high six figures for modern units with large debris tanks and heated water systems. That high capital cost is one reason daily rates feel steep to new project managers.

How vacuum excavation affects production and pricing

If you are trying to estimate how much to excavate 200 cubic yards or how long it takes to dig a 100 ft trench, production rates matter more than hourly rates. For mechanical excavation, a mid-size excavator might remove 80 to 150 cubic yards per hour in ideal conditions. Vacuum excavation is slower but safer around utilities.

How much can a vac ex excavate in a day? In utility potholing, I have seen crews remove 8 to 15 cubic yards of spoils per day, but that is tied to many small, precise holes. In slot trenching, a hydrovac might excavate 10 to 30 linear feet of trench at 2 to 3 feet wide and several feet deep in a full shift in Sacramento clays. Heavier, wet soil cuts into that rate fast.

When I help owners understand why hydrovac looks “expensive,” I point out that they are paying for risk reduction. One cut gas line, fiber trunk, or electrical duct bank can cost far more than an extra few thousand dollars in safe excavation.

CDL, tanker endorsements, and hydrovac work

On the trucking side, several questions come up regularly.

Is a CDL required for hydrovac jobs? Practically, yes. Hydrovac trucks are commercial vehicles, often over 26,000 pounds GVWR. Operating them on public roads requires the appropriate class of Commercial Driver’s License and compliance with Hours-of-Service rules, including variations like the 7 3 rule in trucking used as shorthand for split sleeper berth options under federal HOS regulations.

Do you need a tanker endorsement for a hydrovac truck? That depends on how your state and local enforcement classify the water and slurry tanks. Many jurisdictions treat hydrovacs with large liquid capacities as tank vehicles, especially if they carry liquids in permanently mounted tanks of 1,000 gallons or more. Many Sacramento-area contractors require a tanker endorsement as a matter of policy, even where it might be a gray area legally, because it avoids roadside arguments and violations.

If you are hiring hydrovac services, you do not have to manage these credentials directly, but you should vet that your vendor’s operators are properly licensed. A roadside out-of-service order in the middle of a lane closure quickly kills productivity.

Training and certifications for excavation and vacuum work

What certifications do you need to run an excavator or hydrovac in California? There is no single nationwide license for excavator operators. Requirements break down into a few categories:

Employers must designate a “competent person” for trenching and excavation who can identify hazards and has authority to correct them. That comes from OSHA. Many companies use formal training programs and third-party classes to satisfy this, but the law focuses more on knowledge and authority than a specific card.

Equipment operator credentials vary by contract and union agreements. On many larger jobs and public works, excavator operators must hold recognized certifications like NCCER or union operator cards. Smaller private projects might rely on internal evaluations and documented training.

Hydrovac operators need CDL licenses, possibly tanker endorsements, and site-specific training on high-pressure water, confined spaces, utility locating, and spoil handling. What kind of training is required for vacuum excavation is partly determined by your safety program, but in Sacramento utility corridors, owners often require their own orientations and competency verifications.

OSHA's 3 most cited violations in construction tend to revolve around fall protection, hazard communication, and scaffolding, but trenching violations are consistently in the top tier of serious citations. If you work in trenches or around them, invest in real, hands-on training instead of just annual slide decks.

Homeowners, small contractors, and “backyard” digging

People sometimes ask if it is illegal to dig a hole in your backyard without a permit or shoring. The short answer is that you can generally dig on your own property for landscaping and small projects, but you must not create unsafe conditions for others or damage utilities.

In Sacramento, you must call 811 before you dig if you will be going deeper than simple gardening, especially near property lines, driveways, or streets. If you are digging anything that resembles a trench that someone will enter, you should give yourself the same safety margins contractors use.

Is it better to dig a hole when the ground is wet or dry? From a safety standpoint, saturated soils are more prone to sudden sloughing, while extremely dry, cracked clays can also be unstable. Light moisture can help with dust, but do not rely on “sticky mud” to hold vertical walls. If in doubt, slope the sides back aggressively or stay out of the hole.

Can you dig a trench with a pressure washer? Technically, water will move soil, but using an improvised setup as a “poor man’s hydrovac” is risky. You lack the vacuum to control spoils and the training around high-pressure jets and buried utilities. And again, the same depth rules apply to any resulting trench if a person is going to enter it.

For DIY foundation or utility work that approaches 4 or 5 feet deep, it is usually worth paying a small excavation contractor or hydrovac crew rather than pushing the limits on your own.

Why depth without shoring is the wrong primary question

Strictly speaking, how deep can you dig without shoring, under OSHA, is “less than 5 feet, in stable soil, without workers in the cut or with a competent person deeming it safe.” But treating that as a green light misses the point.

The more useful mental checklist is:

- How likely is this soil to move, given moisture, layers, and nearby loads.
- Will anybody have to go down in there, even briefly, and how will they get out.
- How long will the trench be open, and what weather or vibration will it see.
- Are there alternatives like sloping, benching, trench boxes, or vacuum excavation that cut risk.
- Can I justify the risk, on this specific job, to a Cal/OSHA inspector or a jury after the fact.

Vacuum excavation gives you another tool in the kit, especially around utilities, but it does not erase the fundamentals. Whether you drive a 20 ton excavator or a hydrovac truck, the soil does not care about your schedule.



SACRAMENTO VACUUM EXCAVATION

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Respect the 4 foot and 5 foot thresholds, use competent people who are truly empowered to say "no," and remember that a day of slower, safer excavation costs far less than a minute of collapse.