

On a hot July afternoon in Sacramento, watching a hydrovac truck pull a clean, straight slot trench between a gas main and an old clay sewer line still feels a little like cheating. Fifteen years ago we would have thrown a crew with shovels and a mini-excavator at it, crossed our fingers, and hoped we did not hear that awful hiss that means you just clipped a service.

Vacuum excavation and hydro excavation have moved from niche tools to everyday methods in Sacramento, especially for utility locating, infill development, and tight urban work. The problem is, the terms get mixed together, the pricing sounds mysterious, and the safety rules feel like alphabet soup.

This guide walks through how each method works, where each one shines, and what it really means for cost, production, and safety on projects in and around Sacramento.

What vacuum excavation actually is

Contractors use “vacuum excavation” two ways. Sometimes it means any excavation that uses a vacuum truck to pull material out of the ground. Sometimes it means dry vacuum excavation, where you loosen material with compressed air, not water.

At its core, vacuum excavation is simple: you break up the soil with a tool, then pull that loosened soil out of the hole with a powerful vacuum into a debris tank on the truck. You get a controlled excavation, usually with smaller diameter holes or narrow trenches, and you can work directly over or alongside existing utilities.

Typical dry vac excavation setup on Sacramento jobs:

- A vacuum truck (or trailer unit) with a debris tank and blower.
- An air lance or air knife that uses compressed air to fracture soil.
- Suction hose, usually 6 to 8 inches in diameter.
- Grounding and dust control measures when conditions require them.

Dry vacuum excavation works best in looser, drier soils, or where you want to reuse the material as backfill. Sacramento’s alluvial soils along the American and Sacramento rivers can be cooperative for dry vac in summer, but clay zones and winter moisture change the game quickly.

When people ask “What is vacuum excavation?” in the context of construction, they are almost always talking about this combination of air plus suction, not medical vacuum deliveries or hospital procedures.

How hydro excavation is different

Hydro excavation, or hydrovac, uses high-pressure water instead of just air to cut and liquefy the soil, then the vacuum pulls that slurry into the debris tank. The truck looks similar at first glance, but a hydrovac carries a water tank and a boiler when hot water is needed.

So, what is the difference between hydro excavation and vacuum excavation?

In practice, Sacramento contractors use these terms like this:

Vacuum excavation (narrow sense): Dry method using air to loosen soil, then vacuum.

Hydro excavation: Wet method, using water to break up soil, then vacuum.

Most modern hydrovac trucks can also do air excavation with the right attachments, but water is by far the more common mode on real jobs. Water simply cuts hardpan and cohesive soil more reliably than air alone.

Situations where hydro excavation tends to win:

- Deep potholing around congested utility corridors downtown.
- Winter work when the surface has crusted or partially frozen.
- Trenches in dense clay or compacted fill along major roadways.
- Excavation inside sensitive facilities where precision is critical.

Situations where a dry vacuum setup can be the smarter choice:

- Work where you want to reuse the native soil as backfill.
- Locations where slurry disposal is expensive or constrained.
- Very shallow daylighting in loose, dry material.
- Projects with limited water availability.

On Sacramento projects, the default question from project managers is rarely “Should we use vac or hydro?” It is “Do we really need a hydrovac truck for this phase, or can we get by with conventional digging?” Once you genuinely need a non destructive method, hydro usually ends up being the go-to.



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How deep can vacuum excavation go?

For most municipal and private work in Sacramento, the practical limit for vacuum or hydro excavation is about 20 to 30 feet deep. The limiting factors are not physics alone, but:

- Lift capacity of the blower or fan.
- Hose diameter and friction losses.
- Site logistics: hose routing, traffic, overhead lines.
- Safety requirements for access, shoring, and atmospheric testing.

You may see brochures claiming “up to 50 feet” or more. That is technically possible with ideal conditions, straight vertical runs, and high-end trucks, but productivity falls sharply at greater depths. If you ask, “How deep can vacuum excavation go?” the honest field answer is usually:

Safe, reasonable production: 0 to 15 feet.

Still workable but slower: 15 to 25 feet.

Beyond that, it is specialty work and you should treat it as such in both schedule and budget.

Remember that depth is not just a production issue. “How deep can you excavate without shoring?” is a safety question that comes up often. Under OSHA regulations, any trench 5 feet or deeper usually requires a protective system such as sloping, shoring, or shielding, unless the excavation is entirely in stable rock. Even when you use non destructive excavation, once the void is large enough for a person to enter, you have a trench or excavation hazard, not just a pothole.

For smaller “potholes” or “daylighting” holes, many contractors treat anything under 4 feet as less critical, but that is judgment, not a blanket exemption. Soft, collapsing soil can trap a worker with much less depth.

How much can a vac or hydrovac excavate in a day?

Production depends heavily on soil, congestion, access, and the type of work. A hydrovac slot trench across a lawn is not the same as surgical daylighting in a downtown alley full of fiber.

On a typical Sacramento-area utility locating or daylighting job:

- In relatively clean soil with limited utilities, a hydrovac truck might excavate 20 to 60 cubic yards in a day.
- In tighter urban settings around dense utilities, that might drop to 5 to 20 cubic yards per day, but you gain safety and avoid costly hits.

If you have ever wondered, “How much can a vac ex excavate in a day?” those ranges are realistic for planning. For project level estimates, I usually assume a baseline around 15 to 25 cubic yards per day for careful utility work, then adjust up or down based on known site conditions.

For hourly thinking, “How much does an excavator excavate in one hour?” depends on size and material, but a standard 20-ton excavator like a Cat 320 can easily move 60 to 120 cubic yards per hour in bulk earthmoving. That is the contrast: mechanical excavation wins big on volume, hydrovac wins on precision and reduced risk.

Cost: what you really pay for vacuum or hydro excavation

Owners and small contractors often ask variations of the same questions:

- How much does it cost for a vac excavation?
- How much does vacuum excavation cost per hour?
- How much to excavate 200 cubic yards this way?

Pricing varies by contractor, truck size, and whether you are in the core Sacramento market or somewhere that requires travel. For 2024-ish numbers in Northern California, hydrovac or vacuum excavation commonly lands in these ranges:

- Hourly truck rates: roughly 275 to 450 dollars per hour, including operator. Some firms have minimum call-out times, typically 4 hours.
- Day rates: for a full 8 to 10-hour shift, often in the 2,400 to 3,800 dollar range, again depending on truck size and conditions.
- Mobilization: additional if the truck travels outside the immediate metro area.

"How much to excavate 200 cubic yards?" with hydrovac is not a one line answer, because that volume could be several days or weeks of work depending on conditions. If we assume 25 cubic yards per productive day, that is roughly 8 working days. At, say, 3,000 dollars per day all-in, you are in the 24,000 dollar ballpark. Good soil and straightforward work can cut that sharply, while congested conditions can double both time and cost.

Buying your own vac truck is another common question. "How much is a vac ex to buy?" or "How much is a vacuum excavation truck?" depends on age and spec, but:

- New mid-size hydrovac units often run 450,000 to 650,000 dollars.
- Larger, higher spec units or specialized builds can exceed 700,000 dollars.
- Used trucks can be found from around 150,000 dollars up, but service history matters enormously.

For most contractors who only need hydrovac part time, renting or hiring a specialty firm remains more sensible than buying.

A quick comparison: vacuum vs hydro for Sacramento conditions

Sacramento's mix of older utilities, expanding suburbs, and clayey soils makes both methods useful. The tradeoffs can be summarized as follows.

List 1 of 2 (comparison overview):

1. Soil handling: Hydro excavation produces slurry that must be hauled and disposed of at an approved facility. Dry vacuum excavation preserves native soil, which is easier to reuse as backfill on small sites.
2. Soil types: Water cuts through hardpan, dense clay, and compacted base more efficiently than air. Dry vac works best in loose, dry soils and can struggle in heavy, wet clay.
3. Precision near utilities: Both methods are considered non destructive, but hydro tends to be more consistent in difficult soils. Dry air can deflect around cobbles or leave hard chunks.
4. Environmental impact: Dry vac uses less water and can be advantageous where water usage or transport is constrained. Hydro can increase disposal volume but often shortens overall disturbance time.
5. Cost and speed: Hourly rates for hydro and vacuum trucks are similar. Actual cost effectiveness depends on the soil and the work. Hydro often finishes faster in Sacramento's harsher soils, even if unit rates are identical.

[*Sacramento Vacuum Excavation*](#)

Regulatory rules, OSHA basics, and the alphabet soup

A lot of questions online mix excavation rules, trucking rules, and even childbirth rules. Some of the numbers you see, like "what is the 19 inch rule?" or "what is the 4 foot rule in excavation?" do exist in certain safety contexts, but they are not always universal.

For construction excavation in the United States, OSHA's primary excavation standard is 29 CFR 1926 Subpart P. A few practical points that come up often on hydrovac jobs:

The 4 foot rule: At 4 feet deep, OSHA requires a safe means of egress, such as a ladder, within 25 feet of lateral travel in a trench. This applies even to small hydrovac trenches if a worker needs to enter.

The 5 foot rule: At 5 feet deep, a protective system is generally required (sloping, benching, shoring, or a trench box), unless you can demonstrate the excavation is entirely in stable rock. Many people call this the "5 foot rule" or mix it into various "3/4/5" or "5 4 3 2 1" shorthand systems in training.

"How deep can you dig without shoring?" is really asking how deep you can go without some protective system. Beyond 5 feet, unprotected straight vertical walls in typical Sacramento soil are not acceptable.

The 19 inch idea: You might see "What is the 19 inch rule?" in safety discussions. In excavation, this number is not a primary OSHA standard on its own, but 19 inches appears in several places in OSHA rules, such as maximum rises between steps or ladder rungs. In trench access, it can appear indirectly, but do not rely on a single "19 inch rule" to define your excavations.

"OSHA's 3 most cited violation" changes from year to year, but excavation and trenching hazards consistently appear on enforcement lists. On hydrovac jobs, I see citations when crews assume that small, narrow trenches or potholes are "safe by default." Once someone climbs in, all excavation requirements apply.

You may also run across references like:

- "What is the 5 4 3 2 1 rule for excavation?"
- "What is the 3/4/5 rule for excavation?"
- "What is rule 1413 for excavation?"
- "What are the 5 OSHA requirements?"

These are usually internal company training mnemonics, specific state rules, or misremembered citations, not a uniform federal standard. When in doubt, go back to 29 CFR 1926 Subpart P, and your local competent person training, not to internet shorthand.

Trucking rules: CDL, endorsements, and hydrovac specifics

Operating hydrovac and vacuum trucks triggers commercial vehicle rules. People regularly ask:

Do you need a tanker endorsement for a hydrovac truck?

Is a CDL required for hydrovac jobs? What is the 7 3 rule in trucking?

Hydrovac trucks almost always require a commercial driver's license, because the combined weight rating exceeds the CDL threshold. In California, you generally need at least a Class B CDL, sometimes Class A depending on configuration.

Whether you need a tanker endorsement depends on how the truck is registered and configured, and how your state interprets "tanks" and "liquid loads." Some jurisdictions treat hydrovac debris tanks as tank [Sacramento Vacuum Excavation](#) vehicles once they hold above a certain liquid capacity. Others focus on highway transport of dedicated tankers. This is something to confirm with your safety department or DMV, not guess at.



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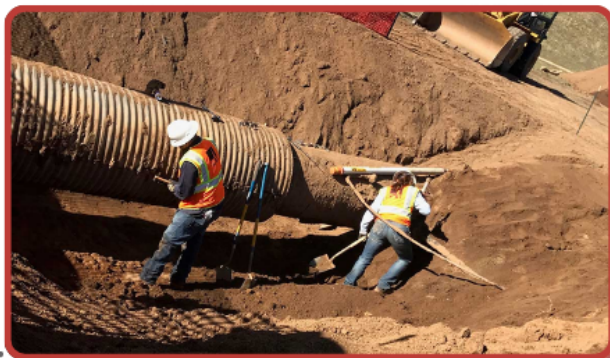
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The “7 3 rule in trucking” usually refers to hours-of-service provisions, such as taking 8 hours off after a 16 hour shift, or working within a 150 air-mile radius without certain records, depending on the context. For hydrovac operations, the main point is that federal and state hours-of-service rules apply just like they do for other commercial trucking. Plan shifts so your hydrovac operators are not trying to drive home exhausted after a 12 hour day on a live gas main.

Training and certifications for vacuum excavation

Clients sometimes assume that because hydrovac is “non destructive,” it is also low risk. That is a mistake. High pressure water, moving hoses, confined spaces, and live utilities are a serious mix.

“What kind of training is required for vacuum excavation?” in Sacramento usually includes:

- CDL training and testing for the appropriate class of license.
- Formal operator training on the specific hydrovac or vacuum truck model.
- Excavation safety and competent person training under OSHA standards.
- Utility locating and damage prevention practices, in line with 811 requirements.
- Site specific safety programs when working with major utilities or agencies.

“What certifications do you need to run an excavator?” is a related question. For tracked excavators, OSHA requires that operators be “competent” and trained, and some jurisdictions or owners demand third party certifications such as NCCER or operator cards from recognized programs. Hydrovac operators face similar expectations on larger public works and industrial projects.

Hydrovac work is also attractive for mid-career tradespeople. When people ask "Is 50 too old to become a heavy equipment operator?" my honest answer is no, but you need to approach it with realistic expectations. It is physical work, there are long days on your feet managing hose and nozzles, and you must stay sharp for safety. I have seen operators in their late 50s handle trucks beautifully, and I have seen younger operators burn out in a few seasons.

On pay: "What is the highest salary for an excavator operator?" and similar salary questions always depend on region and sector. In Northern California, top operators on union industrial work or remote projects can clear into six figures with overtime and benefits. Hydrovac operators with CDL and strong safety records are in similar demand.

Job costing: pricing hydrovac and vacuum excavation into your project

If you handle estimating, you eventually face these questions:

- What does excavation cost per hour for hydrovac?
- How to price out excavating jobs that involve vacuum excavation?
- Why do you divide by 27 for cubic yards?

Most hydrovac pricing in our area is either hourly or day based. When you break it down internally, you convert between cubic feet and cubic yards by dividing by 27, since there are 27 cubic feet in a cubic yard (3 feet by 3 feet by 3 feet).

The mistake I see is treating hydrovac like a bulk earthmoving line item. Instead, consider:

List 2 of 2 (simple pricing checklist):

1. Identify where non destructive excavation is truly required: near utilities, in sensitive sites, or where specs call for it.
2. Estimate volumes and depths for those specific areas, not for the whole project.
3. Apply realistic production rates based on local soil and congestion, not brochure numbers.
4. Add mobilization, traffic control, and disposal costs, especially slurry disposal for hydro excavation.
5. For the remaining bulk earthwork, price conventional equipment separately, using appropriate per-cubic-yard or per-hour rates.

If a client asks "How much would it cost to excavate 10 acres of land?" your answer should separate bulk clearing and grading, which might use dozers and scrapers, from targeted hydrovac work around existing infrastructure. Hydrovac is not the tool to move thousands of cubic yards cheaply.

The same logic helps when a homeowner or small business asks about "the cost of 1000 sq ft" of excavation or "How long does it take to dig a 100 ft trench?" The length and area matter, but the real drivers are depth, soil, number of utility crossings, and access. A 100 foot trench for a shallow irrigation line in clean soil is one day with a mini-excavator. A 100 foot trench across a congested downtown street might take several days with hydrovac and traffic control.

Limitations of vacuum and hydro excavation

Hydrovac trucks are impressive, but they are not magic. A few practical limitations:

Soil and rock: "What are the limitations of vacuum excavation?" starts with material type. Both vacuum and hydrovac struggle with solid rock. Water can erode small cracks or weathered rock, but if you hit competent rock,

you are chiseling, hammering, or blasting, not hydrovacating.

Water and slurry: Hydro excavation uses water. In areas with poor drainage, restricted disposal, or environmental constraints, managing slurry becomes a project in itself. You can not simply pile hydro slurry back in the trench and walk away, especially if specs or agencies require controlled backfill.

Access: Hydrovac hose can reach a long way, but tight alleys, overhead lines, and traffic can limit where a truck can park. On some Sacramento infill projects, we staged the truck half a block away and snaked hose through a maze of parked cars, losing production to logistics.

Cost: Hourly costs are higher than conventional excavation gear. If the project does not genuinely benefit from non destructive work, you are burning budget for no reason.

Non construction confusion: Search queries sometimes bring in unrelated topics: "Is vacuum delivery painful?", "How risky is vacuum delivery?", "What is the 5 3 1 rule for labor?", "What is the rarest hour to be born?" Those all live in the obstetrics world, not the construction yard. They have nothing to do with vacuum or hydro excavation on job sites in Sacramento.

Equipment choices and related machines

On a broader equipment note, people occasionally ask "What are the three types of excavators?" or "What are the four types of excavation?" The taxonomy varies, but on a typical civil job you will see:

- Crawler excavators, the tracked machines that do most of the digging.
- Wheeled excavators or backhoes, useful in urban and road work.
- Compact or mini excavators, ideal for tight sites and service work.

Hydrovac trucks are not excavators in the conventional sense, but they sit beside them in the toolbox for modern civil work. As for "What's stronger than a bulldozer?" in practice, large excavators and dozers each excel at different tasks. Dozers push and spread, excavators dig and load. Hydrovac fits where neither is safe enough around buried infrastructure.

Questions like "Is a Cat 320 a 20 ton excavator?" are straightforward. Yes, a Cat 320 is roughly in the 20-ton class, which is why it shows up so often on mid-sized commercial and public works sites.

Sacramento-specific considerations

Sacramento adds its own wrinkles to vacuum and hydro excavation decisions.

Soil moisture and timing: "Is it better to dig a hole when the ground is wet or dry?" For hydrovac, slightly moist soil often cuts cleanly, while fully saturated or soupy ground can turn everything into an unmanageable slurry. In the valley, winter storms can raise groundwater and soften subgrades. Planning hydrovac work in the shoulder seasons often gives better production than immediately after heavy rains.

Hydrovac and pressure washers: "Can I dig a trench with a pressure washer?" shows up in DIY discussions. Using a household pressure washer in place of a hydrovac is not a good idea. You have inadequate suction, no debris tank, no proper safety procedures, and no control around utilities. On regulated projects, it is also not acceptable practice.

Legalities: "Is it illegal to dig a hole in your backyard?" by itself, no. But if you hit a gas main or fiber conduit, the legal and financial consequences are very real. 811 rules apply in California, and many local jurisdictions, including Sacramento, have their own permitting and inspection requirements for utility work and larger excavations.

Depth and reach: Local agencies often have their own “35 foot rule” or similar parameters for clearances around power lines, building faces, or trees. Those are not hydrovac specific, but they affect where and how you can stage a truck and run hoses.

Permitting and traffic: Vacuum excavation often happens in roadways, alleys, or sidewalks. The City of Sacramento and Caltrans both have work-in-right-of-way rules. Even a “simple” hydrovac daylighting run can require lane closures, traffic control plans, and off-peak scheduling downtown.

Vacuum and hydro excavation are no longer exotic art in Sacramento. They are everyday tools that, when used intelligently, save utilities, save time, and sometimes quietly save lives. The real skill lies in knowing when to call the truck, how to integrate it into your sequence, and how to respect both the capabilities and the limits of that big humming rig parked at the curb.