

GEOTECH REPORT PRICING CHECKLIST

The parts of a geotechnical report that change the price. Read the recommendations first, then the boring logs and lab data, then check both against the plans.

PROJECT	BID DATE	ESTIMATOR																								
HOW TO USE THIS CHECKLIST • Read the recommendations first, then the logs and lab sheets, then the appendices and plates. • Tick each line as you find it and write the report page next to it so the number can be defended later. • Anything the report is silent on, or that conflicts with the plans or specs, becomes an RFI before bid or a clarification in the proposal. • Price what the documents say, not what you expect the site to do. • General guide only. The contract documents govern. SECTIONS <table> <tr> <td>01 REPORT IDENTIFICATION AND STATUS</td><td>09 FILL AND COMPACTION</td><td>17 PAVEMENT SECTIONS AND FLATWORK</td></tr> <tr> <td>02 PLAN MATCH AND CONFLICTS</td><td>10 ON-SITE SOILS AND IMPORT</td><td>18 STORMWATER AND INFILTRATION</td></tr> <tr> <td>03 SCOPE AND EXPLORATION LIMITS</td><td>11 EXPANSIVE AND COLLAPSIBLE SOILS</td><td>19 SEISMIC, FROST AND CORROSIVITY FLAGS</td></tr> <tr> <td>04 BORING LOGS AND FIELD DATA</td><td>12 EXCAVATION CHARACTERISTICS</td><td>20 TESTING AND INSPECTION</td></tr> <tr> <td>05 LABORATORY DATA</td><td>13 GROUNDWATER AND DEWATERING</td><td>21 SEQUENCING, WEATHER AND MOISTURE</td></tr> <tr> <td>06 SITE HISTORY AND EXISTING CONDITIONS</td><td>14 SLOPES, BENCHING AND SHORING</td><td>22 ARID WEST AND INTERMOUNTAIN CHECKS</td></tr> <tr> <td>07 CLEARING, STRIPPING AND SUBGRADE PREP</td><td>15 FOUNDATIONS, PADS AND RETAINING WALLS</td><td>23 PRICING CONVERSIONS</td></tr> <tr> <td>08 OVER-EXCAVATION AND REPLACEMENT</td><td>16 UTILITY TRENCHES</td><td>24 PROPOSAL EXCLUSIONS AND CLARIFICATIONS</td></tr> </table>			01 REPORT IDENTIFICATION AND STATUS	09 FILL AND COMPACTION	17 PAVEMENT SECTIONS AND FLATWORK	02 PLAN MATCH AND CONFLICTS	10 ON-SITE SOILS AND IMPORT	18 STORMWATER AND INFILTRATION	03 SCOPE AND EXPLORATION LIMITS	11 EXPANSIVE AND COLLAPSIBLE SOILS	19 SEISMIC, FROST AND CORROSIVITY FLAGS	04 BORING LOGS AND FIELD DATA	12 EXCAVATION CHARACTERISTICS	20 TESTING AND INSPECTION	05 LABORATORY DATA	13 GROUNDWATER AND DEWATERING	21 SEQUENCING, WEATHER AND MOISTURE	06 SITE HISTORY AND EXISTING CONDITIONS	14 SLOPES, BENCHING AND SHORING	22 ARID WEST AND INTERMOUNTAIN CHECKS	07 CLEARING, STRIPPING AND SUBGRADE PREP	15 FOUNDATIONS, PADS AND RETAINING WALLS	23 PRICING CONVERSIONS	08 OVER-EXCAVATION AND REPLACEMENT	16 UTILITY TRENCHES	24 PROPOSAL EXCLUSIONS AND CLARIFICATIONS
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24 sections • 287 check items • Tick each line, or mark N/A. Lines with a note underneath are the ones that most often move the number.

! MOST COMMON MISSES: READ THESE FIRST

- Pricing from the summary. The over-ex depth, import spec, or testing frequency is often only in an appendix, plate, or typical detail.
- Pricing from a report written for an earlier grading plan. Compare the date, the pad elevation, and the building footprint before you use a single number.
- Measuring the over-ex lateral limit from the building line when the report means the footing edge, or the other way around.
- Taking over-ex depth from existing grade in cut areas when the report measures it below the footing, the slab, or subgrade.
- Borings that stop above the deepest cut, trench, or basin. Treat what is below the last boring as unknown and say so in the proposal.
- Groundwater logged during a dry season. Ask for the seasonal high before you assume dry digging.
- Assuming cut material is reusable when the report calls it unsuitable, expansive, or oversize. The swing to export plus import is the biggest single miss.
- Using one compaction percent without checking the test method. D1557 and D698 are not interchangeable.
- Forgetting that import is bought loose and placed compacted. Convert compacted CY to tons before you price it.
- Skipping the lab sheets. Sulfates, plasticity, and expansion data turn into import, pipe, and concrete cost.
- Pricing export by the truck load when it should be priced by the ton.
- Reading rippable as cheap. Material that rips still slows production and wears equipment.
- Ignoring observation and testing holds. Waiting on geotech approval is standby for your crew and machines.
- Leaving assumptions out of the proposal. If an exclusion or clarification is not written down, it is in your price.

01

REPORT IDENTIFICATION
AND STATUS

Know exactly which document you are pricing from, and whether it governs.

- ☐ Firm, project number, report title, and site address or APN match the project you are bidding
Reports get reused between adjacent parcels and phases. Check the cover, the page headers, and the text for another project's name or lot number.
- ☐ Report date and the date of the field exploration
An old report, or one written before nearby grading or demolition, may not reflect today's site. Flag the age and ask if it is still current.
- ☐ Engineer stamp, signature, and license on the final report
- ☐ Every revision, update letter, addendum, and response letter, listed by date
Later letters often change over-ex depths, compaction, or import rules. Confirm in the bid documents which one supersedes.
- ☐ Which volumes, appendices, plates, and figures you actually received
- ☐ Recommendations that appear only in appendices, plates, typical details, or the last pages
Over-ex limits, trench backfill rules, wall drain details, and testing frequency are often outside the summary.
- ☐ Whether the specs adopt the report by reference, override it, or say nothing about it
If the report is part of the contract documents, its recommendations are scope. If the specs are silent, RFI before you price from it.
- ☐ Order of precedence between report, specs, plans, and addenda
- ☐ Whether the contractor may rely on the report or it is for information only
Reliance language decides who carries a differing condition. Read it with the differing site conditions clause.
- ☐ Disclaimers: addressed to the owner or designer only, no warranty between borings, conditions may change
- ☐ Statements that means and methods, excavation safety, and slope stability are the contractor's responsibility
- ☐ Differing site conditions clause, and any unit prices in the bid documents for rock, over-ex, and dewatering

02

PLAN MATCH AND
CONFLICTS

A report only works for the site, building, and grades it was written for. Check it against the set you are bidding.

- ☐ Site plan or grading plan the report cites: sheet set, date, and revision, compared to your bid set
A report written for an earlier layout is the most common source of wrong over-ex limits and wrong quantities.
- ☐ Building footprint and finished floor elevation used by the geotech compared to the current plans
A pad that was moved, rotated, or raised after the borings makes the over-ex depth and lateral limits stale.
- ☐ Cut and fill depths the geotech assumed compared to the current grading plan
- ☐ Fill and cut slope ratios in the report compared to the slopes drawn on the grading plan
- ☐ Report typical details (over-ex limits, trench backfill, wall drains) compared to the plan set details
- ☐ Compaction percent, test method, and moisture range: report vs specs vs plan notes
- ☐ Over-excavation depth and lateral extent: report vs plan notes vs specs
- ☐ Deepest utility inverts, footings, pits, and basin bottoms on the plans compared to the depths explored
A boring that stops above the lowest invert tells you nothing about the trench bottom.
- ☐ Items the report requires that no plan sheet or spec section mentions
Subdrains, geotextile, geogrid, moisture barriers, lime treatment, and special inspection are the usual orphans.
- ☐ Each conflict written as an RFI with the report page, the plan sheet, and your proposed answer
Send it through the channel named in the bid documents. If no addendum follows, carry the answer into your proposal.
- ☐ For every conflict still open at bid time, price the stricter requirement or state your assumed answer in the proposal

RFI FORMAT

Report page + plan sheet or spec section + the conflict + the answer you will price if there is no reply.

03

SCOPE AND EXPLORATION LIMITS

Borings only describe what they touched. Find out what they touched and what they did not.

- ☐ Boring and test pit locations plotted on the current building, paving, utility, pond, and wall footprints
- ☐ Areas bid vs areas explored: parking, drive aisles, trash enclosures, retaining walls, basins, and offsite work
- ☐ Depth explored vs the deepest cut, footing, pipe invert, basin bottom, and wall footing
A boring that stops above the deepest cut says nothing about what the machine will hit at the bottom.
- ☐ Borings that ended on refusal, at target depth, or at the limit of the rig
- ☐ Gaps: wide spacing, locations moved from plan, or borings skipped because of access
- ☐ Test pits vs borings: which areas were pit-logged and which were drilled only
Pits show cemented layers, cobbles, and debris far better than small-diameter borings, which can miss them or stop on them.
- ☐ Features not explored: ponds, old buildings, fill piles, drainage channels, and areas under existing paving
- ☐ Offsite and frontage work with no borings: street widening, utility tie-ins, driveway aprons, and sidewalks
- ☐ Season and date of exploration compared to the season you will be building
A dry-season exploration can miss perched water and soft wet subgrade that show up months later.
- ☐ Limits language such as 'widely spaced borings' or 'depth of fill not defined'
Those phrases mark where the exposure is. Carry them into exclusions or an allowance.
- ☐ Prior as-graded or compaction reports for pads already on site, and whether the geotech relied on them

04

BORING LOGS AND FIELD DATA

The logs show the real cutting and fill conditions. Read every log, not just the summary table.

- ☐ Soil type for each layer by USCS group symbol (for example SM, SC, CL, CH, ML, GP, GM)
- ☐ Consistency of cohesive soils and relative density of granular soils (soft, stiff, loose, dense) by depth

- ☐ Blow counts by depth, and which sampler was used
Counts from different samplers are not directly comparable. Read the legend on the log before you compare borings.
- ☐ Fill vs native: depth and extent of fill or disturbed soil in each boring, with any debris, trash, concrete, asphalt, or wood noted
Undocumented fill under structures or paving is usually removed and recompact. Quantify depth boring by boring.
- ☐ Odors, staining, discoloration, or sheen noted in the logs
- ☐ Cobbles and boulders: size, percentage, and depth, in the logs and in the narrative
Drives oversize handling, screening, and haul-off. Borings can miss them entirely, so test pits are the better evidence.
- ☐ Caliche, cemented layers, or hard drilling comments, with depth and thickness
Cemented layers can look like soil in a pit and drill like rock. Read the driller's comments and any coring.
- ☐ Refusal depth and what stopped the rig: bedrock, cobble, boulder, or cemented layer
- ☐ Caving, sloughing, or unstable sidewalls noted in borings and test pits
Direct evidence for trench stability, slope recommendations, and shoring cost.
- ☐ Seepage, free water, and natural moisture by layer (dry, moist, wet, saturated), with depth and date
Wet native soil means drying time. Dry native soil means water trucks. Both are cost.
- ☐ Thickness of topsoil, organic, or loose surface soil at each boring
- ☐ Ground surface elevation at each boring, or depth only, and the datum used

05

LABORATORY DATA

The lab sheets turn the logs into numbers you can price from. Check what was tested and what was not.

- ☐ Gradation, including percent passing the No. 200 sieve, for each sample
- ☐ Atterberg limits (liquid limit and plasticity index) for each sample
Plasticity ties to expansion, workability, and whether lime treatment or import is called for. Compare it to any plasticity limit in the import spec.
- ☐ Natural moisture content compared to optimum moisture
- ☐ Proctor curves: sample used, maximum dry density, optimum moisture, and test method
Confirm the curve was run on soil you will actually place. Fill from another layer may need its own curve.

- ☐ Proctor method used (ASTM D1557 modified or D698 standard), and whether the compaction percent is based on it
The same percent under D1557 takes more compactive effort than under D698. A percent with no stated method is an RFI.
- ☐ Oversize correction applied or not on soils with gravel and cobbles
- ☐ R-value or CBR results by sample, and whether the design used the lowest, the average, or one result
One low sample can drive a thick pavement section across the whole site.
- ☐ Expansion index or swell test results by sample and depth
- ☐ Consolidation and collapse test results, with the load and wetting condition used
- ☐ Soluble sulfates, chlorides, pH, and minimum resistivity results
They drive concrete mix and pipe material for other trades. Flag them to whoever prices those items.
- ☐ Organic content results or notes on organic soils
- ☐ In-situ dry density and moisture of ring or tube samples
Needed to convert export CY to tons. Moist unit weight is dry density times one plus the moisture content.
- ☐ Tests listed in the text with no data sheet, or requested and never reported
- ☐ Sample depth and location for each test compared to the layers you will cut or place

06

SITE HISTORY AND EXISTING CONDITIONS

What was on the site before is often more expensive than what the soil does.

- ☐ Existing fill, documented or not, with limits, depth, and condition
Fill under future structures or paving is typically removed and recompacted unless a controlled fill report exists. Get depths from the logs.
- ☐ Old foundations, slabs, footings, basements, cisterns, septic systems, or wells noted in the report
- ☐ Buried or abandoned utilities, lines, and conduit noted, and who locates and removes them
- ☐ Former ponds, drainage channels, washes, stock ponds, or irrigation features, and how the report says to treat them
- ☐ Old landfill, dump, or burn areas: debris percentage, depth, and who classifies the material

- ☐ Environmental flags in the geotech: Phase I findings, tanks, stained soil, odors, or soil gas
Earthwork pricing excludes contaminated material. Ask whether the owner has a plan and a consultant.
- ☐ Radon, methane, or other soil gas, and whether a mitigation layer or vent system touches the subgrade
- ☐ Previous grading, mining, or farming: old fill pads, borrow pits, tilled layers, or spoil piles
- ☐ Adjacent structures, roads, and property lines near deep cuts
Triggers shoring, monitoring, or restricted slopes. Measure from the cut to the neighbor's footing or wall.
- ☐ Trees, stumps, and roots: removal depth, root ball voids, and disposal
- ☐ Sinkholes, voids, or mine workings noted

07

CLEARING, STRIPPING AND SUBGRADE PREP

Subgrade prep is often a different spec than fill. Read the prep section of the report for every area.

- ☐ Stripping depth in the report, and whether it varies by area
Report depths are often 'approximately' or 'to firm soil'. Price a stated depth and say that is your basis.
- ☐ Topsoil and organic material: stockpile, reuse in landscape only, or waste
- ☐ Disposal of stripped material: onsite stockpile, onsite placement area, or export per ton
- ☐ Subgrade preparation after stripping or cutting: scarify depth, moisture conditioning, and recompaction percent
In cut areas the report may call for scarifying and recompacting the subgrade to a stated depth. That is volume you work twice.
- ☐ Proof rolling: equipment, number of passes, who observes, and what a failure triggers
Failures lead to removal or stabilization. Check whether that fix is in your price or a unit price.
- ☐ Unsuitable soil criteria in the report (organic, soft, wet, debris) and who decides
'As determined by the geotechnical engineer' is open-ended. Price a stated assumption and clarify.
- ☐ Removal depth of unsuitable material: an estimate in the report, or criteria only
- ☐ Stabilization methods named in the report: crushed rock bridge lift, geotextile, geogrid, lime, or cement

- ☐ Chemical treatment of wet or fine soils: depth, rate per the report, mixing, curing time, and testing
Lime and cement need spreaders, mixers, water, and curing. Check soluble sulfate results first, since high sulfate can make treatment a problem.
- ☐ Protection of approved subgrade from rain, traffic, and drying
- ☐ Subgrade prep limits beyond the building, paving, and slab edges, and which edge they are measured from
- ☐ Benching into existing slopes before fill: bench width and height per the report

Strip CY = area (SF) x stripping depth (ft) / 27

Use the depth in the report, by area. Carry the topsoil stockpile and the export as separate lines.

08

OVER-EXCAVATION AND REPLACEMENT

This is where the biggest yardage swings come from. Get the reference, the depth, and the lateral limit exactly right.

- ☐ Over-ex depth reference: below the footing, below the slab, below subgrade, or below existing grade
Same number, very different yardage. Depth below footing bottom and depth below existing grade can differ by feet.
- ☐ Over-ex below footings vs below slab-on-grade: separate depths for each
Footing zones are deeper and narrower. Slab zones are shallower but cover the whole footprint. Quantify each.
- ☐ Lateral limit: feet beyond the footing edge, the slab edge, or the building line
A limit from the footing edge is a much smaller area than one from the building line. Clarify wording like 'beyond the building'.
- ☐ Lateral limits for paving, flatwork, and walls, separate from the building
- ☐ Shape of the lateral limit: a fixed distance, or a slope down and out from the footing edge
- ☐ Depth stated as a number, a range, 'to firm native soil', or 'as directed by the geotechnical engineer'
A range or open-ended depth needs an assumption or a unit price. Price the stated depth and exclude beyond it.
- ☐ Separate over-ex recommendations by problem soil: expansive, collapsible, soft, organic, or fill
- ☐ Cut-fill transition pads: over-ex on the cut side to reach a uniform fill thickness
Reports often want even fill thickness under the building, so the cut side gets over-excavated.

- ☐ Cut areas: over-ex is measured below final subgrade, so total depth from existing grade is cut plus over-ex
Do not price over-ex from existing grade. Carry the mass cut to subgrade, then the over-ex below it.
- ☐ Whether removed material can be reused after moisture conditioning, screening, or blending
If not, it is export by the ton plus import to replace it. If yes, you still have double handling.
- ☐ Replacement material: native recompacted, select fill, import structural fill, or crushed aggregate
- ☐ Bottom of the over-ex: scarify, proof roll, and approval before fill goes in
- ☐ Who verifies the bottom (geotech observation or testing), and how fast they respond
- ☐ Over-ex near property lines, walls, or existing structures where the lateral limit cannot be met
The report may offer an alternative such as deeper footings or a reduced extent. RFI before bid.
- ☐ Preloading or surcharge in place of over-ex: height, duration, monitoring, and removal
- ☐ Over-ex quantity basis: which borings set the depth in each zone

Over-ex CY = $(L + 2e) \times (W + 2e) \times D / 27$
L, W = footprint. e = lateral extension per side. D = depth below the stated reference.
Run each zone separately: footings, slab, paving, flatwork, walls, trenches.
Take irregular footprints off the actual outline. Add any sloped-side volume on top.

09

FILL AND COMPACTION

Every area has its own requirements. Capture them area by area.

- ☐ Percent compaction by area: building pad, paving, flatwork, trench backfill, landscape, and slopes
- ☐ Test method for each area: ASTM D1557 (modified) or D698 (standard)
A mismatch between report and specs changes passes, moisture, and test results. RFI it.
- ☐ Moisture range relative to optimum for each material type and area
Expansive clays are often placed wet of optimum and granular soils near it. The range sets your water or drying cost.
- ☐ Maximum loose lift thickness by equipment: heavy roller, light roller, hand tamper
- ☐ Maximum particle size allowed in fill, and in the top lift or last foot
Oversize must be screened, removed, or crushed. Price the processing and the haul.

- ☐ Structural fill vs general fill vs utility backfill vs landscape fill: separate definitions and requirements
Structural fill usually carries tighter material and compaction. Know where the structural fill line falls on the plans.
- ☐ Overbuilding fill slopes and trimming back, or track walking, to compact the face
- ☐ Compaction next to walls, in confined areas, and behind retaining walls: equipment and lift limits
- ☐ Acceptance criteria: minimum for any single test vs the average of tests
- ☐ Relative density instead of Proctor for clean granular soils, and the method
- ☐ Compaction of aggregate base and subbase: percent and test method
- ☐ Shrink, swell, and bulking factors stated in the report or the earthwork notes
If a factor is stated, use it in the balance. If not, state the factor you used in your proposal.
- ☐ Settlement monitoring or a waiting period before building on deep fill
- ☐ Rock fill or oversize placement rules: maximum size, depth below finished grade, voids filled with fines
Rock fills are slow, may need special equipment and observation, and are often not allowed near finished grade.
- ☐ Lean concrete or controlled low strength material (CLSM) allowed in place of compacted fill

For every area, get four numbers: percent compaction, test method, moisture range, and maximum lift thickness.
Areas: building pad, paving, flatwork, trench, landscape, slopes, basin embankments.

10

ON-SITE SOILS AND IMPORT

The report decides what stays on site and what you buy.

- ☐ Which on-site soils the report calls suitable for structural fill, by boring and depth
- ☐ On-site soils the report calls unsuitable, or suitable only for non-structural fill
Unsuitable cut becomes export plus import. That swing is often the largest change in an earthwork price.
- ☐ Native soil that must be segregated or placed only in certain zones: deep fill, landscape, or away from the building
- ☐ Import specification: gradation, plasticity index, expansion index, maximum size, and fines limits
A tight spec can rule out the cheapest local pit. Get a supplier quote against the exact spec.

- ☐ Import approval: sample submittal, test results, and lead time before delivery
- ☐ Non-expansive or select fill required under footings, slabs, and pavements
- ☐ Aggregate base and Type II specification: gradation, R-value or CBR minimum, and crushed content
- ☐ Recycled materials: whether crushed concrete or asphalt millings are allowed for base or fill
- ☐ Cut material that needs processing (screening, crushing, blending) before reuse, and how much
Plants and crushers add equipment and labor beyond mass excavation. The report may say 'screen oversize' with no quantity.
- ☐ Blending native soil with import to meet plasticity or expansion limits: ratio and mixing method

11

EXPANSIVE AND COLLAPSIBLE SOILS

Both problems turn into over-ex, special fill, or moisture control. Find which one the report calls out, and where.

- ☐ Expansion index or swell classification by boring and depth
- ☐ Recommended treatment under slabs: over-ex and replace, moisture conditioning, lime treatment, or a non-expansive fill cap
Each has a different cost. Moisture conditioning takes time and water. Lime needs spreaders, mixers, and curing.
- ☐ Depth and lateral extent of non-expansive fill below slabs, footings, and pavements
- ☐ Keeping subgrade moist until concrete, with retesting just before placement
Retests before the pour can mean rewetting and rerolling subgrade that was already approved.
- ☐ Treatment at flatwork, sidewalks, curb, and pavement, or whether only the building is treated
- ☐ Whether expansive native soil may be used as trench or wall backfill near structures
- ☐ Collapse potential by boring and depth, and the load and wetting condition tested
- ☐ Collapsible soil treatment: over-ex and recompact, pre-wetting, deep compaction, or grouting
Pre-wetting needs water, time, and monitoring. Deep compaction and grouting are specialty subs, not part of the earthwork price.
- ☐ Depth of collapsible soil compared to the planned cut
- ☐ Pre-wetting or ponding requirements: water source, duration, runoff control, and testing after wetting

- ☐ Soft or compressible soils (soft clay, peat, loose silt): preloading, wick drains, removal, or accepted settlement

- ☐ Lime or cement treatment where soluble sulfate is high

High soluble sulfate in clay can cause heave after lime or cement treatment. Check the lab results before you price treatment.

12

EXCAVATION CHARACTERISTICS

Hard digging is a production hit on every cubic yard below the hard layer. Find it, size it, and name it in the bid.

- ☐ Rock, bedrock, cemented soil, or caliche by depth, thickness, and extent from the logs
- ☐ Rippability statement: rippable, rippable with difficulty, or needs hammering or blasting
'Rippable with difficulty' still means slow production and heavy wear. Price the production, not the soil name.
- ☐ Seismic refraction or other geophysical velocities, and the dozer class the interpretation assumes
Velocity charts are keyed to certain dozer and ripper models. Compare them to the fleet you will run.
- ☐ Equipment the report expects: ripper dozer, large excavator, hydraulic hammer, trencher, or rock saw
- ☐ Unit price for rock or hard material, or a clear definition in the specs
With no unit price, rock is a risk you carry. Define it by method, such as material that cannot be excavated by a named class of machine.
- ☐ How the specs and report define rock, who decides, and how it is measured
- ☐ Blasting and hammering: allowed, prohibited, or restricted by permit, noise, vibration limits, or adjacent structures
If blasting is prohibited, the alternatives are hammering or chemical expansion, both slower and costlier.
- ☐ Cobbles and boulders: percentage, maximum size, and what must be crushed, hauled, or placed
- ☐ Rock or cemented trench bottoms: over-dig below pipe, bedding, and removal of oversize
- ☐ Trench production in hard material, priced per LF, with trench box moves and tooth wear
- ☐ Continuity of caliche or cemented layers: lenses and nodules vs a continuous layer
- ☐ Variation in top-of-rock or hard-layer depth between borings: the shallowest and deepest values

13

GROUNDWATER AND DEWATERING

Water changes every other number: digging, hauling, compaction, trench safety, and schedule.

- ☐ Depth to groundwater when the borings were drilled, with the date
Compare it to your deepest cut, footing, pipe invert, and basin bottom. Water inside the dig zone is a dewatering item.
- ☐ Seasonal high groundwater estimate, and what it was based on
A dry-season exploration can understate the water you will meet in wet months. Check the exploration date.
- ☐ Perched water, seepage zones, or springs noted in the logs or narrative
Perched water over clay can appear at shallow depth only after rain. It can hit trenches and basins that look dry in the logs.
- ☐ Groundwater elevation compared to plan elevations of the deepest work
- ☐ Dewatering recommendations in the report: sumps, well points, deep wells, or none
- ☐ Who holds dewatering: the report, the specs, and the plan notes
Reports often say 'contractor to provide dewatering'. Check the specs for a design requirement, permits, and a pay item.
- ☐ Required drawdown: how far below the excavation water must be held, and any engineer or design requirement
- ☐ Pumping: flow, duration, fuel or power, standby, and monitoring
- ☐ Discharge: where water can go, permits, testing, turbidity limits, and treatment
- ☐ Effect of groundwater on compaction, subgrade stability, and sidewall stability
Wet subgrade can need stabilization, chemical treatment, or a rock bridge lift. Wet sidewalls change slopes.
- ☐ Drying time for wet native soil, and room to spread and aerate it
- ☐ Separation to seasonal high water for basins and infiltration systems, and excavation near it
- ☐ Water in utility trenches: bedding change to washed rock with fabric, trench stabilization, and pumping
- ☐ Temporary dewatering vs permanent subdrains, and where the subdrains discharge

14

SLOPES, BENCHING AND SHORING

The report gives recommendations. The excavation and its safety stay with you.

- ☐ Soil type (OSHA A, B, or C) stated in the report, and which layers it applies to
The report's classification is a recommendation. The competent person on site makes the field call.
- ☐ Recommended temporary slope ratios by soil and depth, and maximum depths allowed
- ☐ Permanent cut slope limits: height, ratio, benches, and facing
- ☐ Room to slope: distance from the cut to property lines, streets, and existing utilities
Sloping needs space. A cut that cannot lay back to the property line needs shoring or a different method.
- ☐ Excavation near existing structures and footings: setback, surcharge, and underpinning
- ☐ Shoring type recommended: trench box, sheet piling, soldier piles and lagging, soil nails, tiebacks, or bracing
Who designs, who builds, and who pays. Deep shoring is a specialty item, not an earthwork unit price.
- ☐ Lateral earth pressures given for shoring design (active, at-rest, and surcharge)
- ☐ Vibration limits for adjacent structures and utilities, and monitoring requirements
- ☐ Movement monitoring: survey points, inclinometers, crack gauges, and pre-construction surveys of neighbors
- ☐ Maximum excavation depth for each area, and the protective system needed at each depth
- ☐ Sidewall caving in sands and gravels: sheeting, benching, or dewatering ahead of the cut
- ☐ Spoil placement: space on site, or haul out and back

OSHA maximum slopes (horizontal : vertical):
Type A 3/4 : 1, Type B 1 : 1, Type C 1-1/2 : 1.

Stable rock may be cut vertical. A protective system is required at 5 ft and deeper unless in stable rock.

A registered engineer designs the system when deeper than 20 ft. Spoil and equipment stay at least 2 ft from the edge.

Canada and some states run their own regulations. Check local rules.

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FOUNDATIONS, PADS AND RETAINING WALLS

Foundation recommendations set the depth and width of the earthwork around every footing and wall.

- ☐ Foundation type and allowable bearing pressure: spread footings, mat, or deep foundations
- ☐ Minimum footing depth below finished grade or below subgrade, and frost depth where it applies
- ☐ Structural fill pad under footings: thickness below the bottom of footing and lateral extent beyond the footing edge
Pad thickness runs from the bottom of footing, not the slab. Lateral extent runs from the footing edge, not the building line.
- ☐ Ground improvement for settlement limits: deep compaction, stone columns, aggregate piers, or over-ex
- ☐ Footing excavation: width, sidewall slopes, and geotech observation of each footing bottom
- ☐ Footing bottom cleanup: loose, wet, or softened soil removed before concrete
- ☐ Slab-on-grade support: base thickness, capillary break, and subgrade preparation under slabs
Base thickness under slabs is often in the report and not on the plans.
- ☐ Deep foundations (piers, piles, shafts): spoil, casing, and who handles disposal
Spoils and slurry are often forgotten in the earthwork price.
- ☐ Elevator pits, deep footings, and below-grade walls: depth compared to borings and groundwater
- ☐ Backfill around footings, stem walls, and basement walls: material, lift thickness, and compaction near the structure
- ☐ Retaining wall type and bearing recommendation for the wall footing: cantilever, gravity, segmental, or MSE
- ☐ Wall excavation: wall LF plus the cutback slope behind the wall, set by soil type or the report
Cutback behind the wall is added volume. Quantify the slope the soil allows, not a vertical cut.
- ☐ Wall backfill: free-draining material gradation, fabric wrap, and lift thickness near the wall
- ☐ Wall drainage: perforated pipe, outlet location, weep holes, and gravel zone width and depth
- ☐ Leveling pad under walls: crushed rock thickness, width, and compaction
- ☐ MSE reinforced fill: gradation, plasticity, pH, and sulfate limits, and compaction by zone
On-site soil often does not qualify. Price import and testing.

- ☐ Compaction equipment limits near the wall face and in the reinforced zone

Pad thickness is measured from the **BOTTOM** of the footing.

Lateral extent is measured from the **FOOTING EDGE** unless the report says building line. Run the pad, the footing zones, and the wall zones as separate quantities.

16 UTILITY TRENCHES

Trenches have their own rules in the report. They are often different from pad and paving rules.

- ☐ Trench backfill material and compaction by zone: bedding, pipe zone, initial backfill, and final backfill
Utility owner standards and the report may differ. Price the stricter one until the RFI is answered.
- ☐ Bedding thickness and material, and who sets it: the report, the plans, or the utility owner standard
- ☐ Whether native soil may be used for bedding or backfill, and the maximum particle size in the pipe zone
- ☐ Soft or unstable trench bottoms: over-dig and stabilize with stone, geotextile, or flowable fill, to the depth in the report
- ☐ Groundwater in trenches: washed rock bedding with fabric, dewatering, trench plugs, or cutoffs
Rock bedding can carry water along the trench. Check for plugs or cutoffs the report requires.
- ☐ Soil corrosivity for pipe and fittings: resistivity, pH, chlorides, sulfates, and what the report recommends
Coatings, wrap, or alternate pipe change the pipe price. Flag it to whoever prices the pipe.
- ☐ Thrust restraint or soil bearing values for thrust blocks
- ☐ Trench width and payment limits: pay width and over-dig allowances in the specs
Extra width for slopes or shoring is usually not paid. Price the width the soil type forces.
- ☐ Trench depth compared to depth explored, especially at sewer invert, storm drain outfalls, and structures
- ☐ Backfill compaction method and limits: mechanical only, jetting allowed or prohibited, or flowable fill
- ☐ Excess spoil from pipe, bedding, and rock displacement, hauled off per ton
- ☐ Manholes, vaults, and structures: excavation size, base rock, and compaction around them

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PAVEMENT SECTIONS AND FLATWORK

Read the pavement recommendations against the plan details for every traffic area.

- ☐ Pavement design basis: traffic index or ESALs, design life, and the subgrade value used
- ☐ Asphalt and aggregate base thickness for each traffic area: light duty, heavy duty, truck lanes, and fire lanes
The report section can differ from the plan detail. Quantify each area.
- ☐ Design subgrade value (R-value or CBR) compared to the lab results and the soil you will actually expose
- ☐ Subgrade preparation under paving: scarify depth, moisture conditioning, and compaction percent
Often a different spec than the pad areas, and deeper than the pavement section itself.
- ☐ Lime or cement treated subgrade: depth, rate, mixing, curing, and testing
A separate work item with its own equipment and curing time. Price area and depth, then the material.
- ☐ Base material: gradation, R-value or CBR, crushed content, and compaction percent with test method
- ☐ Rigid pavement: slab thickness, base thickness, and subgrade prep at truck pads, trash enclosures, and drive-thru lanes
- ☐ Aggregate under curb and gutter, sidewalk, and flatwork: width, depth, and whether the plan detail or the report governs
- ☐ Pavement in fill vs cut areas: differing prep or over-ex
- ☐ Fine grading tolerance for subgrade and base in the specs
- ☐ Pavement over existing fill: removal, or acceptance with proof roll and testing

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STORMWATER AND INFILTRATION

Basins and infiltration systems carry their own excavation limits, test data, and compaction rules.

- ☐ Infiltration test method, depth, locations, and reported rate
Check whether the rate is a raw measurement or a design rate with a safety factor.
- ☐ Test locations and depths compared to the basin or chamber footprint and bottom elevation
- ☐ Basin excavation: depth, side slopes, and bottom treatment
Infiltration bottoms are often not to be compacted by equipment. Check equipment limits on the bottom.

- ☐ Basin bottom elevation compared to groundwater, bedrock, and cemented layers
- ☐ Dry wells and underground chambers: depth, spacing, gravel envelope, fabric, and excavation limits
- ☐ Setbacks from foundations, walls, and property lines for infiltration systems
- ☐ Basin embankments and berms: material, compaction, and keyway
Embankments may be held to a tighter compaction and test frequency than pads.
- ☐ Basin liner or low-permeability fill: compacted clay, geomembrane, or soil liner requirements
- ☐ Protection of infiltration surfaces from sediment, and restoration before acceptance
- ☐ Engineered or bioretention soil layers: mix, depth, and testing

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SEISMIC, FROST AND CORROSIVITY FLAGS

Items that mostly belong to other trades or the designer, but change your scope or your exclusions.

- ☐ Liquefaction potential: layers, depths, and the mitigation the report recommends
Mitigation ranges from over-ex and replacement to deep compaction. The latter is rarely in an earthwork unit price.
- ☐ Fault setback zones or surface rupture hazards on or near the site
- ☐ Landslide, slope instability, or rockfall hazard noted for the site or the cut slopes
- ☐ Land subsidence or earth fissures noted in the area
Some basins have both. Mitigation may restrict grading or call for special fill.
- ☐ Frost depth and frost-susceptible soils: footing depth, trench depth, and non-frost-susceptible fill under slabs
- ☐ Seasonal frost or permafrost: thaw settlement, winter work limits, and frozen fill rules
- ☐ Soluble sulfate exposure class for concrete (ACI 318 S0 to S3) and the mix limits it triggers
Flag it for the concrete estimator. Sulfate can drive cement type and water-cement limits.
- ☐ Chlorides, pH, and resistivity: corrosion recommendations for steel, rebar, and buried metal
- ☐ Imported topsoil or planting soil: specification, testing, and quantity if landscaping is in scope

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TESTING AND INSPECTION

Testing sets your pace and your standby. Know the frequency, the cost owner, and the hold points.

- ☐ Testing frequency: per lift, per area in SF, per CY, or per day
Heavy testing slows production. Know tests per lift before you plan crews and equipment.
- ☐ Who pays for testing, inspection, and retests after failures: owner, GC, or contractor
- ☐ Geotech observation required for stripping, over-ex bottoms, subgrade, fill placement, footing bottoms, and trench backfill
- ☐ Special inspection requirements tied to the geotech and the building code
- ☐ Proof roll: who witnesses it, the equipment, and the acceptance criteria
- ☐ Density test method: nuclear gauge (ASTM D6938), sand cone, or drive cylinder, and the Proctor it is compared to
- ☐ Turnaround time on test results, and access to each lift before the next lift goes on
Waiting for results holds the fill. Ask whether results come back the same day.
- ☐ Required notice for testing and observation
- ☐ Import testing: gradation, plasticity, and expansion before and during delivery, and who pays
- ☐ Final grading certification, as-graded report, or pad certificate required at the end
A certificate needed before the foundation permit puts a failed pad on the critical path.
- ☐ Moisture check of subgrade before slab or base placement, repeated after weather or delay

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SEQUENCING, WEATHER AND MOISTURE

Moisture and weather decide whether the fill can be placed when the schedule says it will.

- ☐ Wet season or winter limits on grading in the report
- ☐ Water for moisture conditioning and dust control: quantity, source, and meter or hydrant cost
Dry soils and big fills take a lot of water. Estimate it from the moisture gap and the CY.
- ☐ Weather protection and rework of approved subgrade after storms
Who pays for rework after approval is usually not stated. Say so in the clarifications.

- ☐ Required sequence: over-ex before footings, fill before utilities, subgrade approval before base, and waiting periods
- ☐ Cold weather placement: no fill on frozen subgrade, no frozen fill, and protection of finished work
- ☐ Schedule holds waiting on geotech approvals, and whether delay is compensable
- ☐ Lead times for specialty work: lime spreading, deep compaction, dewatering systems, and shoring

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ARID WEST AND INTERMOUNTAIN CHECKS

Conditions common across desert and intermountain sites. These are things to look for in the report and logs, not facts about every site.

- ☐ Caliche or cemented carbonate layers: depth, thickness, hardness, and whether the report says it rips or needs a hammer
- ☐ Collapsible alluvial soils: loose, dry, low-density silty sands or silts, with collapse test data
Loose dry alluvium can drop when wetted. Check dry density and collapse test data on the lab sheets.
- ☐ Expansive clays and claystones, especially in old lake deposits and weathered bedrock
- ☐ Gypsum or soluble salts in the lab sulfate results or described in the logs
- ☐ Shallow bedrock or cemented layers on fans, hillsides, and canyon edges
- ☐ High groundwater near valley floors, rivers, lakes, canals, or irrigated land, even on a dry-looking site
Valley floors can sit close to the water table. Compare the boring water depths to your lowest cut.
- ☐ Cobbles and boulders in alluvial fan and mountain-front deposits: oversize and screening
- ☐ Washes and flood channels: scour, loose sand, and flood-prone grading
- ☐ Windblown sand or loose silt: trafficability, dust control, and trench stability
- ☐ Soils that are hard when dry and unworkable when wet: dust control in summer and wet-weather limits in storms

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PRICING CONVERSIONS

State the units and the factors behind every quantity so the number can be defended.

- ☐ Cut and fill CY computed to subgrade, not just existing grade to finished grade
Add the base, slab, and paving thickness below finished grade. That is the true excavation to subgrade.
- ☐ Strip, over-ex, and unsuitable removal carried as separate lines from mass cut
- ☐ Aggregate and Type II tons converted at 1.85 tons per CY, after computing CY
Our default. Ask the supplier for the actual conversion on the material you order.
- ☐ Bank, loose, and compacted yardage labeled on every quantity
Trucks and stockpiles carry loose yards, fill is measured compacted, and cut is measured in the bank.
- ☐ Shrink or swell factor for cut and fill balance
Use the report's value if stated. If none is given, state the factor you used. Do not carry zero without saying so.
- ☐ Import tons bought loose vs compacted CY needed in place
Convert compacted CY to tons with the project factor, then add any waste and overbuild you carry.
- ☐ Export priced per ton, not per truck load
Get the scale ticket weights and the disposal fee by the ton.
- ☐ Moist vs dry unit weight for export tonnage when lab data are available
Tonnage follows moist weight. Using dry weight understates tons and cost.
- ☐ Haul distance and dump fee for unsuitable material, and the acceptance rules of the disposal site
- ☐ Over-ex quantities taken off the actual outline with the lateral offset, not a bounding rectangle
- ☐ Wall and trench volumes calculated by slope where the soil type requires sloping, not with vertical sides
- ☐ Lime or cement treatment: area, depth, application rate per the report, and tons
- ☐ Balance check by zone and in total, in one consistent yardage: cut + import = fill + export
A balance that only works by ignoring shrink or unsuitable soil is wrong.

$$CY = SF \times \text{depth (ft)} / 27$$

Aggregate tons = CY x 1.85 tons per CY (our default for Type II, after computing CY)

Moist unit weight = dry unit weight x (1 + moisture content as a decimal)

Bank (BCY), loose (LCY), and compacted (CCY) are three different yardages. Label every quantity.

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PROPOSAL EXCLUSIONS AND CLARIFICATIONS

What the geotech gives you becomes your assumptions. Write them into the proposal.

- ☐ Rock and hard material: excluded, or priced as a unit price defined by method
Name the equipment that defines it, such as material that cannot be ripped by a stated class of dozer.
- ☐ Unsuitable soils beyond the depths and quantities in the report: excluded or unit priced
- ☐ Over-excavation beyond the report depth and lateral limits: excluded or unit priced
- ☐ Dewatering and groundwater control: excluded, or limited to a stated allowance
State the assumption: no groundwater above subgrade or trench bottoms to the depth explored.
- ☐ Contaminated, hazardous, or environmentally impacted soils and their disposal: excluded
- ☐ Buried obstructions, old foundations, tanks, and utilities not shown in the documents: excluded or unit priced
- ☐ Boulders and oversize beyond what the logs show: excluded or unit priced
- ☐ Lime or cement treatment, geogrid, geotextile, and ground improvement: included or excluded by name
- ☐ Testing, inspection, and retests: by others, with any exception for failures caused by your work
Retest cost for your own failures may fall on you. Say so, or exclude it.
- ☐ Import and export priced on the tons stated, with adjustments by unit price
- ☐ Standby for geotech observation and approval beyond a stated response time
- ☐ The report firm, number, date, and revisions the bid is based on, written into the proposal
- ☐ Every open RFI conflict: the assumption you priced

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