SMP-30

RECLAMATION PLAN AMENDMENT

JULY | 2012

Lead Agency
Alameda County, Planning Department

Operator
Oliver de Silva, Inc.

BENCHMARK
RESOURCES

SMP-30
RECLAMATION PLAN AMENDMENT

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Lead Agency
Alameda County, Planning Department
224 West Winton Avenue, Hayward, California 94544

Operator
Oliver de Silva, Inc.
11555 Dublin Boulevard, Dublin, California 94568

Preparer
Benchmark Resources
4990 Hillsdale Circle, Suite 400, El Dorado Hills, California 95762

STATEMENT OF RECLAMATION RESPONSIBILITY *(PRC § 2772(c)(10))*

I certify that the information in this Reclamation Plan is correct, to the best of my knowledge, and that all of the owners of possessory interest in the property in question have been notified of the planned operation and potential uses of the land after reclamation. I also certify that I am authorized on behalf of Oliver de Silva, Inc. to accept responsibility for reclaiming the mined lands described and submitted herein, with any modification required by Alameda County and agreed to as Conditions of Approval.

Signed this __ day of July, 2012.

_____

Jim Summers
for Oliver de Silva, Inc.

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PLAN SUMMARY

Operation Name:	SMP-30 Quarry
California Mine Identification Number:	91-01-0007
Alameda Co. Surface Mining Permit No.:	SMP-30
Reclamation Plan No.:	SMP-30 Resolution No. 92-32
Mine Operator:	Oliver de Silva, Inc.
Street Address or P.O. Box:	11555 Dublin Boulevard
City, State, Zip Code:	Dublin, CA 94568
Telephone Number:	925-828-7999
Contact:	Jim Summers
Owner of Property Name:	San Francisco Public Utilities Commission (SFPUC)
Owner of Mineral Rights:	SFPUC
Street Address or P.O. Box:	1155 Market Street, 11th Floor
City, State, Zip Code:	San Francisco, CA 94103
Telephone Number:	415-554-3155
Lead Agency:	Alameda County, Planning Department
Street Address or P.O. Box:	224 West Winton Avenue,
City, State, Zip Code:	Hayward, California 94544
Telephone Number:	510-670-5400
Contact:	Jim Gilford
Location:	6527 Calaveras Road, approximately 1 mile south of Interstate 680 in Sunol Valley, Alameda County, CA
Assessor's Parcel Numbers:	096-0080-008 and 096-0375-011-05
Section, Township, and Range:	Section 36 of Township 24 South, Range 1 West of the U.S. Geological Service (USGS) topographic map (Mount Diablo Baseline and Meridian)
Latitude and Longitude (at center of site):	Latitude: N 37°34'06.76" Longitude: W 121°52'07.18"
Directions to the Site:	Take I-680 to Calaveras Road heading south for approximately 4 miles to the quarry entrance.
Total Parcel Size(s):	± 381 acres
Total Area to Be Mined:	± 275 acres
Total Area to Be Reclaimed:	± 275 acres

Quantity and Type of Materials to Be Mined:	Maximum production of 3.0 million tons (marketed) per year of construction aggregates
Start-Up Date and Termination Date:	Anticipated Start-up: Ongoing since the 1960s Anticipated Termination: December 31, 2042 (or 30 years after date of approval)
Potential Land Use after Reclamation:	Water storage and watershed

RECLAMATION PLAN AMENDMENT

1.0 PURPOSE AND OBJECTIVES

1.1 Purpose

The reclamation plan for the SMP-30 Quarry (quarry) has been prepared in accordance with the requirements of the California Surface Mining and Reclamation Act (SMARA), or the statute, found in California Public Resources Code (PRC) Section 2710 et seq., Title 14 of the California Code of Regulations (CCR) Section 3500 et seq. and Alameda County's (County's) (the lead agency) implementing ordinance.

The reclamation plan is prepared in a format that addresses each plan requirement found in the statute (primarily PRC § 2772) and the standards that must be met in reclamation implementation, as specified in CCR § 3503 and CCR § 3700 through CCR § 3713. Applicable PRC and CCR references are provided throughout this document.

This plan is intended to serve several purposes:

1. Provide the required contents for a reclamation plan as specified in PRC § 2772 and CCR § 3502;
2. Provide a clear list of intended actions necessary to comply with Annual Minimum Practices (CCR § 3503) and Reclamation Standards (CCR § 3700 et seq.) where required as part of operations or final reclamation;
3. Serve as a reference manual for the mine operator to guide site development consistent with the approved plan, and to assist in regulatory compliance for operational activities, through items (2) and (3) above, and appended regulation and informational materials;
4. Serve as a compliance document for the Lead Agency in monitoring ongoing compliance with the reclamation plan, as approved; and
5. This plan is intended to supersede provisions and requirements of all previous plans and amendments such that it is comprehensive and supersedes those documents.

SMARA's reclamation plan requirements are found primarily in PRC § 2772 and CCR § 3502. Minimum standards to be followed (CCR § 3503) and reclamation performance standards (CCR § 3700 et seq.), as applicable, are incorporated within the plan.

1.2 Reclamation Objectives

The reclamation plan includes actions designed to meet physical objectives for reclamation treatment of disturbed lands and that are readily adaptable to the second use:

- Provide for long-term stability of slopes;
- Prevent wind and water erosion by stabilizing the soil surface through proper grading and drainage;
- Implement resoiling and revegetation that is designed to establish self-sustaining vegetation cover over the portions of the site returned to watershed and where such cover would be compatible with the second use as water storage.

2.0 BACKGROUND AND OVERVIEW

In 2006, the SFPUC put out a request for proposals to prospective quarry operators to lease and operate the quarry at SMP-30, and to potentially expand quarry operations at the site through a revision of SMP-30 permit. The SFPUC entered into an exclusive negotiating agreement with ODS, and ODS has now been issued a lease from the City and County of San Francisco for the Sunol Valley Aggregate Quarry Site. The lease includes the currently active quarry site of 323 acres permitted under Alameda County SMP-30, and an additional approximately 58-acre area along the southeast boundary of the current SMP-30 site. As the new leaseholder/operator of the Sunol Valley Aggregate Quarry, ODS applied to Alameda County for a Revised SMP-30 mining permit and has been approved.

SMP-30 has been approved for an aggregate mining and production facility. Although resources are available, and the site could continue to operate under its existing permit through 2021, the adjacent parcel has become available, providing opportunity to increase reserves and expand the basin to be used for water storage.

Continued operations would be typical of sand and gravel extraction operation, with conventional mining practices common to the industry. Soils and overburden would be removed and the underlying aggregate reserves excavated and transported to the rock processing plant site for washing and sizing. Mining will be scheduled in phases that increase both the depth and width of the basin. Materials would be sold as washed aggregates, or used to make products, including asphaltic concrete and Portland cement concrete at on-site plants. A planned maximum production of 3.0 million tons (marketed) per year is anticipated. Site access would be from Calaveras Road north to Interstate 680 (I-680). Mining activities would occur incrementally and take about 3 decades to complete. Overburden and accumulated unmarketable silts and clays (wash

fines) would be used as backfill in completed designated excavation areas and then covered with salvaged topsoil (where surface grade is met); these surfaces would be returned to watershed. However, most of the property would be converted to water storage basins to increase the capacity of such facilities operated by SFPUC.

3.0 SITE DESCRIPTION AND ENVIRONMENTAL SETTING

3.1 Site Location and Size

The approximately 381-acre quarry site is located at 6527 Calaveras Road, approximately 1 mile south of I-680 (Scotts Corner) in the Sunol Valley portion of unincorporated southern Alameda County. The site is bounded by San Antonio Creek to the north, Alameda Creek to the west and Calaveras Road frontage to the east. Figure 1, "Regional Location," Figure 2, "Site Location," and Figure 3, "Parcel Map," show the site's regional and local location and a parcel map showing the boundaries of the lease agreement.

3.2 Existing Land Use

Approximately 323 acres (nearly 85 percent) of the site currently operates under an Alameda County Surface Mining Permit (SMP-30), which was approved by Alameda County in 1992. This permit authorizes the mining of sand and gravel within 323 acres of the quarry site and up to 140 feet deep. Quarrying operations are permitted through June 1, 2021, or upon completion of reclamation, whichever occurs first. The remainder of the site consists of a 58-acre expansion area at the southeast portion of the site.

Figure 4, "Site Conditions," Sheet 1, "Site Conditions," and Sheet 2, "Site Conditions Cross-Sections," show 2010 conditions on-site.

3.3 Site Conditions

The quarry site is relatively flat, with elevations ranging from 260 feet above mean sea level (amsl) at the western site limits, to 280 feet at the eastern limit. The property is a flat terrace of former river deposits. No structures are located on the site, other than an administration building/scalehouse for the mining operation. Other improvements include the operating infrastructure for the aggregate operation, including a network of roadways.

The site is currently undergoing active sand and gravel extraction, the plant is actively sorting and producing various aggregate materials and the material product is being hauled to various locations throughout the Bay Area pursuant to the current Alameda

County SMP-30 permit. Current operations, activities, and permit conditions are illustrated in Figure 4 and Sheets 1 and 2.

3.3.1 Vegetation (CCR § 3705(a))

The site is highly altered from decades of mining activities, and other land uses, with little or no native habitat associations present. Those that do occur are temporary, establishing themselves within the mining basins where surface disturbances are discontinuous. Vegetation includes ruderal, non-native annual grassland, willow scrub, mulefat scrub, freshwater marsh, and seasonal wetland. Active operations areas are largely devoid of vegetation and the few plants present are weedy, invasive species.

Ruderal areas include both disturbed and undisturbed surfaces of former non-native grasslands that have been heavily invaded by a variety of including yellow star thistle (*Centaurea solstitialis*), Italian thistle (*Carduus pycnocephalus*), milk thistle (*Silybum* spp.), wild radish (*Raphanus sativus*), wild mustards (*Brassica nigra* and *Hirschfeldia incanca)*, jubata grass (*Cortaderia jubata*), and poison hemlock (*Conium maculatum*). Vegetative growth in the ruderal areas is tall and dense. Scattered to dense stands of native coyote brush, an early successional native scrub species common to the area are included as part of the ruderal community. These stands are considered ruderal because they occur in areas that have been disturbed in the past, they occur in association with other ruderal species, and support none of the plant associates typical of undisturbed scrub communities.

Remaining non-native grassland within the quarry area is limited to its eastern edge and is characterized by low species diversity and a dense, generally tall cover of non-native annual grasses, including soft chess (*Bromus hordeaceus*), wild oat (*Avena fatua*), foxtail barley (*Hordeum murinum* var. *leporinum*), and Italian ryegrass (*Lolium multiflorum*). Common herbaceous associates include cutleaf geranium (*Geranium dissectum*), red-stem filaree (*Erodium cicutarium*), scarlet pimpernel (*Anagallis arvensis*), common vetch (*Vicia sativa*), and English plantain (*Plantago lanceolata*).

Areas of willow scrub and/or mulefat scrub occur at and above the high water line of the active mining areas. Willows (*Salix lasiolepis, S. laevigata,* and *S. exigua*) occur in patches throughout the active fines storage basin. There are patches of dense dead cattails, interspersed with stands of coyote brush, mulefat (*Baccharis salicifolius*), and scattered elderberry (*Sambucus nigra* ssp. *canadensis*).

Freshwater marsh occurs in a 5- to 10-foot fringe bordering active settling ponds. Broadleaf cattail (*Typha latifolia*) and tule (*Schoenoplectus acutus* var. *occidentalis*) grow in

the deeper portions of the marsh, while mulefat dominates above the waterline. Seasonal wetlands are found within the active mining basin where seeps occur.

Native and non-native trees, such as a variety of pines (*Pinus* sp.), sycamore (*Platanus racemosa*), and coast live oak and valley oak (*Quercus agrifolia* and *Q. lobata*) are widely scattered throughout the area and oaks, including non-native cork oak (*Q. suber*) line Calaveras Road along the eastern boundary of SMP-30.

3.3.2 Wildlife *(CCR § 3703 (b))*

The diversity and numbers of wildlife at SMP-30 are low when compared with typical habitats of the same type in the general vicinity due to the high degree of past and ongoing disturbance.

Developed areas provide low quality habitat for wildlife due to the general lack of vegetation, poor soil quality and regular disturbance. However, these areas may serve as a movement corridor for common wildlife species such as wild pig (*Sus scrofa*), mule deer (*Odocoileus hemionus*), and coyote (*Canis latrans*) and provide limited nesting habitat for common birds tolerant of human activity, such as house finch (*Carpodacus mexicanus*), mourning dove (*Zenaida macroura*), and killdeer (*Charadrius vociferus*).

Ruderal communities do not support the diversity of wildlife characteristic of healthy natural communities, but many native wildlife species have adapted to exploit ruderal areas: red-tailed hawk (*Buteo jamaicensis*), American crow (*Corvus brachyrhynchos*), white-crowned sparrow (*Zonotrichia leucophrys*), American goldfinch (*Spinus [Carduelis] tristis*), and raccoon (*Procyon lotor*) are examples. Non-native animal species that are commonly associated with ruderal communities and developed areas include European starling (*Sturnus vulgaris*) rock dove (*Columba livia*), Virginia opossum (*Didelphis virginiana*), and Norway rat (*Rattus norvegicus*).

Western yellow-bellied racer (*Coluber constrictor mormon*), western rattlesnake (*Crotalus viridis helleri*), and western fence lizard (*Sceloporus occidentalis*) have been observed in quarry area grasslands and ruderal habitat. Pacific gopher snake (*Pituophis catenifer catenifer*) is also commonly found in grasslands where prey is abundant. Birds and mammals associated with local grasslands may visit the property, including short-eared owl (*Asio flammeus*), golden eagle (*Aquila chrysaetos*), white-tailed kite (*Elanus leucurus*), and red-tailed hawk, American badger (*Taxidea taxus*), common house mouse (*Mus musculus*), California vole (*Microtus californicus*), Botta's pocket gopher (*Thomomys bottae*), California ground squirrel (*Spermophilus beecheyi*), cottontail (*Sylvilagus auduboni*), and black-tailed jackrabbit (*Lepus californicus*).

Shrub-dominated vegetation, often interspersed with other habitats, typically provides foraging and nesting habitat for species that are attracted to edges of plant communities. Bird species that use the shrub canopy for catching insects and nesting include bushtit (*Psaltriparus minimus*) and California towhee (*Pipilo crissalis*). Raptors, including Cooper's hawk (*Accipiter cooperii*) and sharp-shinned hawk (*Accipiter striatus*), may forage over such areas and prey on some of these small birds as well as on small mammals and reptiles such as California vole and western fence lizard (*Sceloporus occidentalis*). Mammals, including striped skunk (*Mephitis mephitis*), and gray fox (*Urocyon cinereoargenteus*) may use this habitat for cover and foraging. Other reptiles and small mammals that are expected to occur within shrub habitats include northern alligator lizard (*Elgaria coerulea*), Pacific gopher snake (*Pituophis catanifer*), and deer mouse (*Peromyscus maniculatus*).

Freshwater marsh may provide habitat for red-winged blackbird (*Agelaius phoeniceus*), which were observed in the cattails surrounding the settling pond. Seasonal wetlands in the area are known to support Sierran tree frog (*Pseudacris sierra*), which were heard on-site during the reconnaissance survey, and western toad (*Bufo boreas*).

3.3.3 Sensitive Habitats and Special-Status Species Wildlife *(CCR § 3703 (a))*

Special-status plants are considered highly unlikely to occur on the site based on a lack of suitable habitat, the habitat requirements of most of the species that occur in the region, and the results of rare plant surveys conducted. No special-status plants were found on the site and general habitat conditions are such that none are expected to occur.

A number of special-status wildlife species documented in the vicinity include California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), western pond turtle (*Actinemys marmorata*), tricolored blackbird (*Agelaius tricolor*), golden eagle (*Aquila chrysaetos*). The latest available version of CNDDB has no records of these species occurring on-site and, with the exception of tricolored blackbird, which were observed foraging on-site, none have been observed during reconnaissance surveys and habitat assessments conducted for Revised SMP-30. A recent preconstruction survey for WSIP pipeline installation along Calaveras Road sighted a California Tiger Salamander near the site access road (Outside of existing and planned surface disturbances).

4.0 MINE PLAN

Sheet 3, "Excavation and Fill Plan," Sheet 4, "Excavation and Fill Plan Cross-Sections," Figure 5, "Excavation and Fill Plan," and Figure 6, "Excavation and Fill Cross-Sections,"

illustrate the excavation plan before and after fill. Slope "lay-back" will occur along the eastern rim. Excavation to the depth of the floor would occur such that conversion to the reclaimed use in a "phased" manner is not possible, especially given that the post-mining use is water storage, which cannot occur in a basin being actively mined. During excavation, waste fines will be stacked and compacted to a specified height to backfill a portion of the South Basin. When enough backfill area is developed, the backfill surface would become the location of the long-term plant site. Sheet 1 (existing plant site), Sheet 3 (long-term plant site), Figure 7, "Expanded Plant Site," and Figure 8, "Long-Term Plant Site," delineate the processing plant sites (the existing and long-term sites), including the location of specific facilities and storage of materials.

When the maximum floor depth of the basins are reached, and the working areas are no longer needed for mining or processing operations, the basins can be made available for water management. Also see Appendix A, "Geotechnical Report," for discussion of slope stability, factors of safety, and setbacks.

The landscaped berm on eastern side of the site boundary (see Figure 5) is almost entirely outside of the area of the mining and reclamation lease. The berm is associated with a separate project and will be constructed from excavation spoils from an SFPUC pipeline construction (as addressed in the New Irvington Tunnel Final EIR (December 2009)). The operator will be required to landscape the berm for aesthetic screening of active mining and as a condition of approval. However, this off-site feature is not part of reclamation planning for second use of the site under SMARA.

4.1 Quantity and Type of Materials *(PRC § 2772(c)(2))*

The existing lease area is approximately 323 acres, while the revised lease area is approximately 381 acres (a difference of 58 acres). The potential surface disturbance area (the mined area) will be approximately 275 acres, and the same surface area will be reclaimed. Approximately 60 million tons of alluvial and gravel will be mined from the site.

4.2 Initiation and Termination Dates *(PRC § 2772(c)(3) and PRC § 2772(c)(6))*

SMP-30 is currently operating. Reasonably foreseeable operations are presently planned until approximately 30 years from approval date of Revised SMP-30 (estimated at December 31, 2042).

4.3 Maximum Depth *(PRC § 2772(c)(4))*

Aggregate deposits to be mined occur to depths exceeding the planned mining; excavations are restricted by slope requirements and surrounding physical features,

including streambeds and utility easements. Mining will result in lowering of the surface elevation to create deep basins. The mining depths of each basin vary; the deepest basin is planned at -130 feet above mean sea level (400 feet below ground surface).

4.4 Mine Plan and Mined Topography *(PRC § 2772(c)(6))*

This revised plan encompasses a mining area eventually reaching approximately 381 acres. Processing operations, including settling ponds, stockpiling, scale, and an administration office are sited on a 265-acre area. Active mining will occur contiguous to previously disturbed areas.

Actual extraction may not reach the extent of the depth and width shown, depending on geologic conditions and economics; however, this would not affect the conditions or success of reclamation use as water storage basins.

4.5 Effect of Reclamation on Future Mining *(PRC § 2772(c)(9))*

SMP-30 site mineral resources would be effectively exhausted by completion of mining under this plan. Backfill of process fines and use of the site for water management purposes would therefore have little or no effect on mineral resources available for future mining.

4.6 Unused Materials Disposal *(CCR § 3503(d))*

The geologic materials at the site are typical of fluvial deposits, varying from cobbles to silts and clays, reflecting varying deposition within the former stream channel. Deposits of fines (silts and clays) intermixed with aggregates are sorted by washing, and accumulate in wash ponds. These "waste fines" will be placed on mined surfaces within the South Basin, creating a bench for establishment of the Phase II Processing Area. East Basin backfill will be allowed to dry, decompacted by scarifying, and revegetated.

5.0 RECLAMATION AND PHASING PLANS

The anticipated second land use is water storage. The maximum volume of water storage is approximately 27,000 acre-feet (approximately 179 acres). The creation of basins and the presence of surface water courses and water transmission lines are planned to support this use. Note that the operation is conducted in such a manner that the site could be converted to its second use for water storage at virtually any period of operations; continued operations serve to increase the basin's water capacity. Sheet 5, "Reclamation Plan," and Figure 9, "Reclamation Plan," show the reclaimed topography

if all potentially available aggregates are extracted. Sheet 6, "Reclamation Plan Cross-Sections," and Figure 10, "Reclamation Plan Cross-Sections," show the series of basins. The basins would be excavated with side slopes of 2:1 (2 horizontal to 1 vertical) and would have a maximum depth of approximately -130 feet above mean sea level (400 feet below ground surface).

Plans for phasing and reclamation of the quarry are further detailed below.

5.1 Reclamation Objectives *(CCR § 3502(a))*

The anticipated second land use plan is water storage. The creation of basins and the presence of surface water courses and water transmission lines are planned to support this use.

5.2 Topographic Configuration and Surface Treatment *(PRC § 2772(b)(6) and CCR § 3502(3))*

Sheet 5 and Figure 9 show the reclaimed topography if all potentially available aggregates are extracted. Sheet 6 and Figure 10 show that the area would appear as a series of basins. Mined slopes would be excavated at the design angle of 2H:1V.

Surface treatment would be limited to revegetation over remaining surfaces at grade and the backfilled East Basin. Maintenance roadways accessing the site and around the perimeter of each basin would remain.

5.3 Geotechnical Requirements *(CCR § 3704(b))*

The mining area will be reclaimed as water storage basins, except for the East Basin, which is being backfilled with processed fines. This basin will continue to be backfilled, compacted to an acceptable density (80 percent compaction density) for watershed use, resoiled, and revegetated.

5.4 Cut and Fill Slope Stability *(CCR § 3704(f))*

Appendix A includes the geotechnical analysis for cut and fill slopes. Slope stability was analyzed during quarry operations and after reclamation. For quarry operations, the water level was assumed to be 20 to 40 feet deep at the top of the quarry, and the water levels after final reclamation to be 300 to 400 feet deep. The analyses indicated an FS greater than 1.5 in all cases and the pseudostatic FS was greater than 1.0, which are acceptable according to SP 117. The planned 2H:1V slopes are expected to be stable; however, an annual review of the stability of cut slopes will be implemented to determine whether exposed conditions indicate that the quarry slopes should be modified.

5.5 Hydrology and Water Quality *(CCR 2772(a) and 3503(a)(2))*

Water falling on disturbed surfaces is directed to water basins for sedimentation before discharge. The operation currently maintains a National Pollutant Discharge Elimination System (NPDES) General Permit from the San Francisco Bay Regional Water Quality Control Board (RWQCB) for discharge of process water, stormwater, and groundwater pumped from the existing mine basin into San Antonio Creek and Alameda Creek. As part of the permit the operator has maintained a best management practices (BMP) plan for the operation, which includes a program to monitor water discharge and site-specific BMPs to reduce the amount of, contaminates carried off-site. Data collected pursuant to the self-monitoring requirements of this NPDES permit demonstrate that the current operations do not violate any water quality standards or waste discharge requirements. Operation and reclamation of the quarry will not result in appreciable changes to the way stormwater and pumped groundwater are managed and discharged. However, changes will be made to the processing facilities, including the addition of a concrete ready-mix plant and an asphalt batch plant. These new processing facilities will be required to comply with existing regulations for containment of process materials, BMPs to control stormwater, and additional practices for the containment of concrete wash-out fluids.

The San Francisco Bay RWQCB has also determined that aggregate mining operations along Alameda Creek upstream of Sunol are not contributing to any water-quality degradation within Alameda Creek. Therefore, the existing and continued monitoring protocol ensures that operations do not degrade water quality.

Existing permits allow discharge from the North Basin and no requirement exists for the site requiring that the North Basin retain all of the process water, stormwater, and groundwater pumped from the active mining pit. During periods of high rainfall or elevated dewatering requirements, excess water is discharged at the northwest corner of the North Basin into San Antonio Creek or Alameda Creek. This discharge is permitted pursuant to the NPDES General Permit No. R2-2008-0011, as issued by the San Francisco Bay RWQCB, and serves as an emergency outflow in the event that the North Basin cannot hold the volume of dewatering and runoff flows.

5.6 Protection of On-Site and Downstream Beneficial Uses of Water *(CCR § 3706(a))*, Groundwater Quality, Recharge Potential, and Storage Capacity *(CCR § 3706(b) and CCR § 3706(c))*

Potential sedimentation and handling of potential contaminants will be conducted to protect on-site and downstream beneficial uses of water. Fuel or other chemicals present on the mine site will be handled and stored using appropriate containment to

prevent accidental spillage into open water bodies. County-approved spill prevention and emergency response plans outlining guidelines and procedures for handling hazardous materials will be implemented.

Mining activities will not involve placing fill or dredged material in waters of the United States. Control of drainage, siltation, and erosion will be effective in protecting downstream beneficial uses of surface water in accordance with the Porter-Cologne Water Quality Control Act, Water Code § 13000 et seq., and the federal Clean Water Act, 33 USC § 1251 et seq.

5.7 Siltation and Erosion Control *(CCR § 3503(b)(2), CCR § 3710(a), PRC § 2772(c)(8)(a)) and CCR § 3706)*

Surface waters are collected in or sheet flow is directed to the quarry, where they are used for the on-site consumptive process, including dust control and washing of aggregates. Potential off-site sedimentation is therefore prevented, because the site is configured for interior basin drainage in conformance with § 3503(b). The revegetated surfaces surrounding the basins, the basins themselves, which drain internally, and the basins' abundant capacity to permanently store sediments from surface runoff will minimize the potential for waters leaving the site at reclamation to contain silt.

Erosion control facilities would be constructed as required. Temporary measures such as silt fences, berms, hay bales or similar means to deter erosion may be employed as necessary at locations of identified concern, depending on the particular configuration of the grading work and roadways.

5.8 Revegetation *(CCR § 3503(g))* and Test Plots *(CCR § 3705(b))*

Species to be used in revegetation will be commercial erosion species for controlling and have a high rate of success on surfaces created from process fines. Planting will occur during the fall and winter months. A locally supplied seed mix for controlling erosion with success guaranteed by the supplier will be used (see Section 3.10 below).

Test plots will be based on existing site conditions. The plots will be designed to include various treatments appropriate to the local climatic and precipitation regimes.

Four 10- by 10-foot plots will be established. Each treatment area will be staked at its corners and separated by a 3-foot buffer between other treatments. Specific treatments will include:

- **Treatment A:** Rip to 6 inches deep, disk, and add seed erosion control seed mixture directly on existing soil surface.

- **Treatment B:** Rip to 6 inches deep, disk, add seed erosion control seed mixture, and apply polyurethane-coated slow-release 22-7-11 (or equivalent) fertilizer.
- **Treatment C:** Rip to 6 inches deep, apply 6 inches of topsoil or screened fines, disk, broadcast seed erosion control seed mixture, and apply polyurethane-coated 22-7-11 (or equivalent) slow-release fertilizer.
- **Treatment D:** Rip to 6 to 12 inches deep, apply 6 to 12 inches of topsoil or screened fines, disk, and add seed erosion control seed mixtures.

Test plots will be monitored for at least 2 years after installation. Monitoring data will include a list of the species present, plant cover and composition estimates, and an evaluation of the effectiveness of the erosion control methods. A specialist with qualifications acceptable to the State Mining and Geology Board will conduct all monitoring and reporting requirements for the site.

Test plots will be monitored for at least 2 years after installation. Monitoring data will include a list of the species present, plant cover and composition estimates, and an evaluation of the effectiveness of the erosion control methods. A specialist with qualifications acceptable to the State Mining and Geology Board will conduct all monitoring and reporting requirements for the site.

5.9 Resoiling *(CCR 3503(f) and 3711(e))*

Stockpiles containing 19,000 cubic yards of topsoil was salvaged for reclamation of the East Basin. These stockpiles are sufficient to cover this 20-acre area to a depth of 6 inches.

5.10 Site Preparation, Species, and Planting Densities *(CCR § 3705(a)(c)(g)(h))*

Surfaces created by mining are planned to accommodate active subsequent land use as managed water basins. Compacted areas surrounding the basins will be scarified 12 inches deep to allow for seeding of revegetation to control erosion. No revegetation within the basins themselves will occur because revegetation would be contrary to the postreclamation use of water management by the SFPUC.

Species to be planted will consist of grasses that have proven success on disturbed soils and quickly generate grasses that will reseed annually for continued erosion control. Species may be modified for consistency with the *Sunol Valley Restoration Plan*. The seed mix is detailed in Table 1 below.

TABLE 1
SEED MIX

Species	Broadcast Seeding (pounds per acre)
SEED MIX 1	
Annual barley	90
Blando brome	12
Zorro annual fescue	9
California brome	12
Wildflower mix (no legumes, optional)	2–3
SEED MIX 2	
Wimmera 62 annual ryegrass	9
Berber orchardgrass	16
Blando brome	12
Zorro annual fescue	9
California poppy	1

Notes: Fertilizer is 16-20-0; rate is 500 pounds per acre

Planting may include use of mulch such as clean straw (4,000 pounds per acre) or wood fiber (1,500 pounds per acre). Mulch would be applied immediately after seed and fertilizer is applied. If Pure Live Seed falls below 80 percent, the seeding rates will be increased accordingly (found on seed labels).

Pure Live Seed = % germination x % purity

5.11 Revegetation Performance Criteria *(CCR § 3705(a)(m))*

Revegetation success will be monitored for a period of at least 2 years, or until success criteria are achieved. Monitoring will include comparing the quantified measures of vegetative cover, density, and species-richness of the reclaimed mined lands to similar parameters of naturally occurring vegetation in the nearby area. Monitoring data will include a list of the species present, plant cover and composition estimates, and an evaluation of erosion control effectiveness. Performance standards to be met before revegetation financial assurance is released shall include cover value of 80 percent, a confidence level of 80 percent, and a species diversity of two species. Remedial measures will be implemented if these standards are not achieved in any of the monitoring years. Examples of remedial actions include reseeding bare areas and/or increasing weeding sessions.

5.12 Weed Abatement *(CCR § 3705(k))*

SMARA regulations specify that "Noxious weeds shall be managed: (1) when they threaten the success of the proposed revegetation; (2) to prevent spreading to nearby

areas; and (3) to eliminate fire hazard (CCR § 3705(k)).” Conditions at SMP-30 relative to these requirements include:

1. Areas of planned revegetation are limited because water storage basins are the reclaimed use. Surfaces to be revegetated are the East Basin (after it is backfilled) and limited areas between water basins. Those surfaces are not planned to be revegeted for several decades. Active surfaces on the site include virtually all available areas surrounding the processing plant site; the occurrence of weeds is primarily temporary on the slopes within the basins because the basins will be filled with water.
2. Weeds that occur on the site are documented (see San Francisco Public Utilities Commission’s *Non-Indigenous Plant Species Inventory and Mapping of the Alameda Watershed*) as prevalent throughout the watershed and therefore do not occur as a result of ongoing mining operations. Eradication of weeds at SMP-30 is therefore unlikely.
3. The site is not heavily vegetated and is devoid of vegetation on its active surface areas; therefore, the site poses no increased threat to wildfire.

As a result, the focus of weed management efforts will be to prevent new species from becoming established and control existing weeds that may threaten future revegetation efforts.

5.12.1 Preventative Measures

The following actions will prevent new infestation of weeds and spread of existing weeds:

1. Inspect vehicles sent off-site to ensure that undercarriages and grill works are kept free of weed seed.
2. Undercarriages of vehicles or machinery potentially contaminated with noxious weed fruits and seeds will be washed before entering uninfested areas.
3. Erosion-control products (hay or straw), groundcover, or any other imported natural material used must be noxious-weed free and from a certified source.

5.12.2 Control Measures

The following actions will control the existing weed population to prevent weeds from interfering substantially with revegetation efforts:

1. Inspect aggregate pits and yards, staging and storage areas, and access roads to identify and document weed-free and weed-infested areas and establish a weed control list.
2. Schedule weed control efforts to prevent the noxious weeds identified from reaching the flowering or seed dispersal stage.
3. Prevent small noxious weed patch reproduction (vegetative spread and seed dispersal) while steadily replacing removed weeds with desired plants (naturally or through revegetation)

If necessary, only pesticides registered by the U.S. Environmental Protection Agency will be used and applied under appropriate permits and in accordance with manufacturer's label and Material Safety Data Sheets directions.

5.12.3 Weed Monitoring

Weed species will be prioritized and targeted consistent with the San Francisco Public Utilities Commission's *Non-Indigenous Plant Species Inventory and Mapping of the Alameda Watershed*. During mining operations, targeted weeds will be controlled to prevent infestation levels from increasing beyond existing levels. When revegetation efforts begin, weed occurrence should not be greater than their occurrence documented in the watershed.

5.13 Removal of Buildings, Structures, and Equipment *(CCR § 3709(b))*

Following completion of mining and reclamation activities, mobile equipment associated with mining and stationary structures at the processing plant, including the scale and administration building, will be removed.

5.14 Reclamation of Roads *(CCR § 3705(d))*

Roads used to access the site will remain after mining operations are complete.

5.15 Phasing of Areas for Concurrent Reclamation *(PRC § 2772(c)(6))*

Mining is planned as a continuous activity. The slope lay-back and deepening on the South Basin will proceed concurrent with completion of backfilling of the East Basin with process fines. Mining would then proceed northerly into the location of the Plant Site, when backfill placed into the South Basin accumulates sufficient for relocation of the plant to that surface (see Sheet 3).

SMP-30 mining areas are separated by a variety of easements containing water and other transmission lines. Previously completed basins serve to support the mining

operation. Long-term operations continue in the South Basin, which will be continuously enlarged until it reaches its design limits, at which point it can be converted to its second use as a water storage basin. Therefore, little concurrent reclamation is possible or necessary for this site. Regardless, the operation is conducted in such a manner that it could be converted to its second use for water storage at virtually any period of operations; continued operations serve to increase basin water capacity.

5.16 Closure of Surface Openings *(CCR § 3713)*

Drill holes or monitoring wells developed during the course of mining will be closed in accordance with state and local requirements, including Water Code § 13700 et seq. and § 13800 et seq., the applicable local ordinance adopted pursuant to Water Code § 13803, and the applicable California Department of Water Resources report issued pursuant to Water Code § 13800.

5.17 Public Safety *(CCR § 3502(b)(2))*

The operating quarry uses a series of berms and gated entry to prevent inadvertent entry trespass; the site is fenced and gated at the point of entry. The post-reclamation lake, which when filled to capacity, may be over 400 feet deep at the conclusion of operations, present a potential drowning hazard in the event of trespass by the public using the future hiking trail along Alameda Creek. When the final alignment of the trail is determined, the operator will install security fencing between the trail and SMP-30 facilities.

6.0 FINANCIAL ASSURANCE

This section addresses the primary reclamation tasks associated with the reclamation plan that forms the basis of financial assurance calculations for the site. Financial assurance estimates are required to be revised annually (CCR § 3804(c)) and will therefore change over the course of the planned operating life (i.e., 30 years after date of approval).

6.1 Purpose

SMARA requires surface mining operators to obtain lead agency approved financial assurance for reclamation of mined lands so the public does not bear the cost of reclaiming abandoned operations. In the event of financial incapability by the operator, financial assurance funds are used by the lead agency (or the Department of Conservation) to reclaim the mined site.

6.2 Basis for Costs to Complete Reclamation Actions

Financial assurance estimates for the initiation of the operation are based on (1) an analysis of the physical activities necessary to implement the approved reclamation plan; (2) the lead agency's (or third party contract) unit costs for each of these activities; (3) the number of units of each of these activities; and (4) an amount to cover contingency costs, (not to exceed 10 percent of the above calculated reclamation cost) and actual lead agency administrative costs.

The following tasks will need to be completed to implement this reclamation plan:

- Equipment and facilities removal: Remove stationary and mobile equipment.
- Grading: Mine slopes are generally cut to their reclamation angle of 2:1. Only general site grading and resoiling of the East Basin (when filled) would be needed.
- Revegetation:
  - Manage East Basin topsoil stockpiles against erosion,
  - Distribute topsoil, and
  - Seed and plant.
- Monitoring and maintenance:
  - Planting and seeding inspection,
  - Maintenance and weeding,
  - Data collection and reporting, and
  - Replanting contingency.

6.3 Annual Adjustments

Financial assurances are reviewed annually by Alameda County. They are adjusted, if necessary, to reflect changes in the estimated cost of reclamation activities, lands reclaimed the previous year.

6.4 Financial Assurance Mechanism

Financial assurance will be secured by the Operator in a form acceptable under State Mining and Geology Board Guidelines.

FIGURES

10 Miles 0 20 Miles

NORTH

Scale: 1" = 20 Miles

BENCHMARK RESOURCES

Regional Location

REVISED SMP-30

Figure 1

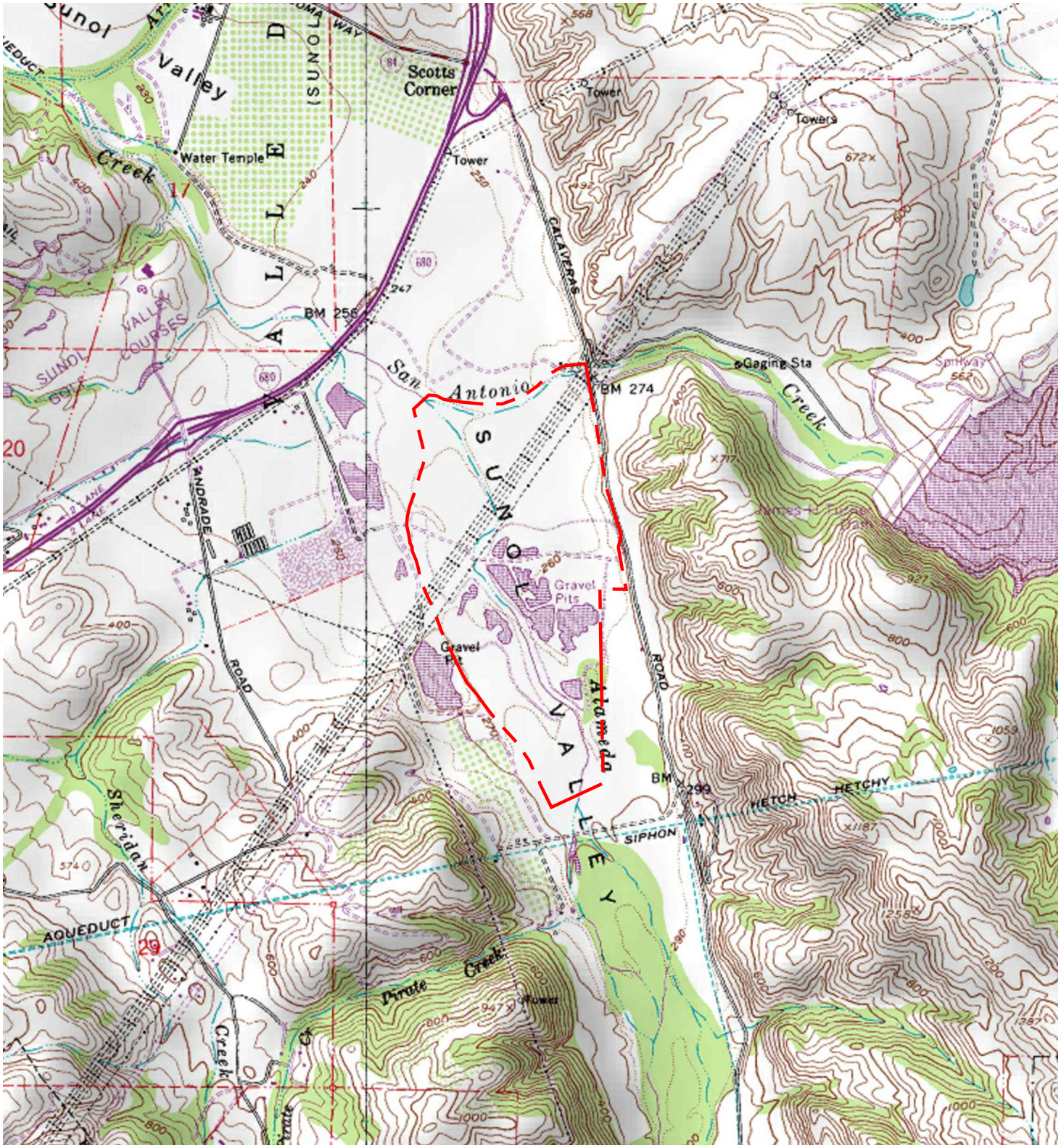


IMAGE SOURCE: DeLorme USGS TopoQuads (2002)

LEGEND

Existing SMP-30 Lease Boundary

1,000' 0 2,000'

NORTH

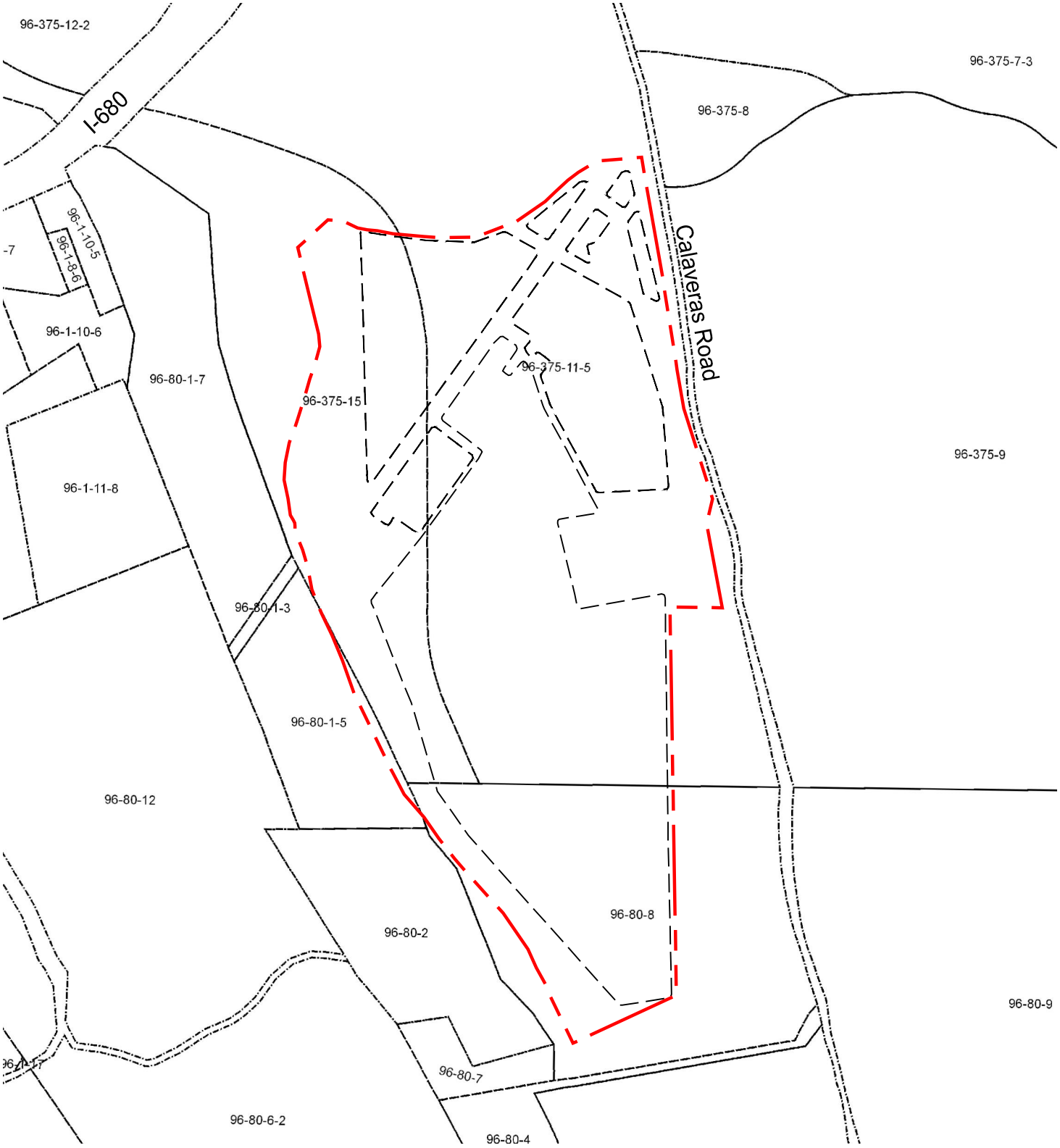
Scale: 1" = 2,000 Feet

BENCHMARK RESOURCES

Site Location

REVISED SMP-30

Figure 2



DATA SOURCE: acgov.org/gis

LEGEND

Existing Lease Boundary

Permitted Excavation Areas

500' 0 1,000'

NORTH

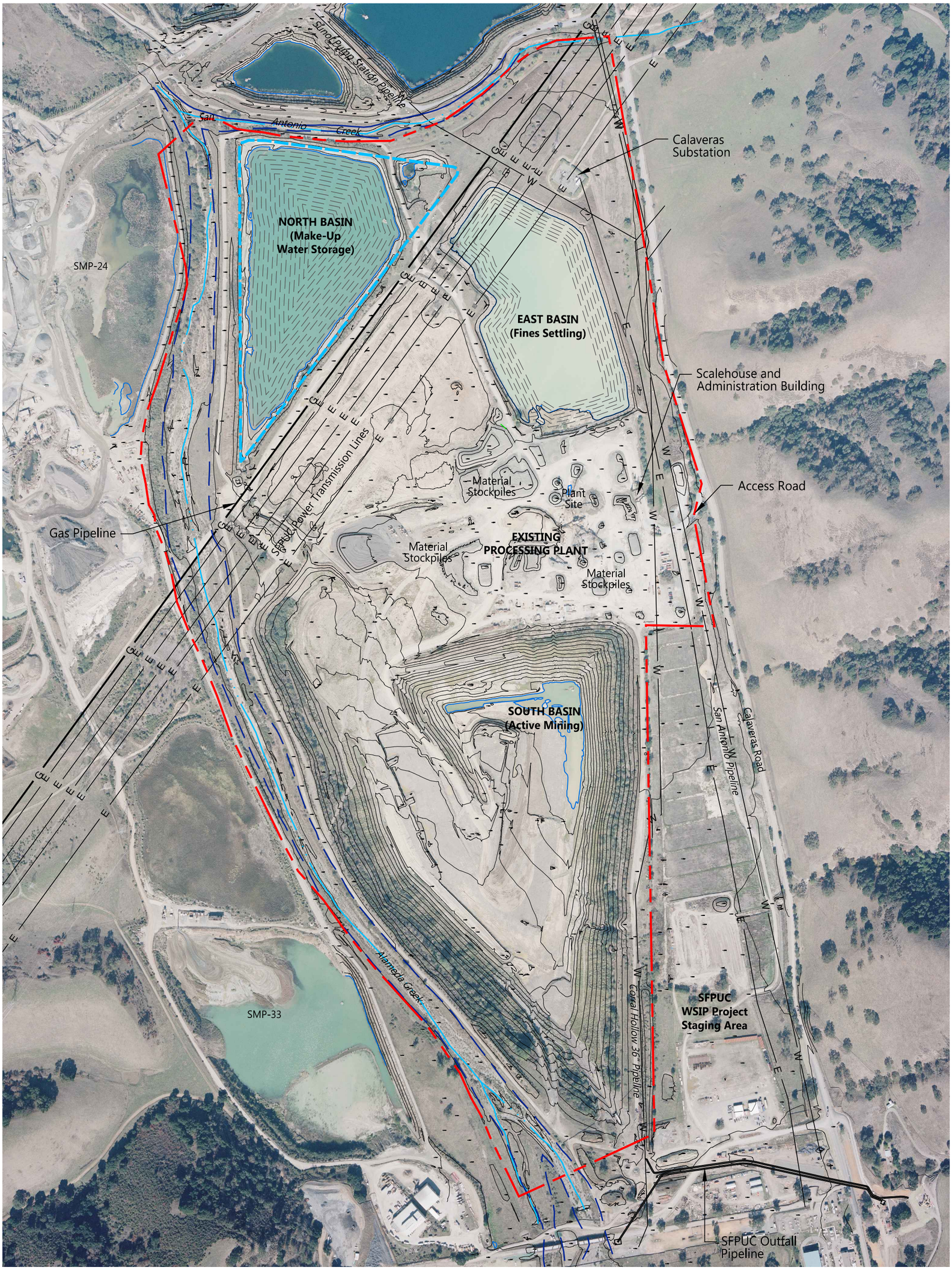
Scale: 1" = 1,000 Feet

BENCHMARK RESOURCES

Parcel Map

REVISED SMP-30

Figure 3



TOPOGRAPHY SOURCE: Terra Tech, Inc. (October 2011), contour interval is 10'.
All elevations shown are above mean sea level (amsl)
AERIAL PHOTOGRAPH SOURCE: RJA Pacific Aerials (October 2011)

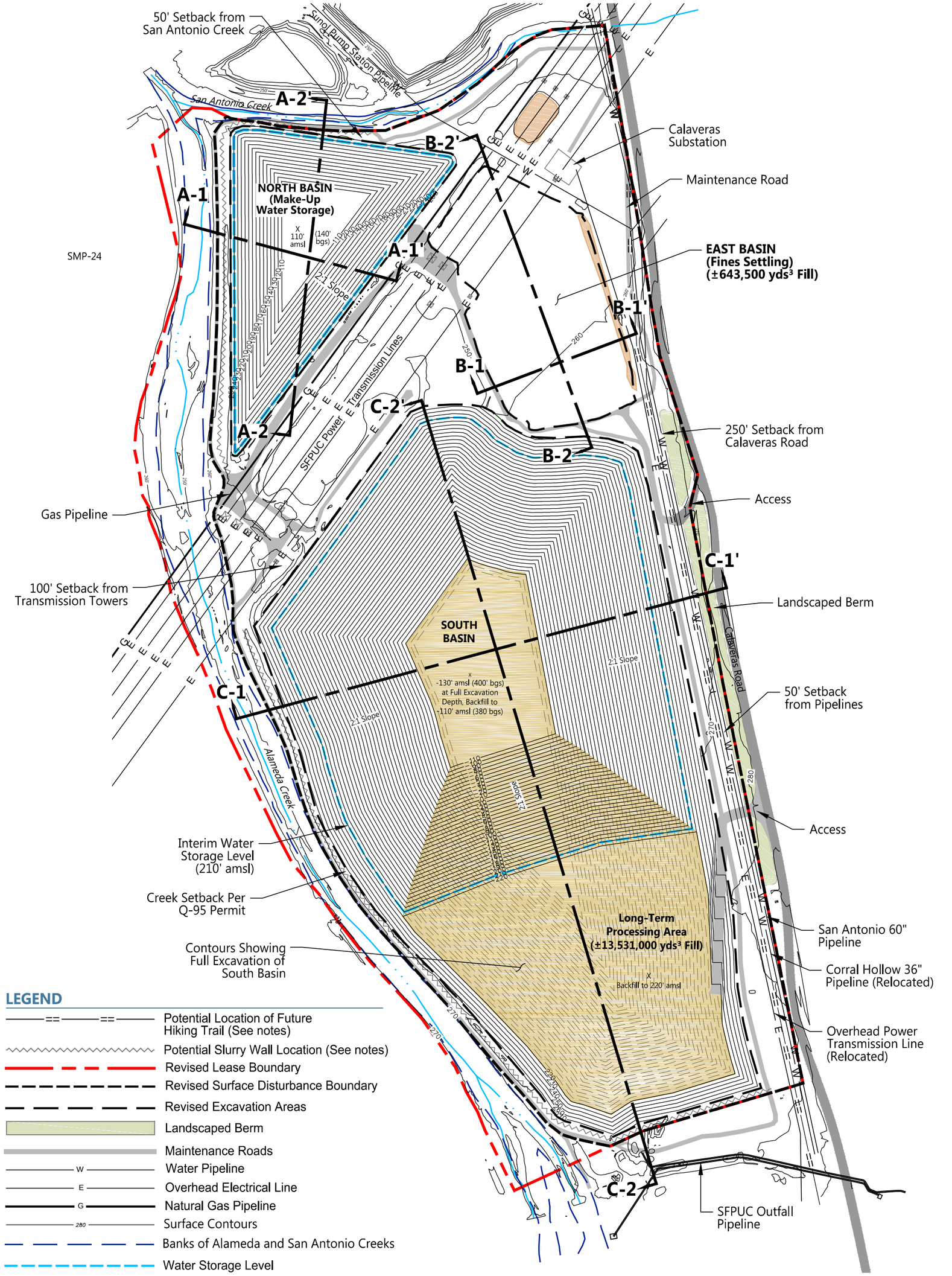
LEGEND

- Existing Lease Boundary
- W — Water PipeLine
- E — Overhead Electrical Lines
- G — Natural Gas Pipeline
- 280 — Surface Contours
- Assumed Existing Contours (Beneath Water Surface)
- Banks of Alameda and San Antonio Creeks

250' 0 500'
NORTH
Scale: 1" = 500 Feet

BENCHMARK® RESOURCES

Site Conditions
REVISED SMP-30
Figure 4



TOPOGRAPHY SOURCE: Terra Tech, Inc. (October 2011), contour interval is 10'

LEGEND

- Potential Location of Future Hiking Trail (See notes)
- Potential Slurry Wall Location (See notes)
- Revised Lease Boundary
- Revised Surface Disturbance Boundary
- Revised Excavation Areas
- Landscaped Berm
- Maintenance Roads
- W — Water Pipeline
- E — Overhead Electrical Line
- G — Natural Gas Pipeline
- 280 — Surface Contours
- Banks of Alameda and San Antonio Creeks
- Water Storage Level
- C-2 C-2' — Cross-Section Location
- Backfill

250' 0 500'

Scale: 1" = 500 Feet

NORTH

BENCHMARK RESOURCES

NOTES:

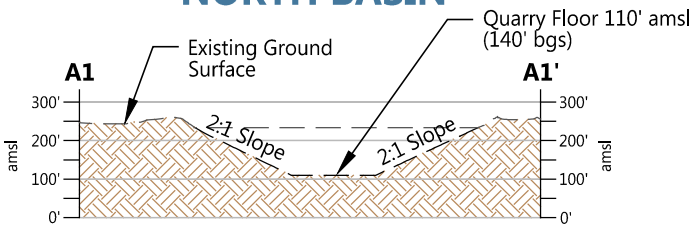
- Future trail in accordance with Sunol Valley Resource Management element of the SFPUC Watershed Management Plan. Alignment is conceptual only.
- Slurry cutoff walls shown in accordance with SFPUC requirements. Locations are conceptual; analysis and investigations are ongoing for design and implementation.
- All elevations shown are above mean sea level (amsl).
- See Figure 6 for Mine Plan Cross-Sections.

Excavation and Fill Plan

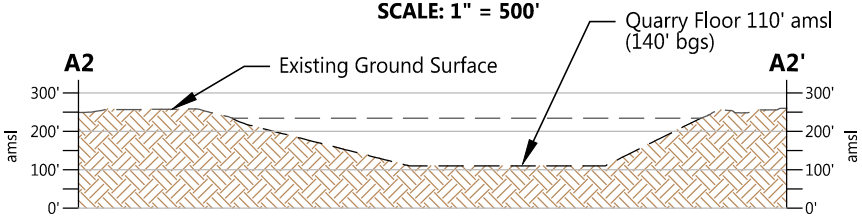
REVISED SMP-30

Figure 5

NORTH BASIN

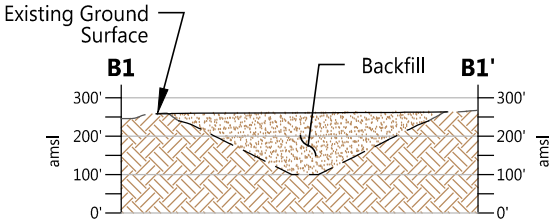


CROSS-SECTION A1-A1'
SCALE: 1" = 500'

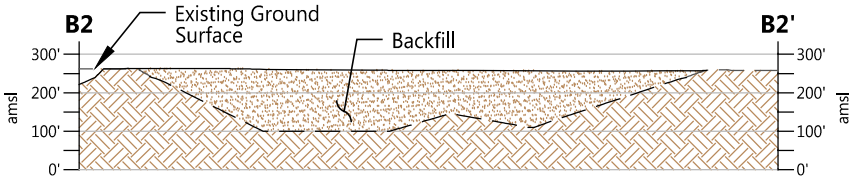


CROSS-SECTION A2-A2'
SCALE: 1" = 500'

EAST BASIN

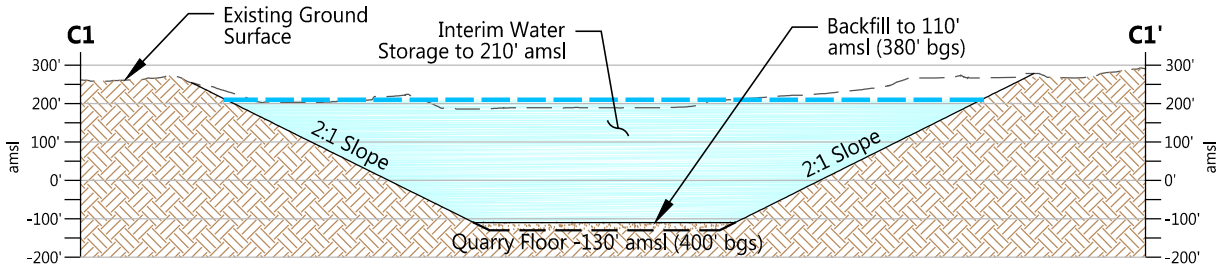


CROSS-SECTION B1-B1'
SCALE: 1" = 500'

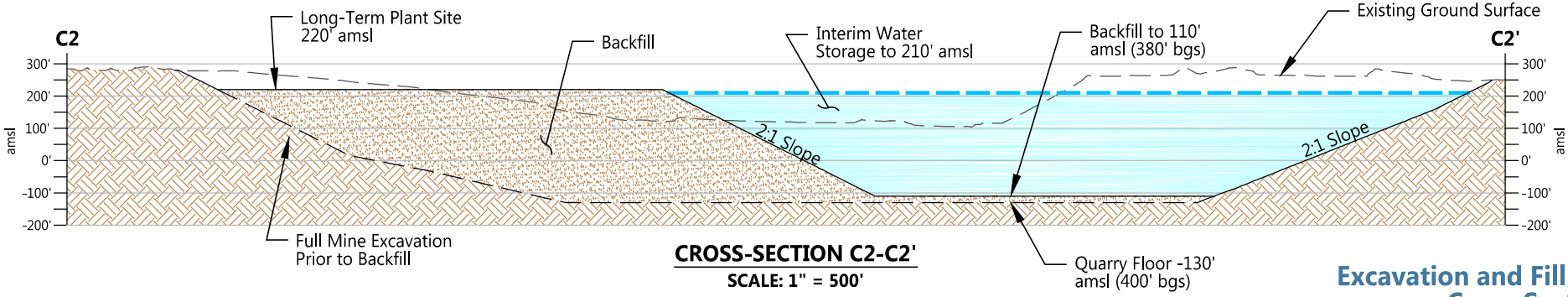


CROSS-SECTION B2-B2'
SCALE: 1" = 500'

SOUTH BASIN



CROSS-SECTION C1-C1'
SCALE: 1" = 500'



CROSS-SECTION C2-C2'
SCALE: 1" = 500'

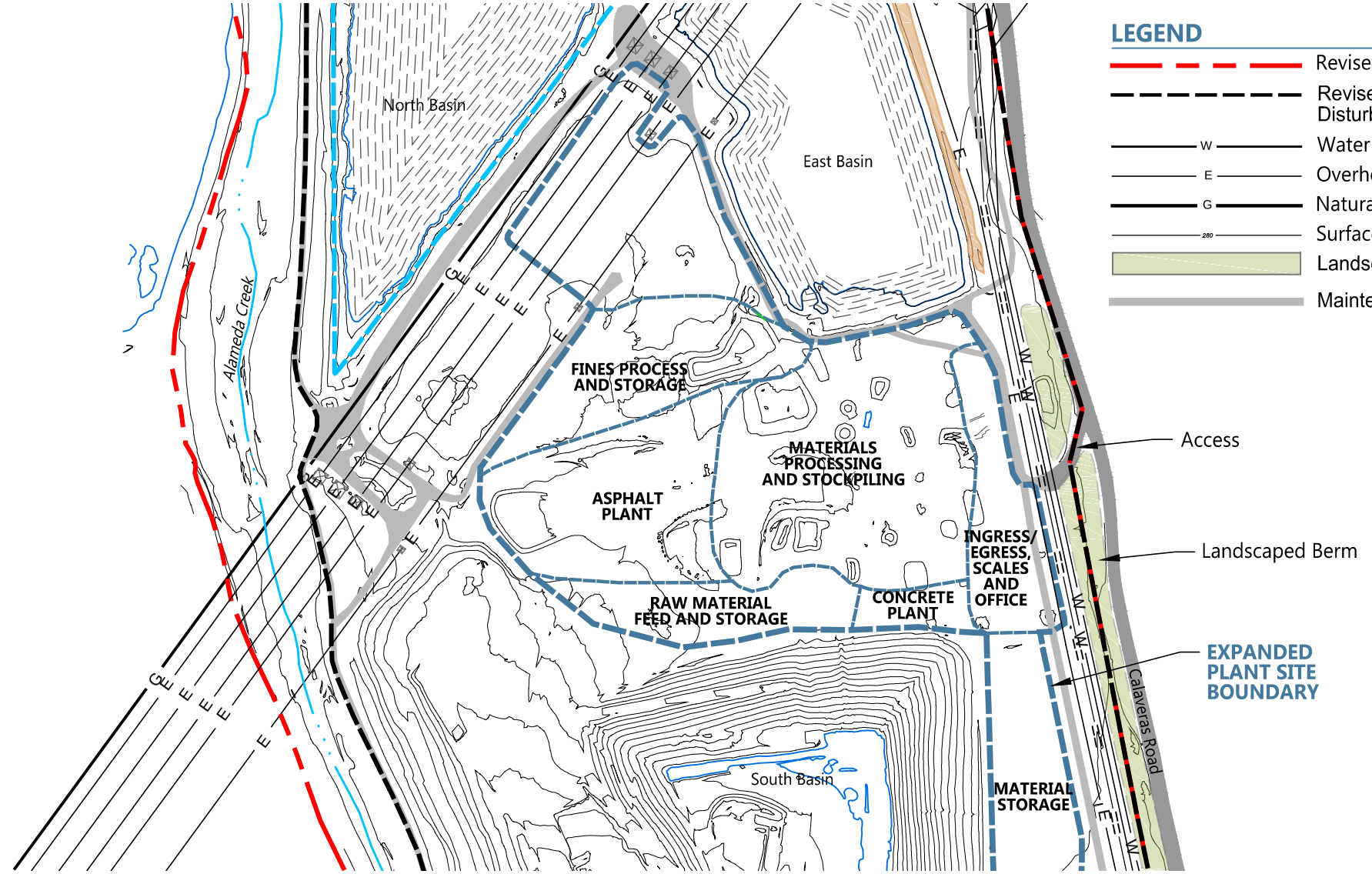
NOTES:
- Once backfill for the Long-Term Plant Site is established and full excavation of the South Basin is complete, the pit will be used for water storage. Upon completion of material processing, the plant site will be removed and the water storage level will be raised (see Reclamation Plan, Figure 9).
- See Figure 5 for Mine Plan cross-section locations.

BENCHMARK RESOURCES

Excavation and Fill Plan Cross-Sections

REVISED SMP-30

Figure 6



DATA SOURCE: CALKINS Engineers and Contractors (07-2010)

250' 0 500'

NORTH

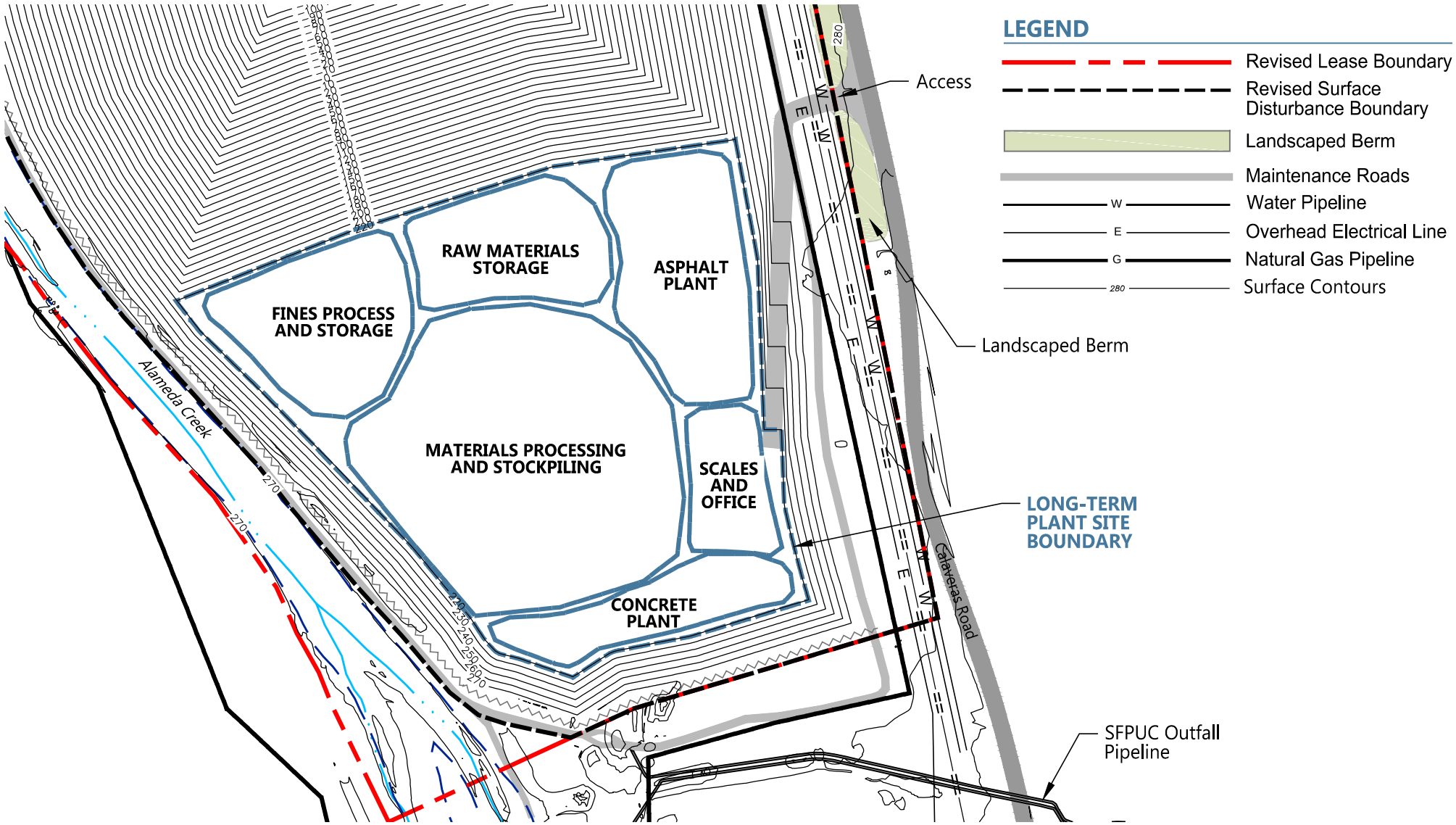
Scale: 1" = 500 Feet

BENCHMARK RESOURCES

Expanded Plant Site

REVISED SMP-30

Figure 7



DATA SOURCE: CALKINS Engineers and Contractors (07-2010)

250' 0 500'

NORTH

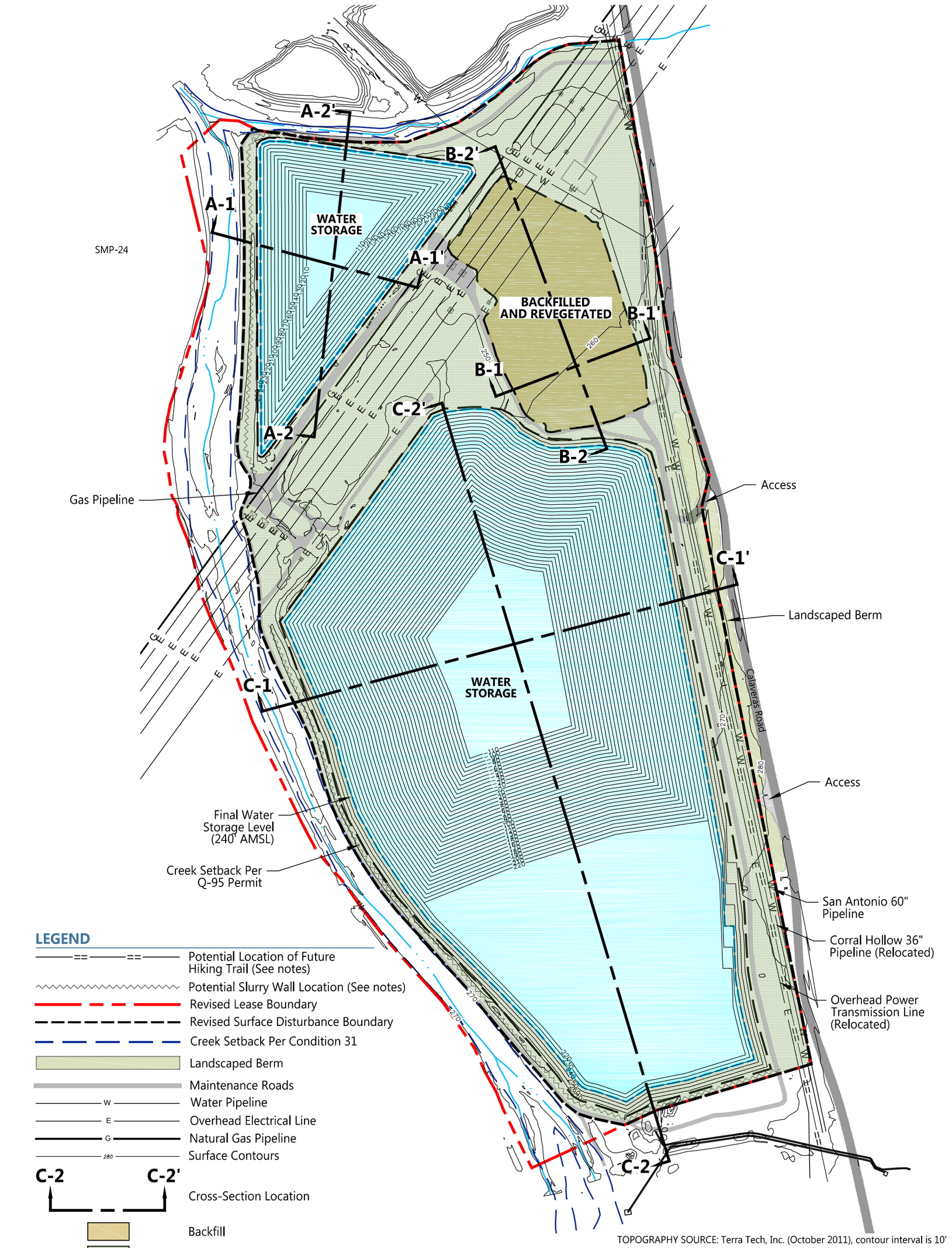
Scale: 1" = 500 Feet

BENCHMARK RESOURCES

Long-Term Plant Site

REVISED SMP-30

Figure 8



TOPOGRAPHY SOURCE: Terra Tech, Inc. (October 2011), contour interval is 10'

500' 0 1,000'

Scale: 1" = 1,000 Feet

NORTH

BENCHMARK RESOURCES

NOTES:

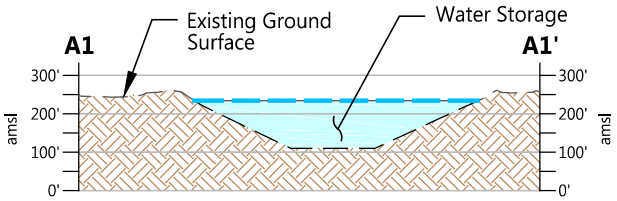
- Future trail in accordance with Sunol Valley Resource Management element of the SFPUC Watershed Management Plan. Alignment is conceptual only.
- Slurry cutoff walls shown in accordance with SFPUC requirements. Locations are conceptual; analysis and investigations are ongoing for design and implementation.
- All elevations shown are above mean seal level (amsl).
- See Figure 10 for Reclamation Plan Cross-Sections.

Reclamation Plan

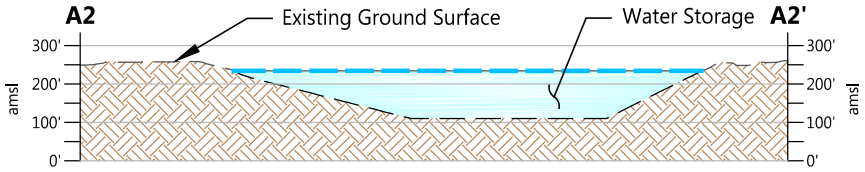
REVISED SMP-30

Figure 9

NORTH BASIN

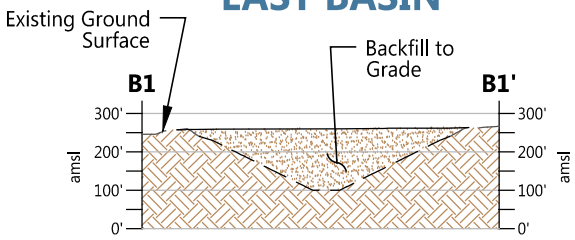


CROSS-SECTION A1-A1'
SCALE: 1" = 500'

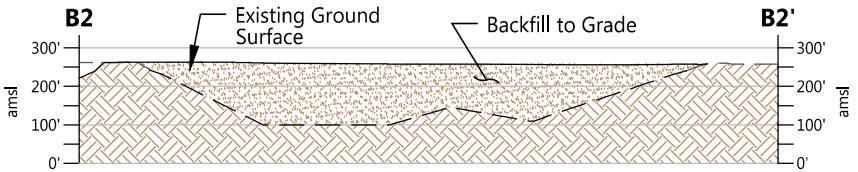


CROSS-SECTION A2-A2'
SCALE: 1" = 500'

EAST BASIN

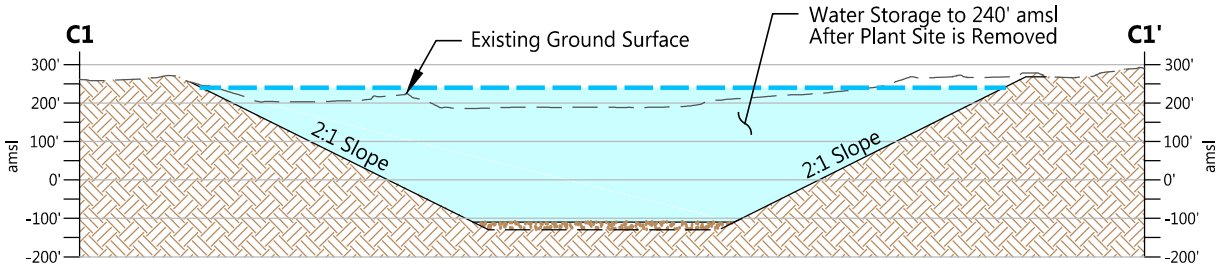


CROSS-SECTION B1-B1'
SCALE: 1" = 500'

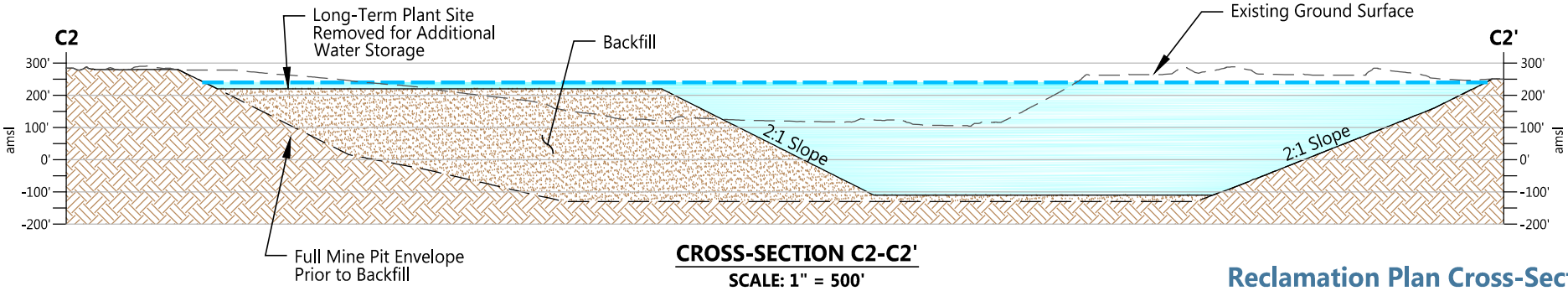


CROSS-SECTION B2-B2'
SCALE: 1" = 500'

SOUTH BASIN



CROSS-SECTION C1-C1'
SCALE: 1" = 500'



CROSS-SECTION C2-C2'
SCALE: 1" = 500'

Reclamation Plan Cross-Sections

REVISED SMP-30

Figure 10

BENCHMARK RESOURCES

NOTE:
- See Figure 9 for location of cross-sections.

SHEETS

LEGEND

- Existing Lease Boundary
- Existing Surface Disturbance Boundary
- Existing Excavation Areas
- Water Pipeline (W)
- Overhead Electrical Line (E)
- Natural Gas Pipeline (G)
- Surface Contours (280)
- Assumed Existing Contours (Beneath Water Surface)
- C-2 C-2' Cross-Section Location

A-1 A-1' A-2 A-2' B-1 B-1' B-2 B-2' C-1 C-1' C-2 C-2'

NORTH BASIN (Make-Up Water Storage)

EAST BASIN (Fines Settling)

SOUTH BASIN (Active Mining)

SMP-24

SMP-33

SFPUC Power Transmission Lines

Gas Pipeline

San Antonio Creek

Sunol Pump Station Pipeline (W)

Alameda Creek

Calaveras Substation

Topsoil Stockpiles

PROCESSING PLANT

Fines Process and Storage

Asphalt Plant

Material Stockpiles

Raw Materials Storage

Existing Plant Site

Materials Processing and Stockpiling

Concrete Plant

Ingress/Egress Scales and Office

Material Storage

EXPANDED PLANT SITE BOUNDARY

Scalehouse and Administration Building

Access Road

SFPUC WSIP Project Staging Area

Existing Corral Hollow 36" Pipeline

San Antonio 60" Pipeline

Existing Overhead Transmission Line

Existing SFPUC Outfall Pipeline

Calaveras Road

CA Mine ID No.: 91-01-0007
Alameda Co. Surface Mining Permit No.: SMP-30
Reclamation Plan No.: SMP-30 Resolution No. 92-32
Parcels: 096-0080-008 and 096-0375-011-05
Existing Lease Area: ± 323 acres
Revised Lease Area: ± 381 acres
Limits of Surface Disturbance: ± 275 acres
Owner of Property Name:
San Francisco Public Utilities Commission (SFPUC)
Owner of Mineral Rights: SFPUC
Street Address or P.O. Box:
1155 Market Street, 11th Floor
City, State, Zip Code: San Francisco, CA 94103
Telephone Number: 415-554-3155
Mine Operator: Oliver de Silva, Inc.
Street Address or P.O. Box: 11555 Dublin Boulevard
City, State, Zip Code: Dublin, CA 94568
Telephone Number: 925-828-7999
Contact Person: Jim Summers
Latitude and Longitude (at Center of Project):
N 37°34'06.76", W 121°52'07.18"

Benchmark for Sunol Quarry SMP-30

Alameda County Benchmark 184 A. Survey Disk set on Bridge. Described by National Geodetic Survey 1973 as:

1.6 mi SE from Sunol. 0.65 mile southeast along state highways 21 and 84 (Paloma Way) from the entrance gate to the San Francisco Water Department Park at Sunol, thence 0.9 mile southeast along Calaveras Road to a bridge and the mark in the southeast corner, 14 feet east of the center of the road and 1.5 fee north of the south edge of the bridge.

Elevation: 273.94 Datum: NGVD29

NOTES:

- Future trail in accordance with Sunol Valley Resource Management element of the SFPUC watershed management plan. Alignment is conceptual only.
- Slurry cutoff walls shown in accordance with the SFPUC requirements. Locations are conceptual; analysis and investigations are ongoing for design and implementation.
- All elevations shown are above mean sea level (amsl).
- See Sheet 2 for Site Conditions cross-sections.

200' 100' 0 200' 400'
NORTH
Scale: 1" = 200 Feet

BENCHMARK RESOURCES

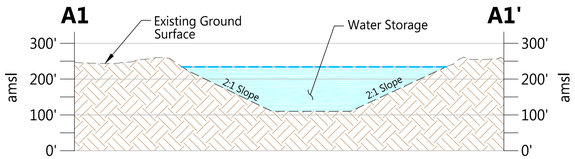
TOPOGRAPHY SOURCE: Terra Tech, Inc. (October 2011), contour interval is 10'.
AERIAL PHOTOGRAPH SOURCE: RJA Pacific Aerials (October 2011)

Site Conditions

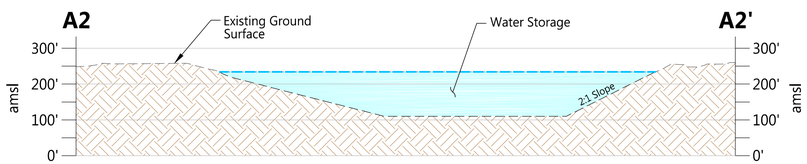
REVISED SMP-30 RECLAMATION PLAN

Sheet 1

NORTH BASIN

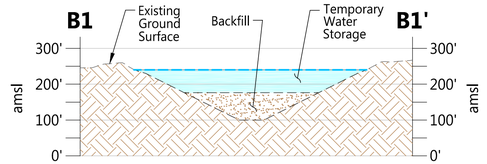


CROSS-SECTION A1-A1'
SCALE: 1" = 200'

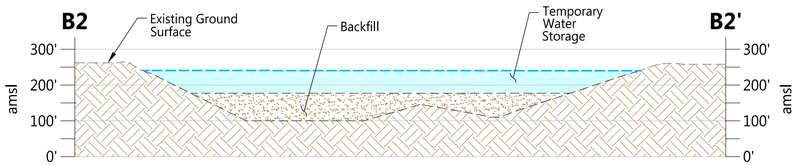


CROSS-SECTION A2-A2'
SCALE: 1" = 200'

EAST BASIN

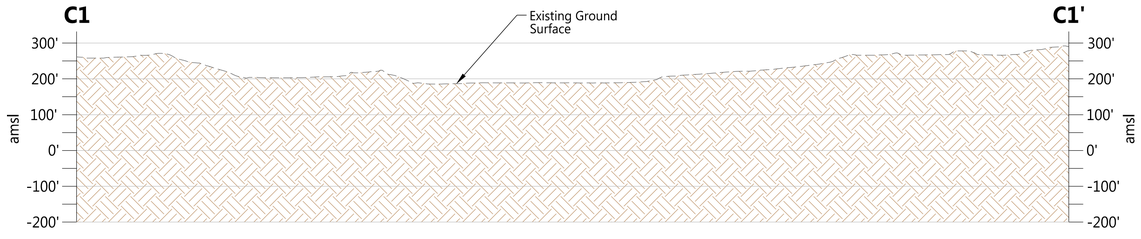


CROSS-SECTION B1-B1'
SCALE: 1" = 200'



CROSS-SECTION B1-B1'
SCALE: 1" = 200'

SOUTH BASIN



CROSS-SECTION C1-C1'
SCALE: 1" = 200'

CROSS-SECTION C2-C2'
SCALE: 1" = 200'

NOTES:

- See Sheet 1 for Site Conditions cross-section locations.
- All elevations shown are above mean sea level (amsl).

Site Conditions Cross-Sections

REVISED SMP-30 RECLAMATION PLAN

Sheet 2

BENCHMARK RESOURCES

50' Setback from San Antonio Creek

Sunol Pump Station Pipeline

San Antonio Creek

A-2'

A-1

Water Storage Level (240' amsl)

NORTH BASIN (Make-Up Water Storage)

X 140' bgs

2:1 Slope

B-2'

A-1'

Temporary Stockpile Location

Calaveras Substation

Gas Pipeline

A-2

SFPUC Power Transmission Lines

C-2'

B-1

X 180' amsl (approx.)

EAST BASIN (Fines Settling) (±643,500 yds³ Fill)

100' Setback from Transmission Towers

PHASE I

PHASE II

B-1'

Maintenance Road

B-2

C-1

Landscaped Berm

250' Setback from Calaveras Road

Interim Water Storage Level (210' amsl)

PHASE II

PHASE I

2:1 Slope

Access

SOUTH BASIN

X -130' amsl (400' bgs) at Full Excavation Depth, Backfill to -110' (380 bgs)

50' Setback from Pipelines

C-1'

Slurry Wall

2:1 Slope

2:1 Slope

Alameda Creek

Calaveras Road

Fines Process and Storage

Raw Materials Storage

Creek Setback Per Q-95 Permit

Long-Term Processing Area (±13,531,000 yds³ Fill)

Asphalt Plant

Contours Showing Full Excavation of South Basin

Materials Processing and Stockpiling

X Backfill to 220' amsl

Overhead Power Transmission Line (Relocated)

Potential Future Hiking Trail Location

Ingress/ Egress Scales and Office

San Antonio 60" Pipeline

Corral Hollow 36" Pipeline (Relocated)

Concrete Plant

LONG-TERM PLANT SITE

(Long-term plant site fill elevation may vary depending on actual conditions and waste generated)

C-2

Slurry Wall

SFPUC Outfall Pipeline

LEGEND

- Potential Location of Future Hiking Trail (See notes)
- Potential Slurry Wall Location (See notes)
- Revised Lease Boundary
- Revised Surface Disturbance Boundary
- Revised Excavation Areas
- Landscaped Berm
- Maintenance Roads
- Water Pipeline
- Overhead Electrical Line
- Natural Gas Pipeline
- Surface Contours
- Banks of Alameda and San Antonio Creeks
- Phase Boundary
- Water Storage Level
- Cross-Section Location (C-2 to C-2')
- Backfill

NOTES:

- Future trail in accordance with Sunol Valley Resource Management element of the SFPUC Watershed Management Plan. Alignment is conceptual only.
- Slurry cutoff walls shown in accordance with SFPUC requirements. Locations are conceptual; analysis and investigations are ongoing for design and implementation.
- All elevations shown are above mean sea level (amsl) unless otherwise noted.
- See Sheet 4 for Excavation and Fill Plan Cross-Sections.

200' 100' 0 200' 400'

NORTH

Scale: 1" = 200 Feet

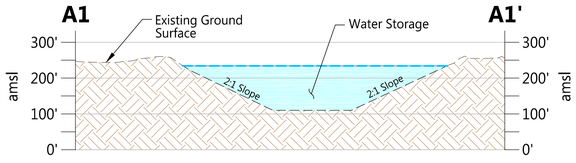
BENCHMARK RESOURCES

TOPOGRAPHY SOURCE: Terra Tech, Inc. (October 2011), contour interval is 10'.

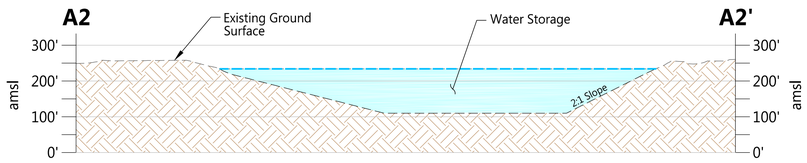
Excavation and Fill Plan

REVISED SMP-30 RECLAMATION PLAN

NORTH BASIN



CROSS-SECTION A1-A1'
SCALE: 1" = 200'



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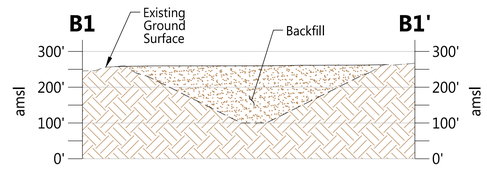
SCALE: 1" = 200'

EAST BASIN



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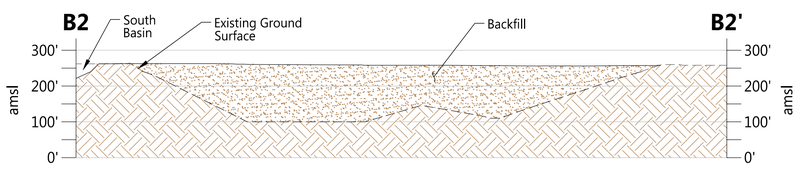
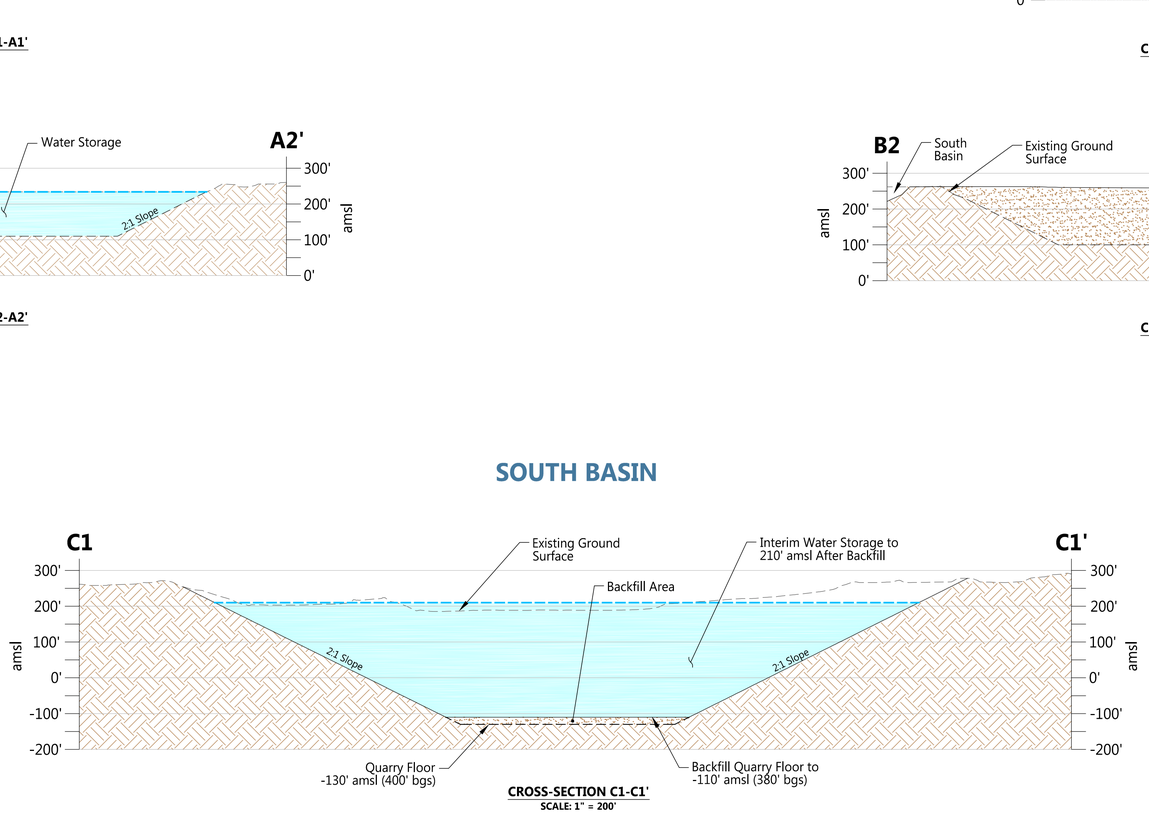
SCALE: 1" = 200'

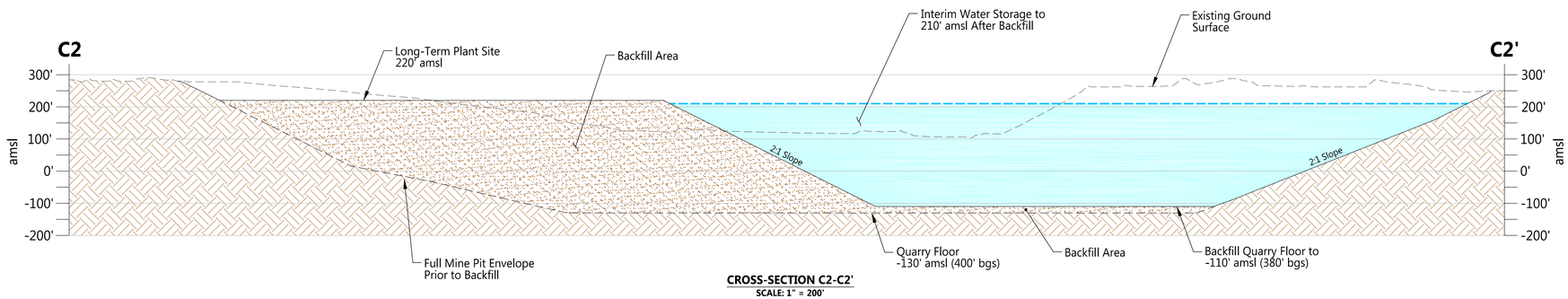


CROSS-SECTION B1-B1'
SCALE: 1" = 200'

SOUTH BASIN



CROSS-SECTION C1-C1'
SCALE: 1" = 200'



CROSS-SECTION C2-C2'
SCALE: 1" = 200'

NOTES:

- Once backfill for the Long-Term Plant Site is established and full excavation of the South Basin is complete, the pit will be used for water storage. Upon completion of material processing, the plant site will be removed and the water storage level will be raised (see Reclamation Plan, Sheet 5).
- See Sheet 3 for Mine Plan cross-section locations.
- All elevations shown are above mean sea level (amsl).

Excavation and Fill Plan Cross-Sections

REVISED SMP-30 RECLAMATION PLAN

BENCHMARK RESOURCES

50' Setback from San Antonio Creek

Sunol Pump Station Pipeline

San Antonio Creek

A-1

A-2'

NORTH BASIN (Water Storage)

B-2'

A-1'

A-2

Gas Pipeline

SFPUC Power Transmission Lines

C-2'

B-1

EAST BASIN Backfilled to Grade and Revegetated (256'-261' amsl)

B-1'

100' Setback from Transmission Towers

B-2

C-1

Landscaped Berm

250' Setback from Calaveras Road

Final Water Storage Level (240' amsl)

Access

SOUTH BASIN

50' Setback from Pipelines

C-1'

Alameda Creek

Calaveras Road

Creek Setback Per Q-95 Permit

Access

San Antonio 60" Pipeline

Corral Hollow 36" Pipeline (Relocated)

Overhead Power Transmission Line (Relocated)

C-2

SFPUC Outfall Pipeline

Calaveras Substation

Maintenance Road

X 256' amsl

X 257' amsl

X 260' amsl

X 261' amsl

LEGEND

- Potential Location of Future Hiking Trail (See notes)
- Potential Slurry Wall Location (See notes)
- Revised Lease Boundary
- Revised Surface Disturbance Boundary
- Revised Excavation Areas
- Landscaped Berm
- Maintenance Roads
- Water Pipeline
- Overhead Electrical Line
- Natural Gas Pipeline
- Surface Contours
- Banks of Alameda and San Antonio Creeks
- C-2 / C-2' Cross-Section Location
- Backfill
- Revegetated ± 110 acres
- Water Storage ± 173 acres (Volume: ± 27,000 acre ft)

NOTES:

- Surface disturbance boundaries may not be identical to those depicted due to actual geologic conditions and engineering issues encountered during mine operation, although total acreage to be disturbed and reclaimed would be within the "limits of the surface disturbance". Reclamation would, in any case, be completed according to the standards described in the approved Plan. Deviations from the plan would be evaluated pursuant to CCR§3502(d).
- All elevations shown are above mean sea level (amsl).
- See Sheet 6 for Reclamation Plan Cross-Sections.

200' 100' 0 200' 400'

NORTH

Scale: 1" = 200 Feet

BENCHMARK RESOURCES

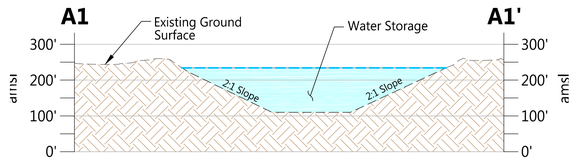
TOPOGRAPHY SOURCE: Terra Tech, Inc. (October 2011), contour interval is 10'.

Reclamation Plan

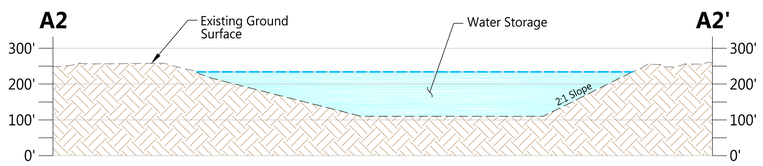
REVISED SMP-30 RECLAMATION PLAN

Sheet 5

NORTH BASIN

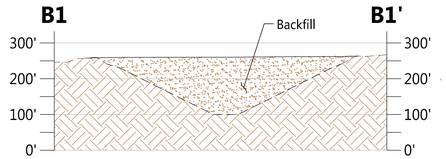


CROSS-SECTION A1-A1'
SCALE: 1" = 200'

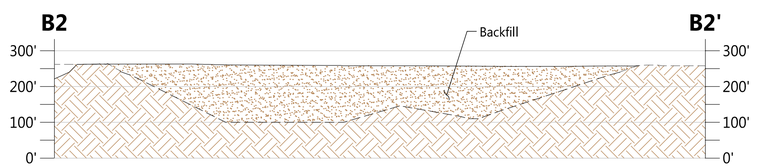


CROSS-SECTION A2-A2'
SCALE: 1" = 200'

EAST BASIN

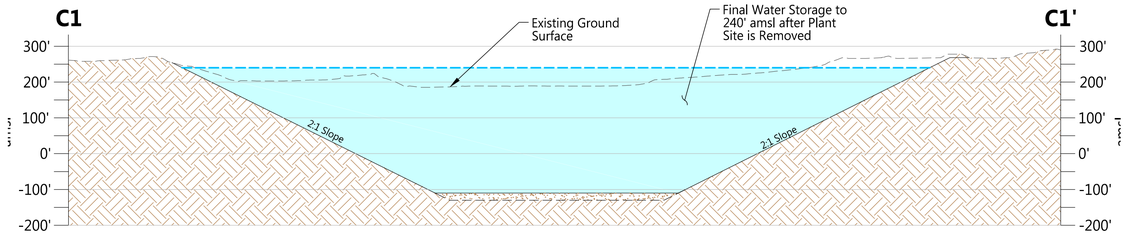


CROSS-SECTION B1-B1'
SCALE: 1" = 200'

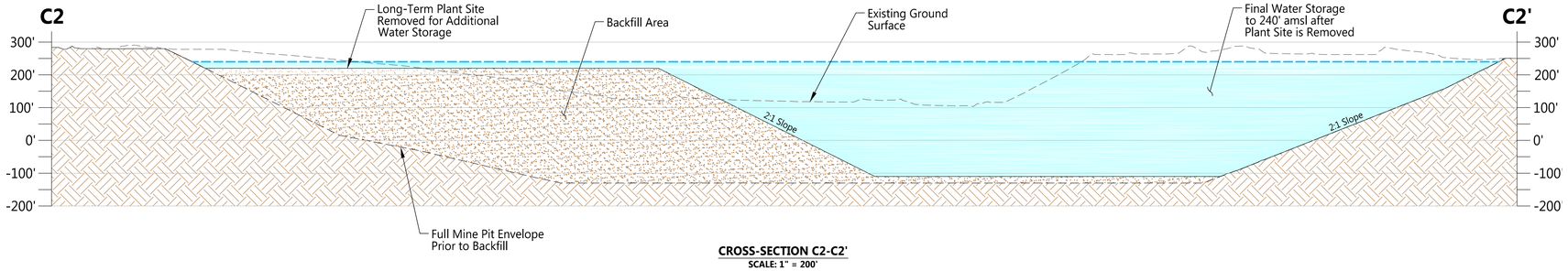


CROSS-SECTION B1-B1'
SCALE: 1" = 200'

SOUTH BASIN



CROSS-SECTION C1-C1'
SCALE: 1" = 200'



CROSS-SECTION C2-C2'
SCALE: 1" = 200'

NOTES:

- See Sheet 5 for Reclamation Plan cross-section locations.
- All elevations shown are above mean sea level (amsl).

Reclamation Plan Cross-Sections

REVISED SMP-30 RECLAMATION PLAN

APPENDICES

APPENDIX A
GEOTECHNICAL REPORT

GEOTECHNICAL INVESTIGATION
AMENDED RECLAMATION PLAN
SUNOL QUARRY, SMP-30
CALAVERAS ROAD
SUNOL, CALIFORNIA

FOR
OLIVER DE SILVA, INC.
May 25, 2012

Job No. 3021.703

BERLOGAR STEVENS & ASSOCIATES

Via Email and Hand-Delivery

May 25, 2012
Job No. 3021.703

BERLOGAR STEVENS & ASSOCIATES

Mr. Jim Summers
Oliver de Silva, Inc.
11555 Dublin Boulevard, Suite 201
Dublin, California 94568

Subject: Geotechnical Investigation
Amended Reclamation Plan, Sunol Quarry, SMP-30
Calaveras Road
Sunol, California

Dear Mr. Summers:

INTRODUCTION

Berlogar Stevens & Associates is presenting our geotechnical investigation for the Amended Reclamation Plan for Sunol Quarry, SMP-30. SMP-30 is being mined for construction aggregate according to an approved design for post-mining use as water storage and trails. The existing SMP-30 permit limits the quarry slopes to 2H:1V. The quarry floor is currently designed at 140 feet below ground surface (bgs). The existing quarry is proposed to be expanded by 58 acres, which also provides an increased depth of up to 400 feet bgs. The quarry expansion is constrained by Calaveras Road (250 foot setback) and a SFPUC 60-inch San Antonio pipeline on the east, SFPUC 66-inch overflow pipeline on the south, Alameda Creek on the west, and a PG&E electric transmission tower line on the north. Plate 1, Site Plan, Existing Conditions, and Plate 2, Geologic Cross Sections, show existing conditions and the configuration of the quarry after completion of mining.

Five PG&E electric transmission lines and a natural gas transmission line cross diagonally across the northern portion of the site, shown as "PG&E Easement" on the attached Plate 1, Site Plan, Existing Conditions. The electric and natural gas transmission lines in the easement were constructed prior to the start of quarry operations as seen in the historical topographic maps and aerial photographs. The natural gas pipeline runs along an access road corridor between the silt pond area and ponds F4 and F5. The electric transmission lines run through the silt pond area, with the transmission tower foundations located on "islands" of original ground. The SFPUC 60-inch diameter San Antonio pipeline line runs north-south between the east side of the quarry and Calaveras Road. The south end has a SFPUC 66-inch Overflow pipe and 66-inch Siphon #4 near the quarry boundary.

Quarry processing equipment is currently located on the north side of the quarry. Quarry expansion is initially planned towards the east. During quarry expansion, the southern portion of the quarry will be partially backfilled with engineered fill composed of process fines and other suitable engineered fill material in preparation for the relocation of the processing plant. The engineered fill pad will be 50 feet below the top of the quarry and have 2H:1V side slopes. Once

the south engineered fill pad has been constructed, the quarry processing plant will be moved to this location and quarry expansion will then proceed northerly.

PURPOSE AND SCOPE OF SERVICES

The purpose of this investigation was to evaluate the stability of slopes in the proposed amended reclamation plan and to provide geotechnical recommendations for proposed quarry cut slopes, engineered fill construction, and geologic hazard impacts to the quarry site. The scope of our services included a review of available geotechnical and geologic reference material, field exploration, laboratory testing, engineering analyses based on field and laboratory data, and preparation of this report.

FIELD EXPLORATION AND LABORATORY TESTING

We have performed several investigations between 2007 and the present. The results of these investigations are contained in separate reports. The relevant investigations containing information for assessing quarry slope stability include:

1. A field investigation for assessing the aggregate resources at the Sunol Quarry, SMP-30, was performed in the fall of 2007. Our investigation included drilling, coring, seismic refraction surveys, and laboratory testing. The locations of the borings are shown on Plate 1, Site Plan, Existing Conditions. Table 1 summarizes the sieve analyses (fines and gravel content by elevation), Appendix A contains Becker Hammer blowcounts that were performed as part of this study, and Appendix B contains the sonic boring logs (drilled up to 375 feet deep).

2. Site reconnaissance of the site were performed at different times of the year since 2007 to observe variations in water seepage out of the quarry slopes and potential erosion caused by water seepage.

3. Several test pits were excavated in 2011 in the northern portion of the site as part of a study for the aggregate processing and AC batch plant to better define the limits of the silt pond. The locations of these test pits are shown on Plate 1, Site Plan, Existing Conditions. The silt pond material is weaker than the native soil, which may impact quarry cut slopes in this material.

SITE GEOLOGY

The Calaveras fault is located along the base of the hills near the eastern edge of the quarry. The peak ground acceleration at the Sunol Quarry site for a 10% chance of exceedance in 50 years is 0.67g according to the USGS deaggregation website. The State of California considers the Calaveras fault as an active fault. The eastern margin of the site is located in a State of California Alquist Priolo Earthquake Fault Zone as shown on Plates 1 and 2. These plates also

show the short dashes and dotted lines indicating where the fault is inferred and concealed, respectively. Permanent structures with human occupancy should be located at least 50 feet from a confirmed fault trace when a structure is located within an Earthquake Fault Zone. Confirmed fault traces are typically delineated by excavating trenches across the potential fault traces.

Fugro in conjunction with William Lettis performed a fault investigation for the Alameda Siphon No. 4, and excavated 3 trenches south the of the quarry site, west of Calaveras Road (see Plate 1, Site Plan, Existing Conditions). Trench C1 and the eastern end of Trench C2 did not find evidence of historical fault offset in the older alluvium. The western end of C2 and Trench C3 did not encounter the fault trace in the younger alluvium. Hence, the Calaveras fault trace was not found at the south end of the site from Calaveras Road to approximately 150 feet west of Calaveras Road. The mapped location of the Calaveras Fault relative to SMP-30 is generally east of Calaveras Road, but locally is shown as much as 60 feet west of Calaveras Road.

According to William Lettis and Associates (2004), coseismic displacement for a large-magnitude earthquake on the northern Calaveras Fault is expected to be 2 to 5 feet, with an assumed ratio of 5:1 for horizontal to vertical displacement. The coseismic displacement will impact the adjacent pipelines since these pipelines cross the Calaveras Fault. Setbacks have been established from the top of the quarry cut slopes for permanent structures after final restoration in the Slope Stability section of this report.

The quarry is located within the long, linear northwest-southeast trending extension of Sunol Valley that is occupied by Alameda Creek. As is common in strike-slip tectonic systems, a drainage course (Alameda Creek) has developed subparallel to the fault trace. Deposition of sand and gravel within Sunol Valley has occurred at least since the Pleistocene epoch of geologic time (within the past 1.6 million years). The east and west boundaries of the valley expose Pleistocene aged (roughly 11,000 to 1.6 million years before present) fan deposits that were later eroded into and layers of gravel were deposited atop the older materials during the Holocene epoch (within the past 11,000 years).

SLOPE STABILITY

The stability of the quarry cut slopes were evaluated based on operating quarry conditions and permanent conditions after completion of mining. The engineered fill slope on the south end of the quarry was evaluated under operating quarry conditions; permanent conditions after reclamation were not evaluated since structures will not be constructed on this fill pad. Our analyses assessed the stability of slopes utilizing the guidelines contained in "Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California" (ASCE, Southern California Earthquake Center, June 2002).

Slope stability was analyzed with Slope/W 2007 slope stability analysis software. The Morgentstern-Price method of slope stability analysis was used to search for critical (lowest

factor of safety) slip circles with user defined entry and exit limits along the top and face of the slope, respectively. Once a static factor of safety was calculated, the analysis was re-run with a deterministic pseudo-static factor of 0.24 (as estimated from the Recommended Procedures for Implementation of DMG Special Publication 117 – Guidelines for Analyzing and Mitigating Landslide Hazards in California, 2002). If the pseudo-static analysis resulted in a factor of safety of approximately 1.0 or less, a probabilistic analysis of slope deformation was performed (Bray et al, 1998).

A minimum static factor-of-safety (FS) of 1.2 and 1.5 is considered acceptable for quarry operation conditions and after completion of mining, respectively. However, if the pseudo-static FS is approximately equal to or less than unity, a setback was established based on the results of the slope deformation analyses.

QUARRY CUT SLOPES

The stability of the quarry cut slopes were evaluated utilizing strength parameters correlated with Becker Hammer blowcounts and empirical data. Obtaining soil samples for laboratory strength testing was not practical in the native gravelly and cobbley material. Borings B1 through B4 were drilled at several locations and elevations within the quarry site as shown on Plate 1, Site Plan. Becker Hammer blowcounts were obtained from these 4 borings between the top of the quarry and about 190 feet deep (between elevations 67 and 260 feet MSL). Strength parameters for slope stability analyses for quarry cut slopes were determined by converting the Becker blowcounts to equivalent corrected SPT blowcounts. The friction angle was obtained from the converted SPT blowcounts from two published sources (Terzhagi and Cornforth). The results of our analyses indicate the native material has an average strength envelope between 200 to 500 psf cohesion and a 50 to 54 degree friction angle.

The slope was modeled as a 400 foot high, 2H:1V homogeneous native material slope overlying impermeable bedrock. For quarry operation conditions, we assumed various groundwater levels (summer and winter conditions) at the top of the quarry slope between 20 feet to 40 feet below the top of the quarry, and several water levels in the quarry up to 300 feet deep (assuming a 400 foot deep quarry). The water levels after completion of mining were analyzed with water levels at 300 and 400 feet below the top of the quarry. Since the FS increases with higher water levels in the quarry, shallower water levels were not analyzed. The static FS was found to be more than 1.5 in all cases. When the pseudo-static analysis indicated FS of approximately 1.0 or less, deformation analyses were performed per DMG Special Publication 117 guidelines. Deformation analysis resulted in maximum deformation of the slope toe of less than 1 inch, which indicates relative stability. A summary of the results of our slope stability analysis are presented in Table 2, Slope Stability Analysis Summary.

It is our understanding that processed silt in the silt ponds on the north side of quarry will be removed from the top of quarry cut slopes (see Plate 1, Site Plan, Existing Conditions for the location of silt the ponds) when the quarry is expanded to the north. We recommend that a minimum of 30 feet of silt be removed laterally back from the top of quarry slopes when this occurs.

ENGINEERED FILL SLOPE AT SOUTH END OF QUARRY

Slope stability analyses were also performed for the proposed 2H:1V engineered fill slope at the south end of the quarry. The engineered fill material is expected to be comprised of compacted process fines and other fill material. The fill slope was modeled as homogeneous engineered fill slope, 350 feet high, with a 2H:1V slope. The engineered fill should have an average minimum friction angle of 30 degrees and 500 psf cohesion. The groundwater levels during quarry operations will be controlled by a drainage system to intercept groundwater that could be emanating from the south cut slope and the quarry floor. A drainage system consisting of a drainage blanket, a chimney drain, perforated pipes and permeable material will be needed to intercept groundwater inflow and to reduce the potential for saturating the engineered fill during active mining. The water level in the quarry was modeled at depths of zero, 100 feet, and 200 feet below the top of the quarry.

Our analysis indicated that the FS increases as the failure circle went deeper into the fill (i.e. shallow failure surfaces are less stable than deep failure blocks). The static FS was analyzed to be greater than 1.4 for quarry static operations, and less than 1.0 for pseudostatic conditions. Deformation analyses indicated approximately 1 to 2 feet of slope deformation, which would be unacceptable for structures located within the failure zone (approximately 100 to 150 feet back from the top of the engineered fill slope). In our opinion, the static FS of 1.4 is acceptable for operating quarry conditions. Due to the low pseudostatic FS and the anticipated deformation for the southern engineered fill slope, we recommend setbacks for equipment and stockpiles as presented below.

We also analyzed the proposed fill slope to include geogrid to reduce the setback requirements (see Quarry Slope Setbacks section below). The following is our recommendations for a geogrid reinforced engineered fill slope. The geogrid reinforcement provides a pseudostatic FS of at least 1.1, which is acceptable.

- Utilize Tensar UX1400HS geogrid or equivalent.
- Install 7 layers of geogrid extending into the fill slope at least 350 feet along the entire slope face.
- The first layer of geogrid should be placed at the 350 foot depth.
- Subsequent layers should be spaced at 50 foot vertical intervals up to a depth of 50 feet below the engineered fill pad.

QUARRY SLOPE SETBACKS

We recommend the following setbacks for settlement sensitive structures from the top of the quarry slopes. Setbacks requirements can be evaluated on an individual basis, depending on the type of structure, if needed.

During Quarry Operations Prior to Final Reclamation	Setback
Quarry Cut Slopes on West, North and East sides	
Light structures during mining	20 feet
Heavy structures (such as crushers)	30 feet
Heavy loads (such as stockpiles) during mining	50 feet
Engineered Fill Slope on South End, Unreinforced Slope Face	
Light structures during mining	100 feet
Heavy structures (such as crushers) or heavy loads (such as stockpiles) during mining	200 feet
Engineered Fill Slope on South End, Geogrid Reinforced Slope Face, 7 layers of Tensar UX1400HS, 350 feet deep, 50 feet vertical spacing	
Light structures during mining	30 feet
Heavy structures (such as crushers) or heavy loads (such as stockpiles) during mining	50 feet

After Final Reclamation	Setback
Quarry Cut Slopes on West, North, East and South sides	
Permanent structures after final reclamation, including PG&E towers	100 feet
Water pipelines on the south and east sides of quarry	50 feet
Engineered Fill Slope on South End	
This slope will be under water and there will be no permanent structures	Not Applicable

Permanent structures besides the existing PG&E towers and new water pipelines are not planned after final reclamation use for water storage and trails. Sampling and testing of the proposed engineered fill material should be performed to confirm the assumed strength parameters utilized in the slope stability analyses.

ENGINEERED FILL CONSTRUCTION

The following provides recommendations for the construction of engineered fills.

1. On-site soils are generally suitable for engineered fill, provided they are free of debris, significant vegetation, and other deleterious matter.
2. Import fill should be generally free of no deleterious matter and have low expansion potential (Plasticity Index less than 20). Fill materials should be subject to evaluation by this office prior to their use. We suggest that the import fill tested and confirmed to be clear of toxic or hazardous materials prior to importing.
3. Fill should be placed in thin lifts (normally 6 to 8 inches in loose lift thickness depending on the compaction equipment), properly moisture conditioned, and compacted as specified below.
    - Soils with rock particles less than about 12 inches in size should be moisture conditioned to at least 3 percent above the optimum moisture content and compacted to at least 95 percent relative compaction.

- Gravelly material should be moisture conditioned to at least 3 percent above the optimum moisture content and should be compacted with at least 5 passes of an 825 sheepsfoot compactor.

- Relative compaction refers to the in-place dry density of the soil expressed as a percentage of the maximum dry density determined by ASTM D1557 compaction test procedure. Optimum moisture is the water content (percentage by dry weight) corresponding to the maximum dry density.

4. Observations and soil density tests should be carried out during engineered fill construction to assist in obtaining the required degree of compaction and proper moisture content. Where the compaction is outside the range required, additional compaction effort and adjustment of moisture content should be made until the specified compaction and moisture conditioning is achieved.

Silt Pond F5 will either be backfilled to support vehicles and light loads or will be utilized for water storage. If the Pond F5 area will be backfilled, we recommend that engineered fill be placed in the upper few feet to support vehicles and light loads. The silt in the ponds will need to remain untouched for a few years in order for a dry crust to form by air drying. Once a crust has formed, a geogrid layer (such as Tensar TX160) should be placed on the ground surface. A bulldozer should then spread approximately 2 feet of soil over the geogrid, starting at the edges and push fill towards the middle of Pond F5. The dried crust, geogrid, and 2 foot layer of soil will act as a bridge over the softer silt. Engineered fill can then be placed in thin lifts and compacted as described below. A minimum thickness of compacted fill should be 3 feet.

1. Fill should be placed in thin lifts (normally 6 to 8 inches in loose lift thickness depending on the compaction equipment), properly moisture conditioned, and compacted as specified below.

   - Soils with rock particles less than about 12 inches in size should be moisture conditioned to at least 3 percent above the optimum moisture content and compacted to at least 90 percent relative compaction.

   - Gravelly material should be moisture conditioned to at least 3 percent above the optimum moisture content and should be compacted with at least 5 passes of an 825 sheepsfoot compactor.

   - Relative compaction refers to the in-place dry density of the soil expressed as a percentage of the maximum dry density determined by ASTM D1557 compaction test procedure. Optimum moisture is the water content (percentage by dry weight) corresponding to the maximum dry density.

2. Observations and soil density tests should be carried out during engineered fill construction to assist in obtaining the required degree of compaction and proper moisture content. Where the compaction is outside the range required, additional compaction effort and adjustment of moisture content should be made until the specified compaction and moisture conditioning is achieved.

Minor settlement will occur with the engineered fill that is constructed as recommended in 1 through 4 above, but should not impact quarry processing structures and operations. Long term total settlement of the ground surface in silt pond areas (Pond F5) should be less than about 2 feet.

It has been a pleasure to work with Oliver DeSilva on this project. If you have any questions, please contact Bill Stevens or Frank Berlogar at (925) 484-0220.

Respectfully Submitted,

BERLOGAR STEVENS & ASSOCIATES

William R. Stevens, PE, GE
Principal Engineer
GE 2339

REGISTERED PROFESSIONAL ENGINEER
WILLIAM R. STEVENS
No. 2339
GEOTECHNICAL
STATE OF CALIFORNIA

Frank Berlogar

WRS/FB:jmb

Attachments:

References
Table 1 – Laboratory Test Results - Fines and Gravel Content
Table 2 – Slope Stability Analyses Summary, Native Quarry Cut Slopes
Plate 1 (pocket) – Site Plan, Existing Conditions
Plate 2 (pocket) – Geologic Cross Sections 1-1' through 4-4'
Appendix A – Becker Hammer Blowcounts, B1 through B4
Appendix B – Sonic Drilling Boring Logs

Copies: Addressee (5)
Benchmark Resources, David Brown (email only)
Andrew Kopania (email only)

U:\@@@Public\1-Quarries\3021-Calaveras\703-Report\Reclamation\GI Amended Reclamation Plan - 24554.doc

REFERENCES

Black and Veatch/AGS, Inc. JV, Alameda Siphon No. 4, Draft Geotechnical Investigation and Site Characterization Report, San Francisco Public Utilities Commission, February 13, 2007.

California Division of Mines and Geology, State of California Special Studies Zones, La Costa Valley, Revised Official Map, Effective: January 1, 1982, 7.5 Minute Series.

Fugro West, Inc., Geotechnical Data Report, Calaveras Fault Investigation, Alameda Siphon No. 4, CS-804, Sunol Valley, California, February 8, 2007: draft report prepared for Black & Veatch/AGS Joint Venture.

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Table 1 - Laboratory Test Results - Fines and Gravel Content

Sunol Aggregates SMP-30 Quarry **BSA Project No. 3021.703**

% Fines	Elevation		% Gravel	Elevation	
17	271		50	271	
14	259			259	
29	255	**Avg**		255	**Avg**
42	245	**20.3**		245	**60.7**
12	212	**Std Dev**	61	212	**Std Dev**
8	165	**12.8**	71	165	**10.5**
24	140		39	140	
19	123		50	123	
13	98		49	98	
21	86		46	86	
17	36	**Avg**	51	36	**Avg**
21	-9	**18.9**	46	-9	**49.0**
15	-22	**Std Dev**	61	-22	**Std Dev**
21	-61	**3.6**	50	-61	**6.2**

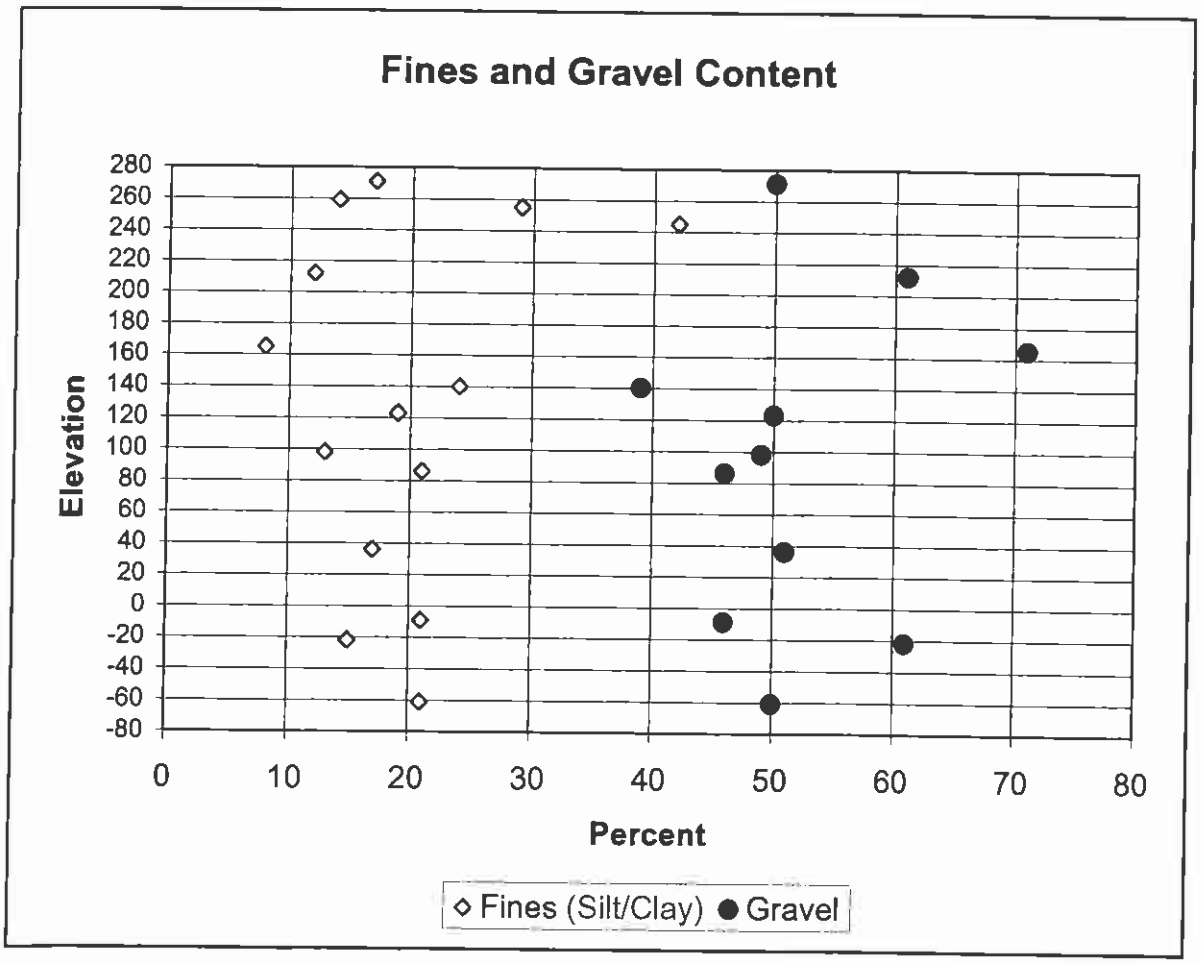


TABLE 2 - Slope Stability Analyses Summary, Native Quarry Cut Slopes

A - During Quarry Operations, Cut Slopes, 2H:1V

Season	Stability Analyses Search Limits[1]	ϕ_{native} (degrees)	c_{native} (psf)	Groundwater Level (feet below top of slope)	Lake Depth (feet below top of slope)	FS_{static}	$FS_{pseduo\text{-}static}$[2]	Pseudostatic Deformation (inches)	Notes
Summer	A	54	500	100	400	2.52	1.52	na	
	B	54	500	100	400	1.96	1.13	na	
	C	54	500	100	400	1.59	0.89	0.00014	
Summer	B	50	200	100	400	1.58	0.90	0.04	
Winter	A	54	500	100	300	3.41	2.1	na	
	B	54	500	100	300	2.16	1.26	na	
	C	54	500	100	300	1.78	0.99	0.0077	
Winter	B	50	200	100	300	1.76	1.02	0.04	
	C	50	200	100	300	1.46	0.80	0.06	

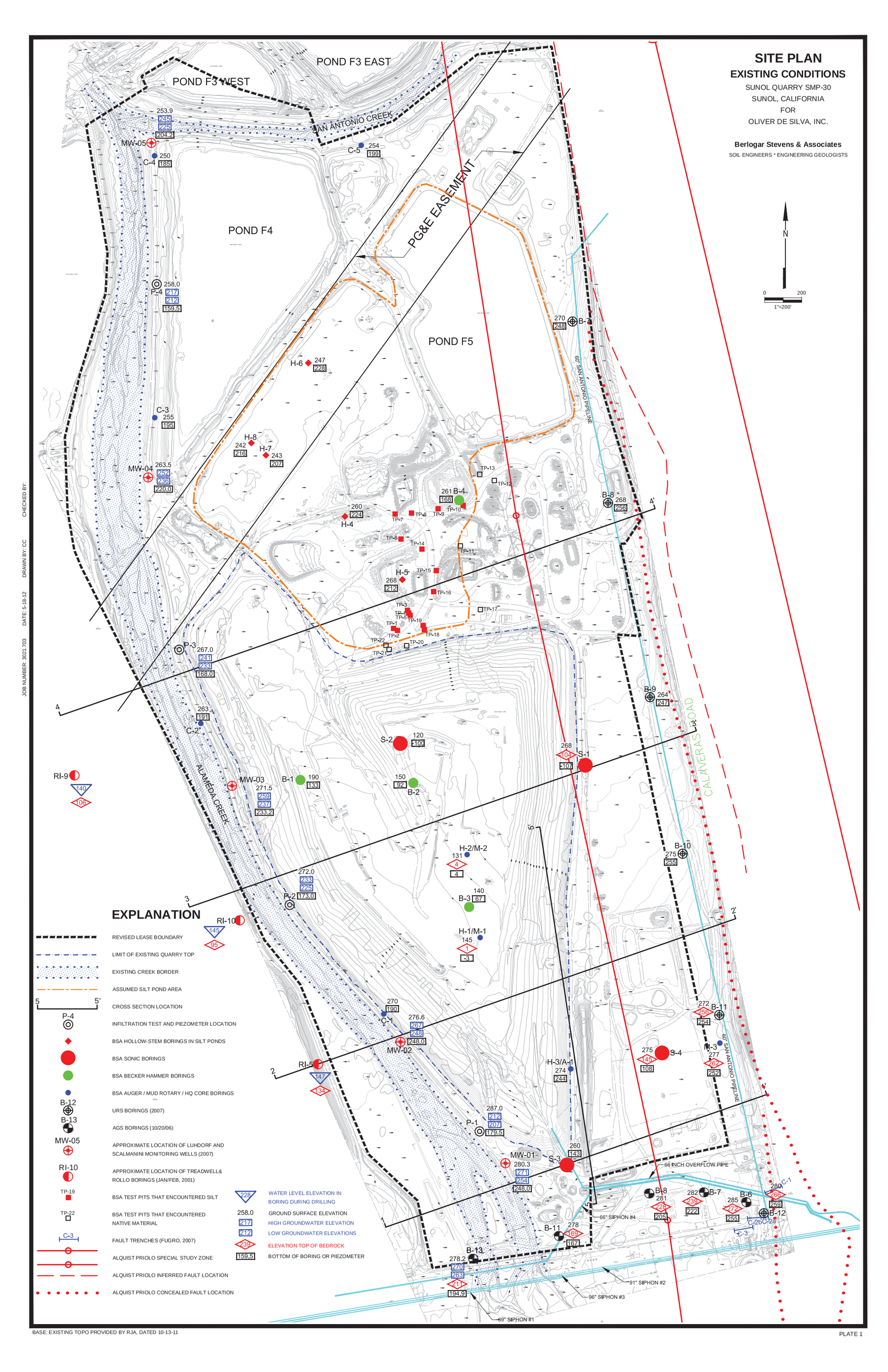
B - After Final Reclamation, Cut Slopes, 2H:1V

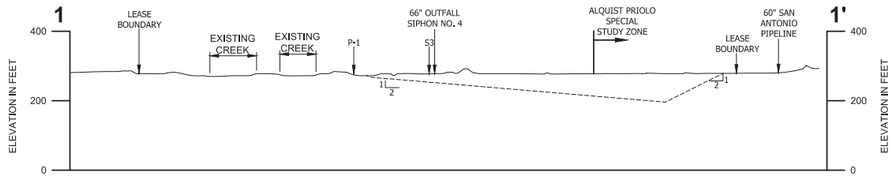
Season	Stability Analyses Search Limits[1]	ϕ_{native} (degrees)	c_{native} (psf)	Groundwater Level (feet below top of slope)	Lake Depth (feet below top of slope)	FS_{static}	$FS_{pseduo\text{-}static}$[2]	Pseudostatic Deformation (inches)	Notes
Summer	A	54	500	100	200	3.55	2.16	na	
	B	54	500	100	200	2.29	1.33	na	
	C	54	500	100	200	2.15	1.20	na	
Summer	B	50	200	100	200	1.87	1.07	0.04	
	C	50	200	100	200	1.76	0.96	0.06	
Summer	A	54	500	100	100	3.55	2.16	na	
	B	54	500	100	100	3.04	1.65	na	
	C	54	500	100	100	3.01	1.44	na	
Winter	A	54	500	0	0	3.90	1.79	na	
	B	54	500	0	0	3.76	1.72	na	
	C	54	500	0	0	3.20	1.42	na	

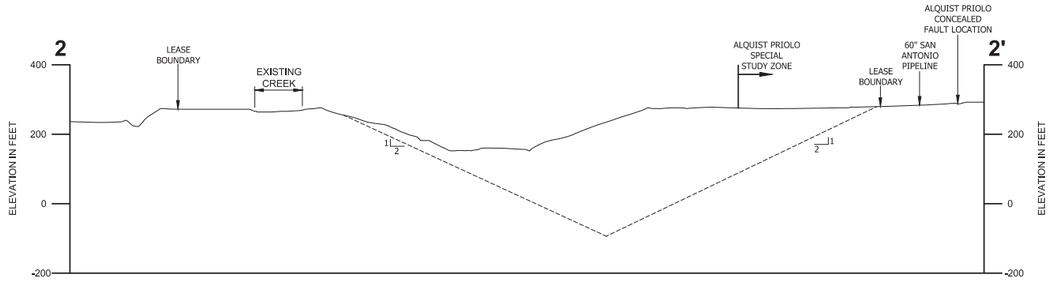
Assumed total unit weight of 140 pcf for native materials.

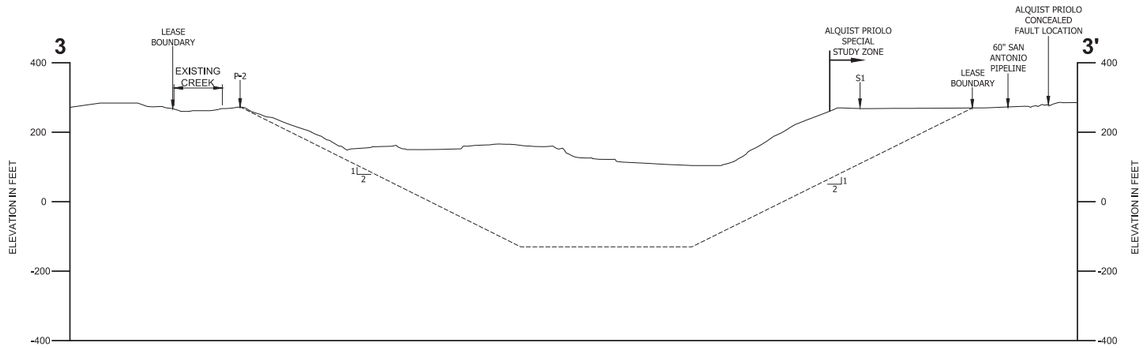
[1] A - Failure surface circle exits slope 20 to 100 feet below top of slope.
B - Failue surface exits slope 20 to 200 feet below top of slope.
C - Failure surface exits slope between 20 feet below top of slope to toe of slope.

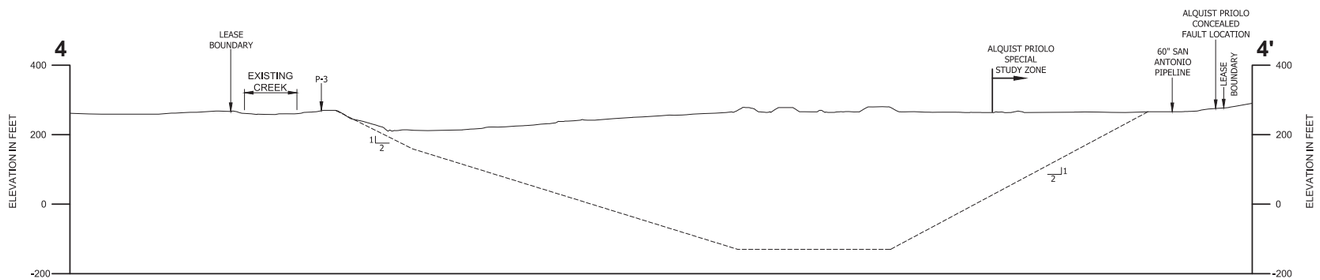
[2] Pseudo-static factor of 0.24

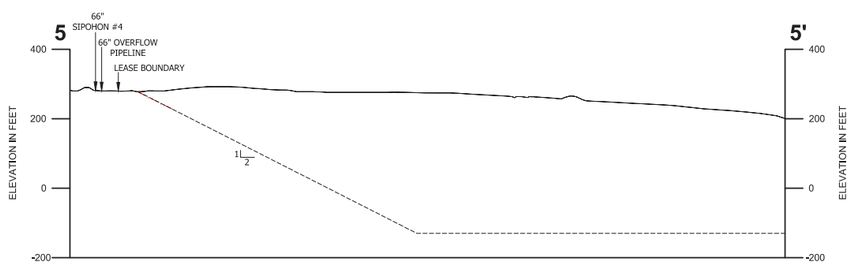

SITE PLAN
EXISTING CONDITIONS
SUNOL QUARRY SMP-30
SUNOL, CALIFORNIA
FOR
OLIVER DE SILVA, INC.
Berlogar Stevens & Associates
SOIL ENGINEERS * ENGINEERING GEOLOGISTS
N
0
200
1"=200'
POND F3 EAST
POND F3 WEST
POND F4
POND F5
SAN ANTONIO CREEK
ALAMEDA CREEK
PG&E EASEMENT
CALAVERAS ROAD
60" SAN ANTONIO PIPELINE
66 INCH OVERFLOW PIPE
69" SIPHON #1
96" SIPHON #3
91" SIPHON #2
66" SIPHON #4
MW-05
C-4
C-5
MW-04
C-3
MW-03
C-2
MW-02
C-1
MW-01
H-1/M-1
H-2/M-2
H-3/A-1
H-4
H-5
H-6
H-7
H-8
P-1
P-2
P-3
P-4
S-1
S-2
S-3
S-4
B-1
B-2
B-3
B-4
B-5
B-6
B-7
B-8
B-9
B-10
B-11
B-12
B-13
RI-9
RI-10
RI-5
TP-1
TP-2
TP-3
TP-4
TP-5
TP-6
TP-7
TP-8
TP-9
TP-10
TP-11
TP-12
TP-13
TP-14
TP-15
TP-16
TP-17
TP-18
TP-19
TP-20
TP-21
TP-22
EXPLANATION
REVISED LEASE BOUNDARY
LIMIT OF EXISTING QUARRY TOP
EXISTING CREEK BORDER
ASSUMED SILT POND AREA
CROSS SECTION LOCATION
INFILTRATION TEST AND PIEZOMETER LOCATION
BSA HOLLOW-STEM BORINGS IN SILT PONDS
BSA SONIC BORINGS
BSA BECKER HAMMER BORINGS
BSA AUGER / MUD ROTARY / HQ CORE BORINGS
URS BORINGS (2007)
AGS BORINGS (10/20/06)
APPROXIMATE LOCATION OF LUHDORF AND SCALMANINI MONITORING WELLS (2007)
APPROXIMATE LOCATION OF TREADWELL& ROLLO BORINGS (JAN/FEB, 2001)
BSA TEST PITS THAT ENCOUNTERED SILT
BSA TEST PITS THAT ENCOUNTERED NATIVE MATERIAL
FAULT TRENCHES (FUGRO, 2007)
ALQUIST PRIOLO SPECIAL STUDY ZONE
ALQUIST PRIOLO INFERRED FAULT LOCATION
ALQUIST PRIOLO CONCEALED FAULT LOCATION
WATER LEVEL ELEVATION IN BORING DURING DRILLING
GROUND SURFACE ELEVATION
HIGH GROUNDWATER ELEVATION
LOW GROUNDWATER ELEVATIONS
ELEVATION TOP OF BEDROCK
BOTTOM OF BORING OR PIEZOMETER
JOB NUMBER: 3021.703
DATE: 5-18-12
DRAWN BY: CC
CHECKED BY:
BASE: EXISTING TOPO PROVIDED BY RJA, DATED 10-13-11
PLATE 1











EXPLANATION

TOPOGRAPHY (FROM RJA SURVEY 10-13-11)

ESTIMATED 2H:1V CUT SLOPE FOR QUARRY EXPANSION

H1/M1 BORING LOCATIONS

GEOLOGIC CROSS SECTIONS

SUNOL QUARRY SMP-30
SUNOL, CALIFORNIA
FOR
OLIVER DE SILVA, INC.

Berlogar Stevens & Associates
SOIL ENGINEERS * ENGINEERING GEOLOGISTS

DATE: 5-18-12 DRAWN BY: CC CHECKED BY:
JOB NUMBER: 3021.703

PLATE 2

APPENDIX A

Becker Hammer Blowcounts, B1 through B4

Becker Hammer Blowcounts — **Sunol Aggregates SMP-30 Quarry**

B1 **Elevation:** **190** — **BSA 3021.703**

NW Corner, West of Quarry Access Road

Depth (ft)	Elevation (ft)	Blows per Foot	Bounce Chamber Pressure (psi)	Start Time	End Time	Comments
1	189	53	19	9..31		
2	188	89	19			
3	187	79	19			
4	186	81	19			
5	185	115	19			
6	184	176	19			
7	183	185	19			
8	182	211	19			
9	181	143	19		9..41	
10	180	95	19	9..54		
11	179	179	19			
12	178	300	19		10..00	
13	177	162	21	10..03		
14	176	222	21			
15	175	228	21			
16	174	204	21			
17	173	249	21			
18	172	305	21		10..17	
19	171	196	21	10..25		
20	170	193	20			
21	169	183	20			
22	168	188	20			
23	167	234	20			
24	166	251	20			
25	165	282	20		10..41	
26	164	151	19	10..43		
27	163	165	19			
28	162	178	19		10..49	
29	161	139	20	10..55		
30	160	161	20			
31	159	112	19			
32	158	184	19			
33	157	155	19			
34	156	166	20			
35	155	159	20		11..07	
36	154	192	20	11..08		
37	153	278	20			
38	152	344	20		11..17	
39	151	116	20	11..29		
40	150	132	20			

Becker Hammer Blowcounts **Sunol Aggregates SMP-30 Quarry**

B1 **Elevation:** **190** **BSA 3021.703**

NW Corner, West of Quarry Access Road

Depth (ft)	Elevation (ft)	Blows per Foot	Bounce Chamber Pressure (psi)	Start Time	End Time	Comments
41	149	171	20			
42	148	215	20			
43	147	141	20			
44	146	132	20			
45	145	188	20		11..40	
46	144	137	20	11..49		
47	143	160	20			
48	142	249	20		11..50	
49	141	167	21	11..55		
50	140	245	21			
51	139	271	20		12..04	
52	138	769	22	12..06		
53	137	993	22		12..25	
54	136	551	21	12..31		
55	135	1065	15	1..13		
56	134	447	20			
57	133	1420/9"	19		1..35	

Becker Hammer Blowcounts **Sunol Aggregates SMP-30 Quarry**

B2 Elevation: 150 **BSA 3021.703**

NW Corner, West of Quarry Access Road

Depth (ft)	Elevation (ft)	Blows per Foot	Bounce Chamber Pressure (psi)	Start Time	End Time	Comments
1	149	21	16	2:45		
2	148	42	17			
3	147	59	17			
4	146	61	18			
5	145	89	19			
6	144	88	19			
7	143	111	19			
8	142	113	19		2:51	
9	141	64	19	3:02		Add Rod
10	140	74	19			
11	139	59	19			
12	138	73	19			
13	137	94	19			
14	136	127	19			
15	135	105	19			
16	134	101	19			
17	133	121	19			
18	132	114	19		3:12	
19	131	84	19	3:22		Add Rod
20	130	121	19			
21	129	208	20			
22	128	216	20			
23	127	158	20			
24	126	254	20			
25	125	134	20			
26	124	146	20			
27	123	154	20			
28	122	138	20		3:40	
29	121	799	18 - 20	7:12		Add Rod; Lift 1'
30	120	620	18 - 22			
31	119	320	20 - 22			
32	118	358				
33	117	400				
34	116	320				
35	115	450				Lift 4'
36	114	163				
37	113	214				
38	112	214				Add Rod
39	111	130				
40	110	154				

Becker Hammer Blowcounts **Sunol Aggregates SMP-30 Quarry**

B2 Elevation: 150 **BSA 3021.703**

NW Corner, West of Quarry Access Road

Depth (ft)	Elevation (ft)	Blows per Foot	Bounce Chamber Pressure (psi)	Start Time	End Time	Comments
41	109	154				
42	108	221				
43	107	275				
44	106	203				
45	105	237				
46	104	165				Lift 7'
47	103	150				
48	102	213				
49	101	176			8:55	Add Rod
50	100	141		9:03		
51	99	159				
52	98	201				
53	97	176				
54	96	198				
55	95	231				
56	94	332				
57	93	923				
58	92	1373				Never made it to 58' only 57 1/2'

Becker Hammer Blowcounts **Sunol Aggregates SMP-30 Quarry**

B3 Elevation: 140 **BSA 3021.703**

NW Corner, West of Quarry Access Road

Depth (ft)	Elevation (ft)	Blows per Foot	Bounce Chamber Pressure (psi)	Start Time	End Time	Comments
1	139	9	16	11:04		
2	138	17				
3	137	28				
4	136	42				
5	135	36				
6	134	30				
7	133	47				
8	132	63			11:08	
9	131	72	16	11:13		
10	130	80				
11	129	110				
12	128	115				
13	127	121				
14	126	125				
15	125	120				
16	124	161				
17	123	182			11:28	
18	122	177	16	11:33		
19	121	164				
20	120	173				
21	119	195				
22	118	165				
23	117	170				
24	116	184				
25	115	172				
26	114	150				
27	113	150				
28	112	161			11:50	Breakdown on swivel joint
29	111	146	16			Add rod 7:10
30	110	142	17			
31	109	164	18			
32	108	156	18			
33	107	254	19			
34	106	261	19			
35	105	214	20			
36	104	197	20			
37	103	199	20			
38	102	265	20		7:33	
39	101	144	20			Add Rod; Lift
40	100	170	20			

Becker Hammer Blowcounts **Sunol Aggregates SMP-30 Quarry**

B3 Elevation: 140 **BSA 3021.703**

NW Corner, West of Quarry Access Road

Depth (ft)	Elevation (ft)	Blows per Foot	Bounce Chamber Pressure (psi)	Start Time	End Time	Comments
41	99	240	20			
42	98	231	20			
43	97	230	20			
44	96	212	19			
45	95	207	19			
46	94	161	20			Lift
47	93	192	20			
48	92	207	20			
49	91	142	20			Add Rod; Lift
50	90	160	20			
51	89	182	20			
52	88	176	20			
53	87	218	23			
54	86	228	21			
55	85	216	20			
56	84	220	21			
57	83	325	24			
58	82	453	24			
59	81	530	24			Rod added; Lift
60	80	582	23			
61	79	466	23			
62	78	612	23			
63	77	861	24			
64	76	530	23			
65	75	415	23			
66	74	522	23			
67	73	325	23			Lift 5'
68	72	551	23	9:40		
69	71	333	23	9:41		Rod Added; Lift 2'
70	70	586	23			
71	69	750	23			
72	68	840	23			
73	67	2000	20	10:34		

Becker Hammer Blowcounts **Sunol Aggregates SMP-30 Quarry**

B4 Elevation: 261 **BSA 3021.703**

NW Corner, West of Quarry Access Road

Depth (ft)	Elevation (ft)	Blows per Foot	Bounce Chamber Pressure (psi)	Start Time	End Time	Comments
1	260	47	16			
2	259	40	16			
3	258	36	16			
4	257	36	16			
5	256	28	16			
6	255	26	16			
7	254	27	16			
8	253	27	16	11:53		
9	252	26	14	11:57		New Rod Added
10	251	23	14			
11	250	20	12			
12	249	16	12			
13	248	15	9			
14	247	16	12			
15	246	22	12			
16	245	19	12			Fuel Failure - hammer stopped
17	244	16	12			
18	243	13	10			17-18 not good. Hammer stopped again.
19	242					New Rod Added
20	241					
21	240					
						19-22: messed up by starting the hammer
22	239	23	16			- soft in general as above
23	238	38	16			
24	237	96	16			
25	236	134	16			
26	235	152	16			
27	234	114	16			
28	233	101	16	12:30		
29	232	67	16			New Rod added; 2-hour break (down time) to fix the hammer for good; 1) new fuel line installed. 2) Fuel line ok. Fuel pump shot.
30	231	106	19	2:30		
31	230	114	19			
32	229	116	19			
33	228	145	19			
34	227	126	19			
35	226	96	19			
36	225	59	19			
37	224	39	19			
38	223	61	19	2:46		
39	222	120	19			New Rod added.
40	221	312	19			

Becker Hammer Blowcounts **Sunol Aggregates SMP-30 Quarry**

B4 Elevation: 261 **BSA 3021.703**

NW Corner, West of Quarry Access Road

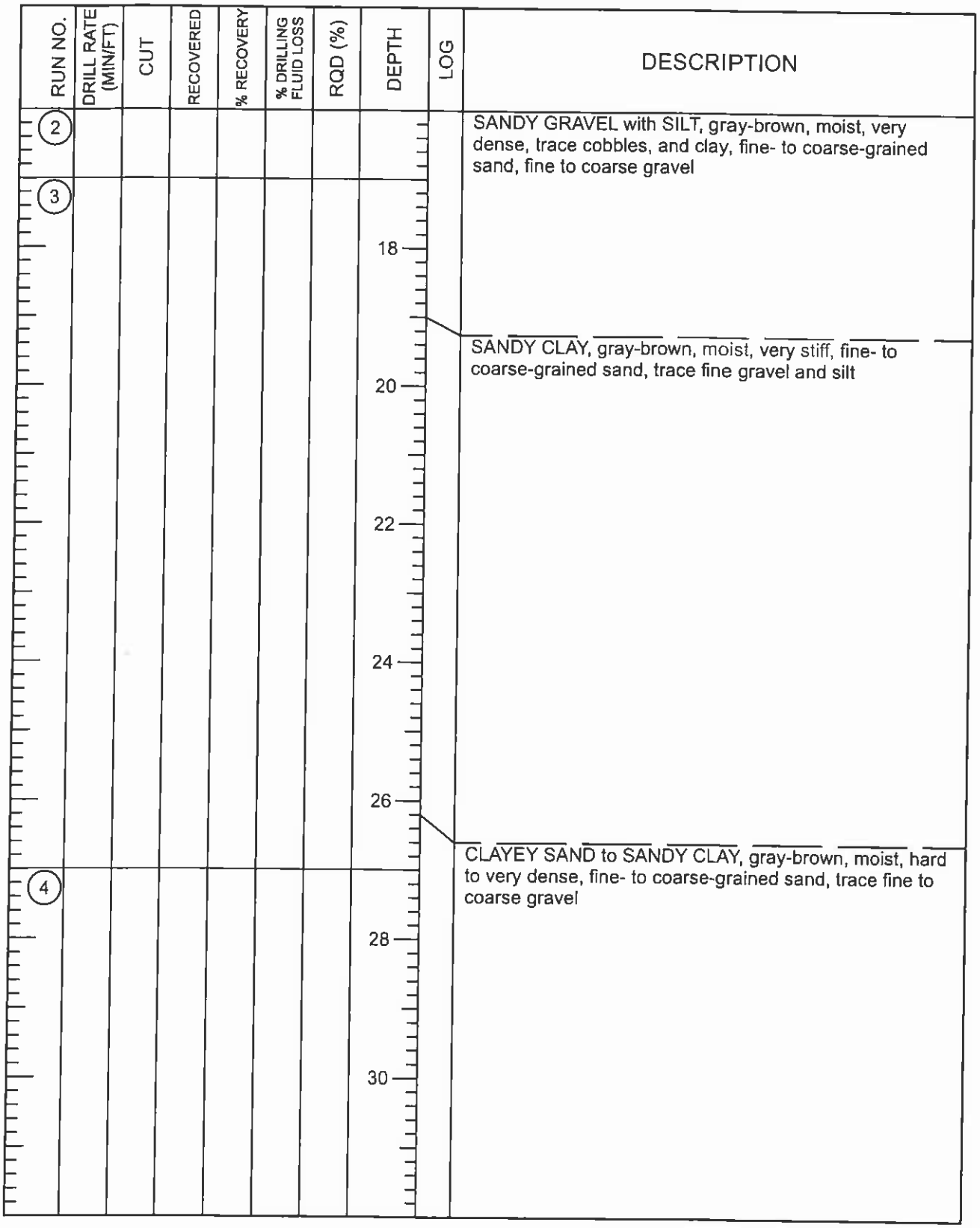
Depth (ft)	Elevation (ft)	Blows per Foot	Bounce Chamber Pressure (psi)	Start Time	End Time	Comments
41	220	521	19			
42	219	280	19			
43	218	190	21			
44	217	170	21			
45	216	180	21			
46	215	158	21			
47	214	136	21			
48	213	160	21	3:14		
49	212	158	19			New Rod added; lift 2'
50	211	179	19			
51	210	136	19			
52	209	110	19			
53	208	136	19			
54	207	156	19			
55	206	195	21			
56	205	220	21			
57	204	241	21			
58	203	426	22	3:38		
59	202	473	21			New Rod added
60	201	520	21			
61	200	402	21			
62	199	310	21			
63	198	282	19			
64	197	210	19			
65	196	170	21			
66	195	312	21			
67	194	536	21			
68	193	660	21	4:30		End of 11/16/07
69	192	1460/311	20	6:25	6:40	New Rod Added Refusal

APPENDIX B

Sonic Drilling Boring Logs

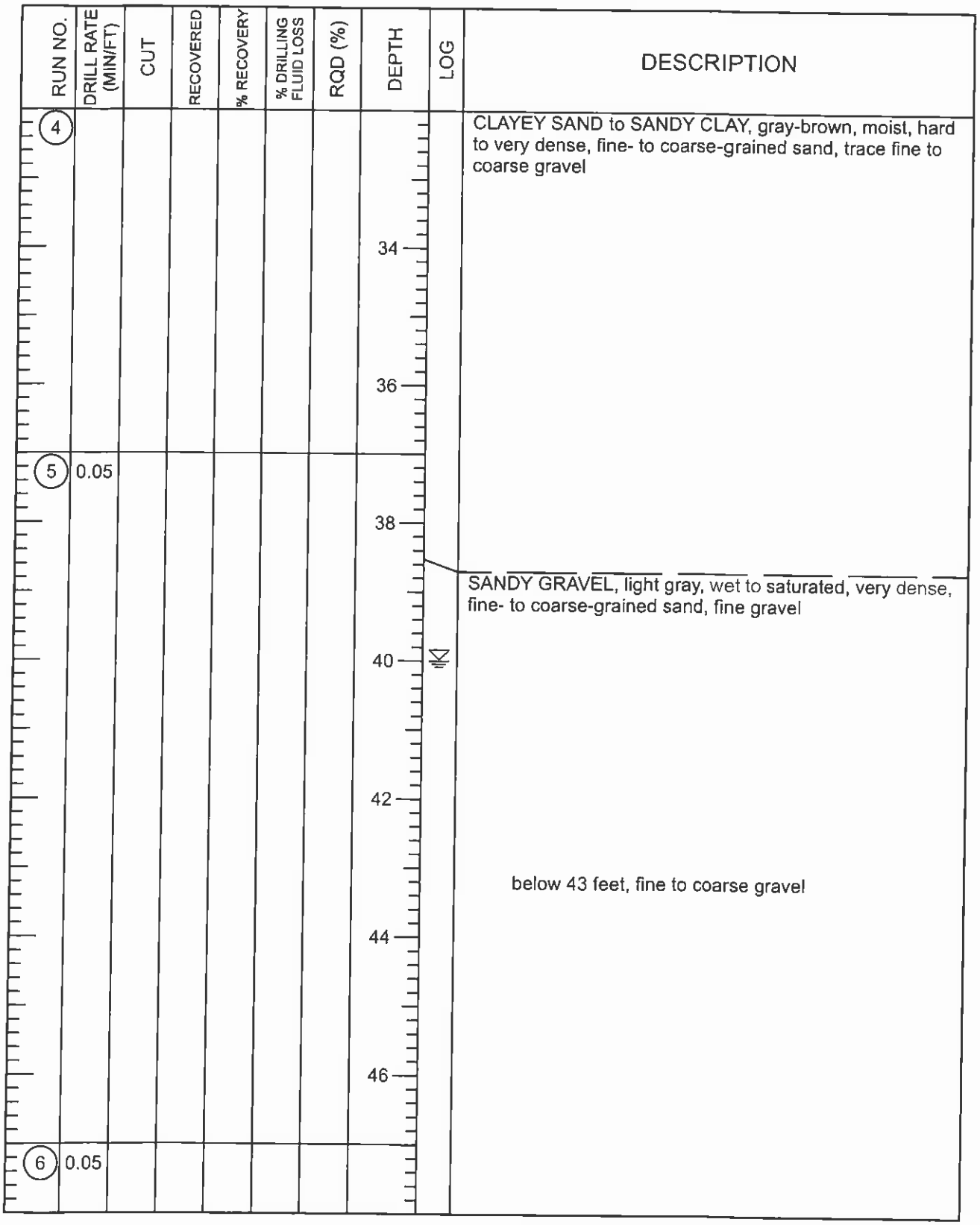
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700



CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700



CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
6	0.05						50		SANDY GRAVEL, light gray, saturated, very dense, fine- to coarse-grained sand, fine to coarse gravel
							52		
							54		
							56		
7	1.0						58		below 57 feet, trace silt and cobbles
							60		
							62		

CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
7	1.0						66		SANDY GRAVEL, light gray, saturated, very dense, fine- to coarse-grained sand, fine to coarse gravel, trace silt, cobbles
8	0.9						68 70 72 74		SANDY GRAVEL, gray, saturated, very dense, fine- to coarse-grained sand, fine to coarse gravel with some clay and silt
9	0.5						76 78		below 76 feet, less clay/silt

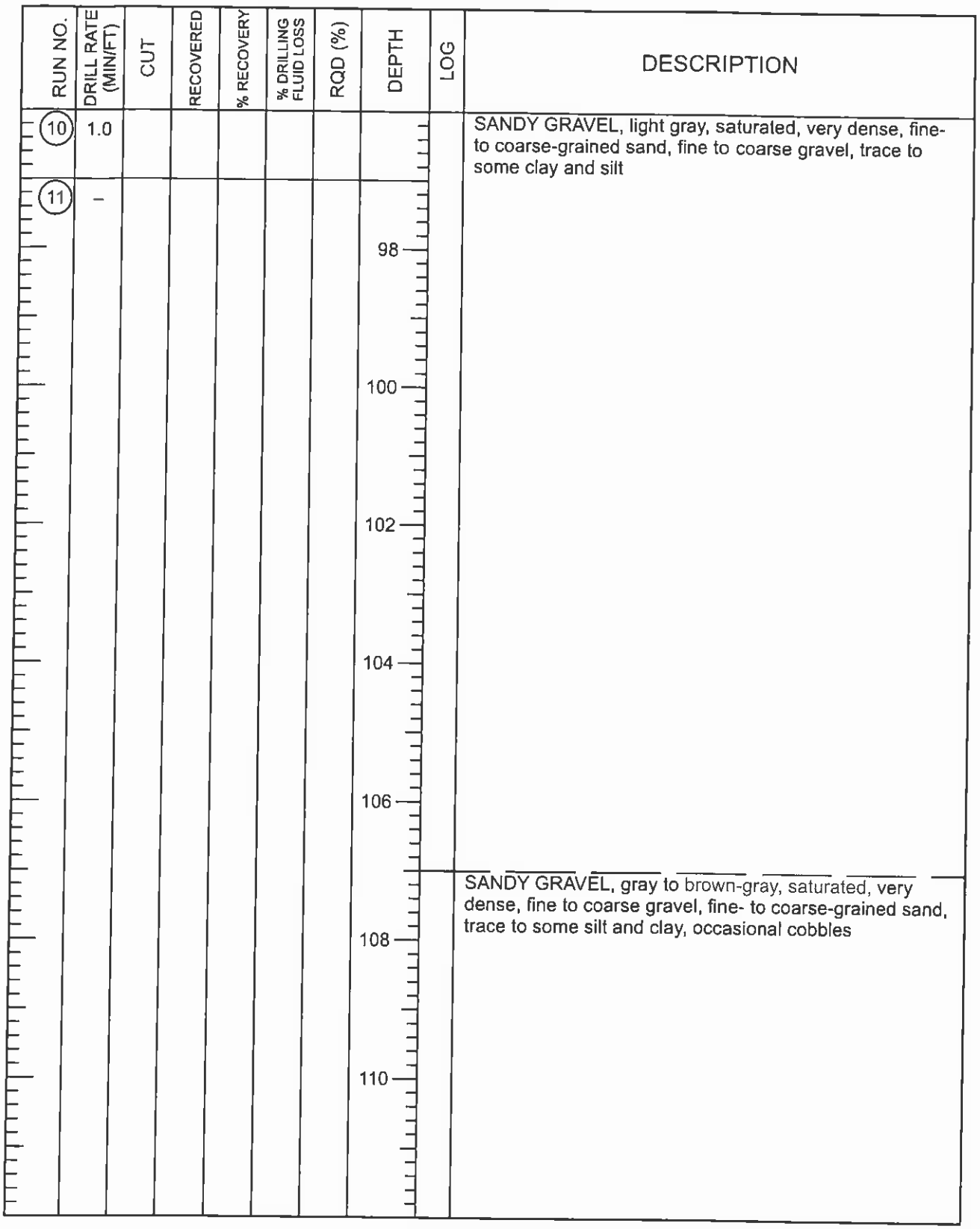
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
9	0.5						82 84 86		SANDY GRAVEL, light gray, saturated, very dense, fine- to coarse-grained sand, fine to coarse gravel, trace clay and silt
10	0.9						88 90 92 94		below 90 feet, trace to some clay and silt

CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700



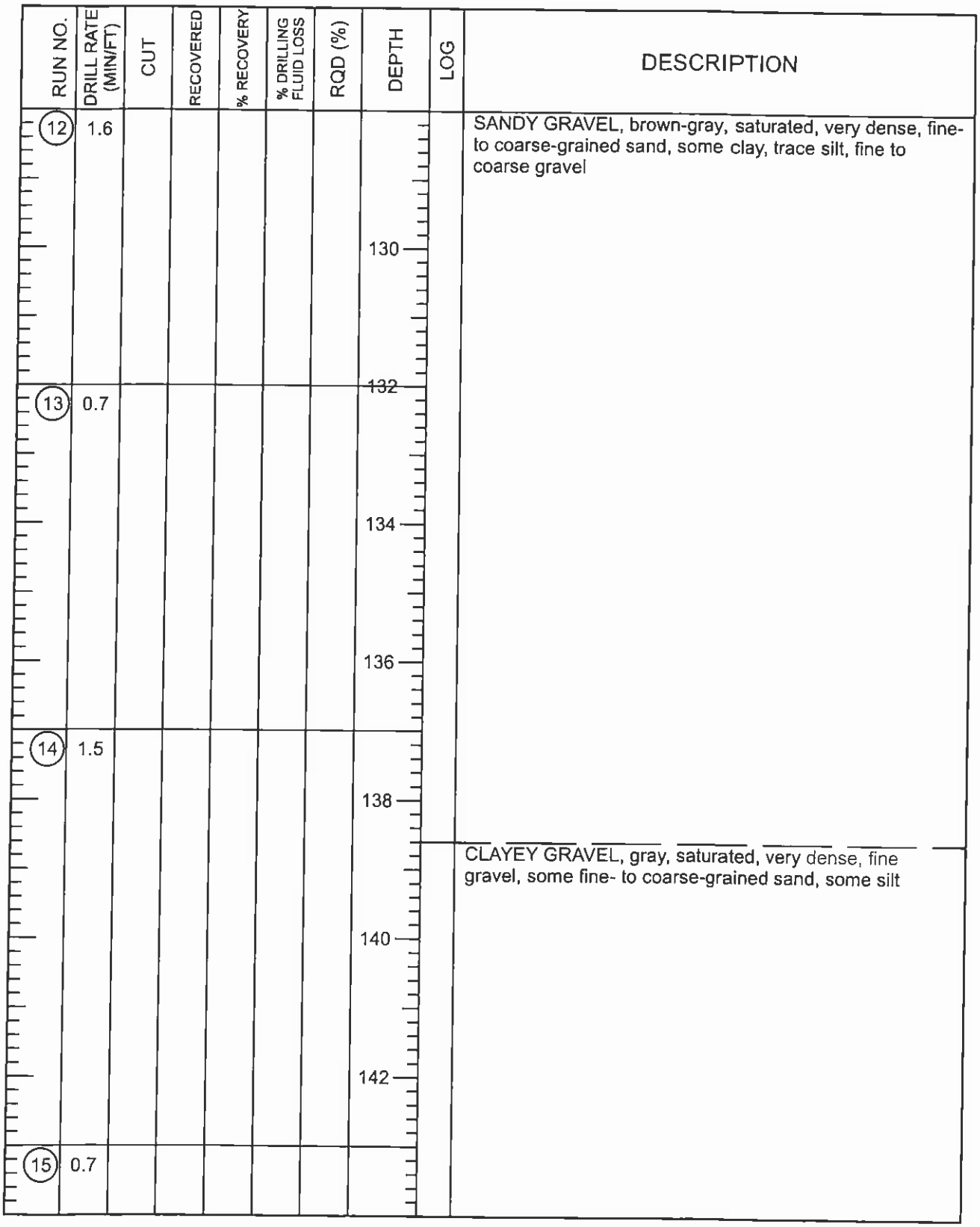
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
11	–						114 – 116		SANDY GRAVEL, gray to brown-gray, saturated, very dense, fine to coarse gravel, fine- to coarse-grained sand, trace to some silt and clay, occasional cobbles
12	0.25						118 – 120 – 122 – 124 – 126		SANDY GRAVEL, brown-gray, saturated, very dense, fine to coarse gravel, fine- to coarse-grained sand, trace silt and some clay below 126 feet, less clay
	1.6								

CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700



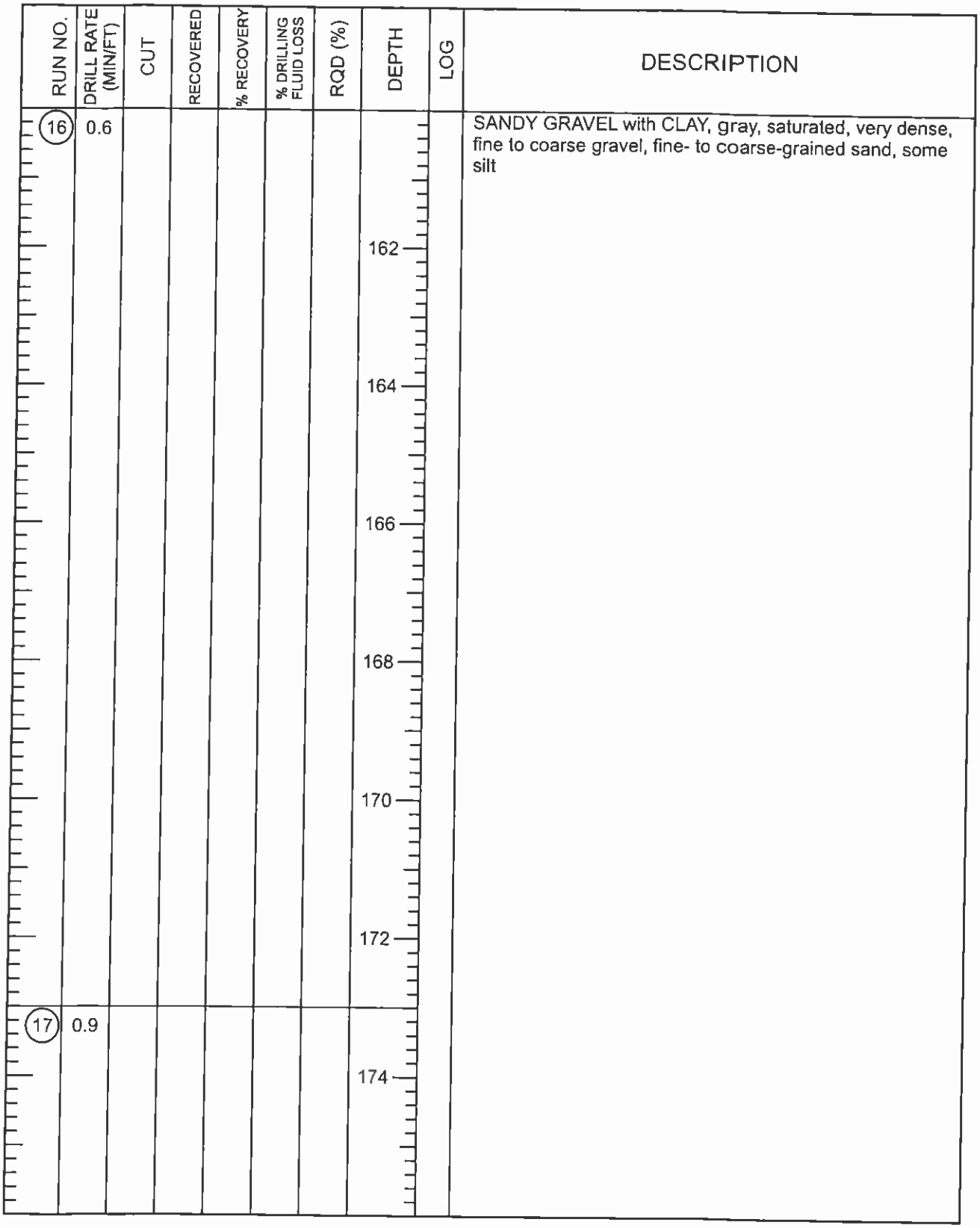
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
15	0.7						146		CLAYEY GRAVEL, gray, saturated, very dense, fine gravel, some fine- to coarse-grained sand, some silt
							148		SANDY GRAVEL with CLAY, gray, saturated, very dense, fine to coarse gravel, fine- to coarse-grained sand, some silt
							150		
							152		
							154		
							156		
16	0.6						158		

CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700



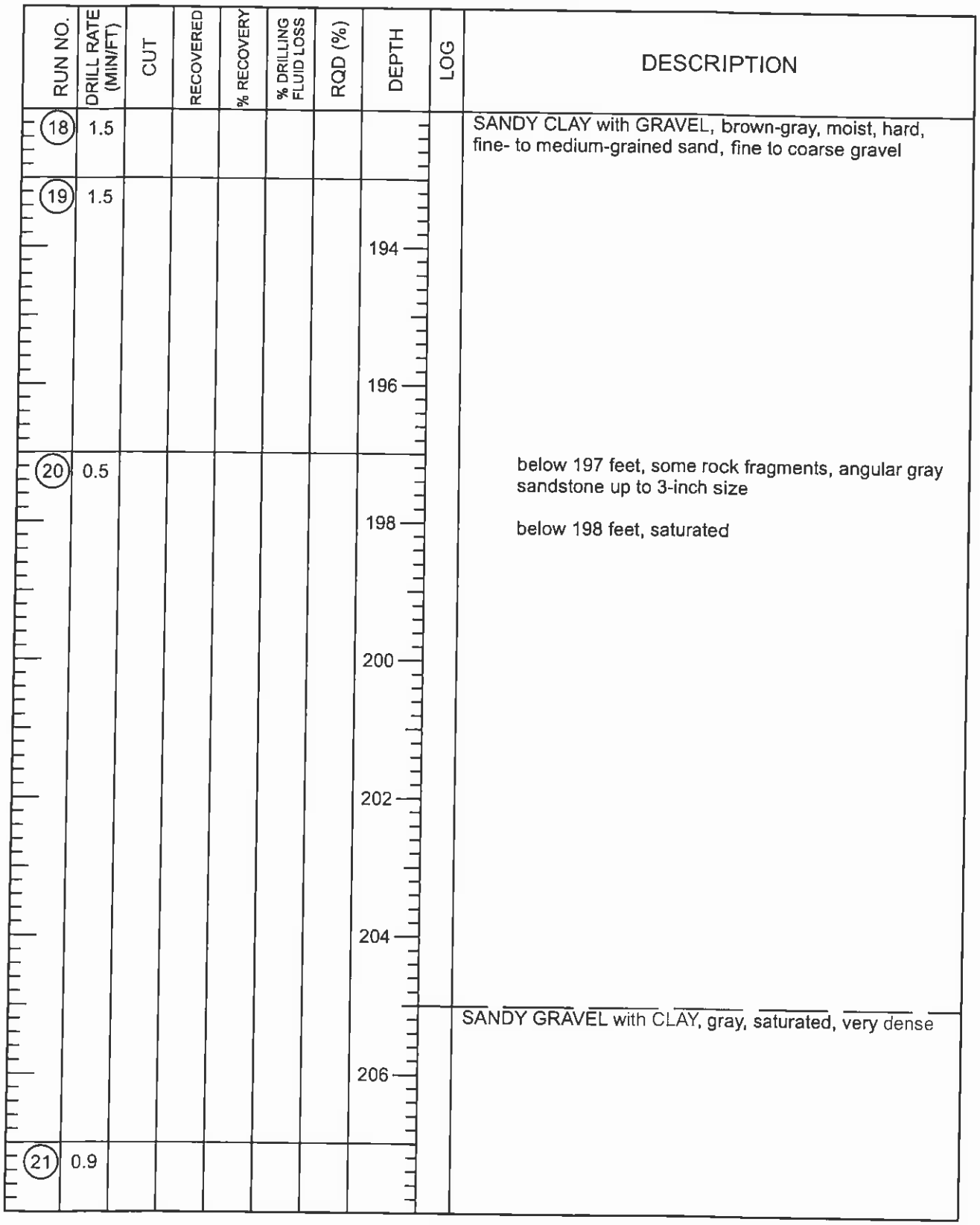
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
17	0.9								SANDY GRAVEL with CLAY, gray, saturated, very dense, fine to coarse gravel, fine- to coarse-grained sand, some silt
18	0.9						178		
							180		
							182		
							184		
							186		
	1.5						188		
							190		SANDY CLAY with GRAVEL, brown-gray, moist, hard, fine- to medium-grained sand, fine to coarse gravel

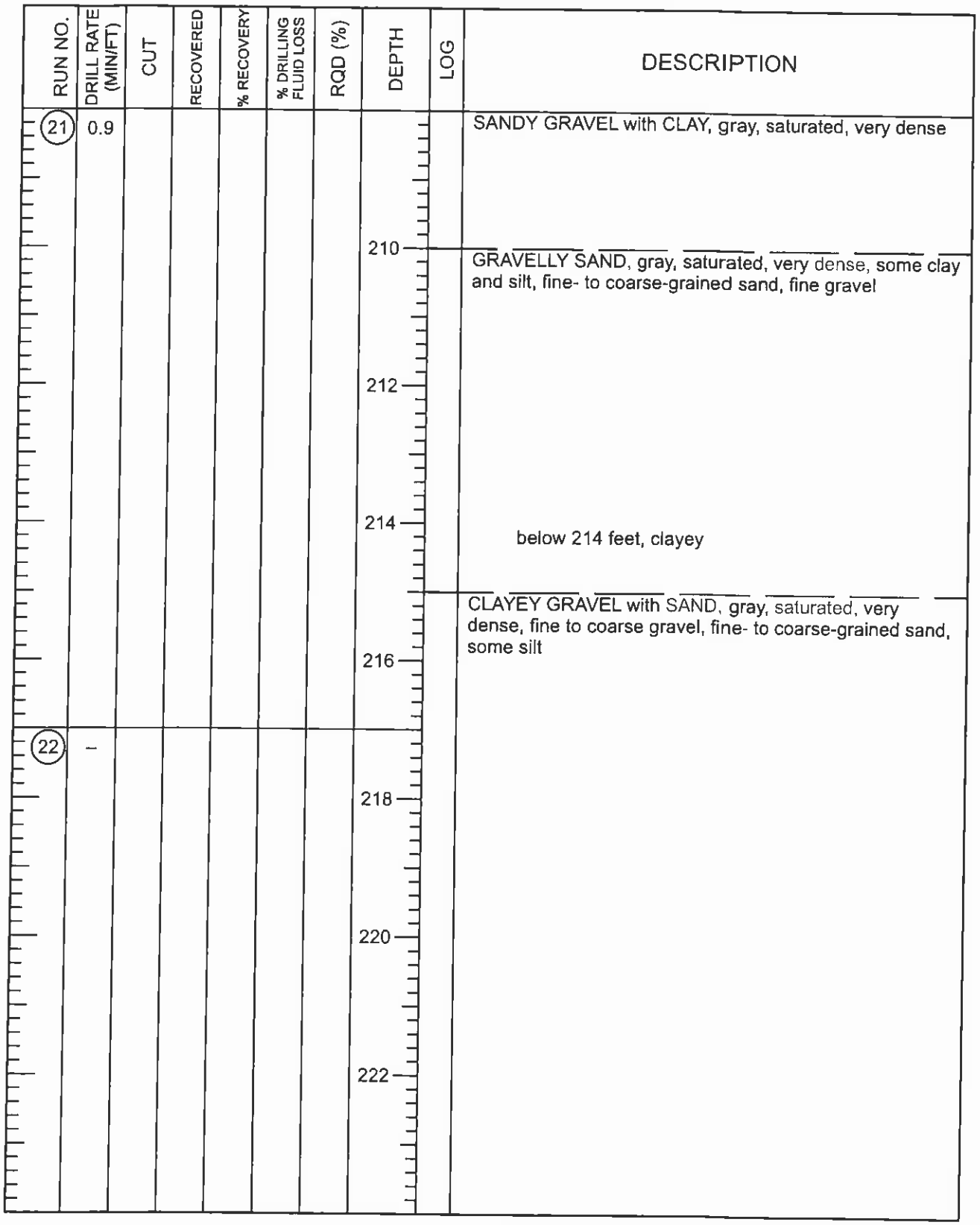
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700



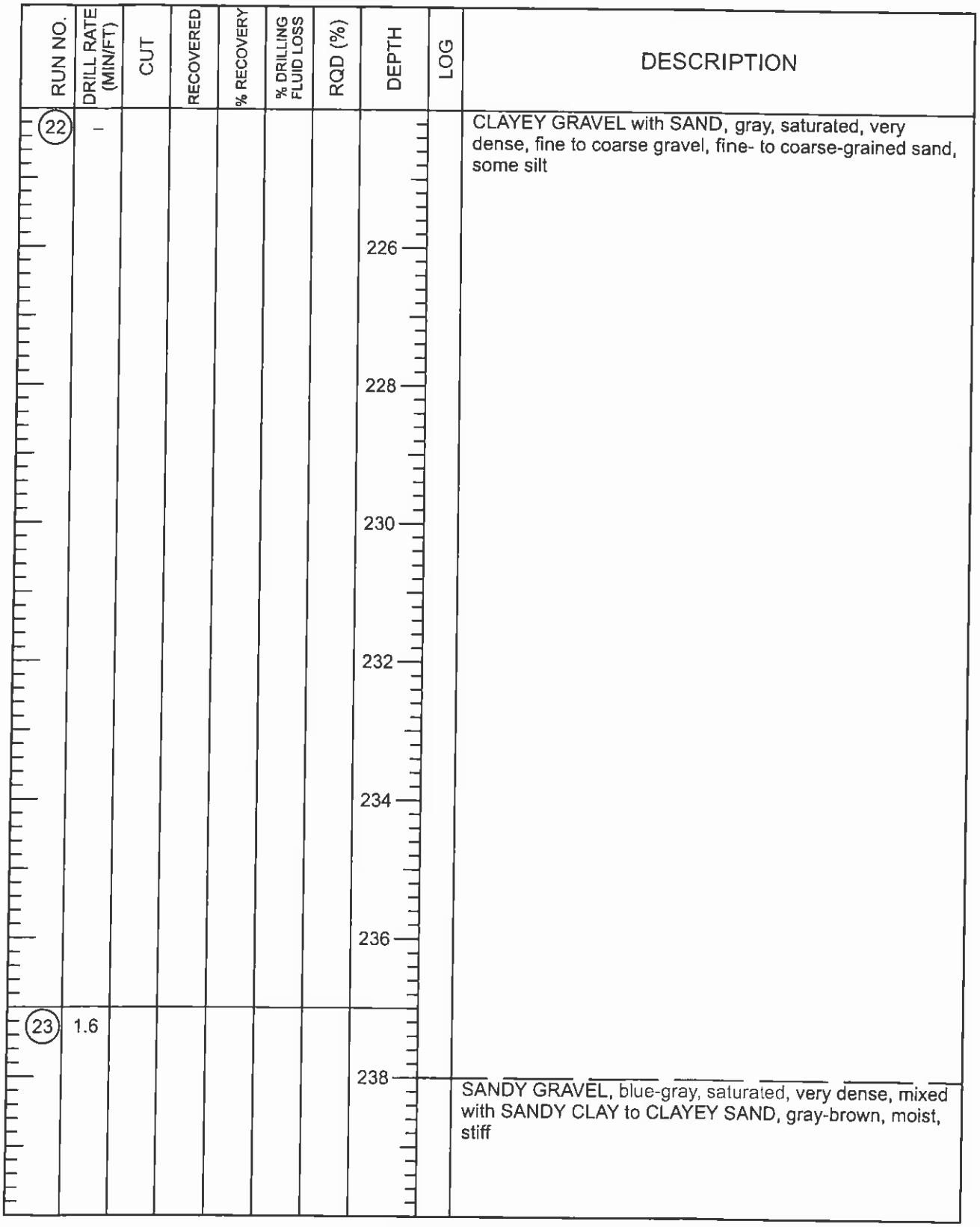
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700



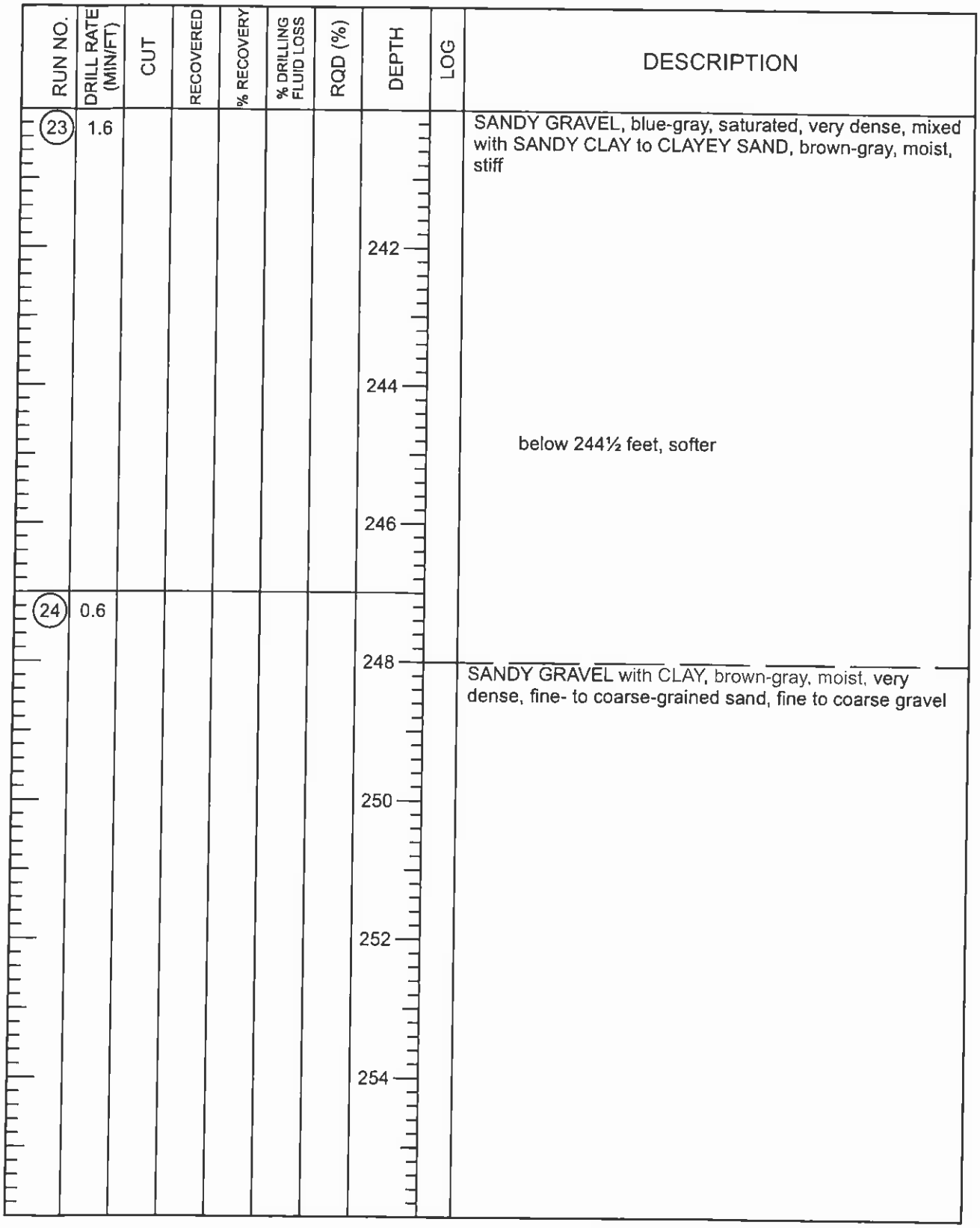
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700



CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700



CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
24	0.6								SANDY GRAVEL with CLAY, brown-gray, moist, very dense, fine- to coarse-grained sand, fine to coarse gravel
25	1.8						258 260		SANDY GRAVEL with CLAY, gray, wet to saturated, very dense, fine- to coarse-grained sand, fine gravel, trace silt, occasional rounded cobbles
26	1.1						262 264 266 268 270		

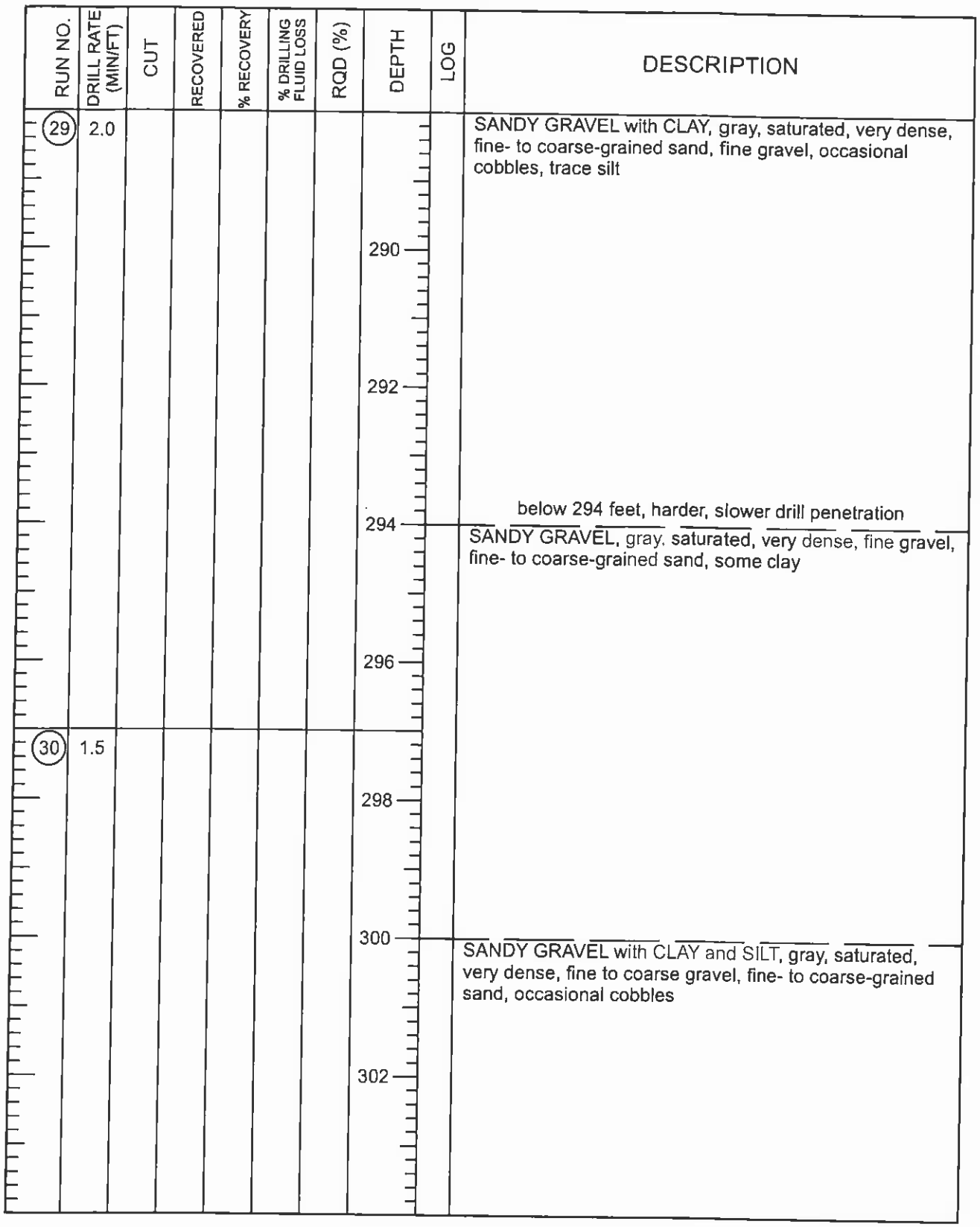
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
26	1.1						274 – 276		SANDY GRAVEL with CLAY, gray, saturated, very dense, fine- to coarse-grained sand, fine gravel with occasional well-rounded gray wakke cobbles, trace silt
27	1.6						278 – 280		
28	3.2						282 – 284 – 286		
29	2.0								

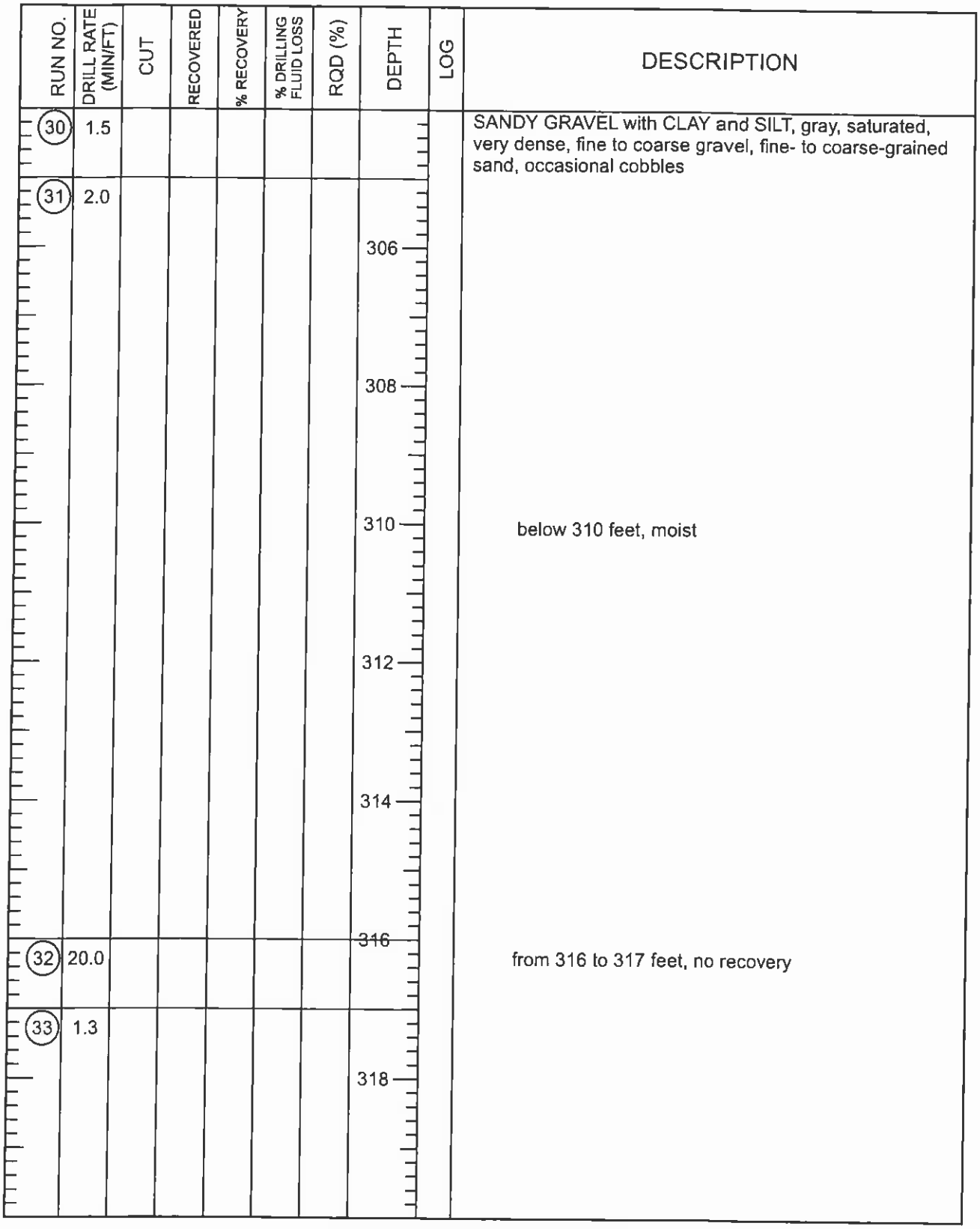
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700



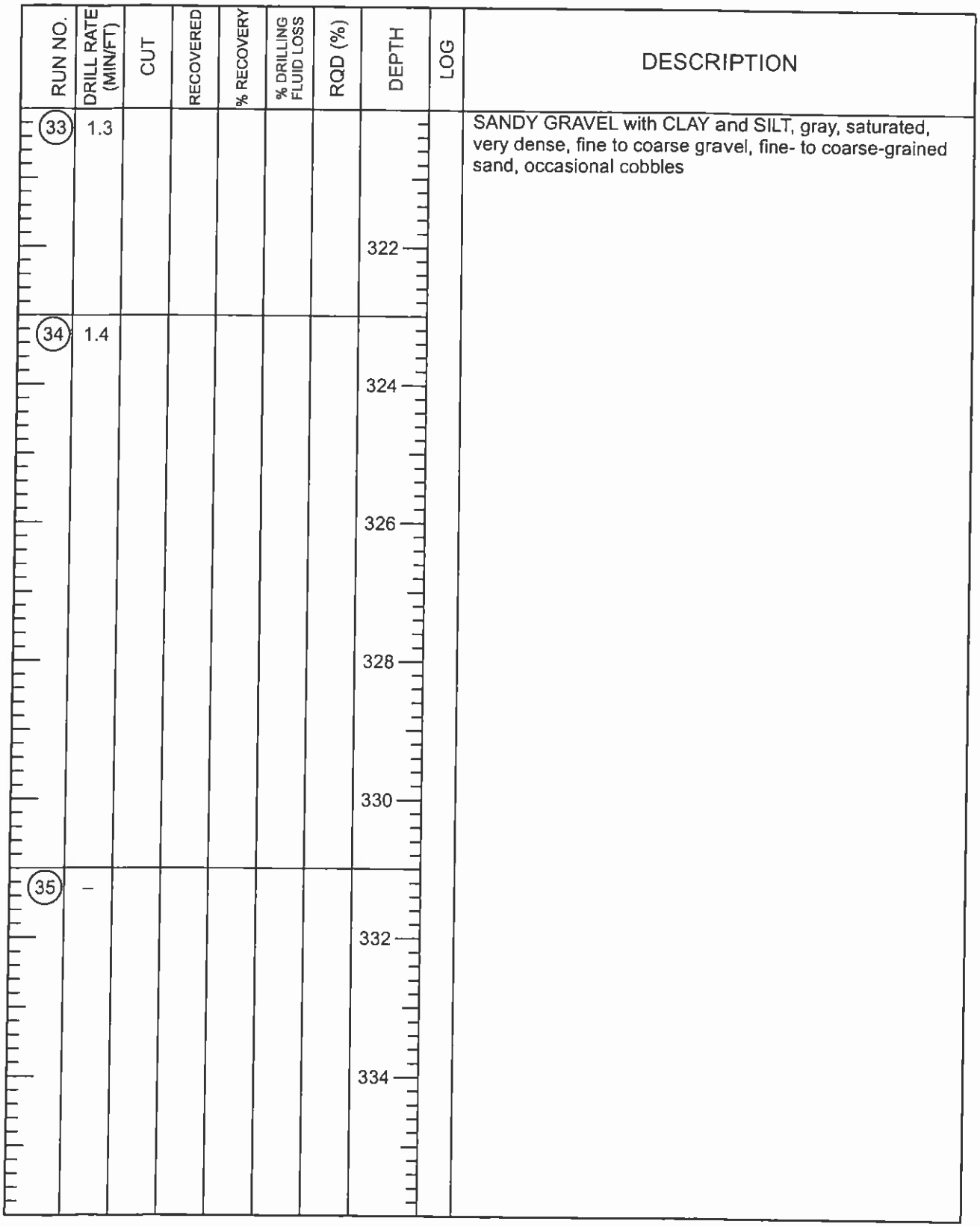
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700



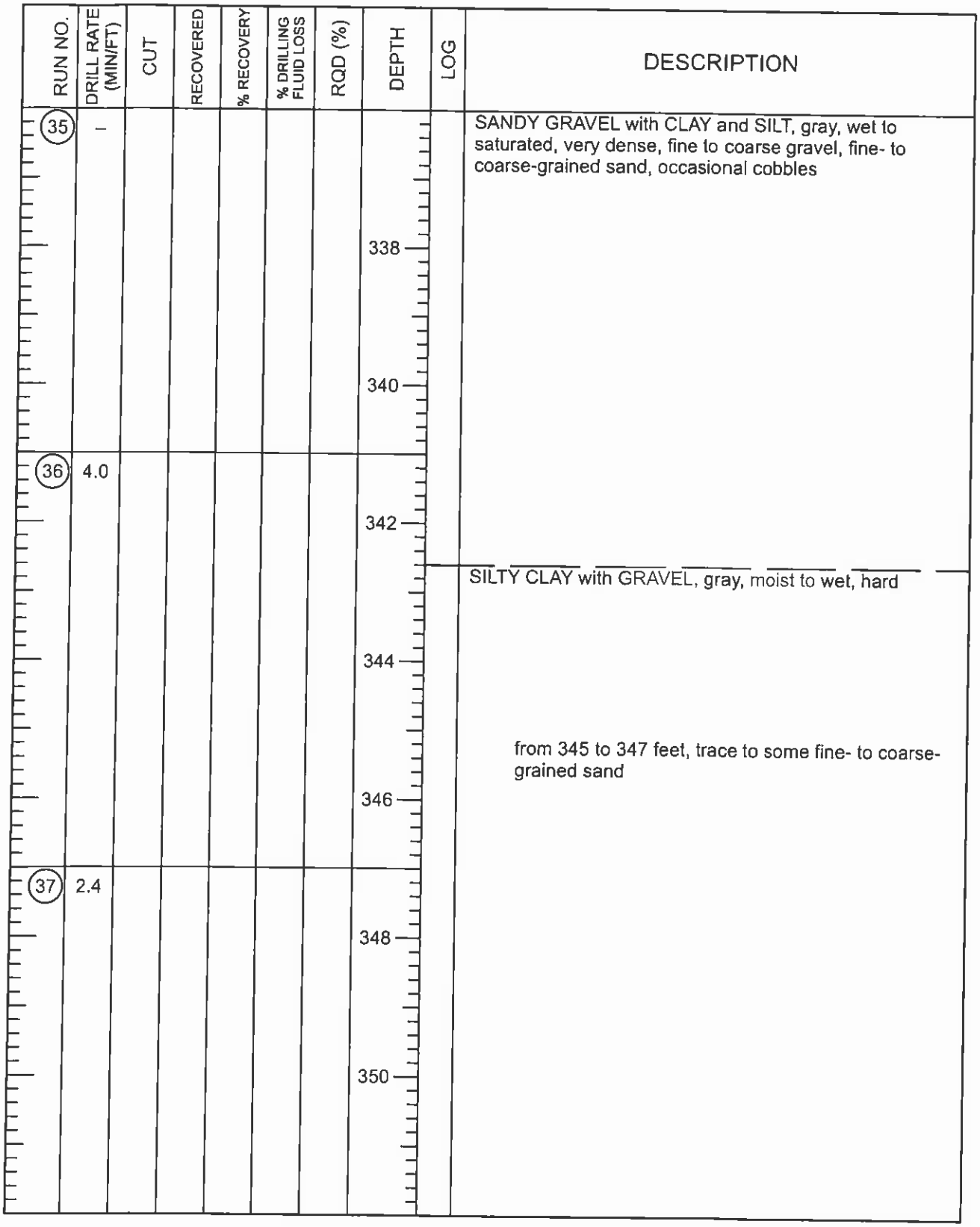
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700



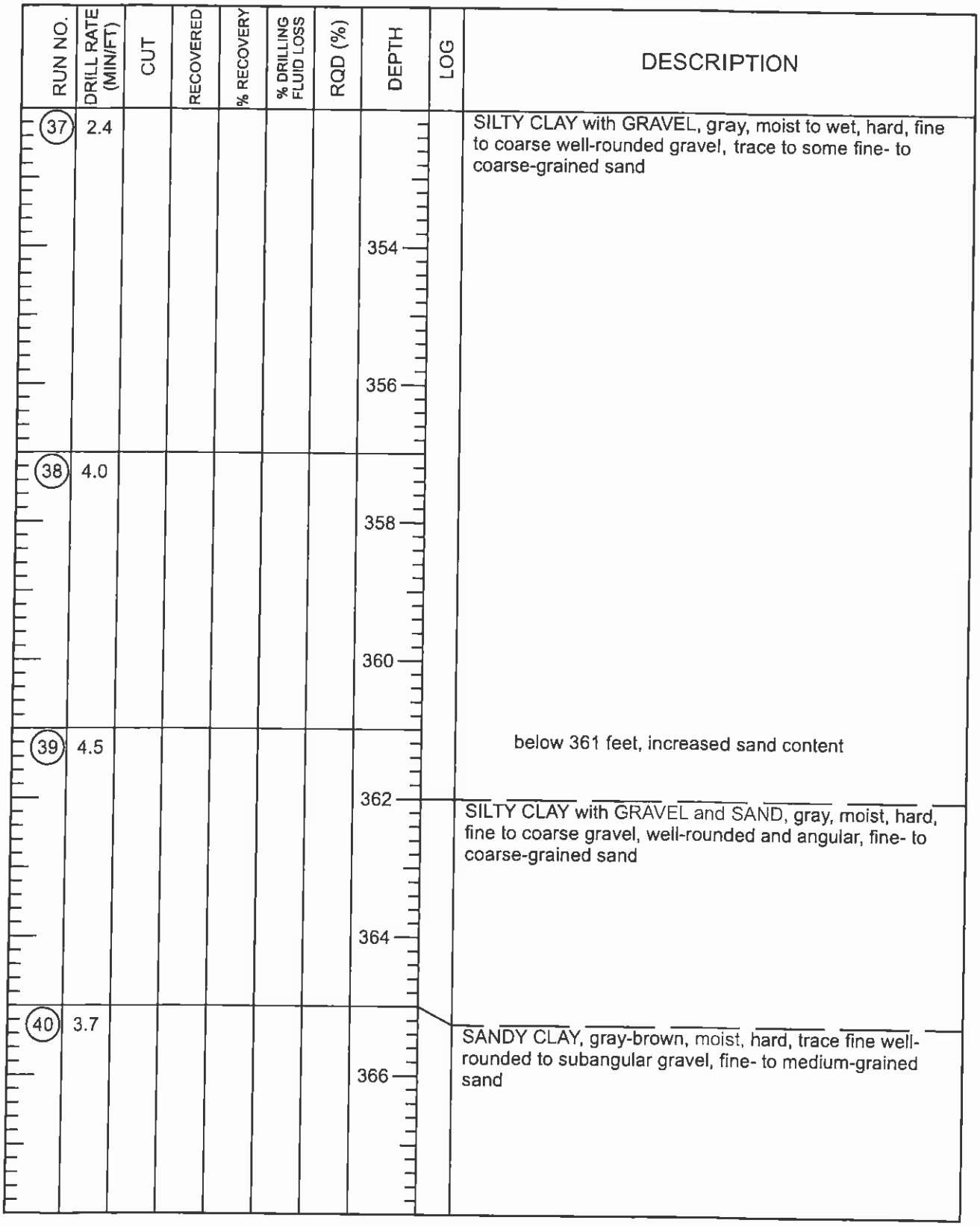
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700



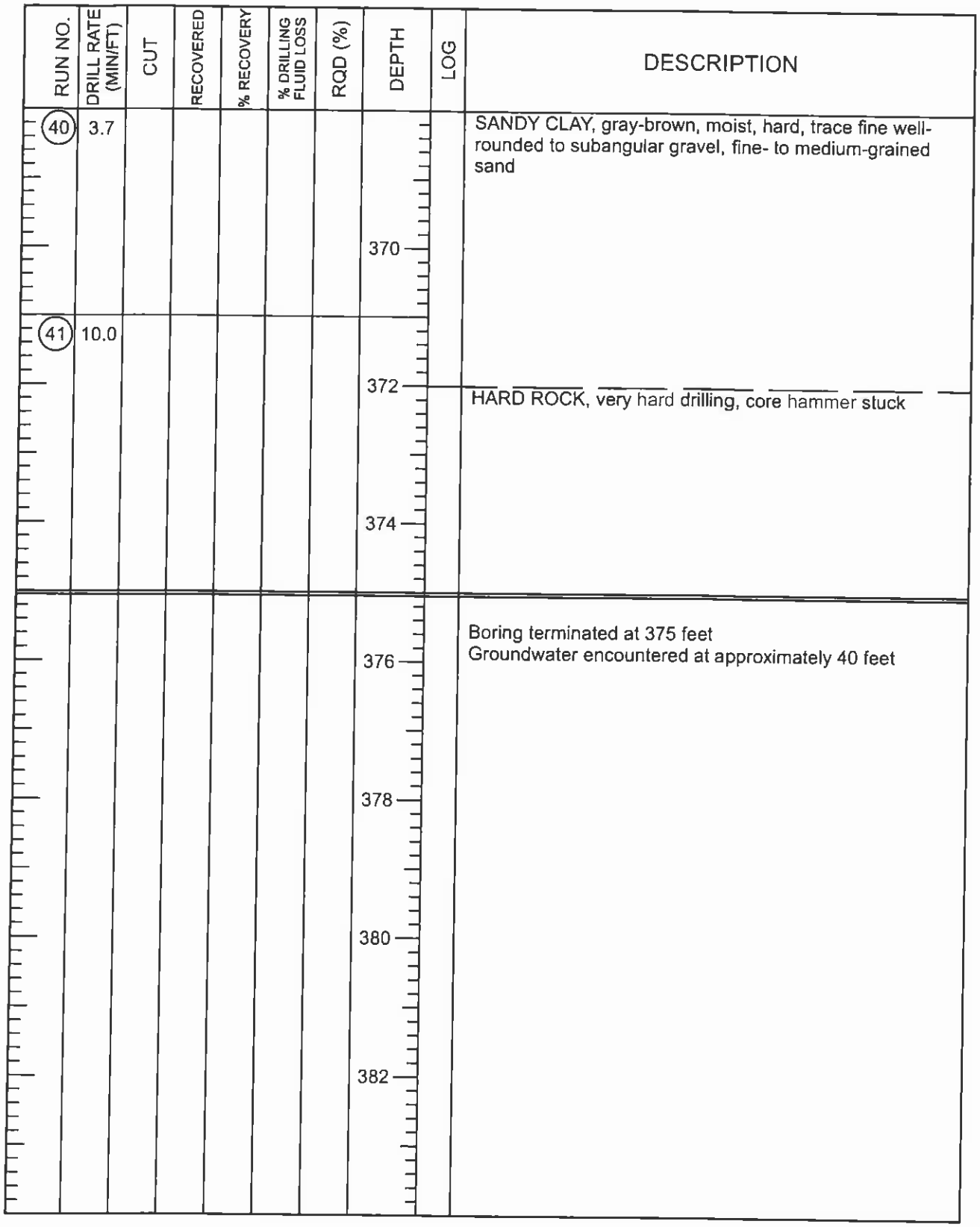
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700



CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-1 JOB NO.: 3021.700



CORE LOG

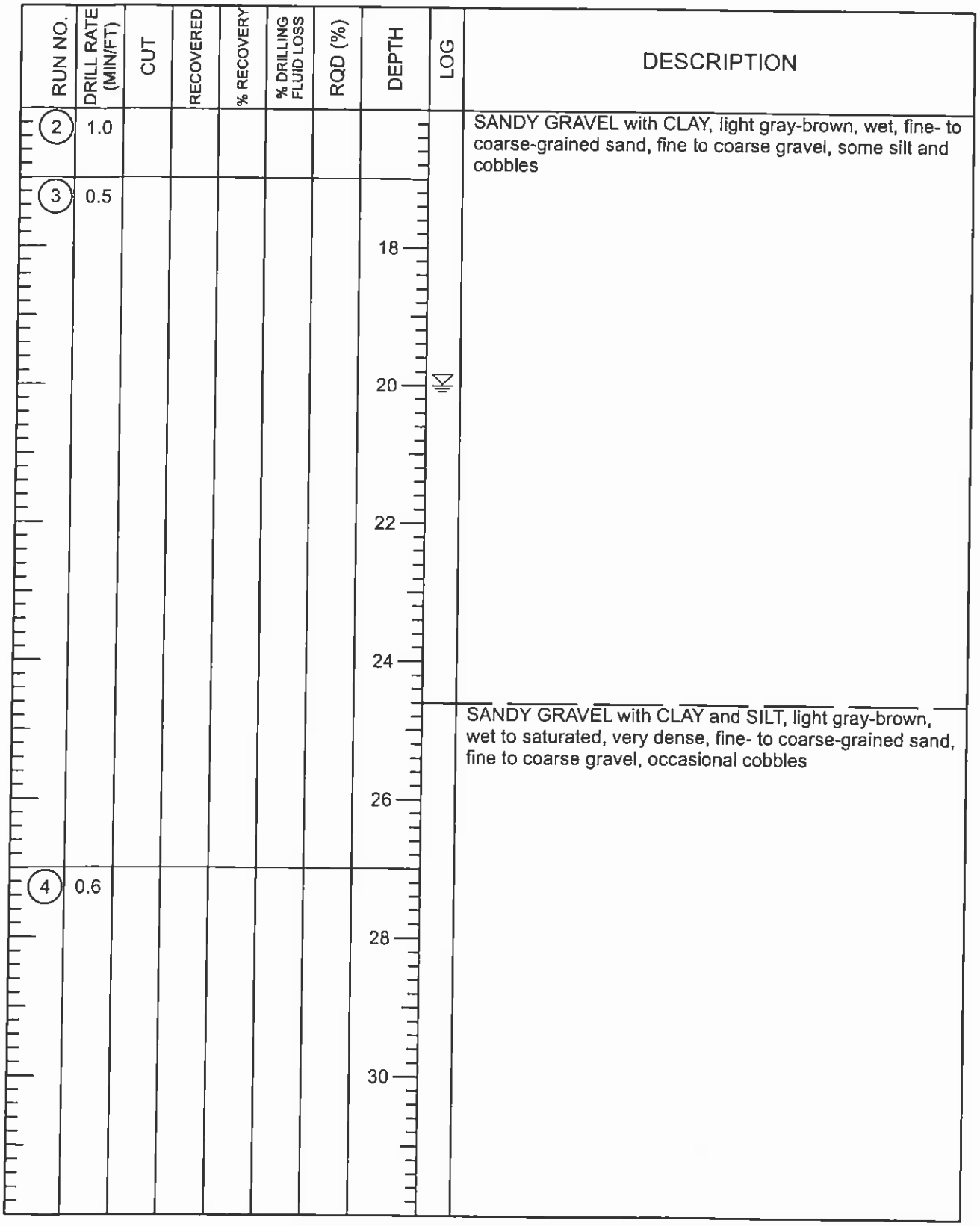
PROJECT: Calaveras Quarry
DRILLING COMPANY: Boart Longyear
DRILLING METHOD: Sonic
NUMBER OF CORE BOXES: N/A
LOGGED BY: ROV

BORING NO.: S-2 JOB NO.: 3021.700
DATE INITIATED: 11/08/2007
DATE COMPLETED: 11/13/2007
TOTAL DEPTH OF HOLE: 220 feet
ELEVATION (FEET ABOVE MSL): 145 feet

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
1	0.5						2, 4, 6, 8, 10, 12		SANDY GRAVEL with CLAY, light gray-brown, moist, hard, fine- to coarse-grained sand, fine to coarse gravel, some silt and cobbles
2	1.0						14		

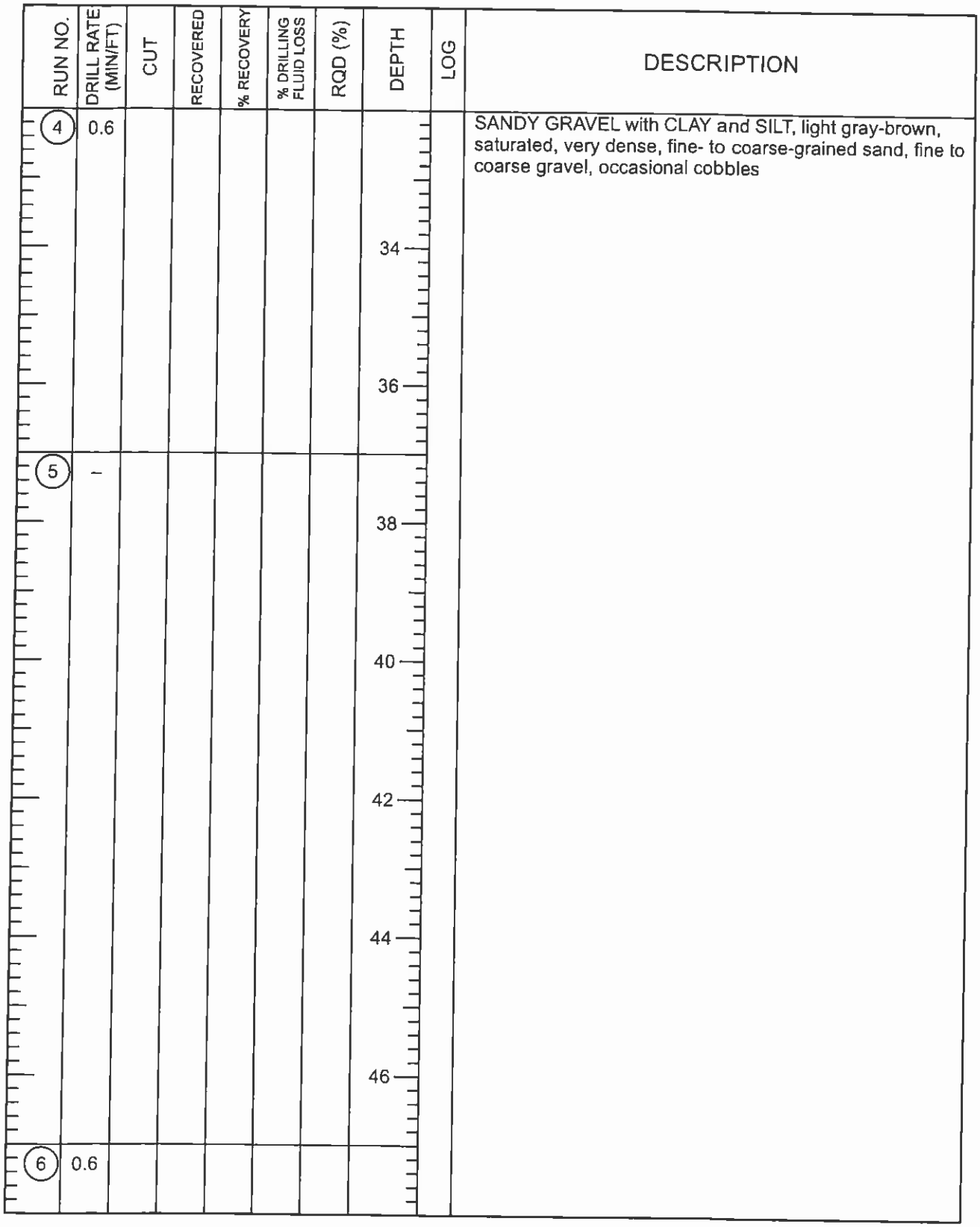
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-2 JOB NO.: 3021.700



CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-2 JOB NO.: 3021.700



CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-2 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
6	0.6						50 52 54 56		SANDY GRAVEL with CLAY and SILT, light gray-brown, saturated, very dense, fine- to coarse-grained sand, fine to coarse gravel, occasional cobbles
7	0.7						58 60 62		

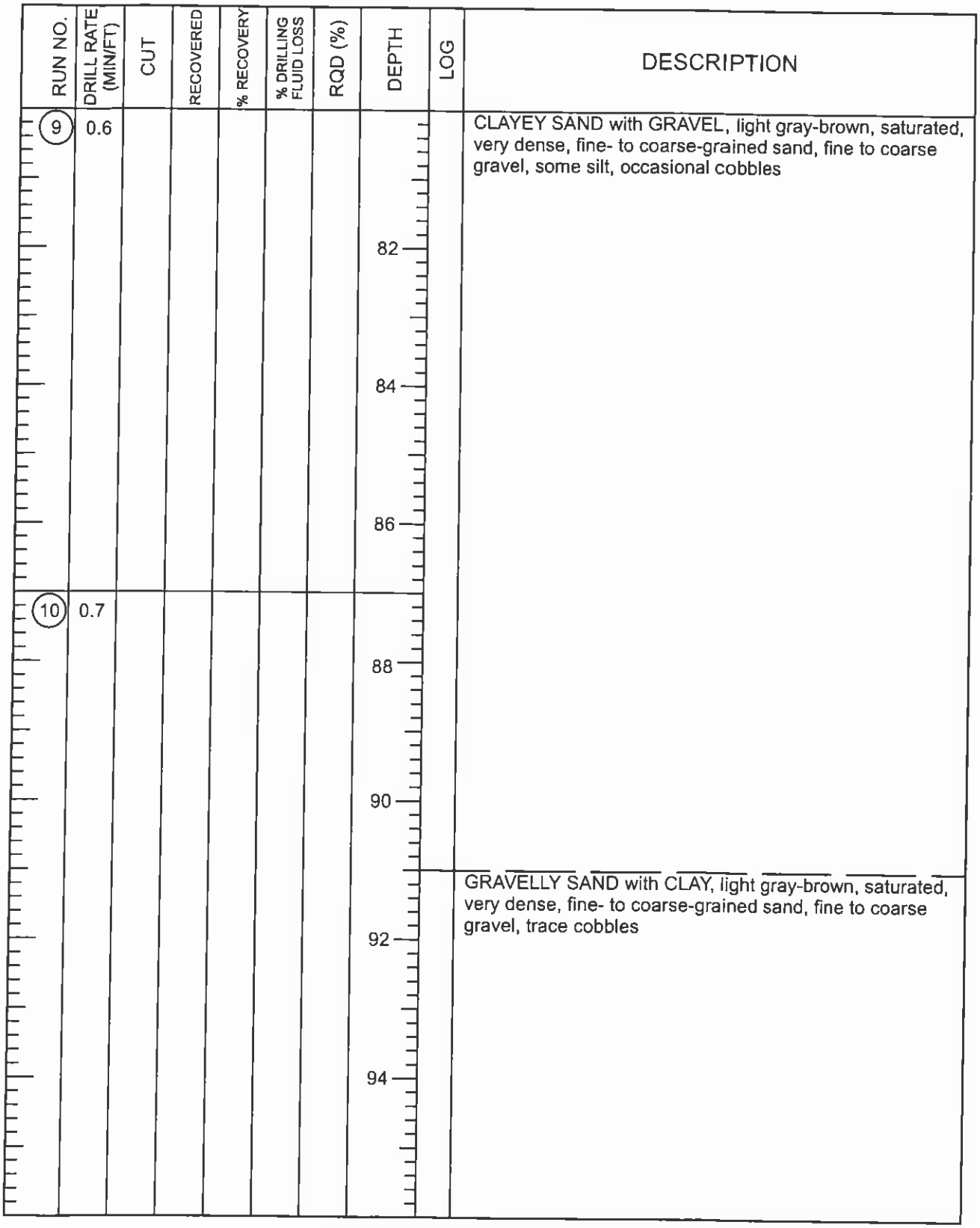
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-2 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
7	0.7						66		SANDY GRAVEL with CLAY and SILT, light gray-brown, saturated, very dense, fine- to coarse-grained sand, fine to coarse gravel, occasional cobbles
8	0.5						68 70 72 74 76		
9	0.6						78		below 80 feet, more clayey

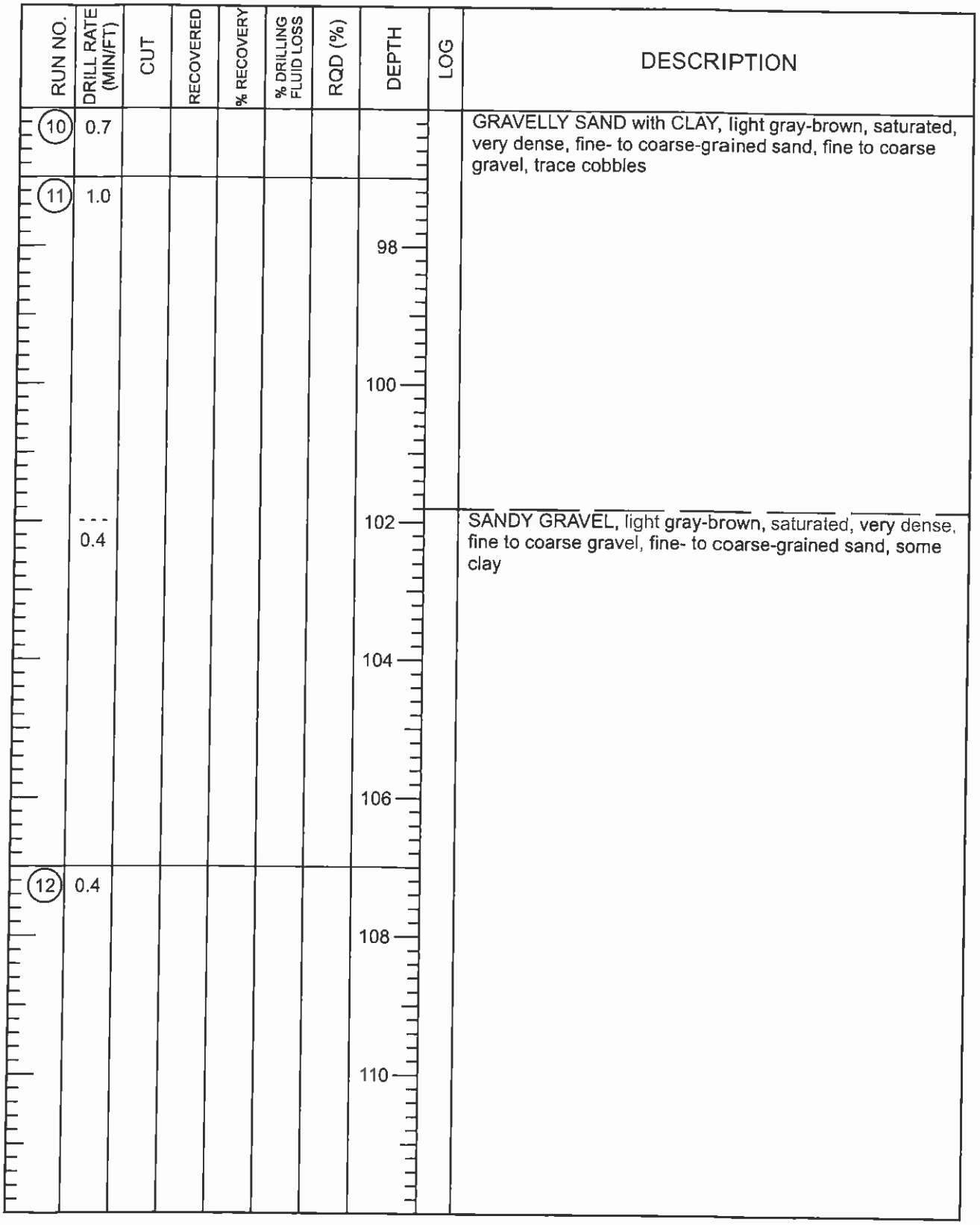
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-2 JOB NO.: 3021.700



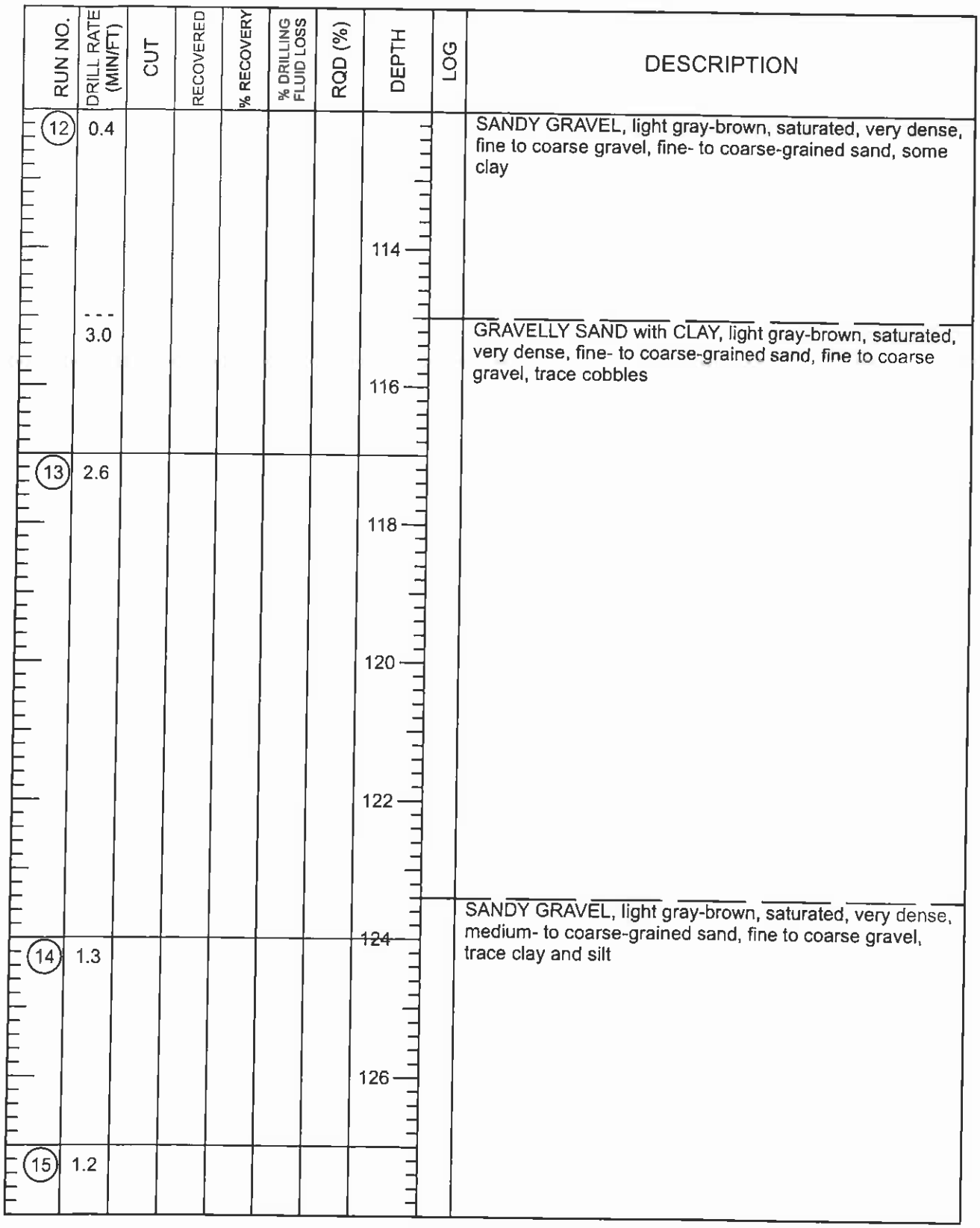
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-2 JOB NO.: 3021.700



CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-2 JOB NO.: 3021.700



CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-2 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
15	1.2						130		SANDY GRAVEL, light gray-brown, saturated, very dense, medium- to coarse-grained sand, fine to coarse gravel, trace clay and silt
							132		SANDY GRAVEL with CLAY, light gray-brown, saturated, very dense, fine- to coarse-grained sand, fine to coarse gravel, trace cobbles and silt
							134		
							136		
16	1.2						138		
							140		
							142		
17	1.4								

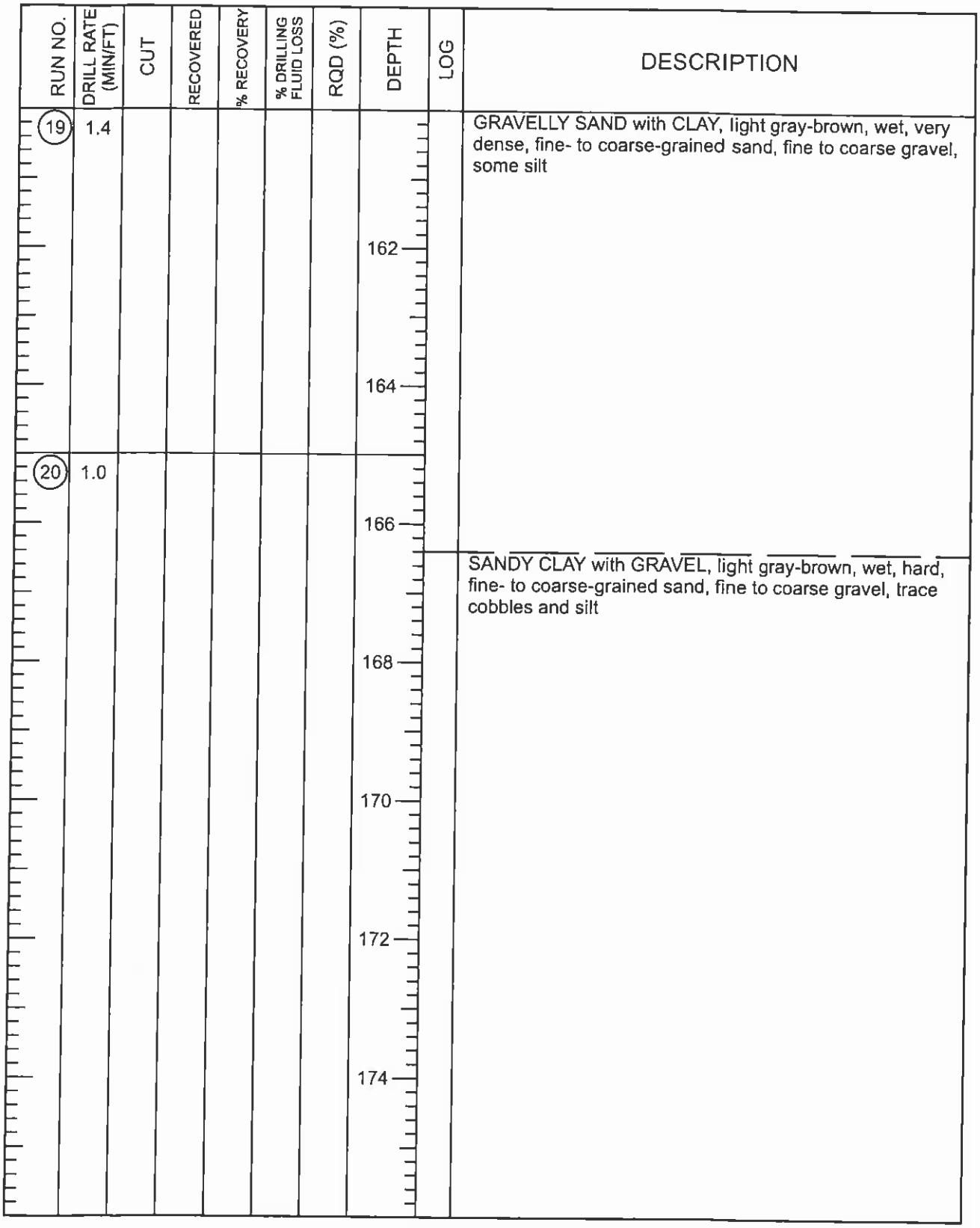
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-2 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
17	1.4						146		SANDY GRAVEL, light gray-brown, saturated, very dense, fine- to coarse-grained sand, fine to coarse gravel, trace cobbles and silt
18	1.2						148 150 152 154 156		below 151½ feet, rounded and angular gravel, clay content increases
19	1.4						158		GRAVELLY SAND with CLAY, light gray-brown, wet, very dense, fine- to coarse-grained sand, fine to coarse gravel, some silt

CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-2 JOB NO.: 3021.700



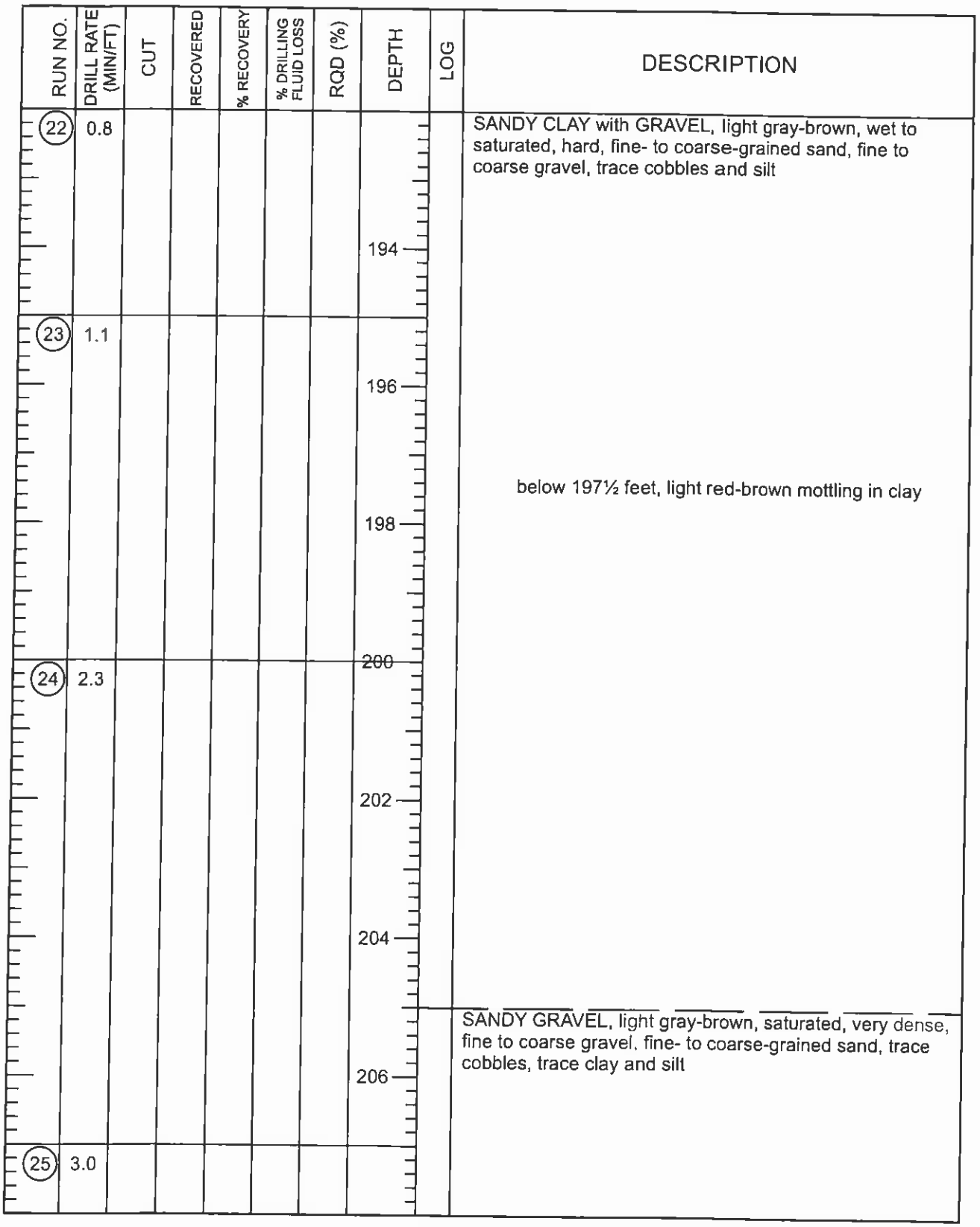
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-2 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
20	1.0								SANDY CLAY with GRAVEL, light gray-brown, wet to saturated, hard, fine- to coarse-grained sand, fine to coarse gravel, trace cobbles and silt
21	0.8						178		
							180		
							182		
							184		
							186		
22	0.8						188		
							190		

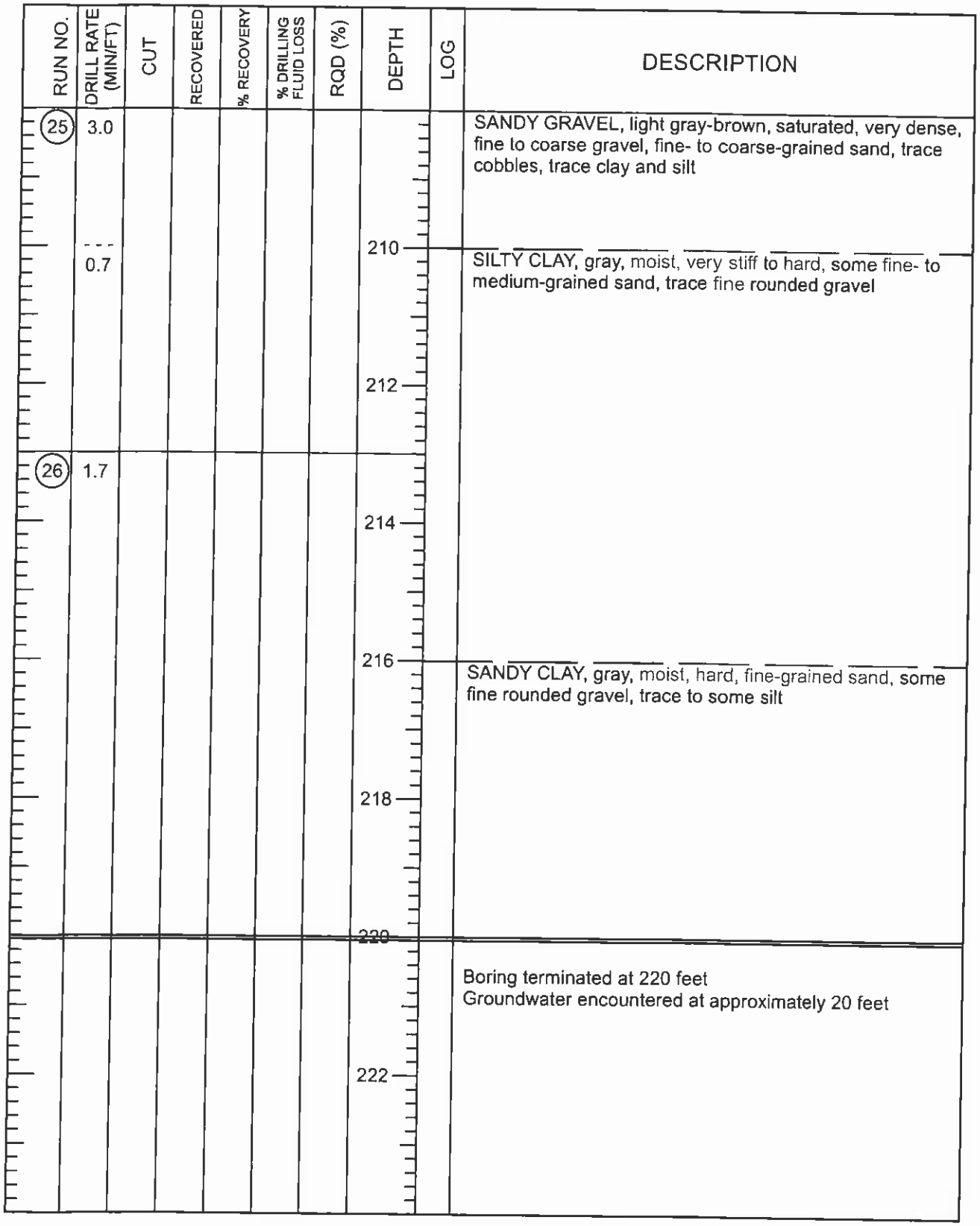
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-2 JOB NO.: 3021.700



CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-2 JOB NO.: 3021.700



CORE LOG

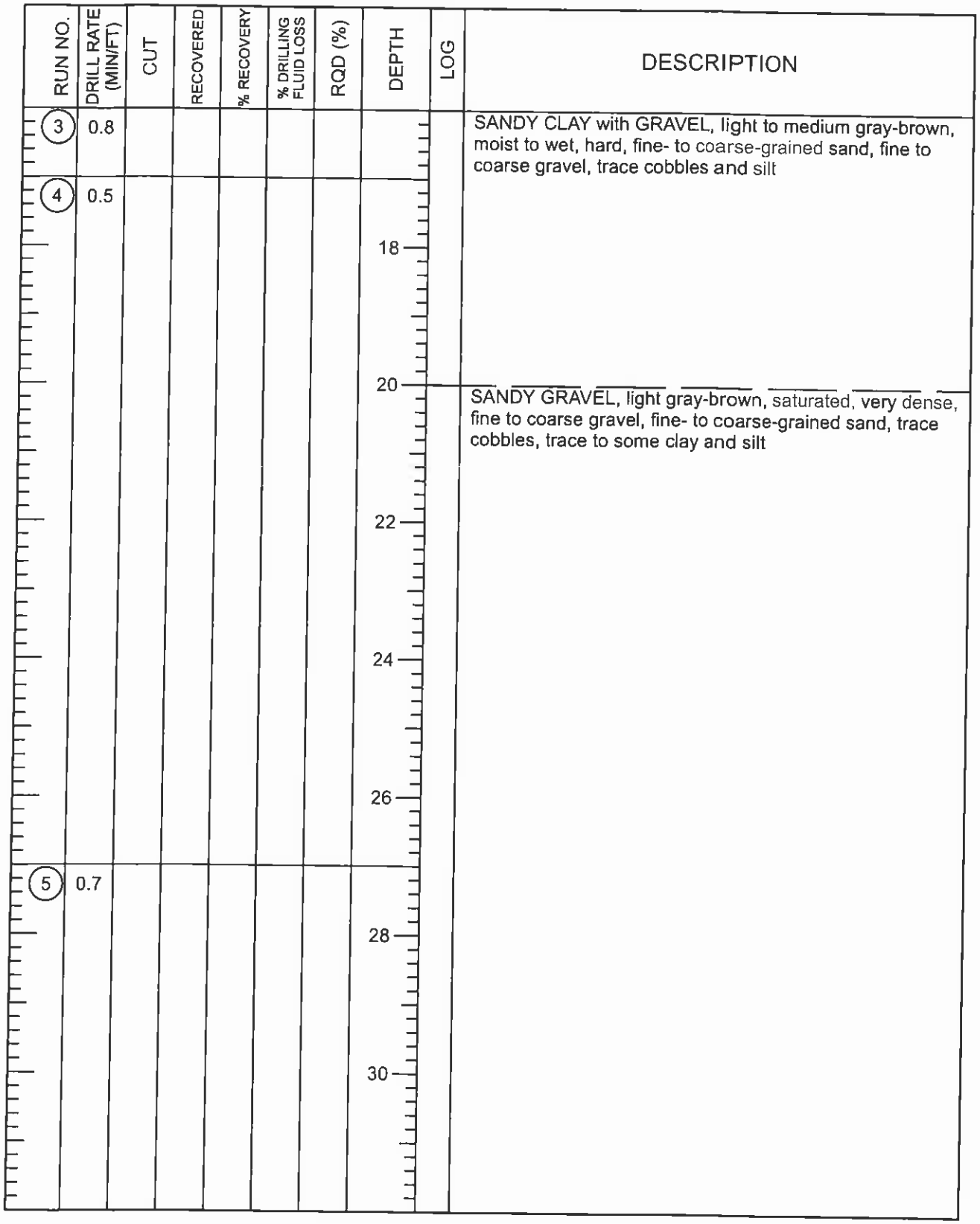
PROJECT: Calaveras Quarry
DRILLING COMPANY: Boart Longyear
DRILLING METHOD: Sonic
NUMBER OF CORE BOXES: N/A
LOGGED BY: ROV

BORING NO.: S-3 JOB NO.: 3021.700
DATE INITIATED: 11/14/2007
DATE COMPLETED: 11/14/2007
TOTAL DEPTH OF HOLE: 117 feet
ELEVATION (FEET ABOVE MSL): 260 feet

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
1	0.4						2, 4, 6		SANDY GRAVEL, light gray-brown, moist, dense to very dense, fine- to coarse-grained sand, fine to coarse gravel, trace cobbles, trace silt and clay
2	0.5						8		below 8 feet, becomes more moist
							10		SANDY CLAY with GRAVEL, light to medium gray-brown, moist, hard, fine- to coarse-grained sand, fine to coarse gravel, trace cobbles and silt
3	0.8						12, 14		

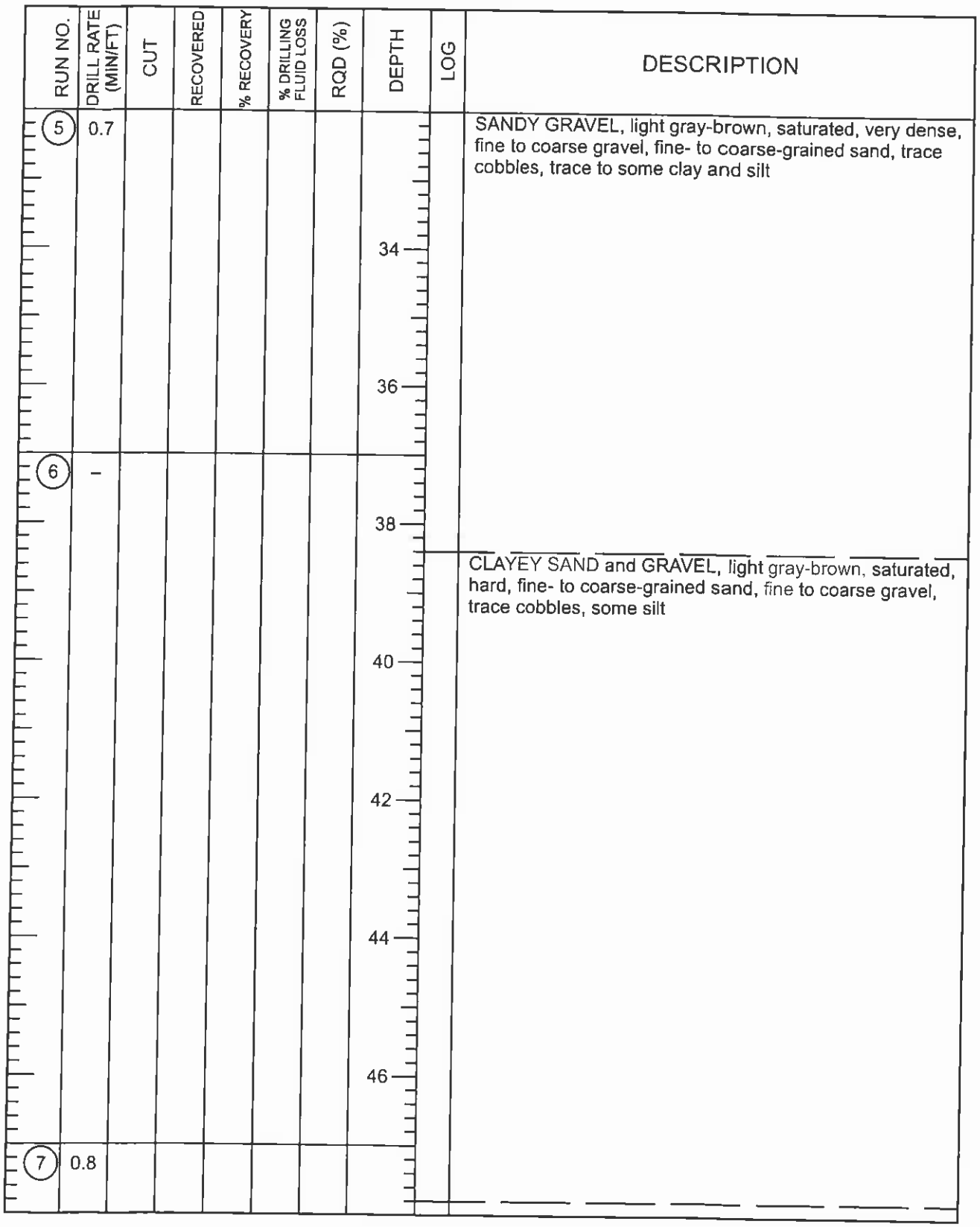
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-3 JOB NO.: 3021.700



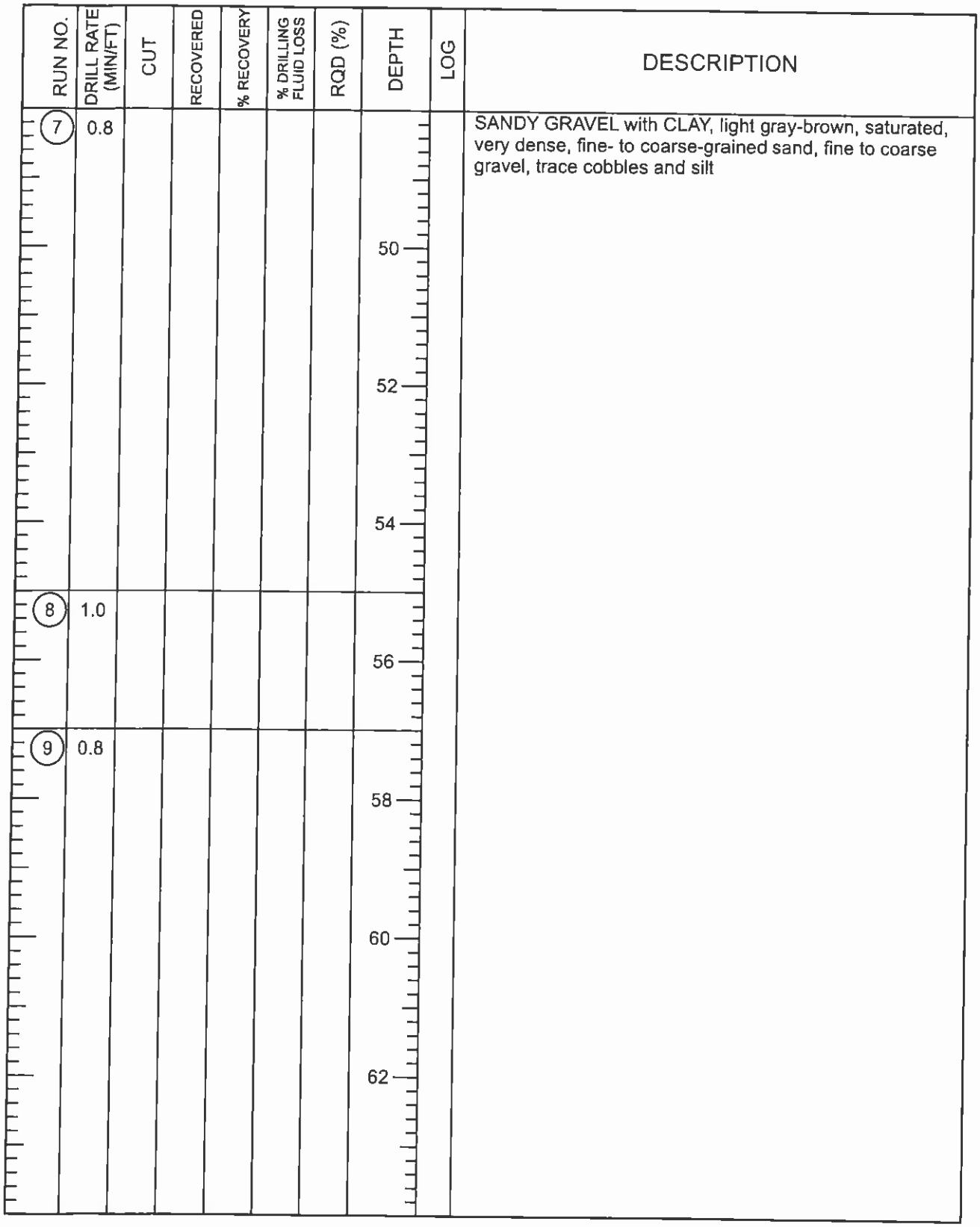
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-3 JOB NO.: 3021.700



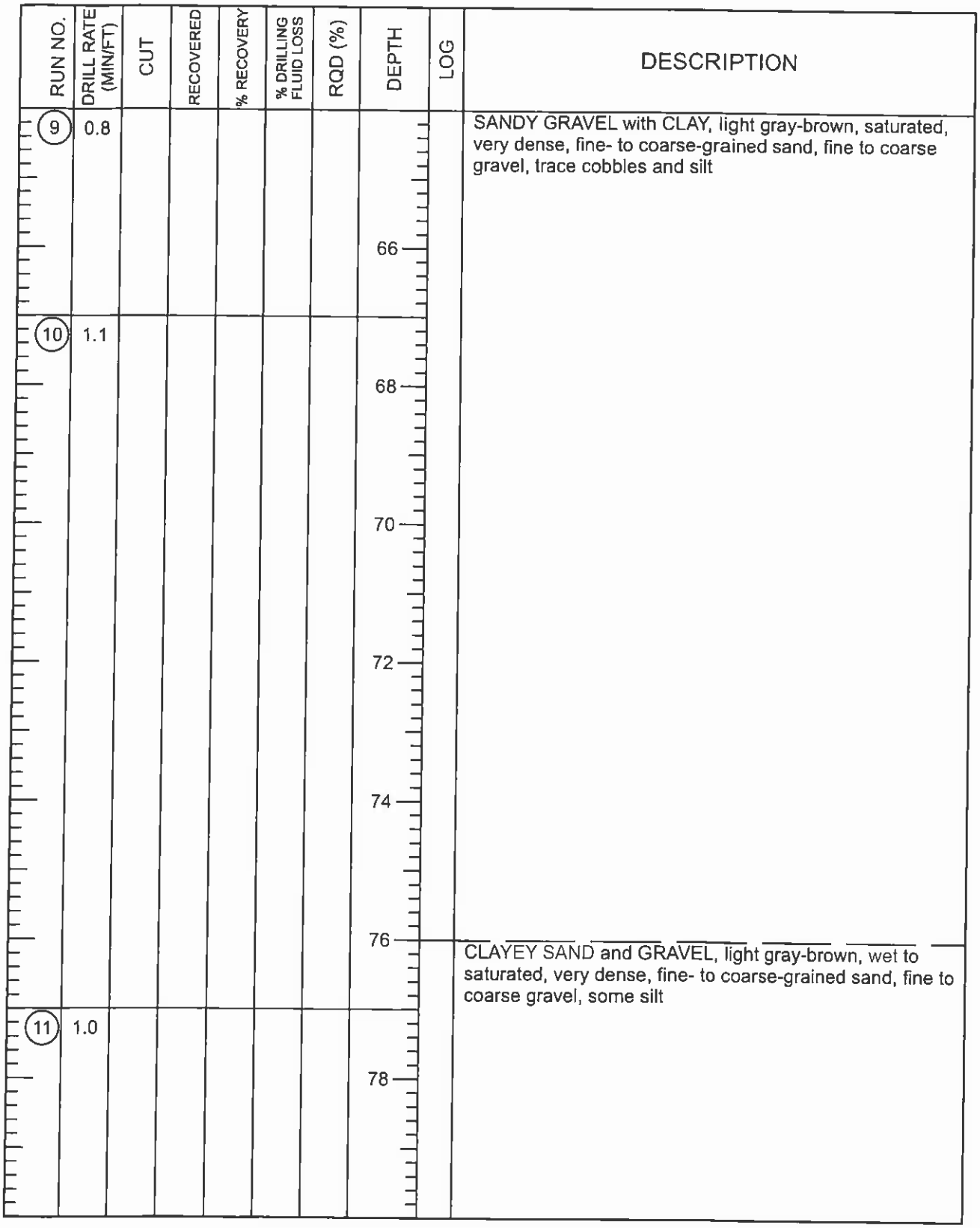
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-3 JOB NO.: 3021.700



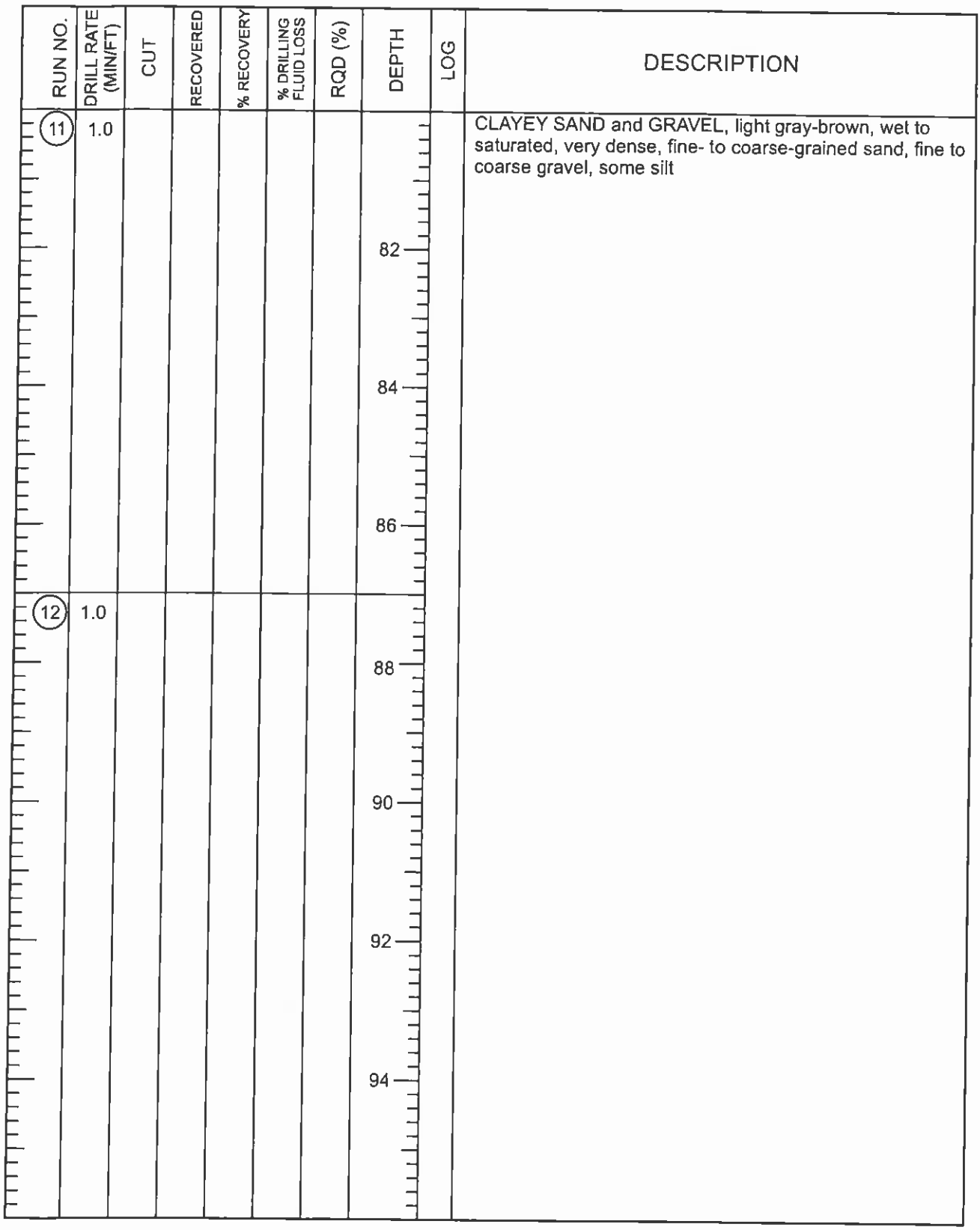
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-3 JOB NO.: 3021.700



CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-3 JOB NO.: 3021.700



CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-3 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
12	1.0								CLAYEY SAND with GRAVEL, light gray-brown, wet to saturated, very dense, fine- to coarse-grained sand, fine to coarse gravel, some silt
13	6.0						98		SILTY GRAVEL with CLAY, gray-brown, moist, very dense, fine gravel, some fine- to coarse-grained sand, trace cobbles
14	0.9						100		below 101 feet, wet to saturated
							102		
							104		
							106		
15	0.9						108		
							110		

CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-3 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
15	0.9						114		SILTY GRAVEL with CLAY, gray-brown, moist, very dense, fine gravel, some fine- to coarse-grained sand, trace cobbles
							116		
							118		Boring terminated at 117 feet Groundwater obscured by drill method
							120		
							122		
							124		
							126		

CORE LOG

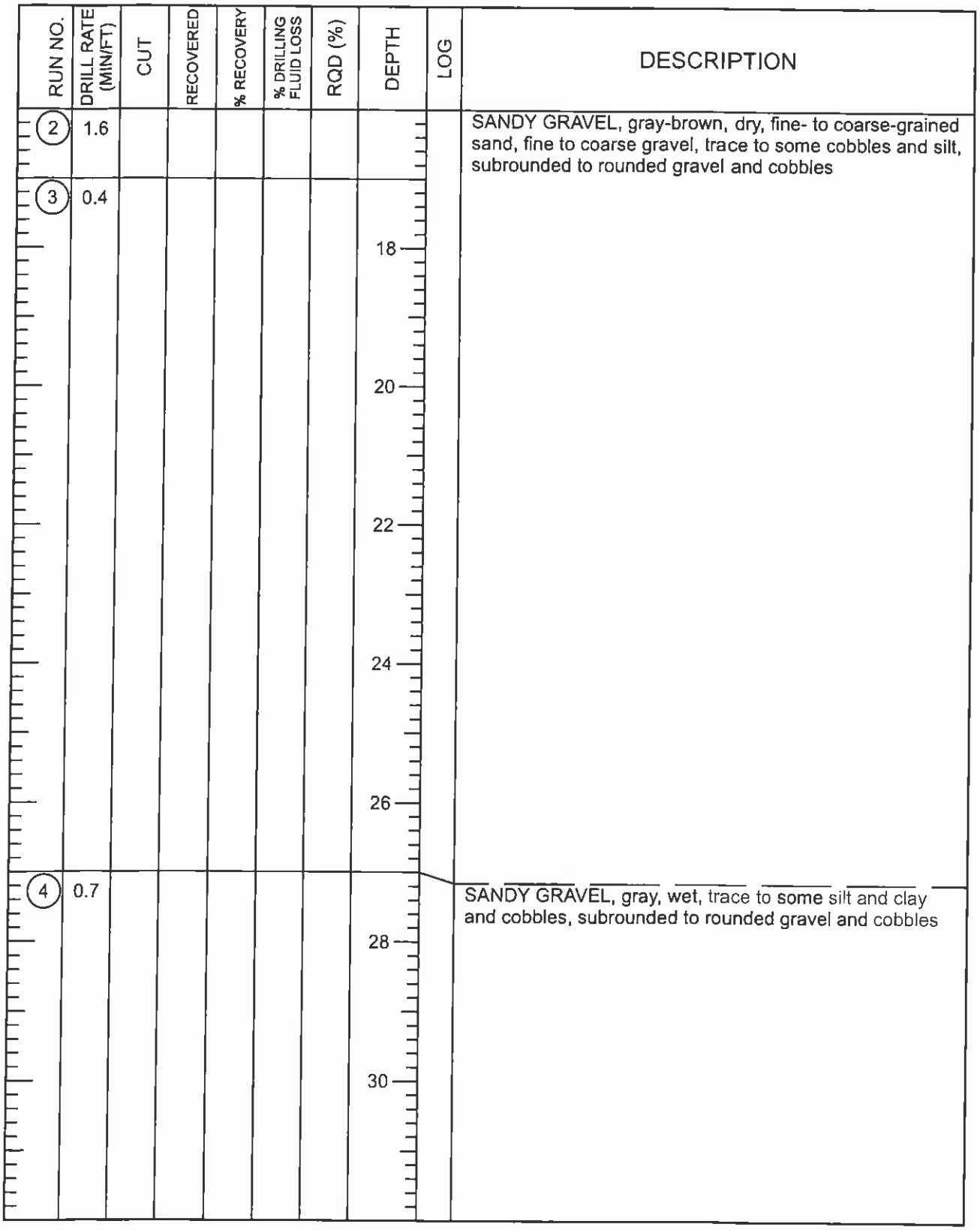
PROJECT: Calaveras Quarry
DRILLING COMPANY: Boart Longyear
DRILLING METHOD: Sonic
NUMBER OF CORE BOXES: N/A
LOGGED BY: BS/PW

BORING NO.: S-4 JOB NO.: 3021.700
DATE INITIATED: 11/19/07
DATE COMPLETED: 11/20/07
TOTAL DEPTH OF HOLE: 167 feet
ELEVATION (FEET ABOVE MSL): 275 feet

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
1	1.2						2, 4, 6		SANDY GRAVEL, gray-brown, dry, fine- to coarse-grained sand, fine to coarse gravel, trace to some cobbles and silt, subrounded to rounded gravel and cobbles
2	1.6						8, 10, 12, 14		

CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-4 JOB NO.: 3021.700



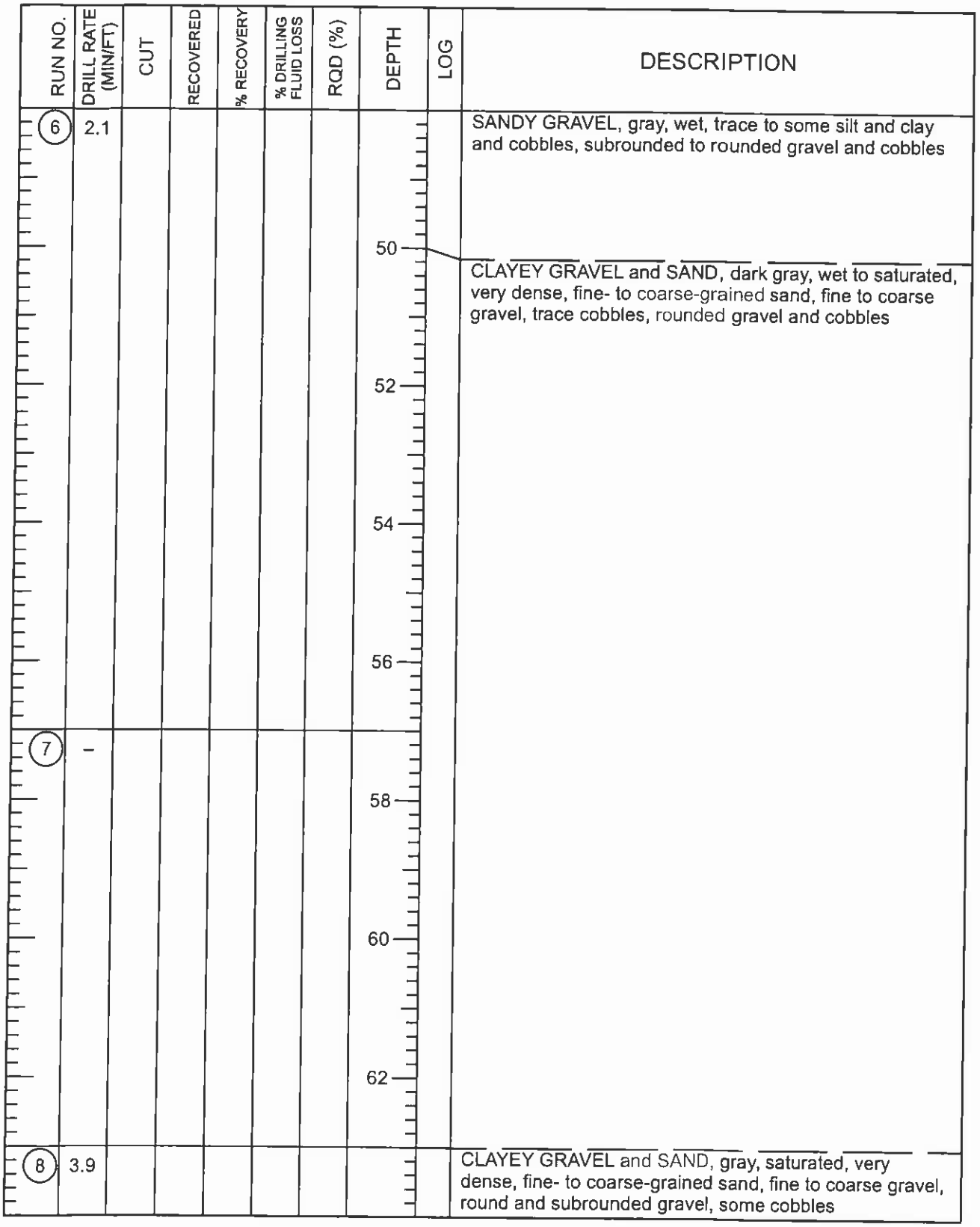
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-4 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
4	0.7						34		SANDY GRAVEL, gray, wet, trace to some silt and clay and cobbles, subrounded to rounded gravel and cobbles
							36		
5	1.8						38		
							40		
							42		
							44		
							46		
6	2.1								

CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-4 JOB NO.: 3021.700



CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-4 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
8	3.9								CLAYEY GRAVEL and SAND, gray, saturated, very dense, fine- to coarse-grained sand, fine to coarse gravel, round and subrounded gravel, some cobbles
9	0.9						66		
							68		
							70		
							72		
							74		
							76		
10	0.9						78		

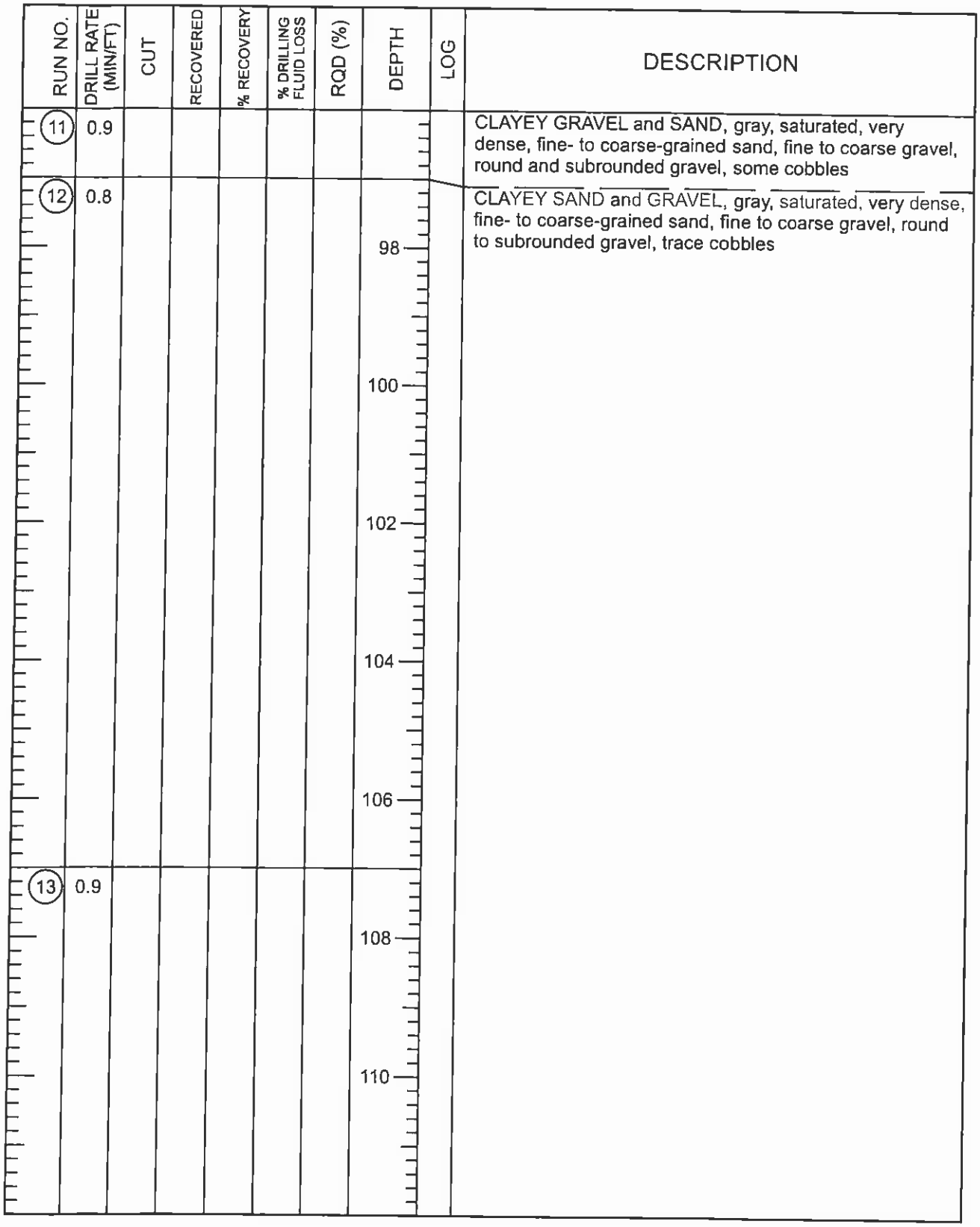
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-4 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
10	0.9						82		CLAYEY GRAVEL and SAND, gray, saturated, very dense, fine- to coarse-grained sand, fine to coarse gravel, round and subrounded gravel, some cobbles
							84		
							86		
11	0.9						88		
							90		
							92		
							94		

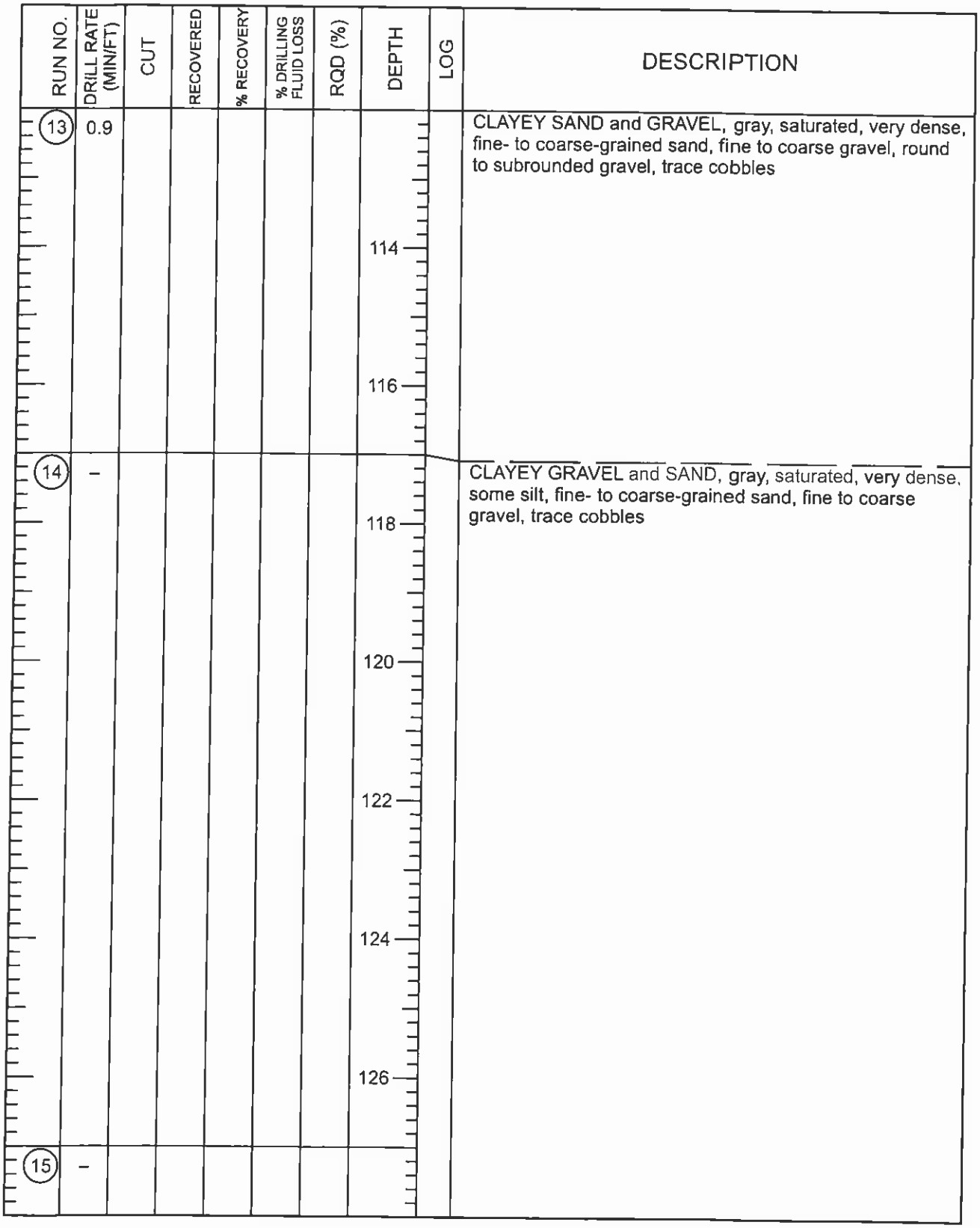
CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-4 JOB NO.: 3021.700



CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-4 JOB NO.: 3021.700



CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-4 JOB NO.: 3021.700

RUN NO.	DRILL RATE (MIN/FT)	CUT	RECOVERED	% RECOVERY	% DRILLING FLUID LOSS	RQD (%)	DEPTH	LOG	DESCRIPTION
15	–						130		CLAYEY GRAVEL and SAND, gray, saturated, very dense, some silt, fine- to coarse-grained sand, fine to coarse gravel, trace cobbles
									SANDSTONE-SILTSTONE, gray, fine- to medium-grained, weak, moderately weathered, crushed
							132		
							134		
16	–								below 135 feet, trace rounded gravel
							136		
							138		
							140		
							142		

CORE LOG

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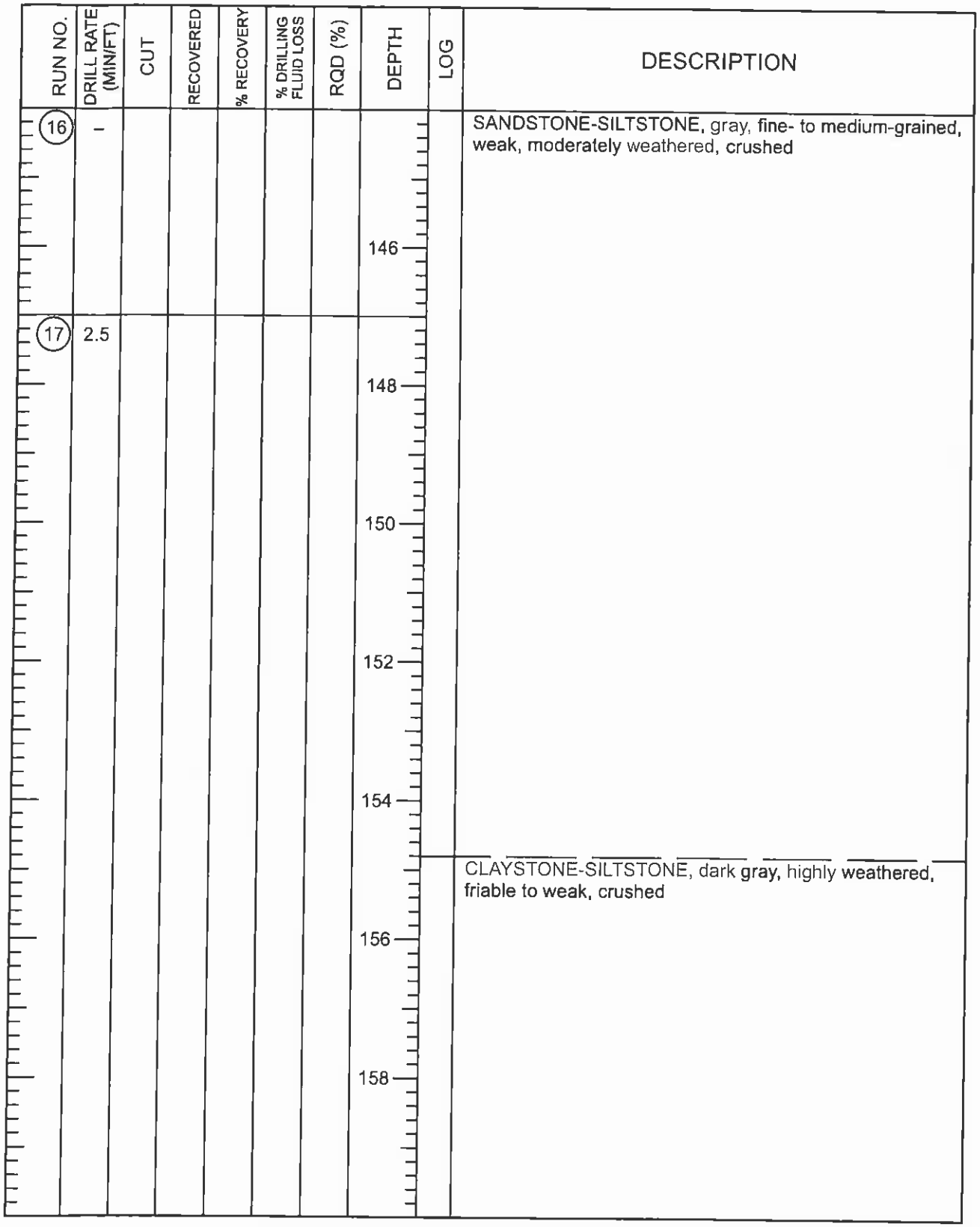
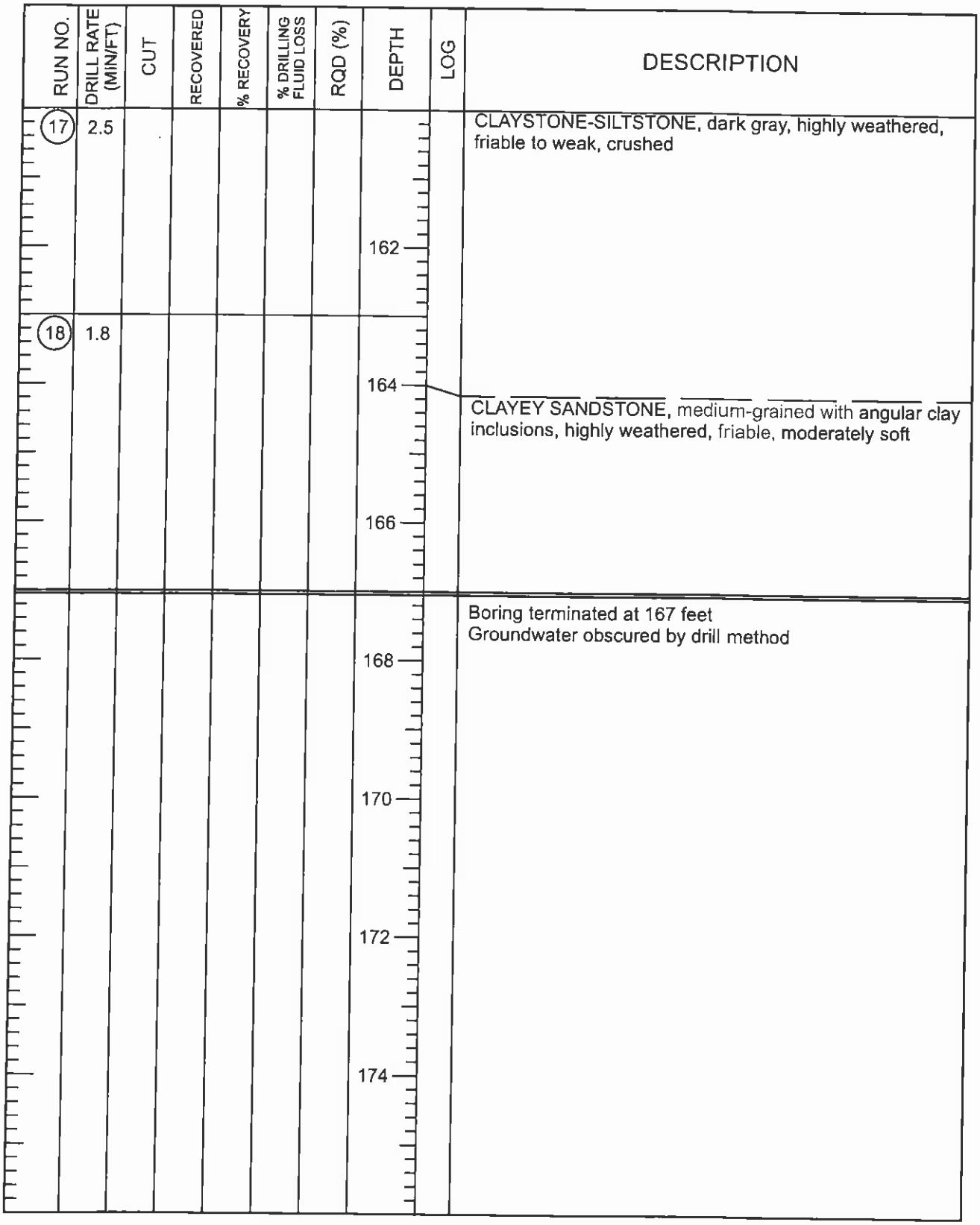


CORE LOG

PROJECT: Calaveras Quarry BORING NO.: S-4 JOB NO.: 3021.700



BENCHMARK
RESOURCES

4990 Hillsdale Circle, Suite 400
El Dorado Hills, California 95762
P: 916.983.9193 | F: 916.983.9194
www.benchmarkresources.net