

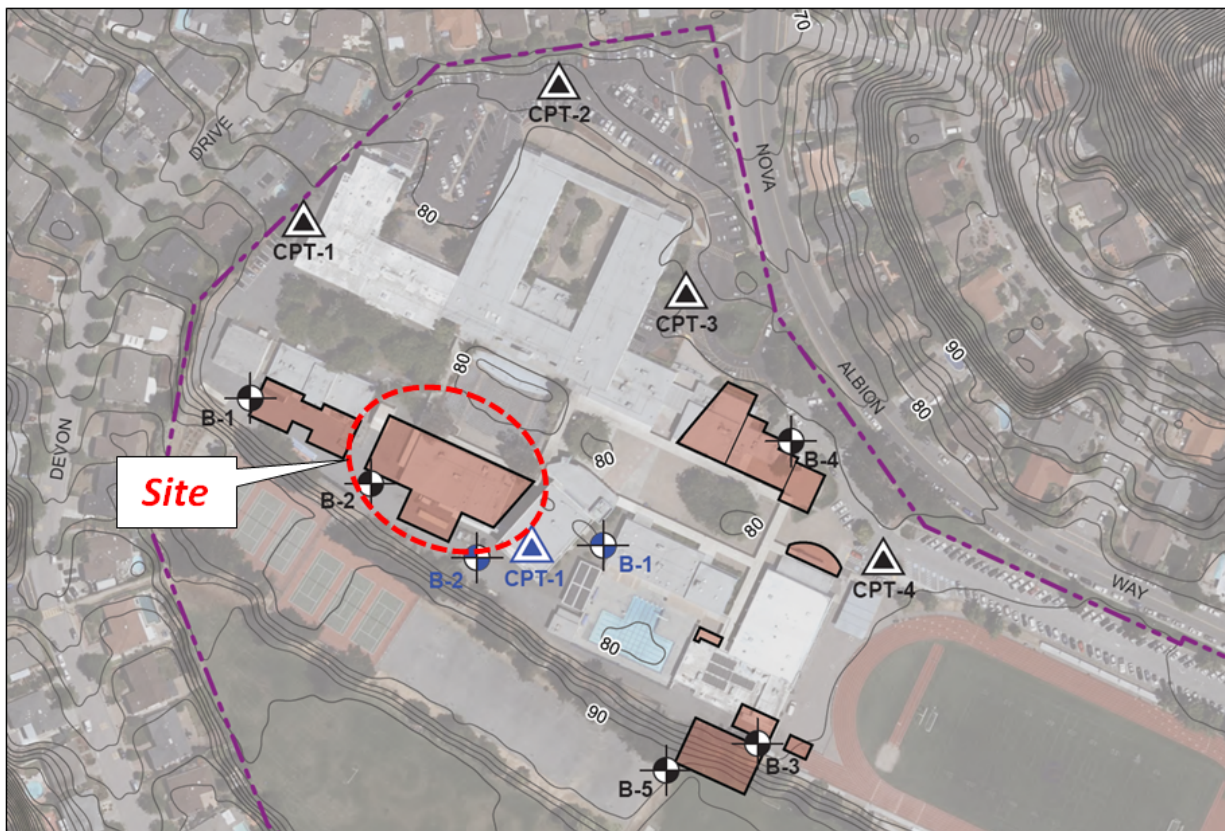
August 11, 2017

Dan Zaich, Ed.D.
Senior Director – Capital Facilities
San Rafael City Schools
310 Nova Albion Way
San Rafael, CA 94903
dzaich@srcs.org

RE: Proposal
Design-Level Geotechnical Investigation and Geologic Hazards Study
Planned Improvements
Terra Linda High School
College of Marin - Kentfield Campus

Dear Mr. Zaich:

A3GEO is pleased to submit this proposal to conduct a design-level geotechnical investigation and geologic hazards study for planned improvements at Terra Linda High School (TLHS) in San Rafael, California. In preparing this proposal, we reviewed information contained in our preliminary geotechnical and geologic report prepared for the TLHS campus¹ together with a drawing titled “Proposed Boring Locations” by Deems Lewis McKinley (DLM), the Project architects. DLM’s 24 July 2017 drawing shows the planned improvements include a cluster of small buildings at the site indicated below.



¹ A3GEO, Inc., 2017, “Preliminary Geotechnical Investigation and Geologic Hazard Study Report, Terra Linda High School, 320, Nova Albion Way, San Rafael, Marin County, California,” consulting report dated March 16, 2017.

INTRODUCTION

The purpose of our study will be to: 1) evaluate site conditions and geologic hazards in a manner consistent with State of California requirements for public school construction (CGS Note 48; latest version attached); and 2) develop geotechnical conclusions and recommendations for the planned Project. Whereas our previous study preliminary assessed geotechnical conditions and geologic hazards throughout the TLHS campus, our proposed design-level study will focus specifically on the areas where new improvements are planned.

To satisfy DSA/CGS Note 48 requirements, our design-level report will be signed and stamped by a California-licensed Geotechnical Engineer (GE) and Certified Engineering Geologist (CEG), and will include data from new borings drilled at the planned building locations. A3GEO will serve as lead consultant and will be assisted by a Principal-level CEG from Lettis Consultants, International, Inc. (LCI), our engineering geologic subconsultant. CGS guidelines for California public school projects (Note 48) indicates that one boring or exploratory shaft is needed for every 5,000 square feet of building footprint with a minimum of two for any one building. For buildings that are relatively close to each other, a single well-positioned boring/shaft can typically be “shared” by two buildings. Based on DLM’s drawing showing proposed boring locations, the available data from previous borings, and access considerations, we currently plan to drill between 6 and 9 new borings as part of this proposed design-level study.

A3GEO’s previous geotechnical and geologic report for the TLHS campus contains logs of three borings and one cone penetration test (CPT) from the site vicinity, which generally show about 12 to 18 feet of competent natural soil overlying bedrock. Based on the available subsurface data, we anticipate that our design-level report will include recommendations for shallow foundations (e.g. spread footings) and that deep foundations (e.g. drilled piers) will not be needed to support/resist the design structural loads.

SCOPE OF SERVICES

Our proposed scope of services consists of:

Task 1 - Review of Existing Data – Our GE and CEG will review the data and findings presented in our preliminary geotechnical and geologic study report together with: 1) any new information provided to us by the project team and/or; 2) relevant geologic, seismic, or regulatory information issued since our preliminary report was prepared. Our CEG will also review the historic aerial photographs contained in an appendix to our preliminary geotechnical and geologic study report to identify and characterize features of geologic significance.

Task 2 - Site Reconnaissance – Our GE and CEG will conduct a detailed reconnaissance of the site and vicinity to observe surficial conditions and check for areas of obvious geotechnical or geologic concern. Based on the results of our data review and site reconnaissance, we will select suitable locations for our exploratory borings and mark the locations on the ground with white paint.

Task 3 - Subsurface Exploration – Prior to drilling, A3GEO will obtain the necessary Marin County drilling permit, notify Underground Service Alert of our intent to drill and retain a private utility locator, who will visit the site to check that the boring locations marked in Task 2 are clear of subsurface utilities. Based on access constraints, we will use a small track-mounted drill rig and/or portable equipment to drill the borings. This proposal includes two 8-hour days onsite for our drilling subcontractor to complete the work. During this time, we plan to drill between 6 and 9 borings on the order of 15 to 25 feet deep; all of the borings will extend into bedrock, time permitting. An A3GEO engineer will direct the drilling operations, log the subsurface materials encountered, obtain samples at frequent intervals, and measure groundwater depths. Following drilling, we will backfill the borings with grout and patch the pavement surface. Spoils from the borings will be containerized in drums and disposed of offsite, provided that they are free of chemical contamination.

Task 4 - Geotechnical Laboratory Testing – Our GE and CEG will review samples from the borings to check field classifications, make geologic notations, and select appropriate specimens for laboratory testing. We plan to conduct geotechnical laboratory tests to evaluate strength, compressibility, moisture content, dry

density, plasticity, and grain size, as deemed appropriate based on the characteristics of the materials recovered in samples.

Task 5 - Site Evaluation and Analyses – Our GE and CEG will characterize geotechnical and geologic conditions at the site, which will include developing a site geologic map and interpretive geologic cross sections based on the data from the borings (both are required per CGS Note 48). Our assessment of geotechnical site conditions will include evaluations of settlement, bearing capacity, soil expansion potential, and geotechnical construction considerations.

Task 6 - Geotechnical Investigation and Geologic Hazards Report – Our services will include preparing a design-level Geotechnical Investigation and Geologic Hazards Report for the proposed Project. Our report will be prepared in accordance with CGS Note 48 and other applicable state guidelines, will summarize the results of our study, and will present geotechnical and geologic conclusions and/or recommendations regarding:

- Site and regional geology;
- Subsurface conditions (including soil and groundwater);
- Geologic hazards (including ground shaking, faulting, liquefaction, lateral spreading, dynamic settlement, landsliding, tsunamis and seiches, and flooding);
- Geologic hazard mitigation, if appropriate;
- California Building Code seismic design parameters;
- Appropriate foundation type(s) for the proposed improvements;
- Recommended foundation type(s) and applicable design criteria;
- Estimates of settlement;
- Site preparation, grading, and earthwork;
- Subgrade preparation;
- Suitability of onsite soils for use as fill, including mitigation measures for expansive soils, if applicable;
- AC pavements; and
- Utility trench backfill.

Please note that our proposed scope of services does *not* include: 1) an environmental assessment or investigation of the site for the presence of toxic material in the soil, groundwater, or air. If during our investigation we suspect that chemically-impacted soils may be present, we will consult the District in order to determine an appropriate course of action.

FEE PROPOSAL

We propose to provide the services outlined in this proposal for a **lump sum fee of \$40,000**. The spreadsheet used to develop our fee estimate is attached along with our 2017 Schedule of Charges. The following assumptions were made in preparing our estimate:

- A site-specific probabilistic seismic hazard assessment (PSHA) will not be required for the Project.
- A shallow foundation system can be used to support the new buildings.
- Our field investigation can be conducted during regular workday hours and can be completed in two 8-hour days onsite;
- School personnel will be responsible for keeping students at a safe distance from our personnel and drilling equipment during our field investigation;
- Soil cuttings generated during drilling will be containerized in 55-gallon drums and left onsite temporarily until disposal company collects them (typically less than 1 week);
- The boring locations will be readily accessible to our personnel and drilling equipment on the scheduled days of drilling;
- Drums can be left relatively close to the boring locations and do not need to be transported by vehicle;
- The subsurface materials are not contaminated to the extent that higher than Level D Personal Protective Equipment (PPE) would be required; and
- Meetings are not required.

If any of the preceding assumptions prove to be incorrect, we will consult with you regarding any necessary modifications to our scope and/or fee. Services provided in excess of the scope specified in this proposal, should they be needed, would be billed on a time-and-materials basis in accordance with our standard Schedule of Charges in effect at the time services are requested.

FUTURE SERVICES

Please note that our geotechnical investigation report will recommend that A3GEO: 1) check that the project Contract Documents are consistent with the intent of our geotechnical recommendations; and 2) provide geotechnical services during construction so that we can verify that our geotechnical recommendations are appropriate for the site conditions. The fees associated with these services are not included in the costs presented above.

CLOSURE

Our services will be performed in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

If you agree with the scope of services and fee estimate outlined, please provide an appropriate authorization that references this proposal. Please do not hesitate to call if you have any questions or comments regarding our proposed scope and fee.

Very truly yours,

A3GEO, Inc.



Wayne Magnusen, PE, GE
Principal Engineer
Cell: (510) 325-5724

Attachments: CGS Note 48 Checklist
A3GEO Cost Estimate Spreadsheet
A3GEO 2017 Schedule of Charges



California Geological Survey - Note 48

Checklist for the Review of Engineering Geology and Seismology Reports for
California Public Schools, Hospitals, and Essential Services Buildings
October 2013

Note 48 is used by the California Geological Survey (CGS) to review the geology, seismology, and geologic hazards evaluated in reports that are prepared under California Code of Regulations (CCR), Title 24, California Building Code (2013 CBC). CCR Title 24 applies to California Public Schools, Hospitals, Skilled Nursing Facilities, and Essential Services Buildings. The Building Official for public schools is the Division of the State Architect (DSA). Hospitals and Skilled Nursing Facilities in California are under the jurisdiction of the Office of Statewide Health Planning & Development (OSHPD). The California Geological Survey serves as an advisor under contract with these two state agencies.

Project Name: _____ Location: _____

OSHPD or DSA File #: _____ Reviewed By: _____

Date Reviewed: _____ California Certified Engineering Geologist #: _____

Checklist Item or Topic Within Consulting Report	Adequately Described; Satisfactory	Additional Information Needed
NA = not applicable NR = not addressed by consultant and therefore not reviewed at this time		

Project Location

1. Site Location Map, Street Address, County Name: Correctly plot site on a 7½-minute USGS quadrangle base-map.		
2. Plot Plan with Exploration Data and Building Footprint: One boring or exploration shaft per 5000 ft ² , with minimum of two for any one building. Exploratory trench locations.		
3. Site Coordinates: Latitude & Longitude		

Engineering Geology/Site Characterization

4. Regional Geology and Regional Fault Maps: Concise page-sized illustrations with site plotted.		
5. Geologic Map of Site: Detailed (large-scale) geologic map with proper symbols and geologic legend.		
6. Subsurface Geology: Engineering geologic description summarized from boreholes or trench logs. Summarize ground water conditions.		
7. Geologic Cross Sections: Two or more detailed geologic sections with pertinent foundations and site grading.		
8. Active Faulting & Coseismic Deformation Across Site: Show proposed structures in relation to Alquist-Priolo Earthquake Fault Zones and/or any potential fault rupture hazard identified from the Safety Element of the local agency (city or county); show location of fault investigation trenches, 50-foot setbacks perpendicular from fault plane and proposed building footprints.		
9. Geologic Hazard Zones (Liquefaction & Landslides): (If applicable) Show proposed structures in relation to CGS official map showing zones of required investigation for liquefaction and landslide, and/or any pertinent geologic hazard map from the Safety Element of the local agency (city or county).		
10. Geotechnical Testing of Representative Samples: Broad suite of appropriate geotechnical tests.		
11. Consideration of Geology in Geotechnical Engineering Recommendations: Discuss engineering geologic aspects of excavation/grading/fill activities, foundation and support of structures. Include geologic and geotechnical inspections and problems anticipated during grading. Special design and construction provisions for bearing capacity failure and/or footings or foundations founded on weak or expansive soils. Consideration of seismic compression of fills; cut/fill differential settlement.		

Seismology & Calculation of Earthquake Ground Motion

12. Evaluation of Historical Seismicity: Prepare a short description of how historical earthquakes have affected the site.		
13. Classify the Geologic Subgrade (Site Class): ASCE 7, Chapter 20.		
14. General Procedure Ground Motion Analysis: Follows CBC §1613A.5. Report parameters S_s , S_1 , S_{DS} and S_{D1} . Recommended method for establishing map values found at: http://geohazards.usgs.gov/designmaps/us/application.php .		
15. Seismic Design Category: Report if $S_1 > 0.75$		
16. Site-Specific Ground Motion Analysis: (If applicable) Required where Seismic Design Category is E or F (CBC §1616A.1.3), and where required by ASCE 7 §11.4.7. See requirements in CBC §1803A.6. CGS suggests a table showing: (a) 2%-in-50-years probabilistic spectrum, (b) risk coefficients (if using ASCE 7 §21.2.1.1, Method 1), (c) probabilistic MCE_R , (d) 84% deterministic spectrum, (e) deterministic lower limit, (f) site-specific MCE_R , (ASCE 7 §21.2.3), (g) 80% of map-based General Response Spectrum, (h) design response spectrum (ASCE 7 §21.3). Also provide S_{DS} and S_{D1} values per ASCE 7 §21.4.		

Checklist Item or Topic Within Consulting Report		Adequately Described; Satisfactory	Additional Information Needed
NA = not applicable NR = not addressed by consultant and therefore not reviewed at this time			
17. Deaggregated Seismic Source Parameters: <i>(If applicable)</i> If needed for liquefaction, slope stability analysis or for earthquake record selection, provide controlling magnitude (M) and fault distance (R). Might be either deterministic or deaggregate for modal M and R.			
18. Time Histories of Earthquake Ground Motion: <i>(If applicable)</i> Identify target spectra (MCE or design); justify selected earthquake records; scale to target to meet ASCE 7 §16.1.3 or §17.3 and CBC §1616A.1.32; and show initial and scaled time histories and response spectra.			

Liquefaction/Seismic Settlement Analysis

19. Geologic Setting for Occurrence of Liquefaction: Perform screening analysis to identify where the following conditions apply: ♦ depth of highest historical ground water surface <50 ft. ♦ low-density, non-plastic alluvium, typically $SPT (N_1)_{60} < 30$.		
20. Seismic Settlement Calculations: <i>(If applicable)</i> Evaluate both saturated and unsaturated layers of the entire soil column, based on several detailed geologic cross sections. Provide calculations (no estimates), including all input parameters. Evaluate liquefaction using highest historical ground water elevation. Evaluate using PGA_M (CBC §1803A.5.12), and calculate liquefaction settlement for each layer where $FS < 1.3$ (CGS SP117A).		
21. Other Liquefaction Effects: <i>(If applicable)</i> Bearing capacity failure and/or lateral spread.		
22. Mitigation Options for Liquefaction: <i>(If applicable)</i> Discuss effectiveness of options to mitigate liquefaction effects. Acceptance criteria for ground-improvement schemes.		

Slope Stability Analysis

23. Geologic Setting for Occurrence of Landslides: Characterize the potential for landsliding both on and off-site affecting proposed project.		
24. Determination of Static And Dynamic Strength Parameters: <i>(If applicable)</i> Conduct appropriate laboratory tests to determine material strength for both static and dynamic conditions.		
25. Determination of Pseudo-Static Coefficient (Keq): <i>(If applicable)</i> Recommended procedure available from http://www.conservation.ca.gov/cgs/shzp/webdocs/Documents/sp117.pdf . Recommend using design-level ground motion based on geometric mean and without risk coefficient (ie, $(PGA_M)/1.5$), or discuss with CGS.		
26. Identify Critical Slip Surfaces for Static and Dynamic Analyses: <i>(If applicable)</i> Failure surfaces should be modeled to include existing slip surfaces, discontinuities, geologic structure and stratigraphy; include appropriate ground water conditions.		
27. Dynamic Site Conditions: <i>(If applicable)</i> Site response analysis and topographic effects should be considered, if appropriate.		
28. Mitigation Options for Landsliding/Other Slope Failure: <i>(If applicable)</i> Discuss effectiveness of options to mitigate landsliding/slope failure effects. Acceptance criteria for ground-improvement schemes.		

Other Geologic Hazards or Adverse Site Conditions

These exceptional geologic hazards do not occur statewide; however, they may be pertinent to a particular site. Where these conditions exist relevant information should be communicated to the design team.

29. Expansive Soils		
30. Corrosive/Reactive Geochemistry of Geologic Subgrade: soluble sulfates and corrosive soils.		
31. Conditional Geologic Assessment: Including but not limited to - A. Hazardous materials methane gas, hydrogen-sulfide gas, tar seeps; B. Volcanic eruption ; C. Flooding Riverine (FEMA FIRMs or local zoning for 100-year flood); see CBC §1612A. Also consider alluvial fan & dam inundation. Is the site elevated or protected from the hazard; D. Tsunami and seiche inundation ; E. Radon-222 gas ; F. Naturally occurring asbestos in geologic formations associated with serpentine; refer to CGS SP 124; G. Hydrocollapse of alluvial fan soils due to anthropic use of water; H. Regional subsidence ; I. Clays and cyclic softening .		

Report Documentation

32. Geology, Seismology, and Geotechnical References		
33. Certified Engineering Geologist: (CBC §1803A.1)		
34. Registered Geotechnical Engineer: (CBC §1803A.1)		

Personnel	LABOR							Direct Costs (by Subtask)	Task Totals
	Principal Engineer	Principal Geologist	Senior Engineer	Staff Engineer	GIS/Graphics	Admin	Labor Subtotal (by Subtask)		
Labor Rate	\$210	\$210	\$190	\$150	\$115	\$105			
Task									
1.0 - Review of Existing Data									
1.1	Collection, Compilation and Review of Information	4	4				\$1,680		\$1,680
1.2	Review of Historic Aerial Photographs		4				\$840		\$840
Task 1.0 Totals:							\$2,520	\$0	\$2,520
2.0 - Site Reconnaissance									
2.1	Geotechnical Site Reconnaissance	4					\$840		\$840
2.2	Geologic Site Reconnaissance		6				\$1,260		\$1,260
Task 2.0 Totals:							\$2,100	\$0	\$2,100
3.0 - Subsurface Exploratorion									
3.1	Coordination, Utility Clearances, Drilling Permit	1			10	2	\$1,920	\$2,013	\$3,933
3.2	Onsite Exploration and Soil Disposal	1			20		\$3,210	\$9,775	\$12,985
Task 3.0 Totals :							\$5,130	\$11,788	\$16,918
4.0 - Laboratory Testing									
4.1	Laboratory Testing	2					\$420	\$1,725	\$2,145
4.2	Sample Review	4	4				\$1,680		\$1,680
Task 4.0 Totals:							\$2,100	\$1,725	\$3,825
5.0 - Site Evaluation and Analyses									
5.1	Prepare Finalized Boring Logs	2			4		\$1,020		\$1,020
5.2	Develop Geologic Map and Cross Sections	2	8			8	\$3,020		\$3,020
5.3	Geotechnical Analyses	4			4		\$1,440		\$1,440
Task 5.0 Totals :							\$5,480	\$0	\$5,480
6.0 - Report Preparation									
6.1	Preparation of Draft Report (text, plates, figures and appendices)	16				8	\$4,280		\$4,280
6.2	Engineering Geologic Review and Input		8				\$1,680		\$1,680
6.3	Preparation of Final Report (text, plates, figures and appendices)	8			2	8	\$3,110		\$3,110
Task 6.0 Totals:							\$9,070	\$0	\$9,070
Total Labor Hours:							48	34	0
Total Labor Fee							\$10,080	\$7,140	\$0
							\$6,000	\$2,760	\$420
							\$26,400		
								TOTAL FEE:	\$39,913

Direct Costs	Unit Cost	Qty	Total (+15%)	Task
Marin County Drilling Permit Fee	\$1,100	1	\$1,265	3.1
Utility Locator	\$650	1	\$748	3.1
DrillingSubcontractor (\$3500/day)	\$3,500	2	\$8,050	3.2
Drum/Soil Disposal	\$1,500	1	\$1,725	3.2
Geotechnical Laboratory Testing	\$1,500	1	\$1,725	4.1
Total Direct Costs:			\$13,513	

Basic Cost Estimate Assumptions:

A site specific ground motion analyses is not required
Recommendations for deep foundations not required
Free access to boring locations on scheduled days
Drill rig time not to exceed two 8-hour days onsite
Cuttings from borings classify as non-hazardous
Fieldwork in Level D Personal Protective Equipment
Environmental monitoring and protocols not required

A3GEO, INC.
2017 SCHEDULE OF CHARGES
(Effective January 1, 2017)

Lump Sum Agreement: If services are performed for a lump sum fee, Client agrees to pay A3GEO the lump sum fee stated in the proposal letter.

Time and Materials Agreement: If services are performed on a time-and-materials basis, Client agrees to pay A3GEO in accordance with the following schedule of charges:

<u>Personnel (Engineer/Geologist)</u>	<u>Hourly Rate</u>
Senior Technical Consultant.....	\$280
Principal.....	\$210
Associate.....	\$200
Senior.....	\$190
Project.....	\$170
Staff.....	\$150
Technician.....	\$120
Graphics.....	\$115
Administrative Support.....	\$105
<u>Equipment*</u>	<u>Rate</u>
All Vehicles.....	\$0.53/mile
Hand Auger Drilling and Sampling Equipment.....	\$500/full day
Nuclear Gauge Testing.....	\$20.00/test
Slope Inclinometer Probe.....	\$150/½-day
	\$200/full day
Plotter.....	\$100/sheet
<u>Laboratory Testing</u>	<u>Rate</u>
Moisture Content (ASTM D 2216).....	\$15.00
Moisture and Density (ASTM D 2937)	
2.5-inch Diameter.....	\$25.00
3.0-inch Diameter.....	\$35.00
#200 Sieve Wash (ASTM D 1140).....	\$80.00
Sieve w/Percent Passing #200 (ASTM D 422).....	\$110.00
Sieve w/Hydrometer (ASTM D 422).....	\$180.00
Plastic and Liquid (Atterberg) Limits (ASTM D 4318).....	\$230.00
Modified Proctor Compaction – 4" Mold (ASTM D 1557).....	\$260.00
Modified Proctor Compaction – 6" Mold (ASTM D 1557).....	\$310.00
Modified Proctor Compaction Check Point (ASTM D 1557).....	\$105.00

* Charges for other equipment can be quoted at time of usage.

These rates will be charged for work performed during the specified year. Work continuing into the following year or years will be charged at the new rates. Work required on Saturdays will be billed at 1.5 times the rates shown above; work required on Sundays or holidays will be billed at 2.0 times the rates shown above. On our invoice, this will be accommodated by increasing the amount of hours worked by 50% and 100%, respectively. Services will be charged in ¼-hour increments, with time rounded upward to the nearest ¼ hour. Any time spent out of the office is charged on a portal-to-portal basis, including mileage.

Miscellaneous Charges: Sub-consultants, equipment rentals, and reimbursables (including outside laboratory) are billed at cost plus 15 percent.