SOLICITATION/CONTRACT/ORDER FOR COMMERCIAL ITEMS

OFFEROR TO COMPLETE BLOCKS 12, 17, 23, 24, & 30

1. REQUISITION NUMBER	PAGE	OF
WFL16SI503	1	117

2. CONTRACT NO.	3. AWARD/ EFFECTIVE DATE	4. ORDER NUMBER	5. SOLICITATION NUMBER	6. SOLICITATION ISSUE DATE
			DTFH7016Q00075	09/19/2016

7. FOR SOLICITATION INFORMATION CALL:	a. NAME	b. TELEPHONE NUMBER (No collect calls)	8. OFFER DUE DATE/LOCAL TIME
	Eric Neckel	360-619-7866	10/05/2016 1200 PT

9. ISSUED BY — CODE WFLHD

Federal Highway Administration
Western Federal Lands Highway Div.
610 East Fifth Street
Vancouver WA 98661-3801

10. THIS ACQUISITION IS ☐ UNRESTRICTED OR ☒ SET ASIDE: 100.00 % FOR:

- ☒ SMALL BUSINESS
- ☐ HUBZONE SMALL BUSINESS
- ☐ SERVICE-DISABLED VETERAN-OWNED SMALL BUSINESS
- ☐ WOMEN-OWNED SMALL BUSINESS (WOSB) ELIGIBLE UNDER THE WOMEN-OWNED SMALL BUSINESS PROGRAM
- ☐ EDWOSB
- ☐ 8(A)

NAICS: 213115

SIZE STANDARD: $7.5

11. DELIVERY FOR FOB DESTINATION UNLESS BLOCK IS MARKED	12. DISCOUNT TERMS	13a. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 700)	13b. RATING / 14. METHOD OF SOLICITATION
☐ SEE SCHEDULE		☐	☒ RFQ ☐ IFB ☐ RFP

15. DELIVER TO — CODE WFLHD

Federal Highway Administration
Western Federal Lands Highway Div.
610 East Fifth Street
Vancouver WA 98661-3801

16. ADMINISTERED BY — CODE WFLHD

Federal Highway Administration
Western Federal Lands Highway Div.
610 East Fifth Street
Vancouver WA 98661-3801

17a. CONTRACTOR/ OFFEROR — CODE — FACILITY CODE

TELEPHONE NO.

☐ 17b. CHECK IF REMITTANCE IS DIFFERENT AND PUT SUCH ADDRESS IN OFFER

18a. PAYMENT WILL BE MADE BY — CODE

☐ 18b. SUBMIT INVOICES TO ADDRESS SHOWN IN BLOCK 18a UNLESS BLOCK BELOW IS CHECKED ☐ SEE ADDENDUM

19. ITEM NO.	20. SCHEDULE OF SUPPLIES/SERVICES	21. QUANTITY	22. UNIT	23. UNIT PRICE	24. AMOUNT
	Russian River Campground Road Geotechnical Subsurface Investigation				

(Use Reverse and/or Attach Additional Sheets as Necessary)

25. ACCOUNTING AND APPROPRIATION DATA

26. TOTAL AWARD AMOUNT *(For Govt. Use Only)*

☒ 27a. SOLICITATION INCORPORATES BY REFERENCE FAR 52.212-1, 52.212-4. FAR 52.212-3 AND 52.212-5 ARE ATTACHED. ADDENDA ☒ ARE ☐ ARE NOT ATTACHED.

☐ 27b. CONTRACT/PURCHASE ORDER INCORPORATES BY REFERENCE FAR 52.212-4. FAR 52.212-5 IS ATTACHED. ADDENDA ☐ ARE ☐ ARE NOT ATTACHED.

☐ 28. CONTRACTOR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN _____ COPIES TO ISSUING OFFICE. CONTRACTOR AGREES TO FURNISH AND DELIVER ALL ITEMS SET FORTH OR OTHERWISE IDENTIFIED ABOVE AND ON ANY ADDITIONAL SHEETS SUBJECT TO THE TERMS AND CONDITIONS SPECIFIED.

☐ 29. AWARD OF CONTRACT: _____ OFFER DATED _____. YOUR OFFER ON SOLICITATION (BLOCK 5), INCLUDING ANY ADDITIONS OR CHANGES WHICH ARE SET FORTH HEREIN, IS ACCEPTED AS TO ITEMS:

30a. SIGNATURE OF OFFEROR/CONTRACTOR	31a. UNITED STATES OF AMERICA *(SIGNATURE OF CONTRACTING OFFICER)*

30b. NAME AND TITLE OF SIGNER *(Type or print)*	30c. DATE SIGNED	31b. NAME OF CONTRACTING OFFICER *(Type or print)*	31c. DATE SIGNED
		Elizabeth Firestone	

19. ITEM NO.	20. SCHEDULE OF SUPPLIES/SERVICES	21. QUANTITY	22. UNIT	23. UNIT PRICE	24. AMOUNT

32a. QUANTITY IN COLUMN 21 HAS BEEN

☐ RECEIVED ☐ INSPECTED ☐ ACCEPTED, AND CONFORMS TO THE CONTRACT, EXCEPT AS NOTED: _____

32b. SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE	32c. DATE	32d. PRINTED NAME AND TITLE OF AUTHORIZED GOVERNMENT REPRESENTATIVE

32e. MAILING ADDRESS OF AUTHORIZED GOVERNMENT REPRESENTATIVE	32f. TELEPHONE NUMBER OF AUTHORIZED GOVERNMENT REPRESENTATIVE
	32g. E-MAIL OF AUTHORIZED GOVERNMENT REPRESENTATIVE

33. SHIP NUMBER	34. VOUCHER NUMBER	35. AMOUNT VERIFIED CORRECT FOR	36. PAYMENT	37. CHECK NUMBER
☐ PARTIAL ☐ FINAL			☐ COMPLETE ☐ PARTIAL ☐ FINAL	

38. S/R ACCOUNT NUMBER	39. S/R VOUCHER NUMBER	40. PAID BY

41a. I CERTIFY THIS ACCOUNT IS CORRECT AND PROPER FOR PAYMENT		42a. RECEIVED BY *(Print)*	
41b. SIGNATURE AND TITLE OF CERTIFYING OFFICER	41c. DATE	42b. RECEIVED AT *(Location)*	
		42c. DATE REC'D *(YY/MM/DD)*	42d. TOTAL CONTAINERS

Drilling BPA RFQ No. DTFH7016Q00075 Project Name: Russian River Campground Road Geotechnical Subsurface Investigation Quotes Due By: October 5, 2016 by 12:00 p.m. Pacific	**Qty**	**Price**	**Unit of measure**	**Subtotal**
Mob/Demobilization - Truck mounted drill			Mile	
Mobilization/Demobilization Track mounted drill			Mile	
Mobilization/Demobilization Portable drill			Mile	
Casing Advancer Drilling (4 or 5 inch diameter)			Ft	
Casing Advancer Drilling (2 ½ - 4 inch) (Portable drill rig)			Ft	
HQ3 core drilling	120		Ft	
NQ core drilling (portable drill rig)			Ft	
Asphalt Cores 4-inch diameter, through roadway			Each	
Hollow stem auger drilling 4 ¼" ID (8 ¼" OD)	436.5		Ft	
Hollow stem auger drilling 3 ¼" ID (portable drill rig)			Ft	
2.5 & 3 inch split spoon samples			Each	
SPT samples (other than 2.5 & 3")	236		Each	
Shelby Tube Samples 2 ½ & 3-inch			Each	
Per diem per person per day at Government rate for area: Kenai-Soldotna, AK (5/1-10/31)		$285	Day	
Per diem per person per day at Government rate for area: Kenai-Soldotna, AK (11/1-4/30)		$190	Day	
On Project Moves			Hour	
Water Haul: Kenai River			Hour	
2.75 Inch Inclinometer Casing Installed	300		Lnft	
2-inch Slotted Piezometer Casing Installed			Lnft	
2-inch Solid Piezometer Casing Installed			Lnft	

Drilling BPA RFQ No. DTFH7016Q00075 Project Name: Russian River Campground Road Geotechnical Subsurface Investigation Quotes Due By: October 5, 2016 by 12:00 p.m. Pacific	**Qty**	**Price**	**Unit of measure**	**Subtotal**
Crane Mob/Demob			Lump Sum	
Crane Use			Hour	
Standby Time (crane and operator)			Hour	
Subgrade Drilling (includes crew, all materials and equipment)			Each	
Monitoring Well Cover Flush Mount with Locking Cap Installed	1		Each	
Monitoring Well Cover, above surface, Installed	2		Each	
Flagger per diem per person per day at Government rate for area:			Day	
Flagging Personnel			Hour	
Flagging Personnel Overtime Hour			Hour	
Mob/Demob for flagging personnel			Lump Sum	
Flagging Equipment			Day	
Shipping Samples	1		Lump Sum	
Standby Time (if any) for drill crew and equipment			Hour	
Monitoring Well Permit	3		Each	
Helicopter Use, highly variable with location and helicopter size Negotiated at time			Hour	
Drill Crew Work (site preparation, skidding drill rig)			Hour	
Construct Drill Access (Bulldozer or Excavator) – Negotiated at Time			Hour	
Ream Casing to Install Instrument	300		Ft	
Crew Breaks (10 days on; 4 days off)			Each	
Fuel Surcharge When Fuel is beyond $4.00 a gallon - Negotiated at Time			Mile	

Drilling BPA RFQ No. DTFH7016Q00075 Project Name: Russian River Campground Road Geotechnical Subsurface Investigation Quotes Due By: October 5, 2016 by 12:00 p.m. Pacific	**Qty**	**Price**	**Unit of measure**	**Subtotal**
Water Level Testing			Hour	
Prepare gINT logs			Hour	
On Project Field Inspection			Hour	
MOB and DEMOB for Field Inspector			Lump Sum	
Per Diem for Field Inspector (at the government rate): Kenai-Soldotna, AK (5/1-10/31)		$285	Day	
Per Diem for Field Inspector (at the government rate): Kenai-Soldotna, AK (11/1-4/30)		$190	Day	
Other(give detail) - Test Pit at Proposed Contact Station	1		Lump Sum	
Other(give detail) - field inspector rental vehicle			Day	
Other(give detail) - utility locate	1		Lump Sum	
Other(give detail) - vibrating wire piezometer (50 psi)	3		Each	
Other(give detail) - grouted in vibrating wire piezometer installation	3		Each	
Other (give detail)				
Other (give detail)				
Other (give detail)				
Other (give detail)				

***Note: Previous RFQs under this BPA have included the parenthetical notation "not subject to wage determination" for the flagging personnel line items. That notation has been deleted from those line items in this RFQ.**

Items in RED text are items the Government anticipates are necessary to complete the work. Items not highlighted red can also be quoted if necessary for contract completion.

Items marked with estimated quantities shall be quoted at the listed quantities. Unless otherwise stated below, the listed estimated quantities are ceiling quantities that may not be exceeded unless authorized by the Contracting Officer through a contract modification. Payment will be based on the actual quantity, not to exceed the ceiling quantity.

Shared Ceiling Price for Drilling Methods:

The following two line items on the quote sheet have a shared ceiling price equal to the sum of the subtotals of both line items:

- HQ3 core drilling; and
- Hollow stem auger drilling 4 ¼" ID (8 ¼" OD)

The Government will not be obligated to pay the Contractor any amount in excess of the ceiling price, and the Contractor shall not be obligated to continue performance if to do so would exceed the ceiling price, unless and until the Contracting Officer modifies the contract to revise the ceiling price.

The depths for each type of drilling method may exceed the estimated quantity shown in the quote sheet, provided that the shared ceiling price is not exceeded.

Items not marked by the Government with estimated quantities may be quoted by the Contractor. For these items the Contractor shall set the not-to-exceed amount necessary to complete the Statement of Work. Payment will be made based on the actual quantity, not to exceed the quantity quoted by the Contractor. No increase will be made to Contractor-quoted quantities, even if the actual quantity exceeds the Contractor-quoted quantity. The Contractor shall continue performance regardless of whether the actual quantity exceeds the Contractor-quoted quantity.

Quotes shall follow pricing in the BPA Master Quote Sheet. If prices quoted are different, a justification letter shall be supplied for approval by Contracting Officer. Quotations may or may not be considered with different prices, depending on the justification.

Quoters shall not alter the line item descriptions, listed quantities, or listed units of measurement. Alteration of these items may render a quote unacceptable and therefore ineligible for award.

Quote amount: _____

Project Start Date:_____
Project Completion Date:_____
Company Name:_____

_____ _____

Signature of Authorized Representative **Date**

Addendum to 52.212-1 -- Instructions to Offerors -- Commercial Items. (Oct 2015)

The following items shall be submitted with quotes:

1. The SF-1449: Solicitation/Contract/Order for Commercial Items;
2. A completed copy of the quote sheet;
3. A justification letter for prices that differ from those in the BPA, if applicable; and
4. A completed copy of the representations and certifications at FAR 52.212-3, or paragraph "b" of FAR 52.212-3 if the representations and certifications currently posted in the SAM database are current, accurate, complete, and applicable to this solicitation

Quotes that do not include all of the above items, or reject the terms and conditions of the solicitation, may be excluded from consideration. **Quoters shall not alter the line item descriptions, listed quantities, or listed units of measurement on the quote sheet. Alteration of these items may render a quote unacceptable and therefore ineligible for award.**

Quotes may be submitted by e-mail to WFL.Purchasing@dot.gov or by mail to:

Western Federal Lands Highway Division
Attn: Simplified Acquisitions
610 East Fifth Street
Vancouver, WA 98661

The solicitation number should be referenced either on the envelope (if mailed) or in the subject line (if e-mailed).

Submit questions regarding the solicitation to WFL.Purchasing@dot.gov.

CONTRACT CLAUSES

This solicitation is issued under the Federal Highway Administration Blanket Purchase Agreement (BPA) for Geotechnical Drilling Services in Alaska, Washington, Oregon, Idaho, Montana, and Wyoming. The terms and conditions of the BPA apply to this solicitation and the resulting contract.

52.252-2 – Clauses Incorporated by Reference. (Feb 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es): https://www.acquisition.gov/

The following clauses are incorporated by reference:

52.204-18 -- Commercial and Government Entity Code Maintenance. (Jul 2016)
52.232-40 – Providing Accelerated Payments to Small Business Subcontractors. (Dec 2013)
52.212-4 -- Contract Terms and Conditions -- Commercial Items. (May 2015)

Addendum to 52.212-4

The following clauses are incorporated by reference:

52.245-1 - Government Property (APR 2012)
52.245-9 - Use and Charges (APR 2012)

End of Addendum to 52.212-4

Full Text Clauses

52.203-99 PROHIBITION ON CONTRACTING WITH ENTITIES THAT REQUIRE CERTAIN INTERNAL CONFIDENTIALITY AGREEMENTS (FEB 2015)

(a) The Contractor shall not require employees or subcontractors seeking to report fraud, waste, or abuse to sign or comply with internal confidentiality agreements or statements prohibiting or otherwise restricting such employees or subcontractors from lawfully reporting such waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information.

(b) The contractor shall notify employees that the prohibitions and restrictions of any internal confidentiality agreements covered by this clause are no longer in effect.

(c) The prohibition in paragraph (a) of this clause does not contravene requirements applicable to Standard Form 312, Form 4414, or any other form issued by a Federal department or agency governing the nondisclosure of classified information.

(d)(1) In accordance with section 743 of Division E, Title VII, of the Consolidated and Further Continuing Resolution Appropriations Act, 2015 (Pub. L. 113-235), use of funds appropriated (or otherwise made available) under that or any other Act may be prohibited, if the Government determines that the Contractor is not in compliance with the provisions of this clause.

(2) The Government may seek any available remedies in the event the contractor fails to comply with the provisions of this clause.

(End of clause)

FAR 52.204-21 Basic Safeguarding of Covered Contractor Information Systems (Jun 2016)

(a) *Definitions.* As used in this clause--

“Covered contractor information system” means an information system that is owned or operated by a contractor that processes, stores, or transmits Federal contract information.

“Federal contract information” means information, not intended for public release, that is provided by or generated for the Government under a contract to develop or deliver a product or service to the Government, but not including information provided by the Government to the public (such as on public Web sites) or simple transactional information, such as necessary to process payments.

“Information” means any communication or representation of knowledge such as facts, data, or opinions, in any medium or form, including textual, numerical, graphic, cartographic, narrative, or audiovisual (Committee on National Security Systems Instruction (CNSSI) 4009).

“Information system” means a discrete set of information resources organized for the collection, processing, maintenance, use, sharing, dissemination, or disposition of information (44 U.S.C. 3502).

“Safeguarding” means measures or controls that are prescribed to protect information systems.

(b) Safeguarding requirements and procedures.

(1) The Contractor shall apply the following basic safeguarding requirements and procedures to protect covered contractor information systems. Requirements and procedures for basic safeguarding of covered contractor information systems shall include, at a minimum, the following security controls:

(i) Limit information system access to authorized users, processes acting on behalf of authorized users, or devices (including other information systems).

(ii) Limit information system access to the types of transactions and functions that authorized users are permitted to execute.

(iii) Verify and control/limit connections to and use of external information systems.

(iv) Control information posted or processed on publicly accessible information systems.

(v) Identify information system users, processes acting on behalf of users, or devices.

(vi) Authenticate (or verify) the identities of those users, processes, or devices, as a prerequisite to allowing access to organizational information systems.

(vii) Sanitize or destroy information system media containing Federal Contract Information before disposal or release for reuse.

(viii) Limit physical access to organizational information systems, equipment, and the respective operating environments to authorized individuals.

(ix) Escort visitors and monitor visitor activity; maintain audit logs of physical access; and control and manage physical access devices.

(x) Monitor, control, and protect organizational communications (i.e., information transmitted or received by organizational information systems) at the external boundaries and key internal boundaries of the information systems.

(xi) Implement subnetworks for publicly accessible system components that are physically or logically separated from internal networks.

(xii) Identify, report, and correct information and information system flaws in a timely manner.

(xiii) Provide protection from malicious code at appropriate locations within organizational information systems.

(xiv) Update malicious code protection mechanisms when new releases are available.

(xv) Perform periodic scans of the information system and real-time scans of files from external sources as files are downloaded, opened, or executed.

(2) *Other requirements*. This clause does not relieve the Contractor of any other specific safeguarding requirements specified by Federal agencies and departments relating to covered contractor information systems generally or other Federal safeguarding

requirements for controlled unclassified information (CUI) as established by Executive Order 13556.

(c) *Subcontracts*. The Contractor shall include the substance of this clause, including this paragraph (c), in subcontracts under this contract (including subcontracts for the acquisition of commercial items, other than commercially available off-the-shelf items), in which the subcontractor may have Federal contract information residing in or transiting through its information system.

(End of clause)

52.212-5 -- Contract Terms and Conditions Required to Implement Statutes or Executive Orders -- Commercial Items. (Jun 2016)

(a) The Contractor shall comply with the following Federal Acquisition Regulation (FAR) clauses, which are incorporated in this contract by reference, to implement provisions of law or Executive orders applicable to acquisitions of commercial items:

(1) 52.209-10, Prohibition on Contracting with Inverted Domestic Corporations (Nov 2015)

(2) 52.233-3, Protest After Award (AUG 1996) (31 U.S.C. 3553).

(3) 52.233-4, Applicable Law for Breach of Contract Claim (OCT 2004) (Public Laws 108-77, 108-78 (19 U.S.C. 3805 note)).

(b) The Contractor shall comply with the FAR clauses in this paragraph (b) that the contracting officer has indicated as being incorporated in this contract by reference to implement provisions of law or Executive orders applicable to acquisitions of commercial items:

[Contracting Officer check as appropriate.]

__✓_ (1) 52.203-6, Restrictions on Subcontractor Sales to the Government (Sept 2006), with Alternate I (Oct 1995) (41 U.S.C. 4704 and 10 U.S.C. 2402).

___ (2) 52.203-13, Contractor Code of Business Ethics and Conduct (Oct 2015) (41 U.S.C. 3509).

___ (3) 52.203-15, Whistleblower Protections under the American Recovery and Reinvestment Act of 2009 (Jun 2010) (Section 1553 of Pub L. 111-5) (Applies to contracts funded by the American Recovery and Reinvestment Act of 2009).

__✓_ (4) 52.204-10, Reporting Executive compensation and First-Tier Subcontract Awards (Oct 2015) (Pub. L. 109-282) (31 U.S.C. 6101 note).

___ (5) [Reserved]

___ (6) 52.204-14, Service Contract Reporting Requirements (Jan 2014) (Pub. L. 111-117, section 743 of Div. C).

___ (7) 52.204-15, Service Contract Reporting Requirements for Indefinite-Delivery Contracts (Jan 2014) (Pub. L. 111-117, section 743 of Div. C).

__✓_ (8) 52.209-6, Protecting the Government's Interest When Subcontracting with Contractors Debarred, Suspended, or Proposed for Debarment (Oct 2015) (31 U.S.C. 6101 note).

___ (9) 52.209-9, Updates of Publicly Available Information Regarding Responsibility Matters (Jul 2013) (41 U.S.C. 2313).

___ (10) [Reserved]

___ (11) (i) 52.219-3, Notice of HUBZone Set-Aside or Sole-Source Award (Nov 2011) (15 U.S.C. 657a).

___ (ii) Alternate I (Nov 2011) of 52.219-3.

___ (12) (i) 52.219-4, Notice of Price Evaluation Preference for HUBZone Small Business Concerns (Oct 2014) (if the offeror elects to waive the preference, it shall so indicate in its offer)(15 U.S.C. 657a).

___ (ii) Alternate I (Jan 2011) of 52.219-4.

___ (13) [Reserved]

_✓__ (14) (i) 52.219-6, Notice of Total Small Business Aside (Nov 2011) (15 U.S.C. 644).

___ (ii) Alternate I (Nov 2011).

___ (iii) Alternate II (Nov 2011).

___ (15) (i) 52.219-7, Notice of Partial Small Business Set-Aside (June 2003) (15 U.S.C. 644).

___ (ii) Alternate I (Oct 1995) of 52.219-7.

___ (iii) Alternate II (Mar 2004) of 52.219-7.

__✓_ (16) 52.219-8, Utilization of Small Business Concerns (Oct 2014) (15 U.S.C. 637(d)(2) and (3)).

___ (17) (i) 52.219-9, Small Business Subcontracting Plan (Oct 2015) (15 U.S.C. 637 (d)(4)).

___ (ii) Alternate I (Oct 2001) of 52.219-9.

___ (iii) Alternate II (Oct 2001) of 52.219-9.

___ (iv) Alternate III (Oct 2015) of 52.219-9.

___ (18) 52.219-13, Notice of Set-Aside of Orders (Nov 2011) (15 U.S.C. 644(r)).

_✓__ (19) 52.219-14, Limitations on Subcontracting (Nov 2011) (15 U.S.C. 637(a)(14)).

___ (20) 52.219-16, Liquidated Damages—Subcontracting Plan (Jan 1999) (15 U.S.C. 637(d)(4)(F)(i)).

___ (21) 52.219-27, Notice of Service-Disabled Veteran-Owned Small Business Set-Aside (Nov 2011) (15 U.S.C. 657f).

_✓__ (22) 52.219-28, Post Award Small Business Program Rerepresentation (Jul 2013) (15 U.S.C. 632(a)(2)).

___ (23) 52.219-29, Notice of Set-Aside for, or Sole Source Award to, Economically Disadvantaged Women-Owned Small Business Concerns (Dec 2015) (15 U.S.C. 637(m)).

___ (24) 52.219-30, Notice of Set-Aside for, or Sole Source Award to, Women-Owned Small Business Concerns Eligible Under the Women-Owned Small Business Program (Dec 2015) (15 U.S.C. 637(m)).

__✓_ (25) 52.222-3, Convict Labor (June 2003) (E.O. 11755).

__✓_ (26) 52.222-19, Child Labor—Cooperation with Authorities and Remedies (Feb 2016) (E.O. 13126).

_✓__ (27) 52.222-21, Prohibition of Segregated Facilities (Apr 2015).

__✓_ (28) 52.222-26, Equal Opportunity (Apr 2015) (E.O. 11246).

__✓_ (29) 52.222-35, Equal Opportunity for Veterans (Oct 2015) (38 U.S.C. 4212).

__✓_ (30) 52.222-36, Equal Opportunity for Workers with Disabilities (Jul 2014) (29 U.S.C. 793).

__✓_ (31) 52.222-37, Employment Reports on Veterans (Feb 2016) (38 U.S.C. 4212).

__✓_ (32) 52.222-40, Notification of Employee Rights Under the National Labor Relations Act (Dec 2010) (E.O. 13496).

__✓_ (33) (i) 52.222-50, Combating Trafficking in Persons (Mar 2015) (22 U.S.C. chapter 78 and E.O. 13627).

___ (ii) Alternate I (Mar 2015) of 52.222-50, (22 U.S.C. chapter 78 and E.O. 13627).

___ (34) 52.222-54, Employment Eligibility Verification (Oct 2015). (E. O. 12989). (Not applicable to the acquisition of commercially available off-the-shelf items or certain other types of commercial items as prescribed in 22.1803.)

___ (35) (i) 52.223-9, Estimate of Percentage of Recovered Material Content for EPA-Designated Items (May 2008) (42 U.S.C. 6962(c)(3)(A)(ii)). (Not applicable to the acquisition of commercially available off-the-shelf items.)

___ (ii) Alternate I (May 2008) of 52.223-9 (42 U.S.C. 6962(i)(2)(C)). (Not applicable to the acquisition of commercially available off-the-shelf items.)

___ (36) 52.223-11, Ozone-Depleting Substances and High Global Warming Potential Hydrofluorocarbons (Jun 2016) (E.O.13693).

___ (37) 52.223-12, Maintenance, Service, Repair, or Disposal of Refrigeration Equipment and Air Conditioners (Jun 2016) (E.O. 13693).

___ (38) (i) 52.223-13, Acquisition of EPEAT® -Registered Imaging Equipment (Jun 2014) (E.O.s 13423 and 13514

___ (ii) Alternate I (Oct 2015) of 52.223-13.

___ (39) (i) 52.223-14, Acquisition of EPEAT® -Registered Television (Jun 2014) (E.O.s 13423 and 13514).

___ (ii) Alternate I (Jun 2014) of 52.223-14.

___ (40) 52.223-15, Energy Efficiency in Energy-Consuming Products (Dec 2007) (42 U.S.C. 8259b).

___ (41) (i) 52.223-16, Acquisition of EPEAT® -Registered Personal Computer Products (Oct 2015) (E.O.s 13423 and 13514).

___ (ii) Alternate I (Jun 2014) of 52.223-16.

__✓_ (42) 52.223-18, Encouraging Contractor Policies to Ban Text Messaging while Driving (Aug 2011) (E.O. 13513).

___ (43) 52.223-20, Aerosols (Jun 2016) (E.O. 13693).

___ (44) 52.223-21, Foams (Jun 2016) (E.O. 13696).

__✓_ (45) 52.225-1, Buy American--Supplies (May 2014) (41 U.S.C. chapter 83).

___ (46) (i) 52.225-3, Buy American--Free Trade Agreements--Israeli Trade Act (May 2014) (41 U.S.C. chapter 83, 19 U.S.C. 3301 note, 19 U.S.C. 2112 note, 19 U.S.C. 3805 note, 19 U.S.C. 4001 note, Pub. L. 103-182, 108-77, 108-78, 108-286, 108-302, 109-53, 109-169, 109-283, 110-138, 112-41, 112-42, and 112-43).

___ (ii) Alternate I (May 2014) of 52.225-3.

___ (iii) Alternate II (May 2014) of 52.225-3.

___ (iv) Alternate III (May 2014) of 52.225-3.

___ (47) 52.225-5, Trade Agreements (Feb 2016) (19 U.S.C. 2501, *et seq.*, 19 U.S.C. 3301 note).

__✓_ (48) 52.225-13, Restrictions on Certain Foreign Purchases (Jun 2008) (E.O.'s, proclamations, and statutes administered by the Office of Foreign Assets Control of the Department of the Treasury).

___ (49) 52.225-26, Contractors Performing Private Security Functions Outside the United States (Jul 2013) (Section 862, as amended, of the National Defense Authorization Act for Fiscal Year 2008; 10 U.S.C. 2302 Note).

___ (50) 52.226-4, Notice of Disaster or Emergency Area Set-Aside (Nov 2007) (42 U.S.C. 5150).

___ (51) 52.226-5, Restrictions on Subcontracting Outside Disaster or Emergency Area (Nov 2007) (42 U.S.C. 5150).

___ (52) 52.232-29, Terms for Financing of Purchases of Commercial Items (Feb 2002) (41 U.S.C. 4505), 10 U.S.C. 2307(f)).

___ (53) 52.232-30, Installment Payments for Commercial Items (Oct 1995) (41 U.S.C. 4505, 10 U.S.C. 2307(f)).

__✓_ (54) 52.232-33, Payment by Electronic Funds Transfer— System for Award Management (Jul 2013) (31 U.S.C. 3332).

___ (55) 52.232-34, Payment by Electronic Funds Transfer—Other Than System for Award Management (Jul 2013) (31 U.S.C. 3332).

___ (56) 52.232-36, Payment by Third Party (May 2014) (31 U.S.C. 3332).

___ (57) 52.239-1, Privacy or Security Safeguards (Aug 1996) (5 U.S.C. 552a).

___ (58) (i) 52.247-64, Preference for Privately Owned U.S.-Flag Commercial Vessels (Feb 2006) (46 U.S.C. Appx 1241(b) and 10 U.S.C. 2631).

___ (ii) Alternate I (Apr 2003) of 52.247-64.

(c) The Contractor shall comply with the FAR clauses in this paragraph (c), applicable to commercial services, that the Contracting Officer has indicated as being incorporated in this contract by reference to implement provisions of law or executive orders applicable to acquisitions of commercial items:

[*Contracting Officer check as appropriate*.]

___ (1) 52.222-17, Nondisplacement of Qualified Workers (May 2014) (E.O. 13495)

_✓__ (2) 52.222-41, Service Contract Labor Standards (May 2014) (41 U.S.C. chapter 67.).

__✓_ (3) 52.222-42, Statement of Equivalent Rates for Federal Hires (May 2014) (29 U.S.C. 206 and 41 U.S.C. chapter 67).

___ (4) 52.222-43, Fair Labor Standards Act and Service Contract Labor Standards -- Price Adjustment (Multiple Year and Option Contracts) (May 2014) (29 U.S.C.206 and 41 U.S.C. chapter 67).

___ (5) 52.222-44, Fair Labor Standards Act and Service Contract Labor Standards -- Price Adjustment (May 2014) (29 U.S.C. 206 and 41 U.S.C. chapter 67).

___ (6) 52.222-51, Exemption from Application of the Service Contract Labor Standards to Contracts for Maintenance, Calibration, or Repair of Certain Equipment-- Requirements (May 2014) (41 U.S.C. chapter 67).

___ (7) 52.222-53, Exemption from Application of the Service Contract Labor Standards to Contracts for Certain Services--Requirements (May 2014) (41 U.S.C. chapter 67).

__✓_ (8) 52.222-55, Minimum Wages Under Executive Order 13658 (Dec 2015) (E.O. 13658).

___ (9) 52.226-6, Promoting Excess Food Donation to Nonprofit Organizations. (May 2014) (42 U.S.C. 1792).

___ (10) 52.237-11, Accepting and Dispensing of $1 Coin (Sep 2008) (31 U.S.C. 5112(p)(1)).

(d) *Comptroller General Examination of Record* The Contractor shall comply with the provisions of this paragraph (d) if this contract was awarded using other than sealed bid, is in excess of the simplified acquisition threshold, and does not contain the clause at 52.215-2, Audit and Records -- Negotiation.

(1) The Comptroller General of the United States, or an authorized representative of the Comptroller General, shall have access to and right to examine any of the Contractor's directly pertinent records involving transactions related to this contract.

(2) The Contractor shall make available at its offices at all reasonable times the records, materials, and other evidence for examination, audit, or reproduction, until 3 years after final payment under this contract or for any shorter period specified in FAR Subpart 4.7, Contractor Records Retention, of the other clauses of this contract. If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for 3 years after any resulting final termination settlement. Records relating to appeals under the disputes clause or to litigation or the settlement of claims arising under or relating to this contract shall be made available until such appeals, litigation, or claims are finally resolved.

(3) As used in this clause, records include books, documents, accounting procedures and practices, and other data, regardless of type and regardless of form. This does not require the Contractor to create or maintain any record that the Contractor does not maintain in the ordinary course of business or pursuant to a provision of law.

(e)

(1) Notwithstanding the requirements of the clauses in paragraphs (a), (b), (c) and (d) of this clause, the Contractor is not required to flow down any FAR clause, other than those in this paragraph (e)(1) in a subcontract for commercial items. Unless otherwise indicated below, the extent of the flow down shall be as required by the clause—

(i) 52.203-13, Contractor Code of Business Ethics and Conduct (Oct 2015) (41 U.S.C. 3509).

(ii) 52.219-8, Utilization of Small Business Concerns (Oct 2014) (15 U.S.C. 637(d)(2) and (3)), in all subcontracts that offer further subcontracting opportunities. If the subcontract (except subcontracts to small business concerns) exceeds $700,000 ($1.5 million for construction of any public facility), the subcontractor must include 52.219-8 in lower tier subcontracts that offer subcontracting opportunities.

(iii) 52.222-17, Nondisplacement of Qualified Workers (May 2014) (E.O. 13495). Flow down required in accordance with paragraph (1) of FAR clause 52.222-17.

(iv) 52.222-21, Prohibition of Segregated Facilities (Apr 2015).

(v) 52.222-26, Equal Opportunity (Apr 2015) (E.O. 11246).

(vi) 52.222-35, Equal Opportunity for Veterans (Oct 2015) (38 U.S.C. 4212).

(vii) 52.222-36, Equal Opportunity for Workers with Disabilities (Jul 2014) (29 U.S.C. 793).

(viii) 52.222-37, Employment Reports on Veterans (Feb 2016) (38 U.S.C. 4212).

(ix) 52.222-40, Notification of Employee Rights Under the National Labor Relations Act (Dec 2010) (E.O. 13496). Flow down required in accordance with paragraph (f) of FAR clause 52.222-40.

(x) 52.222-41, Service Contract Labor Standards (May 2014), (41 U.S.C. chapter 67).

(xi) ____ (A) 52.222-50, Combating Trafficking in Persons (Mar 2015) (22 U.S.C. chapter 78 and E.O. 13627).

___ (B) Alternate I (Mar 2015) of 52.222-50 (22 U.S.C. chapter 78 E.O. 13627).

(xii) 52.222-51, Exemption from Application of the Service Contract Labor Standards to Contracts for Maintenance, Calibration, or Repair of Certain Equipment--Requirements (May 2014) (41 U.S.C. chapter 67.)

(xiii) 52.222-53, Exemption from Application of the Service Contract Labor Standards to Contracts for Certain Services--Requirements (May 2014) (41 U.S.C. chapter 67)

(xiv) 52.222-54, Employment Eligibility Verification (Oct 2015) (E. O. 12989).

(xv) 52.222-55, Minimum Wages Under Executive Order 13658 (Dec 2015).

(xvi) 52.225-26, Contractors Performing Private Security Functions Outside the United States (Jul 2013) (Section 862, as amended, of the National Defense Authorization Act for Fiscal Year 2008; 10 U.S.C. 2302 Note).

(xvii) 52.226-6, Promoting Excess Food Donation to Nonprofit Organizations. (May 2014) (42 U.S.C. 1792). Flow down required in accordance with paragraph (e) of FAR clause 52.226-6.

(xviii) 52.247-64, Preference for Privately-Owned U.S. Flag Commercial Vessels (Feb 2006) (46 U.S.C. Appx 1241(b) and 10 U.S.C. 2631). Flow down required in accordance with paragraph (d) of FAR clause 52.247-64.

(2) While not required, the Contractor may include in its subcontracts for commercial items a minimal number of additional clauses necessary to satisfy its contractual obligations.

(End of Clause)

52.222-42 -- Statement of Equivalent Rates for Federal Hires. (May 2014)

In compliance with the Service Contract Labor Standards statute and the regulations of the Secretary of Labor (29 CFR part 4), this clause identifies the classes of service employees expected to be employed under the contract and states the wages and fringe benefits payable to each if they were employed by the contracting agency subject to the provisions of 5 U.S.C. 5341 or 5332.

This Statement is for Information Only:
It is not a Wage Determination

Employee Class	**Monetary Wage -- Fringe Benefits**
Well Driller, WG-10, Step 2, Nonsupervisory	$25.98/hr + fringe benefits
Well Driller, WG-10, Step 3, Supervisory	$27.02/hr + fringe benefits
Heavy Equipment Operator, WG-10, Step 2, Nonsupervisory	$25.98/hr + fringe benefits
Heavy Equipment Operator, WG-10, Step 3, Supervisory	$27.02/hr + fringe benefits
Heavy Equipment Mechanic, WG-10, Step 2, Nonsupervisory	$25.98/hr + fringe benefits
Heavy Equipment Mechanic, WG-10, Step 3, Supervisory	$27.02/hr + fringe benefits
Laborer, WG-2, Step 2, Nonsupervisory	$13.35/hr + fringe benefits
Laborer, WG-2, Step 3, Supervisory	$13.88/hr + fringe benefits

(End of Clause)

Transportation Acquisition Regulation (TAR) Contract Clauses

The following Transportation Acquisition Regulation (TAR) clauses are incorporated by reference. The full text of the clauses can be accessed electronically at the following address:

https://www.transportation.gov/assistant-secretary-administration/procurement/tar-part-1252-solicitatons-provisions-and-contract

1252.223-71 ACCIDENT AND FIRE REPORTING (APR 2005)
1252.223-73 SEAT BELT USE POLICIES AND PROGRAMS (APR 2005)
1252.242-73 CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE (OCT 1994)

Statement of Work

Geotechnical Investigation
Chugach National Forest, Alaska
Russian River Campground
AK FS CNF 1015(2)

I. INTRODUCTION

The Western Federal Lands Highway Division (WFLHD) of the Federal Highway Administration is conducting a geotechnical subsurface investigation on the Russian River Campground Road in the Chugach National Forest, Alaska. The project starts nearly a half mile after the intersection of the Sterling Highway and Russian River Campground Road and extends westerly about 1 mile. The project location is shown on the attached vicinity map. This investigation is in support of a project to rehabilitate a landslide and widen the road for a bicycle/pedestrian path.

There are a total of 11 borings and 1 test pit. The purpose of the borings and test pit is to investigate the subsurface conditions along the project. Boring depths range from a minimum of 10.5 to a maximum of 100 feet. It is anticipated that drilling methods will include hollow stem augers and HQ3 coring. Casing advancer is not anticipated. Total drilling footage will range from 436.5 to a maximum of 596.5 feet, depending on the final boring depths.
Test borings are located both on and off of the paved highway. It is anticipated that a portable drill will be needed to access the test boring locations off the paved highway. A truck-mounted drill and traffic control is anticipated for the boring locations on or adjacent to the paved highway. Drilling operations must not begin prior to September 16, 2016.

An excavator, backhoe, or similar piece of equipment with a 24 inch wide bucket will be needed for the test pit. The test pit will be dug to 2 and 5 feet below the ground surface.

II. SCOPE OF WORK FOR DRILLING

All test boring locations contained within this statement of work are shown on the attached Table of Borings.

The table includes the boring locations (GPS coordinates – WGS 84); estimated, minimum, and maximum depths; estimated number of in situ tests; and comments on accessing the boring location. Test boring locations are also provided on the attached Boring Location maps. Boring locations were marked in the field by the COR using a 4-foot lathe with flagging during a site visit the week of June 6, 2016. Borings will be remarked, if necessary, during the pre-drill meeting.

A. Drill Type and Tooling

Provide the necessary drill rigs to complete the work and provide additional drill rigs as necessary to perform the specified work. The drill type is listed on the Table of Borings based on FHWA's interpretation of the most practical means to access the test boring location. However, the selection of drill type for each boring is up to the contractor. Tracked equipment that leaves any indentations in pavement is not allowed to track down the road. Supply all necessary equipment to drill all proposed test borings. Equipment shall include an 8-inch OD hollow stem auger system, standard SPT (2 inch), 2.5 inch and 3 inch split spoon (oversized) samplers, and an HQ wireline core drilling system. NQ coring is not allowed on this project. Advance the hole using hollow-stem augers until the groundwater table is encountered. Casing advancer system may be used in soil after the groundwater table is encountered and measured. Advance all borings below the water table without using any drilling fluids and obtain a stable water level reading prior to using any drilling fluids. Furnish durable, all-weather core boxes and wood separator blocks for HQ core.

B. Sampling Intervals

Drill all borings in accordance with this Statement of Work. Advance holes using the drilling methods listed on the Table of Borings. When in soils, collect SPT samples at the following intervals:

- RR16-01 to RR16-04: Sample every 2.5 feet from the surface to the bottom of hole (BOH)
- RR16-05 to RR16-07: Sample every 2.5 feet from the surface to 15 feet deep, then every 5 feet to BOH
- RR16-08: Continuous sampling from the surface to 10 feet deep, then every 2.5 feet to BOH
- RR16-09 to RR16-11: Continuous sampling from the surface to BOH

When coring or augering in rock and the subsurface material is characterized as highly weathered, very weak to weak rock, take SPT samples to gauge the relative density of the very weak to weak rock material.

C. Drive Samples (SPT)

Collect drive samples using the standard SPT sampler unless otherwise directed by the Field Inspector or COR. Alternate use of the 2 inch SPT with 2.5 inch and/or 3 inch split barrel samplers in gravelly material or where sample recovery with the standard SPT sampler is poor. The Contractor shall:

- Replace the driving shoe on the split barrel samplers if it becomes dented or distorted or has excessive wear;
- Use split barrel samplers with a ball check and vent;

- Furnish metal or plastic sample catchers in the split barrel samplers; and
- Replace the sample catchers when they become worn or no longer function.

Do not exceed 220 SPT samples under this contract, unless authorized by the contracting officer through a contract modification.

D. Drill Rig Automatic Hammer Efficiency

Use a drill rig equipped with an automatic trip hammer to complete all borings excluding borings requiring the use of a portable drill rig. Furnish hammer efficiency reports for all proposed drill rigs to be used on the project prior to mobilization. Reports that are older than 1 year at the time of contract execution will not be accepted. If reports are older than 1 year, have the drill rigs tested and submit the efficiency reports by October 31, 2016.

E. Drill Depths

Drill all holes to the *Minimum Depth* indicated on the Table of Borings. Additional depth may be required as directed by the field inspector or COR up to the *Maximum Depth* listed, subject to the shared ceiling price for drilling methods, as discussed in the next section.

F. Shared Ceiling Price for Drilling Methods

The following two line items on the quote sheet have a shared ceiling price equal to the sum of the subtotals of both line items:

- HQ3 core drilling; and
- Hollow stem auger drilling 4 ¼" ID (8 ¼" OD)

The Government will not be obligated to pay the Contractor any amount in excess of the ceiling price, and the Contractor shall not be obligated to continue performance if to do so would exceed the ceiling price, unless and until the Contracting Officer modifies the contract to revise the ceiling price.

The depths for each type of drilling method may exceed the estimated quantity shown in the quote sheet, provided that the shared ceiling price is not exceeded.

G. Instrumentation

Install slope inclinometer (SI) casing and vibrating wire piezometers (VWP) at borings RR16-01, RR16-02, and RR16-03. Provide the following items:

- Slope inclinometer casing

- Slope Indicator vibrating wire piezometers
- 2 flush mount monitoring wells
- 1 locking upright monitoring well
- Batteries for VW Miniloggers
- Materials for installation (e.g., grout, tremie tube, concrete, etc.)

The Government will provide 3 VW Miniloggers for installation. Install instruments according to manufacturer's recommendations (available at http://www.slopeindicator.com/pdf/manuals/ vw-piezometer-manual.pdf) including both SI and VWP installation and grouting. Leave an additional 5 feet of cable at the ground surface between the piezometer and the data logger. **Note the vibrating wire piezometer serial number on the boring logs and depth of installation below ground surface to the nearest 0.1 foot.** Submit the VWP calibration sheet to the COR before installation.
The Government will take ownership of all furnished equipment at the completion of this call.

H. Access

See the Table of Borings.

We anticipate use of a truck-mounted drill to access all of the boring locations excluding RR16-03. Boring RR16-03 will require a portable drill being set with an excavator, crane, or other means. It will be necessary to remove the guardrail to access boring RR16-02. Boring locations may be adjusted slightly by the COR during the pre-drill meeting in order to minimize impacts.

Reinstall guardrail and patch all holes in the asphalt with an equivalent thickness of asphalt cold patch.

I. Test Pit

Dig an exploration trench (test pit) with a minimum 24" wide bucket in the vicinity of the proposed contact station. Secure soil samples at two separate elevations, 2 feet below the surface and 5.5 feet below the surface. Place sample material in separate 5 gallon buckets. Observe the subsurface conditions and observe the relative ease with which a trench can be dug through the in-situ material. The following should be noted on the exploratory trench log:

- Job name, date, sampling depths
- Visual soil classification using the USCS
- Indicate if caving or sloughing occurred during excavation and at what depth
- Record if water encountered and its source (e.g., ground water)
- On a plan with a north arrow, note the trench direction and length, tying it in with a known feature on the site
- Properly label the samples with the job name, depth of recovery

Pavement will have to be removed to dig the test pit, backfill the test pit with native material to the same grade as the adjacent pavement. The test pit will not be repaved as part of this contract.

J. Pre-Drill Meeting

Hold a pre-drill meeting on site with the COR and other appropriate Government staff prior to starting drilling. At the pre-drill meeting the COR will review all boring locations on site with the Contractor. The Contractor's field inspector must be present at the meeting. It is anticipated that this field review will take two days. At that time, boring locations may be modified slightly based on site conditions to minimize environmental impacts and to address safety hazards. Do not offset borings more than 5 feet from the staked locations discussed during the pre-drill meeting. Coordinate the pre-drill meeting at least 1 week prior to the meeting date.

The COR will provide a copy of the environmental documents at the pre-drill meeting to be kept on site during all operations.

K. Utility Locate

A utility locate is necessary for this drill project at all locations. Complete a utility locate using Alaska Dig Line and/or other appropriate means prior to the start of drilling (http://akonecall.com/locates/, 1-800-478-3121, or 811 from anywhere in Alaska).

L. Water for Drilling

Coring and casing advancer methods may use water or air to advance the hole. The contractor is responsible for any water draw permits that may be necessary. Follow applicable State and or Local laws for water draw.

M. Traffic Control

Camping reservations are not being accepted after September 15, 2016. The only use of the campground will be very limited day use traffic. The need for flagging is not anticipated, but the Contractor is responsible for providing any traffic control that is necessary. Use the Manual on Uniform Traffic Control Devices Part 6 for all traffic control signs, devices, and activities.

Limited access borings or any short term road closures must be coordinated with Marion Glaser of the Chugach National Forest. Submit the closure schedule to Ms. Glaser at the contact information below so it can be provided to the public.

Marion Glaser
Office phone 907-288-7739
Cell phone 719-659-7565
Email meglaser@fs.fed.us

N. Mandatory Bear Training

The Chugach National Forest has provided WFL with mandatory bear awareness training that will be provided to the contractor. These presentations and videos will be given to the contractor after award. They must be watched by everyone that may be on site during drilling operations.

O. Environmental Compliance Summary

Follow all local and State regulations for backfilling a completed test boring, disposing of auger cuttings and containing and/or limiting any runoff from drilling fluids. Utilize best-management-practices (BMPs) for erosion control and use containers or tubs when recirculation of drilling fluid is required.

P. WFLHD Contact Information

The COR for this project is WFLHD Geotechnical Engineer Dustin Woods. If Dustin Woods is not available, you may contact WFLHD Engineering Geologist Doug Anderson if there is an urgent matter.

Dustin Woods
Office phone 360-619-7541
Email Dustin.Woods@dot.gov

Doug Anderson
Office phone 360-619-7958
Email Douglas.A.Anderson@dot.gov

III. SCOPE OF WORK FOR FIELD INSPECTION

The Field Inspector must serve as the main point of contact between the COR and the drill crew during drilling. The Field Inspector must call the COR at the completion of drilling **every day** to provide verbal updates to drilling progress.

A. Qualifications

Provide an experienced engineering geologist or geotechnical engineer with a minimum of 4 years' drilling field inspection experience to act as a field inspector for this drill project. At least 5 days prior to mobilization, submit a resume of the proposed field inspector and provide examples of the field inspector's past field (hand-written) boring logs and past final gINT boring logs to the COR for review. The resume must demonstrate 4 years of experience as a field

inspector and include experience on highway projects with borings drilled for rock cuts and retaining walls. Boring log examples must show the inspector can clearly and neatly characterize and describe complex stratigraphy. Allow 3 working days for review and approval of the field inspector.

B. Boring Logs

Produce boring logs in accordance with Federal Lands Highway – Soil Identification Guidelines and Federal Lands Highway - Rock Characterization Guidelines (see attached).

Complete a detailed field boring log in accordance with Federal Lands Highway – Soil Identification Guidelines and Federal Lands Highway - Rock Characterization Guidelines. Include date started, date completed, personnel on-site, equipment information, drilling methods and size of tooling, location information, pertinent driller's comments and other relevant information on the boring log.

Provide a GPS position in Longitude and Latitude in decimal degrees on each boring log.

Provide scanned copies of the hand-written field logs to the COR in pdf format on a weekly basis during the progression of the drilling activities. Produce electronic gINT logs based on the field logs and send to the COR for review. The COR will send WFLHD's electronic gINT Library to the Field Inspector to be used for all boring logs. The COR will review the draft gINT logs, make changes as necessary and send them back for final gINT log revisions within 14 calendar days of receipt of both the draft gINT logs and the soil and rock samples from the Contractor. This process may require multiple revisions. Submit revised gINT logs to the COR within 7 calendar days after comments have been sent to the Contractor.

C. Materials

Supply durable, all-weather core boxes, wood separator blocks, zip-loc bags, tape measures, writing utensils, hammers, knives, a down-hole water-bailer, and any other equipment needed for drill inspection and test hole logging.

D. Samples

Record the recovery of each split spoon sample and core run to the nearest tenth of a foot on the field boring log.

Retain all split spoon samples collected in one gallon zip-loc bags. Label all samples with the project name, boring number, depth, date, and sample number. Store groups of samples from each hole in separate containers and label each container with the project number, boring number, and date the boring was completed.

The Contractor is responsible for care and transport of all soil samples and rock core to the WFLHD office at**:**

610 East 5th Street
Vancouver, WA 98661

Place core in the box from left to right and down with depth. Label the beginning and end of each core run with the boring number and depth. Mark mechanical breaks in the rock core with an X across the mechanical break. Label each core box with the project name, boring number, depth range in the core box, and date.

E. Water Level Observations

Check and record water levels and borehole cave-in depths for the following cases in all borings, as applicable:

- When advancing the borehole after wet soil samples are encountered;
- If borehole is stopped at the end of the work shift, and before resuming drilling the following shift;
- After reaching the bottom of the borehole, and before pulling the augers/casing out of the ground; and
- After pulling the augers/casing out of the ground.

When water/drilling fluid is used to advance the hole, bail the hole at the end of the work shift and make a water level reading at the beginning of the following work shift.

Report water levels on every field log as described above. If groundwater is not observed at any time during drilling or after withdrawal, note "Groundwater not observed" on the field log. If cave-in occurs, record the cave-in depth upon completion of the hole. Do not record water levels if water or drilling fluids are used to advance the hole unless the hole has been bailed and the groundwater level has stabilized. Record groundwater depths to the nearest tenth of a foot.

When groundwater is encountered, bail the hole and take groundwater level readings at 1, 2, 3, 4, 5, 10 , 20, and 30 minutes, or until the groundwater level stabilizes for a minimum of two readings.

For VWP:

- **Record the VWP serial number on the field boring log;**
- Connect the VWP to the VW Minilogger in accordance with the manufacturer's instructions (available at http://www.slopeindicator.com/pdf/manuals/vw-piezometer-manual.pdf);
- Furnish a copy of the VWP Calibration Certificate for each VWP installed;
- Connect the data logger within 48 hours after the VWP is grouted-in;

- Input the TI or "Temperature Integrated" Calibration Factors, set the clock to local time, and set the data logger to record every 12 hours after connection; and

Download the data and send an excel spreadsheet with the first 7 calendar days of data to the COR for review within 10 days of connecting the data logger.

F. Photographs

Take digital pictures of each core box while at the project site. Include the project name, boring number, depth range in the core box, and date in each of the photographs of the rock core.

Take a minimum of two photographs of each boring location while the drill is on the hole. Use a digital camera that takes photos of 5 megapixels or greater. Take the photo from a distance so that adjacent/background features are visible.

IV. SUBMITTALS AND DELIVERABLES

A. Pre-Mobilization Submittals

Provide the following submittals for review and approval at least 5 business days prior to mobilization to the site:

- Hammer efficiency test reports for all drills used on the project;
- Field Inspector resume;
- Field Inspector example field (hand-written) boring logs; and
- Field Inspector example final gINT boring logs.

Allow 3 business days for the COR to review and approve the submittals.

B. Project Deliverables

Provide daily reports that include all line item quantities for each day of work to the Field Inspector within 24 hours of the day reported. The field inspector must email the reports to the COR weekly.

Ship or hand deliver disturbed samples and rock core to:

Attn. Dustin Woods
WFLHD
610 East 5th St.
Vancouver, Washington 98661

Submit electronic draft gINT logs to the COR for review after completion of drilling. The COR will provide comments within 14 calendar days of having received both the draft gINT logs and all soil and rock samples. Revise and submit final gINT logs to the COR within 7 calendar days after receiving written comments from the COR.

Submit project deliverables in accordance with the schedule listed in Table 1.

Table 1. Project Deliverables and Due Dates.

Deliverable	Due Date
Field Inspector call to COR	Daily to COR during duration of project when crew is on site
Drill Crew Daily Report	Submit hard copy to Field Inspector within 24 hours of shift completion. E-mail scanned reports to COR weekly.
Disturbed Samples: • Split Spoon Samples	Deliver to WFLHD within 14 days of completion of drilling
Rock Core	Deliver to WFLHD within 14 days of completion of drilling
Field Boring Logs	Scan and email to COR weekly
Draft gINT Logs	Email within 14 days after completing drilling
Final gINT Logs	Email within 7 days after receiving comments from COR
VWP Calibration Certificate	Email to COR prior to installation of VWP
VWP data in Microsoft Excel	Email within 10 days after connecting the datalogger to the VWP
Photographs • Core Photos • Boring Location Photos	Email to COR weekly

V. SCHEDULE

The earliest start date for drilling is **OCTOBER 4, 2016**.

Complete all drill holes by **NOVEMBER 23, 2016**. Multiple drills may need to be on site at one time in order to meet the completion date. Submit all deliverables by **DECEMBER 21, 2016**.

It is preferred that the drill crews work 10 days on and 4 days off.

RR16-03 must be the first hole drilled for this project. It is preferred that the next two are RR16-01 and RR16-02.

VI. ATTACHMENTS

Wage Determination No. 2005-2017, Rev. 21, 12/29/2015
Vicinity Map
Table of Borings 1 of 1
Aerial View of Borings
Boring Location Photos
Federal Lands Highway - Soil Description and Identification Guidelines (December 2015)

Federal Lands Highway - Rock Characterization Guidelines (December 2015)

SOLICITATION PROVISIONS

52.252-1 -- Solicitation Provisions Incorporated by Reference. (Feb 1998)

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at this/these address(es): https://www.acquisition.gov/

(End of Provision)

The following provisions are incorporated by reference:

52.204-7 -- System for Award Management. (Jul 2013)
52.204-16 --Commercial and Government Entity Code Reporting. (Jul 2016)
52.212-1 -- Instructions to Offerors -- Commercial Items. (Oct 2015)

Addendum to 52.212-1 -- Instructions to Offerors -- Commercial Items. (Oct 2015)

The following items shall be submitted with quotes:

1. The SF-1449: Solicitation/Contract/Order for Commercial Items;
2. A completed copy of the quote sheet;
3. A justification letter for prices that differ from those in the BPA, if applicable; and
4. A completed copy of the representations and certifications at FAR 52.212-3, or paragraph "b" of FAR 52.212-3 if the representations and certifications currently posted in the SAM database are current, accurate, complete, and applicable to this solicitation

Quotes that do not include all of the above items, or reject the terms and conditions of the solicitation, may be excluded from consideration. **Quoters shall not alter the line item descriptions, listed quantities, or listed units of measurement on the quote sheet. Alteration of these items may render a quote unacceptable and therefore ineligible for award.**

Quotes may be submitted by e-mail to WFL.Purchasing@dot.gov or by mail to:

Western Federal Lands Highway Division
Attn: Simplified Acquisitions
610 East Fifth Street
Vancouver, WA 98661

The solicitation number should be referenced either on the envelope (if mailed) or in the subject line (if e-mailed).

Submit questions regarding the solicitation to WFL.Purchasing@dot.gov.

Full Text Provisions

Evaluation Factors for Award

The Government will evaluate quotes using the Lowest Price Technically Acceptable (LPTA) source selection process. The Government will award a contract resulting from this solicitation to the lowest price, technically acceptable quoter whose quote conforms to the solicitation. Technical acceptability will be based on one factor: price realism. Price realism analysis is the process of evaluating each quoter's price to determine whether the quoted price is realistic for the work to be performed and reflects a clear understanding of the requirements. Quotes with unrealistic prices will be considered technically unacceptable.

52.203-98 Prohibition on Contracting with Entities that Require Certain Internal Confidentiality Agreements-Representation (Feb 2015)

(a) In accordance with section 743 of Division E, Title VII, of the Consolidated and Further Continuing Resolution Appropriations Act, 2015 (Pub. L. 113-235), Government agencies are not permitted to use funds appropriated (or otherwise made available) under that or any other Act for contracts with an entity that requires employees or subcontractors of such entity seeking to report fraud, waste, or abuse to sign internal confidentiality agreements or statements prohibiting or otherwise restricting such employees or subcontractors from lawfully reporting such waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information.

(b) The prohibition in paragraph (a) of this provision does not contravene requirements applicable to Standard Form 312, Form 4414, or any other form issued by a Federal department or agency governing the nondisclosure of classified information.

(c) Representation. By submission of its offer, the Offeror represents that it does not require employees or subcontractors of such entity seeking to report fraud, waste, or abuse to sign internal confidentiality agreements or statements prohibiting or otherwise restricting such employees or subcontractors from lawfully reporting such waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information.

FAR 52.212-3 Offeror Representations and Certifications -- Commercial Items (July 2016)

The offeror shall complete only paragraphs (b) of this provision if the Offeror has completed the annual representations and certification electronically via the System for Award Management (SAM) Web site accessed through http://www.sam.gov/portal. If the Offeror has not completed the annual representations and certifications electronically, the Offeror shall complete only paragraphs (c) through (r) of this provision.

(a) *Definitions.* As used in this provision--

“Economically disadvantaged women-owned small business (EDWOSB) concern” means a small business concern that is at least 51 percent directly and unconditionally owned by, and the management and daily business operations of which are controlled by, one or more women who are citizens of the United States and who are economically disadvantaged in accordance with 13 CFR part 127. It automatically qualifies as a women-owned small business eligible under the WOSB Program.

“Forced or indentured child labor” means all work or service—

(1) Exacted from any person under the age of 18 under the menace of any penalty for its nonperformance and for which the worker does not offer himself voluntarily; or

(2) Performed by any person under the age of 18 pursuant to a contract the enforcement of which can be accomplished by process or penalties.

“Highest-level owner” means the entity that owns or controls an immediate owner of the offeror, or that owns or controls one or more entities that control an immediate owner of the offeror. No entity owns or exercises control of the highest level owner.

“Immediate owner” means an entity, other than the offeror, that has direct control of the offeror. Indicators of control include, but are not limited to, one or more of the following: Ownership or interlocking management, identity of interests among family members, shared facilities and equipment, and the common use of employees.

“Inverted domestic corporation,” means a foreign incorporated entity that meets the definition of an inverted domestic corporation under 6 U.S.C. 395(b), applied in accordance with the rules and definitions of 6 U.S.C. 395(c).

“Manufactured end product” means any end product in product and service codes (PSCs) 1000-9999, except—

(1) PSC 5510, Lumber and Related Basic Wood Materials;

(2) Product or Service Group (PSG) 87, Agricultural Supplies;

(3) PSG 88, Live Animals;

(4) PSG 89, Subsistence;

(5) PSC 9410, Crude Grades of Plant Materials;

(6) PSC 9430, Miscellaneous Crude Animal Products, Inedible;

(7) PSC 9440, Miscellaneous Crude Agricultural and Forestry Products;

(8) PSC 9610, Ores;

(9) PSC 9620, Minerals, Natural and Synthetic; and

(10) PSC 9630, Additive Metal Materials.

“Place of manufacture” means the place where an end product is assembled out of components, or otherwise made or processed from raw materials into the finished product that is to be provided to the Government. If a product is disassembled and reassembled, the place of reassembly is not the place of manufacture.

“Predecessor” means an entity that is replaced by a successor and includes any predecessors of the predecessor.

“Restricted business operations” means business operations in Sudan that include power production activities, mineral extraction activities, oil-related activities, or the production of military equipment, as those terms are defined in the Sudan Accountability and Divestment Act of 2007 (Pub. L. 110-174). Restricted business operations do not include business operations that the person (as that term is defined in Section 2 of the Sudan Accountability and Divestment Act of 2007) conducting the business can demonstrate—

(1) Are conducted under contract directly and exclusively with the regional government of southern Sudan;

(2) Are conducted pursuant to specific authorization from the Office of Foreign Assets Control in the Department of the Treasury, or are expressly exempted under Federal law from the requirement to be conducted under such authorization;

(3) Consist of providing goods or services to marginalized populations of Sudan;

(4) Consist of providing goods or services to an internationally recognized peacekeeping force or humanitarian organization;

(5) Consist of providing goods or services that are used only to promote health or education; or

(6) Have been voluntarily suspended.

Sensitive technology—

(1) Means hardware, software, telecommunications equipment, or any other technology that is to be used specifically—

(i) To restrict the free flow of unbiased information in Iran; or

(ii) To disrupt, monitor, or otherwise restrict speech of the people of Iran; and

(2) Does not include information or informational materials the export of which the President does not have the authority to regulate or prohibit pursuant to section 203(b)(3) of the International Emergency Economic Powers Act (50 U.S.C. 1702(b)(3)).

“Service-disabled veteran-owned small business concern”—

(1) Means a small business concern—

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a service-disabled veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

“Small business concern” means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR Part 121 and size standards in this solicitation.

“Small disadvantaged business concern, consistent with 13 CFR 124.1002,” means a small business concern under the size standard applicable to the acquisition, that--

(1) Is at least 51 percent unconditionally and directly owned (as defined at 13 CFR 124.105) by--

(i) One or more socially disadvantaged (as defined at 13 CFR 124.103) and economically disadvantaged (as defined at 13 CFR 124.104) individuals who are citizens of the United States; and

(ii) Each individual claiming economic disadvantage has a net worth not exceeding $750,000 after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); and

(2) The management and daily business operations of which are controlled (as defined at 13.CFR 124.106) by individuals, who meet the criteria in paragraphs (1)(i) and (ii) of this definition.

“Subsidiary” means an entity in which more than 50 percent of the entity is owned—

(1) Directly by a parent corporation; or

(2) Through another subsidiary of a parent corporation.

“Successor” means an entity that has replaced a predecessor by acquiring the assets and carrying out the affairs of the predecessor under a new name (often through acquisition or merger). The term “successor” does not include new offices/divisions of the same company or a company that only changes its name. The extent of the responsibility of the successor for the liabilities of the predecessor may vary, depending on State law and specific circumstances.

“Veteran-owned small business concern” means a small business concern—

(1) Not less than 51 percent of which is owned by one or more veterans(as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

“Women-owned business concern” means a concern which is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of the its stock is owned by one or more women; and whose management and daily business operations are controlled by one or more women.

“Women-owned small business concern” means a small business concern --

(1) That is at least 51 percent owned by one or more women or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

“Women-owned small business (WOSB) concern eligible under the WOSB Program (in accordance with 13 CFR part 127),” means a small business concern that is at least 51 percent directly and unconditionally owned by, and the management and daily business operations of which are controlled by, one or more women who are citizens of the United States.

(b)

(1) *Annual Representations and Certifications*. Any changes provided by the offeror in paragraph (b)(2) of this provision do not automatically change the representations and certifications posted on the SAMwebsite.

(2) The offeror has completed the annual representations and certifications electronically via the SAM website accessed through https://www.acquisition.gov. After reviewing the SAM database information, the offeror verifies by submission of this offer that the representation and certifications currently posted electronically at FAR 52.212-3, Offeror

Representations and Certifications—Commercial Items, have been entered or updated in the last 12 months, are current, accurate, complete, and applicable to this solicitation (including the business size standard applicable to the NAICS code referenced for this solicitation), as of the date of this offer and are incorporated in this offer by reference (see FAR 4.1201), except for paragraphs _____. *[Offeror to identify the applicable paragraphs at (c) through (r) of this provision that the offeror has completed for the purposes of this solicitation only, if any. These amended representation(s) and/or certification(s) are also incorporated in this offer and are current, accurate, and complete as of the date of this offer. Any changes provided by the offeror are applicable to this solicitation only, and do not result in an update to the representations and certifications posted electronically on SAM.]*

(c) Offerors must complete the following representations when the resulting contract is to be performed in the United States or its outlying areas. Check all that apply.

(1) *Small business concern*. The offeror represents as part of its offer that it [_] is, [_] is not a small business concern.

(2) Veteran-owned small business concern. [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents as part of its offer that it [_] is, [_] is not a veteran-owned small business concern.

(3) Service-disabled veteran-owned small business concern. [Complete only if the offeror represented itself as a veteran-owned small business concern in paragraph (c)(2) of this provision.] The offeror represents as part of its offer that it [_] is, [_] is not a service-disabled veteran-owned small business concern.

(4) Small disadvantaged business concern. [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents that it [_] is, [_] is not, a small disadvantaged business concern as defined in 13 CFR 124.1002.

(5) Women-owned small business concern. [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents that it [_] is, [_] is not a women-owned small business concern.

Note: Complete paragraphs (c)(8) and (c)(9) only if this solicitation is expected to exceed the simplified acquisition threshold.

(6) WOSB concern eligible under the WOSB Program. [Complete only if the offeror represented itself as a women-owned small business concern in paragraph (c)(5) of this provision.] The offeror represents that—

(i) It [_] is, [_] is not a WOSB concern eligible under the WOSB Program, has provided all the required documents to the WOSB Repository, and no change in

circumstances or adverse decisions have been issued that affects its eligibility; and

(ii) It [_] is, [_] is not a joint venture that complies with the requirements of 13 CFR part 127, and the representation in paragraph (c)(6)(i) of this provision is accurate for each WOSB concern eligible under the WOSB Program participating in the joint venture. [The offeror shall enter the name or names of the WOSB concern eligible under the WOSB Program and other small businesses that are participating in the joint venture: _____.] Each WOSB concern eligible under the WOSB Program participating in the joint venture shall submit a separate signed copy of the WOSB representation.

(7) Economically disadvantaged women-owned small business (EDWOSB) concern. [Complete only if the offeror represented itself as a WOSB concern eligible under the WOSB Program in (c)(6) of this provision.] The offeror represents that—

(i) It [_] is, [_] is not an EDWOSB concern, has provided all the required documents to the WOSB Repository, and no change in circumstances or adverse decisions have been issued that affects its eligibility; and

(ii) It [_] is, [_] is not a joint venture that complies with the requirements of 13 CFR part 127, and the representation in paragraph (c)(7)(i) of this provision is accurate for each EDWOSB concern participating in the joint venture. [The offeror shall enter the name or names of the EDWOSB concern and other small businesses that are participating in the joint venture: _____.] Each EDWOSB concern participating in the joint venture shall submit a separate signed copy of the EDWOSB representation.

(8) Women-owned business concern (other than small business concern). [Complete only if the offeror is a women-owned business concern and did not represent itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents that it [_] is, a women-owned business concern.

(9) *Tie bid priority for labor surplus area concerns.* If this is an invitation for bid, small business offerors may identify the labor surplus areas in which costs to be incurred on account of manufacturing or production (by offeror or first-tier subcontractors) amount to more than 50 percent of the contract price:

_____

(10) HUBZone small business concern. [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents, as part of its offer, that--

(i) It [_] is, [_] is not a HUBZone small business concern listed, on the date of this representation, on the List of Qualified HUBZone Small Business Concerns

maintained by the Small Business Administration, and no material changes in ownership and control, principal office, or HUBZone employee percentage have occurred since it was certified in accordance with 13 CFR part 126; and

(ii) It [_] is, [_] is not a HUBZone joint venture that complies with the requirements of 13 CFR part 126, and the representation in paragraph (c)(10)(i) of this provision is accurate for each HUBZone small business concern participating in the HUBZone joint venture. [*The offeror shall enter the names of each of the HUBZone small business concerns participating in the HUBZone joint venture*: _____.] Each HUBZone small business concern participating in the HUBZone joint venture shall submit a separate signed copy of the HUBZone representation.

(d) Representations required to implement provisions of Executive Order 11246 --

(1) Previous contracts and compliance. The offeror represents that --

(i) It [_] has, [_] has not, participated in a previous contract or subcontract subject to the Equal Opportunity clause of this solicitation; and

(ii) It [_] has, [_] has not, filed all required compliance reports.

(2) *Affirmative Action Compliance*. The offeror represents that --

(i) It [_] has developed and has on file, [_] has not developed and does not have on file, at each establishment, affirmative action programs required by rules and regulations of the Secretary of Labor (41 CFR parts 60-1 and 60-2), or

(ii) It [_] has not previously had contracts subject to the written affirmative action programs requirement of the rules and regulations of the Secretary of Labor.

(e) *Certification Regarding Payments to Influence Federal Transactions* (31 U.S.C. 1352). (Applies only if the contract is expected to exceed $150,000.) By submission of its offer, the offeror certifies to the best of its knowledge and belief that no Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress or an employee of a Member of Congress on his or her behalf in connection with the award of any resultant contract. If any registrants under the Lobbying Disclosure Act of 1995 have made a lobbying contact on behalf of the offeror with respect to this contract, the offeror shall complete and submit, with its offer, OMB Standard Form LLL, Disclosure of Lobbying Activities, to provide the name of the registrants. The offeror need not report regularly employed officers or employees of the offeror to whom payments of reasonable compensation were made.

(f) *Buy American Certificate.* (Applies only if the clause at Federal Acquisition Regulation (FAR) 52.225-1, Buy American – Supplies, is included in this solicitation.)

(1) The offeror certifies that each end product, except those listed in paragraph (f)(2) of this provision, is a domestic end product and that for other than COTS items, the offeror has considered components of unknown origin to have been mined, produced, or manufactured outside the United States. The offeror shall list as foreign end products those end products manufactured in the United States that do not qualify as domestic end products, *i.e.*, an end product that is not a COTS item and does not meet the component test in paragraph (2) of the definition of "domestic end product." The terms "commercially available off-the-shelf (COTS) item," "component," "domestic end product," "end product," "foreign end product," and "United States" are defined in the clause of this solicitation entitled "Buy American—Supplies."

(2) Foreign End Products:

LINE ITEM NO.	COUNTRY OF ORIGIN

[List as necessary]

(3) The Government will evaluate offers in accordance with the policies and procedures of FAR Part 25.

(g)

(1) *Buy American -- Free Trade Agreements -- Israeli Trade Act Certificate*. (Applies only if the clause at FAR 52.225-3, Buy American -- Free Trade Agreements -- Israeli Trade Act, is included in this solicitation.)

(i) The offeror certifies that each end product, except those listed in paragraph (g)(1)(ii) or (g)(1)(iii) of this provision, is a domestic end product and that for other than COTS items, the offeror has considered components of unknown origin to have been mined, produced, or manufactured outside the United States. The terms "Bahrainian, Moroccan, Omani, Panamanian, or Peruvian end product," "commercially available off-the-shelf (COTS) item," "component," "domestic end product," "end product," "foreign end product," "Free Trade Agreement country," "Free Trade Agreement country end product," "Israeli end product," and "United States" are defined in the clause of this solicitation entitled "Buy American--Free Trade Agreements--Israeli Trade Act."

(ii) The offeror certifies that the following supplies are Free Trade Agreement country end products (other than Bahrainian, Moroccan, Omani, Panamanian, or Peruvian end products) or Israeli end products as defined in the clause of this solicitation entitled "Buy American—Free Trade Agreements—Israeli Trade Act":

Free Trade Agreement Country End Products (Other than Bahrainian, Moroccan, Omani, Panamanian, or Peruvian End Products) or Israeli End Products:

LINE ITEM NO.	COUNTRY OF ORIGIN

[*List as necessary*]

(iii) The offeror shall list those supplies that are foreign end products (other than those listed in paragraph (g)(1)(ii) or this provision) as defined in the clause of this solicitation entitled "Buy American—Free Trade Agreements—Israeli Trade Act." The offeror shall list as other foreign end products those end products manufactured in the United States that do not qualify as domestic end products, *i.e.*, an end product that is not a COTS item and does not meet the component test in paragraph (2) of the definition of "domestic end product."

Other Foreign End Products:

LINE ITEM NO.	COUNTRY OF ORIGIN

[*List as necessary*]

(iv) The Government will evaluate offers in accordance with the policies and procedures of FAR Part 25.

(2) *Buy American—Free Trade Agreements—Israeli Trade Act Certificate, Alternate I.* If Alternate I to the clause at FAR 52.225-3 is included in this solicitation, substitute the following paragraph (g)(1)(ii) for paragraph (g)(1)(ii) of the basic provision:

(g)(1)(ii) The offeror certifies that the following supplies are Canadian end products as defined in the clause of this solicitation entitled "Buy American—Free Trade Agreements—Israeli Trade Act":

Canadian End Products:

Line Item No.:

_____

[List as necessary]

(3) *Buy American—Free Trade Agreements—Israeli Trade Act Certificate, Alternate II.* If Alternate II to the clause at FAR 52.225-3 is included in this solicitation, substitute the following paragraph (g)(1)(ii) for paragraph (g)(1)(ii) of the basic provision:

(g)(1)(ii) The offeror certifies that the following supplies are Canadian end products or Israeli end products as defined in the clause of this solicitation entitled “Buy American--Free Trade Agreements--Israeli Trade Act":

Canadian or Israeli End Products:

Line Item No.:	Country of Origin:

[*List as necessary*]

(4) *Buy American—Free Trade Agreements—Israeli Trade Act Certificate, Alternate III.* If Alternate III to the clause at 52.225-3 is included in this solicitation, substitute the following paragraph (g)(1)(ii) for paragraph (g)(1)(ii) of the basic provision:

(g)(1)(ii) The offeror certifies that the following supplies are Free Trade Agreement country end products (other than Bahrainian, Korean, Moroccan, Omani, Panamanian, or Peruvian end products) or Israeli end products as defined in the clause of this solicitation entitled “Buy American—Free Trade Agreements—Israeli Trade Act”:

Free Trade Agreement Country End Products (Other than Bahrainian, Korean, Moroccan, Omani, Panamanian, or Peruvian End Products) or Israeli End Products:

Line Item No.:	Country of Origin:

[*List as necessary*]

(5) *Trade Agreements Certificate*. (Applies only if the clause at FAR 52.225-5, Trade Agreements, is included in this solicitation.)

(i) The offeror certifies that each end product, except those listed in paragraph (g)(5)(ii) of this provision, is a U.S.-made or designated country end product as defined in the clause of this solicitation entitled “Trade Agreements.”

(ii) The offeror shall list as other end products those end products that are not U.S.-made or designated country end products.

Other End Products

Line Item No.:	Country of Origin:

[*List as necessary*]

(iii) The Government will evaluate offers in accordance with the policies and procedures of FAR Part 25. For line items covered by the WTO GPA, the Government will evaluate offers of U.S.-made or designated country end products without regard to the restrictions of the Buy American statute. The Government will consider for award only offers of U.S.-made or designated country end products unless the Contracting Officer determines that there are no offers for such products or that the offers for such products are insufficient to fulfill the requirements of the solicitation.

(h) *Certification Regarding Responsibility Matters (Executive Order 12689).* (Applies only if the contract value is expected to exceed the simplified acquisition threshold.) The offeror certifies, to the best of its knowledge and belief, that the offeror and/or any of its principals--

(1) [_] Are, [_] are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(2) [_] Have, [_] have not, within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a Federal, state or local government contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, violating Federal criminal tax laws, or receiving stolen property; and

(3) [_] Are, [_] are not presently indicted for, or otherwise criminally or civilly charged by a Government entity with, commission of any of these offenses enumerated in paragraph (h)(2) of this clause; and

(4) [_] Have, [_] have not, within a three-year period preceding this offer, been notified of any delinquent Federal taxes in an amount that exceeds $3,500 for which the liability remains unsatisfied.

(i) Taxes are considered delinquent if both of the following criteria apply:

(A) *The tax liability is finally determined.* The liability is finally determined if it has been assessed. A liability is not finally determined if there is a pending administrative or judicial challenge. In the case of a judicial challenge to the liability, the liability is not finally determined until all judicial appeal rights have been exhausted.

(B) *The taxpayer is delinquent in making payment.* A taxpayer is delinquent if the taxpayer has failed to pay the tax liability when full payment was due and required. A taxpayer is not delinquent in cases where enforced collection action is precluded.

(ii) Examples.

(A) The taxpayer has received a statutory notice of deficiency, under I.R.C. §6212, which entitles the taxpayer to seek Tax Court review of a proposed tax deficiency. This is not a delinquent tax because it is not a final tax liability. Should the taxpayer seek Tax Court review, this will not be a final tax liability until the taxpayer has exercised all judicial appear rights.

(B) The IRS has filed a notice of Federal tax lien with respect to an assessed tax liability, and the taxpayer has been issued a notice under I.R.C. §6320 entitling the taxpayer to request a hearing with the IRS Office of Appeals Contesting the lien filing, and to further appeal to the Tax Court if the IRS determines to sustain the lien filing. In the course of the hearing, the taxpayer is entitled to contest the underlying tax liability because the taxpayer has had no prior opportunity to contest the liability. This is not a delinquent tax because it is not a final tax liability. Should the taxpayer seek tax court review, this will not be a final tax liability until the taxpayer has exercised all judicial appeal rights.

(C) The taxpayer has entered into an installment agreement pursuant to I.R.C. §6159. The taxpayer is making timely payments and is in full compliance with the agreement terms. The taxpayer is not delinquent because the taxpayer is not currently required to make full payment.

(D) The taxpayer has filed for bankruptcy protection. The taxpayer is not delinquent because enforced collection action is stayed under 11 U.S.C. §362 (the Bankruptcy Code).

(i) Certification Regarding Knowledge of Child Labor for Listed End Products (Executive Order 13126). [The Contracting Officer must list in paragraph (i)(1) any end products being acquired under this solicitation that are included in the List of Products Requiring Contractor Certification as to Forced or Indentured Child Labor, unless excluded at 22.1503(b).]

(1) Listed End Product

Listed End Product:	Listed Countries of Origin:

(2) Certification. [If the Contracting Officer has identified end products and countries of origin in paragraph (i)(1) of this provision, then the offeror must certify to either (i)(2)(i) or (i)(2)(ii) by checking the appropriate block.]

[_] (i) The offeror will not supply any end product listed in paragraph (i)(1) of this provision that was mined, produced, or manufactured in the corresponding country as listed for that product.

[_] (ii) The offeror may supply an end product listed in paragraph (i)(1) of this provision that was mined, produced, or manufactured in the corresponding country as listed for that product. The offeror certifies that is has made a good faith effort to determine whether forced or indentured child labor was used to mine, produce, or manufacture any such end product furnished under this contract. On the basis of those efforts, the offeror certifies that it is not aware of any such use of child labor.

(j) *Place of manufacture.* (Does not apply unless the solicitation is predominantly for the acquisition of manufactured end products.) For statistical purposes only, the offeror shall indicate whether the place of manufacture of the end products it expects to provide in response to this solicitation is predominantly—

(1) [_] In the United States (Check this box if the total anticipated price of offered end products manufactured in the United States exceeds the total anticipated price of offered end products manufactured outside the United States); or

(2) [_] Outside the United States.

(k) Certificates regarding exemptions from the application of the Service Contract Labor Standards. (Certification by the offeror as to its compliance with respect to the contract also constitutes its certification as to compliance by its subcontractor if it subcontracts out the exempt services.) [The contracting officer is to check a box to indicate if paragraph (k)(1) or (k)(2) applies.]

(1) [_] Maintenance, calibration, or repair of certain equipment as described in FAR 22.1003-4(c)(1). The offeror [_] does [_] does not certify that—

(i) The items of equipment to be serviced under this contract are used regularly for other than Governmental purposes and are sold or traded by the offeror (or subcontractor in the case of an exempt subcontract) in substantial quantities to the general public in the course of normal business operations;

(ii) The services will be furnished at prices which are, or are based on, established catalog or market prices (see FAR 22.1003-4(c)(2)(ii)) for the maintenance, calibration, or repair of such equipment; and

(iii) The compensation (wage and fringe benefits) plan for all service employees performing work under the contract will be the same as that used for these employees and equivalent employees servicing the same equipment of commercial customers.

(2) [_] Certain services as described in FAR 22.1003-4(d)(1). The offeror [_] does [_] does not certify that—

(i) The services under the contract are offered and sold regularly to non-Governmental customers, and are provided by the offeror (or subcontractor in the case of an exempt subcontract) to the general public in substantial quantities in the course of normal business operations;

(ii) The contract services will be furnished at prices that are, or are based on, established catalog or market prices (see FAR 22.1003-4(d)(2)(iii));

(iii) Each service employee who will perform the services under the contract will spend only a small portion of his or her time (a monthly average of less than 20 percent of the available hours on an annualized basis, or less than 20 percent of available hours during the contract period if the contract period is less than a month) servicing the Government contract; and

(iv) The compensation (wage and fringe benefits) plan for all service employees performing work under the contract is the same as that used for these employees and equivalent employees servicing commercial customers.

(3) If paragraph (k)(1) or (k)(2) of this clause applies—

(i) If the offeror does not certify to the conditions in paragraph (k)(1) or (k)(2) and the Contracting Officer did not attach a Service Contract Labor Standards wage determination to the solicitation, the offeror shall notify the Contracting Officer as soon as possible; and

(ii) The Contracting Officer may not make an award to the offeror if the offeror fails to execute the certification in paragraph (k)(1) or (k)(2) of this clause or to contact the Contracting Officer as required in paragraph (k)(3)(i) of this clause.

(l) *Taxpayer identification number (TIN) (26 U.S.C. 6109, 31 U.S.C. 7701).* (Not applicable if the offeror is required to provide this information to the SAM database to be eligible for award.)

(1) All offerors must submit the information required in paragraphs (l)(3) through (l)(5) of this provision to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M, and implementing regulations issued by the Internal Revenue Service (IRS).

(2) The TIN may be used by the government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.

(3) Taxpayer Identification Number (TIN).

[_] TIN:_____.

[_] TIN has been applied for.

[_] TIN is not required because:

[_] Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;

[_] Offeror is an agency or instrumentality of a foreign government;

[_] Offeror is an agency or instrumentality of the Federal Government;

(4) Type of organization.

[_] Sole proprietorship;

[_] Partnership;

[_] Corporate entity (not tax-exempt);

[_] Corporate entity (tax-exempt);

[_] Government entity (Federal, State, or local);

[_] Foreign government;

[_] International organization per 26 CFR 1.6049-4;

[_] Other _____.

(5) Common parent.

[_] Offeror is not owned or controlled by a common parent:

[_] Name and TIN of common parent:

Name _____

TIN _____

(m) *Restricted business operations in Sudan*. By submission of its offer, the offeror certifies that the offeror does not conduct any restricted business operations in Sudan.

(n) Prohibition on Contracting with Inverted Domestic Corporations—

(1) Government agencies are not permitted to use appropriated (or otherwise made available) funds for contracts with either an inverted domestic corporation, or a subsidiary of an inverted domestic corporation, unless the exception at 9.108-2(b) applies or the requirement is waived in accordance with the procedures at 9.108-4.

(2) *Representation*. The offeror represents that—

(i) It [ ] is, [ ] is not an inverted domestic corporation; and

(ii) It [ ] is, [ ] is not a subsidiary of an inverted domestic corporation.

(o) Prohibition on contracting with entities engaging in certain activities or transactions relating to Iran.

(1) The offeror shall email questions concerning sensitive technology to the Department of State at CISADA106@state.gov.

(2) Representation and Certification. Unless a waiver is granted or an exception applies as provided in paragraph (o)(3) of this provision, by submission of its offer, the offeror—

(i) Represents, to the best of its knowledge and belief, that the offeror does not export any sensitive technology to the government of Iran or any entities or individuals owned or controlled by, or acting on behalf or at the direction of, the government of Iran;

(ii) Certifies that the offeror, or any person owned or controlled by the offeror, does not engage in any activities for which sanctions may be imposed under section 5 of the Iran Sanctions Act; and

(iii) Certifies that the offeror, and any person owned or controlled by the offeror, does not knowingly engage in any transaction that exceeds $3,500 with Iran's Revolutionary Guard Corps or any of its officials, agents, or affiliates, the property and interests in property of which are blocked pursuant to the International Emergency Economic Powers Act (50(U.S.C. 1701 et seq.) (see OFAC's Specially Designated Nationals and Blocked Persons List at http://www.treasury.gov/ofac/downloads/t11sdn.pdf).

(3) The representation and certification requirements of paragraph (o)(2) of this provision do not apply if—

(i) This solicitation includes a trade agreements certification (e.g., 52.212-3(g) or a comparable agency provision); and

(ii) The offeror has certified that all the offered products to be supplied are designated country end products.

(p) *Ownership or Control of Offeror*. (Applies in all solicitations when there is a requirement to be registered in SAM or a requirement to have a DUNS Number in the solicitation.

(1) The Offeror represents that it [ ] has or [ ] does not have an immediate owner. If the Offeror has more than one immediate owner (such as a joint venture), then the Offeror shall respond to paragraph (2) and if applicable, paragraph (3) of this provision for each participant in the joint venture.

(2) If the Offeror indicates "has" in paragraph (p)(1) of this provision, enter the following information:

Immediate owner CAGE code:_____

Immediate owner legal name:_____

(Do not use a "doing business as" name)

Is the immediate owner owned or controlled by another entity:

[ ] Yes or [ ] No.

(3) If the Offeror indicates "yes" in paragraph (p)(2) of this provision, indicating that the immediate owner is owned or controlled by another entity, then enter the following information:

Highest level owner CAGE code:_____

Highest level owner legal name:_____

(Do not use a “doing business as” name)

(q) *Representation by Corporations Regarding Delinquent Tax Liability or a Felony Conviction under any Federal Law.*

(1) As required by section 744 and 745 of Division E of the Consolidated and Further Continuing Appropriations Act, 2015 (Pub. L. 113-235), and similar provisions, if contained in subsequent appropriations acts, the Government will not enter into a contract with any corporation that—

(i) Has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability, where the awarding agency is aware of the unpaid tax liability, unless and agency has considered suspension or debarment of the corporation and made a determination that suspension or debarment is not necessary to protect the interests of the Government; or

(ii) Was convicted of a felony criminal violation under any Federal law within the preceding 24 months, where the awarding agency is aware of the conviction, unless an agency has considered suspension or debarment of the corporation and made a determination that this action is not necessary to protect the interests of the Government.

(2) The Offeror represents that--

(i) It is [ ] is not [ ] a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability; and

(ii) It is [ ] is not [ ] a corporation that was convicted of a felony criminal violation under a Federal law within the preceding 24 months.

(r) *Predecessor of Offeror.* (Applies in all solicitations that include the provision at 52.204-16, Commercial and Government Entity Code Reporting.)

(1) The Offeror represents that it [ ] is or [ ] is not a successor to a predecessor that held a Federal contract or grant within the last three years.

(2) If the Offeror has indicated “is” in paragraph (r)(1) of this provision, enter the following information for all predecessors that held a Federal contract or grant within the last three years (if more than one predecessor, list in reverse chronological order):

Predecessor CAGE code _____(or mark “Unknown).

Predecessor legal name: _____.
(Do not use a “doing business as” name).

(End of Provision)

WD 05-2017 (Rev.-21) was first posted on www.wdol.gov on 01/05/2016
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REGISTER OF WAGE DETERMINATIONS UNDER THE SERVICE CONTRACT ACT
By direction of the Secretary of Labor

U.S. DEPARTMENT OF LABOR
EMPLOYMENT STANDARDS ADMINISTRATION
WAGE AND HOUR DIVISION
WASHINGTON D.C. 20210

Daniel W. Simms
Director

Division of
Wage Determinations

Wage Determination No.: 2005-2017
Revision No.: 21
Date Of Revision: 12/29/2015

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.15 for calendar year 2016 applies to all contracts subject to the Service Contract Act for which the solicitation was issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.15 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2016. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

State: Alaska
Area: Alaska Statewide

Fringe Benefits Required Follow the Occupational Listing

OCCUPATION CODE - TITLE	FOOTNOTE	RATE
01000 - Administrative Support And Clerical Occupations		
01011 - Accounting Clerk I		15.33
01012 - Accounting Clerk II		18.76
01013 - Accounting Clerk III		20.98
01020 - Administrative Assistant		23.34
01040 - Court Reporter		18.84
01051 - Data Entry Operator I		14.86
01052 - Data Entry Operator II		17.86
01060 - Dispatcher, Motor Vehicle		20.25
01070 - Document Preparation Clerk		15.39
01090 - Duplicating Machine Operator		14.72
01111 - General Clerk I		15.59
01112 - General Clerk II		17.01
01113 - General Clerk III		19.09
01120 - Housing Referral Assistant		21.01
01141 - Messenger Courier		15.60
01191 - Order Clerk I		15.45
01192 - Order Clerk II		16.86
01261 - Personnel Assistant (Employment) I		19.07
01262 - Personnel Assistant (Employment) II		21.33
01263 - Personnel Assistant (Employment) III		23.79
01270 - Production Control Clerk		22.59
01280 - Receptionist		14.09
01290 - Rental Clerk		16.84
01300 - Scheduler, Maintenance		16.84
01311 - Secretary I		16.84
01312 - Secretary II		18.84
01313 - Secretary III		21.01
01320 - Service Order Dispatcher		16.48
01410 - Supply Technician		23.34
01420 - Survey Worker		18.78
01531 - Travel Clerk I		15.21
01532 - Travel Clerk II		16.80
01533 - Travel Clerk III		18.57

01611 - Word Processor I	16.18
01612 - Word Processor II	18.16
01613 - Word Processor III	20.31
05000 - Automotive Service Occupations	
05005 - Automobile Body Repairer, Fiberglass	27.64
05010 - Automotive Electrician	23.64
05040 - Automotive Glass Installer	21.87
05070 - Automotive Worker	21.87
05110 - Mobile Equipment Servicer	19.62
05130 - Motor Equipment Metal Mechanic	23.96
05160 - Motor Equipment Metal Worker	21.87
05190 - Motor Vehicle Mechanic	23.96
05220 - Motor Vehicle Mechanic Helper	18.53
05250 - Motor Vehicle Upholstery Worker	21.87
05280 - Motor Vehicle Wrecker	21.87
05310 - Painter, Automotive	22.86
05340 - Radiator Repair Specialist	21.87
05370 - Tire Repairer	17.78
05400 - Transmission Repair Specialist	23.96
07000 - Food Preparation And Service Occupations	
07010 - Baker	16.67
07041 - Cook I	15.17
07042 - Cook II	17.46
07070 - Dishwasher	10.99
07130 - Food Service Worker	13.46
07210 - Meat Cutter	18.87
07260 - Waiter/Waitress	11.91
09000 - Furniture Maintenance And Repair Occupations	
09010 - Electrostatic Spray Painter	25.94
09040 - Furniture Handler	17.36
09080 - Furniture Refinisher	25.94
09090 - Furniture Refinisher Helper	19.58
09110 - Furniture Repairer, Minor	22.74
09130 - Upholsterer	25.94
11000 - General Services And Support Occupations	
11030 - Cleaner, Vehicles	11.68
11060 - Elevator Operator	11.68
11090 - Gardener	17.52
11122 - Housekeeping Aide	14.15
11150 - Janitor	14.15
11210 - Laborer, Grounds Maintenance	14.59
11240 - Maid or Houseman	10.96
11260 - Pruner	13.18
11270 - Tractor Operator	16.53
11330 - Trail Maintenance Worker	14.59
11360 - Window Cleaner	15.67
12000 - Health Occupations	
12010 - Ambulance Driver	22.66
12011 - Breath Alcohol Technician	20.48
12012 - Certified Occupational Therapist Assistant	22.50
12015 - Certified Physical Therapist Assistant	21.90
12020 - Dental Assistant	20.32
12025 - Dental Hygienist	44.92
12030 - EKG Technician	29.90
12035 - Electroneurodiagnostic Technologist	29.90
12040 - Emergency Medical Technician	22.66
12071 - Licensed Practical Nurse I	18.31
12072 - Licensed Practical Nurse II	20.48
12073 - Licensed Practical Nurse III	22.84
12100 - Medical Assistant	17.49
12130 - Medical Laboratory Technician	21.01
12160 - Medical Record Clerk	16.04
12190 - Medical Record Technician	17.94

12195 - Medical Transcriptionist		20.41
12210 - Nuclear Medicine Technologist		43.70
12221 - Nursing Assistant I		13.27
12222 - Nursing Assistant II		14.92
12223 - Nursing Assistant III		16.28
12224 - Nursing Assistant IV		18.27
12235 - Optical Dispenser		20.20
12236 - Optical Technician		18.31
12250 - Pharmacy Technician		17.55
12280 - Phlebotomist		18.27
12305 - Radiologic Technologist		29.67
12311 - Registered Nurse I		28.98
12312 - Registered Nurse II		35.45
12313 - Registered Nurse II, Specialist		35.45
12314 - Registered Nurse III		42.88
12315 - Registered Nurse III, Anesthetist		42.88
12316 - Registered Nurse IV		51.40
12317 - Scheduler (Drug and Alcohol Testing)		25.38
13000 - Information And Arts Occupations		
13011 - Exhibits Specialist I		21.09
13012 - Exhibits Specialist II		25.29
13013 - Exhibits Specialist III		30.90
13041 - Illustrator I		21.09
13042 - Illustrator II		25.29
13043 - Illustrator III		30.90
13047 - Librarian		25.66
13050 - Library Aide/Clerk		15.59
13054 - Library Information Technology Systems Administrator		23.84
13058 - Library Technician		19.63
13061 - Media Specialist I		16.71
13062 - Media Specialist II		18.70
13063 - Media Specialist III		20.85
13071 - Photographer I		19.50
13072 - Photographer II		23.82
13073 - Photographer III		27.01
13074 - Photographer IV		33.05
13075 - Photographer V		35.10
13110 - Video Teleconference Technician		18.43
14000 - Information Technology Occupations		
14041 - Computer Operator I		17.09
14042 - Computer Operator II		19.12
14043 - Computer Operator III		24.42
14044 - Computer Operator IV		25.98
14045 - Computer Operator V		27.62
14071 - Computer Programmer I	(see 1)	
14072 - Computer Programmer II	(see 1)	
14073 - Computer Programmer III	(see 1)	
14074 - Computer Programmer IV	(see 1)	
14101 - Computer Systems Analyst I	(see 1)	
14102 - Computer Systems Analyst II	(see 1)	
14103 - Computer Systems Analyst III	(see 1)	
14150 - Peripheral Equipment Operator		18.34
14160 - Personal Computer Support Technician		27.62
15000 - Instructional Occupations		
15010 - Aircrew Training Devices Instructor (Non-Rated)		34.09
15020 - Aircrew Training Devices Instructor (Rated)		41.24
15030 - Air Crew Training Devices Instructor (Pilot)		49.42
15050 - Computer Based Training Specialist / Instructor		34.09
15060 - Educational Technologist		25.26
15070 - Flight Instructor (Pilot)		44.47
15080 - Graphic Artist		25.25
15090 - Technical Instructor		23.55

15095 - Technical Instructor/Course Developer	28.83
15110 - Test Proctor	19.12
15120 - Tutor	19.12
16000 - Laundry, Dry-Cleaning, Pressing And Related Occupations	
16010 - Assembler	11.14
16030 - Counter Attendant	11.14
16040 - Dry Cleaner	14.19
16070 - Finisher, Flatwork, Machine	11.14
16090 - Presser, Hand	11.14
16110 - Presser, Machine, Drycleaning	11.14
16130 - Presser, Machine, Shirts	11.14
16160 - Presser, Machine, Wearing Apparel, Laundry	11.14
16190 - Sewing Machine Operator	15.20
16220 - Tailor	16.24
16250 - Washer, Machine	12.16
19000 - Machine Tool Operation And Repair Occupations	
19010 - Machine-Tool Operator (Tool Room)	26.22
19040 - Tool And Die Maker	32.66
21000 - Materials Handling And Packing Occupations	
21020 - Forklift Operator	19.56
21030 - Material Coordinator	22.59
21040 - Material Expediter	22.59
21050 - Material Handling Laborer	17.01
21071 - Order Filler	15.49
21080 - Production Line Worker (Food Processing)	19.56
21110 - Shipping Packer	17.80
21130 - Shipping/Receiving Clerk	17.80
21140 - Store Worker I	14.56
21150 - Stock Clerk	19.82
21210 - Tools And Parts Attendant	19.56
21410 - Warehouse Specialist	19.56
23000 - Mechanics And Maintenance And Repair Occupations	
23010 - Aerospace Structural Welder	29.25
23021 - Aircraft Mechanic I	27.66
23022 - Aircraft Mechanic II	29.25
23023 - Aircraft Mechanic III	30.86
23040 - Aircraft Mechanic Helper	21.69
23050 - Aircraft, Painter	27.45
23060 - Aircraft Servicer	24.23
23080 - Aircraft Worker	25.48
23110 - Appliance Mechanic	24.68
23120 - Bicycle Repairer	19.56
23125 - Cable Splicer	32.26
23130 - Carpenter, Maintenance	27.35
23140 - Carpet Layer	24.62
23160 - Electrician, Maintenance	33.25
23181 - Electronics Technician Maintenance I	28.23
23182 - Electronics Technician Maintenance II	33.62
23183 - Electronics Technician Maintenance III	35.69
23260 - Fabric Worker	23.00
23290 - Fire Alarm System Mechanic	25.71
23310 - Fire Extinguisher Repairer	21.40
23311 - Fuel Distribution System Mechanic	28.42
23312 - Fuel Distribution System Operator	24.75
23370 - General Maintenance Worker	21.71
23380 - Ground Support Equipment Mechanic	27.66
23381 - Ground Support Equipment Servicer	24.23
23382 - Ground Support Equipment Worker	25.48
23391 - Gunsmith I	21.40
23392 - Gunsmith II	24.62
23393 - Gunsmith III	27.84
23410 - Heating, Ventilation And Air-Conditioning Mechanic	26.32

23411 - Heating, Ventilation And Air Contditioning Mechanic (Research Facility)	28.62
23430 - Heavy Equipment Mechanic	30.13
23440 - Heavy Equipment Operator	29.79
23460 - Instrument Mechanic	27.68
23465 - Laboratory/Shelter Mechanic	26.22
23470 - Laborer	17.01
23510 - Locksmith	25.45
23530 - Machinery Maintenance Mechanic	27.44
23550 - Machinist, Maintenance	27.84
23580 - Maintenance Trades Helper	19.42
23591 - Metrology Technician I	27.68
23592 - Metrology Technician II	29.27
23593 - Metrology Technician III	30.88
23640 - Millwright	27.84
23710 - Office Appliance Repairer	23.24
23760 - Painter, Maintenance	24.94
23790 - Pipefitter, Maintenance	32.26
23810 - Plumber, Maintenance	30.80
23820 - Pneudraulic Systems Mechanic	27.84
23850 - Rigger	27.84
23870 - Scale Mechanic	24.62
23890 - Sheet-Metal Worker, Maintenance	27.48
23910 - Small Engine Mechanic	24.62
23931 - Telecommunications Mechanic I	26.79
23932 - Telecommunications Mechanic II	30.61
23950 - Telephone Lineman	28.61
23960 - Welder, Combination, Maintenance	25.93
23965 - Well Driller	27.05
23970 - Woodcraft Worker	27.84
23980 - Woodworker	21.40
24000 - Personal Needs Occupations	
24570 - Child Care Attendant	12.47
24580 - Child Care Center Clerk	15.54
24610 - Chore Aide	14.06
24620 - Family Readiness And Support Services Coordinator	16.21
24630 - Homemaker	18.94
25000 - Plant And System Operations Occupations	
25010 - Boiler Tender	29.26
25040 - Sewage Plant Operator	28.70
25070 - Stationary Engineer	29.26
25190 - Ventilation Equipment Tender	21.66
25210 - Water Treatment Plant Operator	28.70
27000 - Protective Service Occupations	
27004 - Alarm Monitor	19.71
27007 - Baggage Inspector	15.91
27008 - Corrections Officer	27.17
27010 - Court Security Officer	26.28
27030 - Detection Dog Handler	18.14
27040 - Detention Officer	27.17
27070 - Firefighter	22.46
27101 - Guard I	15.91
27102 - Guard II	18.14
27131 - Police Officer I	31.05
27132 - Police Officer II	34.50
28000 - Recreation Occupations	
28041 - Carnival Equipment Operator	14.59
28042 - Carnival Equipment Repairer	15.47
28043 - Carnival Equpment Worker	11.99
28210 - Gate Attendant/Gate Tender	14.96
28310 - Lifeguard	12.47
28350 - Park Attendant (Aide)	17.23

28510 - Recreation Aide/Health Facility Attendant		12.21
28515 - Recreation Specialist		26.20
28630 - Sports Official		13.72
28690 - Swimming Pool Operator		21.90
29000 - Stevedoring/Longshoremen Occupational Services		
29010 - Blocker And Bracer		24.62
29020 - Hatch Tender		24.62
29030 - Line Handler		24.62
29041 - Stevedore I		27.49
29042 - Stevedore II		30.43
30000 - Technical Occupations		
30010 - Air Traffic Control Specialist, Center (HFO)	(see 2)	35.77
30011 - Air Traffic Control Specialist, Station (HFO)	(see 2)	24.66
30012 - Air Traffic Control Specialist, Terminal (HFO)	(see 2)	27.16
30021 - Archeological Technician I		21.46
30022 - Archeological Technician II		24.90
30023 - Archeological Technician III		29.46
30030 - Cartographic Technician		31.78
30040 - Civil Engineering Technician		29.63
30061 - Drafter/CAD Operator I		23.41
30062 - Drafter/CAD Operator II		27.28
30063 - Drafter/CAD Operator III		29.19
30064 - Drafter/CAD Operator IV		34.79
30081 - Engineering Technician I		22.72
30082 - Engineering Technician II		26.56
30083 - Engineering Technician III		29.74
30084 - Engineering Technician IV		33.02
30085 - Engineering Technician V		38.08
30086 - Engineering Technician VI		45.77
30090 - Environmental Technician		22.13
30210 - Laboratory Technician		26.61
30240 - Mathematical Technician		32.95
30361 - Paralegal/Legal Assistant I		21.93
30362 - Paralegal/Legal Assistant II		27.15
30363 - Paralegal/Legal Assistant III		33.22
30364 - Paralegal/Legal Assistant IV		40.20
30390 - Photo-Optics Technician		32.95
30461 - Technical Writer I		20.22
30462 - Technical Writer II		24.72
30463 - Technical Writer III		33.98
30491 - Unexploded Ordnance (UXO) Technician I		22.74
30492 - Unexploded Ordnance (UXO) Technician II		27.51
30493 - Unexploded Ordnance (UXO) Technician III		32.97
30494 - Unexploded (UXO) Safety Escort		22.74
30495 - Unexploded (UXO) Sweep Personnel		22.74
30620 - Weather Observer, Combined Upper Air Or Surface Programs	(see 2)	29.19
30621 - Weather Observer, Senior	(see 2)	32.42
31000 - Transportation/Mobile Equipment Operation Occupations		
31020 - Bus Aide		12.71
31030 - Bus Driver		19.13
31043 - Driver Courier		17.79
31260 - Parking and Lot Attendant		13.19
31290 - Shuttle Bus Driver		17.89
31310 - Taxi Driver		15.74
31361 - Truckdriver, Light		17.89
31362 - Truckdriver, Medium		19.85
31363 - Truckdriver, Heavy		22.18
31364 - Truckdriver, Tractor-Trailer		22.18
99000 - Miscellaneous Occupations		
99030 - Cashier		12.27
99050 - Desk Clerk		14.09
99095 - Embalmer		22.74

99251 - Laboratory Animal Caretaker I	12.34
99252 - Laboratory Animal Caretaker II	20.92
99310 - Mortician	22.74
99410 - Pest Controller	22.53
99510 - Photofinishing Worker	11.95
99710 - Recycling Laborer	25.38
99711 - Recycling Specialist	30.29
99730 - Refuse Collector	22.92
99810 - Sales Clerk	13.82
99820 - School Crossing Guard	16.32
99830 - Survey Party Chief	26.44
99831 - Surveying Aide	17.60
99832 - Surveying Technician	24.04
99840 - Vending Machine Attendant	17.01
99841 - Vending Machine Repairer	19.91
99842 - Vending Machine Repairer Helper	17.01

ALL OCCUPATIONS LISTED ABOVE RECEIVE THE FOLLOWING BENEFITS:

HEALTH & WELFARE: $4.27 per hour or $170.80 per week or $740.13 per month

VACATION: 2 weeks paid vacation after 1 year of service with a contractor or successor; 3 weeks after 5 years, and 4 weeks after 15 years. Length of service includes the whole span of continuous service with the present contractor or successor, wherever employed, and with the predecessor contractors in the performance of similar work at the same Federal facility. (Reg. 29 CFR 4.173)

HOLIDAYS: A minimum of eleven paid holidays per year: New Year's Day, Martin Luther King Jr's Birthday, Washington's Birthday, Good Friday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans' Day, Thanksgiving Day, and Christmas Day. A contractor may substitute for any of the named holidays another day off with pay in accordance with a plan communicated to the employees involved.) (See 29 CFR 4.174)

THE OCCUPATIONS WHICH HAVE NUMBERED FOOTNOTES IN PARENTHESES RECEIVE THE FOLLOWING:

1) COMPUTER EMPLOYEES: Under the SCA at section 8(b), this wage determination does not apply to any employee who individually qualifies as a bona fide executive, administrative, or professional employee as defined in 29 C.F.R. Part 541. Because most Computer System Analysts and Computer Programmers who are compensated at a rate not less than $27.63 (or on a salary or fee basis at a rate not less than $455 per week) an hour would likely qualify as exempt computer professionals, (29 C.F.R. 541. 400) wage rates may not be listed on this wage determination for all occupations within those job families. In addition, because this wage determination may not list a wage rate for some or all occupations within those job families if the survey data indicates that the prevailing wage rate for the occupation equals or exceeds $27.63 per hour conformances may be necessary for certain nonexempt employees. For example, if an individual employee is nonexempt but nevertheless performs duties within the scope of one of the Computer Systems Analyst or Computer Programmer occupations for which this wage determination does not specify an SCA wage rate, then the wage rate for that employee must be conformed in accordance with the conformance procedures described in the conformance note included on this wage determination.

Additionally, because job titles vary widely and change quickly in the computer industry, job titles are not determinative of the application of the computer

professional exemption. Therefore, the exemption applies only to computer employees who satisfy the compensation requirements and whose primary duty consists of:
(1) The application of systems analysis techniques and procedures, including consulting with users, to determine hardware, software or system functional specifications;
(2) The design, development, documentation, analysis, creation, testing or modification of computer systems or programs, including prototypes, based on and related to user or system design specifications;
(3) The design, documentation, testing, creation or modification of computer programs related to machine operating systems; or
(4) A combination of the aforementioned duties, the performance of which requires the same level of skills. (29 C.F.R. 541.400).

2) AIR TRAFFIC CONTROLLERS AND WEATHER OBSERVERS - NIGHT PAY & SUNDAY PAY: If you work at night as part of a regular tour of duty, you will earn a night differential and receive an additional 10% of basic pay for any hours worked between 6pm and 6am. If you are a full-time employed (40 hours a week) and Sunday is part of your regularly scheduled workweek, you are paid at your rate of basic pay plus a Sunday premium of 25% of your basic rate for each hour of Sunday work which is not overtime (i.e. occasional work on Sunday outside the normal tour of duty is considered overtime work).

HAZARDOUS PAY DIFFERENTIAL: An 8 percent differential is applicable to employees employed in a position that represents a high degree of hazard when working with or in close proximity to ordinance, explosives, and incendiary materials. This includes work such as screening, blending, dying, mixing, and pressing of sensitive ordance, explosives, and pyrotechnic compositions such as lead azide, black powder and photoflash powder. All dry-house activities involving propellants or explosives. Demilitarization, modification, renovation, demolition, and maintenance operations on sensitive ordnance, explosives and incendiary materials. All operations involving regrading and cleaning of artillery ranges.

A 4 percent differential is applicable to employees employed in a position that represents a low degree of hazard when working with, or in close proximity to ordance, (or employees possibly adjacent to) explosives and incendiary materials which involves potential injury such as laceration of hands, face, or arms of the employee engaged in the operation, irritation of the skin, minor burns and the like; minimal damage to immediate or adjacent work area or equipment being used. All operations involving, unloading, storage, and hauling of ordance, explosive, and incendiary ordnance material other than small arms ammunition. These differentials are only applicable to work that has been specifically designated by the agency for ordance, explosives, and incendiary material differential pay.

** UNIFORM ALLOWANCE **

If employees are required to wear uniforms in the performance of this contract (either by the terms of the Government contract, by the employer, by the state or local law, etc.), the cost of furnishing such uniforms and maintaining (by laundering or dry cleaning) such uniforms is an expense that may not be borne by an employee where such cost reduces the hourly rate below that required by the wage determination. The Department of Labor will accept payment in accordance with the following standards as compliance:

The contractor or subcontractor is required to furnish all employees with an adequate number of uniforms without cost or to reimburse employees for the actual cost of the uniforms. In addition, where uniform cleaning and maintenance is made the responsibility of the employee, all contractors and subcontractors subject to this wage determination shall (in the absence of a bona fide collective bargaining agreement providing for a different amount, or the furnishing of contrary affirmative proof as to the actual cost), reimburse all employees for such cleaning and maintenance at a rate of $3.35 per week (or $.67 cents per day). However, in those instances where the uniforms furnished are made of "wash and wear"

materials, may be routinely washed and dried with other personal garments, and do not require any special treatment such as dry cleaning, daily washing, or commercial laundering in order to meet the cleanliness or appearance standards set by the terms of the Government contract, by the contractor, by law, or by the nature of the work, there is no requirement that employees be reimbursed for uniform maintenance costs.

The duties of employees under job titles listed are those described in the "Service Contract Act Directory of Occupations", Fifth Edition, April 2006, unless otherwise indicated. Copies of the Directory are available on the Internet. A links to the Directory may be found on the WHD home page at http://www.dol.gov/esa/whd/ or through the Wage Determinations On-Line (WDOL) Web site at http://wdol.gov/.

REQUEST FOR AUTHORIZATION OF ADDITIONAL CLASSIFICATION AND WAGE RATE {Standard Form 1444 (SF 1444)}

Conformance Process:

The contracting officer shall require that any class of service employee which is not listed herein and which is to be employed under the contract (i.e., the work to be performed is not performed by any classification listed in the wage determination), be classified by the contractor so as to provide a reasonable relationship (i.e., appropriate level of skill comparison) between such unlisted classifications and the classifications listed in the wage determination. Such conformed classes of employees shall be paid the monetary wages and furnished the fringe benefits as are determined. Such conforming process shall be initiated by the contractor prior to the performance of contract work by such unlisted class(es) of employees. The conformed classification, wage rate, and/or fringe benefits shall be retroactive to the commencement date of the contract. {See Section 4.6 (C)(vi)} When multiple wage determinations are included in a contract, a separate SF 1444 should be prepared for each wage determination to which a class(es) is to be conformed.

The process for preparing a conformance request is as follows:

1) When preparing the bid, the contractor identifies the need for a conformed occupation(s) and computes a proposed rate(s).

2) After contract award, the contractor prepares a written report listing in order proposed classification title(s), a Federal grade equivalency (FGE) for each proposed classification(s), job description(s), and rationale for proposed wage rate(s), including information regarding the agreement or disagreement of the authorized representative of the employees involved, or where there is no authorized representative, the employees themselves. This report should be submitted to the contracting officer no later than 30 days after such unlisted class(es) of employees performs any contract work.

3) The contracting officer reviews the proposed action and promptly submits a report of the action, together with the agency's recommendations and pertinent information including the position of the contractor and the employees, to the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, for review. (See section 4.6(b)(2) of Regulations 29 CFR Part 4).

4) Within 30 days of receipt, the Wage and Hour Division approves, modifies, or disapproves the action via transmittal to the agency contracting officer, or notifies the contracting officer that additional time will be required to process the request.

5) The contracting officer transmits the Wage and Hour decision to the contractor.

6) The contractor informs the affected employees.

Information required by the Regulations must be submitted on SF 1444 or bond paper.

When preparing a conformance request, the "Service Contract Act Directory of Occupations" (the Directory) should be used to compare job definitions to insure that duties requested are not performed by a classification already listed in the wage determination. Remember, it is not the job title, but the required tasks that determine whether a class is included in an established wage determination. Conformances may not be used to artificially split, combine, or subdivide classifications listed in the wage determination.

Vicinity Map of AK FS CNF 1015(2) Russian River Campground

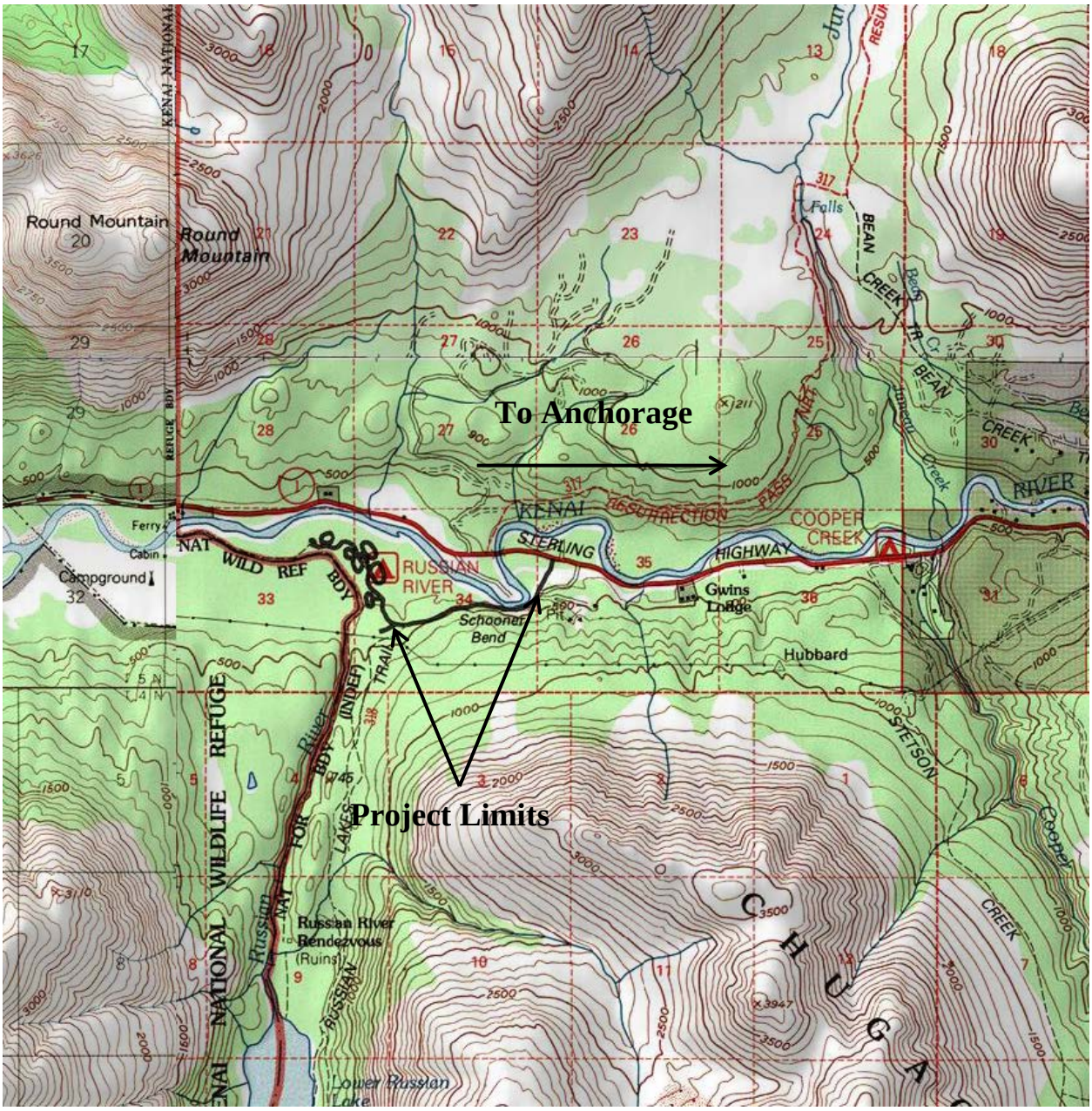


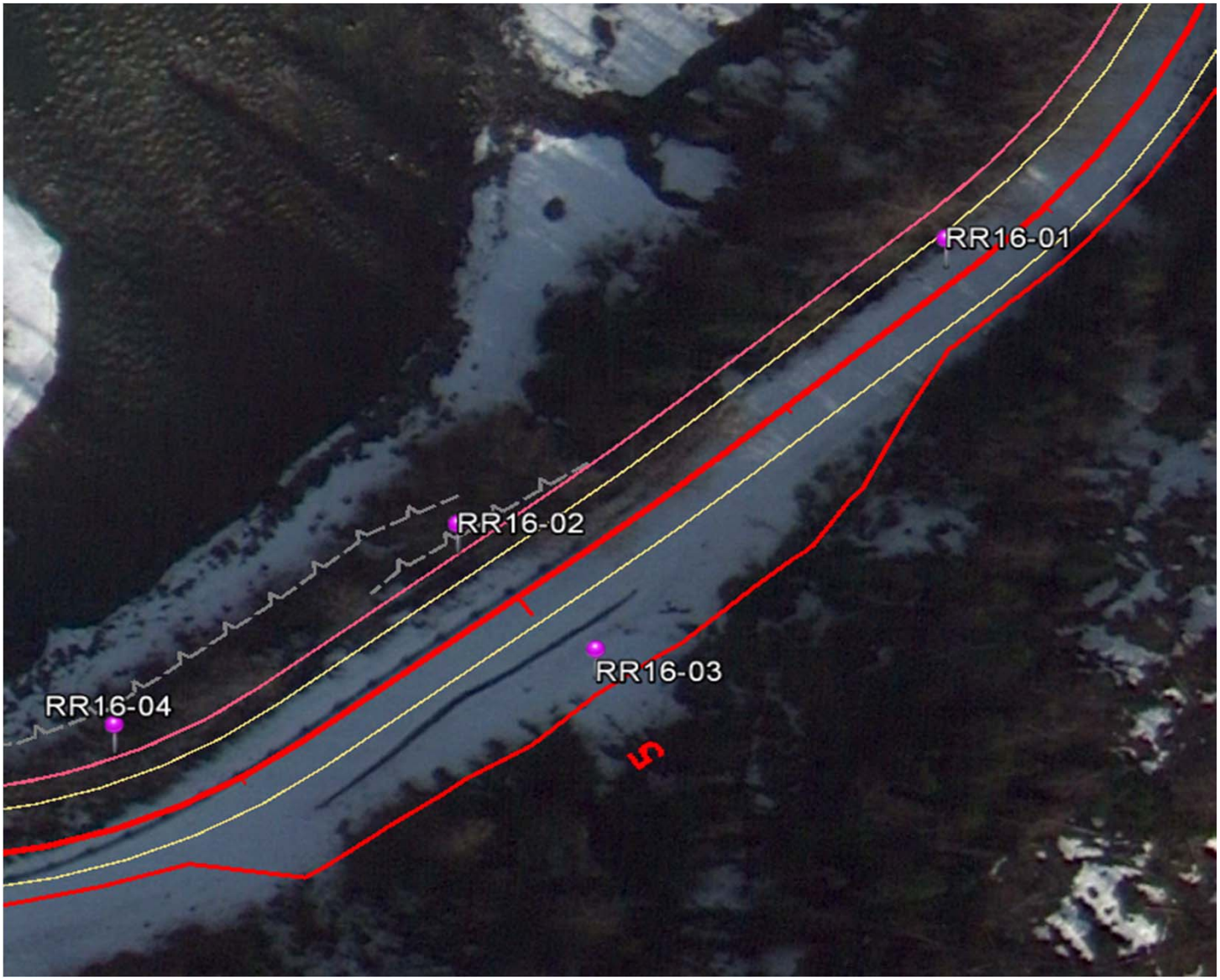
Table of Borings 1 of 1 **Russian River Campground**

Boring #	Purpose	Station	Offset (ft)	Alignment Referenced	Latitude (deg N)	Longitude (deg W)	Estimated Feet of Auger	Estimated Feet of Casing Advancer	Estimated Feet of HQ Core	Max. Hole Diameter (in)	Minimum Depth (ft)	Maximum Depth (ft)	Expected No. of SPTs	Possible Addit. SPTs	Possible Shelby Samples	Vane Shear Tests	Comments: Drill Type, Access, Instruments, Etc.
RR16-01	Landslide	3+35	5' RT		60°28'49.02"	149°56'41.12"	60	0	30	8	60	100	24	16	0	0	Truck drill, access from road, vibrating wire pizeometer and slope inclinometer pipe, sample every 2.5'.
RR16-02	Landslide	5+00	15' RT		60°28'48.11"	149°56'43.98"	60	0	30	8	60	100	24	16	0	0	Truck drill, access from road, vibrating wire pizeometer and slope inclinometer pipe, sample every 2.5'.
RR16-03	Landslide	5+00	20'LT		60°28'47.71"	149°56'43.17"	60	0	30	8	60	100	24	16	0	0	Portable drill rig, vibrating wire pizeometer and slope inclinometer pipe, sample every 2.5'.
RR16-04	Retaining Wall	6+30	5' RT		60°28'47.47"	149°56'45.99"	60	0	30	8	60	100	24	16	0	0	Truck drill, access from road, sample every 2.5'.
RR16-05	Retaining Wall	9+30	5' RT		60°28'46.81"	149°56'51.67"	50	0	0	8	50	50	14	0	0	0	Truck drill, access from road.
RR16-06	Retaining Wall	13+60	5' RT		60°28'46.95"	149°56'59.49"	50	0	0	8	50	50	14	0	0	0	Truck drill, access from road.
RR16-07	Retaining Wall	16+00	5' RT		60°28'47.98"	149°57'3.80"	50	0	0	8	50	50	14	0	0	0	Truck drill, access from road.
RR16-08	Subgrade	17+70	5' RT		60°28'48.23"	149°57'7.35"	15	0	0	8	15	15	10	0	0	0	Truck drill, access from road, continuous sampling to 10.5', samples at 12.5' and 15'.
RR16-09	Subgrade	22+50	5' LT		60°28'47.65"	149°57'16.75"	10.5	0	0	8	10.5	10.5	8	0	0	0	Truck drill, access from road, continuous sampling.
RR16-10	Subgrade	26+30	5' RT		60°28'46.88"	149°57'24.16"	10.5	0	0	8	10.5	10.5	8	0	0	0	Truck drill, access from road, continuous sampling.
RR16-11	Subgrade	31+50	5' LT		60°28'45.94"	149°57'34.18"	10.5	0	0	8	10.5	10.5	8	0	0	0	Truck drill, access from road, continuous sampling.
RRTP16-12	Foundation	-	-				0	0	0	0	0	5.5	0	0	0	0	Test pit dug with excavator/backhoe/similar equipment
						TOTALS	**436.5**	**0**	**120**		**436.5**	**602**	**172**	**64**	**0**	**0**	

NOTES:

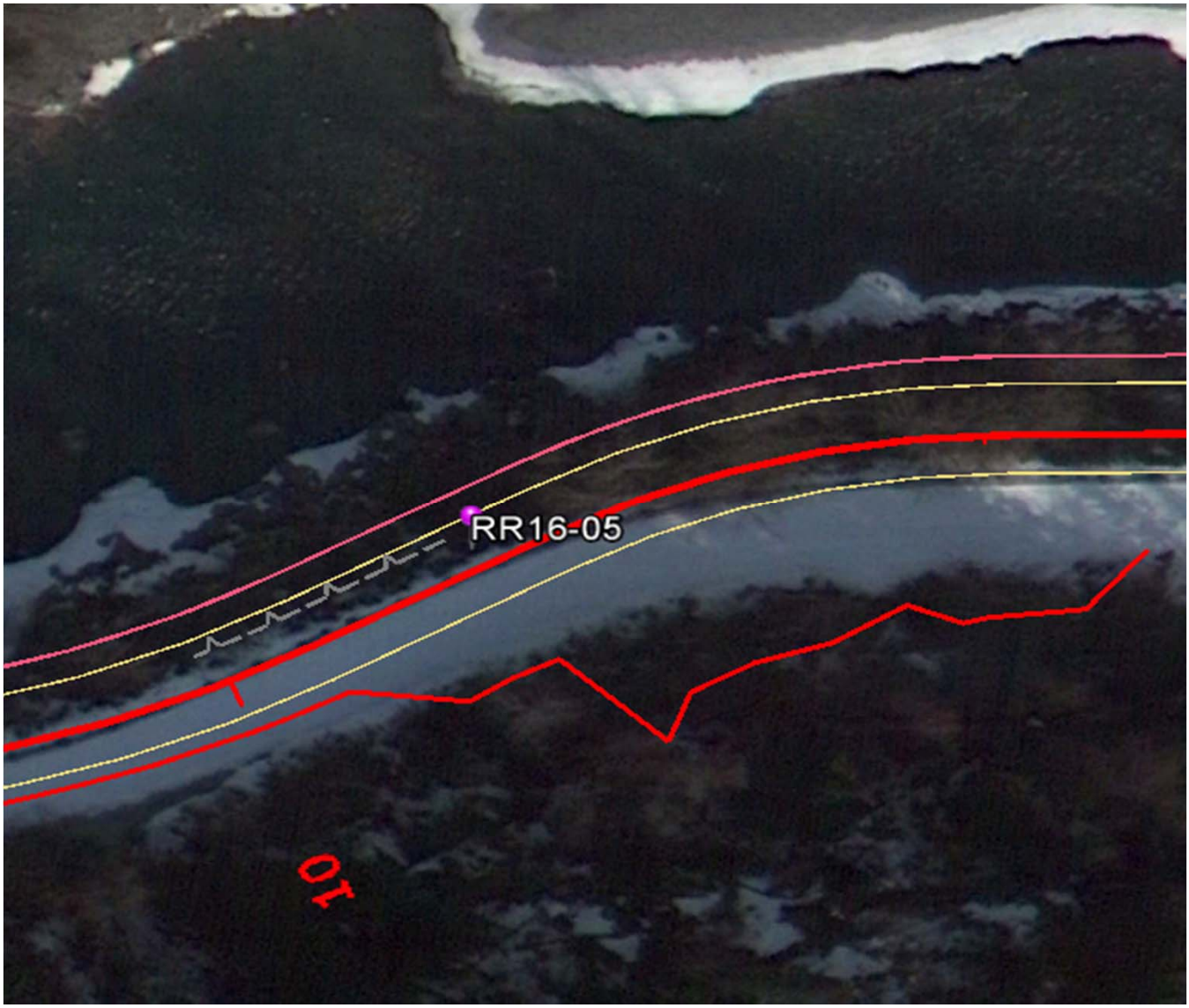
For borings RR16-01 to RR16-04 SPT sample every 2.5' from 0' - BOH.
For borings RR16-05 to RR16-07 SPT sample every 2.5' from 0'-15', then every 5' to BOH.
For boring RR16-08 continuous SPT sample from 0'-10', then every 2.5' to BOH.
For borings RR16-09 to RR16-11 continuous SPT sample from 0'-BOH.
Advance all borings below water table without using any drilling fluids. Obtain stable water level reading prior to using drilling fluids.
Use hammer for SPT samples that has been tested for efficiency in the past 12 months.

Aerial View of Borings Page 1 of 8



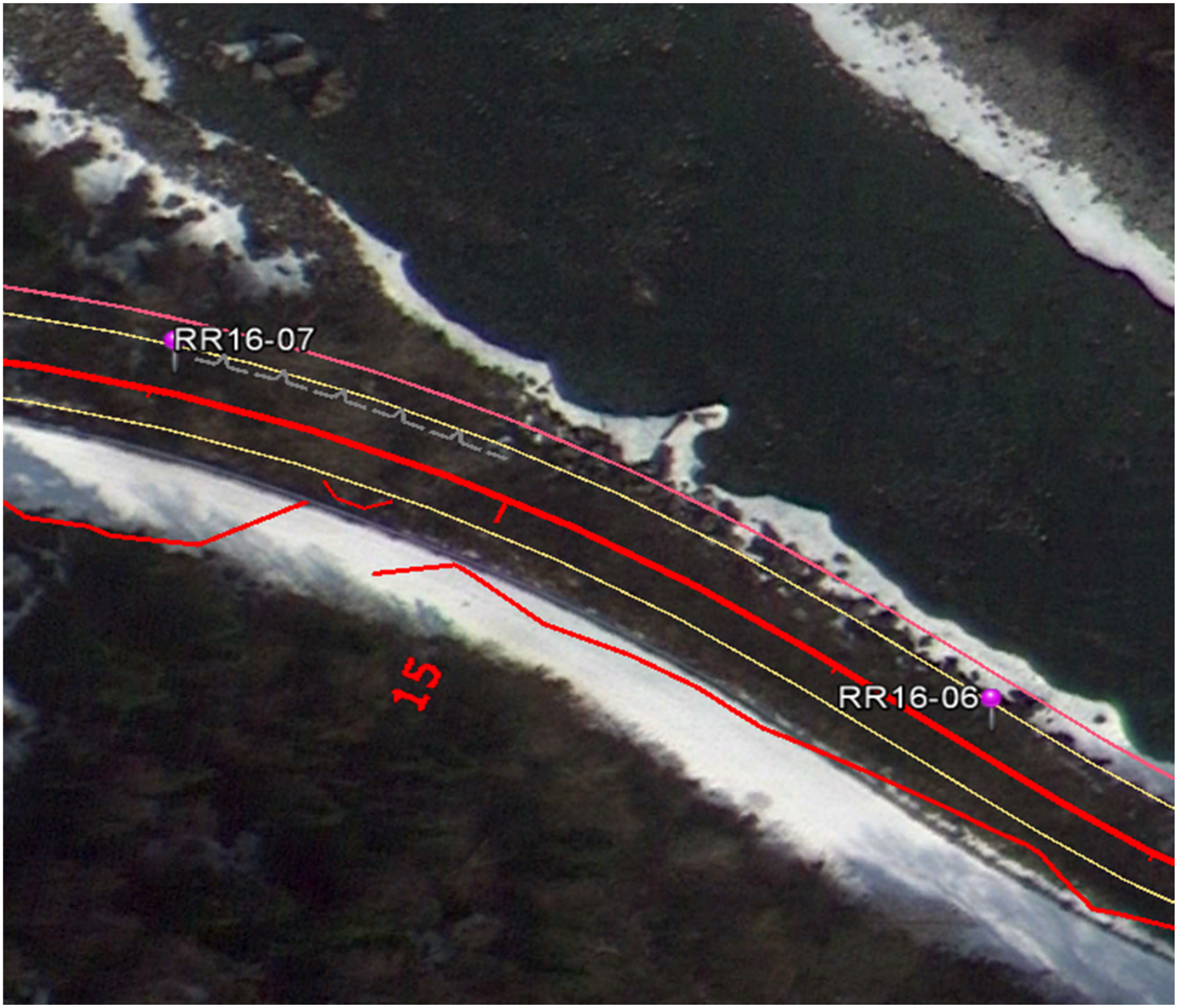
Boring #	Station	Latitude (deg N)	Longitude (deg W)	Max Depth (ft)
RR16-01	3+35	60°28'49.02"	149°56'41.12"	100
RR16-02	5+00	60°28'48.11"	149°56'43.98"	100
RR16-03	5+00	60°28'47.71"	149°56'43.17"	100
RR16-04	6+30	60°28'47.47"	149°56'45.99"	100

Aerial View of Borings Page 2 of 8



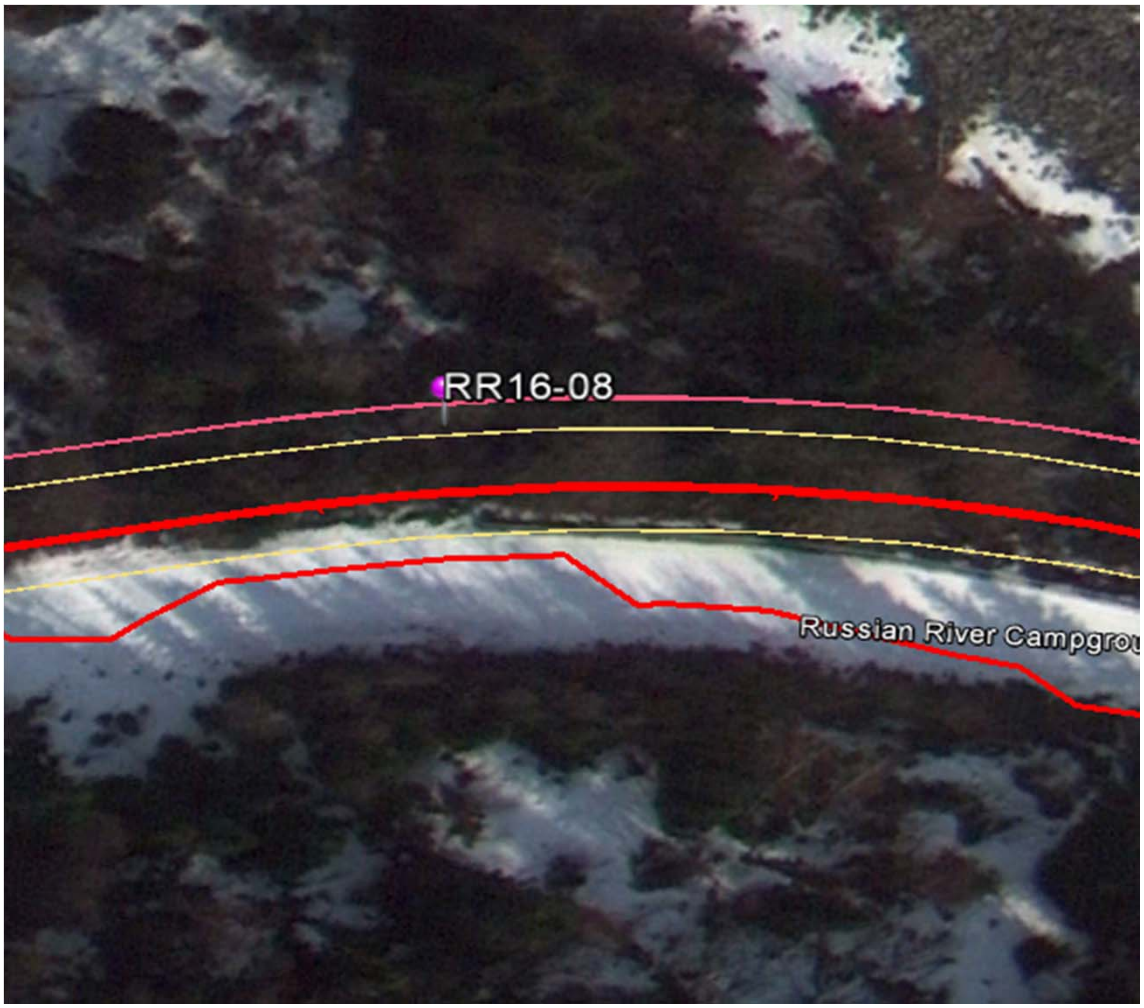
Boring #	Station	Latitude (deg N)	Longitude (deg W)	Max Depth (ft)
RR16-05	9+30	60°28'46.81"	149°56'51.67"	50

Aerial View of Borings Page 3 of 8



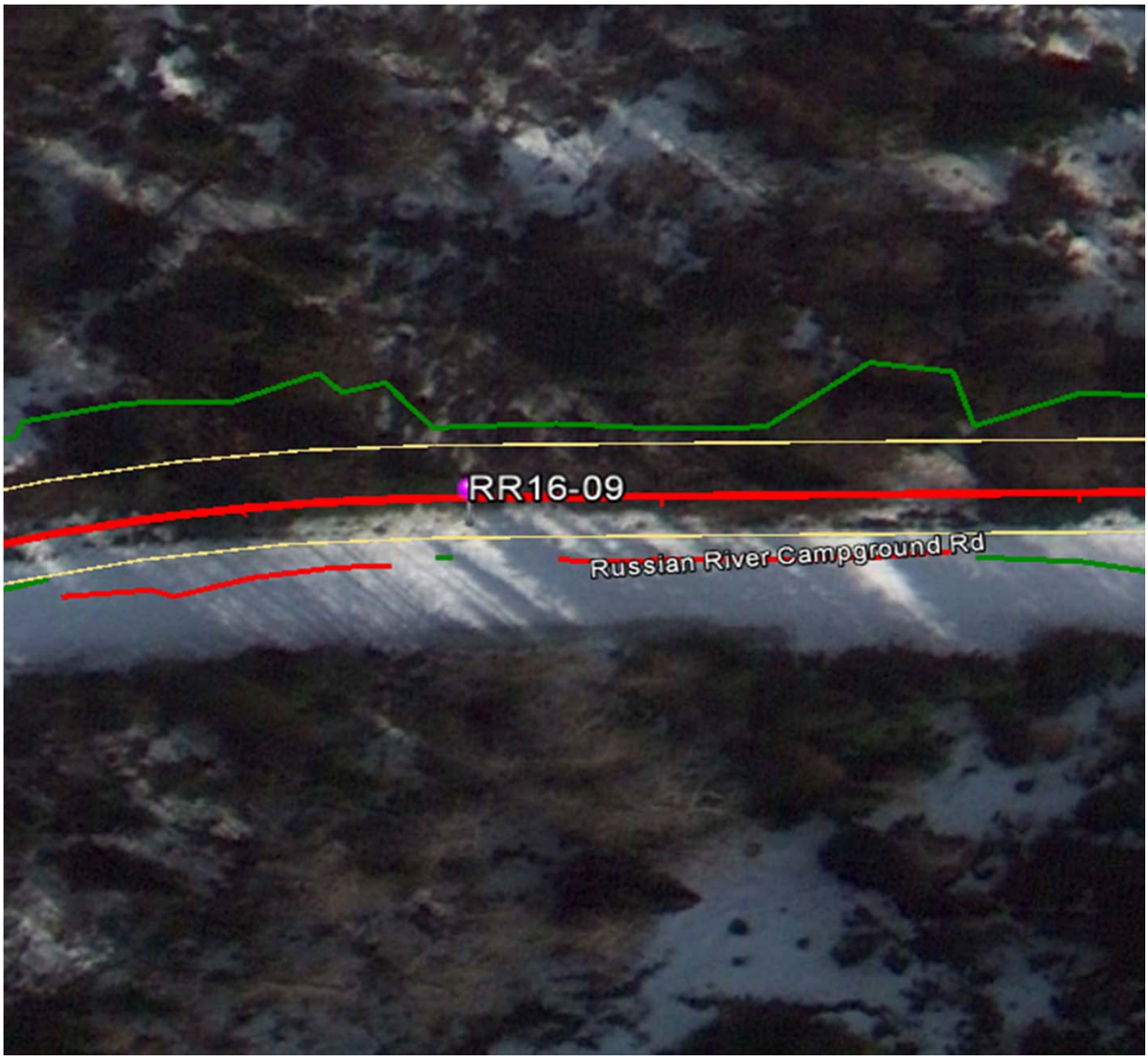
Boring #	Station	Latitude (deg N)	Longitude (deg W)	Max Depth (ft)
RR16-06	13+60	60°28'46.95"	149°56'59.49"	50
RR16-07	16+00	60°28'47.98"	149°57'3.80"	50

Aerial View of Borings Page 4 of 8



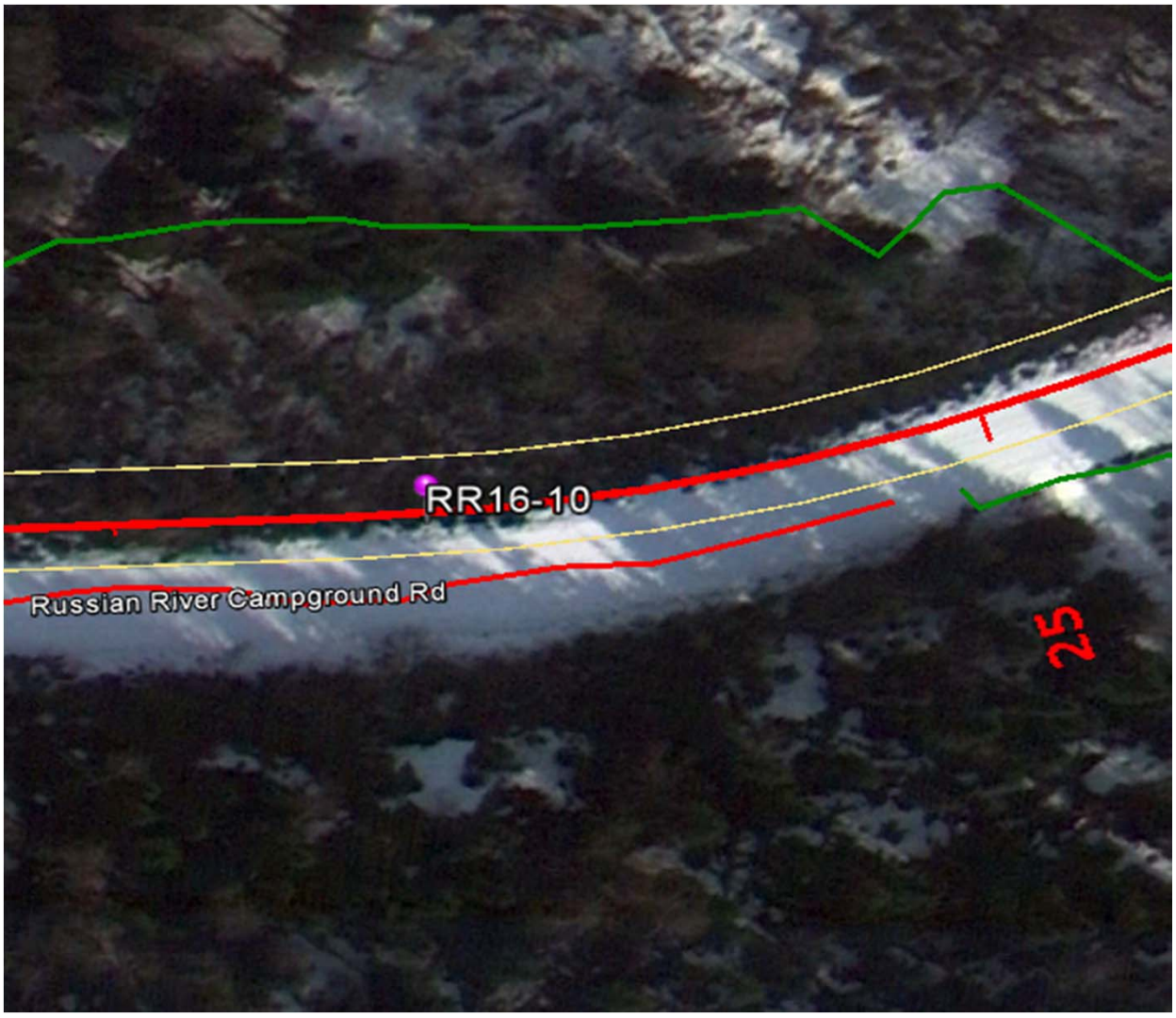
Boring #	Station	Latitude (deg N)	Longitude (deg W)	Max Depth (ft)
RR16-08	17+70	60°28'48.23"	149°57'7.35"	15

Aerial View of Borings Page 5 of 8



Boring #	Station	Latitude (deg N)	Longitude (deg W)	Max Depth (ft)
RR16-09	22+50	60°28'47.65"	149°57'16.75"	10.5

Aerial View of Borings Page 6 of 8



Boring #	Station	Latitude (deg N)	Longitude (deg W)	Max Depth (ft)
RR16-10	26+30	60°28'46.88"	149°57'24.16"	10.5

Aerial View of Borings Page 7 of 8

Boring #	Station	Latitude (deg N)	Longitude (deg W)	Max Depth (ft)
RR16-11	31+50	60°28'45.94"	149°57'34.18"	10.5

Aerial View of Borings Page 8 of 8

Boring #	Station	Latitude (deg N)	Longitude (deg W)	Max Depth (ft)
RRTP16-12	-	60°28'53.49"	149°56'32.99"	5.5

The following photos are of the staked borings for the Russian River Campground subsurface investigation plan and were generally taken from the east looking west.

It is the opinion of Western Federal Lands that all borings can likely be completed under traffic control with a truck mounted drill rig excluding RR16-02 and RR16-03. These borings will need to be completed with a portable drill rig set with a crane or possibly an excavator.

RR16-01

RR16-02

RR16-03

RR16-04

RR16-05

RR16-06

RR16-07

RR16-08

RR16-09

RR16-10

RR16-11

Federal Lands Highway

Rock Characterization Guidelines

U.S. Department of Transportation

Federal Highway Administration

CONTENTS

SECTION 1 – INTRODUCTION

1.1 TEST HOLE LOGGING IN ROCK

Rock characterization for engineering purposes consists of two basic assessments identified in the 1978 and 1981 International Society of Rock Mechanics (ISRM) publications; one based on the *intact rock* properties of the rock, and the other based on the *discontinuity* features. Together, the intact rock and the discontinuity properties define the overall rock mass.

- **Intact rock properties** - This assessment is based on the character of the intact rock (hand specimens and rock core) in terms of its genetic origin, mineralogical make-up, texture, strength, and degree of chemical alteration and/or physical weathering.
- **Discontinuity properties -** This assessment is based on the engineering characteristics (orientation, spacing, etc.) of the bounding discontinuities (bedding, joints, foliation planes, shear zones, faults, etc.) within the rock mass.

Both assessments are essential to engineering characterization of the rock mass, and are the basis for rock slope design and excavation, tunnel design and excavation, foundation design on rock, rock anchorage, and characterization of rock quarries.

Several other rock mass classification systems for engineering purposes and standard guides for utilizing these other systems are presented in ASTM D5878 and STP 984, respectively. However, FLH requires contractors and consultants to use the guidance presented in this document and the 1978 and 1981 ISRM publications unless otherwise directed.

Order of Descriptors

The protocol for field logging the test hole is to first describe the *intact rock* properties followed by the description of the *discontinuity* properties within the rock mass.

INTACT ROCK PROPERTIES *followed by* **DISCONTINUITY PROPERTIES**

[Intact Rock Properties] **ROCK TYPE** (CAPS)**, degree of vesicularity** (when applicable)**, rock color, grain size, weathered state, relative intact rock strength (grade).** *followed by [Discontinuity Properties]* **Discontinuity spacing, discontinuity condition, core recovery (CR), rock quality designation (RQD), fracture frequency (FF), rock coring time (RCT), range of major discontinuity orientations, other properties** (when applicable, e.g. voids, slaking, etc.)

Some examples of this field logging protocol are as follows:

> DIORITE, medium light gray, medium grained, slightly weathered, moderately strong rock (R3). Discontinuities are widely spaced and in fair condition, CR = 100%, RQD = 80%, FF = 2, RCT = 15 minutes, joints and fractures range from 15 to 35 degrees from assumed horizontal.
>
> BASALT, highly vesicular, dark gray, very fine grained, slightly weathered to fresh, strong rock (R4). Discontinuities are closely spaced and in poor condition, CR = 65%, RQD = 40%, FF = 20, RCT = 12 minutes, joints range from 70 to 80 degrees from assumed horizontal with a flow contact at 12 degrees from assumed horizontal.

SILTSTONE, medium dark gray, very fine grained, slightly weathered, very weak rock (R1). Discontinuities are widely spaced and in fair condition, CR = 100%, RQD = 100%, FF = 1, RCT = 6 minutes, apparent bedding ranges from 32 to 46 degrees from assumed horizontal, apparent potential for slaking.Sandstone, medium gray, residual soil to completely weathered, extremely weak rock (R0). Residual soil is a Silty SAND, very dense, moist, coarse, subangular sand, homogeneous, no HCl reaction.

SECTION 2 – INTACT ROCK PROPERTIES

2.1 ROCK TYPE

Rocks are divided into three general categories based on origin. These categories are **igneous rocks**, **sedimentary rocks**, and **metamorphic rocks**. For assistance in general identification of rocks and minerals, the November 1991 FHWA publication entitled, *"Rock and Mineral Identification for Engineers"* should be utilized.

2.2 IGNEOUS ROCKS

Igneous rocks are those rocks that have been formed by the solidification of molten or partially molten material. Typically they are characterized based on mineralogy and genetic occurrence (intrusive or extrusive). Texture is the most conspicuous feature (key indicator) of genetic origin.

In general, coarser grained igneous rocks are intrusive, having been formed (solidified) *before* the molten material has reached the surface; while the finer grained igneous rocks are extrusive and have formed (solidified) *after* the molten material has reached the surface. Although this generality is true in most cases, it must be stressed that there is no clear line between the two.

Exhibit 2.2–A should be used only as an aid in determining the possible genetic origin (intrusive versus extrusive) of the igneous rock. For grain size determination and descriptors use Exhibit 2.6–A.

Exhibit 2.2–A COMMON IGNEOUS ROCKS

Intrusive (Coarser Grained)	Extrusive (Finer Grained)	Primary Minerals	Common Accessory Minerals
Granite	Rhyolite	Quartz K-feldspar	Plagioclase, Mica, Amphibole, and Pyroxene.
Quartz Diorite	Dacite	Quartz Plagioclase	Hornblende, Pyroxene, and Mica.
Diorite	Andesite	Plagioclase	Mica, Amphibole, and Pyroxene.
Gabbro	Basalt	Plagioclase Pyroxene	Amphibole

A special, but common, class of igneous rock is **pyroclastic rocks** (See Exhibit 2.2–B). These rocks have been derived from volcanic material that has been explosively or aerially ejected from a volcanic vent.

Exhibit 2.2–B PYROCLASTIC ROCKS

Rock Name	Characteristics
Pyroclastic Breccia	Pyroclastic rock whose average pyroclast size exceeds 2.5 inches (64 mm); *angular* pyroclasts predominate.
Agglomerate	Pyroclastic rock whose average pyroclast size exceeds 2.5 inches (64 mm); *rounded* pyroclasts predominate.
Lapilli Tuff	Pyroclastic rock whose average pyroclast size is 0.08 to 2.5 inches (2 to 64 mm).
Ash Tuff	Pyroclastic rock whose average pyroclast size is less than 0.08 inches (2 mm).

Some extrusive volcanic rocks contain small sub-rounded to rounded **cavities (vesicles)** formed by the expansion of gas or steam during the solidification process of the rock. The occurrences of these vesicles (when applicable) are to be reported using an estimate of the relative area that the vesicles occupy in relationship to the total area of the sample. The designation is outlined in Exhibit 2.2–C.

Exhibit 2.2–C DEGREE OF VESICULARITY (WHEN APPLICABLE)

Designation	Percentage of Total Sample (by volume)
Slightly Vesicular	5 to 10 Percent
Moderately Vesicular	10 to 25 Percent
Highly Vesicular	25 to 50 Percent
Scoriaceous	Greater than 50 Percent

2.3 SEDIMENTARY ROCKS

Sedimentary rocks are formed by the deposition and lithification of sediments such as gravels, sands, silts, and clays; or by chemical precipitation from solutions (rock salt), or from secretion of organisms (limestones). As indicated above, sedimentary rocks are characterized based on whether they are derived from **clastic sediments or non clastic (chemical precipitates, or organisms)** (Refer to Exhibit 2.3–A and 2.3–B). As listed in Exhibit 2.3–B, a dilute mixture of hydrochloric acid (HCl) can be used to determine if a rock type contains appreciable calcium carbonate. The reaction of a clean face of the rock sample with HCl can help define the sedimentary, non-clastic rock type when they are similar in appearance.

Exhibit 2.3–A CLASTIC SEDIMENTARY ROCKS

Rock Type	Original Sediment
Conglomerate	Sand, Gravel, Cobbles, and Boulders
Sandstone	Sand
Siltstone	Silt
Claystone	Clay
Shale	Laminated Clay and Silt

Exhibit 2.3–B NON-CLASTIC SEDIMENTARY ROCKS

Rock Type	Primary Mineral	HCl Reaction
Limestone	Calcite	*Strong* (violent reaction with bubbles forming immediately)
Dolomite/ Dolostone	Dolomite	*Weak* (Some reaction with bubbles forming slowly)
Chert	Quartz	*None* (No visible reaction)

2.4 METAMORPHIC ROCKS

Metamorphic rocks are those rocks that have been formed from *pre-existing* rocks when minerals in the rocks have been recrystallized to form new minerals in response to changes in temperature and/or pressure. Metamorphic rocks are characterized based on two general categories; **foliated and non-foliated** metamorphic rocks. Foliated metamorphic rocks contain laminated structure resulting from the segregation of different minerals into layers parallel to schistosity. Non-foliated metamorphic rocks are generally recrystallized and equigranular (Refer to Exhibits 2.4–A and 2.4–B).

Exhibit 2.4–A FOLIATED METAMORPHIC ROCKS

Rock Type	Texture	Formed From	Primary Minerals
Slate	Platy, fine grained	Shale, Claystone	Quartz & Mica
Phyllite	Platy, fine grained with silky sheen	Shale, Claystone, Fine grained pyroclastic	Quartz & Mica
Schist	Medium grained with irregular layers	Sedimentary and Igneous Rocks	Mica, Quartz, Feldspar, and Amphibole
Gneiss	Layered, medium to coarse grained	Sedimentary and Igneous Rocks	Mica, Quartz, Feldspar, and Amphibole

Exhibit 2.4–B Non-Foliated Metamorphic Rocks

Rock Type	Texture	Formed From	Primary Minerals
Greenstone	Crystalline	Intermediate Volcanics & Mafic Igneous	Mica, Hornblende, and Epidote
Marble	Crystalline	Limestone &Dolomite	Calcite & Dolomite
Quartzite	Crystalline	Sandstone & Chert	Quartz
Amphibolite	Crystalline	Mafic Igneous & Calcium-Iron Bearing Sediments	Hornblende & Plagioclase

2.5 ROCK COLOR

Rock color is not in itself a specific engineering property, but may be an indicator of the influence of other significant geologic processes that may be occurring in the rock mass (e.g. fracture flow of water, weathering, alteration, etc.) Color may also aid in the subsurface correlation of rock units. The color of the rock should be based on the ***2009 Geological Society of America Munsell Rock Color Charts***, and when not available or practical, use the ***modified 1977 Rock Color Chart from the Geologic Society of London*** provided in Exhibit 2.5–A. Rock color should be determined as soon as the core has been recovered from the test hole and while the core sample is wet.

Exhibit 2.5–A ROCK COLOR (MODIFIED AFTER GEOLOGICAL SOCIETY OF LONDON, 1977)

1st Descriptor	2nd Descriptor	3rd Descriptor
Light	Yellowish	White
Dark	Buff	Yellow
	Orangish	Buff
	Brownish	Orange
	Pinkish	Brown
	Reddish	Pink
	Bluish	Red
	Purplish	Blue
	Orange	Green
	Olive	Purple
	Greenish	Olive
	Greyish	Grey
		Black

2.6 GRAIN SIZE

Grain size is defined as the size of the particles or mineral crystals that make up the intact portion of the rock. The description of grain size should follow the criteria as set forth in Exhibit 2.6–A.

Exhibit 2.6–A GRAIN SIZE

Grain Size	Description	Criteria
Less than 0.003 inches (0.075 mm)	Very fine grained	Cannot be distinguished by unaided eye. Few to no mineral grains are visible with a hand lens.
0.003 to 0.02 inches (0.075 to 0.425 mm)	Fine grained	Few crystal boundaries are visible; grains can be distinguished with difficulty by the unaided eye but can be somewhat distinguished by hand lens.
0.02 to 0.8 inches (0.425 to 2 mm)	Medium grained	Most crystal boundaries are visible; grains distinguishable by eye and with the aid of a hand lens.
0.8 to 2 inches (2 to 4.75 mm).	Coarse grained	Crystal boundaries are visible; grains distinguishable with the naked eye and hand lens.
Greater than 2 inches (>4.75 mm)	Very coarse grained	Crystal boundaries are clearly visible; grains are distinguishable with the naked eye.

2.7 WEATHERED STATE OF ROCK

Weathering is the process of mechanical and/or chemical degradation of the rock mass through exposure to the elements (e.g. rain, wind, groundwater, ice, change in temperature, etc.). In general, the strength of the rock tends to decrease as the degree of weathering increases. In the earliest stages of weathering only discoloration and a slight change in texture occur. As the weathering of the rock advances, significant changes occur in the physical properties of the rock mass, until ultimately the rock is decomposed to soil.

The characterization of the weathered state of the rock mass is based on six weathering classes (See Exhibit 2.7–A developed by the International Society of Rock Mechanics (ISRM, 1978 & 1981)).

Exhibit 2.7–A WEATHERED STATE OF ROCK

Term	Description	Grade
Fresh	No visible sign of rock material weathering; slight discoloration on major discontinuity surface is possible.	I
Slightly Weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All rock material may be discolored by weathering and the external surface may be somewhat weaker than in its fresh condition.	II
Moderately Weathered	Less than half the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones. A minimum 2 inch (50 mm) diameter sample ***cannot*** be broken readily by hand across the rock fabric.	III
Highly Weathered	More than half of the rock is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones. A minimum 2 inch (50 mm) diameter sample ***can*** be broken readily by hand across the rock fabric.	IV
Completely Weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact. Material can be granulated by hand. ***If rock is considered to be completely weathered, use FLH Soil Description and Identification Guidelines to describe the residual soil material.***	V
Residual Soil	All rock material is converted to soil. The mass structure and material fabric are destroyed but the apparent structure remains intact. There may be a large change in volume, but the soil has not been significantly transported. Material can be easily broken-down by hand. ***If rock is considered to be residual soil, use FLH Soil Description and Identification Guidelines to describe the residual soil material.***	VI

Alteration is the process that applies *specifically* to the changes in the chemical or mineral composition of the rock due to hydrothermal or metamorphic activities. Alteration may occur in zones or pockets and can be found at depths far below that of normal weathering. Alteration does not strictly infer that there is a degradation of the rock mass or an associated loss in strength.

Where there has been a degradation of the rock mass due to alteration, Exhibit 2.7-A may be used to describe the alteration by simply substituting the word *"altered"* for the word weathered for Grade II through Grade V.

2.8 RELATIVE ROCK STRENGTH

Rock strength is controlled by many factors including degree of induration, cementation, crystal bonding, degree of weathering or alteration, etc. Determination of relative rock strength can be estimated by simple field tests, which can be refined, if required, through laboratory testing. The relative rock strength should be determined based on intact specimens based on the ISRM method outlined in Exhibit 2.8-A. Due to the potential for variable rock conditions multiple relative strength designations may be required for each core run.

Exhibit 2.8-A RELATIVE STRENGTH OF INTACT ROCK SPECIMENS (ISRM, 1978 & 1981)

Grade	Description	Field Identification	Approximate Uniaxial Compressive Strength
R0	Extremely Weak Rock	Specimen can be indented by thumbnail.	35 – 150 psi (250-1000 kPa)
R1	Very Weak Rock	Specimen crumbles under sharp blow with point of geological hammer, and can be peeled with a pocket knife.	150 - 725 psi (35 – 5000 kPa)
R2	Weak Rock	Shallow cuts or scrapes can be made in a specimen with a pocket knife. A firm blow with a geological hammer point creates shallow indents.	725 – 3500 psi (5000 – 25,000 kPa)
R3	Medium Strong Rock	Specimen cannot be scraped or cut with a pocket knife. Specimen can be fractured with a single firm blow with a geologic hammer point.	3500 - 7250 psi (25,000 to 50,000 kPa)
R4	Strong Rock	Specimen requires more than one firm blow of the geologic hammer point to fracture.	7250 – 14,500 psi (50,000 – 100,000 kPa)
R5	Very Strong Rock	Specimen requires many firm blows from the hammer end of the geologic hammer to fracture.	14500 – 36,250 psi (100,000 – 250,000 kPa)
R6	Extremely Strong Rock	Specimen can only be chipped with firm blows from the hammer end of the geologic hammer.	<36,250 psi (>250,000 kPa)

If soil infilling is observed within the discontinuities, the hole depth, thickness, and field soil identification characteristics should be noted. In addition, a qualitative thumb penetration test should be conducted and described per Exhibit 2.8–B. Areas of prominent soil infilling should be placed in a plastic bag and sealed for moisture content and additional laboratory testing. Any moisture sensitive rock should be preserved (at a minimum) by wrapping the core in clear plastic to retain the field moisture conditions (e.g. claystone, siltstone, coal, argillaceous rocks, etc.). Note that protective measures; such as, bubble wrap, or removing and individually wrapping core and placing them in a padded bucket for shipping may be required to preserve cored materials for laboratory testing. Guidance to Standard Practices for Preserving and Transporting Rock Core Samples is provided in ASTM D5079-08.

Exhibit 2.8-B RELATIVE STRENGTH OF SOIL INFILLING (ISRM, 1978 & 1981)

Grade	Description	Field Identification	Approximate Uniaxial Compressive Strength
S1	Very soft	Easily penetrated several inches by fist	<3.5psi (<25 kPa)
S2	Soft	Easily penetrated several inches by thumb	3.5 – 7 psi (25 - 50 kPa)
S3	Firm	Can be penetrated several inches by thumb with moderate effort	7 – 14.5 psi (50 - 100 kPa)
S4	Stiff	Readily indented by thumb but penetrated only with great effort	14.5 – 36 psi (100 – 250 kPa)
S5	Very Stiff	Readily indented by thumbnail	36 – 72.5 psi (250 – 500 kPa)
S6	Hard	Indented with difficulty by thumbnail	>72 psi (>500 kPa)

SECTION 3 – DISCONTINUITY PROPERTIES

The discontinuity properties of a rock mass are based on the engineering properties of the bounding structure within the rock mass. Structure refers to large-scale (megascopic) planar features which separate intact rock blocks, and impact the overall strength, permeability, and breakage characteristics of the rock mass. Common planar features within the rock mass include joints, fractures, bedding, and faults; collectively called ***discontinuities***. These common planar features are defined as follows:

Joints/fractures- Joints/fractures are discontinuities within the rock mass along which there has been no identifiable displacement.

Bedding - Bedding is the regular layering in sedimentary rocks marking the boundaries of small to massive lithological units or beds.

Faults - Faults are fractures or brecciated zones within the rock mass along which there has been significant shear displacement of the sides relative to each other. The presence of gouge and/ or slickensides *may* be indicators of faulting.

When defining the discontinuity properties of these planar features within the rock mass, the recovered rock core from the borehole is examined, and the following information is recorded:

- Discontinuity Spacing
- Discontinuity Condition
- Core Recovery
- Rock Quality Designation (RQD)
- Fractures Frequency (FF)
- Rock Coring Time (RCT)
- Range of Major Discontinuity Orientations
- Voids

3.1 DISCONTINUITY SPACING

Discontinuity spacing is the distance between *natural* discontinuities as measured along the borehole. An evaluation of discontinuity spacing within each core run should be made, and reported on the field logs in conformance with the ISRM criteria set forth in ***Table 13.*** Mechanical breaks caused by drilling or handling *should not* be included in the discontinuity spacing evaluation, and should be identified on the core by marking an **"X"** across the mechanical breaks.

Exhibit 3.1–A DISCONTINUITY SPACING (INCLUDES JOINTS/FRACTURES, BEDDING, AND FAULTS)

Description	Spacing of Discontinuity
Extremely Widely Spaced	>20 feet (> 6 m)
Very Widely Spaced	~6 to 20 feet (2 to 6 m)
Widely Spaced	~2 to 6 feet (600 mm to 2 m)
Moderately Spaced	~8 inches to 2 feet (200 to 600 mm)
Closely Spaced	~2 to 8 inches (60 to 200 mm)
Very Closely Spaced	~3/4 to 2 inches (20 to 60 mm)
Extremely Closely Spaced	<3/4 inches (<20 mm)

3.2 DISCONTINUITY CONDITION

The surface properties of discontinuities, in terms of roughness, separation/gouge thickness, and wall hardness, affect the shear strength of the discontinuity. An assessment of the discontinuities within each core run should be made, and reported on the field logs in conformance with the descriptions and conditions in Exhibit 3.2–A.

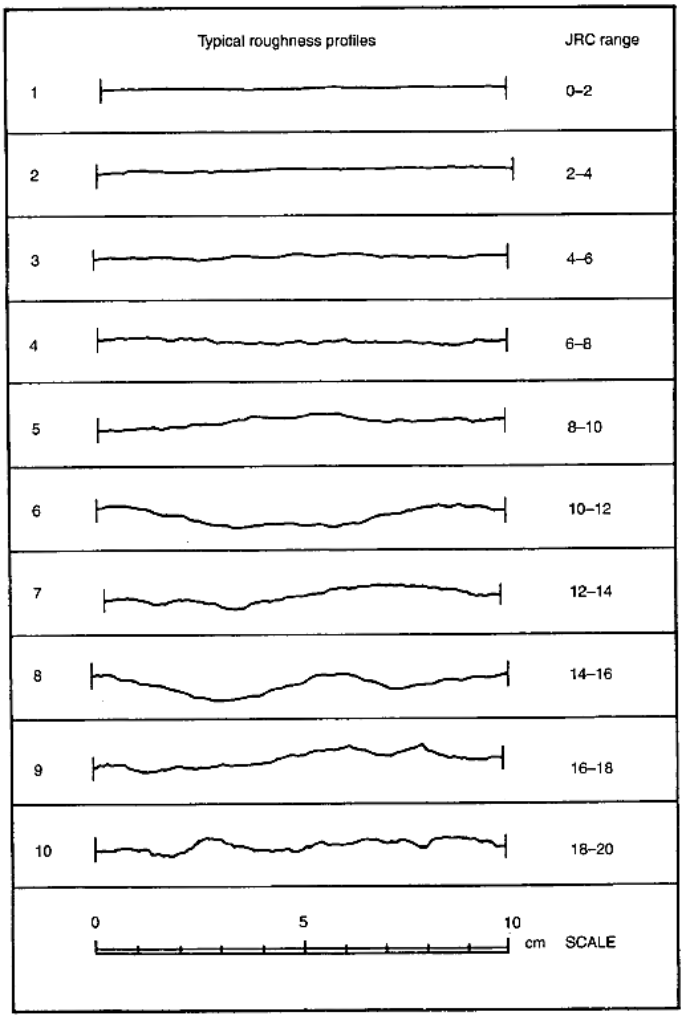
The discontinuity condition description in Exhibit 3.2–A contains three items: roughness, separation/infilling measurement, and discontinuity wall condition. The least favorable condition of these three descriptors should drive the selection of the discontinuity condition. For example, the condition of the discontinuity is very rough, the separation is greater than ~0.04 inches (1 mm), and has a hard discontinuity wall, so it would be characterized as in *"Fair Condition"* because the separation is the least favorable condition.

Exhibit 3.2–A DISCONTINUITY CONDITION (ISRM, 1978 & 1981)

Condition	Description
Excellent Condition	Very rough surfaces, no separation, hard discontinuity wall (>R2).
Good Condition	Slightly rough surfaces, separation less than ~0.04 inches (1 mm), hard discontinuity wall (>R2).
Fair Condition	Slightly rough surface, separation greater than ~0.04 inches (1 mm), soft discontinuity wall (<R3).
Poor Condition	Slickensided surfaces, or soft gouge less than ~0.2 inches (5 mm) thick, or open discontinuities between ~0.04 and 0.2 inches (1 to 5 mm).
Very Poor Condition	Soft gouge greater than ~0.2 inches (5 mm), or open discontinuities greater than ~0.2 inches (5 mm).

For estimating *discontinuity roughness*, use the roughness profiles in Exhibit 3.2–B to estimate the Joint Roughness Coefficient (JRC) from ISRM, 1978 in Exhibit 3.2-A. Generally, very rough discontinuity surfaces have JRC's greater than 10. To estimate *discontinuity wall hardness*, ISRM (1978 & 1981) suggests using the knife and geologic hammer rebound tests described in Exhibit 2.7-A for the relative strength of intact rock specimens.

Exhibit 3.2–B JRC RANGES (ISRM, 1978 & 1981)



3.3 ROCK CORE RECOVERY

Core recovery (CR) is defined as the ratio of core recovered to the run length expressed as a percentage. Therefore:

$$\boldsymbol{CR}\ (\%) = (\boldsymbol{Total\ Length\ of\ Core\ Recovered} \div \boldsymbol{Total\ Length\ of\ Core\ RunDrilled}) \times \mathbf{100}$$

These values should be recorded on the field logs for each core run.

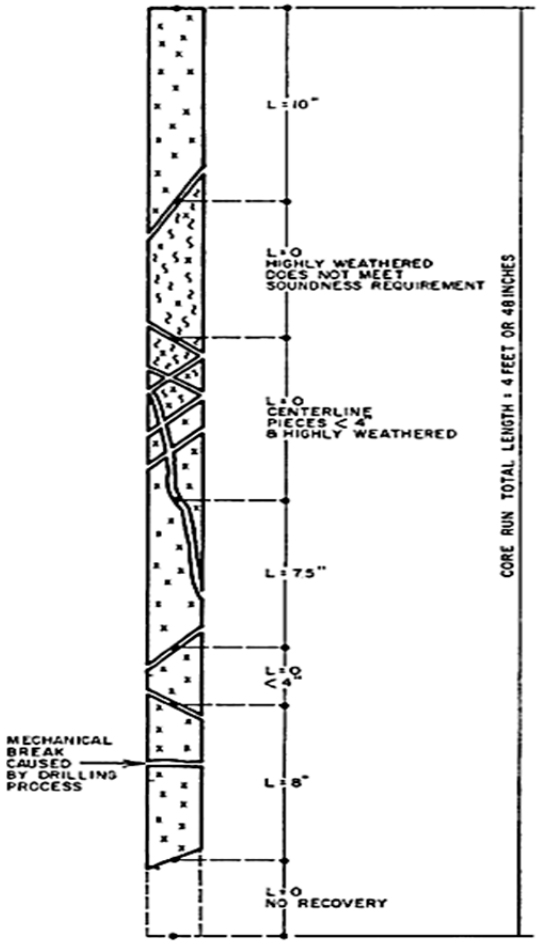
3.4 ROCK QUALITY DESIGNATION

The Rock Quality Designation (RQD) provides a subjective estimate of rock mass quality based on a modified core recovery percentage from a double or triple tube diamond core barrel. The RQD is defined as the percentage of "sound," intact rock core recovered in pieces of 4 inches (100 mm) or more in length through the length of a core run. The soundness of a piece of rock core is qualitative and is typically a measure of the degree of weathering or hydrothermal weathering of the intact pieces. ASTM defines sound core as any core that is fresh to moderately weathered and has sufficient strength to resist hand breakage. Lengths should be measured along the centerline of the core piece and in accordance with ASTM D 6032. Therefore:

$$\boldsymbol{RQD}\ (\%) = \left(\frac{\boldsymbol{Length\ of\ Sound\ Core\ in\ pieces > 4\ inches\ (100mm)}}{\boldsymbol{Total\ Length\ of\ Core\ Run}}\right) \times \mathbf{100}$$

Mechanical breaks caused by drilling or handling and lengths of core that are not "sound" should not be included in the RQD calculation. In addition, vertical fractures in the core <u>*should not*</u> be included in the RQD calculation. An example for measuring RQD is presented in Exhibit 3.4-A. It provides the hole logger with a good example for measuring and calculating RQD.

Exhibit 3.4-A MEASURING RQD (DEERE, 1989)



$$RQD = \frac{\sum \text{LENGTH OF SOUND CORE PIECES} > 4 \text{ INCHES (100mm)}}{\text{TOTAL CORE RUN LENGTH}}$$

$$RQD = \frac{10 + 7.5 + 8}{48} \times 100\%$$

RQD = 53% (FAIR)

RQD (ROCK QUALITY DESIGNATION)	DESCRIPTION OF ROCK QUALITY
0 - 25 %	VERY POOR
25 - 50 %	POOR
50 - 75 %	FAIR
75 - 90 %	GOOD
90 - 100%	EXCELLENT

3.5 FRACTURE FREQUENCY

Fracture frequency (FF) is defined as the number of *natural* fractures per unit length of core recovered. The fracture frequency is measured for each core run, and recorded on the field logs as fractures per foot (300 mm). Therefore,

$$FF = \frac{Number\ of\ natural\ fractures}{Total\ length\ of\ core\ recovered\ (feet)}$$

Mechanical breaks caused by drilling or handling *should not* be included in the fracture frequency count. In addition, vertical fractures in the core *should not* be utilized in the fracture frequency determination. ***If there are significant changes in natural fracture patterns or a change in materials within a core run, two fracture frequencies should be reported for the differing characteristics of the rock.***

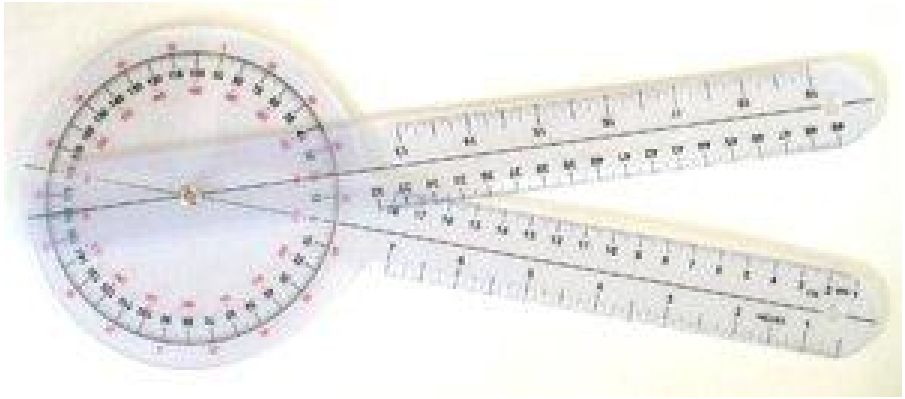
3.6 ROCK CORING TIME

The time it takes to core a run of rock, known as the rock coring time (RCT), can provide valuable information to the designer and contractor regarding penetration rates of the rock units with the drilling methods being utilized. Time for each coring run should be indicated on the field logs. Significant changes in penetration rate within a core run should be noted.

3.7 RANGE OF MAJOR DISCONTINUITY ORIENTATIONS

Major discontinuities; such as, bedding, flow boundaries, disconformities, joints and fractures, etc. should be noted in the logs. A goniometer, like the one shown in Exhibit 3.7-A, or a see-through compass should be used to measure the range of orientations of major discontinuities relative to an assumed horizontal plane.

Exhibit 3.7–A GONIOMETER



SECTION 4 – OTHER PROPERTIES

When applicable, use additional descriptors to describe specific geologic conditions encountered in the sample or non-soil material (i.e., slaking, voids, etc.). Guidelines for additional descriptors are provided in this Section. Do not include these additional descriptors unless they are relevant to the geology at the site.

4.1 SLAKING

Slaking is defined as the disintegration of a rock under conditions of wetting and drying, or when exposed to air. This behavior is related primarily to the chemical composition of the rock and is an *important intact rock property*. It can be identified in the field if samples shrink and crack, or otherwise degrade upon drying, or being exposed to air for several hours. If degradation of the rock sample occurs, and slaking is suspected; an air dried sample may be placed in clean water to observe a reaction. The greater the tendency for slaking the more rapid the reaction will be when immersed in water. This tendency should be expressed on the field logs as *"potential for slaking"*, and can be confirmed through laboratory testing.

4.2 VOIDS

Voids are an *important discontinuity property* to note in the field logs. They are defined as relatively large open spaces within the rock mass caused by chemical dissolution or the action of subterranean water within the rock mass. In addition, voids can be a result of subsurface mining activities. Voids, when encountered, should be recorded on the field logs. Attempts should be made to determine the size of the void by drilling action, water loss, etc.

4.3 LOSS OF CIRCULATION

Loss of coring fluid can indicate a major discontinuity, change in materials, or void in the drill hole. Note the depth, time, and approximate amount of fluid loss when the driller loses circulation of drilling fluids.

SECTION 5 – REFERENCES

Deere, D.U., 1989. RQD After Twenty Years. USACE Contract Report GL-89-1. Waterways Experiment Station, Vicksburg, MS. pp. 101.

Geologic Society of London. 1977. The description of rock masses for engineering purposes: report by the geological society engineering group working party: Quarterly Journal of Engineering Geology. Vol. 10, Great Britain. pp 355-388.

International Society for Rock Mechanics (ISRM). 1978. Commission on Standardization of Laboratory and Field Tests. Suggested Methods for the Quantitative Description of Discontinuities in Rock Masses, International Journal of Rock Mechanics, Minerals, Science, and Geomechanics Abstract. Vol. 15, pp 319-368.

ISRM, 1981 Committee on standardization of laboratory and field tests. Suggested Methods: Rock characterization testing, and monitoring. E.T. Brown, ed. Pergamon Press, London, Great Britian, pp 211.

Ulusay, R. and Hudson, J.A., 2007. The Complete ISRM Suggested Methods for Rock Characterization, Testing and Monitoring: 1974-2006. Compilation arranged by the ISRM Turkish National Group on behalf of ISRM (Ankara, Turkey). Printed by Kozan Offset Matbaacilik San. Ve Tic. Sti., Ankara, Turkey. pp 628.

United States Department of Transportation – Federal Highway Administration (USDOT-FHWA). November 1991. Rock and Mineral Identification for Engineers. Publication No. FHWA-HI-91-025. pp 50.

USDOT-FHWA, April 2002. Geotechnical Engineering Circular No. 5. Evaluation of Soil and Rock Properties. Publication No. FHWA-IF-02-034. pp 195-229.

Federal Lands Highway

Soil Description and Identification Guidelines

U.S. Department of Transportation

Federal Highway Administration

CONTENTS

SECTION 1 - INTRODUCTION

This guide outlines the standard practice for field identification of soil on Federal Lands Highway (FLH) projects. The intent of this guide is to produce consistent and uniform field descriptions for soil by FLH personnel and consultants working on FLH projects.

1.1 REFERENCED PROCEDURES

Soil identification, for engineering purposes, is based on the distribution and behavior of the fine-grained and coarse-grained soil constituents. In this guide, soil descriptions are based on modified procedures outlined in ASTM D 2488 - Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) and Publication No. FHWA NHI-01-031, Subsurface Investigations - Geotechnical Site Characterization Reference Manual (2002). It is important to distinguish that the soil descriptions described herein are based on *soil visual-manual identification* and differ from precise *soil classification* according to classification systems such as the Unified Soil Classification System (USCS) (ASTM D 2487) and the AASHTO Classification System (AASHTO M 145). The *visual-manual identification* utilizes visual observation and simple manual tests to identify the characteristics of the soil constituents whereas *soil classification* is based on prescribed laboratory tests to determine particle size characteristics, liquid limit, and plasticity index. After laboratory testing has been completed, USCS Group Symbols are added behind the group name to indicate that it is a *classification* in accordance with ASTM D 2487 based on the laboratory test results.

AASHTO *soil classifications* may be added to the boring log at the discretion of the project geotechnical engineer or engineering geologist. The AASHTO *soil classifications* are determined in accordance with AASHTO M 145 based on the results of prescribed laboratory tests.

1.2 BORING IDENTIFICATION

Identify each boring with an alphanumeric identification (Boring ID) that includes the two-digit year the boring was completed followed by a dash and then a two-digit boring number. Letters used in the Boring ID should either describe the boring type, instrumentation installed, or location of the boring. Use the same total number of digits in all boring identifications for each project.

The following abbreviations are recommended:

BH	Conventional boring	**MW**	Monitoring well/open standpipe
SG	Subgrade boring	**VW**	Vibrating wire piezometer
CP	Cone penetrometer test hole	**SI**	Slope inclinometer casing
PM	Pressuremeter test hole	**TD**	Time domain reflectometer
DT	Dilatometer test hole	**SA**	ShapeAccelArray

Example Boring IDs are listed and described below:

BH14-01 indicates boring number 1 drilled in 2014,

SG14-22 indicates subgrade boring number 22 drilled in 2014,

VW14-04 indicates boring number 4 drilled in 2014 with a vibrating wire piezometer installation,

SI14-22 indicates boring number 22 drilled in 2014 with slope inclinometer casing installation,

TD14-01 indicates boring number 1 drilled in 2014 with a time domain reflectometer installation.

1.3 STRATIFICATION

Describe the first sample in every stratum using a full description as described under Section 1.4 Order of Descriptors. On subsequent samples, list changes to any of the descriptors from the first sample in that layer, if applicable (e.g. **more boulders up to 3 feet and wet**).

Use a stratification line to separate adjacent layers on the field logs where the group name of the major constituent changes or where the geological origin of the material changes. Stratification lines may also be used if more than two of the descriptors change between samples.

A **solid** horizontal line is used when a stratigraphic change is observed within a sample. A **dashed** horizontal line is used when a change occurs between samples and it is not observed, or when the driller notes a change in drilling behavior between samples. Place the dashed line midway between samples if the location of the change is unknown by drilling behavior.

Indicate the thickness and type of groundcover encountered at the boring location. For example, the uppermost layer may be described as follows:

Asphalt Concrete (0.5 ft thick)
Topsoil (0.4 ft thick)
Duff/leaf litter (0.2 ft thick)
Aggregate Roadway Surfacing (0.5 ft thick)

For borings through paved surfaces, record asphalt concrete (AC) or Portland cement concrete (PCC) pavement thickness and base course thickness when present.

Geologic origin or unit may be added if the information is available from geologic maps or the unit can be easily identified based on known area geology. When samples are interpreted as fill materials, or the geologic origin or unit is known, note it at the end of the sample description, e.g., **Glacial lake deposit** or e.g., **Fill**. Do not include geologic origin or unit for fill material.

Groundwater observations must also be recorded on the boring logs. See Section 3.8 for guidance on recording groundwater, when encountered.

1.4 ORDER OF DESCRIPTORS

The protocol for field identification of soil is to describe the soil properties in the following order:

soil group NAME (main constituent in CAPS) **(USCS group symbol)** (when based on laboratory test results)**, consistency** (fine grained soils) or **apparent density** (coarse grained soils)**, color, moisture, particle size and angularity** (coarse grained soils)**, plasticity** (fine grained soils)**, structure**, **additional remarks** (performance of drill rig, HCL reaction, mica content, presence of cobbles/boulders, etc.)**. AASHTO classification** (when required)**. Geologic origin or unit** (when required)**.**

Some examples of this field logging protocol are as follows:

Well-graded GRAVEL (GW) with cobbles and boulders up to 14 inches, very dense, light brown, wet, fine to coarse, subrounded, homogeneous, drilling action indicates boulders encountered from 5 to 9 feet. A-1-a. Fill.

Sandy SILT (ML), loose, gray, moist, nonplastic, laminated horizontal layers of light and dark gray less than 1/8 inch thick, weak HCL reaction. A-4. Glacial lake deposit.

Fat CLAY, medium stiff, gray, wet, high plasticity, 1/16 inch lenses of fine sand every 6 to 12 inches. Glacial lake deposit.

Poorly-graded SAND (SP), loose to medium dense, brown, wet, medium to coarse, subrounded to subangular, homogeneous. Glacial outwash.

Silty SAND, very loose, gray, wet, fine, homogeneous, augers sunk 10 inches after disconnecting from drill head.

COBBLES and BOULDERS up to 3 feet in a silty sand matrix, wet, subrounded. Silty sand is medium dense, brown, wet, fine to medium. Driller remarks increased drilling resistance below 13 feet.

SECTION 2 - SOIL IDENTIFICATION

Soil identification is based on the portion of the soil sample that will pass a 3-inch (75 mm) sieve.

Fines are defined as soil particles that pass a No. 200 sieve (0.075 mm opening), i.e., silt and clay sized particles.

The first step in identifying soils is to categorize the sample into one of the two broad categories listed below:

- **Coarse Grained Soils**: Soils that contain *less than 50% fines*. These soils are composed primarily of sand and gravel. See Subsection 2.1.

- **Fine Grained Soils**: Soils that contain *50% or more fines*. These soils are composed primarily of silt and clay. See Subsection 2.2.

Peat is a highly organic soil that does not fall into either of the categories listed above. Peat is material composed primarily of vegetative tissue in various stages of decomposition that has a fibrous to amorphous texture, dark brown to black color, a spongy consistency, and an organic odor. See Subsection 2.3 for guidance on describing peat.

Soil identification does not take into account the presence of cobbles and boulders (plus 3 inch material) within the soil mass. See Subsection 2.4 for guidance on describing layers with cobbles and/or boulders.

2.1 COARSE-GRAINED SOILS – GRAVEL & SAND (<50% FINES)

Coarse-grained soils have less than 50% fines. Coarse-grained soils are identified by estimating the percentages of gravel, sand, and fines, and determining the characteristics of the fine-grained material. The particle sizes of gravel, sand, and fines are defined in Exhibit 2.1-A.

Exhibit 2.1-A PARTICLE SIZE DEFINITIONS FOR GRAVEL, SAND, AND FINES

Component	Grain Size Limits
Gravel	#4 to 3-inch Sieve (4.75 mm to 75 mm opening)
Sand	#200 to #4 Sieve (0.075 mm to 4.75 mm opening)
Fines	Smaller than #200 Sieve (0.075 mm opening)

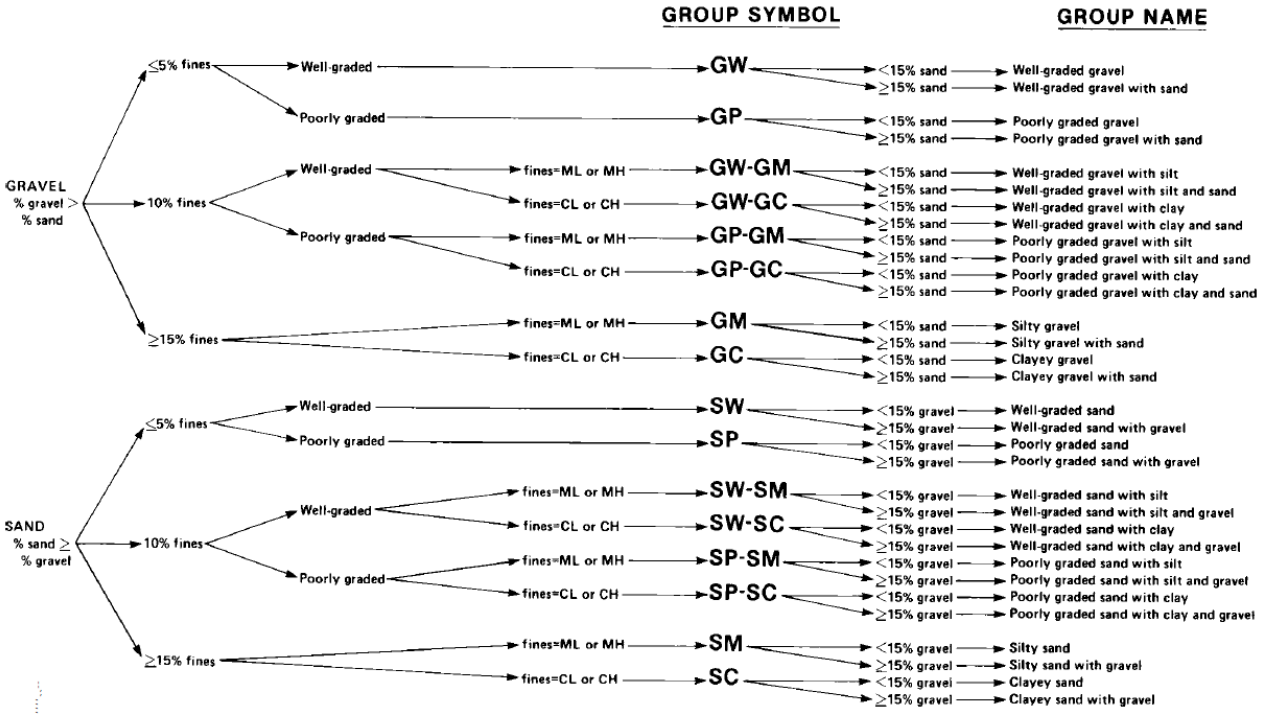
The percentage of fines in the soil should be estimated as: *5% or less*, *10%*, or *15% or more.* Exhibit 2.2.1-A in Subsection 2.2.1 can be used to identify the soil group of the fines.

Identify coarse grained soil as *well-graded* if it has a wide range of particle sizes and substantial amounts of the intermediate particle sizes. Identify coarse grained soil as *poorly graded* if it

contains predominantly one size (uniformly graded) or if it has a wide range of sizes with some intermediate sizes obviously missing (gap graded).

Once the major component is identified, use the flow chart in Exhibit 2.1-B to determine the soil group name.

Exhibit 2.1-B FLOW CHART FOR IDENTIFICATION OF COARSE-GRAINED SOIL (AFTER ASTM D 2488)



2.2 FINE-GRAINED SOIL – SILT & CLAY (≥ 50% FINES)

Fine grained soils have 50% or more fines. Identify inorganic fine-grained soil according to Subsection 2.2.1. If there is enough organic content in the soil to influence the soil properties, identify the soil as organic fine-grained soil according to Subsection 2.2.2.

2.2.1 INORGANIC FINE-GRAINED SOIL

Fine-grained soils are separated into four basic groups based on physical characteristics of dry strength, dilatancy, and toughness. These physical characteristics are summarized in Exhibit 2.2.1-A. Field index tests can be performed on a representative handful-sized sample consisting of material smaller than the No. 40 sieve to determine physical characteristics of fine-grained soil. The field index tests outlined in Exhibit 2.2.1-B should be performed for each soil unit encountered. When describing and identifying similar soil samples, it is generally not necessary to follow all of the procedures for field index testing as outlined in Exhibit 2.2.1-B.

Exhibit 2.2.1-A FIELD IDENTIFICATION OF INORGANIC FINE-GRAINED SOIL

Soil Group	Dry Strength	Dilatancy	Toughness
SILT (ML)	None to Low	Slow to Rapid	Low or thread cannot be formed
elastic SILT (MH)	Low to Medium	None to Slow	Low to Medium
lean CLAY (CL)	Medium to High	None to Slow	Medium
fat CLAY (CH)	High to Very High	None	High

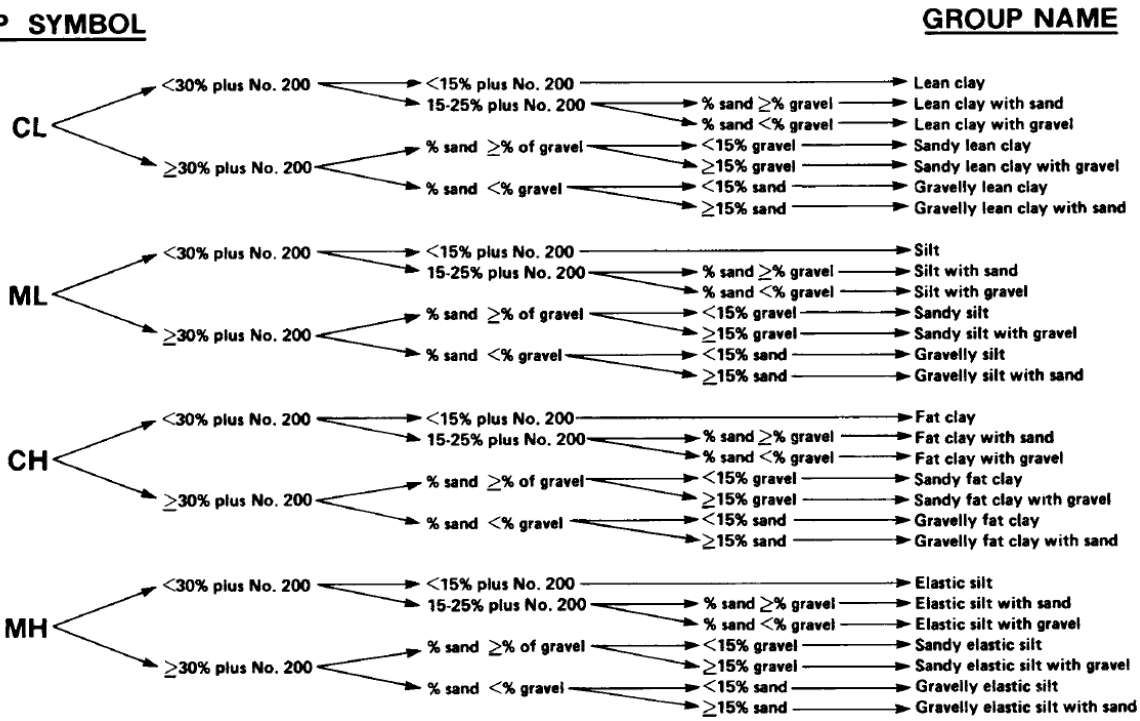
Exhibit 2.2.1-B FIELD METHODS TO IDENTIFY INORGANIC FINE-GRAINED SOILS (AFTER ASTM D 2488)

FIELD TEST **Field Test Procedure** **Description**	**Criteria**
DRY STRENGTH *Field Test Procedure:* From the sample select enough of the specimen to mold a 1-inch diameter ball. Mold the material until it has the consistency of putty, adding water as necessary. Make at least three specimens about ½ inch (13 mm) in diameter. All the specimens to dry in air, sunlight or other means at temperatures below 140°F (60°C). Test the dry strength of the balls by crushing between the thumb and forefinger.	
No dry strength	The dry specimen crumbles into powder with mere pressure of handling.
Low dry strength	The dry specimen crumbles into powder with some finger pressure.
Medium dry strength	The specimen breaks into pieces or crumbles with considerable finger pressure.
High dry strength	The specimen cannot be broken with finger pressure, but will break into pieces when pressed between the thumb and a hard surface.
Very high dry strength	The specimen cannot be broken between the thumb and a hard surface.
DILATANCY *Field Test Procedure:* Select enough material from the sample to mold a ball about ½ inch in diameter. Mold the material, adding water as needed, until it has a soft but not sticky consistency. Smooth the ball onto the palm of the hand with a soil knife or spatula. Shake the specimen horizontally striking the side of the hand vigorously against the other hand multiple times. Note the reaction of water appearing on the surface of the soil (dilatancy sheen). Squeeze the sample by closing the hand or pinching the soil between the fingers, and observe disappearance of sheen.	
No dilatancy	No visible change in the specimen.
Slow dilatancy	Water appears slowly on the surface of the specimen during shaking and does not disappear or disappears slowly upon squeezing.
Rapid dilatancy	Water appears quickly on the surface of the specimen during shaking and disappears quickly upon squeezing.

FIELD TEST **Field Test Procedure** **Description**	**Criteria**
TOUGHNESS AND PLASTICITY *Field Test Procedure:* Following completion of the dilatancy test, the specimen is shaped into an elongated pat and rolled by hand on a smooth surface or between the palms into a thread about 1/8 inch in diameter. The specimen should be repeatedly folded back together into a ball and rerolled until the thread crumbles when it reaches a diameter of 1/8 inch - this is near the soil plastic limit. Note the pressure required to roll the thread and the strength of the thread. After reaching the plastic limit, lump the pieces of thread back together and knead until the lump crumbles. Note the toughness of the material during kneading.	
Low toughness	Only slight pressure is required to roll the thread near the plastic limit. The thread and the lump are weak and soft.
Medium toughness	Medium pressure is required to roll the thread to near the plastic limit. The thread and the lump have medium stiffness.
High toughness	Considerable pressure is required to roll the thread to near the plastic limit. The thread and the lump have very high stiffness.
Nonplastic	1/8-inch (3-mm) diameter thread cannot be rolled at any water content.
Low plasticity	The thread can barely be rolled and the lump cannot be formed when drier than the plastic limit.
Medium plasticity	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching plastic limit. The lump crumbles when drier than the plastic limit.
High plasticity	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

Once the soil group has been determined, estimate the percentages of sand and gravel contained in the field sample to the nearest 5% (by weight) and use the flow chart in Exhibit 2.2.1-C to determine the soil group name.

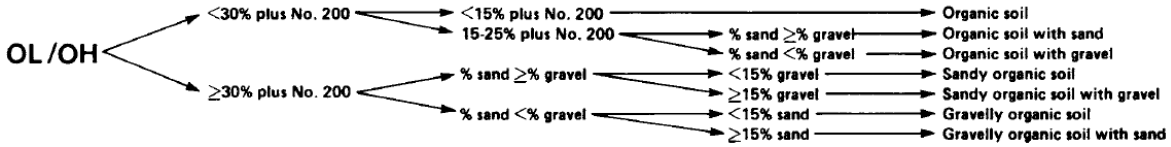
Exhibit 2.2.1-C FLOW CHART FOR IDENTIFICATION OF INORGANIC FINE-GRAINED SOIL (AFTER ASTM D 2488)



2.2.2 ORGANIC FINE-GRAINED SOIL

If the soil has more than 50% fines and contains enough organic particles to influence the soil properties, identify it as an organic fine-grained soil. Organic soils usually have a dark brown to black color and may have an organic odor. Often, organic soils will change colors, for example from black to brown, when exposed to the air. Organic soils will not have a high toughness or plasticity. The thread for the toughness test will be spongy. It will be difficult to differentiate between organic silt and organic clay. Once it has been determined that the soil is an organic fine-grained soil, estimate the percentage of fines, sand, and gravel in the field sample using the same procedures as for inorganic fine-grained soil. Then use the flow chart in Exhibit 2.2.2-A (from ASTM D 2488) to determine the soil group name.

Exhibit 2.2.2–A FLOW CHART FOR IDENTIFICATION OF ORGANIC FINE-GRAINED SOIL (AFTER ASTM D 2488)



2.3 PEAT

Soils that are composed primarily of vegetative tissue in various stages of decomposition that have a fibrous to amorphous texture, usually are dark brown to black, spongy consistency, and have distinctive organic odor are designated as a highly organic soil called peat. Peat is not subjected to any further identification procedures. Include color, moisture, odor, and any other relevant descriptors in the descriptive information for the sample.

2.4 COBBLES AND BOULDERS

Soil identification is based on the minus 3-inch material and therefore does not take into account the presence of cobbles and boulders within the soil mass. Cobbles and boulders are defined as follows:

- **Cobbles** – particles of rock that will pass a 12-inch (300 mm) square opening and be retained on a 3-inch (75 mm) sieve

- **Boulders** – particles of rock that will not pass a 12-inch (300 mm) square opening.

When cobbles and/or boulders are detected, either visually within a test pit or indicated by drilling action or core recovery, report it on the field logs with the maximum dimension indicated.

Cobbles and/or boulders may be listed as the main soil constituent if the layer consists primarily of cobbles and/or boulders. An example description of the main constituents follows:

COBBLES and BOULDERS up to 3 feet in a silty sand matrix

When cobbles and/or boulders are not the main constituent in the layer, report it on the field logs following the main soil constituents. Indicate the maximum dimension of boulders encountered. Add notes at the end of the description indicating the depths where cobbles and boulders are encountered.

Descriptors to be used include:

with cobbles - when only cobbles are present

with boulders up to xx inches/feet - when only boulders are present

with cobbles and boulders up to xx inches/feet - when both cobbles and boulders are present.

SECTION 3 - SOIL DESCRIPTORS

3.1 APPARENT DENSITY AND CONSISTENCY

The standard penetration test (SPT) is an in-situ field test (ASTM D 1586) that is widely used to approximate apparent density of cohesionless soil and consistency of cohesive soil. Use Exhibits 3.1-A and 3.1-B to describe apparent density or consistency, respectively, based on the uncorrected "standard penetration resistance" or "N-value".

The standard penetration tests consists of driving a 2-inch (50 mm) outside diameter split barrel sampler below the bottom of the borehole using a 140 pound (623 N) hammer with a 30-inch (760 mm) drop. The sampler is driven a total of 18 inches (450 mm) and the number of blows is recorded for each 6-inch (150 mm) increment. The first increment is recorded as a "seating drive" of the sampler, and the sum of the number of blows required to advance the second and third increments is the "standard penetration resistance" or the "N-value" reported in blows per foot.

ASTM D 1586 indicates refusal if one of the following occurs:

1) A total of 50 blows is applied during any one of the 6-inch increments,
2) A total of 100 blows has been applied, or
3) There is no observed advance of the sampler during application of 10 successive blows of the hammer.

If the sampler sinks under the weight of the rods, or the weight of the rods and the hammer, record the depth of penetration and drive the sampler through the rest of the test interval. Record the blow count as either weight of rods (WR) or weight of hammer (WH).

The type of hammer used to drive the sampler (e.g. automatic trip hammer, cathead and safety hammer, cathead and donut hammer) should be recorded on the boring log. Also record the use of non-standard samplers (e.g. 3 inch (75 mm) split barrel samplers) on the boring log. In U.S. practice, it is normal to omit the inside liner in the standard 2-inch O.D. split-barrel sampler. Therefore, in the case that liners are used it must be noted on the boring log.

Exhibit 3.1-A APPARENT DENSITY

Apparent Density of Coarse Grained Soil (Gravel and Sand)	
SPT N-value (blows per foot)	**Apparent Density**
0 to 4	Very Loose
5 to 10	Loose
11 to 30	Medium Dense
31 to 50	Dense
> 50	Very Dense

Exhibit 3.1-B CONSISTENCY

Consistency of Fine Grained Soil (Silt and Clay)	
SPT N-value (blows per foot)	**Consistency**
0 to 1	Very Soft
2 to 4	Soft
5 to 8	Firm
9 to 15	Stiff
16 to 30	Very Stiff

3.2 COLOR

Soil color is not a specific engineering property, but may be an indicator of other significant geologic processes that may be occurring within the soil mass. Color may also aid in the subsurface correlation of soil units. Soil color should be determined in the field at the natural moisture content. Use basic color descriptions (i.e., **brown, gray, black, green, white, yellow, red**, etc.). Describe mixed colors by using a dash between the two basic colors (e.g., **gray-green)**. Describe different shades or tints of basic colors by adding the terms **light** or **dark** in front of the basic color, for example, **light brown**.

Use Munsell color descriptions only when specified for a particular project.

The term **mottled** can be used to describe soil marked with spots of color; usually a result of the groundwater table rising and lowering in the soil column, causing reduction and oxidation of minerals in the soil. When using the term mottled, a color should be added to the description (e.g. **mottled orange-red**). The term **streaked** can be used to describe soils with a homogeneous texture but having color patterns which change and are not considered mottled.

3.3 MOISTURE

Make a visual estimation of the relative moisture content of the soil during the field identification. Describe the field moisture content of the soil based on the criteria outlined in Exhibit 3.3-A.

Exhibit 3.3-A CRITERIA FOR DESCRIBING MOISTURE CONDITION

Moisture Description	Criteria
Dry	Absence of moisture; dusty; dry to the touch
Moist	Damp but no visible water
Wet	Visible free water

3.4 PARTICLE SIZE AND ANGULARITY (COARSE-GRAINED SOIL)

For coarse-grained soil (i.e., sand, gravel, cobbles and boulders) as the main constituent, include descriptors of particle size and angularity in the field description.

Conform to the field description of particle size of coarse-grained soil outlined in Exhibit 3.4-A. The coarse-grained soil identification does not take into account the presence of cobbles and boulders within the soil mass, which are often encountered in coarse-grained soil deposits. See Subsection 2.4 for guidance on describing cobbles and boulders. A range of grain size descriptors may be used when appropriate (e.g. **fine to medium**).

Exhibit 3.4-A PARTICLE SIZE DEFINITION FOR COARSE GRAINED SOILS

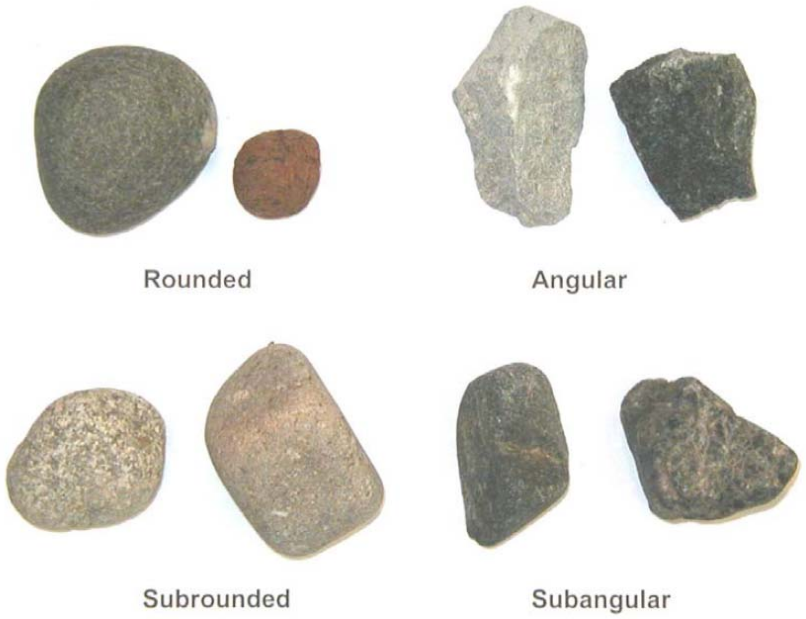
Component	Grain Size Limits
GRAVEL	
Coarse Gravel	¾ – 3” (19 – 75 mm)
Fine Gravel	#4 Sieve – ¾” (4.75 – 19 mm)
SAND	
Coarse Sand	#10 – #4 Sieve (2.00 – 4.75 mm)
Medium Sand	#40 – #10 Sieve (0.425 – 2.00 mm)
Fine Sand	#200 – #40 Sieve (0.075 – 0.425 mm)

Conform to the criteria as outlined in Exhibit 3.4-B and shown in Exhibit 3.4-C for the field description of angularity of the coarse sized particles of a soil (boulders, cobbles, gravel, and coarse sand). A range of angularity descriptors may be used when appropriate (e.g. **subrounded to rounded***)*.

Exhibit 3.4-B CRITERIA FOR THE FIELD DESRIPTION OF ANGULARITY (AFTER ASTM D 2488).

Description	Criteria
Angular	Coarse grained particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular	Coarse grained particles are similar to angular description but have rounded edges
Subrounded	Coarse grained particles have nearly plane sides but have well rounded corners and edges
Rounded	Coarse grained particles have smoothly curved sides and no edges

Exhibit 3.4-C ANGULARITY EXAMPLES (AFTER ASTM D 2488)



3.5 PLASTICITY (FINE-GRAINED SOIL)

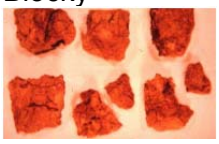
Plasticity is an important index property of soil and should be included in the description of all fine-grained soil. The range of the plasticity index can be estimated by using the results of the toughness test (ASTM D 2488) as outlined in Exhibit 2.2.1-B.

3.6 STRUCTURE

Soil often contains depositional or physical features that are referred to as soil structure. These features should be described following the criteria as outlined in Exhibit 3.6-A.

Exhibit 3.6-A CRITERIA FOR DESCRIBING SOIL STRUCTURE

Description	Criteria
Stratified 	Alternating layers of varying material or color with layers at least 0.25 inch (6 mm) thick; note thickness and inclination.
Laminated* 	Alternating layers of varying material or color with layers less than 0.25 inch (6 mm) thick; note thickness and inclination.

Description	Criteria
Fissured* 	Breaks along definite planes of fracture with little resistance to fracturing.
Slickensided* 	Fracture planes appear polished or glossy, sometimes striated.
Blocky* 	Cohesive soil that can be broken down into smaller angular lumps which resists further breakdown.
Disrupted 	Soil structure is broken and mixed. Infers that material has moved substantially - landslide debris.
Homogeneous 	Same color and appearance throughout.
Lensed 	Inclusion of small pockets of different soil, such as small lenses of sand scattered through a mass of clay; note thickness

**Note: Do not use laminated, fissured, slickensided, or blocky for coarse-grained soils.*

3.7 OTHER DESCRIPTORS

When applicable, use additional descriptors to describe specific geologic conditions encountered in the sample or non-soil material (i.e., HCl reaction, cementation, mica, gypsum, surface coatings on coarse-grained particles, roots, root holes, odor, etc.). Guidelines for additional descriptors are provided in this Section. Do not include these additional descriptors unless they are relevant to the geology at the site. Include remarks on the performance of the drill or comments made by the driller when the conditions change between samples as described in Subsection 3.7.5.

3.7.1 HCl REACTION

HCl reaction should be tested when the soil may contain carbonate minerals. Calcium carbonate is a common cementing agent in soil. To test for the presence of acidic reaction, the soil sample should be tested with dilute (3% to 10%) HCl. Report the reaction of the soil sample with HCl in accordance with the criteria outlined in Exhibit 3.7.1-A. Only include a description of the soil reaction to HCL when the sample has been tested.

Exhibit 3.7.1-A SOIL REACTION TO HYDROCHLORIC ACID

HCl Reaction Description	Criteria
No HCl Reaction	No visible reaction
Weak HCl Reaction	Some reaction with bubbles forming slowly
Strong HCl Reaction	Violent reaction with bubbles forming immediately

3.7.2 CEMENTATION

If the soil particles are cemented, report the cementation of the soil sample in accordance with the criteria outlined in Exhibit 3.7.2-A. Only include a description of the soil cementation if the sample is cemented; however, it may be appropriate to indicate **no cementation** if adjacent samples or other soil layers encountered on the site have cemented particles.

Exhibit 3.7.2-A SOIL CEMENTATION

Description	Criteria
Weak cementation	Sample crumbles or breaks with handling or little finger pressure
Moderate cementation	Sample crumbles or breaks with considerable finger pressure
Strong cementation	Sample will not crumble or break with finger pressure

3.7.3 MICA CONTENT

Only include a description of the mica content if mica has been identified in the sample. Mica is common in residual soils and it has been found to affect compressibility and strength/stability, especially for cut slopes, and it also affects the compaction characteristics of fill/backfill. When the soil includes mica minerals, include one of the following expressions:

slightly micaceous – few shiny flakes

micaceous – common throughout the soil

highly micaceous – soil is almost all mica.

3.7.4 FROZEN SOIL

When frozen soil is encountered in areas that have seasonal frost penetration use the following expression:

frozen from xx to xx feet

When frozen soil is encountered in areas that have permafrost the project geotechnical engineer or engineering geologist may specify the use of ASTM D 4083 Description of Frozen Soils (Visual-Manual Procedure) for a systematic description of frozen soil and ice layers.

3.7.5 REMARKS

Include remarks on the performance of the drill or comments made by the driller when the conditions change between samples, such as water or fluid circulation, heaving sands, caving or sloughing of auger holes or test pits, difficulty in augering, etc.

Examples of additional remarks that may be included are:

driller remarks cobbles and boulders from 25 to 30 feet based on drill chatter

roots encountered from 1 to 4 feet

driller remarks more drilling resistance below 13 feet

driller remarks loss of water circulation from 18’ to 20’

3.8 GROUNDWATER OBSERVATIONS

Groundwater observations are not a specific soil sample descriptor; however, the water table is an important consideration in almost any type of geotechnical design and therefore, it should be sought out in any type of geotechnical investigation.

As a general rule of thumb, water levels and borehole cave-in depths should be checked and recorded in the remarks section of the log in the following cases, as applicable:

- when advancing the borehole after wet soil samples are encountered (e.g. **water level observed at 16 feet during drilling**).

- if borehole is stopped at the end of the work shift, and before resuming drilling (e.g. **water level observed at 17 feet and casing is at 20.5 feet at end of work shift on 9/2/15, water level observed at 16.5 feet before resuming drilling on 9/3/15**).

- after reaching the bottom of the borehole before pulling the augers/casing out of the ground (e.g. **water level observed at 18 feet upon completion of boring with augers in**).

- and after pulling the augers/casing out of the ground (e.g. **water level observed at 17.5 feet immediately after withdrawal of augers**).

- at a set time after completion of the hole (e.g. **water level observed at 15 feet 24 hours after withdrawal of augers**).

Generally, do not record water levels if drilling fluid is used to advance the hole.

Record the time and date that water level is measured.

SECTION 4 – REFERENCES

AASHTO M 145. 2004. Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes. American Association of State Highway and Transportation Officials. 8p.

ASTM D 1586. 2011. Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils. ASTM International. 9p.

ASTM D 2487. 2010. Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System). ASTM International. 12p.

ASTM D 2488. 2006. Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). ASTM International. 11p.

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USDOT-FHWA, 2002. Subsurface Investigations - Geotechnical Site Characterization Reference Manual, Publication No. FHWA NHI-01-031.