CITY OF CHICO

P.O. BOX 3420 CHICO, CA 95927-3420

PURCHASE ORDER / PAYMENT AUTHORIZATION / CLAIM

No. 141373

1. Date	2. Date Check Required	3. Quote/Bid Reference (Complete if applicable)	4. Preparing Dept/Off
October 23, 2020		☒ Per Agreement/Amendment Dated _____ ☐ Bid Quote Summary Attached ☐ Sole Source/Vendor Approval Attached ☐ Rotational Vendor	PWD/O&M/kg

5.	6. Budgeted (Attach Budget to Actual Report)	7. For Contractor's Retention Only:
☐ Annual Master ☒ Encumber ☐ Payment Authorization ☐ Confirming	☒ Budgeted ☐ Supplemental Appropriation No. _____ ☐ Approved Request for Over-Expenditure Attached	☐ Held by City ☐ Paid to Escrow Agent ☐ Paid to Contractor

8. DELIVER TO (Point of Delivery Destination)

City of Chico
PO Box 3420
Chico, CA 95927

REQUIRED DELIVERY DATE: _____

10. FUND(S) AND ACCOUNT(S) CHARGED:

9. VENDOR/CLAIMANT (Name and Address)

PEID NO. _____

NV5
48 Bellarmine Court, Suite 40
Chico, CA 95928

856-691-5400

11. ORDER / CLAIM (Subject to conditions in Section 13.)

QUANTITY ORDERED	UNIT	INV.	DESCRIPTION	PRICE PER UNIT	TOTAL PRICE
			PFAS INVESTIGATION. All work shall be in accordance with the provisions and requirements of the cited Professional Services Agreement (PSA). The Consultant shall be compensated for services rendered per Exhibit "C" of the cited PSA. Tasks 1, 2, 2a & 3 Not to Exceed $88,203.13 Additional Costs based on Rates in Exhibit C or by negotiated cost agreed to by both parties, but not to Exceed the total Annual Professional Services Budget. Invoice Number: _____ Date: _____ PFAS Investigation (_____) Description (14 Characters)		$ 88,203.13
				Subtotal	
				☐ Sales Tax ☐ Use Tax	
				TOTAL ⇨	$ 88,203.13

ATTENTION VENDOR: Mail your invoice with this Purchase Order Number noted thereon to FINANCE OFFICE, P.O. Box 3420, Chico, CA 95927-3420. Unless otherwise stated, ALL PRICES ARE FOB POINT OF DELIVERY, AS SPECIFIED IN SECTION 8, ABOVE. NO EXCEPTIONS.

12. Approvals

A. Claimant (Authorized Signature)	B. Dept. Head (Authorized Signature)	C. City Manager (Authorized Signature)
	[signature]	Mark Orme

13. NOTICE TO VENDOR

ACCEPTANCE OF THIS ORDER/CLAIM BY VENDOR/CLAIMANT NAMED HEREON CONSTITUTES VENDOR'S/CLAIMANT'S AGREEMENT TO AND ACCEPTANCE OF THE FOLLOWING LISTED CONDITIONS.

1. Claimant (Section 12A) certifies that upon claimant's personal knowledge the items and amounts set forth are true and correct, that no part thereof has been paid by the City of Chico, and that the amount claimed is justly due.
2. Void unless signed by City Manager or the authorized representative in Section 12C, above. Changes of any kind from items specified in Section 11, above, are not authorized unless approved in writing by City Manager prior to shipping.
3. Invoices must reflect only those items stipulated in Section 11, above, which have been shipped. Payment will not be made by City of Chico until goods or services ordered have been satisfactorily received. Back ordered items may not be billed on invoice. Invoices must be rendered no later than date of shipment. Invoices must reflect Purchase Order Number appearing on this Order. All goods, material, and supplies delivered must clearly indicate Purchase Order Number on outside of package.
4. Payment will be made with approval from receiving department for items received/services rendered within 30 days of receipt of invoice or as specified by contract.
5. The City Manager reserves the right to cancel from this order any or all item(s) not delivered by the delivery date specified in Section 8, above, unless written notice of vendor's inability to comply with the requirement is forwarded to and accepted by the City Manager.
6. Unless otherwise stated, all prices are F.O.B. point of delivery as specified in Section 8, above.
7. The City of Chico reserves the right to reject any or all item(s) delivered which do not conform to specifications reflected above or which have been damaged in transit. Such goods will be returned at sole risk, cost, and expense of vendor.

FORM REV. 1/03

VENDOR / CLAIMANT COPY

CITY OF CHICO - PROFESSIONAL SERVICES AGREEMENT

NV5
Consultant

PFAS INVESTIGATION
Project Title

856-691-5400
Budget Account Number

TABLE OF CONTENTS

THIS PROFESSIONAL SERVICES AGREEMENT (Agreement) is entered into on October 26, 2020, between the City of Chico, a municipal corporation under the laws of the State of California, (City) and NV5, a California corporation, (Consultant).

SECTION 1 - DESCRIPTION OF PROJECT

City desires to undertake that certain project (Project) described in EXHIBIT A, entitled "DESCRIPTION OF PROJECT," and to engage Consultant to provide the required professional services relating to the Project.

SECTION 2 - SCOPE OF PROFESSIONAL SERVICES - BASIC; COMPLETION SCHEDULE

Consultant shall perform those basic professional services in connection with the Project as are set forth more particularly in EXHIBIT B, entitled "SCOPE OF PROFESSIONAL SERVICES - BASIC; COMPLETION SCHEDULE," and shall complete said professional services in accordance with the completion schedule for professional services as incorporated in EXHIBIT B.

SECTION 3 - SCOPE OF PROFESSIONAL SERVICES - ADDITIONAL; COMPLETION SCHEDULE

City and Consultant agree that it may be necessary, in connection with the Project, for Consultant to perform or secure the performance of professional services other than those set forth in EXHIBIT B. In each such instance, Consultant shall advise City, in advance and in writing, of the need for such additional professional services, their cost and the estimated time, if appropriate, required to perform them. Consultant shall not proceed to perform any such required additional professional service until City has determined that such professional service is beyond the scope of the basic professional service to be provided, is required, and has given its written

authorization to perform or obtain it. Each additional professional service so authorized shall constitute an amendment to this Agreement, shall be identified and sequentially numbered as "Amendment No. 1" and so forth, shall be subject to all of the provisions of this Agreement, and shall be incorporated into EXHIBIT B accordingly.

SECTION 4 - COMPENSATION

Consultant shall be compensated for professional services rendered to City pursuant to this Agreement periodically in the amounts, manner and in accordance with the payment schedule as set forth in EXHIBIT C, entitled "COMPENSATION." Amounts due to Consultant from City for professional service rendered shall be evidenced by the submission to City by Consultant of an invoice, prepared in a form satisfactory to City, setting forth the amount of compensation due for the period covered by it. Each such invoice shall be forwarded to City so as to reach it on or before the 15th day of the month next following the month or months, or other applicable period, for which the professional service invoiced were provided. All such invoices shall be in full accord with any and all applicable provisions of this Agreement. City will make payment on each such invoice within 30 days of receipt of it. However, if Consultant submits an invoice which is incorrect, incomplete, or not in accord with the provisions of this Agreement, then City shall not be obligated to process any payment to Consultant until a correct and complying invoice has been submitted.

SECTION 5 - RESPONSIBILITY OF CONSULTANT

By executing this Agreement, Consultant warrants to City that Consultant possesses, or will arrange to secure from others, all of the necessary professional capabilities, experience, resources and facilities necessary to provide to City the professional services under this Agreement. In procuring the professional services of others to assist Consultant in performing the professional services set forth at EXHIBIT B or additional professional services under SECTION 3 of this Agreement, Consultant shall not employ or otherwise obtain the professional services of any person or entity known to Consultant or City to have, or be likely to develop during the term of this Agreement, an interest that is personally, or professionally, or financially adverse to any interest of City. Consultant will follow the best current, generally accepted professional practices in performing tests and procedures, making findings, rendering opinions, preparing factual presentations and providing professional advice and recommendations regarding professional services rendered under this Agreement.

SECTION 6 - RESPONSIBILITY OF CITY

To the extent appropriate to the Project contemplated by this Agreement, City shall:

6.1 Assist Consultant by placing at Consultant's disposal all available information pertinent to the Project, including previous reports and any other data relative to design and construction of the Project.

6.2 Guarantee access to and make all provisions for Consultant to enter upon public and private property as required for Consultant to perform Consultant's professional services.

6.3 Examine all studies, reports, sketches, drawings, specifications, proposals, and other documents prepared and presented by Consultant, and render verbally or in writing as may be

appropriate, decisions pertaining thereto within a reasonable time so as not to delay the progress of the services by Consultant.

6.4 Designate in writing a person to act as City's representative with respect to the services to be performed under this Agreement. Such person shall have complete authority to transmit instructions, receive information, interpret and define City's policies and decisions with respect to materials, equipment, elements and systems pertinent to Consultant's professional services.

6.5 Give prompt written notice to Consultant whenever City observes or otherwise becomes aware of any defect in the Project.

6.6 Furnish approvals and permits from all governmental authorities having jurisdiction over the Project and such approvals and consents from others as may be necessary for completion of the Project.

SECTION 7 - INDEMNIFICATION

To the fullest extent permitted by law, Consultant shall defend (with counsel of City's choosing), indemnify and hold City, its officials, officers, employees, volunteers and agents free and harmless from any and all claims, demands, causes of action, costs, expenses, liability, loss, damage or injury of any kind, in law or equity, to property or persons, including wrongful death, in any manner arising out of, pertaining to, related to, or incident to any alleged acts, errors or omissions, or willful misconduct of Consultant, its officials, officers, employees, subcontractors, consultants or agents in connection with the services provided under this Agreement, including without limitation the payment of all consequential damages, expert witness fees and attorneys' fees and other related costs and expenses. Consultant shall reimburse City and its officials, officers, employees, agents, and/or volunteers, for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing the indemnity herein provided.

Consultant's responsibility for such defense and indemnity obligations shall survive the termination or completion of this Agreement for the full period of time allowed by law. The defense and indemnification obligations of this Agreement are undertaken in addition to, and shall not in any way be limited by, the insurance obligations contained in this Agreement. Consultant's obligation to indemnify shall not be restricted to insurance proceeds, if any, received by City, its directors, officials, officers, employees, agents, or volunteers. Consultant's obligation to indemnify, defend and hold harmless the City, its officers, employees and agents for claims involving "Professional Liability" claims involving acts, errors or omissions in the rendering of professional services (as defined in Civil Code section 2782.8(2), specifically, architects (Business & Professions Code section 5500), landscape architects (Business & Professions Code section 5615), professional engineers (Business & Professions Code section 6701), and professional land surveyors (Business & Professions Code section 8701)), shall be limited to the extent caused by Consultant's negligent acts, errors or omissions.

SECTION 8 - INSURANCE

Any requirements by City that Consultant carry general liability, errors and omissions, or any other type of insurance in connection with the services to be performed and/or professional services to be rendered by Consultant pursuant to this Agreement shall be as set forth in EXHIBIT

D, entitled "INSURANCE PROVISIONS."

SECTION 9 - GENERAL PROVISIONS

9.1 Access to Records

Consultant shall maintain all books, records, documents, accounting ledgers, and similar materials relating to services performed for City under this Agreement on file for at least four years following the date of final payment to Consultant by City. Any duly authorized representative(s) of City shall have access to such records for the purpose of inspection, audit and copying at reasonable times, during Consultant's usual and customary business hours. Consultant shall provide proper facilities to City's representative(s) for access and inspection. Consultant shall be entitled to reasonable compensation for time and expenses related to such access and inspection activities, which shall be considered to be an additional professional service to City, falling under the provisions of SECTION 3 of this Agreement.

9.2 Assignment

This Agreement is binding on the heirs, successors, and assigns of the parties hereto and shall not be assigned by either City or Consultant without the prior written consent of the other.

9.3 Changes to Scope of Services - Basic Professional Services

City may at any time, upon a minimum of 10 days written notice, modify the scope of basic professional services to be provided under this Agreement. Consultant shall, upon receipt of said notice, determine the impact on both time and compensation of such change in scope and notify City in writing. Upon agreement between City and Consultant as to the extent of said impacts to time and compensation, an amendment to this Agreement shall be prepared describing such changes. Execution of the amendment by City and Consultant shall constitute the Consultant's notice to proceed with the changed scope.

9.4 Compliance with Laws, Rules, Regulations

All professional services performed by Consultant pursuant to this Agreement shall be performed in accordance and full compliance with all applicable Federal, State, or City statutes, and any rules or regulations promulgated thereunder.

9.5 Conflict of Interest Code Applicability

If City's City Manager has determined that one or several of Consultant's Principal(s) or Project Manager(s) are subject to the provisions of Section 2R.04.180 of the Chico Municipal Code (the City's Conflict of Interest Code), then each such person will be required to comply with the provisions of said Code in connection with the professional services they render to the City under this Agreement. In such event, City's requirements are set forth in EXHIBIT E, entitled "CONFLICT OF INTEREST PROVISIONS," to this Agreement.

9.6 Exhibits Incorporated

All Exhibits attached to and referred to in this Agreement are hereby incorporated by this reference.

9.7 Independent Contractor

City and Consultant agree that the relationship between them created by this Agreement is that of an employer-independent contractor. Consultant shall be solely responsible for the conduct and control of the services performed under this Agreement. Consultant shall be free to render professional consulting services to others during the term of this Agreement, so long as such activities do not interfere with or diminish Consultant's ability to fulfill the obligations established herein to City.

9.8 Integration; Amendment

This Agreement represents the entire understanding of City and Consultant as to those matters contained herein. No prior oral or written understanding shall be of any force or effect with respect to those matters covered in it. This Agreement may not be modified or altered except by amendment in writing signed by both parties.

9.9 Jurisdiction

This Agreement shall be administered and interpreted under the laws of the State of California. Jurisdiction of litigation arising from this Agreement shall be in that state. If any part of this Agreement is found to be in conflict with applicable laws, such part shall be inoperative, null, and void insofar as it is in conflict with said laws, but the remainder of the Agreement shall continue to be in full force and effect.

9.10 Notice to Proceed; Progress; Completion

Upon execution of this Agreement by the parties, City shall give Consultant written notice to proceed with the services. Such notice may authorize Consultant to render all of the professional services contemplated herein, or such portions or phases as may be mutually agreed upon. In the latter event, City shall, in its sole discretion, issue subsequent notices from time to time regarding further portions or phases of the services. Upon receipt of such notices, Consultant shall diligently proceed with the services authorized and complete it within the agreed time period.

9.11 Ownership of Documents

Title to all documents, designs, drawings, specifications, and the like with respect to services performed under this Agreement shall vest with City at such time as City has compensated Consultant, as provided herein, for the professional services rendered by Consultant in connection with which they were prepared.

9.12 Subcontracts

Consultant shall be entitled, to the extent determined appropriate by Consultant, to subcontract any portion of the services to be performed under this Agreement. Consultant shall be responsible to City for the actions of persons and firms performing subcontract services. The subcontracting of services by Consultant shall not relieve Consultant, in any manner, of the obligations and requirements imposed upon Consultant by this Agreement.

9.13 Term; Termination

The term of this Agreement shall commence upon City's issuance to Consultant of a notice to proceed for all or a portion of the services, as hereinabove provided, and shall end upon

City's acceptance and payment for all or such portion of the services as was authorized by such notice, including any and all retentions. Notwithstanding the foregoing, City may, in its sole discretion, terminate this Agreement at any time and for any reason whatsoever by giving at least 10 days prior written notice of such termination to Consultant. In this latter event, Consultant shall be entitled to compensation for all professional service rendered and services performed for City to the date of such termination.

9.14 Notice

Any notices required to be given pursuant to this Agreement shall be deemed to have been given by their deposit, postage prepaid, in the United States Postal Service or, alternatively, by personal delivery or overnight courier service addressed to the parties as follows:

To City:	City Manager City of Chico P. O. Box 3420 Chico, CA 95927-3420	or	City Manager City of Chico 411 Main Street Chico, CA 95928
To Consultant:	NV5 48 Bellarmine Court, Suite 40 Chico, CA 95928		

SECTION 10 - SPECIAL PROVISIONS

This Agreement shall include all special provisions, if any, as are set forth on EXHIBIT F, entitled "SPECIAL PROVISIONS."

IN WITNESS WHEREOF, the parties hereto have executed this Agreement the date first set forth above.

CITY:

Mark Orme, City Manager*

*Authorized pursuant to Section 3.08.060 of the Chico Municipal Code

CONSULTANT:

By: Shane D. Cummings

Title: Associates

APPROVED AS TO FORM:

Andrew L. Jared, City Attorney*

*Pursuant to The Charter of the City of Chico, Section 906(D)

APPROVED AS TO CONTENT:

Erik Gustafson, Public Works Director - Operations and Maintenance

REVIEWED AS TO CONTENT:

Scott Dowell, Administrative Services Director*

*Reviewed by Finance and Information Systems

CITY OF CHICO - PROFESSIONAL SERVICES AGREEMENT

NV5
Consultant

PFAS INVESTIGATION
Project Title

856-691-5400
Budget Account Number

EXHIBIT A

DESCRIPTION OF PROJECT

On March 20, 2019, the State Water Resources Control Board (Water Board) issued Order WQ 2019-0005-DWQ, Water Code Section 13267 Order for the Determination of the Presence of Per- and Polyfluoroalkyl Substances (the Order) to 27 California airports certified for aqueous film-forming foam (AFFF) use, which includes Chico Municipal Airport (CMA). The Order required submittal of a work plan for preliminary investigation of potential per- and polyfluoroalkyl substances (PFAS) impacts on soil and groundwater that might have resulted from the use of AFFF containing PFAS. The City hired Jacobs Engineering Group to complete the work plan and provide the plan to the Central Valley Regional Water Quality Control Board, which was finalized and submitted in November 2019. (See Attachment C to Exhibit F hereto).

Chico Municipal Airport (PFAS) Preliminary Investigation Work Plan
For reference, see Attachment C to Exhibit F hereto for the Chico Municipal Airport (PFAS) Investigation Work Plan ("work plan") prepared by Jacobs Engineering Group, Inc. In the event of any contradictions between the requirements, processes or procedures called for under the scope of work in this agreement and the Investigation Work Plan in Attachment C, the requirements of Attachment C shall prevail.

The requirements of the work plan included the following, at a minimum:

- Identification of PFAS material storage, use, or potential release locations (including fire-fighting training or use areas, spills, and related areas). "Release locations" are interpreted to mean locations where AFFF containing PFAS was applied to pervious land.

- Identification of potential sensitive receptors within a 1-mile radius of the identified potential release locations. "Sensitive receptors" in this context include groundwater supply wells (municipal or private) and surface water bodies.

- A proposed subsurface investigation program to assess potential release locations, including soil and groundwater sampling and an acceptable sampling and analysis plan.

Therefore, the Consultant will provide services for the preliminary investigation of potential per- and polyfluoroalkyl substances (PFAS) impacts on soil and groundwater that might have resulted from the use of AFFF containing PFAS and report that information to the Central Valley Regional Water Quality Control Board consistent with such work plan. (Attachment C to Exhibit F hereto).

CITY OF CHICO - PROFESSIONAL SERVICES AGREEMENT

NV5
Consultant

PFAS INVESTIGATION
Project Title

856-691-5400
Budget Account Number

EXHIBIT B

SCOPE OF PROFESSIONAL SERVICES - BASIC; COMPLETION SCHEDULE

Scope of Professional Services - Basic

The Consultant shall provide professional services as follows consistent with the work plan provided in Attachment C to Exhibit F of this agreement:

Preliminary Investigation

The objectives of this preliminary investigation are as follows:

• Evaluate the potential for PFAS impacts on soil or groundwater at the three potential AFFF release locations identified by the City where further investigation was deemed warranted as follows:

AFFF Testing Area
1992 Airplane Crash
2007 Aircraft Fuel Spill

• Obtain data to provide a basis for decisions regarding further investigations, if necessary.

The subsurface investigation of the four potential release locations listed below will include a total of five hand auger or air knife locations, one soil boring, up to 14 soil samples (two per hand auger and 4 in the soil boring) one grab groundwater sample, and the sampling of nine existing groundwater monitoring and/or extraction wells as described below. Sample locations are presented in Figure 4 on Attachment C to Exhibit F hereto.

• *City Fire Station #3* – One groundwater sample will be collected from monitoring well BCV-16 downgradient of City Fire Station #3 (groundwater flow in the first water bearing zone [shallow aquifer] is to the southwest [Geocon, 2019]).

• *AFFF Testing Area* – A total of four groundwater samples will be collected from existing

groundwater monitoring and/or extraction wells (BCV-15, BCV-18, BCVE-1, and BCV-21) downgradient of the AFFF testing area. Additionally, a total of four hand auger borings will be advanced (air knife may be used to advance the borings past cobbles). Two soil samples will be collected at each location via hand auger. The first will be collected within the upper 2 feet. The second will be collected at either a lithologic interface where PFAS compounds may accumulate (such as sand/clay) or at a depth of 10 feet below ground surface (bgs), whichever is shallower.

• *1992 Airplane Crash* – One soil boring will be advanced at the potential release area. As many as four soil samples and one grab groundwater sample will be collected. Soil samples will be collected at the surface, at the water table, and at up to two locations between ground surface and the water table. Soil samples will be collected either equally spaced between ground surface and the water table or at lithologic interfaces where PFAS may accumulate. The locations will be selected once the entire soil core is available. The groundwater grab sample will be collected using a drive-ahead sampler. Additionally, one groundwater sample will be collected from existing first water bearing zone groundwater monitoring well BCV-26 downgradient of the 1992 airplane crash site.

• *2007 Aircraft Fuel Spill* – One hand auger or air knife boring will be advanced at this location. The hand auger or air knife location will be targeted at the location where the concrete is the most weathered and cracked. Although air knife may be used to advance the boring past cobbles, the two soil samples at this location will be collected via hand auger. The first will be collected within the upper 2 feet. The second will be collected at either a lithologic interface where PFAS compounds may accumulate (such as sand/clay) or at a depth of 10 feet below ground surface (bgs), whichever is shallower.

In addition to the activities described above, groundwater samples will be collected from existing first water bearing zone groundwater monitoring wells located upgradient of potential AFFF use/release areas identified in this evaluation. Upgradient monitoring wells BCV-8, BCV-6, and BCV-14 will be sampled to evaluate whether the shallow groundwater zone has been affected by industrial activities northeast of the potential AFFF use/release areas.

Pre-Field Activities

Prior to beginning sampling fieldwork, the following activities will be completed:

a. Health and Safety Plan

Prior to the start of fieldwork, a site-specific health and safety plan (HASP) will be prepared in accordance with Title 29, CFR, Part 1910.120 (29 CFR 1910.120). The HASP will evaluate potential onsite health and safety issues, and provide methods for mitigating identified hazards. A copy of the HASP will be maintained onsite and will be reviewed by field staff and subcontractors prior to beginning work.

b. Permitting

The Consultant will obtain drilling permits from the Butte County Environmental Health Department prior to the start of field activities. The project team will be available to escort representatives from Butte County onsite, if requested.

c. Utility Clearance

Underground utility clearance will be completed prior to the start of fieldwork. The sample locations will be marked in the field as presented in Figure 4 on Attachment C to Exhibit F hereto. Underground Service Alert (USA) will be notified at least 3 full working days in advance of any subsurface activity. Following clearance or input from USA, sample locations will be cleared using geophysical methods by a third-party utility location subcontractor to identify potential obstructions or utilities at sample locations; and locations will be modified as necessary.

d. Mobilization

Mobilization activities will include coordination with CMA staff, site preparation, movement of equipment and materials to the site, orientation of field personnel, and review of the HASP with field staff and subcontractors.

Sample Collection

The subsurface investigation includes the collection of groundwater samples from existing monitoring wells, collection of soil samples and one groundwater grab sample from a soil boring, and collection of soil samples via hand auger. The areas targeted for investigation are City Fire Station #3, the AFFF testing area, and the 1992 airplane crash site. Sample locations are presented in Figure 4 on Attachment C to Exhibit F hereto. The Sampling and Analysis Plan (SAP) that will guide the data collection effort and quality control for the project is included in Attachment C to Exhibit F hereto.

Soil samples at the AFFF testing area and the 2007 aircraft fuel spill area will be collected via hand auger within the upper 2 feet bgs and at either a lithologic interface where PFAS compounds may accumulate (such as sand/clay) or at a depth of 10 feet bgs, whichever is shallower.

The soil boring location at the 1992 airplane crash site will be hand cleared for utilities using an air knife to 5 feet bgs; the boring will be advanced using the appropriate drilling methodology to the first encountered groundwater. Soil and groundwater samples will be collected in accordance with the Water Board's March 20, 2019, *Per- and Polyfluoroalkyl Substances (PFAS) Sampling Guidelines* (see Attachment B). Groundwater is expected to be encountered at approximately 80 to 100 feet bgs. The soil samples will be collected at the surface, at the water table, and at up to two locations between ground surface and the water table. The grab groundwater sample will be collected from the boring using an appropriate PFAS-free pump. The boring will be continuously logged in general accordance with the ASTM D2488-00 *Standard Practice for Classification of Soils (Visual -Manual Procedure),* Unified Soil Classification System (USCS).

Existing groundwater monitoring wells will be sampled via a temporary, PFAS-free pump. The existing groundwater extraction well (BVCE-1) will be sampled with the currently installed pump. If elevated PFAS are detected, the City may opt to remove the dedicated pump and sample with PFAS-free equipment to confirm the results.

Quality control samples will be collected in accordance with the Water Board's March 20, 2019, *Per- and Polyfluoroalkyl Substances (PFAS) Sampling Guidelines.* Refer to the SAP in Attachment C to Exhibit F hereto for additional details.

Laboratory Analysis

Eurofins Test America Sacramento, a California Environmental Laboratory Accreditation Program certified laboratory, will provide PFAS-free sample bottles, chain of custody, custody seals, trip blanks, and PFAS-free deionized water for field and equipment blanks.

Soil and groundwater samples will be analyzed using the Department of Defense-certified laboratory Standard Operating Procedure WS-LC-0025, *Per- and Polyfluorinated Alkyl Substances (PFAS) in Water, Soils, Sediments and Tissue [Method 537 (Modified), Method PFAS by LCMSMS Compliant with QSM 5.1 Table B-15],* Rev. 3.7, Effective 8/13/2019 for all the required PFAS analytes listed in Table 2 on Attachment C to Exhibit F hereto and as many of the not-required analytes as possible. In addition, groundwater samples will be analyzed for total dissolved solids, chloride, carbonate, bicarbonate, nitrate-nitrogen, sulfate, calcium, magnesium, potassium, and sodium. After sample collection, all soil and groundwater samples will be placed in coolers and transported under chain of custody to Eurofins Test America.

Data Validation

Data will be validated according to Level III requirements, which will include review of the following: data set narrative, sample integrity field and laboratory quality control measurements, detection limits, corrective actions, and calibrations. For PFAS analysis, full, raw data review may be conducted if appropriate. The laboratory reporting requirements will be defined in a laboratory statement of work prior to sample collection and will include hardcopy and electronic deliverables. Following validation, a data quality evaluation report will be prepared to discuss data validation findings.

Site Restoration and Investigation-Derived Waste

Soil borings will be backfilled to the surface with a neat cement grout. The investigation-derived waste (IDW) generated during field activities, including soil and groundwater sampling, and decontamination of sampling equipment, will be containerized, sealed, properly labeled, and temporarily stored adjacent to the ground run-up enclosure. A composite soil and water sample will be collected from the IDW containers and analyzed (at a minimum) for VOCs (USEPA 8260B), Title 22 metals (USEPA 6010B/7471A), and total petroleum hydrocarbons (USEPA 8015M). Following receipt of analytical results, the IDW will be properly disposed of. The disposal contractor will also be provided sample results from the PFAS analytical suite.

Reporting

Results of this preliminary investigation will be summarized in a preliminary investigation report. The report will be signed by a California-licensed professional geologist or engineer.

The report will include the following:

- Description of field activities and methodologies used
- Summary of locations sampled
- Summary of analytical results
- Laboratory data reports and associated validation reports
- Updates to sensitive receptor information regarding nearby supply wells
- Deviations from this work plan
- Conclusions

Services to be Provided by City

The City will supply vendor badges to identify Consultants employees if needed at no cost to the Consultant. Consultants employees may need to take a Non-Movement Area test provided by the City. City staff will accompany Consultant and Consultants subcontractors in any area within the movement area.

Boring times will need to be coordinated with the Chico Airport Manager or designee and FAA Contract Control Tower and Consultant will be escorted by a City employee when on the City's Airport property movement area.

The City will provide Consultant a designated on-site location to temporarily store 55-gallon drums with investigation-derived waste (IDW).

The City will assist with coordination for shutting down pump operations prior to sampling the groundwater wells and will arrange for the City's existing monitoring contractor to be on-site.

Completion Schedule

The Consultant shall complete all services outlined herein in compliance with the following schedule:

1. Draft Report to the Central Valley Regional Water Quality Control Board by November 30, 2020.

2. Final Report to the Central Valley Regional Water Quality Control Board by February 8, 2021.

CITY OF CHICO - PROFESSIONAL SERVICES AGREEMENT

NV5
Consultant

PFAS INVESTIGATION
Project Title

856-691-5400
Budget Account Number

EXHIBIT C

COMPENSATION

Schedule of Rates:
Compensation for services shall be in accordance with the schedule of rates attached as page C-2, C-3, C-4 and C-5. Compensation shall be based upon actual work done according to Tasks 1, 2, 2a and 3.

Task 2a is optional. The City reserves the right to exercise that option, if needed.

Each invoice shall be forwarded to City so as to reach it on or before the 15th day of the month next following the month or months, or other applicable period, for which the professional service invoiced were provided.

City will make payment on each such invoice within 30 days of receipt of it. However, if Consultant submits an invoice which is incorrect, incomplete, or not in accord with the provisions of this Agreement, then City shall not be obligated to process any payment to Consultant until a correct and complying invoice has been submitted.

Additional Costs:
If additional costs are incurred outside of Task 1, 2, 2a and 3 on page C-2, C-3, C-4 and C-5, those costs will be based on the rates reflected on page C-2, C-3, C-4 and C-5 that are within the scope of this agreement.

If additional costs are incurred and rates are not reflected on page C-2, C-3, C-4 and C-5 but are within the scope of this agreement, the City and Consultant will negotiate a cost agreed to by both parties prior to any work done and document those agreed upon costs in writing.

NV5

PROJECT COST

JOB NAME:	City of Chico Municipal Airport PFAS Investigation	**PROPOSAL NO.:**	PC20.149	**PREPARED BY:**	HJC
DESCRIPTION:	Environmental Services			**DATE PREPARED:**	09/10/20
LOCATION:	150 Airpark Blvd, Chico, CA	**COST TYPE:**	Time and Materials	**FEE SCHEDULE:**	2020

Retainer Fee = $0.00

Grand Total = $88,203.13

DESCRIPTIONS				Task 1		Task 2		Task 3		Task 2a (Optional)		TOTALS
				Project Management		Field Work		Reporting		Resample Extraction Well		
				Subtask		Subtask		Subtask		Subtask		
				Project Coordination, HASP Status Reporting, meetings Permitting, Procurement		USA, Utility Loc Drilling, Sampling Water Source Smpling, IDW		Draft, Draft Final Final		Coordination Pull pump Sampling/Laboratory		
Subtotals				$3,544.50		$70,830.85		$9,872.00		$3,955.78		$88,203.13
PERSONNEL	**CODE**	**RATE ($)**	**UNIT**	**NO.**	**COST ($)**	**NO.**	**COST ($)**	**NO.**	**COST ($)**	**NO.**	**COST ($)**	**COST ($)**
Principal	PR	240.00	hr		0.00		0.00		0.00		0.00	0.00
Associate Eng/Geo	AE	175.00	hr	1.0	175.00		0.00		0.00		0.00	175.00
Senior Eng/Geo	SREG	169.00	hr		0.00	2.0	338.00	5.0	845.00	1.0	169.00	1,352.00
Project Eng/Geo	PEG	155.00	hr	10.0	1,550.00	18.0	2,790.00	15.0	2,325.00	2.0	310.00	6,975.00
Staff Eng/Geo	SFEG	135.00	hr		0.00		0.00		0.00		0.00	0.00
Assistant Eng/Geo	AEG	117.00	hr		0.00	20.0	2,340.00		0.00		0.00	2,340.00
Eng Tch III	TCH3	97.00	hr	16.0	1,552.00	90.0	8,730.00	60.0	5,820.00	10.0	970.00	17,072.00
AutoCAD	ACAD	100.00	hr		0.00		0.00	4.0	400.00		0.00	400.00
Tch Editor	TE	83.00	hr		0.00		0.00	4.0	332.00		0.00	332.00
Proj Assistant	PA	80.00	hr	2.0	160.00	4.0	320.00		0.00		0.00	480.00
PERSONNEL SUBTOTALS				29.0	$3,437.00	134.0	$14,518.00	88.0	$9,722.00	13.0	$1,449.00	$29,126.00
REIMBURSABLES	**MrkUP**	**RATE ($)**	**UNIT**	**NO.**	**COST ($)**	**NO.**	**COST ($)**	**NO.**	**COST ($)**	**NO.**	**COST ($)**	**COST ($)**
Mileage	1.00	0.65	mile	50.0	32.50	150.0	97.50		0.00	20.0	13.00	143.00
Field Supplies	1.00	50.00	day		0.00	6.0	300.00		0.00	1.0	50.00	350.00
Waterra pump	1.00	50.00	day		0.00	3.0	150.00		0.00	1.0	50.00	200.00
1" HDPE Tubing	1.00	1.00	foot		0.00	1,000	1,000.00		0.00	120.0	120.00	1,120.00
5/8" x 1/2" HDPE Tubing	1.00	0.45	foot		0.00	1,000	450.00		0.00	120.0	54.00	504.00
Water level meter	1.00	35.00	day		0.00	3.0	105.00		0.00	1.0	35.00	140.00
nitrile gloves	1.00	0.50	pr		0.00	70.0	35.00		0.00	8.0	4.00	39.00
boot covers	1.00	9.00	pr		0.00	10.0	90.00		0.00	2.0	18.00	108.00
Water Quality Meter	1.00	120.00	day		0.00	3.0	360.00		0.00	1.0	120.00	480.00
Butte County Env. Health Boring Permits	1.05	404.00	ea		0.00	1.0	424.20		0.00		0.00	424.20
Report Preparation and Postage	1.00	75.00	ea	1.0	75.00		0.00	2.0	150.00		0.00	225.00
Lab Sample Shipping (50 lbs) (included in Lab pricing)	1.00	150.00	ea		0.00	0.0	0.00		0.00	0.0	0.00	0.00
REIMBURSABLE SUBTOTALS					$107.50		$3,011.70		$150.00		$464.00	$3,733.20

NV5

PROJECT COST

JOB NAME:	City of Chico Municipal Airport PFAS Investigation	**PROPOSAL NO.:**	PC20.149	**PREPARED BY:**	HJC
DESCRIPTION:	Environmental Services			**DATE PREPARED:**	09/10/20
LOCATION:	150 Airpark Blvd, Chico, CA	**COST TYPE:**	Time and Materials	**FEE SCHEDULE:**	2020

DESCRIPTIONS				Task 1 Project Management		Task 2 Field Work		Task 3 Reporting		Task 2a (Optional) Resample Extraction Well		TOTALS
OUTSIDE SUBCONTRACTORS	**MrkUP**	**RATE ($)**	**UNIT**	**NO.**	**COST ($)**	**NO.**	**COST ($)**	**NO.**	**COST ($)**	**NO.**	**COST ($)**	**COST ($)**
Drilling (Cascade Drilling)	1.05	22310.00	LS		0.00	1.0	23,425.50		0.00		0.00	23,425.50
Laboratory (Pace Laboratory) - Soil/GW	1.05	13640.00	LS		0.00	1.0	14,322.00		0.00		0.00	14,322.00
Laboratory (Pace Laboratory) - City Water Supply	1.05	225.00	LS		0.00	1.0	236.25		0.00		0.00	236.25
Laboratory (Pace Laboratory) - Resample GWE	1.05	355.00	LS		0.00		0.00		0.00	1.0	372.75	372.75
Laboratory (Pace Laboratory) - IDW	1.05	595.00	LS		0.00	1.0	624.75		0.00		0.00	624.75
IDW Disposal (Clean Harbors)	1.05	8400.00	LS		0.00	1.0	8,820.00		0.00		0.00	8,820.00
Utility Locator (Foresite Engineering)	1.05	1200.00	LS		0.00	1.0	1,260.00		0.00		0.00	1,260.00
Surveyor (Roll Anderson Rolls)	1.05	1650.00	LS		0.00	1.0	1,732.50		0.00		0.00	1,732.50
Waterra Hydro Lift Pump Tubing Actuator (Eviro-Tech Services Co.)	1.05	110.60	day		0.00	3.0	346.50		0.00		0.00	346.50
Water Tank, towable (Herc Rentals)	1.05	153.00	day		0.00	3.0	481.95		0.00		0.00	481.95
3 KW generator (Herc Rentals)	1.05	43.00	day		0.00	3.0	151.20		0.00		0.00	151.20
55 gallon drums purge water (Cascade)	1.05	65.00	ea		0.00	6.0	409.50		0.00		0.00	409.50
Pull and replace GWE Pump (Nortstate Pump)	1.05	1555.00	LS		0.00		0.00		0.00	1.0	1,632.75	1,632.75
Level III Reporting (Pace Laboratory)	1.05	1420.00	LS		0.00	1.0	1,491.00		0.00	1.0	37.28	1,528.28
OUTSIDE SUBCONTRACTOR SUBTOTALS					$0.00		$53,301.15		$0.00		$2,042.78	$55,343.93
GRAND TOTALS					$3,544.50		$70,830.85		$9,872.00		$3,955.78	$88,203.13

NV5

Chemical Laboratory Testing Program

PROJECT NAME: City of Chico Municipal Airport PFAS Investigation
DESCRIPTION: Environmental Services
LOCATION: 150 Airpark Blvd, Chico, CA
Prpsl/Prjct No.: PC20.149
LAB QUOTE FROM: Pace Laboratory
COST TYPE: Time and Materials
PREPARED BY: HJC
DATE PREPARED: 09/10/20
FEE SCHEDULE: 2020

TASKS AND CHEM LAB TESTS	CHEMICAL TESTING PROGRAM																								COST		
	Soil		Groundwater							IDW							Extractions		Air		Others						
	EPA 537.1(MOD)	ASTM D2216-1	EPA 537.1	SM 2540C	EPA 300.0	EPA 300.1-1	EPA 300.0-1	SM 2320B	EPA 6010B	EPA 8260B-1	EPA 6010B-1	EPA 8015B	EPA 8260B-2	EPA 6010-4	EPA 8270	EPA 8082	CAC	EPA 1311	EPA TO15	EPA TO15	PFAS Free Water	Level III Rpt	NA	NA	NA	NA			
	PFAS 36 (soil)	% Moisture	PFAS 23 (soil)	TDS	Cl	NO3 as N	SO4	Alkalinity	Ca, Mg, K, Na	VOCs	CAM 17_Hg	DRO/MORO	GRO	Indvdl Mtls	Sm-VIII Orgnc Cmpnds	PCBs	STLC Extrctn	TCLP Extrctn	VIII Orgnc Cmpnds (Air)	VIII Orgnc Cmpnds (Air)	PFAS Free 4L	Level III Rpt	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Laboratory Cost	Mark-UP	Extended Cost
	$225	$0	$225	$20	$15	$25	$15	$20	$35	$75	$85	$45	$30	$20	$0	$0	$65	$75	$0	$0	$25	$0	$0	$0	$0	$0	($)	1.00	($)
Task 2																											Totals		
Soil	14	14																									$3,150	1.00	$3,150.00
Field Duplicate	2	2																									$450	1.00	$450.00
MS	1																										$225	1.00	$225.00
MSD	1																										$225	1.00	$225.00
Trip Blank	4																										$900	1.00	$900.00
Field Blank	4																										$900	1.00	$900.00
Equipment Blank	4																				5						$1,025	1.00	$1,025.00
																										Subtotal	$6,875	1.00	$6,875.00
Task 2																											Totals		
Groundwater			10	10	10	10	10	10	10																		$3,550	1.00	$3,550.00
Field Duplicate			1	1	1	1	1	1	1																		$355	1.00	$355.00
MS			1	1	1	1	1	1	1																		$355	1.00	$355.00
MSD			1	1	1	1	1	1	1																		$355	1.00	$355.00
Trip Blank			4																								$900	1.00	$900.00
Field Blank			3																								$675	1.00	$675.00
Equipment Blank			2																		5						$575	1.00	$575.00
																										Subtotal	$6,765	1.00	$6,765
Task 2																											Totals		
City Potable Water			1																								$225	1.00	$225.00
																										Subtotal	$225	1.00	$225
Task 2																											Totals		
IDW Soil										1	1	1	1	3			1										$360	1.00	$360.00
IDW Water										1	1	1	1														$235	1.00	$235.00
																										Subtotal	$595	1.00	$595

NV5

Chemical Laboratory Testing Program

PROJECT NAME: City of Chico Municipal Airport PFAS Investigation
Prpsl/Prjct No.: PC20.149
PREPARED BY: HJC
DESCRIPTION: Environmental Services
LAB QUOTE FROM: Pace Laboratory
DATE PREPARED: 09/10/20
LOCATION: 150 Airpark Blvd, Chico, CA
COST TYPE: Time and Materials
FEE SCHEDULE: 2020

TASKS AND CHEM LAB TESTS	CHEMICAL TESTING PROGRAM																								COST		
	Soil		Groundwater							IDW							Extractions		Air		Others						
	EPA 537.1(MOD)	ASTM D2216-1	EPA 537.1	SM 2540C	EPA 300.0	EPA 300.1-1	EPA 300.0-1	SM 2320B	EPA 6010B	EPA 8260B-1	EPA 6010B-1	EPA 8015B	EPA 8260B-2	EPA 6010-4	EPA 8270	EPA 8082	CAC	EPA 1311	EPA TO15	EPA TO15	PFAS Free Water	Level III Rpt	NA	NA	NA	NA			
	PFAS 36 (soil)	% Moisture	PFAS 23 (soil)	TDS	Cl	NO3 as N	SO4	Alkalinity	Ca, Mg, K, Na	VOCs	CAM 17_Hg	DRO/MORO	GRO	Indvdl Mls	Sm-Vltl Orgnc Cmpnds	PCBs	STLC Extrctn	TCLP Extrctn	Vltl Orgnc Cmpnds (Air)	Vltl Orgnc Cmpnds (Air)	PFAS Free 4L	Level III Rpt	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Laboratory Cost	Mark-UP	Extended Cost
	$225	$0	$225	$20	$15	$25	$15	$20	$35	$75	$85	$45	$30	$20	$0	$0	$65	$75	$0	$0	$25	$0	$0	$0	$0	$0	($)	1.00	($)
Task 2a																													
Resample GWE			1	1	1	1	1	1	1																		Totals		
																									Subtotal		$355	1.00	$355.00
TOTAL TESTS	30	16	24	14	14	14	14	14	14	2	2	2	2	3	0	0	1	0	0	0	10	0	0	0	0	0	$14,815	1.00	$14,815.00
TOTAL COSTS (No Mark-Up)	$6,750	$0	$5,400	$280	$210	$350	$210	$280	$490	$150	$170	$90	$60	$60	$0	$0	$65	$0	$0	$0	$250	$0	$0	$0	$0	$0	$14,815.00	1.00	$14,815.00

CITY OF CHICO - PROFESSIONAL SERVICES AGREEMENT

NV5
Consultant

PFAS INVESTIGATION
Project Title

856-691-5400
Budget Account Number

EXHIBIT D

INSURANCE PROVISIONS

General Liability Insurance

Consultant/Contractor shall obtain commercial general liability insurance (occurrence policy form) from one or more U.S. domiciled insurance companies licensed to do business in the State of California with an A.M. Best Company rating of "B" or better or, in the alternative, an unlicensed U.S. domiciled company or companies with an "A" rating, which provides coverage for bodily injury, personal injury and property damage liability in the amount of at least $1,000,000 per occurrence, and $2,000,000 in the aggregate, with a maximum policy deductible of $5,000, or as approved by the City's Human Resources and Risk Management Office.

It shall be a requirement under this agreement that any available insurance proceeds broader than or in excess of the specific minimum Insurance coverage requirements and/or limits shall be available to the Additional Insured. Furthermore, the requirements for coverage and limits shall be (1) the minimum coverage and limits specified in this Agreement; or (2) the broader coverage and maximum limits of coverage of any Insurance policy or proceeds available to the named Insured, whichever is greater.

The insurance coverage required herein shall be evidenced by a certificate of insurance with policy endorsements and shall be executed by an authorized official of the insurer(s). In addition to the limits of coverage described above, the certificate of insurance shall provide that the insurer shall provide to City at least 30 days prior notice of cancellation or material change in coverage, or 10 days prior notice of cancellation for non-payment.

Consultant/Contractor acknowledges and agrees that City of Chico, its officers, boards and commissions, and members thereof, its employees and agents, are covered as additional insureds with respect to any liability arising out of the activities of Consultant/Contractor as the named insured. Such additional insured status shall be evidenced by a policy endorsement executed by an authorized official of the insurer(s). A blanket endorsement which provides additional insured status to any person or organization with whom Consultant/Contractor, as named insured, has entered into a written contract, such as this Agreement, shall satisfy this requirement.

The insurance coverage required herein shall be primary and non-contributory insurance with respect to the City of Chico, its officers, officials and employees. Any insurance or self-insurance maintained by the City of Chico, its officers, officials or employees shall be in excess of the insurance afforded to the named insured by the insurance coverage required herein and shall not contribute to any loss. Such primary insurance status shall be evidenced by a policy endorsement issued by an authorized official of the insurer(s), and shall be at least as broad as CG 20 01 04 13. In the alternative, a letter issued by an authorized official of the insurer(s) and copies of the pertinent page(s) of the policy shall satisfy this requirement.

The limits of Insurance required in this agreement may be satisfied by a combination of primary and umbrella or excess Insurance. Any umbrella or excess Insurance shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and non-contributory basis for the benefit of City of Chico (if agreed to in a written contract or agreement) before City of Chico's self-insurance shall be called upon to protect it as a named insured.

All self-insured retentions (SIR) must be disclosed to the City's Human Resources and Risk Management Office for approval and shall not reduce the limits of liability. Policies containing any (SIR) provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named Insured or City of Chico. City of Chico reserves the right to obtain a full certified copy of any Insurance policy or endorsements. Failure to exercise this right shall not constitute a waiver of right to exercise later.

Automobile Liability Insurance

Consultant/Contractor shall obtain automobile liability insurance from one or more U.S. domiciled insurance companies licensed to do business in the State of California with an A.M. Best Company rating of "B" or better which provides coverage for bodily injury, personal injury, and property damage liability in the amount of at least $500,000 combined single limit for each occurrence. Evidence of such coverage shall be maintained by Consultant/Contractor and provided to City upon request.

Subconsultant/Subcontractor Insurance

Consultant/Contractor agrees to include with all subconsultants/subcontractors in their subcontract the same requirements and provisions of this agreement including the indemnity and Insurance requirements to the extent they apply to the scope of the subconsultant/subcontractor's work. Subconsultant/Subcontractor agrees to be bound to Consultant/Contractor and City of Chico in the same manner and to the same extent as Consultant/Contractor is bound to City of Chico under the agreement. Subconsultant/Subcontractor further agrees to include the same requirements and provisions of this agreement, including the indemnity and Insurance requirements, with any Sub-subconsultant/Sub-subcontractor to the extent they apply to the scope of the Sub-subconsultant/Sub-subcontractor's work.

A copy of the City of Chico Insurance Provisions will be furnished to the subconsultant/subcontractor upon request. Evidence of such coverage shall be maintained by Consultant/Contractor and provided to City upon request.

Workers' Compensation Insurance

Consultant/Contractor shall, at Consultant/Contractor's expense, purchase and maintain in full force and effect workers' compensation insurance as required by Federal and State of California law. Consultant/Contractor shall also require all of Consultant's subconsultants/subcontractors to maintain this insurance coverage. Proof of workers' compensation insurance or other documentation acceptable to City evidencing such insurance coverage shall be provided by Consultant/Contractor or Consultant/Contractor's subconsultants/subcontractors to City upon request.

Subrogation

Consultant/Contractor shall agree to waive all rights of subrogation against City for losses arising from Services performed by the Consultant/Contractor or Consultant/Contractor's subconsultants/subcontractors for City under this Agreement.

Indemnity

Consultant/Contractor/Subconsultant/Subcontractor's responsibility for such defense and indemnity obligations shall survive the termination or completion of this agreement for the full period of time allowed by law.

The defense and indemnification obligations of this agreement are undertaken in addition to, and shall not in any way be limited by, the insurance obligations contained in this agreement.

Professional Liability Insurance

Consultant/Contractor shall obtain professional liability (errors and omissions) insurance, with a minimum $1,000,000 limit, from one or more U.S. domiciled insurance companies licensed to do business in the State of California with an A.M. Best Company rating of "B" or better providing coverage for services rendered to City under this Agreement.

Said insurance coverage shall be evidenced by a certificate of insurance which shall be executed by an authorized official of the insurer(s). In addition to the limits of coverage described above, the certificate of insurance shall provide that the insurer shall provide to City at least 30 days prior notice of cancellation or material change in coverage, or 10 days prior notice of cancellation for non-payment.

CITY OF CHICO - PROFESSIONAL SERVICES AGREEMENT

NV5
Consultant

PFAS INVESTIGATION
Project Title

856-691-5400
Budget Account Number

EXHIBIT E

CONFLICT OF INTEREST PROVISIONS

NONE.

CITY OF CHICO - PROFESSIONAL SERVICES AGREEMENT

NV5
Consultant

PFAS INVESTIGATION
Project Title

856-691-5400
Budget Account Number

EXHIBIT F

SPECIAL PROVISIONS

Passive Diffusion Bags (PDB)
If monitoring wells proposed for sampling have passive diffusion bags (PDB's) emplaced as part of the groundwater monitoring program, the City will remove the PDB's prior to PFAS groundwater sampling. Consultant will purge three casing volumes prior to monitoring for stabilization in order to attempt to purge groundwater potentially impacted by the PDB's remaining in the monitoring wells to allow for formational water recharge. If the approximate 300 gallons of purge water needs to be disposed of off-site, the IDW disposal costs for this activity are built into Exhibit C. The City contact for removal of the PDB's is Chris Duffey (530) 879-6913 or chris.duffey@chicoca.gov. Consultant shall give the City contact 5 to 7 days notice prior to sampling to give the City time for the removal of the PDB's.

Sampling Guidelines
Due to the prevalence of PFAS in consumer products and the needed detection levels in ppt, significant care is required when collecting samples of media to prevent cross-contamination and produce defensible results (see Attachment B for PFAS sampling guidelines from the California State Water Quality Control Board).

Meeting Attendance
Consultant is requested to participate during the Chico Municipal Airport and Central Valley Regional Water Quality Control Board (CVRWQCB) meeting to discuss the CVRWQCB review and consents to a virtual meeting.

Consultants Proposal
All information contained in the proposal by Consultant (see Attachment A), with the exception of the "Schedule," shall become part of this Professional Services Agreement. The "Schedule" in the proposal may be modified by the City, with the acceptance of those modifications by the Consultant to better align timelines to meet the goal of submitting a draft final investigation report to the Central Valley Regional Water Quality Control Board as close to November 30, 2020 as possible.

Chico Municipal Airport (PFAS) Preliminary Investigation Work Plan
For reference, see Attachment C to Exhibit F hereto for the Chico Municipal Airport (PFAS) Investigation Work Plan prepared by Jacobs Engineering Group, Inc. In the event of any

contradictions between the requirements, processes or procedures called for under the scope of work in this agreement and the Investigation Work Plan in Attachment C, the requirements of Attachment C shall prevail.

PROPOSAL FOR CHICO MUNICIPAL AIRPORT
PRELIMINARY PER- AND POLYFLUOROALKYL SUBSTANCE INVESTIGATION
RFP NO. 2020-PFAS INVESTIGATION

August 10, 2020

Attachment A

Prepared For:

City of Chico
Public Works – Operations and Maintenance
965 Fir Street
Chico, CA 95928

NV5

48 Bellarmine Court
Suite 40
Chico, CA 95928
Phone: 530.894.2487

RFP No. 2020-PFAS INVESTIGATION

NV5

August 10, 2020

BID PROPOSAL
RECEIVED
8/11/20 @ or before 2:00pm
DATE TIME
BA
RECEIVED BY
CITY OF CHICO
GENERAL SERVICES DEPARTMENT

City of Chico, Public Works O&M
Attn: RFP for PFAS Investigation
965 Fir Street
Chico, CA 95928

Reference: RFP 2020 – PFAS Investigation

Dear Proposal Review Team,

Holdrege & Kull Consulting Engineers and Geologists, dba NV5 (NV5) appreciates the opportunity to provide this proposal for Per- and Polyfluoroalkyl Substance (PFAS) Investigation at the City of Chico Municipal Airport. It has been a pleasure and a privilege to provide our services to the City on a variety of environmental, geotechnical and construction-related projects. Our team looks forward to working with the City to efficiently address the State requirements for PFAS investigation.

NV5 is a leader in PFAS characterization, and NV5 staff have published and presented technical articles regarding PFAS sampling techniques. We are familiar with the assessment of potential PFAS releases from a variety of industrial uses including fire training operations. Our expertise includes site characterization of soil, soil vapor, groundwater, surface water and sediment, as well as strategic program management, education, and outreach.

We are a local firm with deep technical resources. The following factors make us uniquely qualified to provide PFAS investigation services to the City:

- Our extensive experience with site characterization,
- Our knowledge of PFAS-specific requirements,
- Our years of experience with local geologic conditions, and
- Our experience with State and local regulatory requirements.

NV5 is committed to supporting the City's PFAS Investigation based on robust planning, sound scientific methodologies, thorough quality checks and a well-structured deliverable. We are providing similar services to municipal, industrial, and commercial clients subject to the State Water Resources Control Board orders WQ 2019-0005-DWQ (airports) and WQ 2019-0045-DWQ (metal plating facilities). These clients include the City of Oroville Municipal Airport, Ontario International Airport and a chrome-nickel plating industrial facility in southern California.

Heidi Cummings, PG, will serve as the Project Manager and direct point of contact for all work related to this contract. Ms. Cummings has successfully implemented several environmental projects with the City of Chico and is currently the project manager for the City's Big Chico Creek MS4 Receiving Water Monitoring Program and Humboldt Road Burn Dump Monitoring Program, among others. Ms. Cumming's contact information is provided below.

Heidi Cummings, PG, Senior Geologist
48 Bellarmine Court, Suite 40, Chico, California 95928
Heidi.Cummings@NV5.com
(530) 894-2487 office, (530) 864-6971 mobile

This type of contract demands professionals with comprehensive expertise and a wide array of skill sets, a successful record of accomplishments on City of Chico projects, experience performing PFAS sampling and investigative techniques, proven best practices, corporate stability, a highly trained and responsive workforce, and a depth of resources who will provide cost-effective and efficient services. NV5 is the ideal consultant team to provide water monitoring services for the City's PFAS Investigation because we offer the following differentiators.

We have over 50 years of experience providing environmental engineering, geotechnical engineering, and construction quality assurance services for public and private projects, including site characterization under CERCLA, water quality assessment and permitting, essential services facilities, dams, roadways and bridges, schools, photovoltaics, and communication towers.

We are a local firm. The contract will be managed and staffed at our Chico office, less than 9 miles from the City of Chico Municipal Airport. We can typically respond on the same day to requests for any required project services. We have proven procedures, practices, and systems to ensure business continuity during the COVID response. We continue to operate as an essential services organization to maintain regulatory compliance for our clients.

We know the project site. NV5 personnel have successfully completed hundreds of drilling, sampling, and monitoring events within the geologic and regulatory framework within the City of Chico and across California. In addition, we are familiar with procedures related to airport site access.

Our technical resources run deep. The NV5 team has over 500 staff in California with experts assigned to this project who have logged hundreds of site investigation hours. We work with the same regulators with similar site investigative techniques for many of our other clients. We can draw on extensive technical resources from all our NV5 offices in California

Our success is built on trust. We value our strong relationships with City staff. We have worked with the City and have demonstrated our commitment to provide informed and reliable services. Our commitment to quality control and communication is our top priority.

Please let us know if you have any questions or need clarification on anything we have presented in the proposal. If selected, NV5 is ready and able to enter into a binding contract with the City in accordance with the provisions of the RFP. This proposal remains valid for a period of not less than one-hundred-twenty (120) days from the date of our submittal. This cover letter is signed by an employee empowered by NV5 to sign such material and thereby commit NV5 to the obligations contained in the RFP. Further, NV5 understands that signing and submitting our proposal acknowledges the required statements described in Item C-9 "Required Statements" of the RFP. We also note that we have received and read the two addenda issued on July 29 and August 4, 2020, and RFP Attachments A through C. We look forward to the opportunity to continue working with the City of Chico.

Sincerely,

NV5

Heidi Cummings

Heidi Cummings, PG
Senior Geologist and Project Manager

Shane D. Cummings
Associate Geologist and Principal in Charge

TABLE OF CONTENTS

FIRM BIOGRAPHY/QUALIFICATIONS

NV5 is a well-recognized environmental consulting firm in the areas of environmental site assessment, regulatory compliance, water quality permitting, remediation, hazardous materials, industrial hygiene, hazardous waste, environmental health and safety, air quality, sustainability, training, and litigation support. NV5 is uniquely qualified to fully support the City with the technical and regulatory aspects PFAS investigation.

The NV5 team has provided professional environmental consulting services in California for over 50 years, with over 500 qualified professionals in offices in Chico, Nevada City, Sacramento, Long Beach, Irvine, Oceanside, San Diego, and Van Nuys, California. NV5's other local Northern California branch offices are located in Fresno, Murphys, Richmond, San Jose and Truckee.

NV5's clientele includes municipal and government agencies, school districts, universities, construction companies, architecture and engineering firms, land development firms, hospitals, industrial corporations and energy conglomerates.

Alta Environmental, LP (Alta) became an NV5 company in May 2019, adding to the expertise of over 3,000 NV5 engineering and technical consulting staff in over 100 offices worldwide. Alta brings well over 25 years of experience with hazardous materials assessment and mitigation.

The trusted relationships we build with our clients are shown by the recognition by Zweig Group as a Hot Firm (2018 and 2019) for faster growth than our peer firms. Our growth is due to our loyal return and repeat client business and long-term retention and dedication of our technical experts. We were also recognized as a Zweig Group Best Firm to Work For over the last three years (2017, 2018 and 2019).

NV5 staff includes engineers, geologists, hydrogeologists, engineering technicians, inspectors, and laboratory technicians. NV5 has California licensed professional engineers (PE) and geologists (PG) to assist our clients with environmental site investigation. Projects are presented below to highlight our specific experience with a variety of environmental investigations and PFAS investigation planning and implementation.

Environmental Consulting

- CERCLA Remedial Site Investigation
- Soil, Soil Vapor & Groundwater Investigation/Remediation
- Preliminary Endangerment Assessment (PEA)
- Engineering Evaluation/Cost Analysis (EE/CA)
- Human Health/Ecological Risk Assessment
- PFAS investigation
- Leaking Underground Storage Tanks (LUST)
- Phase I/II NPDES Permit Support
- Industrial/Construction NPDES Permit Support
- Phase I & II Environmental Site Assessment
- Budgeting Services for Permit Compliance
- SWAMP Comparable QAPP Development
- Pyrethroid Monitoring Program
- Groundwater Modeling & Hydrogeology
- Storm Water Pollution Prevention Plans (SWPPP)
- Litigation Support
- GIS Mapping and Analysis

Solid Waste Engineering

- Landfill Design
- Construction Quality Assurance
- Regulatory Compliance
- WDR/MRP Monitoring & Reporting
- Joint Technical Document Preparation
- Landfill Gas Monitoring & Reporting

Geology

- Geologic Hazards Reports for Schools & Hospitals
- Geologic Mapping
- Alquist-Priolo Fault Zone Studies & Fault Evaluation

Geotechnical Consulting & Engineering

- Geotechnical Investigation
- Foundation Engineering
- CIDH Pile Mitigation
- Retaining Wall Design
- Slope Stability Analysis
- Earth Dam Design
- Shoring Design
- Distressed Structure Evaluations
- Litigation Support

Professional Licensure (Chico/Nevada City)

- Professional Engineers, 8 (CA, NV, WA, AZ, CO, HI)
- Geotechnical Engineers, 2 (CA)
- Professional Geologists 8 (CA)
- Certified Hydrogeologists 3 (CA)
- Certified Engineering Geologists 3 (CA)

CHROME NICKEL PLATING PFAS ASSESSMENT

Lynwood, CA | Bowman Field, Inc. Chrome Nickel Plating

In 2020, NV5 prepared a work plan for the assessment of per- and polyfluoroalkyl substances (PFAS) at the Chrome Nickel Plating facility in Lynwood, California. The work plan for assessment was prepared to satisfy the requirements of the State Water Resources Control Board Order No. WQ 2019-0045-DWQ for assessment of PFAS concentrations in soil, groundwater, storm water runoff, and effluent wastewater at chrome plating facilities (Order issued in October 2019).

NV5 developed a scope of work consisting of soil sampling and wastewater effluent facility in areas of known PFAS chemical usage. Sampling will commence upon approval of the submitted work plan by the State Water Board. The project was completed on time and within budget.

PROJECT DURATION: 1st Quarter 2020
SERVICES PROVIDED: Planning Document Preparation
NV5 STAFF: Erik Fraske, PE

**Reference for this project can be found in the References Section.*

ONTARIO INTERNATIONAL AIRPORT PRELIMINARY SITE ASSESSMENT PFAS

Ontario, CA | Ontario International Airport Authority

In 2019, NV5 completed a preliminary site assessment (PSA) of per- and polyfluoroalkyl substances (PFAS) in soil and groundwater. The PSA was conducted to pursuant to the Directive for Soil and Groundwater Investigation (Order No. R8-2019-0043) issued by the Santa Ana Regional Water Quality Control Board (RWQCB) on March 20, 2019.

As part of this assessment, NV5 collected soil samples from shallow soil borings at two areas of historic PFAS use and sampled groundwater at six existing groundwater monitoring well locations.

NV5 staff worked with airport personnel and representatives of airport tenants to safely access sampling locations while minimizing disruptions to airport activities. Sampling activities were completed in accordance with the approved work plan and a report of findings was submitted to the Santa Ana RWQCB in February 2020. The scope was completed on time and within the contract budget.

PROJECT DURATION: 2019 TO PRESENT
SERVICES PROVIDED: SOIL AND GROUNDWTER SAMPLING FOR PFAS
NV5 STAFF: ERIC FRASKE (PM), BINA PATEL (FIELD TASK LEAD, PRIMARY AUTHOR PSA REPORT)

**Reference for this project can be found in the References Section.*

OROVILLE MUNICIPAL AIRPORT, AIRPLANE CRASH SITE PRELIMINARY SITE ASSESSMENT FOR PFAS

OROVILLE, CA | CITY OF OROVILLE

NV5 is in contract negotiations with the City of Oroville to perform a Preliminary Site Assessment (PSA) for per- and polyfluoroalkyl substance (PFAS). NV5 developed a cost-effective scope of services for the collection of soil samples and laboratory analysis based on review of the crash site records provided by the City of Oroville. Both aqueous film-forming foam AFFF and jet fuel were released to the ground surface because of fire suppression activities and rupture of the aircraft fuel system. This project is projected to be completed on time and within budget.

PROJECT DURATION: JULY 2020-PRESENT
SERVICES PROVIDED: SCOPING FOR PFAS PSA
NV5 STAFF: HEIDI CUMMINGS, PG (PM/QA OFFICER), CRAIG BOURNE, PG (FIELD SAMPLING AND REPORTING)
**Reference for this project can be found in the References Section.*

ADVENTIST HEALTH, FEATHER RIVER, SITE INVESTIGATION

CHICO, CA | ADVENTIST HEALTH, FEATHER RIVER

NV5 performed multiple phases of environmental investigation in support of Adventist Health's due diligence prior to and after the purchase of a property in southeast Chico that historically operated as an asphalt plant. NV5 completed a Phase I Environmental Site Assessment (ESA) and a Phase II ESA that included soil sampling and drilling and sampling of soil and groundwater to assess the presence of contaminants at depth. NV5 prepared Field Summary Report documenting the field activities, results, data validation and provided recommendation for further investigation of identified groundwater contamination. During July 2020, NV5 performed drilling and monitoring well design and construction to facilitate ongoing groundwater monitoring at the site. We are using many of the same subcontractors on this project that are proposed for the PFAS investigation. This project is projected to be completed on time and within budget.

PROJECT DURATION: NOVEMBER 2019-PRESENT
SERVICES PROVIDED: DRILLING, SOIL AND GROUNDWATER SAMPLING, LABORATORY SERVICES, REPORTING.
NV5 STAFF: HEIDI CUMMINGS, PG (PM/QA OFFICER), CRAIG BOURNE, PG (FIELD SAMPLING AND REPORTING)
**Reference for this project can be found in Section 4.0*

PROJECT DURATION: OCTOBER 2016 – 2018

SERVICES PROVIDED: PHASE I ESA, PEA, HHRA, RAW, RACR, REMEDIAL MONITORING AND QUALITY ASSURANCE, GEOTECHNICAL ENGINEERING, GEOLOGIC HAZARDS EVALUATION, CONSTRUCTION QUALITY ASSURANCE

NV5 STAFF: HEIDI CUMMINGS (PM), JASON MUIR (QA), SHANE CUMMINGS (PIC)
**Reference for this project can be found in the References Section*

HUMBOLDT ROAD BURN DUMP OPERABLE UNIT (HRBDOU) MONITORING AND REPORTING

CHICO, CA | CITY OF CHICO

NV5 provides annual monitoring and on-call stormwater inspection, flow measuring and sampling events for the HRBDOU and adjacent Private Properties Operable Unit. NV5 performs groundwater monitoring from the five site monitoring wells, periodic stormwater monitoring and prepares the annual compliance monitoring report in accordance with the Regional Water Quality Control Board (RWQCB) Waste Discharge Requirement Orders R5-2009-046 and -047. Stormwater monitoring includes estimation of flow rate within the Dead Horse Slough to the north of the facilities. Flow is estimated using the orange peel method Standard Operating Procedure on the RWQCB's Citizen's Water Quality Monitoring Technical Advisory Council web site. The scope was completed four consecutive years on time and within the contract budget.

PROJECT DURATION: OCTOBER 2016 – PRESENT
SERVICES PROVIDED: GROUNDWATER AND STORMWATER MONITORING, SITE INSPECTION AND REPORTING
NV5 STAFF: HEIDI CUMMINGS (PM), CRAIG BOURNE
**Reference for this project can be found in Section 4.0*

SHASTA ELEMENTARY SCHOOL EXPANSION DTSC CLEANUP AND CERTIFICATION

CHICO, CA | CHICO UNIFIED SCHOOL DISTRICT

NV5 obtained DTSC site certification for this school expansion project in the Chico Unified School District. Services included hazardous substances site investigation, human health risk assessment, cleanup planning, community outreach, remediation quality assurance and record document preparation. NV5 worked closely with the school district and California Department of Toxic Substances Control (DTSC) to facilitate regulatory review and public participation.
The school expansion project included structure demolition, cleanup, and reconstruction. Land use records and site investigation identified lead, arsenic, pesticides, PCBs, petroleum hydrocarbons, dioxins, and furans as constituents of concern. Remedial action was driven primarily by lead and organochlorine pesticides (OCPs) in soil. The cleanup included excavation and off-site disposal of contaminated soil, dust monitoring, verification sampling and site restoration. NV5 obtained DTSC certification for the proposed school site expansion.
NV5 also performed a geotechnical engineering investigation and geohazards investigation to address requirements of the Department of General Services Division of the State Architect (DSA) for the school expansion project. NV5 provided construction quality assurance (CQA) services during school construction, and the new campus facilities opened for the second half of the 2018-19 school year. The scope was completed on time and within the contract budget.

SCOPE OF SERVICES

The following scope of work was prepared pursuant to the City's RFP (July 20, 2020) and

- RFP Attachment A, *Chico Municipal Airport PFAS Investigation Work Plan* (Work Plan, November 2019), and
- RFP Attachment B, *PFAS Investigation Sampling and Analysis Plan* (SAP, November 2019).

The investigation described in the Work Plan and SAP is intended to meet requirements of the *State Water Resources Control Board (Water Board) Order WQ 2019-0005-DWQ, Water Code Section 13267 Order for the Determination of the Presence of Per- and Polyfluoroalkyl Substances* (Order). The Work Plan was approved by the SWRCB as indicated in the City of Chico's response to question No. 11 to the RFP.

The objective of the soil and groundwater sampling program is to assess the presence of PFAS in near-surface and subsurface soil and groundwater at the various use and/or potential release sites identified in the Work Plan, and to assess the presence of PFAS at up gradient locations for background comparison.

TASK 1. PROJECT MANAGEMENT/PRE-MOBILIZATION ACTIVITIES

NV5 will prepare meeting materials and attend a kickoff meeting with the City and facilitate ongoing communications/meetings via telephone and a virtual platform that is acceptable to the City. NV5 will coordinate and schedule pre-mobilization and field activities with the City, Airport and NV5 staff and subcontractors. Pre-mobilization activities will include preparation of a health and safety plan (HASP), subcontractor procurement, acquisition of a drilling permit for the soil borings, and marking the drilling/excavation locations for Underground Service Alert. NV5 will subcontract with Foresite Engineering to perform utility clearance using geophysical methods at each of the exploratory locations. NV5 will prepare routine status reports to keep the City up to date on the overall progression of data acquisition and deliverable status.

NV5 is prepared to assist the City with preparation of the Federal Aviation Administration (FAA) notification form (FAA 7460-1) if required for the work. Up to two hours of professional staff time is budgeted for this effort.

TASK 2. FIELD WORK AND LABORATORY ANALYSIS

Drilling/Excavation and Sampling

NV5 staff are trained on the specific PFAS field sampling protocols and sample handling procedures and will review the Work Plan, SAP, and HASP in preparation of the field work. PFAS-containing materials and products will be avoided during implementation of the field work to reduce the chance of cross-contamination of the environmental samples. NV5 is aware that a City escort will be required during implementation of the Work Plan and as such will coordinate all site work with the City and Airport staff.

As noted in the SAP (Section 4.2), it will be necessary to sample the potable water supply at the airport that will be used for decontamination of equipment and materials used for the investigation. Prior to mobilization, NV5 will coordinate with the City and Airport staff to identify and sample the potable water supply. NV5 will submit the water sample for laboratory analysis of PFAS to verify that the potable water supply is, in fact, PFAS free. It is assumed, for cost estimating purposes, that the sample will be obtained from a standard water spigot and no special equipment will be needed for collection of this sample (e.g. water meter or other connections to a fire hydrant).

NV5 will provide a geologist to oversee the drilling operations and collect environmental samples. Field samples and quality assurance/quality control (QA/QC) samples will be collected in laboratory-supplied containers in accordance with SAP Table 1, Sample Matrix. NV5 will subcontract with Cascade Drilling, a California C-57 licensed driller to drill one deep exploratory boring at the 1992 airplane crash site and obtain shallow samples using an air knife (vac-truck) and hand auger at the AFFF testing area (four locations) and the 2007 aircraft fuel spill site (one location).

Prior to the commencement of drilling at the 1992 airplane crash site, a surface soil sample will be collected for laboratory analysis in accordance with the Work Plan. Following surface sample collection, Cascade Drilling will advance the top five feet of the boring using an air-knife, and then drilling will commence. NV5 proposes to use a sonic drill rig to collect continuous core soil samples for lithologic classification and to identify changes in lithology where PFAS accumulation may have occurred. Three subsurface soil sample intervals will be selected for laboratory analysis pursuant to the Work Plan criteria (at lithologic interfaces or at regular intervals and at the intersection with the water table).

Upon encountering the water table, which is anticipated to be at approximately 60 feet below ground surface (bgs) (Geocon, 2020), the boring will be advanced an additional 10 feet and a groundwater sample will be obtained using a Hydropunch® sampler or equivalent. For budgeting purposes, the exploratory borehole will be drilled to a maximum depth of 100 feet bgs or 10 feet below the water table, whichever occurs first. All downhole materials will be PFAS-free. Upon completion of sampling, the exploratory boring will be abandoned by backfilling with a cement-bentonite grout mixture pursuant to the requirements of Butte County Environmental Health Department (BCHED). It is anticipated that drilling, soil and groundwater sampling and borehole abandonment may take up to two 10-hour days to complete.

Excavation of four exploratory boreholes at the AFFF testing area will be accomplished by first saw-cutting the concrete or asphalt surfaces to expose the underlying base materials and native soil. Once the underlying materials are exposed, Cascade Drilling will use a hand auger and air-knife to advance the excavation to the target depth or lithologic interface, whichever occurs first. Soil conditions are anticipated to be comprised of cobbles embedded in a clayey, dry, hard matrix. An attempt with a hand auger will be made to collect the shallow soil sample within the upper 2 feet of soil. If refusal is met, then the air knife will be used to advance the excavation one to two feet at a time. Spoils will be removed from the air-knife tank after each interval is advanced and will be classified by the NV5 geologist. If a change in lithology is observed, then a sample of the material overlying the newly identified material will be collected for laboratory analysis, and the boring will be terminated and subsequently abandoned pursuant the requirements of BCEHD. If no lithologic change is observed, the final sample will be collected at the maximum target depth of 10 feet bgs.

Excavation of one exploratory borehole at the 2007 aircraft fuel spill site will be accomplished in the same manner as described for the AFFF testing area, but special consideration will be given to selection of the borehole location. As indicated in the work plan, the borehole is to be sited within an area where the asphalt is most degraded and cracked providing a pathway to the subsurface geologic materials.

NV5 anticipates that excavation of the five shallow locations at the AFFF testing area and 2007 aircraft fuel spill site, including soil sampling and borehole abandonment, may take up to two 10-hour days to complete.

Groundwater Monitoring and Extraction Well Sampling

NV5 will provide a two-person sampling team consisting of a geologist and engineering technician to obtain groundwater samples from the existing groundwater monitoring wells and groundwater extraction well. NV5 understands that the existing wells are being used to monitor a chlorinated solvent plume in groundwater and sampling is achieved through the use of passive diffusion bags (PDBs) deployed in the monitoring wells. NV5 will coordinate with the City and the City's contractor prior to entering the field for the removal and redeployment of the passive diffusion bags. Removal and redeployment will be performed by the City's monitoring contractor.

Once the PDBs have been removed from the existing monitoring wells, NV5 will mobilize personnel and equipment for well sampling. Prior to sampling, the depth to water will be measured in each well to verify the depth at which the pump intake will be set. If the water level is below the top of the screen, then a depth equivalent to the center of the water column will be used (or a minimum of 2 feet off the bottom of the well to limit disturbance of sediment).

NV5 proposes to use a PFAS-free stainless-steel bladder pump (manufactured by Geotech) to purge the wells and collect groundwater samples from the monitoring wells. The pump will be deployed down the well and set at the calculated depth. NV5 is familiar with the United States Environmental Protection Agency (USEPA) guidance document *Low-Flow (Minimal drawdown) Groundwater Sampling Procedures* (1996; revised 2017) and will employ

these protocols during purging and sampling. Field parameters (pH, temperature, electrical conductivity, turbidity, dissolved oxygen, and oxidation reduction potential) will be monitored using a multi-parameter water quality meter and flow cell. The field parameters will be recorded on a field sampling data sheet along with drawdown. The flow rate and purge volume will be adjusted as appropriate to accommodate field conditions. Upon purging of the target volume and stabilization of field parameters, a groundwater sample will be collected from the discharge tubing prior to entry to the flow cell. Stabilization of field parameters is defined in USEPA 2017. Field samples and QA/QC samples will be collected in laboratory-supplied containers in accordance with SAP Table 1, Sample Matrix.

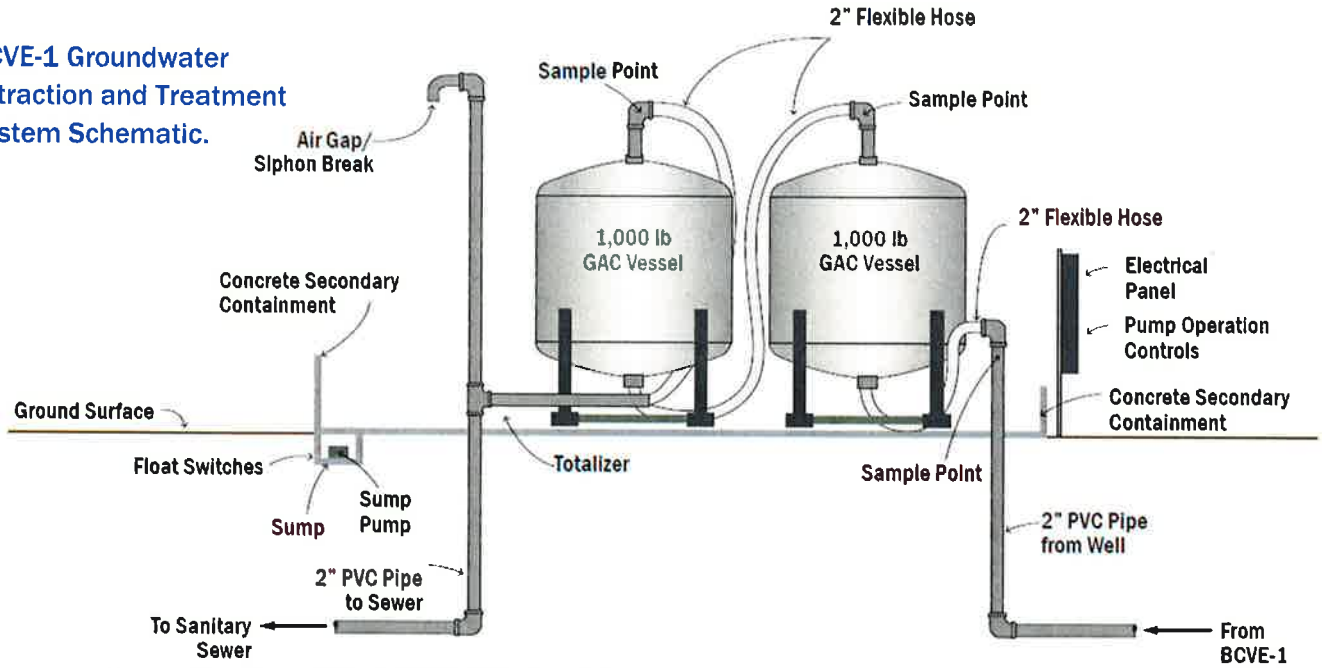
All downhole equipment will be PFAS-free. New high-density polyethylene (HDPE) tubing will be deployed at each location along with a new polyethylene bladder. The stainless steel pump housing and screen intake and HDPE connection fittings will be decontaminated prior to the first sampling site and between sites using an Alconox® solution and triple-rinse system, with the final rinse being PFAS free deionized water obtained from the laboratory. The final rinseate will be collected as an equipment blank to verify that decontamination was successful.

Exploratory locations will be surveyed by a licensed land surveyor. NV5 will subcontract with Northstar of Chico, California to perform a coordinate survey. The survey will be performed in accordance with state regulations (California Code of Regulations, Title 23, Chapter 16, Article 12; added Sections 2729 and 2729.1) as required for obtaining and electronically submitting the site-specific data to Geotracker. The survey will include ground surface elevation relative to mean sea level to an accuracy of 0.01 foot, and horizontal coordinates (latitude and longitude) in decimal degrees using methods that satisfy state regulations.

Sampling of the groundwater extraction well will be accomplished using the existing installed equipment. The extraction treatment system schematic is shown below. If the pump is not running at the time of sampling, the pump will be started using the control panel. The multi-parameter water quality meter will be fitted to the sampling port upstream of the first 1,000-pound granulated activated carbon vessel (GAC), and field parameters will be recorded until stabilization is achieved. Upon stabilization, a groundwater sample will be collected from the sampling port and placed in a laboratory-supplied container.

NV5 anticipates that groundwater sampling from the monitoring wells and extraction well may take up to two 10-hour days to complete.

BCVE-1 Groundwater Extraction and Treatment System Schematic.



Source: Brown and Caldwell, 2016. *CMA Field Sampling and Laboratory Analysis Plan*. March 14.

Resample Groundwater Extraction Well (Optional)

NV5 will resample the groundwater at extraction well BCVE-1 if PFAS are detected in the sample collected using the existing system equipment. NV5 will subcontract with Northstate Pump of Chico, California to disconnect and remove the groundwater pump from the extraction well casing and replace the pump and electrical upon completion of sampling.

Resampling of the groundwater extraction well will be accomplished in the same manner using a PFAS-free bladder pump as described for the groundwater monitoring wells. A stand alone task is identified on NV5's fee estimate should resampling become necessary.

Laboratory Analysis

NV5 will subcontract with Eurofins Environment Testing, TestAmerica, Inc. of West Sacramento, California to provide analytical services for soil and groundwater samples. The laboratory is certified by the California Environmental Laboratory Accreditation Program (ELAP No. 2897).

Eurofins has been serving the environmental community for over 33 years and has over 20 years of experience with PFAS analysis and the largest PFAS testing capacity in North America. The laboratory operates under a written Quality Assurance (QA) Plan. Personnel are trained on the QA plan procedures and Standard Operating Procedures for each test.


Water Boards

CALIFORNIA STATE

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

CERTIFICATE OF ENVIRONMENTAL ACCREDITATION

Is hereby granted to

Eurofins TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Scope of Accreditation is limited to the "Fields of Testing" which accompany this Certificate.

Continued accreditation status depends on successful completion of on-site inspection, proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of Section 100825, et seq. of the Health and Safety Code.

Certificate No.: 2897

Expiration Date: 1/31/2023

Effective Date: 2/1/2020

Sacramento, California

Signed by Authority of Executive

Director, Water Board

Environmental Laboratory Accreditation Program

Samples will be analyzed in accordance with SAP Table 1, Sample Matrix. As requested in the RFP, Eurofins will analyze for each of the 23 required PFAS compounds plus an additional 7 compounds (for a total of 30 compounds). Although there are minor discrepancies between the sample quantities expressed in the SAP text (p. 5-1) and SAP Table 1, quantities from Table 1 were used for estimating purposes. NV5 personnel have received training on PFAS sample collection, field measurement procedures and documentation. We are familiar with the sampling guidance documents referenced in SAP Section 4.0.

Sample turn-around time (TAT) will be 10-business days (i.e. Monday through Friday, excluding holidays). Expedited TAT is available from the laboratory upon request by the City. The laboratory will provide a Level III data validation report and an electronic deliverable compatible with the State Water Resources Control Board Geotracker database. In the event that the City requests a review of the raw data, additional cost will be incurred. No costs are included for expedited TAT or raw data deliverable and staff review time.

IDW Handling, Transport and Disposal

Investigation-derived waste (IDW) will consist of soil cuttings, groundwater purge water and decontamination water. The soil cuttings and water will be temporarily stored on site in 55-gallon drums at a designated location acceptable to the City and CMA. Samples will be collected and submitted to Eurofins for waste profile analyses as specified in Section 4.5 of the Work Plan. NV5 assumes that one soil sample and one water sample will be needed for waste profile analysis. Based on our experience with local soil conditions, NV5 is including one soluble threshold limit concentration waste extraction test (WET) for the IDW soil sample with analysis of the extractant for three individual metals. If the disposal facility requires additional samples or laboratory analysis additional cost will be incurred and a budget increase will be needed.

NV5 will subcontract with Clean Harbors for the transport and disposal of IDW at an appropriately permitted disposal facility. At the time of this proposal, all PFAS-contaminated media is being sent out of state to be incinerated because this is the most protective means for destruction of these highly mobile contaminants.

TASK 3. REPORTING

Following completion of the field work and receipt of the analytical results, NV5 will prepare a Preliminary Investigation Report (PIR) that documents the field methodology and summarizes the laboratory results. The PIR will describe the drilling and sampling procedures and provide tabulated summaries of the laboratory data, geologic boring logs, sample location maps, copies of field sample data sheets, laboratory reports, data evaluation, photographs and survey coordinates of the exploratory locations. The PIR will describe deviations from the Work Plan/SAP, if any, and will provide conclusions regarding the presence of PFAS in site media. The PIR will be approved for release by a California licensed professional geologist and/or engineer.

The draft PIR will be provided to the City electronically four weeks following receipt of the analytical results. The proposed schedule allows for one week of review by the City and 3 days for NV5 to incorporate comments and prepare the draft final report for submittal to the RWQCB. NV5 will incorporate one round of comments received from the RWQCB and prepare the final report. Up to 8 hours of professional staff time is budgeted for comment incorporation. Once the final report is completed, two hard copies and an electronic PDF deliverable of the report will be provided to the City.

Routine status reports will be submitted to the City via email monthly at a minimum. The status reports will provide information regarding scheduling and coordination activities, copies of recently collected data and observations, budget updates, and other pertinent information.

PROJECT SCHEDULE

The following schedule is proposed to demonstrate our understanding of the various project components and timing of field, laboratory, and reporting elements. Timing of the field work and reporting elements are critical to meeting the City's overall project end date of November 30, 2020. As shown on the schedule the draft final version of the PIR is scheduled to be submitted to the RWQCB on November 27, 2020. RWQCB review and time to prepare the final version of the report with response to comments, if needed, will extend beyond the November 30, 2020 project end date.

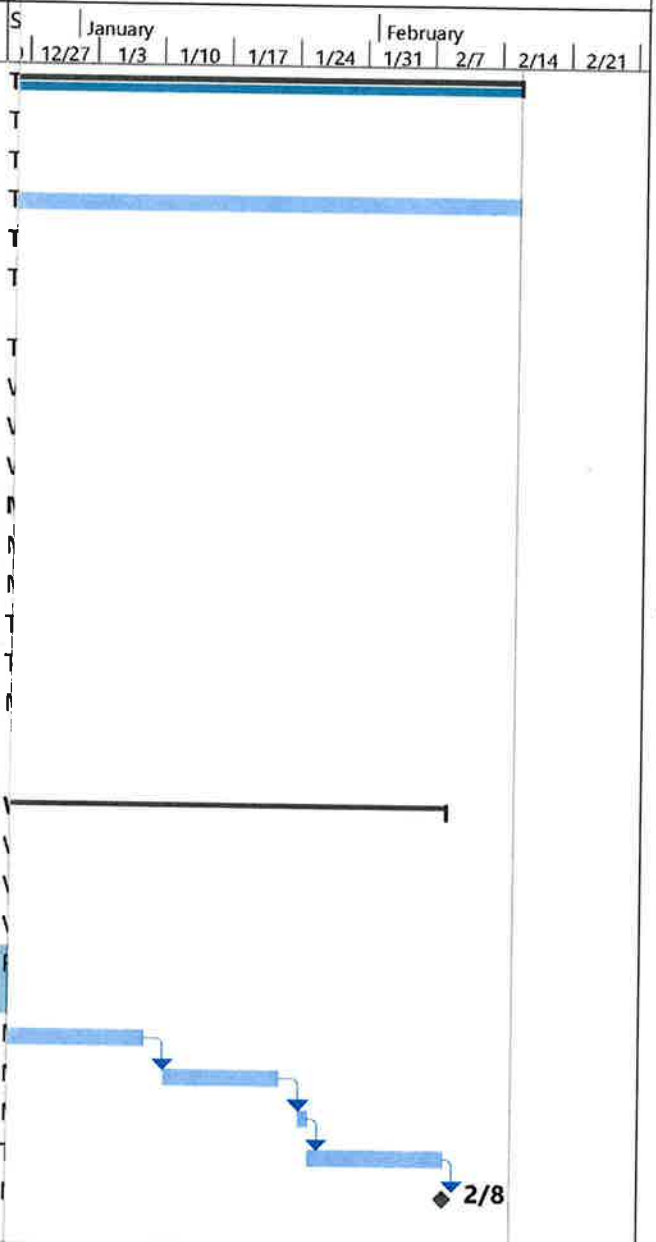
LIMITATIONS

NV5's professional services will be performed consistent with the current generally accepted engineering principles and practices employed in northern California. Our report will be prepared for use by the City of Chico and the regulatory agencies and will not represent a legal opinion. Because PFAS regulations and standards continue to evolve, it is possible that future changes in regulations over which NV5 has no control will affect the status of the subject property.

OWNERSHIP OF WORK PRODUCTS

Data and deliverables developed during the City's PFAS investigation will become the property of the City. NV5 will maintain confidential files related to the project. NV5 staff will not be allowed to share this information outside the project team. NV5 will maintain the project files for a minimum period of 3 years after project completion.

ID	Task Name	Duration
1	**Project Management**	**120 days**
2	Notice to Proceed	0 days
3	Kickoff Meeting	1 day
4	Status Reporting	120 days
5	**Pre-Mobilization**	**18 days**
6	Prepare Health and Safety Plan	4 days
7	Procurement	5 days
8	Sample Potable Water Supply	12 days
9	Permitting	5 days
10	USA/Utility Clearance	1 day
11	**Field Work**	**32 days**
12	Drilling/Excavation & Sampling	4 days
13	Sample Groundwater Wells	2 days
14	Laboratory Analysis	16 days
15	IDW Transport/Disposal	1 day
16	Resample GWE and Laboratory Analysis (Optional)	12 days
17	**Reporting**	**79 days**
18	Prepare Draft Report	20 days
19	City Review	5 days
20	Prepare Draft Final Report	3 days
21	Submit Draft Final to Water Board	0 days
22	Water Board Review	30 days
23	Receive Comment Letter	10 days
24	Meeting with Water Board	1 day
25	Prepare Final Report	10 days
26	Submit Final Report to Water Board	0 days



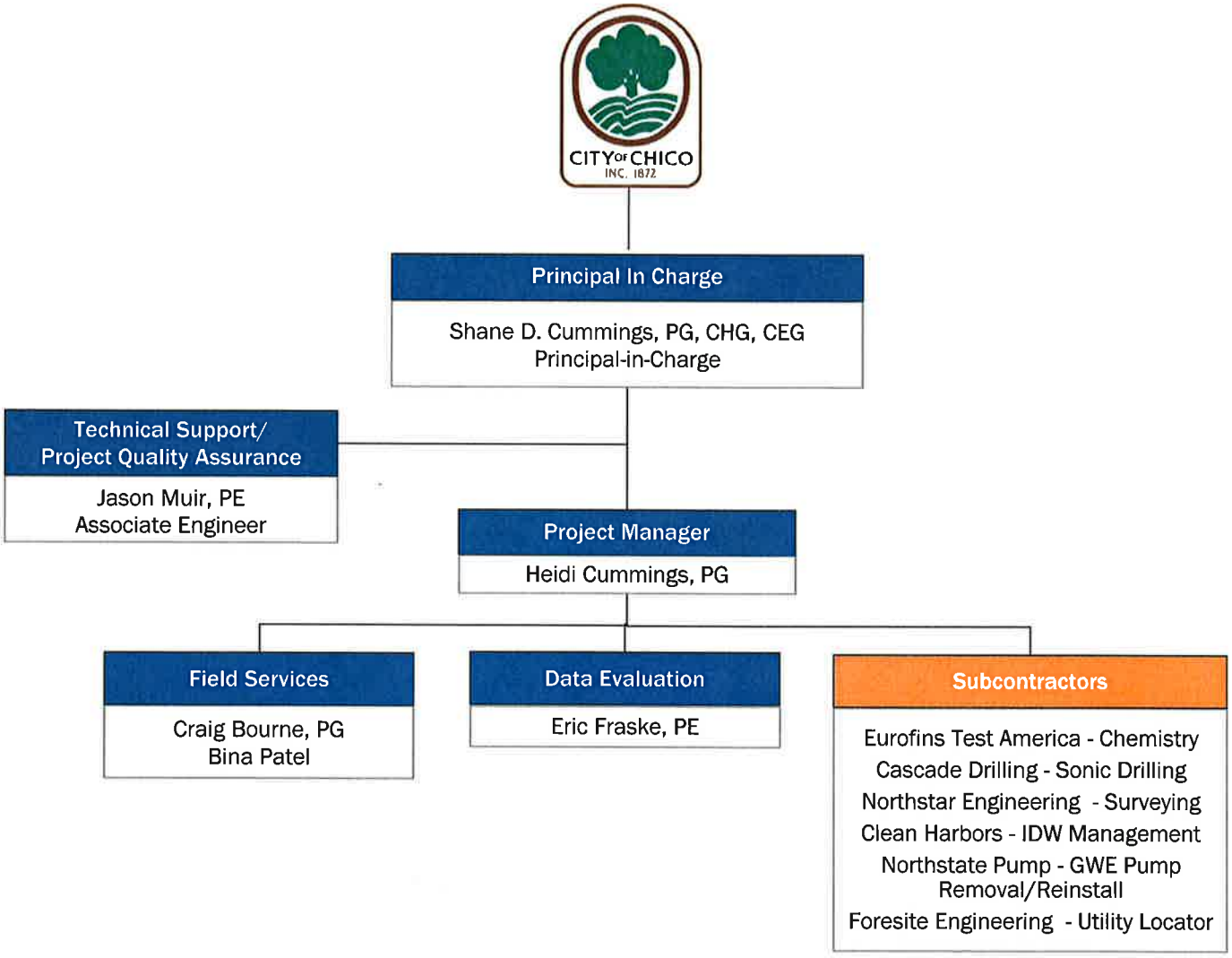
Project: PC20.149_Schedule.mp
Date: Mon 8/10/20

Task
Split
Milestone
Summary

STAFFING PLAN AND CHAIN-OF-COMMAND

NV5's greatest assets are the people who make up the company. Our staff members are highly trained individuals who take pride in their projects. The City will be able to rely on our project team's management and key personnel for the duration of this project. NV5 is able to locally commit the proposed project staff for the full duration of the project. The project will be managed and coordinated through NV5's Chico office. As project timing and staffing needs require, NV5 may supplement the team with staff from other offices, following pre-approval from the City of Chico.

Below you will find an organization chart showing the key personnel who will be assigned to this project and their anticipated role. Following the organizational chart, we have included a staffing plan that presents the anticipated staffing availability for the duration of this contract.



KEY STAFF AND CHAIN-OF-COMMAND

We are 100% committed to ensuring our staff will be available to the City's project demands as they occur. The expected project availability is presented on the following page.

STAFF AVAILABILITY

Key Staff Member and Project Responsibility	Current Assignment(s)	Availability
Shane D. Cummings, PG, CHG, CEG, QISP Principal in Charge	Office Manager and Project Management for: Various Geotechnical Investigation and Construction Quality Assurance Projects	15%
Jason Muir, PE Quality Assurance/Toxicologist	Environmental services manager for the NV5 Nevada City office. Manages and provides technical expertise for USEPA Brownfields programs, hazardous materials site investigation and cleanup under CERCLA (including exposure assessment and risk characterization), solid waste disposal facility permitting and compliance, and water quality permitting, monitoring and compliance.	20%
Heidi Cummings, PG, QISP Project Manager	Project Management for the City of Chico Big Chico Creek MS4 Receiving Water Monitoring Program, HRBDOU Monitoring and Reporting Services and Baseline Pyrethroid Monitoring Program, Project Management for Former Sierra Farms #2 LUST Groundwater Investigation, Project Management for Feather River Adventist Health Groundwater Investigation, Senior Technical Lead Blue Diamond Soil Vapor and Vapor Intrusion Site Characterization	40%
Craig Bourne, PG, QISP Project Geologist/Field Services	Project Geologist for: City of Chico Big Chico Creek MS4 Receiving Water Monitoring Program, HRBDOU Monitoring and Reporting Services, Former Sierra Farms #2 LUST Groundwater Investigation, Feather River Adventist Health Groundwater Investigation, North State Hulling Cooperative Diesel Fuel Soil Remediation	80%
Eric Fraske, PE Data Review/Validation	Resident Engineer for Exide-Vernon Phase I Closure, Project Manager for various site assessments including the Chrome Nickel Plating Shop PFAS assessment. Senior reviewer for various Phase I Environmental Site Assessments throughout California and Project Manager/Senior Engineer for various hazardous waste tank assessment/ certification projects throughout Southern California.	15%
Bina Patel, Environmental Scientist Field Support Services	Staff Scientist/Field Manager for soil and groundwater assessments at multiple LUST facilities, airport facilities, including Ontario Airport PFAS assessment and school sites.	30%

** Our staff listed in this table are committed to the success of this project and will be available, as-needed, throughout the project duration. Brief resumes are provided on the following pages.

SHANE CUMMINGS, PG, CEG, CHG

Operations Manager, Chico Office
Associate Engineering Geologist, Principal-in-Charge

CONSTRUCTION QUALITY ASSURANCE VERTICAL
Chico, CA
Shane.Cummings@NV5.com
530.894.2487

EDUCATION
B.S. in Geology, California State University, Chico

REGISTRATIONS
Professional Geologist, CA No. 7915
Certified Engineering Geologist, CA No. 2492
Certified Hydrogeologist, CA No. 885
Qualified SWPPP Developer/ Practitioner, CA No. 736

EXPERTISE
Aquifer and hydrogeological evaluations
Borehole geophysical applications in fractured rock
Contaminated soil and groundwater investigations
Geotechnical investigations
Remediation of soil and groundwater
Contaminant transport evaluations
Engineering geology
Geologic evaluations
Landfill design, closure, and post closure monitoring

AFFILIATIONS
Geoprofessional Business Association
ASCE, Past President Feather River Branch
Association of Environmental and Engineering Geologists (AEG)
Earthquake Engineering Research (EERI)

Shane Cummings, PG, CEG, CHG, is the Operations Manager of the Chico office. He has been in the industry for 20 years, 15 of which have been with NV5. Mr. Cummings performs and oversees field investigations for geotechnical and materials testing projects, geologic hazards evaluations, environmental investigations, earthquake fault and surface rupture hazards, air photo interpretation, environmental site assessments, and remediation of contaminated sites. Mr. Cummings manages construction quality assurance testing and inspection projects for large multiple-story buildings, school, hospitals, road improvements projects, and municipal infrastructure improvements. He is the past President of the Feather River Branch of the American Society of Civil Engineers (ASCE) and a Subject Matter Expert with the California Board for Professional Engineers and Land Surveyors. He also prepares the examination materials for licensure as a Certified Engineering Geologist (CEG) and Certified Hydrogeologist (CHG) and for the California Supplemental Component to the Professional Geologist (PG) exams.

Project Experience

BRUCE ROAD REHABILITATION PROJECT
CHICO, CA

Project Manager and Engineering geologist in charge of the geotechnical investigation for the rehabilitation of an existing roadway consisting of a portion of Bruce Road beginning approximately at Skyway Road and extending northward approximately 4500 feet to the intersection of East 20th Street and Bruce Road. Future development planned in the area includes subdivisions with over 1,000 residential homes and the existing road is insufficient to meet future traffic needs. The road rehabilitation will widen the existing road into the right of ways and include curb and gutters, center median, new intersections and traffic signals, storm drain collection, and class I bike lanes. Geotechnical recommendations include multiple pavement design options included remove and replace, treated subgrade with HMA, and roller compacted concrete.

LITTLE CHICO CREEK BIKE/PEDESTRIAN PATH BRIDGE
CHICO, CA

Project Manager and Engineering geologist in charge of the geotechnical investigation for a new bridge. The project proposes to construct approximately 1,741 linear feet of multi-use Class 1 path and a pedestrian/bicycle bridge over Little Chico Creek. The pedestrian/bicycle path will close the gap between existing facilities located on both sides of the creek and improve the safety through the installation of lights and security cameras. The geotechnical study focused on the bridge foundation design. The proposed bridge is a prefabricated design that will span 110 feet. NV5 provided full foundation design in accordance with the Caltrans Highway Design Manual standards.

LAUREL AVENUE RECONSTRUCTION PROJECT
SUTTER COUNTY, CA

Project Manager and Engineering geologist in charge of the geotechnical investigation for the design of the reconstruction of Laurel Avenue, east of State Highway 99. The existing roadway is in poor condition with numerous areas

of alligator and longitudinal cracking observed in the pavement surface. Several rutted areas and potholes along the roadway alignment. Areas of ponded water adjacent to the roadway were present in areas along the southern portion of the roadway. The geotechnical recommendations included Pulverizing the existing asphalt concrete (AC) and aggregate base (AB) rock into the underlying native subgrade soil; Compacting the pulverized mixture of AC, AB rock and native subgrade soil; Placing and compacting new AB rock and a new AC wearing surface; and Placing new AC wearing surface as overlay.

CALIFORNIA STATE UNIVERSITY, CHICO, PEDESTRIAN BRIDGE

CHICO, CA

Project manager responsible for overseeing materials testing and inspection services during the construction of a pedestrian bridge and a pedestrian / emergency vehicle access bridge on campus. The bridges were on cast-in-drilled-hole piers with concrete abutments, steel frames, and concrete decks.

ORLAND LIFT STATION AND SEWER EXTENSION

ORLAND, CA

Engineering geologist and hydrogeologist for the design approach to construction of a lift station in an area where standard excavation methods were not possible. The depth of the proposed lift station was approximately 29 feet below the existing ground surface (bgs), and the 15-inch-diameter sewer pipe was placed at a maximum depth of approximately 21 feet bgs in an area underlain by cohesionless sand and gravel deposits and shallow groundwater at approximately 10 feet bgs. A subsurface investigation was conducted using a hallow stem auger drill rig to collect standard penetrometer test blow counts and undisturbed representative soil samples. An extraction well and four observation wells were constructed, and a 72-hour constant discharge aquifer pump test performed to determine the hydrogeological properties of a gravelly shallow aquifer and develop geotechnical engineering design recommendations for use by the dewatering contractor, shoring contractor, and sewer line trench backfill contractor. A preliminary coffer-dam sheet pile design with tie-back restraints was developed to allow the contractor to limit the trench width during construction. This design included analyses of groundwater flow nets and laboratory shear strength test results.

TURNTABLE BAY MARINA EVALUATIONS

LAKE SHASTA, CA

Engineering geologist and project geologist during multiple phases of subsurface site investigations for a new roadway and lakeside boat launch and resort. Performed kinematic slope stability analysis for determining the risk of planar, toppling, or wedge failures on proposed road cut alignments; provided recommendations for steep cut and fill slopes; performed seismic refraction surveys; and performed mechanically stabilized earth retaining wall evaluation and design. Provided value engineering for concrete soil amendment during slope grading construction and made recommendations for placement of large rock materials and engineered underwater fill for the boat ramp construction.

TEHAMA STREET SAFE ROUTES TO SCHOOL AND REHABILITATION

ORLAND, CA

Project Manager and engineering geologist for street and pedestrian sidewalk improvements. Tehama Street is located near the center of the City of Orland with a large portion of the existing paved roadway being designed for pavement rehabilitation that extends approximately 4,000 feet west to the existing railroad crossing, just east of 6th Street. This section of Tehama Street is in relatively poor condition with numerous areas of visible cracking and rutting. The City of Orland will grind the existing asphalt concrete (AC) and overlaying the existing road with new AC as well as construct new sidewalk, curb, gutter, and other roadway improvements.

CHICO VETERANS ADMINISTRATION OUTPATIENT CLINIC

CHICO, CA

Engineering geologist responsible for overseeing geotechnical engineering services for the development of the new Veterans Administration Outpatient Clinic in Chico, California. NV5 prepared a geotechnical report and reviewed the final plans for conformance with the report and construction quality assurance materials testing and special inspection services during construction. As part of the geotechnical and engineering services, NV5 performed the appropriate geological and geotechnical engineering investigations in accordance with the requirements of the 2016 California Building Code (CBC). NV5 prepared a geotechnical engineering investigation report that presented the findings, conclusions and recommendations for earthwork grading and structural improvements which were specific to the proposed improvements.

Heidi Cummings, PG, QSD/QSP

Senior Geologist/Project Manager

Chico, California
Heidi.Cummings@NV5.com
530.894.2487

EDUCATION

B.S. in Geology, California State University, Chico

REGISTRATIONS / CERTIFICATIONS

Professional Geologist, CA No. 7732
Qualified SWPPP Developer/ Practitioner, CA No. 00180

SPECIALIZED TRAINING

40-hour HAZWOPER
CPR/First Aid Certified
Qualified SWPPP Developer & Practitioner
High Performance Leadership Training
Certified Project Manager
Improving Hydrogeologic Analysis of Fractured Bedrock Systems

EXPERTISE

Geologic and hydrogeologic studies
Site characterization, assessment, and remediation
Contaminant transport evaluations
Compliance monitoring and reporting
Preliminary Endangerment Assessment
Phase I/II Environmental Site Assessment
Initial Site Assessment
Preliminary Site Assessment
Water Quality Monitoring and Permitting
Storm water compliance

AFFILIATIONS

Geoprofessional Business Association
Association of Engineering & Environmental Geologists (AEG)
Groundwater Resources Association
California State University, Chico, Professional Advisory Board, Geological & Environmental Sciences

Heidi Cummings, PG, is a Senior Geologist with 20 years of experience. Ms. Cummings specializes in site characterization and cleanup under DTSC's expedited CERCLA process. Her expertise includes hazardous substances site investigation, geologic and hydrogeologic investigation, remedy evaluation, remedial design, remediation monitoring and quality assurance, and site certification for federal, state, county, and private projects.

Ms. Cummings is experienced with geospatial analysis and the development of monitoring and reporting programs; analysis of aquifer test data and extraction system data; geologic and hydrostratigraphic sections; and design of extraction and monitoring well systems. She is responsible for quality control and technical review of sampling and analysis plans, health and safety plans, monitoring compliance reports, remedial investigation reports, corrective action plans and feasibility studies.

Project Experience

CITY OF CHICO MS4 PERMIT WATER QUALITY MONITORING -BIG CHICO CREEK

CHICO, CA

Ms. Cummings was responsible for review and update of the City's water quality monitoring Quality Assurance Project Plan. Ambient water quality monitoring and Bioassessment activities were being performed at three locations within Big Chico Creek. Based on review of the MS4 permit, Ms. Cummings was able find cost savings for the City by eliminating one monitoring station from the City's program while remaining in compliance with the provisions of the permit. During 2019 and 2020 she implemented the City of Chico's MS4 permit receiving water monitoring program within Big Chico Creek. This phase of the project included collection of surface water and sediment samples for field and laboratory analysis, preparation of periodic reports, electronic deliverables for upload to the State Water Resources Control Board CEDEN database, and coordination with the City's bioassessment contractor.

CITY OF CHICO HUMBOLDT ROAD BURN DUMP AND PRIVATE PROPERTIES OPERABLE UNITS, GROUNDWATER MONITORING AND REPORTING

CHICO, CA

Currently providing hydrogeological services to perform facility inspections, groundwater and leachate monitoring, stormwater inspections and annual reporting for the closed landfill waste management units. Annual reporting includes preparation of data tables, maps, summary of inspections, and a compliance evaluation. Ms. Cummings has provided the hydrogeological services to the City of Chico since 2016. The facilities have remained in compliance with their respective waste discharge requirements issued by the Regional Water Quality Control Board during her tenure with the project.

CITY OF CHICO BASELINE PYRETHROID MONITORING PLAN

PLACER COUNTY, CA

Provided environmental services to develop a pyrethroid pesticide baseline monitoring plan. The plan included procedures for the sampling of surface water and sediment from three instream locations within the City limits to assess the presence of pyrethroid pesticides. The plan was completed on time and within budget and submitted to the RWQCB.

CLOSED LINCOLN LANDFILL, CITY OF LINCOLN

PLACER COUNTY, CA

Provided hydrogeological services to prepare a conceptual site model (CSM) to assess the sources and extent of a contaminant plume emanating from the landfill property. Using the results of the CSM, she designed a perimeter cutoff trench dewatering system to prevent contamination of groundwater at the site. The cutoff trench lowered the groundwater level to below the bottom of the waste and extracted the existing plume to meet the requirements of the California Water Quality Control Board. Provided construction oversight and construction quality assurance (CQA) observation and materials testing services during construction and operation and maintenance (O&M) activities, including extraction system startup, monitoring and reporting. The innovative design for this project saved the City of Lincoln approximately $12 million. In 2016, the project earned state and national awards for Environmental Engineering Services from the Sacramento Chapter of the American Public Works Association (APWA), CalGeo and American Council of Engineering Companies.

SHASTA ELEMENTARY SCHOOL EXPANSION DTSC CERTIFICATION

CHICO, CA

Project manager responsible for conducting a Preliminary Endangerment Assessment (PEA), Human Health Risk Assessment (HHRA), Removal Action Work Plan (RAW), and a Removal Action Completion Report (RACR) under the California EPA Department of Toxic Substances Control (DTSC) expedited CERCLA process for an elementary school expansion site adjacent to Shasta Elementary School in Chico, California. Contaminants of concern included lead paint and termiticides, dioxins and furans in the burn waste, and polychlorinated biphenyls (PCBs) associated with historical transformers. Risk management decisions were driven by lead and organochlorinated pesticides (OCPs) in soil. In addition, petroleum hydrocarbons and arsenic were present in the site soil. The site was successfully remediated under DTSC oversight.

FEATHER RIVER HOSPITAL, POTENTIAL PROPERTY PURCHASE PHASE I/II ESA

CHICO, CA

Reviewed historically documented environmental conditions and managed a Phase II Environmental Site Assessment of a 39-acre for an existing golf course and two industrial properties used for asphalt and asphalt sealant production prior to purchase by the Adventist Health Feather River. Conditions included use of hazardous substance and petroleum product storage and unauthorized release. The preliminary Phase II ESA identified petroleum hydrocarbons and metals in soil at concentrations exceeding screening levels. Prepared a work plan for supplemental Phase II ESA for additional sampling of surface water, groundwater and soil. Implemenation of the sampling program included trenching and air rotary drilling to further characterize the extents of previously identified contaminants and evaluate the presence of contaminants in site media. Current work inlcudes drilling and design/installation of groundwater monitoring wells to facilitate ongoing groundwater monitoring of a diesel fuel plume.

FINGER'S LANDFILL

ROCKLIN, CA

Provided site characterization services for partial clean closure of the landfill. Ms. Cummings and team members were responsible for preparing the Supplemental Site Characterization Work Plan to assess the nature and extents of the waste within the landfill. She developed an in-waste drilling program to collect samples of the waste for material identification, chemical analysis, assess the presence of landfill gas leachate and evaluate the presence of contaminants in the native subgrade material. The data generated during the field effort were used in developing an Engineering Feasibility Study, Waste Segregation Plan and Revised Post Closure Maintenance Plan. Additional elements of the project included public participation, preparing and implementing dust mitigation and traffic plans. The objective of the investigation was to support the decision-making process involved in redevelopment of the property for commercial land use. All planning documents were subject to Regional Water Quality Control Board approval.

COMANCHE CREEK GREENWAY IMPROVEMENT PROJECT

CHICO, CA

Ms. Cummings performed a Phase I Environmental Site Assessment for the 10.2 acre linear property within an industrial and residential part of south Chico. The City's project plans include development of the entire property as public open space, a Class I multi-use pathway and the City plans to construct a sewer line extension along the length of the property. Ms. Cummings performed historical review of the former railway corridor and identified several recognized environmental conditions including the potential for polychlorinated biphenyls (PCB) from electrical transformers, aerially deposited lead from vehicle emissions, asbestos containing materials in concrete structures, a variety of contaminants associated with the railway corridor historical land use and the potential for groundwater contamination beneath the site from neighboring properties with hazardous materials releases. Based on Ms. Cummings experience, she was able to defer all sampling and laboratory analysis to the construction phase limiting the cost associated with project planning.

Nevada City, California
Jason.Muir@NV5.com
530.478.1305

EDUCATION

M.S. Environmental Engineering, U.C. Berkeley
B.A. Environmental Science, U.C. Berkeley

REGISTRATIONS/CERTIFICATIONS

Professional Engineer, CA No. 60167
Geotechnical Engineer, CA No. 2697
OSHA HAZWOPER Supervisor
Qualified SWPPP Developer/ Practitioner

EXPERTISE

Preliminary Endangerment Assessment (PEA)
Engineering Evaluation/Cost Analysis (EE/CA)
Human Health Risk Assessment (HHRA)
Phase I Environmental Site Assessment (ESA)
Initial Site Assessment (ISA)
Phase II Site Investigation (PSI/SI)
Ecological Scoping Assessment (ESA)
Ecological Predictive Assessment (Eco PA)
Ecological Validation Study
Construction Quality Assurance (CQA)
Construction Management (CM)
Mine Waste Characterization (Title 27/Non-15)
Mine Reclamation Planning (SMARA)
Water Quality Monitoring and Permitting
Contaminant Transport Modeling
Geotechnical Investigation and Design

AFFILIATIONS

Geoprofessional Business Association
American Society of Civil Engineers
Engineer's Association of Nevada County
Association of Drilled Shaft Contractors
Placer Architects, Geologists, Engineers, and Surveyors

Jason W. Muir, PE, GE

Manager, Environmental Division
Associate Engineer

Mr. Muir is a California registered Civil Engineer and Geotechnical Engineer and holds a Master of Science in Environmental Engineering from the University of California at Berkeley. He has been in the industry for 25 years.

His professional background includes hazardous materials site characterization, risk assessment and remediation under CERCLA, water quality evaluation and permitting under the California Water Code and Title 27, and mine reclamation under SMARA. Mr. Muir performs hazardous substances exposure assessment and statistical analysis as well as predictive human health and ecological risk assessment to support hazardous substances site characterization and remediation.

Mr. Muir has provided characterization, risk assessment, remedial design and/or quality assurance for over three dozen sites regulated by the California Department of Toxic Substances Control (DTSC). He and his team have characterized over 3,000 acres of land in California, and they have participated in eight USEPA Brownfield assessment and cleanup projects. Mr. Muir currently leads a USEPA Brownfields assessment coalition grant.

He and his team have performed more than 500 Phase I/II environmental site assessments including municipal, commercial, and transportation improvement projects, characterizing and mitigating environmental conditions related to hydrocarbon and solvent releases, unpermitted waste disposal sites, abandoned mine features, underground storage tanks, lead-containing paint, naturally occurring asbestos, aerially deposited lead and pesticide residuals pursuant to local, state, and federal guidelines.

Mr. Muir also oversees solid waste facility permitting and reclamation planning; water quality monitoring; storm water permitting, design and monitoring; waste discharge permitting and development of water quality protection standards; and spill prevention, control and cleanup planning.

Project Experience

DTSC/USEPA YUBA RIVER CHARTER SCHOOL HAZARDOUS MATERIALS ASSESSMENT AND CLEANUP

GRASS VALLEY, CA

Project manager for site characterization, risk assessment and remedial action planning related to cleanup of an unpermitted disposal site for development of a new elementary school campus. NV5's site investigation, risk assessment and Removal Action Work Plan (RAW) were approved by DTSC. The approved cleanup plan facilitated the award of a USEPA Brownfields cleanup grant of $600,000. Mr. Muir oversaw the remedial quality assurance (QA) testing and inspection in 2015, and the property was certified by DTSC for school construction. Mr. Muir subsequently managed quality assurance services during school construction and the school opened for the 2018-19 school year.

DTSC/USEPA BROWNFIELDS COALITION ASSESSMENT, GOLD COUNTRY COALITION

NEVADA COUNTY, CA

Project manager for $600,000 USEPA Coalition Assessment Grant awarded to the Gold Country Coalition (Grass Valley, Nevada City and Nevada County). Mr. Muir oversees site characterization and cleanup planning for key Brownfields cleanup sites for residential and commercial reuse. Site assessments include human health and ecological risk assessment and water quality evaluation overseen by the USEPA and the California DTSC. NV5 is currently in year 2 of this three-year project.

DTSC/USEPA BROWNFIELDS CLEANUP DESIGN, SOUTH AUBURN STREET PROPERTIES

GRASS VALLEY, CA

Conducted hazardous materials site investigation (SI) to characterize heavy metals including mercury in a proposed residential area and wetland impacted by 16,000 cubic yards of mine tailings, as well as historical aerial deposition of contaminants from nearby historical milling processes. Services included SI, human health risk assessment (HHRA), ecological scoping assessment (ESA), ecological predictive assessment (PA) and validation study, and preparation of a cleanup plan (RAW).

DTSC SHASTA ELEMENTARY SCHOOL INVESTIGATION AND REMEDIATION

CHICO, CA

Performed risk assessment and technical review for Preliminary Endangerment Assessment (PEA), Removal Action Work Plan (RAW), and a Removal Action Completion Report (RACR) under the DTSC expedited CERCLA process for an elementary school expansion. Contaminants of concern included lead paint and termiticides, dioxins and furans in the burn waste, and PCBs, as well as petroleum hydrocarbons and arsenic in soil. The site was successfully remediated under DTSC oversight.

MALAKOFF DIGGINS STATE HISTORIC PARK SEDIMENT AND MERCURY ABATEMENT INITIATIVE

NEVADA COUNTY, CA

Project manager for engineering evaluation of sediment and mercury control at Malakoff Diggins State Historic Park for a 330-acre hydraulic mining pit. Evaluated passive technologies to reduce sediment and mercury discharge to Humbug Creek and the South Yuba River.

NID COMBIE RESERVOIR SEDIMENT AND MERCURY REMOVAL PROJECT

MEADOW VISTA, CA

Project manager for three-year sediment and mercury removal project funded by the California Department of Water Resources (DWR) and Nevada Irrigation District (NID), including the removal of over 50,000 tons of sediment and associated mercury from the reservoir, permitting and regulatory compliance, water quality monitoring and performance monitoring.

DTSC BEAR RIVER MILL SITE RDIP

GRASS VALLEY, CA

Project manager for site characterization and preparation of Remedial Design and Implementation Plan (RDIP) for approximately 15,000 cubic yards of mine waste rock and tailings to be consolidated at the former Bear River Sawmill site located centrally within the property. Previously developed land use controls and obtained DTSC certification for southern portion of the property on behalf of the County of Nevada, and performed a geotechnical engineering investigation for the proposed Nevada County Operations Center currently under design. Previously obtained DTSC certification for industrial use of the eastern and western portions of the property on behalf of Golder Associates.

DTSC SPRING HILL MINE RAW

GRASS VALLEY, CA

Project manager responsible for a PEA and RAW approved by DTSC for the consolidation and capping of 60,000 cubic yards of mill tailings associated with a former tailings pond and associated mine waste rock. The approved cleanup plan allows most of the mine waste to be used as engineered fill for a proposed commercial center, while a

portion of the tailings will be removed and disposed as Class I hazardous waste.

SR 49 DORSEY DRIVE INTERCHANGE

GRASS VALLEY, CA

Managed hazardous materials characterization for naturally occurring heavy metals for this award-winning project. The project included construction of northbound and southbound on- and off-ramps from SR 49; re-alignment of an existing frontage road; and extensive cuts and fills up to 65 feet in height.

MEADOW VISTA LANDFILL

PLACER COUNTY, CA

CQA engineer during landfill closure activities. Revised design of leachate collection and recovery system and facilitated improvements to gas extraction system, storm drain system and joint trench hydrostatic pressure release.

McCOURTNEY ROAD LANDFILL

NEVADA COUNTY, CA

Project manager for CM and CQA during facility improvements, including earthwork repairs and pump station installation, as well as post-closure monitoring and maintenance of the facility. Prepared Report of Waste Discharge and negotiated a reduction in leachate and groundwater monitoring during update of Waste Discharge Requirements. Prepared Final Closure Plan for surface impoundment and Post Closure Maintenance Plan for landfill units. Supervised settlement surveys and prepared liner repair plans and specifications to address settlement issues. Evaluated anomalous constituent concentrations in groundwater considering the interaction with landfill gas and leachate constituents. Performed hydrogeologic evaluation regarding drawdown in adjacent wells resulting from groundwater extraction at the facility. Project engineer for closure of two landfill units.

RIDGE ROAD REHABILITATION PROJECT

SIERRA COUNTY, CA

Project manager in charge of hazardous materials Initial Site Assessment (ISA) and Site Investigation (SI) (Phase I/II Environmental Site Assessment) under Caltrans review for a 2.6-mile road improvement project in Sierra County. SI included soil sampling and analysis along the improvement corridor for aerially deposited lead (ADL), naturally occurring asbestos (NOA) and targeted assessment for historical mine features. Classified soil pursuant to Caltrans guidelines and provided management alternatives.

WATER QUALITY, MINING AND WASTE MANAGEMENT

NORTHERN CALIFORNIA

Project manager for the waste characterization and waste discharge requirements under Title 27 for numerous surface mines and waste management units in northern California. Working closely with the California Regional Water Quality Control Board, Mr. Muir has permitted mine sites and solid waste facilities in the counties of Calaveras, Nevada, Placer, Sierra, Siskiyou, and Yuba.

Craig Bourne, PG

Project Geologist/Field Task Lead

Chico, California
Craig.Bourne@NV5.com
530.894.2487

EDUCATION
B.S. in Geology, California State University, Chico

REGISTRATIONS / CERTIFICATIONS
Professional Geologist, CA No. 8564

SPECIALIZED TRAINING
40-hour HAZWOPER
CPR/First Aid Certified

EXPERTISE
Geologic and hydrogeologic studies
Site characterization, assessment, and remediation
Contaminant transport evaluations
Compliance monitoring and reporting
Phase I/II Environmental Site Assessment
Water Quality Monitoring and Permitting
Storm water compliance
Operation and maintenance of remediation systems

Craig Bourne, PG, is a Project Geologist with 7 years of experience. Mr. Bourne specializes in hydrogeologic investigations, monitoring, and remediation. His expertise includes geologic and hydrogeologic investigations, remedy evaluation, remedial design, remediation monitoring, and operation and maintenance of groundwater and soil vapor remediation systems.

Mr. Bourne is experienced with the development of monitoring and reporting programs; analysis of groundwater and soil vapor data; geologic and hydrostratigraphic sections; and design and maintenance of extraction and monitoring well systems. He is responsible for preparation of sampling and analysis plans, health and safety plans, monitoring compliance reports, remedial investigation reports, corrective action plans and feasibility studies.

Project Experience

CITY OF CHICO MS4 PERMIT WATER QUALITY MONITORING - BIG CHICO CREEK
CHICO, CA

Responsible for ambient water quality monitoring and reporting associated with the City of Chico's MS4 Receiving Water Monitoring Program for Big Chico Creek. Mr. Bourne's responsibilities include collection of surface water samples for field and laboratory analysis, preparation of periodic reports and preparation of electronic deliverables for upload to the State Water Resources Control Board CEDEN database.

HAMILTON UNION HIGH SCHOOL EXPANSION DTSC CERTIFICATION
HAMILTON CITY, CA

Assisted in conducting a Preliminary Endangerment Assessment (PEA) and Human Health Risk Assessment (HHRA) under the California EPA Department of Toxic Substances Control (DTSC) expedited CERCLA process for a high school expansion site in Hamilton City, California. Contaminants of concern included metals and pesticides from historic agricultural uses and polychlorinated biphenyls (PCBs) associated with historical transformers. Risk management decisions were driven by lead and organochlorinated pesticides (OCPs) in soil. In addition, petroleum hydrocarbons and arsenic were present in the site soil. The site was successfully evaluated under DTSC oversight and the project is moving forward.

FEATHER RIVER HOSPITAL, POTENTIAL PROPERTY PURCHASE PHASE I/II ESA
CHICO, CA

Reviewed historically documented environmental conditions and assisted in a Phase II Environmental Site Assessment of a 39-acre site of an existing golf course and two industrial properties used for asphalt and asphalt sealant production prior to purchase by Adventist Health Feather River. Assisted in preparation and implementation of a work plan for supplemental Phase II ESA for additional sampling of surface water, groundwater and soil. Implemenation of the sampling program included trenching and air rotary drilling to further characterize the extents of previously identified contaminants and evaluate the presence of contaminants in site media.

NEAL ROAD RECYCLING AND WASTE FACILITY – CLEAN CLOSURE OF SEPTAGE IMPOUNDMENT

CHICO, CA

Developed and implemented a sampling plan for confirmation sampling during the clean closure of the septage pond at the Neal Road landfill in Chico, California. Pre-excavation and post-excavation samples were collected for characterization of the waste and investigation of potential impacts beneath the landfill liner. Confirmation sampling involved the collection of 240 integrated samples within a sampling grid covering the pond footprint.

HUMUBOLT ROAD BURN DUMP OPERABLE UNIT AND PRIVATE PROPERTIES OPERABLE UNIT

CHICO, CA

Currently providing hydrogeological services to perform facility inspections, groundwater and leachate monitoring, stormwater inspections and annual reporting for the closed landfill waste management units. Mr. Bourne prepared the 2019 annual report which includes preparation of data tables, maps, summary of inspections, and a compliance evaluation.

FORMER SIERRA FARMS #2

GEORGETOWN, CA

Currently providing hydrogeological services to perform site characterization and corrective action related to a historical release of petroleum hydrocarbons from underground storage tanks and associate fuel island and conveyance piping. Mr. Bourne is the field task lead and is responsible for overseeing the drilling subcontractor during direct push and hollow stem auger drilling, monitoring well design, soil sample collection, well development and collection of borehole data including lithologic and hydrogeologic informtion.

TA TRAVELCENTERS GROUNDWATER EXTRACTION AND TREATMENT SYSTEM

CORNING, CA

Responsible for the installation of groundwater-extraction wells for a carbon filtration system at the TA TravelCenter in Corning, California. Later, after an ozone treatment element was added to the system, Mr. Bourne performed regular monitoring and maintenance of the extraction and treatment systems. Additionally, Mr. Bourne performed compliance monitoring and reporting in accordance with the system's waste discharge requirements.

ERIC FRASKE, PE

Senior Engineer

SITE ASSESSMENT & REMEDIATION | ENVIRONMENTAL
Long Beach, CA
Eric.Fraske@altaenviron.com
562.495.5777

EDUCATION
BS, Civil Engineering, Michigan State University, 2004

EXPERIENCE
15 years

REGISTRATIONS
Registered Professional Engineer (Civil), California (#C76976)

Nevada Certified Environmental Manager (#EM2244)

US Occupational Safety & Health Administration (OSHA) 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Certification

Eric Fraske is a California Professional Engineer and a Senior Project Manager at Alta/NV5. He began working in the environmental industry 15 years ago and has since expanded his skill set to include project management, environmental site assessment, characterization, remediation, and property condition assessment. Mr. Fraske has managed Phase I Environmental Site Assessments (ESAs) and Phase II ESAs of numerous commercial properties as part of due-diligence and property acquisitions.

Project Experience

CHROME NICKEL PLATING PFAS ASSESSMENT
LYNWOOD, CA

Prepared the work plan for the assessment of per- and polyfluoroalkyl substances (PFAS) at the Chrome Nickel Plating facility in Lynwood, California. The work plan for assessment was prepared to satisfy the requirements of the State Water Resources Control Board (State Water Board) Order for assessment of PFAS concentrations in soil, groundwater, storm water runoff, and effluent wastewater at chrome plating facilities (Order No. WQ 2019-0045-DWQ) issued in October 2019. NV5 developed a scope of work consisting of soil sampling and wastewater effluent facility in areas of known PFAS chemical usage. Sampling will commence upon approval of the submitted work plan by the State Water Board.

ONTARIO INTERNATIONAL AIRPORT PFAS ASSESSMENT
ONTARIO, CA

Acted as technical reviewer for the PFAS assessment at the Ontario International Airport. The assessment consisted of collection and analysis of groundwater samples from existing groundwater monitoring wells and shallow soil sampling at areas of historical PFAS containing material use.

LAX LANDSIDE ACCESS MODERNIZATION PROGRAM (LAMP) PHASE I ESA
LOS ANGELES, CA

Conducted and managed a Phase I ESA of the automated people mover route that is part of the proposed LAX Landside Access Modernization Program. Multiple properties both along and nearby the route were assessed to identify potential environmental concerns that might impacted the construction process.

LAUSD PRELIMINARY ENDANGERMENT ASSESSMENTS (PEA)
LOS ANGELES, CA

Managed and conducted PEA assessments on three school campuses for the Los Angeles Unified School District (LAUSD). Sampling activities included public participation and notification, geophysical surveys, and the collection of soil and soil vapor samples throughout each campus. The PEA's identified areas of lead, arsenic, and pesticide impacted soils at each campus.

Project Experience (Continued)

LAUSD REMOVAL ACTION WORKPLANS (RAW)

SAMPLE MARKET SECTOR | LOCATION CITY, ST

Developed and prepared soil removal action workplans for shallow impacted soils at two LAUSD District campuses.

EDWARDS AIR FORCE BASE SPCC PLAN UPDATE

KERN COUNTY, CA

Managed and prepared the 5-year update to the spill prevention, control, and countermeasure plan for Edwards Air Force Base. Challenges included coordinating access to over 250 above ground storage tanks, fuel pipelines, and remote storage facilities located throughout a 301,000-acre Air Force Test and Research Center.

FORMER PLATING FACILITY CLOSURE SERVICES

SAN JOSE, CA

Managed the closure of a former plating operation in San Jose, California. Developed and implemented the site-specific closure plan for the removal of all hazardous materials and waste water treatment system. Closure sampling was completed under the supervision of the local Fire Department and County Health Department in Summer 2017.

FORMER DRY CLEANER SITE ASSESSMENT

GARDEN GROVE, CA

Supported the assessment, monitoring, pilot study, and remedial action plan design and implementation for a former dry-cleaning facility in Garden Grove, California. Remedial activities included the excavation and disposal of shallow soils impacted with chlorinated solvents from both the interior and exterior of the former dry cleaner tenant space. A bio-amendment injection program was selected for the groundwater remedial program following bench testing, in-situ amendment product testing, and a full-scale pilot test.

Work Experience

PHASE I AND PHASE II ESAS

SOUTHWESTERN U.S.

Personally prepared over 1,000 Phase I and Phase II ESAs throughout the Southwestern United States. Project sites have included multi-family housing, industrial facilities, commercial retail properties, hotels, and office properties. Notable project sites have included: the Kodak Theater, the Beverly Hills Hilton, Sony Picture Studios, the Los Angeles Memorial Coliseum, West Coast Customs Corona facility, the Hotel Del Coronado, GoPro Headquarters, Marine Corps Air Station Miramar, former Nike Missile Base Pointe Vicente, and the Google Venice Campus.

FORMER GASOLINE STATION RELEASE SITES

SOUTHERN CALIFORNIA

Performed site assessment, remedial design and oversite, and monitoring activities for multiple underground storage tank release sites located throughout Southern California. Remedial methods employed have included soil-vapor extraction, source removal, and monitored natural attenuation. Worked with multiple regulatory agencies to achieve site closure through cost effective remedial solutions including low-threat closure assessment.

HAZARDOUS WASTE TANK ASSESSMENTS

CALIFORNIA

Managed and conducted hazardous waste tank assessments in accordance with California Code of Regulations Title 22 66265.192. Personally conducted assessments at various automotive repair facilities, aerospace, and other manufacturing facilities.

BINA PATEL

Associate Consultant II

SITE ASSESSMENT & REMEDIATION | ENVIRONMENTAL

Long Beach, CA
Bina.Patel@altaenviron.com
562.495.5777

EDUCATION

MS, Earth Science, University of California, San Diego, 2014

BS, Earth Science, University of California, San Diego, 2013

EXPERIENCE

5 years

TRAINING

US Occupational Safety & Health Administration (OSHA) 40-hour Hazardous Waste Operations and Emergency Response Certification (HAZWOPER)

Ms. Patel has five years of experience in environmental site assessment and remediation, focusing on air, soil, and groundwater projects. She is experienced in Phase I site assessment, Phase II site investigations, site characterization, soil excavation, environmental drilling and soil sampling, soil vapor probe installation and sampling, groundwater well installation, and groundwater monitoring and sampling. Her responsibilities include managing projects and field work including contractor oversight and compliance, sampling and soil and groundwater assessment, technical reporting, proposal writing, and drafting figures.

Project Experience

ONTARIO INTERNATIONAL AIRPORT PFAS ASSESSMENT

ONTARIO, CA

Managed and personally conducted the per- and polyfluoroalkyl substances (PFAS) assessment at the Ontario International Airport. The assessment consisted of collection and analysis of groundwater samples from existing groundwater monitoring wells and shallow soil sampling at areas of historical PFAS containing material use.

CHROME NICKEL PLATING PFAS ASSESSMENT

LYNWOOD, CA

Assisted with the preparation of the work plan for the assessment of PFAS at the Chrome Nickel Plating facility in Lynwood, California. The work plan for assessment was prepared to satisfy the requirements of the State Water Resources Control Board (State Water Board) Order for assessment of PFAS concentrations in soil, groundwater, storm water runoff, and effluent wastewater at chrome plating facilities (Order No. WQ 2019-0045-DWQ) issued in October 2019. NV5 developed a scope of work consisting of soil sampling and wastewater effluent facility in areas of known PFAS chemical usage. Sampling will commence upon approval of the submitted work plan by the State Water Board.

LAX TERMINAL 1 & TERMINAL 2 GROUNDWATER MONITORING

LOS ANGELES, CA

Field manager for soil sampling and drilling program of temporary groundwater monitoring wells. Duties included logging borehole cuttings and core samples, collecting samples for chemical analysis, and oversight of groundwater sampling. Assisted in semi-annual groundwater monitoring and sampling events at Terminal 1 and Terminal 2 of Los Angeles International Airport.

REFERENCES

Client references for the projects described in the Executive Summary section of this proposal are listed in the table below. Additional references are available upon request.

Project Name	**Chrome Nickel Plating PFAS Assessment**
Project Description	NV5 prepared a work plan for a PFAS assessment for the Chrome Plating facility pursuant to State Water Resources Control Board Order No. WQ 20196-0045-DWQ. The work plan is pending Water Board approval.
NV5 Key Staff Members	Eric Fraske, PE
Client Reference	Wendie Chen Bowman Field, Inc., Chrome Nickel Plating wendie@chrome1.com
Project Name	**Preliminary Assessment PFAS Ontario International Airport**
Project Description	NV5 performed soil and groundwater sampling, laboratory analysis and reporting for PFAS investigation similar to the City of Chico Municipal Airport scope of work.
NV5 Key Staff Members	Eric Fraske, PE Project Manager; Bina Patel, Field Task Leader
Client Reference	Keith G. Owens, PE – Director of Program Management Ontario International Airport (951) 741-2785 kowens@flyontario.com
Project Name	**City of Oroville Airplane Crash Site – Preliminary PFAS Investigation**
Project Description	NV5 provided scoping services for the City's preliminary PFAS investigation and is in contract negotiations with the City of Oroville to perform soil sampling and PFAS laboratory analysis and reporting.
NV5 Key Staff Members	Heidi Cummings, PG: Project Manager Craig Bourne, PG: Field Geologist
Client Reference	Mr. Matt Thompson, PE City of Oroville Engineering (530) 538-2507 mthompson@cityoforoville.org
Project Name	**Adventist Health Feather River**
Project Description	Phase I ESA/Phase II ESA, Drilling and Sampling Soil and Groundwater, Monitoring well construction and groundwater monitoring
NV5 Key Staff Members	Heidi Cummings, PG, Project Manager; Craig Bourne, PG; Project Geologist
Client Reference	Don Nanney, Esq. (Client Representative) Adventist Health Feather River (530) 751-4010 gonzale@ah.org
Project Name	**Humboldt Road Burn Dump Operable Unit (HRBDOU) Monitoring and Reporting**
Project Description	NV5 provides annual monitoring and on-call stormwater inspection, flow measuring and sampling events for the HRBDOU and adjacent Private Properties Operable Unit.
NV5 Key Staff Members	Heidi Cummings, PG, Project Manager; Craig Bourne, PG; Project Geologist
Client Reference	Chris Duffey, PE, Associate Engineer City of Chico Public Works – Engineering (530) 879-6913 chris.duffey@chicoca.gov

Project Name	Shasta Elementary School Expansion DTSC Cleanup and Certification
Project Description	NV5 obtained DTSC site certification for this school expansion project in the Chico Unified School District. Services included hazardous substances site investigation, human health risk assessment, cleanup planning, community outreach, remediation quality assurance and record document preparation.
NV5 Key Staff Members	Heidi Cummings, PG, Project Manager; Shane Cummings (PIC); Jason Muir, PE, Quality Assurance
Client Reference	Julie Kistle, Director Facilities and Construction Chico Unified School District (530) 891-3140 jkistle@chicousd.org

COST PROPOSAL

NV5 prepares a cost proposal detailing the time and cost associated with implementing the Work Plan. The fee estimate is based on NV5's 2020 Fee Schedule. Details including professional staff time, hourly rates, materials and expenses and subcontractor fees are presented in the separate sealed envelope included with this proposal.

The following assumptions were used to develop the cost proposal:

- Each of the laboratory trip, field and equipment blanks defined in the Work Plan will be analyzed. If fewer blank samples are needed, then the fee for these samples will remain unbilled to the client.
- Meetings conducted will be held either by phone or virtual platform; no travel fees are included for attendance at meetings unless held at the site.

Attachment B

2019

Per- and Polyfluoroalkyl Substances (PFAS) Sampling Guidelines

CALIFORNIA STATE WATER QUALITY CONTROL BOARD

DIVISION OF WATER QUALITY

Water Boards

March 20, 2019

TABLE OF CONTENTS

1.0 INTRODUCTION

Per- and polyfluoroalkyl substances (PFAS) are a class of manufactured compounds that are extensively used to make everyday items more resistant to stains, grease, and water. These chemicals have been used in a variety of industrial, commercial, and consumer products. Some of these products could be present and/or used during a routine sampling event, such as plastic bags and bottles, waterproof clothing, detergents, and waterproof pens and paper. The use of these products could possibly contaminate the samples during sample collection (including preparing the sampling site, actual sample collection, decontamination, and shipment).

The probability of false positives is relatively high during PFAS sample collection due to the potential for many sources of cross-contamination, combined with low laboratory detection limits (nanograms per liter, ng/L; or parts per trillion, ppt), and as such, care must be taken in the design and implementation of a PFAS sampling program. This guidance will provide steps to take to help you avoid potential sample contamination.

2.0 GENERAL SAMPLING GUIDELINES

Before conducting any PFAS sampling, it is recommended that a project-specific Quality Assurance Project Plan (QAPP) be developed. The QAPP should include the 24 elements identified by EPA guidance that describe the project's goals, data needs and assessment, responsible individuals, quality assurance plan, quality control measures, and reporting deadlines. The QAPP elements (e.g., analyte list, method of analysis, environmental matrices, and reporting limits) are based on the project objectives.

The QAPP should clearly identify potential cross-contamination sources. These can include water used during drilling or decontamination, materials used within the sampling environment, sampling equipment, field clothing and personal protective equipment (PPE), sun and biological protection products, food packaging, and the environment itself.

Additional guidelines for the preparation of a QAPP can be found in the Water Boards QAPP Development Resources website (https://www.waterboards.ca.gov/water_issues/programs/quality_assurance/qapp.html) and U.S. Environmental Protection Agency's (EPA) *Guidance for Quality Assurance Project Plans*, EPA QA/G-5 (dated December 2002) and also located here: https://www.epa.gov/quality/guidance-quality-assurance-project-plans-epa-qag-5.

Sampling materials and field supplies for the purposes of sampling for PFAS are divided into three groups:

1. Allowable materials: These materials are proven not to be sources of PFAS cross contamination and can be used during all sampling stages in the immediate sampling environment.
2. Staging area-only materials: These materials may contain PFAS and should not come into direct contact with the sample but can be used in the staging area away from sample bottles and equipment. Care should be taken to thoroughly wash hands and don new gloves after handling any of these materials.
3. Prohibited materials: These include items that are well-documented to contain PFAS and may present a threat to the integrity of the sample.

2.1 PERSONAL PROTECTIVE EQUIPMENT AND FIELD CLOTHING

Any field planning and mobilization effort should address the physical, chemical, and biological hazards associated with each PFAS site. The mitigation of potential risks should be documented in a site-specific health and safety plan (HASP). The HASP should identify personal protective equipment (PPE) that is free of PFAS materials to avoid cross-contamination.

PFAS are used to coat various clothing and leather products to repel water, oil, and dirt. While preparing for sampling, attention should be paid on clothing that is advertised as having waterproof, water-repellant, or dirt and/or stain resistant characteristics. These types of clothing are most likely to have had PFAS used in their manufacturing.

Allowable materials	Staging area materials	Prohibited materials
• Well-laundered synthetic or 100% cotton clothing (with most recent launderings not using fabric softeners) • Powderless nitrile gloves • Waterproof clothing made of or with polyurethane, PVC, wax-coated fabrics, rubber, neoprene • Boots made of polyurethane and/or PVC	• If the HASP requires a specific type of boot (such as steel-toed), and PFAS-free cannot be purchased, PFAS- free over-boots may be worn. The over-boots must be put on, and hands washed after donning the over-boots before the beginning of sampling activities. Over-boots may only be removed in the staging area and after the sampling activities are completed. • Application of approved sunscreens and insect repellants (see below).	• Water/stain/dirt-resistant treated clothes (including but not limited to Gore-Tex™, Scotchgard™, RUCO®, etc.) • New unwashed clothing • Clothes recently washed with fabric softeners • Clothes chemically treated for insect resistance and ultraviolet protection • Coated Tyvek® • Latex gloves

There are many often-used and industry standard PPE items that may be required to be used during sampling events that have not been completely evaluated, including hard hats, safety glasses, and Tyvek®. If use of these items is required, they should be screened by reviewing the safety data sheets (if available) and/or collecting an equipment blank prior to use.

2.2 SUN AND BIOLOGICAL PROTECTION

Because biological hazards (sunburn, mosquitos, ticks, etc.) may be encountered during sampling, the elimination of specific clothing materials or PPE (sunscreens and insect repellants) could pose a health and safety hazard to staff.

The safety of staff should not be compromised by fear of PFAS-containing materials without any scientific basis. Personal safety is paramount. Any deviation from this guidance, including those necessary to ensure the health and safety of field staff, should be recorded in field notes and discussed in the final report.

Prolonged sun exposure will require sunscreens, which may include PFAS in their manufacture. Protection against insects may require the use of insect repellant. The words "natural" and/or "organic" in a product name or used to describe it does not mean that it is PFAS-free. Below is a detailed list of sunscreens and insect repellants that have been analyzed and found to be PFAS-free. Note that this is not a comprehensive list of allowable insect repellants or sunscreens; other products may meet the

requirements for use. Listing or omission of any product does not imply endorsement or disapproval. Also, there is no guarantee that these products will always remain PFAS free.

- Allowable Insect Repellants:
  - OFF Deep Woods
  - Sawyer Permethrin
  - Jason Natural Quit Bugging Me
  - Repel Lemon Eucalyptus Insect repellant
  - Herbal Armor
  - California Baby Natural Bug Spray
- Allowable Sunscreens:
  - Banana Boat Sport Performance Sunscreen Lotion Broad Spectrum SPF 30.
  - Meijer Sunscreen Lotion Broad Spectrum SPF 30.
  - Neutrogena Ultra-Sheer Dry-Touch Sunscreen Broad Spectrum SPF 30.
  - Banana Boat for Men Triple Defense Continuous Spray Sunscreen SPF 30
  - Banana Boat Sport Performance Coolzone Broad Spectrum SPF 30
  - Banana Boat Sport Performance Sunscreen Lotion Broad Spectrum SPF 30
  - Banana Boat Sport Performance Sunscreen Stick SPF 50
  - Coppertone Sunscreen Lotion Ultra Guard Broad Spectrum SPF 50
  - Coppertone Sport High-Performance AccuSpray Sunscreen SPF 30
  - Coppertone Sunscreen Stick Kids SPF 55 • L'Oréal Silky Sheer Face Lotion 50+
  - Meijer Clear Zinc Sunscreen Lotion Broad Spectrum SPF 15, 30 and 50
  - Meijer Wet Skin Kids Sunscreen Continuous Spray Broad Spectrum SPF 70
  - Neutrogena Beach Defense Water + Sun Barrier Lotion SPF 70
  - Neutrogena Beach Defense Water + Sun Barrier Spray Broad Spectrum SPF 30
  - Neutrogena Pure & Free Baby Sunscreen Broad Spectrum SPF 60+

If none of the above sunscreens or insect repellents are available, an equipment blank sample must be collected to verify that it is PFAS-free.

2.3 FOOD PACKAGING

PFAS are known to be prevalent in food packaging, including paper plates, food containers, bags, and wraps. Although long-chain PFAS have been banned for use in the manufacturing of contact food materials in the United States, short-chain PFAS have not been banned.

Food packaging must not be in the sampling and staging areas during sampling due to the potential for PFAS cross-contamination. When staff requires a break to eat or drink, they should remove their gloves, coveralls, and any other appropriate PPE, if worn, in the staging area and move to the designated area for food and beverage consumption. When finished, staff should wash their hands and put on a fresh pair of powderless nitrile gloves at the staging area, before returning to the sampling area.

3.0 SAMPLING PROCEDURES

Conventional sampling procedures can generally be used to collect samples for PFAS analysis. Exceptions requiring alternative actions include the following considerations.

3.1 SAMPLING EQUIPMENT

The actual list of PFAS-containing materials potentially encountered onsite will change based on the specific sampled media and site-specific sampling conditions. Allowable materials include high-density polyethylene (HDPE), polypropylene, silicone, stainless steel, nylon, PVC, acetate, and cotton. Do not use any equipment that contains any known fluoropolymers including, but not limited to:

- Polytetrafluoroethylene (PTFE), including the trademark Teflon® and Hostaflon®, which can be found in many items, including but not limited to ball check-valves on certain bailers, the lining of some hoses and tubing, some wiring, certain kinds of gears, lubricant, and some objects that require the sliding action of parts.
- Polyvinylidene fluoride (PVDF), including the trademark Kynar®, which can be found in many items, including but not limited to tubing, films/coatings on aluminum, galvanized or aluminized steel, wire insulators, and lithium-ion batteries.
- Polychlorotrifluoroethylene (PCTFE), including the trademark Neoflon®, which can be found in many items, including but not limited to valves, seals, gaskets, and food packaging.
- Ethylene-tetrafluoro-ethylene (ETFE), including the trademark Tefzel®, which can be found in many items, including but not limited to wire and cable insulation and covers, films for roofing and siding, liners in pipes, and some cable tie wraps.
- Fluorinated ethylene propylene (FEP), including the trademarks Teflon® FEP and Hostaflon® FEP, and may also include Neoflon®, which can be found in many items, including but not limited to wire and cable insulation and covers, pipe linings, and some labware.
- Low density polyethylene (LDPE) should not be used for any items that will come into direct contact with the sample media. LDPE can be found in many items, including but not limited to containers and bottles, plastic bags, and tubing.

Equipment that contains PFAS materials such as Teflon coated parts can be used if the PFAS is internal to the equipment and does not contact the external environment. If in doubt about a product, collect and analyze an equipment blank sample.

3.2 SAMPLING COLLECTION AND STORAGE

All bottles used for PFAS sampling should come from the laboratory that will also be performing the PFAS analysis. For all environmental media, hands should be well washed before sampling. Clean powderless nitrile gloves must be put on before collecting samples, handling sample containers, and handling sampling equipment. The sample container must be kept sealed and only open during the

sample collection. The sampling container cap or lid should never be placed the ground, or on any other surface unless it is PFAS-free.

The following additional considerations should be taken during sample collection to prevent contamination:

- Regular/thick size markers (Sharpie® or otherwise) are to be avoided; as they may contain PFAS.
- Do not use sticky notes (e.g. Post-it Notes®), plastic clipboards, or waterproof paper and notebooks in the sampling area.
- Fine and Ultra-Fine point Sharpie® markers are acceptable to label the empty sample bottle while in the staging area provided the lid is on the sample bottle and gloves are changed following sample bottle labeling.
- Ballpoint pens may be used when labeling sample containers. If ballpoint pens do not write on the sample container labels, preprinted labels from the laboratory may be used.
- Rite in the Rain® notebooks are acceptable to use in the staging area provided gloves are changed after note taking.
- Use HDPE or polypropylene sample bottles with Teflon®-free caps, provided by the laboratory.
- Chemical or blue ice should not be used.
- Samples and ice should be double-bagged using LDPE bags (e.g. Ziploc®). Care should be taken to ensure that they are kept in the staging area, do not come into direct contact with the sample media, and gloves are changed after handling.

Samples must be chilled during storage and shipment and must not exceed 50°F (10°C) during the first 48 hours after collection.

3.3 DECONTAMINATION

For non-dedicated sampling equipment, the following materials and procedures must be used for decontamination:

- Do not use Decon 90®.
- Laboratory supplied PFAS-free deionized water is preferred for decontamination.
- Alconox®, Liquinox®, and Citranox® can be used for equipment decontamination.
- Sampling equipment can be scrubbed using a polyethylene or Polyvinyl chloride (PVC) brush to remove particulates.
- Decontamination procedures should include triple rinsing with PFAS-free water.
- Commercially available deionized water in an HDPE container may be used for decontamination if the water is verified to be PFAS-free.
- Municipal drinking water may be used for decontamination purposes if it is known to be PFAS-free.

4.0 FIELD QUALITY CONTROL SAMPLES

Due to the prevalence of PFAS in a wide range of materials, there may be a greater likelihood for cross-contamination during sampling, transport, and storage of samples. As such, it is recommended to collect field quality control samples to evaluate if cross-contamination has occurred. The type and frequency of samples should be identified in the site-specific QAPP.

- Equipment blank samples are collected by passing laboratory-verified PFAS-free water over or through decontaminated field sampling equipment before the collection of samples to assess the adequacy of the decontamination process and/or to evaluate potential contamination from the equipment used during sampling.
- Field blanks are prepared in the laboratory by placing an aliquot of PFAS-free water reagent water in a sample container and treating it as a sample in all respects, including shipment to the sampling site, exposure to sampling site conditions, storage, preservation, and all analytical procedures. The field blank sample is used to determine if method analytes or other interferences are present in the field environment.
- Trip blanks are a bottle of PFAS-free water that is prepared in the laboratory, travels from the laboratory to the site, and then get transported back to the laboratory without having been exposed to any sampling procedures. The trip blank sample is used to assess cross-contamination introduced from the laboratory and during shipping procedures.
- Field duplicates are replicate or split samples collected in the field and submitted to the laboratory as two different samples. Field duplicates measure both field and laboratory precision.

Each analytical method provides instructions on how many blanks and duplicate samples are required per sampling event. Analytical test methods approved for use by the US EPA are found at: https://www.epa.gov/measurements-modeling/collection-methods.

5.0 REFERENCES

Bartlett, Samuel A. and Davis, Katherine L. "Evaluating PFAS cross contamination issues." *Remediation.* 2018; 28:53-57.

Department of Defense Environmental Data Quality Workgroup. "Bottle Selection and other Sampling Considerations When Sampling for Per and Poly-Fluoroalkyl Substances (PFAS)." 2017. https://www.denix.osd.mil/edqw/home/what-s-new/unassigned/edqw-pfas-sampling-factsheet-rev-1-2-july-2017/

Government of Western Australia, Department of Environment Regulation. "Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)." January 2017. https://www.der.wa.gov.au/images/documents/your-environment/contaminated-sites/guidelines/Guideline_on_Assessment_and_Management_of_PFAS_v2.1.pdf

Heads of EPAs Australia and New Zealand. "PFAS National Environmental Management Plan." January 2018. https://www.epa.vic.gov.au/your-environment/land-and-groundwater/pfas-in-victoria/~/media/Files/Your%20environment/Land%20and%20groundwater/PFAS%20in%20Victoria/PFAS%20NEMP/FINAL_PFAS-NEMP-20180110.pdf

Interstate Regulatory Technology Council (ITRC). "Site Characterization Considerations, Sampling Precautions, and Laboratory Analytical Methods for Per- and Polyfluoroalkyl Substances (PFAS)." March 2018. https://pfas-1.itrcweb.org/wp-content/uploads/2018/03/pfas_fact_sheet_site_characterization_3_15_18.pdf

Michigan Department of Environmental Quality. "General PFAS Sampling Guidance." 16 October 2018. https://www.michigan.gov/documents/pfasresponse/General_PFAS_Sampling_Guidance_634597_7.pdf

Naval Facilities Engineering Command (NAVFAC). "Interim Per- and Polyfluoroalkyl Substances (PFAS) Site Guidance for NAVFAC Remedial Project Managers (RPMs)/September 2017 Update." September 2017. https://www.navfac.navy.mil/content/dam/navfac/Specialty%20Centers/Engineering%20and%20Expeditionary%20Warfare%20Center/Environmental/Restoration/er_pdfs/gpr/navfac-pfas-guidance-sept-2017.pdf

Attachment C

JACOBS®

Preliminary Per- and Polyfluoroalkyl Substance Investigation

Chico Municipal Airport Per- and Polyfluoroalkyl Substance (PFAS) Investigation Work Plan
150 Airpark Boulevard, Chico, California

Final

November 2019

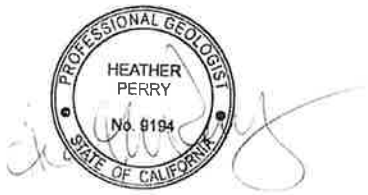
City of Chico

JACOBS

Chico Municipal Airport Per- and Polyfluoroalkyl Substance (PFAS) Preliminary Investigation Work Plan 150 Airpark Boulevard, Chico, California

November 2019

This report was prepared under the direct supervision of a Professional Geologist registered with the State of California, whose signature appears below.



Heather Perry, Professional Geologist
License No. 9194
Jacobs Engineering Group Inc.

Date: November 26, 2019

Contents

Attachments

Tables

Figures (located at the end of this report)

Acronyms and Abbreviations

AFFF	aqueous film-forming foam
ARFF	air rescue and firefighting
bgs	below ground surface
CFR	*Code of Federal Regulations*
City	City of Chico
CMA	Chico Municipal Airport
CV Water Board	Central Valley Regional Water Quality Control Board
DWR	California Department of Water Resources
Extension Approval Letter	*Extension Approval of Deadlines for Submitting Site-Specific Airport Work Plans and Final Sampling and Analysis Reports to Determine the Presence of Per- and Polyfluoroalkyl Substances (PFAS) Subject to the March 20, 2019, State Water Resources Control Board Order WQ 2019-0005-DWQ*
FAA	Federal Aviation Administration
GAMA	Groundwater Ambient Monitoring Assessment
GWETS	groundwater extraction and treatment systems
HASP	health and safety plan
IDW	investigation-derived waste
the Order	*Water Code Section 13267 Order for the Determination of the Presence of Per- and Polyfluoroalkyl Substances*
PFAS	per- and polyfluoroalkyl substances
SAP	sampling and analysis plan
Water Board	State Water Resources Control Board
USA	Underground Service Alert
USCS	Unified Soil Classification System
VOC	volatile organic compound
WDL	Water Data Library

1. Introduction

On March 20, 2019, the State Water Resources Control Board (Water Board) issued Order WQ 2019-0005-DWQ, *Water Code Section 13267 Order for the Determination of the Presence of Per- and Polyfluoroalkyl Substances* (the Order) to 27 California airports certified for aqueous film-forming foam (AFFF) use, which includes Chico Municipal Airport (CMA). The Order requires submittal of a work plan for preliminary investigation of potential per- and polyfluoroalkyl substances (PFAS) impacts on soil and groundwater that might have resulted from the use of AFFF containing PFAS. On May 9, 2019, the Water Board extended the deadline for work plan submittal in the *Extension Approval of Deadlines for Submitting Site-Specific Airport Work Plans and Final Sampling and Analysis Reports to Determine the Presence of Per- and Polyfluoroalkyl Substances (PFAS) Subject to the March 20, 2019, State Water Resources Control Board Order WQ 2019-0005-DWQ* (Extension Approval Letter) to be 75 days after the receipt of the Order (that is, July 6, 2019). On August 1, 2019, the Water Board granted CMA's *Extension Request for Work Plan Related to Order WQ 2019-005-DWQ (PFAS); Chico Municipal Airport, 150 Airpark Boulevard, Chico, Butte County, California (Global ID T10000012788)*, extending the deadline for submittal to October 18, 2019.

The requirements of the work plan include the following, at a minimum:

- Identification of PFAS material storage, use, or potential release locations (including fire-fighting training or use areas, spills, and related areas). "Release locations" are interpreted to mean locations where AFFF containing PFAS was applied to pervious land.

- Identification of potential sensitive receptors within a 1-mile radius of the identified potential release locations. "Sensitive receptors" in this context include groundwater supply wells (municipal or private) and surface water bodies.

- A proposed subsurface investigation program to assess potential release locations, including soil and groundwater sampling and an acceptable sampling and analysis plan (SAP).

CMA is an approximate 1,500-acre facility located approximately 4 miles north of the city of Chico (City), California (Brandley, 2018). The airport is currently a general aviation airport; however, it is anticipated that commercial airline service will resume in the near future. CMA was originally constructed and operated by the City of Chico in the late 1930s and was leased by the United States Government for the purpose of constructing and operating an Army Air Force Basic Training Airfield during World War II. After the war, the airport reverted back to the City of Chico, who has owned and operated this airport since that time. California Department of Forestry and Fire Protection operates a fire suppression service for Northern California at CMA using aircraft ranging from the small spotter aircraft to the large four-engine jet aircraft. The U.S. Air Force and Coast Guard use the airport for training touch-and-go operations.

This work plan has been prepared and submitted on behalf of the City by Jacobs Engineering Group Inc. to satisfy the requirements of the Order. A draft version of this work plan was submitted to the Central Valley Regional Water Quality Control Board (CV Water Board) on October 16, 2019. CV Water Board comments were received on November 21, 2019 and are incorporated into this final version of the work plan (CV Water Board, 2019).

2. AFFF Material Storage and Use

As stated previously, CMA accommodates commercial passenger, air cargo, and general aviation traffic. A vicinity map is provided on Figure 1. Infrastructure at CMA includes one terminal and two runways, as well as a system of taxiways, aircraft parking and general aviation aprons, a number of hangars, passenger gate ramps, and buildings with various airport-related operations including a fire station.

Air rescue and firefighting (ARFF) is a required activity under Federal Aviation Administration (FAA), Title 14, *Code of Federal Regulations* (CFR), Part 139 for certified airports. ARFF is required to respond to aircraft emergencies at CMA. Training and testing of ARFF services are required, including use of fire equipment and aircraft firefighting foam. The City searched available historical records and reports, and interviewed CMA staff and the Chico Fire Department to identify AFFF material storage and use areas and areas where AFFF was used or spilled (for example, firefighting training, ARFF equipment, AFFF testing areas, and emergency response incidents using AFFF).

AFFF is currently (and has been historically) stored at CMA Fire Station #3 (Figure 2; Metroka, 2019). Current AFFF storage locations and volumes (which are approximate) are as follows:

- Two crash response vehicles, which each have a capacity to store 205 gallons of AFFF
- One Type I engine, which stores 15 gallons of AFFF
- Four 55-gallon drums on pallets, which store 220 gallons of AFFF

There are no known spills or releases of AFFF within Fire Station #3 other than ancillary spills during filling and cleaning of pumps/tanks/hoses, which occurs in the tank room. The Fire Station #3 floor drain discharges to the City of Chico's sanitary sewer system.

2.1 National Fire Incident Reporting System Sites

Correspondence with Chico Fire Department personnel identified five aircraft fire incidents at CMA. A summary of the incidents is provided below, and the locations of the incidents are included on Figure 2. Available incident reports associated with the incidents listed in Table 1 are included as Attachment 1.

Table 1. Chico Municipal Airport Fire Incidents
Preliminary Per- and Polyfluoroalkyl Substance Investigation, Chico Municipal Airport Per- and Polyfluoroalkyl Substance (PFAS) Preliminary Investigation Work Plan

Figure 2 Incident Number	Date	Fire Department	Incident Number	Incident Type	Area	Incident Description
1	6/12/1992	Chico	Unknown	Aircraft crash	Approximately 1,500 feet south of main runway	This incident is discussed in more detail in Section 2.2.
2	6/9/2007	Chico	2007-0004195	Aircraft accident, fuel spill	Wash rack south of the Air Attack Base	A small aircraft lost control. It struck a trailer and overturned on the wash rack, causing fuel to leak from the aircraft. No fire occurred, but AFFF was applied to the fuel leak. This incident is discussed in more detail in Section 2.2.
3	10/13/2010	Chico	2010-0008401	Aircraft wheel or brake fire	Taxiway H near intersection of Taxiway A	Aircraft brakes caught fire while running down the runway. Fire was extinguished by the crash rescue vehicle. AFFF was not used.

Table 1. Chico Municipal Airport Fire Incidents

Preliminary Per- and Polyfluoroalkyl Substance Investigation, Chico Municipal Airport Per- and Polyfluoroalkyl Substance (PFAS) Preliminary Investigation Work Plan

Figure 2 Incident Number	Date	Fire Department	Incident Number	Incident Type	Area	Incident Description
4	6/30/2016	Chico	2016-6050	Aircraft wheel or brake fire	Runway 13L Taxiway E	A landing aircraft lost control of its hydraulic brakes, causing the aircraft to skid and result in a wheel fire. The fire was extinguished by the crash rescue vehicle. AFFF was not used.
5	7/22/2016	Chico	2016-6811	Fuel spill	Loading ramp in front of tower	A large fuel spill involving a fuel tanker and helicopter occurred. The spill was cleaned up by a hazardous materials crew. AFFF was not used.

2.2 Overview of Potential AFFF Use/Release Areas

Four locations were identified as AFFF material storage and/or potential use/release areas, as shown on Figure 2. A potential release to pervious land may have occurred in three of the four locations identified. Each location is further described below.

- ***City Fire Station #3*** – As described above, this facility is used to store and transfer AFFF and to clean ARFF equipment. Groundwater sampling will be conducted downgradient from this area.

- ***AFFF Testing Area*** – Although CMA does not currently train with AFFF, FAA-required sampling of AFFF material historically took place in the western half of the AFFF testing area (Metroka, 2019). Information regarding historical AFFF training/testing is unavailable. Annual FAA-required sampling consists of discharging the turrets and collecting a sample of AFFF to test the foam concentrate. AFFF is discharged at approximately 250 gallons per minute for 5 seconds. Sampling will be conducted in this area.

- ***1992 Airplane Crash*** – An aircraft reportedly crashed approximately 1,500 feet south of the main runway during the Chico Air Show on June 12, 1992. It is unknown if AFFF was used during the incident response; sampling will be conducted in this area.

- ***2007 Aircraft Fuel Spill*** – A small aircraft lost control, struck a trailer, and overturned on the wash rack, causing fuel to leak from the aircraft. Chico Fire Department responded to the incident. AFFF was used to cover the fuel spill. A storm drain on the wash rack was diked at the time of AFFF deployment, preventing AFFF from entering the storm drain. The fuel and AFFF were cleaned up by a hazardous materials cleanup crew. Because of the rapid response and cleanup, this area was not initially proposed for additional investigation. Due to cracks in the concrete at this location, CV Water Board directed CMA to sample at this location (CV Water Board, 2019). Sampling will be conducted in this area.

In addition, there are two groundwater extraction and treatment systems (GWETS) in operation at CMA that are designed to treat volatile organic compounds (VOCs) plumes emanating from a facility leased for industrial use on the northeastern side of Fortress Street and southeast of Boeing Avenue. Other industrial operations at CMA have included aluminum tube/can manufacturing and commercial wood treating (Brown and Caldwell, 2016).

3. Sensitive Receptors

An initial sensitive receptor survey was conducted to locate water supply wells within a 1-mile radius of the four above-mentioned AFFF material storage and/or potential release locations planned for preliminary investigation. The following databases were queried to identify domestic, agricultural, or industrial supply wells within 1 mile of each identified potential release location:

- California Department of Water Resources (DWR) Water Data Library (WDL) database[1]:includes groundwater quality and groundwater elevation data for wells historically or currently monitored by DWR.
- State Board Groundwater Ambient Monitoring Assessment (GAMA) database[2]: includes groundwater quality data compiled from multiple local, state, and federal monitoring programs.
- DWR Well Completion Report Map Application[3]: includes a count by township/range/section of well completion reports filed with DWR. It should be noted that these represent all well completion reports filed and may include wells that have been abandoned.

Figure 3 shows the results of these queries. A query of the WDL database indicates that there is one residential well, one well of unknown use, and one well identified as "other" use within 1 mile of potential use/release areas at CMA (Figure 3). As shown on Figure 3, the results from the GAMA database indicate that potentially up to 13 municipal and 17 wells of unknown use are within 1 mile of potential use/release areas at CMA. It should be noted that because the GAMA database is a compilation of multiple monitoring programs, several of these locations may represent the same well with data being reported by different agencies. In addition to the WDL and GAMA results, Figure 3 presents counts of completion reports for domestic, production, and public wells. Over 100 domestic well completion reports are on file with DWR for the sections southwest of CMA, while the production and public well counts are much lower. As previously described, these data include all well completion reports on file with DWR and may include wells that have been abandoned.

Surface water bodies within 1 mile of the potential release locations include Mud Creek, Sheep Hollow Creek, and Sycamore Creek. These surface water bodies are shown on Figure 3.

[1] http://wdl.water.ca.gov/waterdatalibrary/
[2] https://gamagroundwater.waterboards.ca.gov/gama/datadownload
[3] https://dwr.maps.arcgis.com/apps/webappviewer/index.html?id=181078580a214c0986e2da28f8623b37

4. Preliminary Investigation

The objectives of this preliminary investigation are as follows:

- Evaluate the potential for PFAS impacts on soil or groundwater at the three potential AFFF release locations identified by the City where further investigation was deemed warranted.
- Obtain data to provide a basis for decisions regarding further investigations, if necessary.

The subsurface investigation of the four potential release locations will include a total of five hand auger or air knife locations, one soil boring, up to 14 soil samples (two per hand auger and 4 in the soil boring), one grab groundwater sample, and the sampling of nine existing groundwater monitoring and/or extraction wells as described below. Sample locations are presented on Figure 4.

- ***City Fire Station #3*** – One groundwater sample will be collected from monitoring well BCV-16 downgradient of City Fire Station #3 (groundwater flow in the first water bearing zone [shallow aquifer] is to the southwest [Geocon, 2019]).

- ***AFFF Testing Area*** – A total of four groundwater samples will be collected from existing groundwater monitoring and/or extraction wells (BCV-15, BCV-18, BCVE-1, and BCV-21) downgradient of the AFFF testing area. Additionally, a total of four hand auger borings will be advanced (air knife may be used to advance the borings past cobbles). Two soil samples will be collected at each location via hand auger. The first will be collected within the upper 2 feet. The second will be collected at either a lithologic interface where PFAS compounds may accumulate (such as sand/clay) or at a depth of 10 feet below ground surface (bgs), whichever is shallower.

- ***1992 Airplane Crash*** – One soil boring will be advanced at the potential release area. As many as four soil samples and one grab groundwater sample will be collected. Soil samples will be collected at the surface, at the water table, and at up to two locations between ground surface and the water table. Soil samples will be collected either equally spaced between ground surface and the water table or at lithologic interfaces where PFAS may accumulate. The locations will be selected once the entire soil core is available. The groundwater grab sample will be collected using a drive-ahead sampler. Additionally, one groundwater sample will be collected from existing first water bearing zone groundwater monitoring well BCV-26 downgradient of the 1992 airplane crash site.

- ***2007 Aircraft Fuel Spill*** – One hand auger or air knife boring will be advanced at this location. The hand auger or air knife location will be targeted at the location where the concrete is the most weathered and cracked. Although air knife may be used to advance the boring past cobbles, the two soil samples at this location will be collected via hand auger. The first will be collected within the upper 2 feet. The second will be collected at either a lithologic interface where PFAS compounds may accumulate (such as sand/clay) or at a depth of 10 feet below ground surface (bgs), whichever is shallower.

In addition to the activities described above, groundwater samples will be collected from existing first water bearing zone groundwater monitoring wells located upgradient of potential AFFF use/release areas identified in this evaluation. Upgradient monitoring wells BCV-8, BCV-6, and BCV-14 will be sampled to evaluate whether the shallow groundwater zone has been affected by industrial activities northeast of the potential AFFF use/release areas.

4.1 Pre-field Activities

Prior to beginning sampling fieldwork, the following activities will be completed.

4.1.1 Health and Safety Plan

Prior to the start of fieldwork, a site-specific health and safety plan (HASP) will be prepared in accordance with Title 29, CFR, Part 1910.120 (29 CFR 1910.120). The HASP will evaluate potential onsite health and safety issues, and provide methods for mitigating identified hazards. A copy of the HASP will be maintained onsite and will be reviewed by field staff and subcontractors prior to beginning work.

4.1.2 Permitting

The project team will obtain drilling permits from the Butte County Environmental Health Department prior to the start of field activities. The project team will be available to escort representatives from Butte County onsite, if requested.

4.1.3 Utility Clearance

Underground utility clearance will be completed prior to the start of fieldwork. The sample locations will be marked in the field as presented on Figure 4. Underground Service Alert (USA) will be notified at least 3 full working days in advance of any subsurface activity. Following clearance or input from USA, sample locations will be cleared using geophysical methods by a third-party utility location subcontractor to identify potential obstructions or utilities at sample locations; and locations will be modified as necessary.

4.1.4 Mobilization

Mobilization activities will include coordination with CMA staff, site preparation, movement of equipment and materials to the site, orientation of field personnel, and review of the HASP with field staff and subcontractors.

4.2 Sample Collection

The subsurface investigation includes the collection of groundwater samples from existing monitoring wells, collection of soil samples and one groundwater grab sample from a soil boring, and collection of soil samples via hand auger. The areas targeted for investigation are City Fire Station #3, the AFFF testing area, and the 1992 airplane crash site. Sample locations are presented on Figure 4. The SAP that will guide the data collection effort and quality control for the project is included in Appendix B.

Soil samples at the AFFF testing area and the 2007 aircraft fuel spill area will be collected via hand auger within the upper 2 feet bgs and at either a lithologic interface where PFAS compounds may accumulate (such as sand/clay) or at a depth of 10 feet bgs, whichever is shallower.

The soil boring location at the 1992 airplane crash site will be hand cleared for utilities using an air knife to 5 feet bgs; the boring will be advanced using the appropriate drilling methodology to the first encountered groundwater. Soil and groundwater samples will be collected in accordance with the Water Board's March 20, 2019, *Per- and Polyfluoroalkyl Substances (PFAS) Sampling Guidelines*. Groundwater is expected to be encountered at approximately 80 to 100 feet bgs. The soil samples will be collected at the surface, at the water table, and at up to two locations between ground surface and the water table. The grab groundwater sample will be collected from the boring using an appropriate PFAS-free pump. The boring will be continuously logged in general accordance with the ASTM D2488-00 *Standard Practice for Classification of Soils (Visual -Manual Procedure),* Unified Soil Classification System (USCS).

Existing groundwater monitoring wells will be sampled via a temporary, PFAS-free pump. The existing groundwater extraction well (BVCE-1) will be sampled with the currently installed pump. If elevated PFAS are detected, the City may opt to remove the dedicated pump and sample with PFAS-free equipment to confirm the results.

Quality control samples will be collected in accordance with the Water Board's March 20, 2019, *Per- and Polyfluoroalkyl Substances (PFAS) Sampling Guidelines*. Refer to the SAP in Appendix B for additional details.

4.3 Laboratory Analysis

Eurofins Test America Sacramento, a California Environmental Laboratory Accreditation Program certified laboratory,[4] will provide PFAS-free sample bottles, chain of custody, custody seals, trip blanks, and PFAS-free deionized water for field and equipment blanks. Soil and groundwater samples will be analyzed using the Department of Defense-certified laboratory Standard Operating Procedure WS-LC-0025, *Per- and Polyfluorinated Alkyl Substances (PFAS) in Water, Soils, Sediments and Tissue [Method 537 (Modified), Method PFAS by LCMSMS Compliant with QSM 5.1 Table B-15]*, Rev. 3.7, Effective 8/13/2019 for all the required PFAS analytes listed in Table 2 and as many of the not-required analytes as possible. In addition, groundwater samples will be analyzed for total dissolved solids, chloride, carbonate, bicarbonate, nitrate-nitrogen, sulfate, calcium, magnesium, potassium, and sodium. After sample collection, all soil and groundwater samples will be placed in coolers and transported under chain of custody to Eurofins Test America.

Table 2. PFAS Analytes

Preliminary Per- and Polyfluoroalkyl Substance Investigation, Chico Municipal Airport Per- and Polyfluoroalkyl Substance (PFAS) Preliminary Investigation Work Plan

Chemical Name	Chemical Abstracts Service
Hexafluoropropylene oxide dimer acid (Perfluoro-2-propoxypropionic acid)[a]	13252-13-6*
10:2 Fluorotelomer sulfonic acid[a]	120226-60-0*
Perfluorooctadecanoic acid	16517-11-6*
N-Ethyl perfluorooctane sulfonamide ethanol	*1691-99-2**
Perfluorooctane sulfonic acid[a]	1763-23-1
Perfluoroundecanoic acid[a]	2058-94-8
N-Methyl perfluorooctane sulfonamidoacetic acid[a]	2355-31-9
N-Methyl perfluorooctane sulfonamide ethanol	*24448-09-7**
Perfluoropentanoic acid[a]	2706-90-3
Perfluoropentane sulfonoic acid[a]	2706-91-4
6:2 Fluorotelomer sulfonic acid[a]	27619-97-2
N-Ethyl perfluorooctane sulfonamidoacetic acid[a]	2991-50-6
Perfluorohexanoic acid[a]	307-24-4
Perfluorododecanoic acid[a]	307-55-1
N-Methyl perfluorooctane sulfonamide	31506-32-8*
Perfluorooctanoic acid[a]	335-67-1
Perfluorodecanoic acid[a]	335-76-2
Perfluorodecane sulfonic acid[a]	335-77-3
2H,2H,3H,3H-Perfluorohexanoic acid	*356-02-5**
Perfluorohexane sulfonic acid[a]	355-46-4
Perfluorobutanoic acid[a]	375-22-4
Perfluorobutane sulfonic acid[a]	375-73-5
Perfluoroheptanoic acid[a]	375-85-9
Perfluoroheptane sulfonic acid[a]	375-92-8
Perfluorononanoic acid[a]	375-95-1
Perfluorotetradecanoic acid[a]	376-06-7

[4] Laboratory accredited by the California Environmental Laboratory Accreditation Program to perform the analytical method for PFAS compliant with the Department of Defense Table B-15 of Quality System Manual, dated 2017, version 5.1 or later.

Table 2. PFAS Analytes

Preliminary Per- and Polyfluoroalkyl Substance Investigation, Chico Municipal Airport Per- and Polyfluoroalkyl Substance (PFAS) Preliminary Investigation Work Plan

Chemical Name	Chemical Abstracts Service
2H,2H,3H,3H-Perfluorodecanoic acid	*812-70-4**
8:2 Fluorotelomer sulfonic acid[a]	39108-34-4
N-Ethyl perfluorooctane sulfonamide	4151-50-2*
Perfluorononane sulfonic acid[a]	474511-07-4*
Perfluorohexadecanoic acid[a]	67905-19-5*
Perfluorotridecanoic acid[a]	72629-94-8
Perfluorooctanesulfonamide[a]	754-91-6
4:2 Fluorotelomer sulfonic acid[a]	757124-72-4
Perfluoro(2-((6-chlorohexyl)oxy)ethanesulfonic acid	756426-58-1*
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	763051-92-9*
2H,2H,3H,3H-Perfluorooctanoic acid	*914637-49-3**
4,8-Dioxa-3H-perfluorononanoic acid[a]	919005-14-4*

[a] Laboratory holds DOD certification for this analyte.

Notes:

The list of PFAS analytes subject to analysis as provided in the Order was revised by the Water Board on April 5, 2019. This Table 2 reflects that more recent revision.

The 23 analytes unshaded and without the asterisk (*) are required to be analyzed. The analytes with the asterisk (*) are included in some but not all lists provided by accredited laboratories. The laboratory contracted for this sampling event is able to analyze for all analytes except those that have been italicized.

4.4 Data Validation

Data will be validated according to Level III requirements, which will include review of the following: data set narrative, sample integrity field and laboratory quality control measurements, detection limits, corrective actions, and calibrations. For PFAS analysis, full, raw data review may be conducted if appropriate. The laboratory reporting requirements will be defined in a laboratory statement of work prior to sample collection and will include hardcopy and electronic deliverables. Following validation, a data quality evaluation report will be prepared to discuss data validation findings.

4.5 Site Restoration and Investigation-derived Waste

Soil borings will be backfilled to the surface with a neat cement grout. The investigation-derived waste (IDW) generated during field activities, including soil and groundwater sampling, and decontamination of sampling equipment, will be containerized, sealed, properly labeled, and temporarily stored adjacent to the ground run-up enclosure. A composite soil and water sample will be collected from the IDW containers and analyzed (at a minimum) for VOCs (USEPA 8260B), Title 22 metals (USEPA 6010B/7471A), and total petroleum hydrocarbons (USEPA 8015M). Following receipt of analytical results, the IDW will be properly disposed of. The disposal contractor will also be provided sample results from the PFAS analytical suite.

5. Reporting

Results of this preliminary investigation will be summarized in a preliminary investigation report. The report will be signed by a California-licensed professional geologist or engineer.

The report will include the following:

- Description of field activities and methodologies used
- Summary of locations sampled
- Summary of analytical results
- Laboratory data reports and associated validation reports
- Updates to sensitive receptor information regarding nearby supply wells
- Deviations from this work plan
- Conclusions

6. Schedule

The Order requires the sampling analysis and reporting plan to be submitted within 90 days of the Water Board's approval of the work plan. The Extension Approval Letter stated that any extension requests should be submitted as part of this work plan. Table 3 provides the anticipated timeframes for the implementation and reporting of this investigation.

Table 3. Anticipated Schedule

Preliminary Per- and Polyfluoroalkyl Substance Investigation, Chico Municipal Airport Per- and Polyfluoroalkyl Substance (PFAS) Preliminary Investigation Work Plan

Task ID	Task Name	Duration of Task (Working Days)
1	Water Board concurrence on final work plan	0
2	Contract and schedule subcontractors; develop and approve a HASP	30
3	Obtain Butte County drilling permits	30
4	Conduct utility locate and field sampling activities	7
5	Laboratory analysis and data validation	60
6	Develop and submit draft investigation report to CMA for review	45
7	Revise and submit draft final investigation report to Water Board for review	30
8	Meeting between CMA and Water Board to discuss Water Board's review	1
9	Develop responses to Water Board comments and submit final investigation report	24

Based on the itemized timeframes outlined above, CMA anticipates data collection will not be completed sooner than 90 days following acceptance of the work plan. Therefore, the CMA requests an additional 120 days for submittal of the final investigation report. Should there be any unforeseen delays in the tasks described above where the reporting deadline requirement will not be met, CMA will request Water Board approval of another time extension.

7. References

ASTM D2488-00 Standard Practice *for Classification of Soils (Visual -Manual Procedure),* Unified Soil Classification System (USCS).

Brandley, Reinard W. *Chico Municipal Airport Layout Plan Update Narrative.* Prepared for City of Chico, California. September.

Brown and Caldwell. 2016. *Operation and Maintenance Manual.* Prepared for Chico Municipal Airport. June.

California State Water Quality Control Board, Division of Water Quality. 2019. *Per- and Polyfluoroalkyl Substances Sampling Guidance.* March 20.

Central Valley Regional Water Quality Control Board (CV Water Board). 2019. *PRE:Central Valley Regional Water Quality Control Board Review of the Per-and Polyfluoroalkyl Substances (PFAS) Investigation Work Plan at Chico Municipal Airport, 150 Airpark Boulevard, Chico, Butte County, California (Global ID T10000012788), Cost Recovery ID#2050106.* November 21.

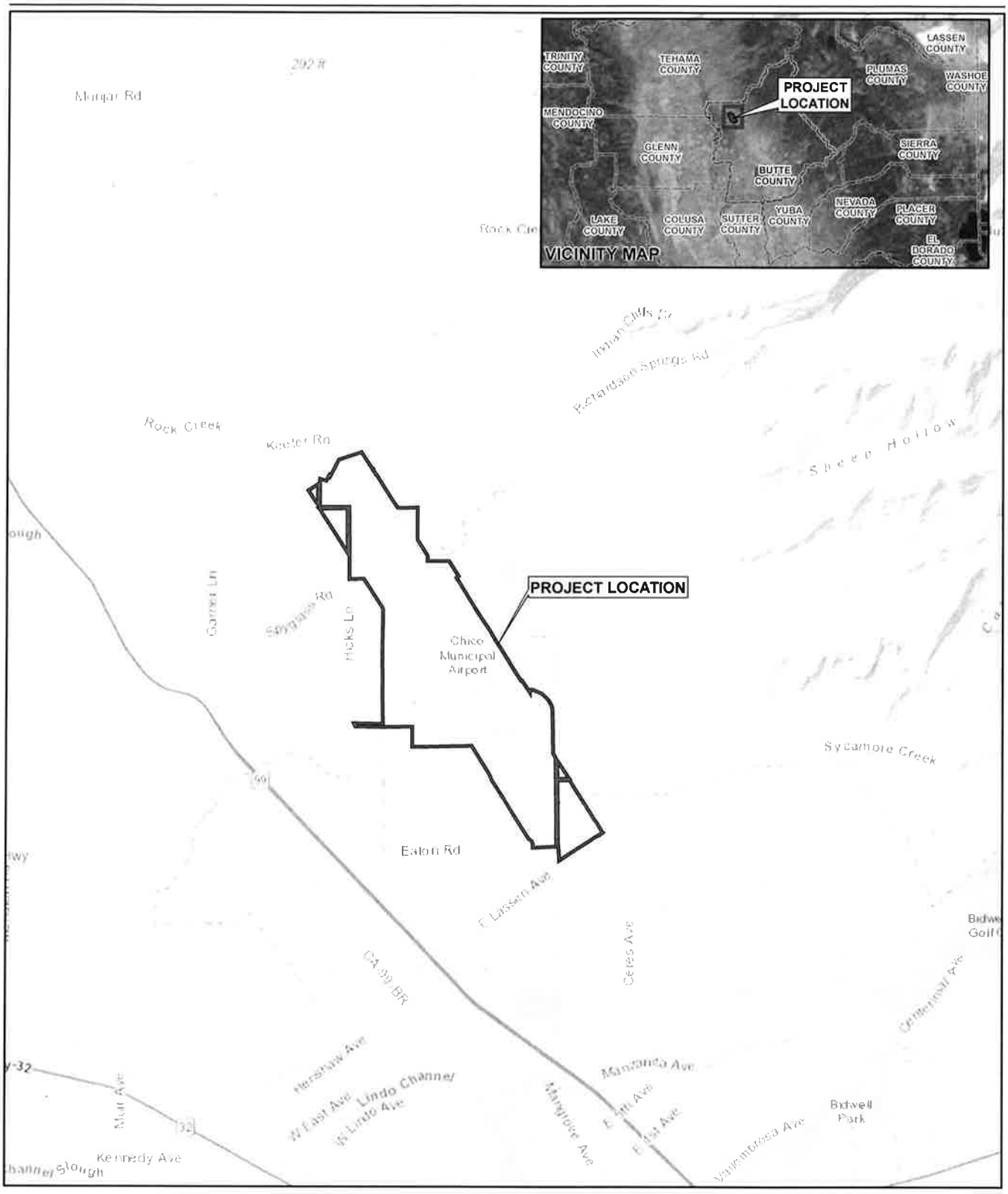
Geocon Consultants, Inc (Geocon). 2019. *Second Semi-Annual Groundwater Monitoring Report – 2017.* Prepared for City of Chico Public Works – Engineering. March.

Metroka, Wes. 2019. *Personal Communication, Kick-off Teleconference for Chico Municipal Airport PFAS Investigation.* September 12.

State Water Resources Control Board (Water Board). 2019. *Extension Approval of Deadlines for Submitting Site-Specific Airport Work Plans and Final Sampling and Analysis Reports to Determine the Presence of Per- and Polyfluoroalkyl Substances (PFAS) Subject to the March 20, 2019, State Water Resources Control Board Order WQ 2019-0005-DWQ.* May 9, including April 5 update of Table 1.

State Water Resources Control Board (Water Board). 2019. Order WQ 2019-0005-DWQ, *Water Code Section 13267 Order for the Determination of the Presence of Per- and Polyfluoroalkyl Substances.*

Figures



LEGEND

CHICO MUNICIPAL AIRPORT

NOTE:

PFAS = PER- AND POLYFLUOROALKYL SUBSTANCE.

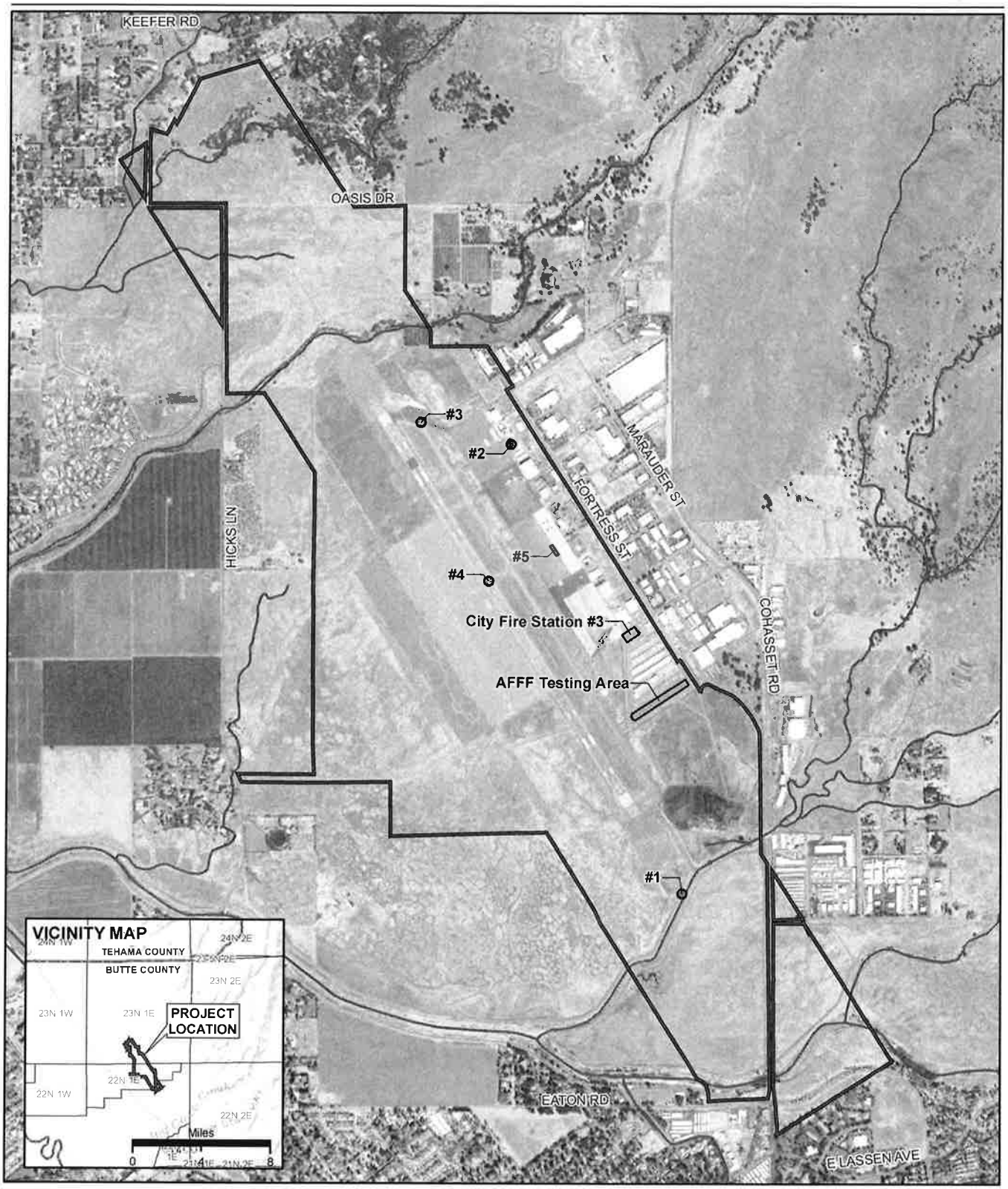
N

0 1 2 Miles

FIGURE 1
VICINITY MAP
PFAS Investigation Work Plan
City of Chico, Butte County, California

R:\ENBG\00_PROJ\C\CHICOCITYOF\MAPFILES\PFAS_WPLAN\FIG01_VICINITYMAP.MXD 11/25/2019 9:10:42 AM FELHADID

JACOBS



LEGEND

RIVER/STREAM

CHICO MUNICIPAL AIRPORT

PRELIMINARY INVESTIGATION SITE

AFFF STORAGE/USE

CMA FIRE INCIDENT

NO FURTHER ACTION SITE

CMA FIRE INCIDENT

NOTES:

POTENTIAL AFFF USE AREA DETAIL PROVIDED IN TABLE 1.

AFFF = AQUEOUS FILM-FORMING FOAM.

PFAS = PER- AND POLYFLUOROALKYL SUBSTANCE.

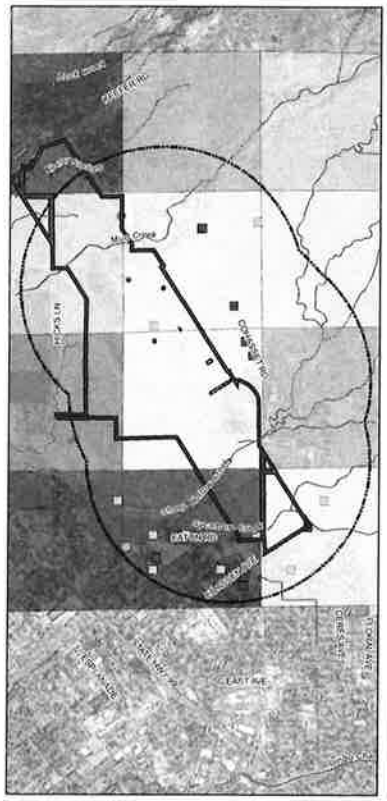
N

0 2,000 4,000 Feet

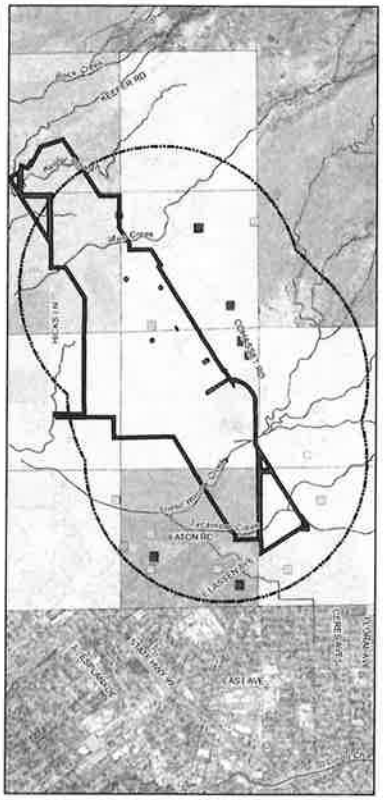
FIGURE 2
POTENTIAL AFFF USE AREAS
PFAS Investigation Work Plan
City of Chico, Butte County, California

R:\ENBG\00_PROJ\CHICOCITYOF\MAPFILES\PFAS_WPLAN\FIG02_POTENTIALAFFFAREAS.MXD 11/25/2019 10:06:20 AM FELHADID

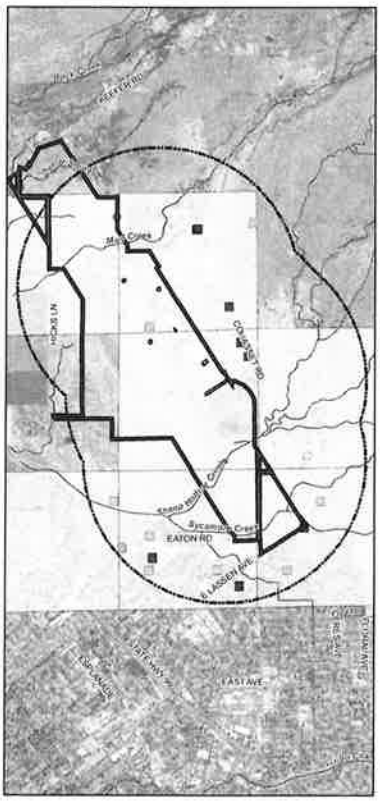
JACOBS



LEGEND
DOMESTIC WELL COUNT
- 0
- 1 to 5
- 6 to 10
- 11 to 25
- 26 to 50
- 51 to 119



LEGEND
PRODUCTION WELL COUNT
- 0
- 1 to 5
- 6 to 10
- 11 to 25
- 26 to 50
- 51 to 119



LEGEND
PUBLIC WELL COUNT
- 0
- 1 to 5
- 6 to 10
- 11 to 25
- 26 to 50
- 51 to 119

LEGEND

WDL WELL LOCATION
- IRRIGATION WELL LOCATION
- RESIDENTIAL WELL
- OTHER WELL TYPE

GAMA WELL LOCATION
- MUNICIPAL WELL
- UNKNOWN WELL TYPE

- RIVER/STREAM
- 1-MILE BUFFER
- POTENTIAL AFFF USE AREA
- CHICO MUNICIPAL AIRPORT

NOTES:

GAMA = GROUNDWATER AMBIENT MONITORING AND ASSESSMENT PROGRAM

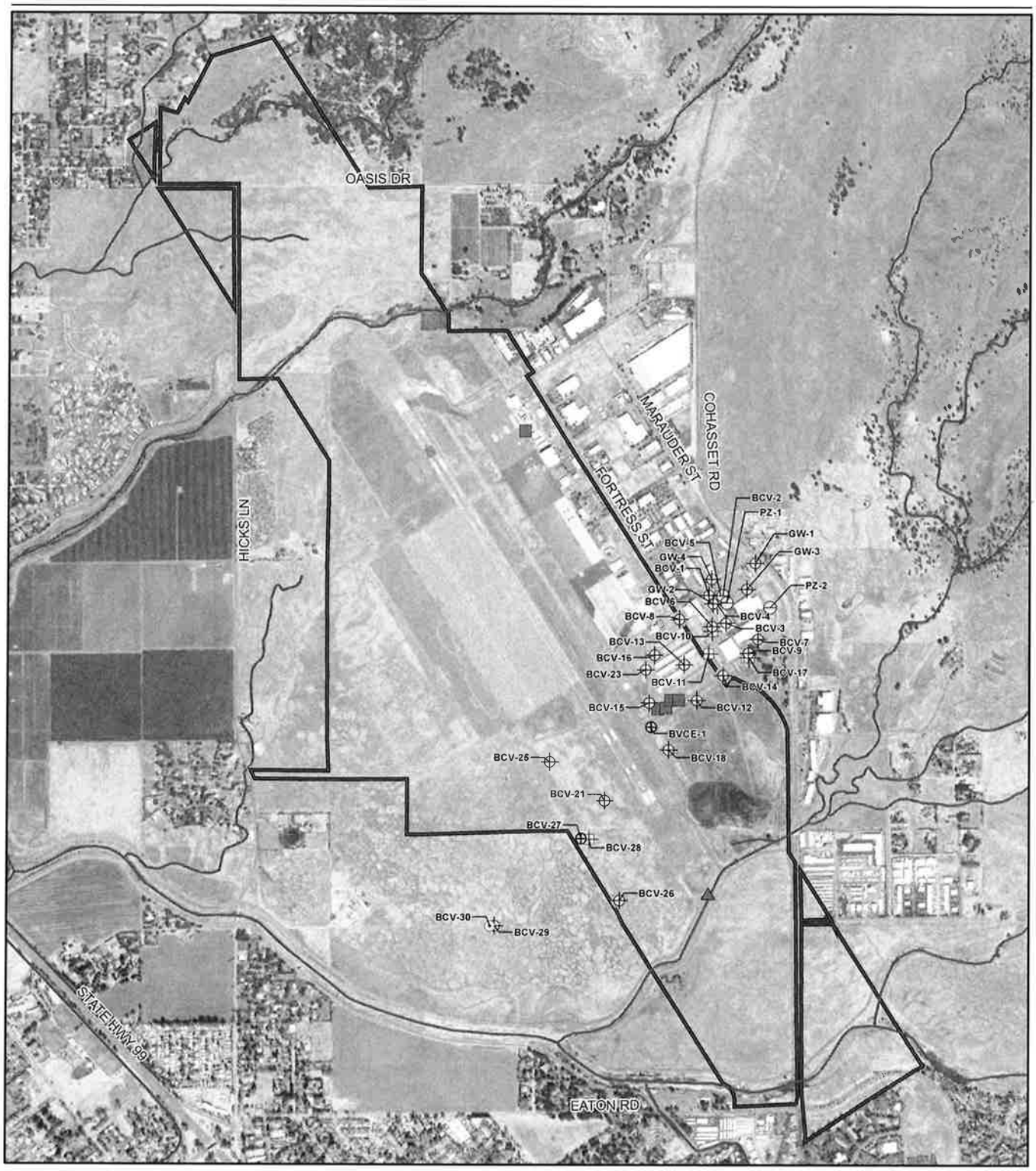
PFAS = PER- AND POLYFLUOROALKYL SUBSTANCE

WDL = WATER DATA LIBRARY

SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP, GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

FIGURE 3
SENSITIVE RECEPTORS WITHIN 1 MILE OF POTENTIAL AFFF USE AREAS
PFAS Investigation Work Plan
City of Chico, Butte County, California

JACOBS



LEGEND

FIRST WATER BEARING ZONE (WELL LOCATION APPROXIMATE)

- APPROXIMATE SHALLOW MONITORING WELL LOCATION
- APPROXIMATE SHALLOW PIEZOMETER LOCATION
- APPROXIMATE INTERMIDIATE PIEZOMETER LOCATION
- APPROXIMATE GROUND WATER EXTRACTION WELL LOCATION

SECOND WATER BEARING ZONE (WELL LOCATION APPROXIMATE)

- SHALLOW MONITORING WELL LOCATION

- PROPOSED GROUNDWATER SAMPLING LOCATION (EXISTING WELL)
- PROPOSED BORING LOCATION (GROUNDWATER/SOIL SAMPLING LOCATION)
- PROPOSED SOIL SAMPLING LOCATION (HAND AUGER)
- RIVER/STREAM
- CHICO MUNICIPAL AIRPORT

NOTE:

PFAS = PER- AND POLYFLUOROALKYL SUBSTANCE.

0 2,000 4,000 Feet

N

FIGURE 4
PROPOSED SAMPLING AND DRILLING LOCATIONS
PFAS Investigation Work Plan
City of Chico, Butte County, California

R:\ENBG\00_PROJ\C\CHICOCITYOF\MAPFILES\PFAS_WPLAN\FIG04_PROPOSEDSAMPLES.MXD 11/25/2019 2:46:06 PM FELHADID

JACOBS

Attachment 1
Incident Reports

City of Chico Fire Department
Station: **1**
Shifts Or Platoon: **0**

Location: **100 AIRPORT RUNWAY** **CHICO CA 95926** Lat/Long: **N 39° 44′ 46.07″** **W 121° 50′ 41.55″** Location Type: **1 - Street address** Census Tract: **00 -0140**	Incident Type: **460 - Accident, potential accident, other** FDID: **04010** Incident #: **2007-0004195** Exposure ID: **5261426** Exposure #: **0** Incident Date: **06/09/2007**

Report Completed by:	CONWAY , DAVID W	**ID:** 000004115	**Date:** 06/09/2007
Report Reviewed by:	CONWAY , DAVID W	**ID:** 000004115	**Date:** 06/09/2007
Report Printed by:	Metroka, Wes	**ID:** 3435	**Date:** 9/17/2019 **Time:** 16:23

Structure Type:	Property Use: **974 - Aircraft loading area**	
Automatic Extinguishment System Present: ☐	Detectors Present: ☐	Cause of Ignition:
Aid Given or Received: **None**	Primary action taken: **32 - Provide basic life support (BLS)**	
Additional actions: **44 - Hazardous materials leak control & containment , -**		

Losses		**Pre-Incident Values**					
Property:	**$0.00**	Property:	**$0.00**	Civilian Injuries:	**0**	Fire Service Injuries:	**0**
Contents:	**$0.00**	Contents:	**$0.00**	Civilian Fatalities:	**0**	Fire Service Fatalities:	**0**
Total:	**$0.00**	Total:	**$0.00**	Total Casualties:	**0**	Total Fire Service Casualties:	**0**

Total # of apparatus on call:	**13**	Total # of personnel on call:	**22**

NARRATIVE (1)

Narrative Title: n/a

Narrative Author:

Narrative Date:

Narrative Apparatus ID: n/a

Narrative:

071600107Call#: 071600107 Beat: STATION 3Units.: CF1 Employees: 0000001130 BROWN, STEVEUnits.: CPNY1Units.: ENMED1Units.: E2R2 Employees: 0000004575 GARRISON, FRANK0000001320 GOOGINS, STUART0000001940 MEIER, JAMESUnits.: E3CR3 Employees: 0000004115 CONWAY, DAVID0000004425 FARRARA, RON0000005750 WILLIAMSON, PHILIPUnits.: E4 Employees: 0000001125 HACK, WILLIAM0000002295 ALEXANDER, JESSE0000003460 VELAZQUEZ, MIKEUnits.: E5 Employees: 0000000130 HARRISON, STEPHEN0000001955 GONZALEZ, ED0000003260 STELLE, PHILUnits.: E6 Employees: 0000004900 JACK, JAMES0000001925 ZINKO, CHRIS0000002240 CAMPBELL, KENUnits.: PVOUnits.: PV2 Employees: 0000001275 FICKERT, MARIEUnits.: T1 Employees:ts.: T5 Employees: 0000002000 WILEY, TODD0000002985 KELSO, JOHNUnits.: WT1 Employees: 0000009000 CDF/BUTTE CO,L5 NOTIFIED. VM/5BUTTE CO ENVIRONMENTAL HEALTH LESLIE ROBERTS ADVISEDAND SHE WILL LOCATE A NORTH RESPONDER. VM/5CROP DUSTER HIT HANGER NO FIREAIRPORT COMMAND TAC YELLOWCR3: PLANE ON ITS TOP, CONTINUE RESPONSEAIRPORT COMMAND:INJURED PATIENT OUT FENCE AERIAL APPLICATORT5 TO AERIAL APPLICATORENG 3 MEDICS RESPOND TO NORTH ENDMODERATE INJURIESALL OTHER RESOURCES RESPOND TO RAMP AT NORTH END APPLICATORFOR 15 GALLON FUEL LEAKAPRT COMMAND: RELEASING T1, ENG4, ENG6ALL OTHER RESOURCES COMMITTED.AIRPORT COMMAND: 8-10 GAS ON GROUND POSSIBLY INTOSTORM DRAIN, FOAM DEPLOYMENTNOTIFY BUTTE COUNTY ENVIRONMENTAL HEALTHAIRPORT COMMAND: RELEASED T5 FROM INCIDENTBEST ACCESS FOR ENVIRONMENTAL RESPONSE AIRPORT BLVD TOFORTRESS TURN NORTH TO AERIAL APPLICATORS TO RESOURCEST5: PATIENT TRANSPORTED POVCAPT3: REQ OES INICDENT NUMBER FOR POSSIBLE RELEASE OFFUEL/FOAM INTO STORM DRAIN. CONFIRM OES WILL NOTIFYREGINAL WATER CONTROL BOARD AND FISH & GAMEPOSSIBLE RELEASE OF 9 GALLONS OF AIRLINE FUEL AND APROX750 GALLONS OF CONTAINMENT FOAM. CONTACTED RON DEMAYOOES OFFICE, ISSUED OES #07-3493 AND WILL MAKE NOTIFICATIONSLISTED ABOVE. MSG LEFT FOR LESLIE ROBERTS WITH OES NUMBER.AIRPORT COMMAND TERMINATED. E3CR3 AVAIL. PV2 TO REMAIN ATSCENE.NEXT TO THE AIR ATTACK BASE1 INJURED54- TO THE GATES.S11- CODE 3 FOR UNITS RESPONDINGS11- REQUESTING NORTH END SECURITYKIM PARKS CALLED IN GIVEN INFO. JC/02KIM -20MIN ETA.LESLIE ROBERTS// AND TOM PARKER ETA 20MIN ENVIOR HEALTH.JC/02DISPO/S11 - CASE TAKEN SCENE RELEASED TO AIRPORTMGR AND CITY EMPLOYEES. JC/02NATURE OF EMERGENCY PLANE INTO HANGERPLANE TYPE AND TAIL# CROP DUSTER #N6528K# PASSENGERS/CREW. ANY INJURIES 1 INJURYETA OF AIRCRAFT TO AIRPORT GROUNDED PLANERUNWAY TO BE USED ** MORE ** NEAR NORTH ARIALDave Burkland 966-1785/345-6756 NOTIFIEDKim Parks 624-8238/532-0964 NOTIFIEDChief Hagerty 518-3246/893-5102 CELL 0937 VM/5Capt Maloney 521-8115/893-1238 NOTIFIED 0935 VM/5Greg Jones 864-2666/899-7008 DAVE BURKLAND TO NOTIFYEngine 3 crew heard on our aircraft radio an aircraft notify ChicoATCT of an accident at the north T hangars. Engine 3 was returningfrom an incident on Benton Avenue. Engine 3 returned to Station 3,Code 3, for the ARFF equipment. While returning, ATCT reported a cropduster into a T hanger and notified Chico Fire Dispatch via the ringdown phone. Crash Rescue 3 and Engine 3 responded. Upon arrival, crewfound a mid 70's Grumman Ag Cat (N6528K) upside down, at the washrack, just south of the Air Attack Base. The pilot, Dutch Wall, hadmoved from the aircraft to the Chico Aerial Applicators hanger. He wastreated by Fire personnel and Enloe Medics. The pilot reportedly hadcuts and bruises. He refused transport by Enloe Medics, and reportedlywas transported via private vehicle (AMA). A mechanic, Gary Walker,reportedly tried to stop the aircraft and injured his right leg. Garyrefused medical treatment. The aircraft was originally at ChicoAerial Applicators. The aircraft was started and reportedlyimmediately revved up out of control. It reportedly jumped the chocksand headed for the airfield. The pilot reportedly tried to shut itdown. As the aircraft moved onto the wash rack, it struck Aero Union'spressure washer trailer. This knocked loose a 15-20 gallon propanecylinder that was partially full. All the brass valving was sheared,and the cylinder was leaking off. Because of the rapid decompression,the leaks froze up and slowed. The cylinder had been knocked 150-200feet from the trailer, striking a hangar before coming to rest againstanother part of the metal building. It was moved back into the open,as it drained off. A second cylinder of the same size was struck, butthe protective cap was in place and prevented severe damage. Itappeared that the aircraft flipped over when it struck the trailer. Asit came to rest on its top, the aircraft engine and prop struck anAero Union golf cart that was also on the wash rack. Fortunately,there was no fire. Crash Rescue 3 applied foam to a fuel leak fromthe aircraft. A second, uninvolved aircraft was parked within 100 ftof the wash rack. This was in immediate threat of the fuel spill. Astorm drain was diked at the same time that the foam was applied.Environmental Health was notified and responded (Leslie Roberts andTom Parker). Karl Klem, of the ATCT, arrived for FAA info andnotification. Kim Parks, of the City, also responded to coordinatemitigation. NTSB telephoned Kim and indicated that they were not goingto investigate the incident. A vehicle accident report was done byCPD. Aero Union removed their two vehicles. Chico Aerial Applicatorswas left to remove their aircraft. Environmental health determined aneed for hazardous materials cleanup. A/C Industrial was called byChico Aerial Applicators. All Station 3 resources returned toquarters to restock agent. Inspector/PIO Fickert remained at scenewith the media. Estimated cost of aircraft: airframe $50,000; newengine $60,000; prop $15,000. Unknown cost on the pressure washertrailer and golf cart.END.

APPARATUS

Unit	CF1	**Unit**	CPNY1
Type:	Chief officer car	**Type:**	Other apparatus/resource
Use:	Other	**Use:**	Suppression
Response Mode:	()	**Response Mode:**	()
# of People	1	**# of People**	0
Alarm	06 /09/2007 09:22:03	**Alarm**	06 /09/2007 09:22:03
Dispatched	06 /09/2007 09:22:06	**Dispatched**	06 /09/2007 09:22:06
Enroute	-- / -- / -- -- : -- : --	**Enroute**	-- / -- / -- -- : -- : --
Arrived	06 /09/2007 09:35:31	**Arrived**	-- / -- / -- -- : -- : --
Cancelled	-- / -- / -- -- : -- : --	**Cancelled**	-- / -- / -- -- : -- : --
Cleared Scene	06 /09/2007 11:48:44	**Cleared Scene**	06 /09/2007 09:23:34
In Quarters	-- / -- / -- -- : -- : --	**In Quarters**	-- / -- / -- -- : -- : --
In Service	-- / -- / -- -- : -- : --	**In Service**	-- / -- / -- -- : -- : --
Unit	EMED1	**Unit**	E2R2
Type:	None	**Type:**	Engine
Use:	EMS	**Use:**	Suppression
Response Mode:	()	**Response Mode:**	()
# of People	0	**# of People**	3
Alarm	06 /09/2007 09:22:03	**Alarm**	06 /09/2007 09:22:03
Dispatched	06 /09/2007 09:22:06	**Dispatched**	06 /09/2007 09:22:06
Enroute	-- / -- / -- -- : -- : --	**Enroute**	-- / -- / -- -- : -- : --
Arrived	06 /09/2007 09:32:56	**Arrived**	06 /09/2007 09:32:48
Cancelled	-- / -- / -- -- : -- : --	**Cancelled**	-- / -- / -- -- : -- : --
Cleared Scene	06 /09/2007 10:20:46	**Cleared Scene**	06 /09/2007 10:20:31
In Quarters	-- / -- / -- -- : -- : --	**In Quarters**	-- / -- / -- -- : -- : --
In Service	-- / -- / -- -- : -- : --	**In Service**	-- / -- / -- -- : -- : --
Unit	E3CR3	**Unit**	E4
Type:	Engine	**Type:**	Engine
Use:	Suppression	**Use:**	Suppression
Response Mode:	()	**Response Mode:**	()
# of People	3	**# of People**	3
Alarm	06 /09/2007 09:22:03	**Alarm**	06 /09/2007 09:22:03
Dispatched	06 /09/2007 09:22:06	**Dispatched**	06 /09/2007 09:22:06
Enroute	-- / -- / -- -- : -- : --	**Enroute**	-- / -- / -- -- : -- : --
Arrived	06 /09/2007 09:29:53	**Arrived**	06 /09/2007 09:34:01
Cancelled	-- / -- / -- -- : -- : --	**Cancelled**	-- / -- / -- -- : -- : --
Cleared Scene	06 /09/2007 12:20:09	**Cleared Scene**	06 /09/2007 09:40:42
In Quarters	-- / -- / -- -- : -- : --	**In Quarters**	-- / -- / -- -- : -- : --
In Service	-- / -- / -- -- : -- : --	**In Service**	-- / -- / -- -- : -- : --
Unit	E5	**Unit**	E6
Type:	Engine	**Type:**	Engine
Use:	Suppression	**Use:**	Suppression
Response Mode:	()	**Response Mode:**	()
# of People	3	**# of People**	3
Alarm	06 /09/2007 09:22:03	**Alarm**	06 /09/2007 09:22:03
Dispatched	06 /09/2007 09:22:06	**Dispatched**	06 /09/2007 09:22:06
Enroute	-- / -- / -- -- : -- : --	**Enroute**	-- / -- / -- -- : -- : --
Arrived	06 /09/2007 09:33:48	**Arrived**	06 /09/2007 09:34:07
Cancelled	-- / -- / -- -- : -- : --	**Cancelled**	-- / -- / -- -- : -- : --
Cleared Scene	06 /09/2007 10:20:37	**Cleared Scene**	06 /09/2007 09:40:46
In Quarters	-- / -- / -- -- : -- : --	**In Quarters**	-- / -- / -- -- : -- : --
In Service	-- / -- / -- -- : -- : --	**In Service**	-- / -- / -- -- : -- : --
Unit	PVO	**Unit**	PV2
Type:	Other apparatus/resource	**Type:**	Other apparatus/resource
Use:	Other	**Use:**	Other
Response Mode:	()	**Response Mode:**	()
# of People	0	**# of People**	1
Alarm	06 /09/2007 09:22:03	**Alarm**	06 /09/2007 09:22:03
Dispatched	06 /09/2007 09:22:06	**Dispatched**	06 /09/2007 09:41:23
Enroute	-- / -- / -- -- : -- : --	**Enroute**	-- / -- / -- -- : -- : --
Arrived	-- / -- / -- -- : -- : --	**Arrived**	06 /09/2007 09:52:50
Cancelled	-- / -- / -- -- : -- : --	**Cancelled**	-- / -- / -- -- : -- : --
Cleared Scene	06 /09/2007 09:41:41	**Cleared Scene**	06 /09/2007 13:26:57
In Quarters	-- / -- / -- -- : -- : --	**In Quarters**	-- / -- / -- -- : -- : --
In Service	-- / -- / -- -- : -- : --	**In Service**	-- / -- / -- -- : -- : --
Unit	T1	**Unit**	T5
Type:	Truck or aerial	**Type:**	Truck or aerial

Use:	Suppression	**Use:**	Suppression
Response Mode:	()	**Response Mode:**	()
# of People	2	**# of People**	2
Alarm	06 /09/2007 09:22:03	**Alarm**	06 /09/2007 09:22:03
Dispatched	06 /09/2007 09:22:06	**Dispatched**	06 /09/2007 09:22:06
Enroute	-- / -- / -- -- : -- : --	**Enroute**	-- / -- / -- -- : -- : --
Arrived	06 /09/2007 09:34:13	**Arrived**	06 /09/2007 09:29:43
Cancelled	-- / -- / -- -- : -- : --	**Cancelled**	-- / -- / -- -- : -- : --
Cleared Scene	06 /09/2007 09:40:35	**Cleared Scene**	06 /09/2007 09:57:16
In Quarters	-- / -- / -- -- : -- : --	**In Quarters**	-- / -- / -- -- : -- : --
In Service	-- / -- / -- -- : -- : --	**In Service**	-- / -- / -- -- : -- : --
Unit	WT1		
Type:	Other apparatus/resource		
Use:	Suppression		
Response Mode:	()		
# of People	1		
Alarm	06 /09/2007 09:22:03		
Dispatched	06 /09/2007 09:22:06		
Enroute	-- / -- / -- -- : -- : --		
Arrived	-- / -- / -- -- : -- : --		
Cancelled	-- / -- / -- -- : -- : --		
Cleared Scene	06 /09/2007 09:23:34		
In Quarters	-- / -- / -- -- : -- : --		
In Service	-- / -- / -- -- : -- : --		

Number Of People not on apparatus: 0

PERSONNEL ON CALL

Name	Personnel Rank	Role(s)	Apparatus
ALEXANDER, JESSE			E4
BROWN, STEVE			CF1
CAMPBELL, KEN			E6
CDF/BUTTE CO,			WT1
CONWAY, DAVID			E3CR3
FARRARA, RON			E3CR3
Fickert, Marie	Fire Insp		PV2
GARRISON, FRANK			E2R2
GASSIOT, JP			T1
GONZALEZ, ED			E5
GOOGINS, BRAD			E2R2
HACK, BILL			E4
HARRISON, STEVE			E5
JACK, JAMES			E6
KELSO, JOHN			T5
MEAD, TODD			T1
MEIER, JAMES			E2R2
STELLE, PHIL			E5
VELAZQUEZ, MIKE			E4
WILEY, TODD			T5
WILLIAMSON, PHILIP			E3CR3
ZINKO, CHRIS			E6

Member Making Report (DAVID W CONWAY): _____

Incident Reviewer (DAVID W CONWAY): _____

City of Chico Fire Department
Station: **003**
Shifts Or Platoon: **0**

Location: **150 AIRPARK BLV** **CHICO CA 95926** Lat/Long: **N 39° 47' 56.1"** **W 121° 51' 13.49"** Location Type: **1 - Street address** Census Tract: **00 -0140**	Incident Type: **135 - Aircraft fire** FDID: **04010** Incident #: **2010-0008401** Exposure ID: **5235545** Exposure #: **0** Incident Date: **10/13/2010**

Report Completed by:	BARTEL , BILL	**ID:** 000004105	**Date:** 10/13/2010
Report Reviewed by:	BARTEL , BILL	**ID:** 000004105	**Date:** 10/13/2010
Report Printed by:	Metroka, Wes	**ID:** 3435	**Date:** 6/25/2019 **Time:** 14:55

Structure Type:	Property Use: **973 - Aircraft taxiway**				
Automatic Extinguishment System Present: ☐	Detectors Present: ☐	Cause of Ignition: **Unintentional**			
Aid Given or Received: **None**	Primary action taken: **11 - Extinguishment by fire service personnel**				
Additional actions: **86 - Investigate , -**					
Losses	**Pre-Incident Values**				
Property: **$2,000.00**	Property: **$600,000.00**	Civilian Injuries: **0**	Fire Service Injuries: **0**		
Contents: **$0.00**	Contents: **$1,000.00**	Civilian Fatalities: **0**	Fire Service Fatalities: **0**		
Total: **$2,000.00**	Total: **$601,000.00**	Total Casualties: **0**	Total Fire Service Casualties: **0**		
Total # of apparatus on call: **1**		Total # of personnel on call: **3**			

NARRATIVE (1)

Narrative Title: n/a

Narrative Author:

Narrative Date:

Narrative Apparatus ID: n/a

Narrative:
102860203Call#: 102860203 Beat: STATION 3Units.: E3CR3 Employees: 0000004105 BARTEL, WILLIAM0000001320 GOOGINS, BRAD0000002365 SMITH, KENPLANE TYPE AND TAIL# BONANZA TWIN ENGINE*** CAD Call Narrative ***2-J KOEHLER WAS ADVISEDCALLED KIM PARKS, NO ANSWER AND MAIL BOX IS FULL. VM/5AIRCRAFT ON GROUND. FIRE COMING OUT OF LANDING GEARBONANZA ENGINE.TAXI WAY HOTEL.BONANZA TWIN ENGINECONFIRMED FIRE ON THE LANDING GEAR.FIRE EXTINGUISHED.COMMITTED FOR APPROX 30 MINS.1619HRS STILL COMMITTED. LU/1S20-NOTIFIEDCrash-Rescue 3 and 3R responded on an alert from the CMA tower of anaircraft with brakes on fire on taxiway Hotel near the intersection oftaxiway Alpha. As units arrived fire could be seen coming from bothwheels of the Beechcraft Baron twin. Crash-Rescue 3 utilized thebumper turret for a quick knockdown on the wheels. Company OfficerBartel then pulled the reel line for further extinguishment.Crash-Rescue 3R utilized its main turret to knock down a reignition ofone of the wheels and then FF Smith pulled its reel line. The aircrafthad new brakes and the occupants were seating the brakes by runningthe aircraft down the runway when the fire broke out. The aircraft hadnot been flying. The aircraft was being operated by Henry Roversonwith Scott Roverson also on board..

APPARATUS	
Unit	E3CR3
Type:	Engine
Use:	Suppression
Response Mode:	()
# of People	3
Alarm	10 /13/2010 15:40:10
Dispatched	10 /13/2010 15:40:21
Enroute	-- / -- / -- -- : -- : --
Arrived	10 /13/2010 15:42:59
Cancelled	-- / -- / -- -- : -- : --
Cleared Scene	10 /13/2010 16:23:01
In Quarters	-- / -- / -- -- : -- : --
In Service	-- / -- / -- -- : -- : --
Number Of People not on apparatus: 0	

FIRE			
Acres Burned	None or Less Than One	**Acres Burn From Wildland Form**	
Area Of Fire Origin	Engine area, running gear, wheel area	**Heat Source**	Radiated or conducted heat from operating equipment
Item First Ignited	Item first ignited, other	**Fire Is Confined To Object Of Origin**	1
Type Of Material	Type of material first ignited, other	**Cause Of Ignition**	Unintentional
Estimated Age Of Person Involved	0	**Sex Of Person Involved**	
Mobile Property Involve And Type	Involved in ignition and burned	**Mobile Property Type**	Personal aircraft less than 12,500 lb. gross wt.
Mobile Property Make	Other Make	**Mobile Property Year**	1985
Mobile Property Model	BEECHCRAFT BARON 58	**License Plate**	N581RC
State		**VIN**	TH1477

PERSONNEL ON CALL			
Name	**Personnel Rank**	**Role(s)**	**Apparatus**
BARTEL, BILL			E3CR3
GOOGINS, BRAD			E3CR3
SMITH, KEN			E3CR3

Member Making Report (BILL BARTEL): _____

Incident Reviewer (BILL BARTEL): _____

City of Chico Fire Department
Station: **3**
Shifts Or Platoon: **C Shift**

Location: **100 AIRPORT RUNWAY** **Chico CA 95928** **AIRPORT SERVICE RD** Lat/Long: **S 1° 0′ 0″** **W 1° 0′ 0″** Zone: **3 Sta3 - Station 3's District** Location Type: **2 - Intersection** Map Page: **C5-RUNWAY** Cross Street, Directions or National Grid: **AIRPORT SERVICE RD**	Incident Type: **1353 - Aircraft Wheel Or Brake Fire** FDID: **04010** Incident #: **2016-6050** Exposure ID: **18706707** Exposure #: **0** Incident Date: **06/30/2016** Dispatch Run #: **161820126**

Report Completed by:	Metroka , Wes	**ID:** 3435	**Date:** 06/30/2016
Report Reviewed by:	Metroka , Wes	**ID:** 3435	**Date:** 06/30/2016
Report Printed by:	Metroka, Wes	**ID:** 3435	**Date:** 6/20/2019 **Time:** 11:54

Structure Type:	Property Use: **972 - Aircraft runway**				
Automatic Extinguishment System Present: ☐	Detectors Present: ☐	Cause of Ignition: **Failure of equipment or heat source**			
Aid Given or Received: **None**	Primary action taken: **10 - Fire control or extinguishment, other**				
Additional actions: **82 - Notify other agencies. , -**					
Losses	**Pre-Incident Values**				
Property:	Property:	Civilian Injuries:	**0**	Fire Service Injuries:	**0**
Contents:	Contents:	Civilian Fatalities:	**0**	Fire Service Fatalities:	**0**
Total:	Total:	Total Casualties:	**0**	Total Fire Service Casualties:	**0**
Total # of apparatus on call: **6**		Total # of personnel on call: **13**			

NARRATIVE (1)

Narrative Title: n/a

Narrative Author: Metroka, Wes

Narrative Date:

Narrative Apparatus ID: n/a

Narrative:
CR3 with E2, E42, E41, T1 and D3 responded to an Alert 2 at the CMA for a DC7 Air Tanker reporting a hydraulic system failure. City 708 with Jim Koehler also responded. CR3 arrived at scene, staged at taxiway E at runway 13L and assumed Airport Command. Aircraft was Tanker 60 with 4 souls on board with approximately 2000 gallons of fuel. D3 assumed Airport Command. The aircraft made a landing on 13L and had lost function of the hydraulic brakes. Pilots activated the emergency brake system and the planes wheels subsequently locked up resulting in an approximately 80 yard skid down the runway. The skid caused a wheel fire on the starboard side. CR3 positioned at the 1 O'clock position and extinguished the fire with the roof turret. E2 assisted with cooling the wheels with their front 1 3/4 hoseline. There were no injuries. D3 issued a NOTAM due to the closure of runway 13L. Mechanic for the aircraft determined that the necessary repairs to the wheels and tires would need to be completed on the runway prior to it being towed off. Estimated time of repair was to be 3 hours. All units with the exception of CR3 were released and command was transferred back to CR3. The tail number for the aircraft is N838D. City 708 to remain at scene during the repair of the aircraft. City 708 to cancel the NOTAM once the runway was cleared and inspected for FOD. Airport command was terminated and CR3 went available. No further action taken.

Narrative from dispatch:

DC7 HYDRLIC FAIL RUNWAY 13 LEFT, ETA 5 OR LESS 4 ON BOARD
4HRS OF FUEL
KN1
CR3-HAS COMMAND. ALL INCOMING TO STAGE
D3-AIRPORT COMMAND
E42-STAGGING AT THE GATE
29-NO UPDATE YET/WM@3
51-2 MINUTES OUT/WM@3
S12-PLANE 1 OUT. FIRE/PD 97/WM@2

S12-PLANE LANDED. NO COLLISION. HAS SMALL FIRE
THAT IS BEING ADDRESSED NOW/WM@3
AIRPORT COMM-WHEEL FIRE, PLANE LANDED, FIRE OUT.
AIRPORT COMM-CR3 E2R2 AND D3 COMMITED ALL OTHER RESOURCES
AVAIL
L8-CALL TOWER AND SEE WHAT PROTOCOL IS WITH FFA NOW/WM3
S12-VIPS TO GATE ON HICKS
29-GATE AT LOCKHEED NORTH OF AIRPORT LOCKED DOWN/WM@3
PHONED 530-567-7515 FOR FFA EMPLOYEE. NO ANSWER.
NO ANSWER ON AIR TOWER RING DOWN/WM@3
RUNWAY 13L CLOSED UNTIL AIRCRAFT MOVED,AIRPORT COMMAND
TERMINATED AND CR3 AVB

APPARATUS

Unit	CR3	**Unit**	DIV3
Type:	ARFF (aircraft rescue & firefighting)	**Type:**	Chief officer car
Use:	Suppression	**Use:**	Suppression
Response Mode:	()	**Response Mode:**	()
# of People	1	**# of People**	1
Alarm	06 /30/2016 10:38:44	**Alarm**	06 /30/2016 10:38:44
Dispatched	06 /30/2016 10:39:17	**Dispatched**	06 /30/2016 10:39:17
Enroute	06 /30/2016 10:39:28	**Enroute**	06 /30/2016 10:39:31
Arrived	06 /30/2016 10:40:33	**Arrived**	06 /30/2016 10:42:04
Cancelled	-- / -- / -- -- : -- : --	**Cancelled**	-- / -- / -- -- : -- : --
Cleared Scene	06 /30/2016 12:20:20	**Cleared Scene**	06 /30/2016 11:40:41
In Quarters	-- / -- / -- -- : -- : --	**In Quarters**	-- / -- / -- -- : -- : --
In Service	06 /30/2016 12:20:20	**In Service**	06 /30/2016 11:40:41
Unit	E2R2	**Unit**	E41
Type:	Ground fire suppression, other	**Type:**	Engine
Use:	Suppression	**Use:**	Suppression
Response Mode:	()	**Response Mode:**	()
# of People	3	**# of People**	2
Alarm	06 /30/2016 10:38:44	**Alarm**	06 /30/2016 10:38:44
Dispatched	06 /30/2016 10:39:17	**Dispatched**	06 /30/2016 10:39:17
Enroute	06 /30/2016 10:40:26	**Enroute**	06 /30/2016 10:41:22
Arrived	06 /30/2016 10:46:35	**Arrived**	06 /30/2016 10:49:12
Cancelled	-- / -- / -- -- : -- : --	**Cancelled**	-- / -- / -- -- : -- : --
Cleared Scene	06 /30/2016 11:22:52	**Cleared Scene**	06 /30/2016 10:59:35
In Quarters	-- / -- / -- -- : -- : --	**In Quarters**	-- / -- / -- -- : -- : --
In Service	06 /30/2016 11:22:52	**In Service**	06 /30/2016 10:59:35
Unit	E42	**Unit**	T1
Type:	Engine	**Type:**	Quint
Use:	Suppression	**Use:**	Suppression
Response Mode:	()	**Response Mode:**	()
# of People	2	**# of People**	4
Alarm	06 /30/2016 10:38:44	**Alarm**	06 /30/2016 10:38:44
Dispatched	06 /30/2016 10:39:17	**Dispatched**	06 /30/2016 10:39:17
Enroute	06 /30/2016 10:39:28	**Enroute**	06 /30/2016 10:40:16
Arrived	06 /30/2016 10:46:21	**Arrived**	06 /30/2016 10:50:40
Cancelled	-- / -- / -- -- : -- : --	**Cancelled**	-- / -- / -- -- : -- : --
Cleared Scene	06 /30/2016 11:00:41	**Cleared Scene**	06 /30/2016 10:57:18
In Quarters	-- / -- / -- -- : -- : --	**In Quarters**	-- / -- / -- -- : -- : --
In Service	06 /30/2016 11:00:41	**In Service**	06 /30/2016 10:57:18

Number Of People not on apparatus: 0

FIRE			
Acres Burned	None or Less Than One	**Acres Burn From Wildland Form**	False
Area Of Fire Origin	Engine area, running gear, wheel area	**Heat Source**	Heat source: other
Item First Ignited	Tire	**Fire Is Confined To Object Of Origin**	TRUE
Type Of Material	Rubber, excluding synthetic rubbers	**Cause Of Ignition**	Failure of equipment or heat source
Factor Contributing To Ignition	Mechanical failure, malfunction, other		
Human Factors Contributing	None		
Mobile Property Involve And Type	Involved in ignition and burned	**Mobile Property Type**	Commercial aircraft: propeller, fixed wing
Mobile Property Make	Other Make	**Mobile Property Year**	

PEOPLE -- PERSON 1			
Is Owner	False	**Business Name**	Erickson Aero Tankers
Telephone Number	530-258-2725	**Involvement**	Pilot
Name	Marc Osman	**Date of Birth**	
Address			

PEOPLE -- PERSON 2			
Is Owner	False	**Business Name**	Erickson Aero Tankers
Telephone Number	541-261-3157	**Involvement**	Pilot
Name	Scot Douglas	**Date of Birth**	
Address			

CUSTOM FIELDS FORM	
What type of Medical Call? Type N for Not a Medical. Type C for Cancelled Enroute.	Not a Medical call
Was Alcohol a possible contributing factor?	No
Reportable Medical Procedure Used.	None Used
Help List of FDID's, Need for Local Mutual Aid Calls	

PERSONNEL ON CALL

Name	Personnel Rank	Role(s)	Apparatus
,			DIV3
Campbell, Ken	ENG/RT		E2R2
ENGINE 41, FF#1			E41
ENGINE 41, FF#2			E41
ENGINE 42, E42			E42
ENGINE 42, FF#1			E42
Gibbons, Bryan	FF		T1
Metroka, Wes	CAPT/HT/A/FIT		CR3
Murphy, Darryn	FF		T1
Sassen, Tyler	FF/FIT		E2R2
Smith, Ken	ENG		T1
Stelle, Phil	ENG/RT/FIT		E2R2
Zinko, Chris	CAPT		T1

Member Making Report (CAPT/HT/A/FIT Wes Metroka): _____

Incident Reviewer (CAPT/HT/A/FIT Wes Metroka): _____

City of Chico Fire Department
Station: **3**
Shifts Or Platoon: **B Shift**

Location: **150 AIRPARK BLVD** **Chico CA 95928** **INVADER ST** Lat/Long: **N 39° 47' 56.53"** **W 121° 51' 13.4"** Zone: **3 Sta3 - Station 3's District** Location Type: **2 - Intersection** Map Page: **C5** Cross Street, Directions or National Grid: **INVADER ST**	Incident Type: **411 - Gasoline or other flammable liquid spill** FDID: **04010** Incident #: **2016-6811** Exposure ID: **19064619** Exposure #: **0** Incident Date: **07/22/2016** Dispatch Run #: **162040171**

Report Completed by:	Andrews , Steve	**ID:** 2215	**Date:** 07/22/2016
Report Reviewed by:	Andrews , Steve	**ID:** 2215	**Date:** 07/22/2016
Report Printed by:	Dillard, Annalisa	**ID:** 1795	**Date:** 7/25/2016 **Time:** 08:35

Structure Type:	Property Use: **974 - Aircraft loading area**				
Automatic Extinguishment System Present: ☐	Detectors Present: ☐	Cause of Ignition:			
Aid Given or Received: **None**	Primary action taken: **41 - Identify, analyze hazardous materials**				
Additional actions: **43 - Hazardous materials spill control and confinement , 53 - Evacuate area**					
Losses	**Pre-Incident Values**				
Property:	Property:	Civilian Injuries:	**0**	Fire Service Injuries:	**0**
Contents:	Contents:	Civilian Fatalities:	**0**	Fire Service Fatalities:	**0**
Total:	Total:	Total Casualties:	**0**	Total Fire Service Casualties:	**0**
Total # of apparatus on call:		**5**	Total # of personnel on call:		**9**

NARRATIVE

ST3 received a ring down call for a hazardous fuel spill on the loading ramp in front of the Tower. CR3 responded code 3 to said area. CR3 arrived at scene, Large fuel spill involving a fuel tanker Oregon plates YACP635 and helicopter tail number N1043T, spill aprox 80' x 40', request two additional engines, CR3 will be Airport Command.
CR3 position south of the spill in a defensive position. Command witnessed, 3 men in the fuel spill, trying to stop further spread. The three men; one was the pilot Mario Nickl 801-440-0582, one driver of the fuel truck, and the other was an assistant. All parties worked for the Croman Company. I exited the CR3 and met 2 more men that worked for Croman Company, Luke Hanson 541-261-1222 and Eric McDonald, informed them to say a safe distance from the incident, as I approached the other men and asked them to leave the spill area and directed them to a safe area which the other employs were standing.
Jim Koehler, Chico Airport Maintenance, arrived at scene I assigned him to open the gate at Boeing and let E42 and E2 in. E2 and E42 arrived at scene and were assigned to dike the spill and stop the spread. After calculating the quantity and dimensions of the spill, 100+ gallons and 300' x 120' perimeter, I requested two Hazmat tech Captain Fry and FAE Zaring. Both were not available do to an alarm T/C. Chief Silverman, who is a Hazmat Leader, contacted Airport Command by phone and assisted with the Hazmat issue, stabilizing the fuel leak and spill. CR3 contacted the Croman Company responsible for clean up, Richard Snapp 541-944-6583 cell, 541-826-4455 office, he assured me that he would be responsible for the cost of the clean up and asked me to arrange for someone to come out and clean it up. I assigned Jim Keohler to contact NRC environmental cleaning and arrange them to clean it up. Made notification with Richard Snapp and he OK the process.
NRC arrived at scene and started the clean up process. Chief Alexander arrived at scene for up date. Chief of Fire, City Manager, Airport manager and Duty Chief all contacted and updated. With the clean up process completed, all resources available, Airport Command terminated.

Narrative from dispatch:

TOWER GROUND EMERGENCY AIRCRAFT YELLOW HELICOPTER WITH FUEL LEAK. CR 3 ENROUTE. LU/5 -CR3/40X80 FT JET FUEL SPILL DIRECTLY IFO THE AIR TOWER. -REQ 2 ADDITIONAL ENGINES. -CR3/ASSUME AIRPORT COMMAND. CR3/E2R2 COMMITTED. -FUEL HAS STOPPED AND WAITING FOR CLEAN UP PROCEEDURES. -CR3/E2R2 COMMITTED, RELEASE E42 D2 ADV AIRPORT MANAGER NEEDS TO BE NOTIFIED. THEY ARE WAITING FOR RESPONSIBLE TO CLEAN UP/WM@2 -JIM KOEHLER ADVISED. AVAILABLE AT {624-1342} PHONE IF NEEDED. -REQ 2 HAZMAT TECH, FRY AND ZARING FROM STATION 6 -CANC HAZMAT REQ. RELEASE E2R2. CR3 STAYING AT SCENE. -D3 AT SCENE 15 AGO -CR3 STILL COMMITTED UNTIL NO FIRE THREAT. -ENVIROMENTAL CLEAN UP CREW ARRIVED AT SCENE 40 AGO. -JIM KOEHLER IS THE CONTACT PERSON FOR THE PRIVATE COMPANY ENVIROMENTAL CLEAN UP CREW THAT IS ON SCENE. CR3-CLEANUP PROCESS COMPLETE.

COMMAND TERMINATED. KM/1

APPARATUS

Unit	CR3	**Unit**	DIV2
Type:	ARFF (aircraft rescue & firefighting)	**Type:**	Chief officer car
Use:	Suppression	**Use:**	Suppression
Response Mode:	()	**Response Mode:**	()
# of People	1	**# of People**	1
Alarm	07 /22/2016 13:51:56	**Alarm**	07 /22/2016 13:51:56
Dispatched	07 /22/2016 13:52:44	**Dispatched**	07 /22/2016 13:55:04
Enroute	07 /22/2016 13:52:53	**Enroute**	07 /22/2016 13:57:19
Arrived	07 /22/2016 13:53:54	**Arrived**	07 /22/2016 14:28:54
Cancelled	-- / -- / -- -- : -- : --	**Cancelled**	-- / -- / -- -- : -- : --
Cleared Scene	07 /22/2016 18:22:02	**Cleared Scene**	07 /22/2016 14:33:11
In Quarters	-- / -- / -- -- : -- : --	**In Quarters**	-- / -- / -- -- : -- : --
In Service	07 /22/2016 18:22:02	**In Service**	07 /22/2016 14:33:11
Unit	DIV3	**Unit**	E2R2
Type:	Chief officer car	**Type:**	Ground fire suppression, other
Use:	Suppression	**Use:**	Suppression
Response Mode:	()	**Response Mode:**	()
# of People	1	**# of People**	4
Alarm	07 /22/2016 13:51:56	**Alarm**	07 /22/2016 13:51:56
Dispatched	07 /22/2016 15:38:38	**Dispatched**	07 /22/2016 13:54:59
Enroute	-- / -- / -- -- : -- : --	**Enroute**	07 /22/2016 13:56:37
Arrived	07 /22/2016 15:38:40	**Arrived**	07 /22/2016 14:04:28
Cancelled	-- / -- / -- -- : -- : --	**Cancelled**	-- / -- / -- -- : -- : --
Cleared Scene	07 /22/2016 16:01:59	**Cleared Scene**	07 /22/2016 14:38:46
In Quarters	-- / -- / -- -- : -- : --	**In Quarters**	-- / -- / -- -- : -- : --
In Service	07 /22/2016 16:01:59	**In Service**	07 /22/2016 14:38:46
Unit	E42		
Type:	Engine		
Use:	Suppression		
Response Mode:	()		
# of People	2		
Alarm	07 /22/2016 13:51:56		
Dispatched	07 /22/2016 13:54:59		
Enroute	07 /22/2016 13:56:58		
Arrived	07 /22/2016 14:01:25		
Cancelled	-- / -- / -- -- : -- : --		
Cleared Scene	07 /22/2016 14:10:37		
In Quarters	-- / -- / -- -- : -- : --		
In Service	07 /22/2016 14:10:37		

Number Of People not on apparatus: 0

PEOPLE -- PERSON 1

Telephone Number	-	**Involvement**	CALR
Name	AIR TOWER	**Date of Birth**	
Address	0		

CUSTOM FIELDS FORM

What type of Medical Call? Type N for Not a Medical. Type C for Cancelled Enroute.	Not a Medical call
Was Alcohol a possible contributing factor?	No
Reportable Medical Procedure Used.	None Used
Help List of FDID's, Need for Local Mutual Aid Calls	

PERSONNEL ON CALL

Name	Personnel Rank	Role(s)	Apparatus
,			DIV2
Alexander, Jesse	Division Chief		DIV3
Andrews, Steve	CAPT/RTL/A		CR3
Bretan, Marius	FAE		E2R2
ENGINE 42, E42			E42
ENGINE 42, FF#1			E42
Hart, Daniel	FF		E2R2
Haskell, Abby	FF		E2R2
Houtman, Jim	ENG/RT		E2R2

Member Making Report (CAPT/RTL/A Steve Andrews): _____

Supervisor (CAPT/RTL/A Steve Andrews): _____

Attachment 2
Sampling and Analysis Plan

JACOBS

Preliminary Per- and Polyfluoroalkyl Substance Investigation

Sampling and Analysis Plan

November 2019

City of Chico

1. Introduction

This supplement to the *Chico Municipal Airport Per- and Polyfluoroalkyl Substance (PFAS) Investigation Work Plan* (work plan) has been prepared to address quality assurance criteria as they relate to sampling design approach, sample collection, sample handling, and laboratory analysis. Project team members and analytical laboratories will adhere to the procedures and specifications outlined in this plan.

2. Certification Requirements

Eurofins Test America Sacramento is certified under the California Department of Health Environmental Laboratory Accreditation Program where applicable and where accreditation is offered by this program. The laboratories will also be certified to perform the analytical method for PFAS compliant with Department of Defense Table B-15 of Quality Systems Manual, dated 2017, Version 5.1 or later. The laboratory managers are responsible for ensuring that all laboratory personnel have been properly trained and are qualified to perform their assigned task.

3. Sample Approach Design

The sample approach is defined in the work plan. Historical site activities may have resulted in the release of PFAS to environmental media. The goals of this investigation are to assess if soil and/or groundwater have been affected by detectable concentrations of PFAS. Knowledge of historical site use and previously collected analytical sample results are incorporated into the sample approach design. The results will be used to determine whether additional investigation is required.

Sample matrix is included as Table 1.

4. Field Sample Procedures

Samples will be collected in accordance with the following documents:

- California State Water Quality Control Board, Division of Water Quality. 2019. *Per- and Polyfluoroalkyl Substances (PFAS) Sampling Guidelines.* March 20.
- Interstate Technology Regulatory Council (ITRC). 2018. *Site Characterization Considerations, Sampling Precautions and Laboratory Analytical Methods for Per- and Polyfluoroalkyl Substances (PFAS).* March 15.

4.1 Equipment and Supplies

Many materials used in the course of environmental investigation can potentially contain PFAS. There is limited published research or guidance on how certain materials used by field staff affect sample results. Therefore, a conservative approach has been recommended to exclude materials known to contain PFAS. This includes obtaining and reviewing all safety data sheets before considering materials for use during PFAS sampling. Materials to avoid include the following:

- Teflon, polytetrafluoroethylene (PTFE)
- Coated Tyvek
- Waterproof coatings containing PFAS
- Food containers or aluminum foil
- Latex gloves
- Decon 90
- Waterproof paper, field books, or forms
- UV-resistant or insect-resistant clothing
- Anything with "fluoro" in the name
- Fluorinated ethylene propylene (FEP)
- Ethylene tetrafluoroethylene (ETFE)
- Low-density polyethylene (LDPE), polyvinylidene fluoride (PVDF)

Many waterproof coatings contain PFAS, such as Gore-Tex-treated personal protective equipment (PPE) or waterproof papers; but some products are waterproofed with acceptable materials such as polyurethane, rubber, or polyvinyl chloride (PVC). Individual product specifications will be examined closely; and clothing and PPE worn by the field crew, sampling supplies, and sampling equipment with the potential to contain PFAS will not be used for sample collection. In the case of Tyvek PPE, plain Tyvek does not contain PFAS, but coated Tyvek does. In addition, materials incidentally transported to sites may contain PFAS. For example, fast food wrappers may contain PFAS; however, common industry-standard precautions would not allow those materials to be present at the wellhead during sampling; therefore, avoidance of items related to sample crew activities away from the wellsite is not necessary. Due to the ubiquitous nature of PFAS, sampling crews will review all materials used to avoid contamination. Clothing and equipment used during the investigation will be reviewed at each sampling location to help minimize introduction of PFAS to the sampling environment. Field personnel will wear a new pair of disposable powderless nitrile gloves prior to decontaminating reusable sampling equipment, prior to contact with sample containers, prior to inserting equipment for groundwater sampling, prior to sample collection, and prior to handling of any filed or laboratory quality control samples. Collection of quality assurance and quality control (QA/QC) samples will assist with assessing field contamination (ITRC, 2018).

4.2 Sources of Water for Decontamination and Work

Because of widespread PFAS occurrence and low-level laboratory detection limits, additional efforts will be implemented to ensure that water is suitable beyond being potable. Water used for sample equipment decontamination or to use during work (such as, for drilling) will be confirmed as being PFAS-free prior to use. Final rinse of equipment decontamination will be completed with PFAS-free deionized water. To the extent practicable, large equipment will be decontaminated with potable water whose source has been tested to be free of PFAS. To determine if water is PFAS-free, the detectable concentration must be less than half the limit of quantification (LOQ) and less than the regulatory screening levels.

4.3 Sample Bottles

Containers and preservatives will be specific to the analytical method, provided by the laboratory selected to perform the analysis, and will be certified by the laboratory to be PFAS-free.

4.4 Soil Samples

Soil sampling will involve the collection of subsurface soil from soil borings advanced by appropriate drilling methodology at one location and by hand auger or air knife at five other locations. Up to four soil samples will be collected from the drilled boring, one within the upper 2 feet below ground surface (bgs), one at the water table, and up to two between ground surface and the water table. Two soil samples will be collected at each of five hand auger or air knife borings, one within the upper 2 feet bgs and one at either a lithologic interface where PFAS compounds may accumulate (such as sand/clay) or at a depth of 10 feet bgs, whichever is shallower. Although air knife may be used to advance the borings past cobbles, the soil samples submitted for laboratory analysis will be collected via hand auger. Soil boring logs will be completed on soil boring log sheets separate from the field notes.

The soil will be transferred into laboratory-supplied sample jars for submittal to the analytical laboratory. Maximum holding times for soil samples is 14 days for extraction and 30 days to analysis.

30 grams of soil is required per analysis.

4.5 Groundwater Samples

Groundwater sampling will be conducted at existing monitoring and/or extraction wells and from one temporary boring advanced by the appropriate drilling method to assess potential releases of PFAS to groundwater. Groundwater samples will be collected consistent with the U.S. Environmental Protection Agency (EPA) guidance, *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures* (Puls and

Barcelona, 1996). Sampling equipment will be decontaminated before and after each purge; and decontamination water will be transferred to 55-gallon drums, which will be sealed, labeled, and stored in a secured central staging area.

One groundwater samples will be collected from each of nine existing monitoring wells, and one grab groundwater sample will be collected from the temporary boring. New, clean, high-density polyethylene sampling tubing will then be inserted into the boring; and groundwater will be purged with a PFAS-free pump until water quality parameters (pH, temperature, dissolved oxygen, electric conductivity, oxidation-reduction potential, and turbidity) stabilize. When parameter stabilization is achieved, a groundwater sample will be collected in a method-appropriate container and immediately stored in an ice-chilled cooler. Following sample collection, sampling equipment will be removed and the boring sealed using bentonite. Maximum holding times for water samples is 14 days for extraction and 28 days to analysis.

1,000 milliliters of groundwater are required per analysis.

5. Proposed Analytes and Associated Reporting Limits

Soil and groundwater reporting limits are provided in Table 2.

5.1 Field Quality Control Sampling

5.1.1 Equipment Blanks

After decontamination, PFAS-free water will be poured over the subject piece of equipment. Free-flowing runoff will be collected in laboratory-provided containers. At a minimum, equipment blanks will be collected at a frequency of one per day of equipment decontamination. The purpose for this type of QC sample is to eliminate bias from cross contamination introduced from decontamination procedures. An equipment blank sample performance will be determined based on no target analytes detected at more than half LOQ.

At minimum, equipment blanks will be collected at a frequency of approximately 5 percent or one per day.

5.1.2 Field Blanks

Field blanks are provided by the laboratory and contain an aliquot of PFAS-free water reagent and sample bottes containing only PFAS-free matrixes. The sample is exposed to sampling site conditions, storage, preservation, and all analytical procedures. The purpose for this type of QC sample is to eliminate bias from cross contamination introduced by the analytical laboratory. Field blank sample performance will be determined based on no target analytes detected greater than half LOQ.

Each cooler used to transport samples to the analytical laboratory will contain a field blank.

5.1.3 Trip Blanks

Trip blanks are provided by the laboratory and filled with PFAS-free water. The trip blank travels from the laboratory to the site and then back to the laboratory without being exposed to any sampling procedures. At a minimum, one trip blank sample will be included in each cooler shipped or transported by a courier to the analytical laboratory. The purpose of QC samples is to eliminate bias from cross contamination introduced during the sample transportation processes. Trip blank sample performance will be determined based on no target analytes detected greater than half LOQ.

Each cooler used to transport samples to the analytical laboratory will contain a trip blank.

5.1.4 Field Duplicates

Field duplicates will be collected for groundwater only as field homogenization of soil cannot be verified. These samples will be submitted to the laboratory blind. The purpose of field duplicates is to verify the precision of the sample collection, handling, and analytical procedures. Field duplicate sample performance will be determined based on target analytical concentrations being within 30 percent of those in the respective parent sample.

At minimum, field duplicates will be collected at a frequency of approximately 10 percent.

5.1.5 Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicates (MS/MSD) are representative but randomly chosen client samples that have known concentrations of analytes of interest added to the samples prior to sample preparation and analysis. They are processed along with the same un-spike sample. The purpose of the MS/MSD is to document the accuracy and precision of the method for that specific sample. Control charts are

maintained that are indicative of typical MS/MSD recoveries of "real" samples rather than laboratory-controlled samples.

At minimum, MS/MSD will be analyzed at a frequency of approximately 5 percent for each matrix.

5.1.6 Temperature Blanks

Temperature blanks are laboratory-provided containers filled with PFAS-free water. They will be placed in each cooler prior to the addition of field samples. Upon receipt of samples by the analytical laboratory, the temperature is measured. Each cooler used to transport samples to the analytical laboratory will contain a temperature blank. The purpose of temperature blanks is to verify sample repetitiveness bias introduced by sample volatile off-gassing during sample transportation. Temperature blank performance criteria will be determined based on temperature at time or receipt by laboratory of 0 to 6 degrees Celsius.

Each cooler used to transport samples to the analytical laboratory will contain a temperature blank.

6. References

California State Water Quality Control Board, Division of Water Quality. 2019. *Per- and Polyfluoroalkyl Substances (PFAS) Sampling Guidelines*. March 20.

Interstate Technology Regulatory Council (ITRC). 2018. *Site Characterization Considerations, Sampling Precautions and Laboratory Analytical Methods for Per- and Polyfluoroalkyl Substances (PFAS)*. March 15.

Puls, Robert W. and Michael J. Barcelona. 1996. *U.S. EPA Ground Water Issue: Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures*. EPA/540/S-95/504. April.

Tables

Table 1. Sample Matrix

Eurofins TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605-1500
Phone: 916-373-5600

						Analysis Name	PFAS	Total Metals	Alkalinity	Anions	TDS
						Method	USEPA 537.1	USEPA 6010B	SM 2320B	USEPA 300	SM 2540C
						Containers	4 x 250 mL HDPE (GW) 1 x 8 oz jar (S)	1 x 250 mL poly	1 x 250 mL poly	1 x 500 mL poly	1 x 500 mL poly
						Preservative	None	HNO_3 to pH <2	None	None	None
						Holding Time[a]	14 days	180 days	14 days	48 hrs	7 days
Location	Boring/ Well ID	Top (ft bgs)	Bottom (ft bgs)	Sample ID	Matrix	Type					
Crash	Crash-01	0	1	Boring-Crash-01-1-S	S	N	X				
	Crash-01	TBD[b]	TBD	Boring-Crash-01-X[b]-S	S	N	X				
	Crash-01	TBD	TBD	Boring-Crash-01-X-S	S	N	X				
	Crash-01	TBD	TBD	Boring-Crash-01-X-S	S	FD	X				
	Crash-01	TBD	TBD	Boring-Crash-01-X-S	S	N	X				
	Crash-01	–	–	Boring-Crash-01-GW	GW	N	X	X	X	X	X
	BCV-26	–	–	BCV-26-GW	GW	N	X	X	X	X	X
Fuel	Fuel-01	0	2	Boring-Fuel-01-2-S	S	N	X				
	Fuel-01	TBD[c]	TBD	Boring-Fuel-01-X[c]-S	S	FD	X				
	Fuel-01	TBD[c]	TBD	Boring-Fuel-01-X[c]-S	S	N	X				
CFS3	BCV-16	–	–	BCV-16-GW	GW	N	X	X	X	X	X
	BCV-16	–	–	BCV-16-GW-MS	GW	MS	X	X	X	X	X
	BCV-16	–	–	BCV-16-GW-MSD	GW	MSD	X	X	X	X	X
ATA	ATA-01	0	2	Boring-ATA-01-2-S	S	N	X				
	ATA-01	TBD[c]	TBD	Boring-ATA-01-X[c]-S	S	N	X				
	ATA-02	0	2	Boring-ATA-02-2-S	S	N	X				
	ATA-02	TBD	TBD	Boring-ATA-02-X-S	S	N	X				
	ATA-03	0	2	Boring-ATA-03-2-S	S	N	X				
	ATA-03	TBD	TBD	Boring-ATA-03-X-S	S	N	X				
	ATA-04	0	2	Boring-ATA-04-2-S	S	N	X				
	ATA-04	TBD	TBD	Boring-ATA-04-X-S	S	N	X				
	ATA-04	TBD	TBD	Boring-ATA-04-X-S-MS	S	MS	X				
	ATA-04	TBD	TBD	Boring-ATA-04-X-S-MSD	S	MSD	X				
	BCV-15	–	–	BCV-15-GW	GW	N	X	X	X	X	X
	BCV-18	–	–	BCV-18-GW	GW	N	X	X	X	X	X
	BCVE-1	–	–	BCVE-1-GW	GW	N	X	X	X	X	X
	BCV-21	–	–	BCV-21-GW	GW	N	X	X	X	X	X
Upgradient	BCV-6	–	–	BCV-6-GW	GW	N	X	X	X	X	X
	BCV-8	–	–	BCV-8-GW	GW	N	X	X	X	X	X
	BCV-8	–	–	BCV-8-GW-FD	GW	FD	X	X	X	X	X
	BCV-14	–	–	BCV-14-GW	GW	N	X	X	X	X	X
QC	Trip blank[d]	–	–	Tripblank_01	TB	TB	X				
	Trip blank	–	–	Tripblank_02	TB	TB	X				
	Trip blank	–	–	Tripblank_03	TB	TB	X				
	Trip blank	–	–	Tripblank_04	TB	TB	X				
	Trip blank	–	–	Tripblank_05	TB	TB	X				
	Trip blank	–	–	Tripblank_06	TB	TB	X				
	Trip blank	–	–	Tripblank_07	TB	TB	X				
	Trip blank	–	–	Tripblank_08	TB	TB	X				

Table 1. Sample Matrix

	Field Blank[4]	--	--	FieldBlank_01*	FB	FB	X				
	Field Blank	--	--	FieldBlank_02*	FB	FB	X				
	Field Blank	--	--	FieldBlank_03*	FB	FB	X				
	Field Blank	--	--	FieldBlank_04*	FB	FB	X				
	Field Blank	--	--	FieldBlank_05*	FB	FB	X				
	Field Blank	--	--	FieldBlank_06*	FB	FB	X				
	Field Blank	--	--	FieldBlank_07*	FB	FB	X				
	Field Blank	--	--	FieldBlank_08*	FB	FB	X				
	Equipment Blank[4]	--	--	EquipmentBlank_01	EB	EB	X				
	Equipment Blank	--	--	EquipmentBlank_02	EB	EB	X				
	Equipment Blank	--	--	EquipmentBlank_03	EB	EB	X				
	Equipment Blank	--	--	EquipmentBlank_04	EB	EB	X				

[1]Maximum holding time is calculated from the time the sample is collected to the time the sample is prepared/extracted.
[2]Soil samples will be collected at the water table and up to two locations between the ground surface and the water table. Sample ID will include the bottom depth of the sample interval.
[3]The second soil sample at each ATA or Fuel boring location will be collected at either a lithologic interface (such as sand/clay) or at a depth of 10 feet below ground surface, whichever is shallower. Sample ID will include the bottom depth of the sample interval.
[4]Each cooler used to transport samples to the analytical laboratory will contain a trip blank and a field blank.
[5]At minimum, equipment blanks will be collected at a frequency of approximately 5 percent or one per day.
[6]Sample will be submitted to laboratory with ID selected to blind the nature of the sample to the laboratory.

Notes:
ATA = AFFF Testing Area
BGS = Below Ground Surface
CFS3 = City Fire Station #3
COLLECTING FRBs = A sample bottle will be filled with reagent water, at the sampling site open the reagent water bottle and pour into another sample bottle.
Crash = 1992 Airplane Crash
EB = Equipment Blank
EPA = U.S. Environmental Protection Agency
Fuel = 2007 Aircraft Fuel Spill
FB = Field Blank
FD = Field Duplicate
ft = Feet
g = Gram
GW = Groundwater
L = Liter
mL = Milliliter
MS = Matrix Spike
MSD = Matrix Spike Duplicate
N = Normal
S = Soil
TB = Trip Blank

Table 2. PFAS Analytes (Adapted from Work Plan Table 2)

Chemical Name	Chemical Abstracts Service	EPA Analysis and Holding Time	Reporting Limit – Water (ng/L)	Reporting Limit – Soil (µg/kg)
Hexafluoropropylene oxide dimer acid (Perfluoro-2-propoxypropionic acid)[a]	13252-13-6*	Laboratory SOP WS-LC-0025 (Modified EPA method 537) 14 days groundwater/ 14 days for soil	2.0	0.25
10:2 Fluorotelomer sulfonic acid[a]	120226-60-0*		2.0	0.2
Perfluorooctadecanoic acid	16517-11-6*		2.0	0.2
N-Ethyl perfluorooctane sulfonamide ethanol	*1691-99-2**		*NA*	*NA*
Perfluorooctane sulfonic acid[a]	1763-23-1		2.0	0.5
Perfluoroundecanoic acid[a]	2058-94-8		2.0	0.2
N-Methyl perfluorooctane sulfonamidoacetic acid[a]	2355-31-9		20.0	2.0
N-Methyl perfluorooctane sulfonamide ethanol	*24448-09-7**		*NA*	*NA*
Perfluoropentanoic acid[a]	2706-90-3		2.0	0.2
Perfluoropentane sulfonoic acid[a]	2706-91-4		2.0	0.2
6:2 Fluorotelomer sulfonic acid[a]	27619-97-2		20.0	2.0
N-Ethyl perfluorooctane sulfonamidoacetic acid[a]	2991-50-6		20.0	2.0
Perfluorohexanoic acid[a]	307-24-4		2.0	0.2
Perfluorododecanoic acid[a]	307-55-1		2.0	0.2
N-Methyl perfluorooctane sulfonamide	31506-32-8*		20.0	2.0
Perfluorooctanoic acid[a]	335-67-1		2.0	0.2
Perfluorodecanoic acid[a]	335-76-2		2.0	0.2
Perfluorodecane sulfonic acid[a]	335-77-3		2.0	0.2
Perfluorohexane sulfonic acid[a]	355-46-4		2.0	0.2
2H,2H,3H,3H-Perfluorohexanoic acid	*356-02-5**		*NA*	*NA*
Perfluorobutanoic acid[a]	375-22-4		2.0	0.2
Perfluorobutane sulfonic acid[a]	375-73-5		2.0	0.2
Perfluoroheptanoic acid[a]	375-85-9		2.0	0.2
Perfluoroheptane sulfonic acid[a]	375-92-8		2.0	0.2
Perfluorononanoic acid[a]	375-95-1		2.0	0.2
Perfluorotetradecanoic acid[a]	376-06-7		2.0	0.2
2H,2H,3H,3H-Perfluorodecanoic acid	*812-70-4**		*NA*	*NA*
8:2 Fluorotelomer sulfonic acid[a]	39108-34-4		20.0	2.0
N-Ethyl perfluorooctane sulfonamide	4151-50-2*		20.0	2.0
Perfluorononane sulfonic acid[a]	474511-07-4*		2.0	0.2
Perfluorohexadecanoic acid[a]	67905-19-5*		2.0	0.2
Perfluorotridecanoic acid[a]	72629-94-8		2.0	0.2
Perfluorooctanesulfonamide[a]	754-91-6		2.0	0.2
4:2 Fluorotelomer sulfonic acid[a]	757124-72-4		20.0	2.0
Perfluoro(2-((6-chlorohexyl)oxy)ethanesulfonic acid	756426-58-1*		2.0	0.2
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	763051-92-9*		2.0	0.2
2H,2H,3H,3H-Perfluorooctanoic acid	*914637-49-3**		*NA*	*NA*
4,8-Dioxa-3H-perfluorononanoic acid[a]	919005-14-4*		20.0	2.0

[a] Laboratory holds Department of Defense certification for this analyte.

Notes:

The list of PFAS analytes subject to analysis as provided in the Order was subsequently revised by the State Water Quality Control Board on April 5, 2019. This Table 1 reflects that more recent revision.

The 23 analytes not shaded and without the asterisk (*) are required to be analyzed. The analytes with the asterisk (*) are included in some but not all lists provided by accredited laboratories. The laboratory contracted for this sampling event is able to analyze for all analytes except those that have been italicized.

µg/kg = microgram per kilogram
NA = not applicable
ng/L = nanogram per liter