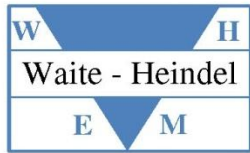


Exhibit CS-MW-2

PFOA Analysis Report



Waite - Heindel Environmental Management

August 9, 2018

Ecos Energy
Attn.: Brad Wilson
229 South 9th St, #1600
Minneapolis, MN 55402

Sent via email: brad.wilson@ecosrenewable.com

RE: Report on Evaluation of the Potential for Mobilization of PFOA
from Solar Array Construction
Chelsea Solar, LLC
Willow Road, Bennington, VT
PUC Docket No. 8302

At the request of Ecos Energy (Ecos), Waite-Heindel Environmental Management (WHEM) has evaluated the potential that the construction or operation of the proposed Chelsea Solar project could mobilize perfluorooctanoic acid (PFOA) and exacerbate the existing contamination of nearby drinking water wells. The Chelsea Solar project is a proposed 2.0 MW-AC solar array on undeveloped land accessed from Willow Road in Bennington, Vermont. Refer to maps in Appendix 1 for the site location and layout of the proposed solar array.

WHEM conducted a preliminary review of the proposed solar development, the soil mapping, geological mapping, and hydrogeology of the area, as well as conducted a literature review on PFOA and the known PFOA contamination to wells in this portion of Bennington. This was followed by soil testing for PFOA at several locations within the proposed footprint of the Chelsea Solar Project. Description of this work follows.

1.0 PRELIMINARY REVIEW

1.1 No Significant Disturbance of Soil, Groundwater and Surface Water by project:

1. The solar panels, combiner boxes and perimeter fence will be installed on metal posts driven into the ground approximately 4 to 6 feet, per the design plans [Reference #1]. Very little soil will be excavated by this procedure, and the soil that is excavated will remain directly beside each post.
2. Utility trenches for electric lines will be installed in shallow excavations [typically 3 feet], and the excavated soil will be replaced directly back into the trenches.
3. Given the shallow depths of the posts and utility trenches, it is not anticipated that significant amounts of groundwater will be encountered or disturbed. If shallow groundwater is encountered, it will not be significantly altered because the posts are small in diameter, so that groundwater will pass around them, and because the utility trenches will be backfilled primarily with the excavated material, thus not significantly altering groundwater flows.

4. The proposed solar array is on a southwest sloping hillside with a grade of approximately 10%. Stormwater flow is by overland flow to the southwest, toward a small wetland located approximately 310 ft. south of the proposed array. Based on the USGS topographic contour map of the area [see Appendix 1], it appears that surface water flows from this wetland area further to the west, eventually joining Furnace Brook and the Walloomsac River.
5. There will be no alteration of the surface water flow directions caused by the project. No significant re-grading of the existing terrain is proposed. The access road from Willow Road will be installed at a similar elevation as the current ground surface, so it will not significantly alter the flow of surface water or stormwater.
6. Existing trees and shrubs on 6.377 acres of land will be cleared, with the trees cut flush to the ground surface and the stumps will be left in place. An additional 3.263 acres will be stumped, grubbed and graded to consistent slopes. This tree-clearing and re-grading will not significantly disturb the soils, groundwater, or surface water.

1.2 Description of Soils at Project:

The soils at the project site are mapped by the Natural Resources Conservation Service [NRCS Web Soil Survey, Reference #2; see NRCS Soil Reports in Appendix 3] as two soil types: Georgia Loam, very stony; and Stockbridge Loam, very stony. Both soil types are derived from glacial till, which is a very dense material. Both soil types are characterized as high runoff soils, and are in Hydrologic Soil Group C and/or D [characterized by low infiltration rates]. These runoff and infiltration characteristics impede the vertical migration of water downward into the underlying bedrock, so most of the precipitation and snowmelt falling on the site will run off as surface water and stormwater, as it has been historically.

Refer to Section 2.0 for field description of soils.

1.3 Existing Soil Contamination by PFOA:

1. A May 2016 state-sponsored soil sampling study in North Bennington did not include soil sampling in the general area of the Chelsea Solar project [Reference #3].
2. In 2017, a consultant for Saint-Gobain Performance Plastics reported on soil sampling results from a location very close to the proposed Chelsea Solar project [see Reference #5] identified as D-19 (shown on the “Site Location Map” in Appendix 1). It is located approximately 900 ft northeast of the proposed Chelsea Solar array. The two soil samples analyzed from this location showed concentrations of PFOA ranging from 1.4 ng/g [at 1.5 ft. to 3.0 ft. in depth] to 1.8 ng/g [0.0 ft. to 1.5 ft. in depth]. The Vermont Department of Health (VT DOH) and Vermont Department of Environmental Conservation (VT DEC) soil screening level (“soil standard”) for PFOA is 300 ppb [See Reference #4], so the concentrations of PFOA found in the soil samples that were collected closest to the Chelsea Solar project are far below the VTDEC soil standard.
3. These recent soil sampling results indicate that the current concentrations of PFOA in the soils at the Chelsea Solar project are likely to be very low – far below the VTDEC soil

standard. However, to confirm this, Ecos decided to conduct soil testing from the proposed Chelsea Hill solar project footprint, discussed in detail in Section 2.0.

1.4 Existing Groundwater and Drinking Water Contamination by PFOA:

1. State-sponsored testing of wells in April 2016 [see Reference #6] in the general area of the Bennington Landfill and Chemfab facility on Northside Drive included thirty-two well samples from homes on Chelsea Road, Astrachan Drive, Cortland Drive, McIntosh Lane, Cortland Lane, and Russett Drive. These homes are all uphill, or hydrogeologically upgradient of, the proposed Chelsea Solar array [see the following bullet].
2. A potentiometric map of hydrologic gradients in the region of Bennington and North Bennington [See Reference #8], prepared by the Vermont Geological Survey and based on static water level data collected from 105 wells in the region, indicates that groundwater flow at the Chelsea Solar site is to the West and Southwest. It should be noted that this map is currently in draft form.
3. The results of this April 2016 [See Reference #7] well testing showed PFOA concentrations in water from these thirty-two homes ranging from 32 to 201 parts per trillion (ppt), with an average of 109 ppt. These concentrations are all higher than the VT Drinking Water Standard for PFOA of 20 ppt. All 32 of these homes were fitted with treatment systems, which remove the PFOA from the drinking water via Granular Activated Carbon (GAC) filters.
4. The closest well in the downgradient direction (to the south-southwest) from the Chelsea Solar project that WHEM could confirm is being utilized and periodically sampled in the state-sponsored sampling program is located at 734 Orchard Hill Road, approximately 1,500 ft to the south of the study area.
5. The sources of PFOA in the drinking water wells located upgradient and down-gradient of the proposed Chelsea Solar project have not been definitely identified, to date. State officials indicate that the most likely sources of well contamination in this area are direct groundwater impacts from the Bennington Landfill, and indirect impacts by atmospheric deposition from air emissions from the closed former Chemfab Northside Drive facility.

1.5 Evaluation of Potential for Mobilization of Existing Soil Contamination by PFOA:

1. PFOA has high solubility, low vapor pressure, and low volatility in water due to relatively high Organic Carbon Partition Coefficient. PFOA that is deposited on soil has the propensity to dissolve in rainwater, and then travel laterally with that water as surface water and stormwater, or travel vertically by infiltration into the underlying groundwater in the soils and bedrock. In organic-rich soils, or soils with high fraction of organic content (F_{oc}), the PFOA can remain adsorbed to soil particles, so migration in water can be limited.
2. The ubiquitous presence of very low levels of PFOA in soil samples collected in and around Bennington, Vermont [3,5] indicate that the potential soil impacts from atmospheric deposition originating from the closed Chemfab Northside Drive facility are likely to have been in the past, many years ago. The PFOA soil impacts are not likely to be continuing

today. The former PFOA soil impacts from atmospheric deposition are likely to have been substantially washed out of the soils at the Chelsea Solar project years ago, and are not likely to be present in significant concentrations today.

3. Although the construction process of the Chelsea solar panels will briefly cause a minor amount of soil disturbance, that is not likely to mobilize the very low levels of PFOA in the soils at the site because of the small areas and shallow depths of soil disturbance.
4. There may be a small increase in the amount of surface runoff coming from the solar array after it is constructed. This is due to the tree clearing [trees tend to absorb and evapo-transpire more water than grassland], and to the minor amount of soil compaction during construction. The current land cover of woods and brush in fair condition has Hydrologic Curve Numbers (“runoff coefficients”) [see Reference #9] ranging from 76 to 82. After the solar array is constructed, and assuming 50% - 75% grass coverage, the Curve Numbers would increase slightly to 79 to 84, which would result in a stormwater prediction of a slightly reduced amount of infiltration into groundwater, and a slightly increased amount of runoff to the southwest wetland. These potential hydrologic changes will be very minor – far less than the annual variations in total precipitation over the coming decades.

2.0 SOIL TESTING

On July 5, 2018, WHEM collected shallow soil samples (0 ft bgs to 1.0 ft bgs) from thirteen (13) locations and deeper soil samples (2-3 ft, approx.) from two (2) locations on the proposed Chelsea Solar property, on behalf of Ecos Energy. The shallow soil samples are denoted in the data tables and laboratory report (Appendix 2) with a “0-1” identifier, and the deeper samples are denoted with the “2-2.5” or “2.5-3.0” identifier. Sampling locations are depicted in WHEM’s Site Plan with Soil Borings (see Appendix 1). Samples were collected in a grid-like pattern in order to characterize the entire area potential area of disturbance per the proposed design plans. The deeper soil samples were located in areas that would require deeper excavation of soil, per design plans. Soil samples were collected for analysis of PFAS compounds (including PFOA, PFOS, and twelve additional PFAS compounds) by EPA Method 537 (Modified); additionally four (4) samples, three shallow and one deep, were collected for analysis of Total Organic Carbon (TOC) content by the Lloyd Kahn Method. TOC analysis was included because literature suggests that higher TOC is correlated with higher PFAS concentrations due to the PFAS’ tendency to sorb to organic material in soils.

All soil samples were collected using a decontaminated bucket auger, which was advanced to the indicated depth. Samples were collected only from the depth ranges noted. The samples from each depth range were mixed prior to placing into sampling bottles so to provide a cross-section of the indicated depth range. Between samples, the bucket auger was decontaminated using a solution of Alconox and laboratory-provided PFAS-free DI water, then rinsed with PFAS-free DI water. All samples were kept on ice and delivered to TestAmerica Laboratories in South Burlington, Vermont under chain-of-custody procedure. The chain-of-custody can be found in the complete Laboratory Report, included in Appendix 2 of this report.

Soil results have been reviewed and tabulated by WHEM personnel. Soil results were compared to the VT DEC Residential Soil Screening levels and the EPA Regional Screening Levels. Complete tabulated soil data can be found in Appendix 2 of this report.

The soil sampling results reveal the following:

- Soils were described as relatively uniform, with a thin “duff” layer of decomposing organic material over a generally moist, dense silt loam, giving way to a very stony, very dense loam. Refusal upon large cobbles in dense material was met at 2.5 feet in one of the borings (MW-12D), which was supposed to extend to 3.0 feet. Field descriptions of these soils generally match the descriptions provided in Reference #2.
- PFAS compounds were detected in each of the soil samples collected at the proposed Chelsea Solar site, as described below:
 - Shallow (0-1 ft) soils reported higher concentrations of PFAS compounds than deeper (2-3 ft, approx.) samples.
 - The highest PFOA concentrations were observed in SB-2, 0-1' (22 ng/g), SB-5 (18 ng/g) and SB-11 (13 ng/g). All three of these points were in the northwestern portion of the study area, which was marked by densely vegetated first-growth forest. This area appears to have been an apple orchard until somewhat recently, and the former orchard is now being overtaken by native growth.
 - The lowest PFOA concentrations were observed in SB-9 (2.0 ng/g), SB-10 (0.67 ng/g), SB-12 (2.3 ng/g), and SB-13 (1.6 ng/g), all in the southern portion of the study area. This area was marked by older, thinner, later-succession forest, denoted by considerably less undergrowth compared to the northern and eastern portions of the study area.
 - The mean PFOA concentration in shallow soils was 6.5 ng/g, with a standard deviation of 6.96 ng/g.
 - In deep soils, which were described as dense, stony silt loams, PFOA values were generally lower than in the shallow samples, ranging from a high in SB-6D, 2.5-3.0' (2.0 ng/g) to a low at SB-12D, 2.0-2.5' (1.3 ng/g).
 - The mean PFOA in deep soils was 1.7 ng/g, with a standard deviation of 0.49 ng/g.
- In shallow soils where Total Organic Carbon (TOC) was analyzed, the highest reported TOC concentration (SB-5, 42,000 mg/Kg) corresponded with the highest PFOA concentration (18 ng/g). Lower TOC values corresponded with lower PFOA concentrations, as in SB-3 (TOC: 29,000 mg/Kg; PFOA: 3.5 ng/g) and SB-12S (25,000 mg/Kg, PFOA: 2.3 ng/g). This trend is consistent with literature suggesting that PFAS compounds tend to sorb to more carbon-rich soils.
- In the one (1) deep soil sampled for Total Organic Carbon, the value (6,000 mg/Kg) was markedly lower than in any of the shallow samples; correspondingly, the PFOA concentration (1.3 ng/g) was among the lowest concentrations detected across the site.
- While PFOA was detectable in each collected soil samples, PFOA soil concentrations were well below the Vermont DEC Residential Soil Screening Level of 300 ng/g. The peak soil concentration for PFOA (22 ng/g, in SB-2) was more than an order of magnitude below the Residential Soil Screening Level.
- Compared to soil samples from D-19, collected 900 ft to the northeast of the site by a consultant on behalf of St. Gobain, the mean shallow results from the Chelsea Solar site (6.5 ng/g) are higher than the levels observed at D-19 (1.8 ng/g); the mean value for deep soils at Chelsea Solar (1.7 ng/g) is similar to the deep value at D-19 (1.4 ng/g).
 - TOC results from D-19's shallow samples (19,900 mg/Kg from 0-0.5 ft, 22,600 mg/Kg from 0.5-1 ft, mean=21,250 mg/Kg) and deep samples (2,720 mg/Kg, 2-3

- ft) are lower than the values observed in the non-disturbed samples collected for the Chelsea Solar site.
- Sample SB-12S (0-1 ft), which reported a TOC of 25,000, PFOA was reported at 2.3 ng/g, only slightly higher than the value observed at D-19 (0-0.5 ft), which reported a TOC of 19,900 mg/Kg.
 - The difference in shallow concentrations is likely due to D-19's location in a cleared and disturbed area, proximal to a roadway, where much of the PFAS would have already been washed away and which has less organic carbon. At depth, soil conditions are quite similar between the two locations.

These sample results reveal that PFOA is present at detectable concentrations across the site, but well below the Residential Screening Standard set by the VT DEC and VT DOH. Additionally, there appears to be a noticeable correlation between Total Organic Carbon (TOC) and PFAS concentrations, as has been indicated in other documents [3,5]. Concentrations drop considerably in the 2-3 foot depth range, compared to the 0-1 foot depth; this is likely related to the lack of organic material in soils at depth. While results show that the PFAS concentration varies across the site, the range of concentrations is well below the Residential Screening Standard and WHEM finds it very unlikely that any soils would be found in exceedance of that concentration anywhere on-site.

3.0 CONCLUSIONS

Soil samples collected in a grid-like pattern at the proposed Chelsea Solar site reported PFOA concentrations well below the VT DEC Soil Screening Standard for Residential Soils (300 ng/g). The data collected suggest that no soil on-site would be found in exceedance of the VT DEC Soil Screening Standard. Although the construction process of the Chelsea Solar panels and infrastructure will briefly cause a minor amount of soil disturbance, it is not likely to mobilize the PFOA in the soils at the site, particularly with the use of standard silt-fencing and erosion control measures. Potential hydrologic runoff changes will be minimal because the soils are naturally high-runoff, low-infiltration, and the change in land use should only cause a slight increase in runoff.

Based on the information and evaluation described above, we conclude that it is very unlikely that the construction or operation of the proposed Chelsea Solar facility would cause a material change in PFOA contamination or mobilization of PFOA that would impact the soils at the site, or the underlying bedrock aquifer and the drinking water wells that draw from it.

References:

1. Krebs & Lansing Consulting Engineers, Inc., *Preliminary Site Plan – Sheet C-100*, dated November 12, 2017.
2. NRCS Web Soil Survey: (<https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>).
3. VT DEC publication, "Results from soil screening testing for perfluorooctanoic acid (PFOA) in North Bennington", May 2016:
(<http://dec.vermont.gov/sites/dec/files/co/pfoa/documents/PFC-NoBenn-Surface-Soil-Results.pdf>)

4. VT DEC, Investigation and Remediation of Contaminated Properties Rule (IRULE), Appendix A - § 35-APX-A1.
5. Barr Engineering, *Draft Interim Conceptual Site Model Site Investigation Report: Bennington, Vermont*, December 2017.
6. Vermont PFOA Contamination Response: (<http://dec.vermont.gov/commissioners-office/pfoa>).
7. Table: North Bennington and Bennington Private Well Testing Results, December 31, 2016: <http://dec.vermont.gov/sites/dec/files/co/pfoa/documents/NBenn-Benn-Sample-Results-CURRENT.pdf>
8. Kim, J.J. and Dowe, C.W., 2017, Derivative maps generated from water well data logs in the Bennington area, Vermont; Vermont Geological Survey Open File Report VG2017-3, Plate D.
9. USDA, *Urban Hydrology for Small Watersheds (TR-55)*, June 1986.

Do not hesitate to contact me if you have questions or concerns. I can be reached at (802) 860--9400 ext. 101, or by email at mwaite@waiteenv.com.

Sincerely,



Miles E. Waite, PhD, PG
Principal, and Senior Hydrogeologist
Waite-Heindel Environmental Management

Appendices:

- Appendix 1 – Maps and Plans
- Appendix 2 – Soil Testing Data & Laboratory Report
- Appendix 3 – NRCS Soil Reports
-

APPENDIX 1

MAPS & PLANS



LEGEND

Private Wells

- GPS Location
- screen digitized
- E911 Address
- Map
- Unknown

Public Water Sources

- Active
- Proposed
- Inactive

Roads

- Interstate
- Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- Local
- Not part of function Classification S

Waterbody

Stream

Parcels (Non-Standardized)



1: 5,000

July 9, 2018



NOTES

Map created using ANR's Natural Resources Atlas

254.0 0 127.00 254.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere

© Vermont Agency of Natural Resources

1" = 417 Ft. 1cm = 50 Meters

THIS MAP IS NOT TO BE USED FOR NAVIGATION

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

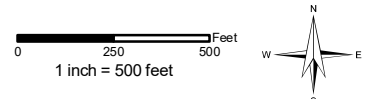


ECOS - Chelsea Solar Site Location Map

Legend

-  Proposed Location of Chelsea Solar Project (approx.)
-  VCGI Consolidated Parcels (2014)
-  Private Water Supplies (GPS location; in use)

Note: Water Supply location data provided upon request by the VT DEC.
WHEM has not independently verified the accuracy of these GPS-collected locations.



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July 17, 2018

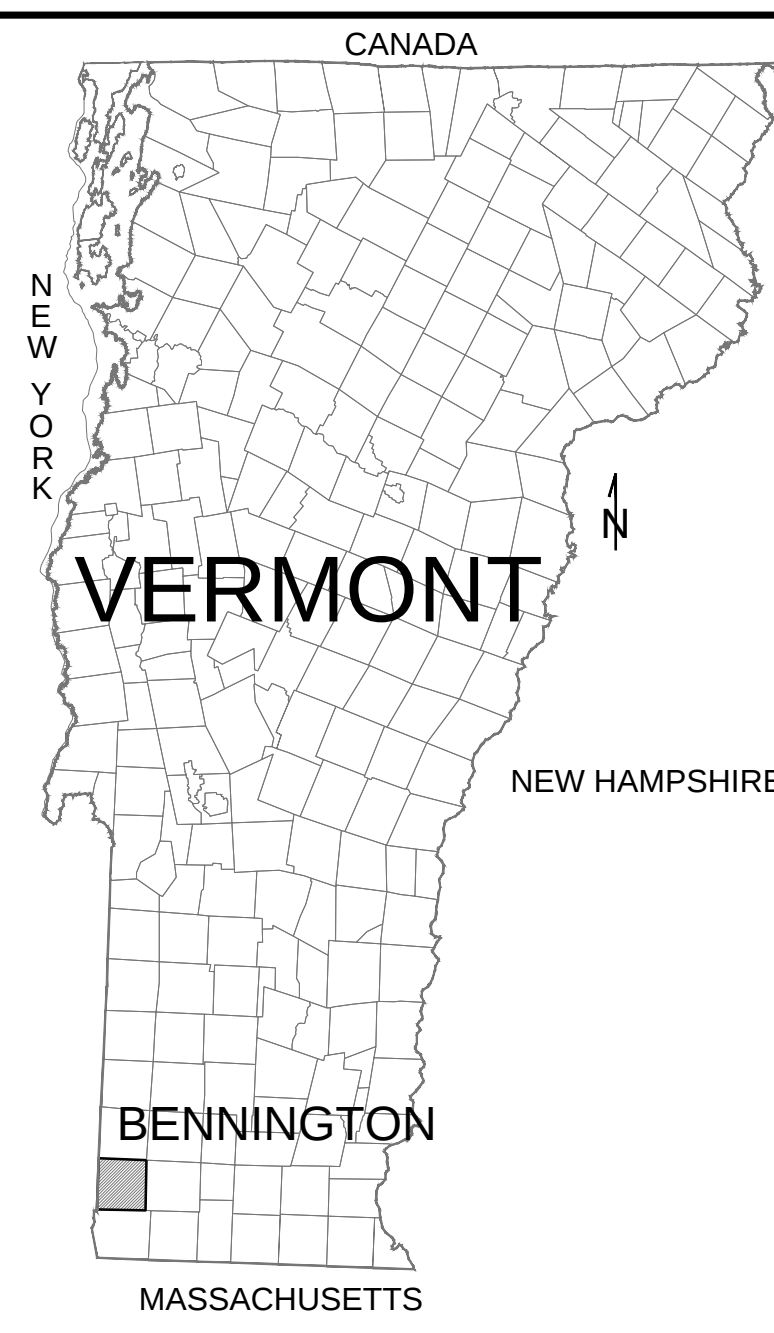
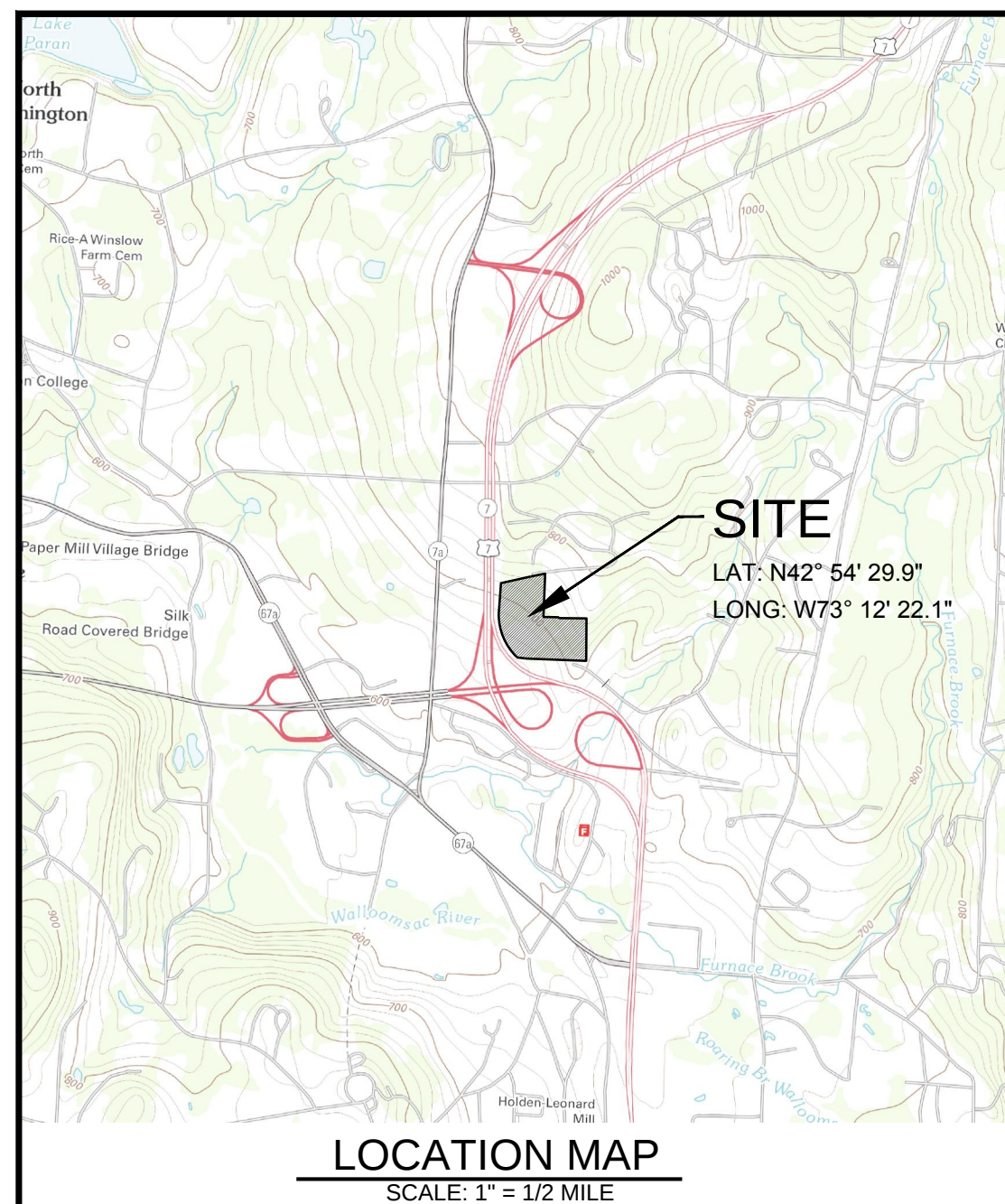
Map produced by: Chris Page

U:\PROJECTS - WHEM\Ecos - Chelsea Solar\Maps Plans\GIS\SLM_Chelsea_Solar.mxd

Orthophoto year: BING, ~ 2013

Easting: W 73 5 49.07

Northing: N 44 47 40.09



NOTES:

- ASPECTS OF PLAN ARE APPROXIMATE AND DERIVED FROM AERIAL PHOTOGRAPHY.
- THE HORIZONTAL COORDINATE SYSTEM IS BASED ON NAD83 VERMONT STATE PLANE 4400 (US SURVEY FEET). ELEVATIONS ARE BASED ON THE NAVD83 (US SURVEY FEET).
- EXISTING GROUND CONTOUR ELEVATIONS ARE BASED ON STATE OF VERMONT LIDAR INFORMATION FROM VERMONT CENTER FOR GEOGRAPHIC INFORMATION (VCGI).
- UTILITIES ARE NOT WARRANTED TO BE COMPLETE OR ACCURATE. CONTRACTOR SHALL CONTACT DIG SAFE BEFORE BEGINNING ANY EXCAVATION.
- THIS IS IN NO WAY A BOUNDARY SURVEY. PROPERTY LINES SHOWN ON THIS PLAN ARE BASED ON TOWN TAX MAP INFORMATION.
- THIS IS A PRELIMINARY DESIGN PLAN. FINAL DESIGN WILL BE MODIFIED TO MATCH EQUIPMENT PURCHASED AND POSSIBLE PERMIT CONSTRAINTS REVEALED DURING PROJECT'S REVIEW.

LEGEND

- EXISTING POWER POLE / PROPOSED POLE
- EXISTING OVERHEAD POWER
- EXISTING TREELINE
- EXISTING GRADE CONTOUR LINES (10 FOOT INTERVALS)
- EXISTING GRADE CONTOUR LINES (2 FOOT INTERVALS)
- FINISH GRADES
- APPROXIMATE PROPERTY LINES
- DELINEATED WETLANDS
- ENVIRONMENTAL BUFFERS
- EXISTING STREAM FROM THE VERMONT CENTER FOR GEOGRAPHIC INFORMATION (VCGI)
- EXISTING SOIL FROM VCGI
- PROJECT SETBACKS
- PROPOSED PERIMETER FENCING
- PROPOSED ACCESS DRIVES
- PROPOSED FIXED SOLAR PANEL RACKING
- PROPOSED UNDERGROUND POWER
- PROPOSED OVERHEAD POWER
- PROPOSED LIMITS OF CLEARING
- CLEARED AREAS WHICH WILL BE FULLY DISTURBED
- CLEARED AREAS WITH MINIMAL DISTURBANCE
- PROPOSED SOIL SAMPLE LOCATIONS, 0-1 FT BGS (WHEM, 3.26.18)

PROJECT AREA CALCULATIONS

PROPOSED CLEARING

- Areas cleared that will be stumped, grubbed and graded to consistent slopes (access drive, power skid, secondary oil containment, underground electric trench, slope grading on east side of site) = ±3.263 Acres
- Areas cleared, trees cut flush and stumps left in place = ±6.377 Acres
- Total Clearing = ±9.64 Acres

PROPOSED EXCAVATED SOIL

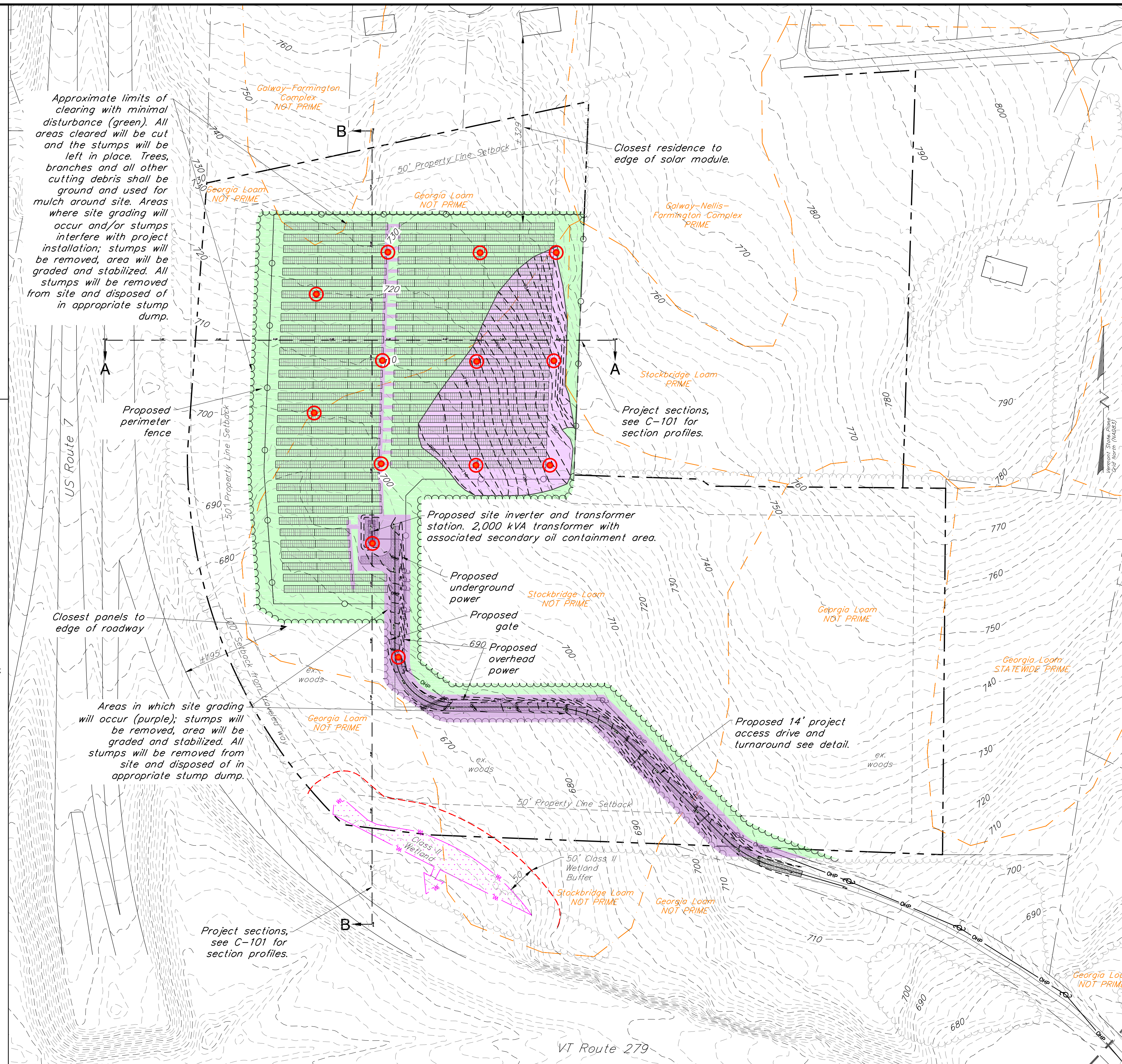
- Areas cleared that will be stumped, grubbed and graded to consistent slopes (access drive, power skid, secondary oil containment, underground electric trench) = ±3.263 Acres (142,134 s.f.)
- Proportion (30%) of the remaining cleared areas disturbed while clearing (scuffing) = ±1.911 Acres (83,336 s.f.)
- Installation for solar racking, fence posts & proposed power poles = ±0.115 Acres (5,000 s.f.)
- Misc. other disturbances and construction staging in uplands = ±1.148 Acres (50,000 s.f.)
- Total Disturbance = ±6.44 Acres (280,471 s.f.)

PROPOSED IMPERVIOUS AREA

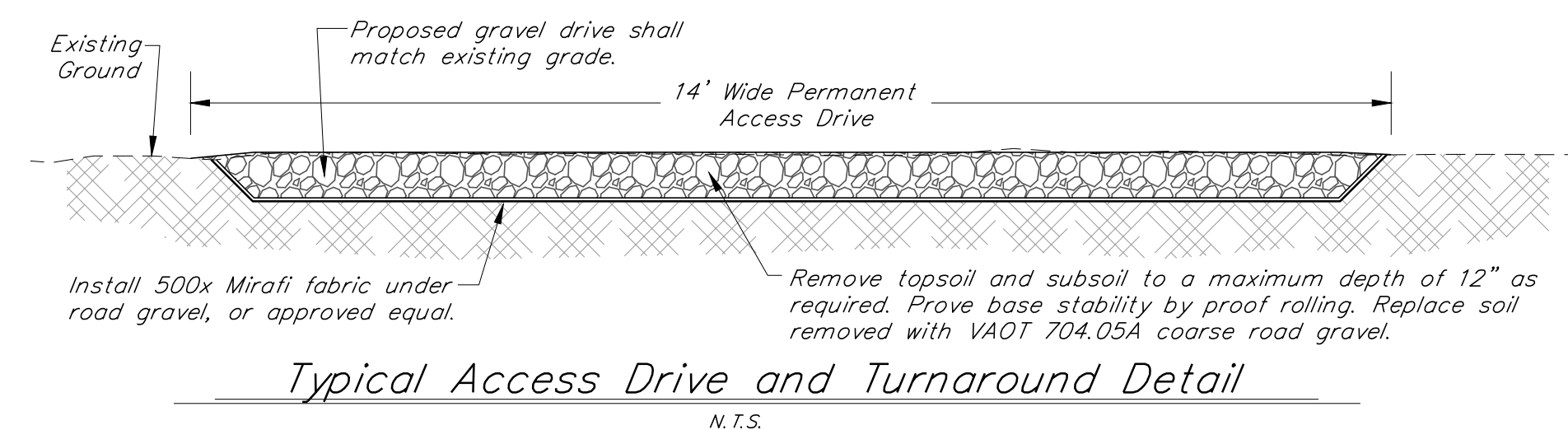
- Permanent gravel access drive = ±16,500 s.f.
- Installation of inverter and transformer stations with secondary oil containment = ±1,500
- Total Project Impervious Post Construction = ±18,000 s.f. (±0.41 Acres)

PROPOSED PROJECT LIMITS

- Completed Combined Project Limits (defined by the edge of proposed fence) = ±7.1 Acres



Annotated by WHEM: 3/26/2018



CHELSEA SOLAR

Willow Road
Bennington, Vermont,



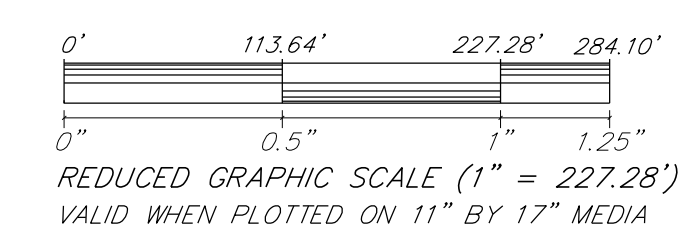
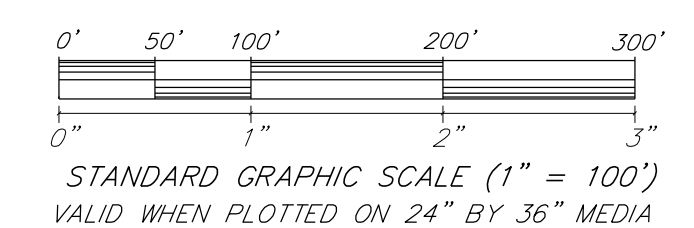
Krebs & Lansing Consulting Engineers, Inc.
164 Main Street, Suite 201
Colchester, VT 05446
T: (802) 878-0375
F: (802) 878-9618
email@kresandlansing.com
KrebsandLansing.com

ISSUED FOR PERMIT REVIEW
NOT FOR CONSTRUCTION

SOURCE DATA LEGEND

MAPPING SOURCE DATA USED FOR PLAN COMPILATION

Civil Engineering:
Krebs and Lansing Consulting Engineers, Inc.
164 Main Street, Suite 201
Colchester, Vermont 05446
Electrical Engineering:
ECOS Energy
222 South 9th Street
Minneapolis, MN 55402
Environmental:
Arrowwood Environmental
950 Bert White Road
Huntington, Vermont 05462



Proposed 2.0 MW-AC Solar Array

REV	REVISIONS/COMMENTS	DATE

Drawing Title:

SITE PLAN
DRAFT

DATE of Issue: 11/12/17

Drawn by: GTD Checked by: IAJ

Project No.: 17272 Scale: 1" = 100'

Drawing No.: C-100 Rev No.:

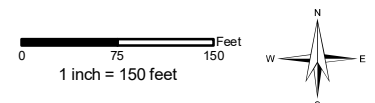


ECOS - Chelsea Solar Site Plan with Soil Borings

Legend

-  Soil Boring Locations
-  Proposed Location of Chelsea Solar Project (approx.)
-  VCGI Consolidated Parcels (2014)
-  Private Water Supplies (GPS location; in use)

Note: Water Supply location data provided upon request by the VT DEC.
WHM has not independently verified the accuracy of these GPS-collected locations.



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July 17, 2018

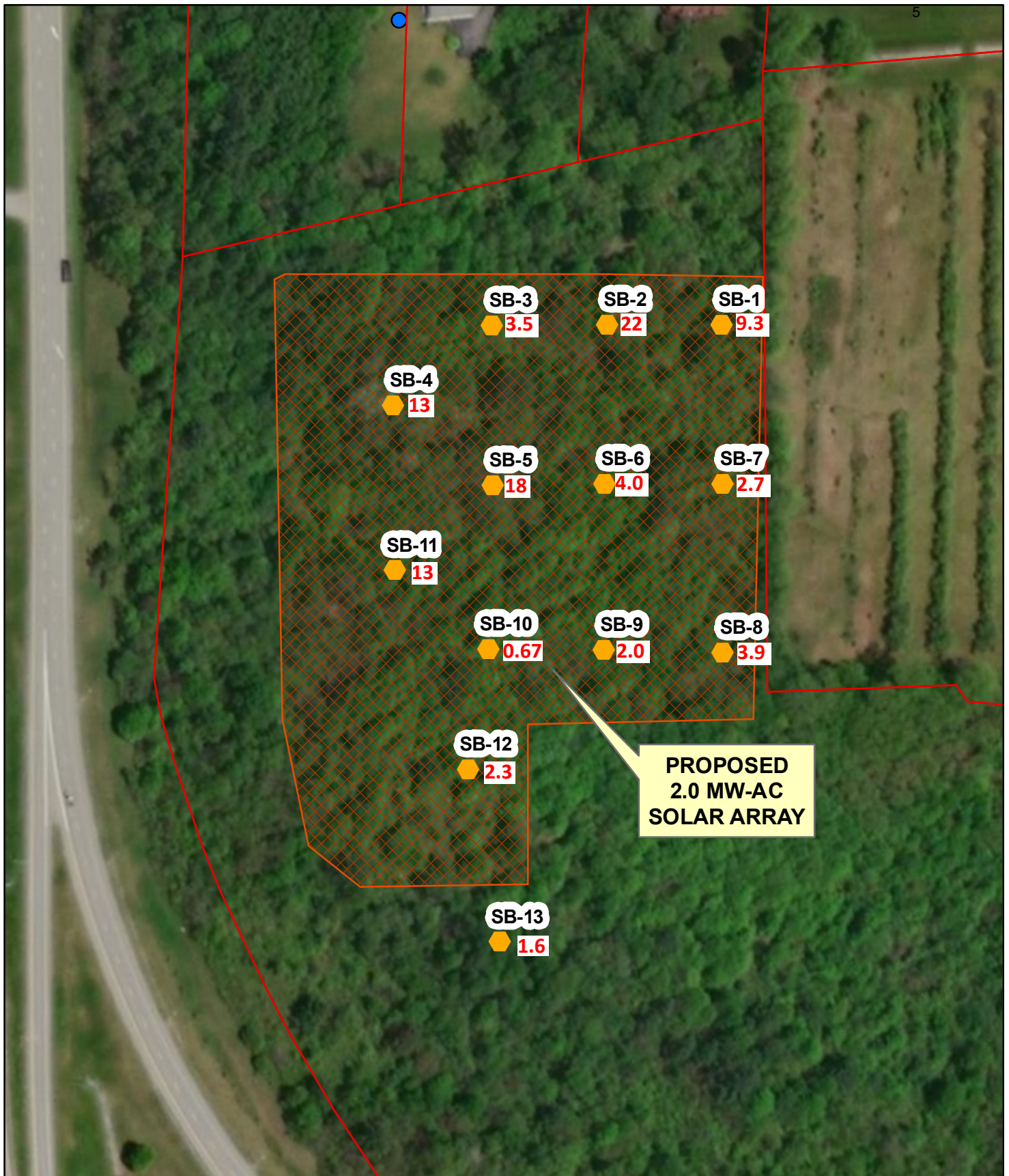
Map produced by: Chris Page

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Orthophoto year: BING, ~ 2013

Easting: W 73 5 49.07

Northing: N 44 47 40.09

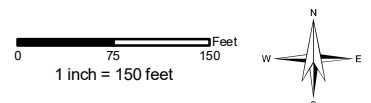


ECOS - Chelsea Solar PFOA Concentrations in Shallow Soils (0-1' bgs)

Legend

- Soil Boring Locations
- Proposed Location of Chelsea Solar Project (approx.)
- VCGI Consolidated Parcels (2014)
- Private Water Supplies (GPS location; in use)
- 9.3 PFOA concentration (ng/g)

Note: Water Supply location data provided upon request by the VT DEC.
WHEM has not independently verified the accuracy of these GPS-collected locations.



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August 7, 2018

Map produced by: Chris Page

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Orthophoto year: BING, ~ 2013

Easting: W 73 5 49.07

Northing: N 44 47 40.09

APPENDIX 2

SOIL DATA & LABORATORY REPORT

**ECOS - CHELSEA SOLAR
PFAS SOIL SAMPLING RESULTS
Apple Hill Road, Bennington, VT
PUC Docket No. 8302**



1

				Lab Results ^{[2],[3]}
SB-1 0-1'	Units	VT DEC Residential Soil Screening Level	EPA RSL Residential Soil	Sample Date:
7/5/2018				
Perfluoroalkyl Substances (PFAS) Analyzed (Modified EPA Method 537)				
Perfluorooctanoic acid (PFOA)	ng/g	300	none	9.3
Perfluorooctane sulfonic acid (PFOS)	ng/g	none	none	0.70
Perfluorohexane sulfonic acid (PFHxS)	ng/g	none	none	0.037 J
Perfluoroheptanoic acid (PFHpA)	ng/g	none	none	0.42
Perfluorononanoic acid (PFNA)	ng/g	none	none	0.46
Perfluorobutane sulfonic acid (PFBS)	ng/g	none	1,600,000	ND / < 0.24
Perfluorohexanoic acid (PFHxA)	ng/g	none	none	0.49
Perfluoroundecanoic Acid (PFUnA)	ng/g	none	none	0.33
Perfluorodecanoic Acid (PFDA)	ng/g	none	none	0.29
Perfluorododecanoic Acid (PFDoA)	ng/g	none	none	0.18 J
Perfluorotridecanoic Acid (PFTriA)	ng/g	none	none	0.14 J
Perfluorobutanoic Acid (PFBA)	ng/g	none	none	0.48
Perfluoropentanoic Acid (PFPeA)	ng/g	none	none	0.35
Perfluorotetradecanoic Acid (PFTeA)	ng/g	none	none	0.12 J
Total Organic Carbon (TOC)	mg/Kg	none	none	NS

				Lab Results ^{[2],[3]}
SB-2 0-1'	Units	VT DEC Residential Soil Screening Level	EPA RSL Residential Soil	Sample Date:
7/5/2018				
Perfluoroalkyl Substances (PFAS) Analyzed (Modified EPA Method 537)				
Perfluorooctanoic acid (PFOA)	ng/g	300	none	22
Perfluorooctane sulfonic acid (PFOS)	ng/g	none	none	0.91
Perfluorohexane sulfonic acid (PFHxS)	ng/g	none	none	0.13 J
Perfluoroheptanoic acid (PFHpA)	ng/g	none	none	1.2
Perfluorononanoic acid (PFNA)	ng/g	none	none	0.26 J
Perfluorobutane sulfonic acid (PFBS)	ng/g	none	1,600,000	ND / < 0.29
Perfluorohexanoic acid (PFHxA)	ng/g	none	none	0.69
Perfluoroundecanoic Acid (PFUnA)	ng/g	none	none	0.24 J
Perfluorodecanoic Acid (PFDA)	ng/g	none	none	0.24 J
Perfluorododecanoic Acid (PFDoA)	ng/g	none	none	0.14 J
Perfluorotridecanoic Acid (PFTriA)	ng/g	none	none	0.099 J
Perfluorobutanoic Acid (PFBA)	ng/g	none	none	0.44
Perfluoropentanoic Acid (PFPeA)	ng/g	none	none	0.44
Perfluorotetradecanoic Acid (PFTeA)	ng/g	none	none	0.096 J
Total Organic Carbon (TOC)	mg/Kg	none	none	NS

				Lab Results ^{[2],[3]}
SB-3 0-1'	Units	Residential Soil Screening Level	EPA RSL Residential Soil	Sample Date:
7/5/2018				
Perfluoroalkyl Substances (PFAS) Analyzed (Modified EPA Method 537)				
Perfluorooctanoic acid (PFOA)	ng/g	300	none	3.5
Perfluorooctane sulfonic acid (PFOS)	ng/g	none	none	0.58 J
Perfluorohexane sulfonic acid (PFHxS)	ng/g	none	none	ND / < 0.31
Perfluoroheptanoic acid (PFHpA)	ng/g	none	none	0.35
Perfluorononanoic acid (PFNA)	ng/g	none	none	0.34
Perfluorobutane sulfonic acid (PFBS)	ng/g	none	1,600,000	ND / < 0.31
Perfluorohexanoic acid (PFHxA)	ng/g	none	none	0.28 J
Perfluoroundecanoic Acid (PFUnA)	ng/g	none	none	0.24 J
Perfluorodecanoic Acid (PFDA)	ng/g	none	none	0.31
Perfluorododecanoic Acid (PFDoA)	ng/g	none	none	0.16 J
Perfluorotridecanoic Acid (PFTriA)	ng/g	none	none	0.082 J
Perfluorobutanoic Acid (PFBA)	ng/g	none	none	0.38
Perfluoropentanoic Acid (PFPeA)	ng/g	none	none	0.29 J
Perfluorotetradecanoic Acid (PFTeA)	ng/g	none	none	0.098 J
Total Organic Carbon (TOC)	mg/Kg	none	none	29000

				Lab Results ^{[2],[3]}
SB-4 0-1'	Units	Residential Soil Screening Level	EPA RSL Residential Soil	Sample Date:
7/5/2018				
Perfluoroalkyl Substances (PFAS) Analyzed (Modified EPA Method 537)				
Perfluorooctanoic acid (PFOA)	ng/g	300	none	1.3
Perfluorooctane sulfonic acid (PFOS)	ng/g	none	none	0.40 J
Perfluorohexane sulfonic acid (PFHxS)	ng/g	none	none	ND / < 0.23
Perfluoroheptanoic acid (PFHpA)	ng/g	none	none	0.19 J
Perfluorononanoic acid (PFNA)	ng/g	none	none	0.27
Perfluorobutane sulfonic acid (PFBS)	ng/g	none	1,600,000	ND / < 0.23
Perfluorohexanoic acid (PFHxA)	ng/g	none	none	0.19 J
Perfluoroundecanoic Acid (PFUnA)	ng/g	none	none	0.20 J
Perfluorodecanoic Acid (PFDA)	ng/g	none	none	0.26
Perfluorododecanoic Acid (PFDoA)	ng/g	none	none	0.10 J
Perfluorotridecanoic Acid (PFTriA)	ng/g	none	none	0.065 J
Perfluorobutanoic Acid (PFBA)	ng/g	none	none	0.35
Perfluoropentanoic Acid (PFPeA)	ng/g	none	none	0.17 J
Perfluorotetradecanoic Acid (PFTeA)	ng/g	none	none	0.063 J
Total Organic Carbon (TOC)	mg/Kg	none	none	NS

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				Lab Results ^{[2][3]}
SB-5 0-1'				Sample Date:
	Units	Residential Soil Screening Level	EPA RSL Residential Soil	7/5/2018
Perfluoroalkyl Substances (PFAS) Analyzed (Modified EPA Method 537)				
Perfluorooctanoic acid (PFOA)	ng/g	300	none	18
Perfluorooctane sulfonic acid (PFOS)	ng/g	none	none	0.57 J
Perfluorohexane sulfonic acid (PFHxS)	ng/g	none	none	0.052 J
Perfluoroheptanoic acid (PFHpA)	ng/g	none	none	0.91
Perfluorononanoic acid (PFNA)	ng/g	none	none	0.32
Perfluorobutane sulfonic acid (PFBS)	ng/g	none	1,600,000	ND / < 0.26
Perfluorohexanoic acid (PFHxA)	ng/g	none	none	0.44
Perfluoroundecanoic acid (PFUnA)	ng/g	none	none	0.25 J
Perfluorodecanoic acid (PFDA)	ng/g	none	none	0.26
Perfluorododecanoic acid (PFDoA)	ng/g	none	none	0.12 J
Perfluorotridecanoic acid (PFTriA)	ng/g	none	none	0.090 J
Perfluorobutanoic acid (PFBA)	ng/g	none	none	0.47
Perfluoropentanoic acid (PFPeA)	ng/g	none	none	0.22 J
Perfluorotetradecanoic acid (PFTeA)	ng/g	none	none	0.076 J
Total Organic Carbon (TOC)	mg/Kg	none	none	42000

				Lab Results ^{[2][3]}
SB-6S 0-1'				Sample Date:
	Units	Residential Soil Screening Level	EPA RSL Residential Soil	7/5/2018
Perfluoroalkyl Substances (PFAS) Analyzed (Modified EPA Method 537)				
Perfluorooctanoic acid (PFOA)	ng/g	300	none	4.0
Perfluorooctane sulfonic acid (PFOS)	ng/g	none	none	0.46 J
Perfluorohexane sulfonic acid (PFHxS)	ng/g	none	none	ND / < 0.23
Perfluoroheptanoic acid (PFHpA)	ng/g	none	none	0.53
Perfluorononanoic acid (PFNA)	ng/g	none	none	0.28
Perfluorobutane sulfonic acid (PFBS)	ng/g	none	1,600,000	ND / < 0.23
Perfluorohexanoic acid (PFHxA)	ng/g	none	none	0.34
Perfluoroundecanoic acid (PFUnA)	ng/g	none	none	0.21 J
Perfluorodecanoic acid (PFDA)	ng/g	none	none	0.29
Perfluorododecanoic acid (PFDoA)	ng/g	none	none	0.12 J
Perfluorotridecanoic acid (PFTriA)	ng/g	none	none	0.080 J
Perfluorobutanoic acid (PFBA)	ng/g	none	none	0.37
Perfluoropentanoic acid (PFPeA)	ng/g	none	none	0.23
Perfluorotetradecanoic acid (PFTeA)	ng/g	none	none	ND / < 0.23
Total Organic Carbon (TOC)	mg/Kg	none	none	NS

				Lab Results ^{[2][3]}
SB-6D 2.5-3.0'				Sample Date:
	Units	Residential Soil Screening Level	EPA RSL Residential Soil	7/5/2018
Perfluoroalkyl Substances (PFAS) Analyzed (Modified EPA Method 537)				
Perfluorooctanoic acid (PFOA)	ng/g	300	none	2.0
Perfluorooctane sulfonic acid (PFOS)	ng/g	none	none	ND / < 0.54
Perfluorohexane sulfonic acid (PFHxS)	ng/g	none	none	ND / < 0.22
Perfluoroheptanoic acid (PFHpA)	ng/g	none	none	0.24
Perfluorononanoic acid (PFNA)	ng/g	none	none	0.039 J
Perfluorobutane sulfonic acid (PFBS)	ng/g	none	1,600,000	ND / < 0.22
Perfluorohexanoic acid (PFHxA)	ng/g	none	none	0.17 J
Perfluoroundecanoic acid (PFUnA)	ng/g	none	none	ND / < 0.22
Perfluorodecanoic acid (PFDA)	ng/g	none	none	0.035 J
Perfluorododecanoic acid (PFDoA)	ng/g	none	none	ND / < 0.22
Perfluorotridecanoic acid (PFTriA)	ng/g	none	none	ND / < 0.22
Perfluorobutanoic acid (PFBA)	ng/g	none	none	0.057 J
Perfluoropentanoic acid (PFPeA)	ng/g	none	none	ND / < 0.22
Perfluorotetradecanoic acid (PFTeA)	ng/g	none	none	ND / < 0.22
Total Organic Carbon (TOC)	mg/Kg	none	none	NS

				Lab Results ^{[2][3]}
SB-7 0-1'				Sample Date:
	Units	Residential Soil Screening Level	EPA RSL Residential Soil	7/5/2018
Perfluoroalkyl Substances (PFAS) Analyzed (Modified EPA Method 537)				
Perfluorooctanoic acid (PFOA)	ng/g	300	none	2.7
Perfluorooctane sulfonic acid (PFOS)	ng/g	none	none	0.43 J
Perfluorohexane sulfonic acid (PFHxS)	ng/g	none	none	ND / < 0.22
Perfluoroheptanoic acid (PFHpA)	ng/g	none	none	0.26
Perfluorononanoic acid (PFNA)	ng/g	none	none	0.28
Perfluorobutane sulfonic acid (PFBS)	ng/g	none	1,600,000	ND / < 0.22
Perfluorohexanoic acid (PFHxA)	ng/g	none	none	0.33
Perfluoroundecanoic acid (PFUnA)	ng/g	none	none	0.20 J
Perfluorodecanoic acid (PFDA)	ng/g	none	none	0.27
Perfluorododecanoic acid (PFDoA)	ng/g	none	none	0.12 J
Perfluorotridecanoic acid (PFTriA)	ng/g	none	none	0.060 J
Perfluorobutanoic acid (PFBA)	ng/g	none	none	0.33
Perfluoropentanoic acid (PFPeA)	ng/g	none	none	0.23
Perfluorotetradecanoic acid (PFTeA)	ng/g	none	none	ND / < 0.22
Total Organic Carbon (TOC)	mg/Kg	none	none	NS

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				Lab Results ^{[2][3]}
SB-8 0-1'				Sample Date:
	Units	Residential Soil Screening Level	EPA RSL Residential Soil	7/5/2018
Perfluoroalkyl Substances (PFAS) Analyzed (Modified EPA Method 537)				
Perfluorooctanoic acid (PFOA)	ng/g	300	none	3.9
Perfluorooctane sulfonic acid (PFOS)	ng/g	none	none	0.60 J
Perfluorohexane sulfonic acid (PFHxS)	ng/g	none	none	ND / < 0.25
Perfluoroheptanoic acid (PFHpA)	ng/g	none	none	0.35
Perfluorononanoic acid (PFNA)	ng/g	none	none	0.39
Perfluorobutane sulfonic acid (PFBS)	ng/g	none	1,600,000	ND / < 0.25
Perfluorohexanoic acid (PFHxA)	ng/g	none	none	0.45
Perfluoroundecanoic acid (PFUnA)	ng/g	none	none	0.21 J
Perfluorodecanoic acid (PFDA)	ng/g	none	none	0.26
Perfluorododecanoic acid (PFDoA)	ng/g	none	none	0.17 J
Perfluorotridecanoic acid (PFTriA)	ng/g	none	none	0.079 J
Perfluorobutanoic acid (PFBA)	ng/g	none	none	0.43
Perfluoropentanoic acid (PFPeA)	ng/g	none	none	0.35
Perfluorotetradecanoic acid (PFTeA)	ng/g	none	none	0.077 J
Total Organic Carbon (TOC)	mg/Kg	none	none	NS

				Lab Results ^{[2][3]}
SB-9 0-1'				Sample Date:
	Units	Residential Soil Screening Level	EPA RSL Residential Soil	7/5/2018
Perfluoroalkyl Substances (PFAS) Analyzed (Modified EPA Method 537)				
Perfluorooctanoic acid (PFOA)	ng/g	300	none	2.0
Perfluorooctane sulfonic acid (PFOS)	ng/g	none	none	0.42 J
Perfluorohexane sulfonic acid (PFHxS)	ng/g	none	none	ND / < 0.23
Perfluoroheptanoic acid (PFHpA)	ng/g	none	none	0.19 J
Perfluorononanoic acid (PFNA)	ng/g	none	none	0.32 J
Perfluorobutane sulfonic acid (PFBS)	ng/g	none	1,600,000	ND / < 0.23
Perfluorohexanoic acid (PFHxA)	ng/g	none	none	0.30
Perfluoroundecanoic acid (PFUnA)	ng/g	none	none	0.21 J
Perfluorodecanoic acid (PFDA)	ng/g	none	none	0.31
Perfluorododecanoic acid (PFDoA)	ng/g	none	none	0.11 J
Perfluorotridecanoic acid (PFTriA)	ng/g	none	none	ND / < 0.23
Perfluorobutanoic acid (PFBA)	ng/g	none	none	0.36
Perfluoropentanoic acid (PFPeA)	ng/g	none	none	0.30
Perfluorotetradecanoic acid (PFTeA)	ng/g	none	none	0.069 J
Total Organic Carbon (TOC)	mg/Kg	none	none	NS

				Lab Results ^{[2][3]}
SB-10 0-1'				Sample Date:
	Units	Residential Soil Screening Level	EPA RSL Residential Soil	7/5/2018
Perfluoroalkyl Substances (PFAS) Analyzed (Modified EPA Method 537)				
Perfluorooctanoic acid (PFOA)	ng/g	300	none	0.67
Perfluorooctane sulfonic acid (PFOS)	ng/g	none	none	0.42 J
Perfluorohexane sulfonic acid (PFHxS)	ng/g	none	none	ND / < 0.28
Perfluoroheptanoic acid (PFHpA)	ng/g	none	none	0.098 J
Perfluorononanoic acid (PFNA)	ng/g	none	none	0.22 J
Perfluorobutane sulfonic acid (PFBS)	ng/g	none	1,600,000	ND / < 0.28
Perfluorohexanoic acid (PFHxA)	ng/g	none	none	ND / < 0.28
Perfluoroundecanoic acid (PFUnA)	ng/g	none	none	0.27 J
Perfluorodecanoic acid (PFDA)	ng/g	none	none	0.32
Perfluorododecanoic acid (PFDoA)	ng/g	none	none	0.14 J
Perfluorotridecanoic acid (PFTriA)	ng/g	none	none	0.10 J
Perfluorobutanoic acid (PFBA)	ng/g	none	none	0.29
Perfluoropentanoic acid (PFPeA)	ng/g	none	none	0.11 J
Perfluorotetradecanoic acid (PFTeA)	ng/g	none	none	0.097 J
Total Organic Carbon (TOC)	mg/Kg	none	none	NS

				Lab Results ^{[2][3]}
SB-11 0-1'				Sample Date:
	Units	Residential Soil Screening Level	EPA RSL Residential Soil	7/5/2018
Perfluoroalkyl Substances (PFAS) Analyzed (Modified EPA Method 537)				
Perfluorooctanoic acid (PFOA)	ng/g	300	none	13
Perfluorooctane sulfonic acid (PFOS)	ng/g	none	none	0.73
Perfluorohexane sulfonic acid (PFHxS)	ng/g	none	none	ND / < 0.28
Perfluoroheptanoic acid (PFHpA)	ng/g	none	none	0.81
Perfluorononanoic acid (PFNA)	ng/g	none	none	0.39
Perfluorobutane sulfonic acid (PFBS)	ng/g	none	1,600,000	ND / < 0.28
Perfluorohexanoic acid (PFHxA)	ng/g	none	none	0.72
Perfluoroundecanoic acid (PFUnA)	ng/g	none	none	0.26 J
Perfluorodecanoic acid (PFDA)	ng/g	none	none	0.40
Perfluorododecanoic acid (PFDoA)	ng/g	none	none	0.15 J
Perfluorotridecanoic acid (PFTriA)	ng/g	none	none	0.085 J
Perfluorobutanoic acid (PFBA)	ng/g	none	none	0.55
Perfluoropentanoic acid (PFPeA)	ng/g	none	none	0.36
Perfluorotetradecanoic acid (PFTeA)	ng/g	none	none	ND / < 0.28
Total Organic Carbon (TOC)	mg/Kg	none	none	NS

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				Lab Results ^{[2],[3]}
SB-12S 0-1'				Sample Date:
	Units	Residential Soil Screening Level	EPA RSL Residential Soil	7/5/2018
Perfluoroalkyl Substances (PFAS) Analyzed (Modified EPA Method 537)				
Perfluorooctanoic acid (PFOA)	ng/g	300	none	2.3
Perfluorooctane sulfonic acid (PFOS)	ng/g	none	none	0.43 J
Perfluorohexane sulfonic acid (PFHxS)	ng/g	none	none	ND / < 0.22
Perfluoroheptanoic acid (PFHpA)	ng/g	none	none	0.20 J
Perfluorononanoic acid (PFNA)	ng/g	none	none	0.21 J
Perfluorobutane sulfonic acid (PFBS)	ng/g	none	1,600,000	ND / < 0.22
Perfluorohexanoic acid (PFHxA)	ng/g	none	none	0.23
Perfluoroundecanoic acid (PFUnA)	ng/g	none	none	0.30
Perfluorodecanoic Acid (PFDA)	ng/g	none	none	0.27
Perfluorododecanoic Acid (PFDoA)	ng/g	none	none	0.17 J
Perfluorotridecanoic Acid (PFTriA)	ng/g	none	none	0.11 J
Perfluorobutanoic Acid (PFBA)	ng/g	none	none	0.39
Perfluoropentanoic Acid (PFPeA)	ng/g	none	none	0.21 J
Perfluorotetradecanoic Acid (PFTeA)	ng/g	none	none	0.10 J
Total Organic Carbon (TOC)	mg/Kg	none	none	25000

				Lab Results ^{[2],[3]}
SB-12D 2-2.5'				Sample Date:
	Units	Residential Soil Screening Level	EPA RSL Residential Soil	7/5/2018
Perfluoroalkyl Substances (PFAS) Analyzed (Modified EPA Method 537)				
Perfluorooctanoic acid (PFOA)	ng/g	300	none	1.3
Perfluorooctane sulfonic acid (PFOS)	ng/g	none	none	ND / < 0.59
Perfluorohexane sulfonic acid (PFHxS)	ng/g	none	none	ND / < 0.24
Perfluoroheptanoic acid (PFHpA)	ng/g	none	none	0.088 J
Perfluorononanoic acid (PFNA)	ng/g	none	none	0.049 J
Perfluorobutane sulfonic acid (PFBS)	ng/g	none	1,600,000	ND / < 0.24
Perfluorohexanoic acid (PFHxA)	ng/g	none	none	0.14 J
Perfluoroundecanoic Acid (PFUnA)	ng/g	none	none	0.050 J
Perfluorodecanoic Acid (PFDA)	ng/g	none	none	0.046 J
Perfluorododecanoic Acid (PFDoA)	ng/g	none	none	ND / < 0.24
Perfluorotridecanoic Acid (PFTriA)	ng/g	none	none	ND / < 0.24
Perfluorobutanoic Acid (PFBA)	ng/g	none	none	0.088 J
Perfluoropentanoic Acid (PFPeA)	ng/g	none	none	0.11 J
Perfluorotetradecanoic Acid (PFTeA)	ng/g	none	none	ND / < 0.24
Total Organic Carbon (TOC)	mg/Kg	none	none	6000

				Lab Results ^{[2],[3]}
SB-13 0-1'				Sample Date:
	Units	Residential Soil Screening Level	EPA RSL Residential Soil	7/5/2018
Perfluoroalkyl Substances (PFAS) Analyzed (Modified EPA Method 537)				
Perfluorooctanoic acid (PFOA)	ng/g	300	none	1.6
Perfluorooctane sulfonic acid (PFOS)	ng/g	none	none	0.41 J
Perfluorohexane sulfonic acid (PFHxS)	ng/g	none	none	ND / < 0.22
Perfluoroheptanoic acid (PFHpA)	ng/g	none	none	0.16 J
Perfluorononanoic acid (PFNA)	ng/g	none	none	0.21 J
Perfluorobutane sulfonic acid (PFBS)	ng/g	none	1,600,000	ND / < 0.22
Perfluorohexanoic acid (PFHxA)	ng/g	none	none	0.16 J
Perfluoroundecanoic Acid (PFUnA)	ng/g	none	none	0.24
Perfluorodecanoic Acid (PFDA)	ng/g	none	none	0.30
Perfluorododecanoic Acid (PFDoA)	ng/g	none	none	0.15 J
Perfluorotridecanoic Acid (PFTriA)	ng/g	none	none	0.096 J
Perfluorobutanoic Acid (PFBA)	ng/g	none	none	0.30
Perfluoropentanoic Acid (PFPeA)	ng/g	none	none	0.12 J
Perfluorotetradecanoic Acid (PFTeA)	ng/g	none	none	0.073 J
Total Organic Carbon (TOC)	mg/Kg	none	none	NS

[1] Vermont DEC Residential Soil Screening Level and EPA RSL Residential values are from the Investigation and Remediation of Contaminated Properties Rule (IRULE), Table 35-APX-A1, adopted July 11, 2017.

[2] ND / <: compound not detected above the detection limits shown.

[3] J: Trace concentration estimated below laboratory reporting limits.

[4] Laboratory Analysis conducted by TestAmerica Laboratories, South Burlington, Vermont.

[5] NS: No analysis for Total Organic Carbon.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-40943-1

TestAmerica Sample Delivery Group: 320-40943-1

Client Project/Site: PFAS Projects

For:

Waite-Heindel Environmental Management

7 Kilburn Street

Suite 301

Burlington, Vermont 05401

Attn: Mr. Miles Waite



Authorized for release by:

7/31/2018 5:32:51 PM

Kathryn Kelly, Project Manager II

(802)923-1021

kathryn.kelly@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

7

Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Qualifiers

LCMS

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
F1	MS and/or MSD Recovery is outside acceptance limits.

General Chemistry

Qualifier	Qualifier Description
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Job ID: 320-40943-1

Laboratory: TestAmerica Sacramento

Narrative

CASE NARRATIVE

Client: Waite-Heindel Environmental Management

Project: PFAS Projects

Report Number: 320-40943-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The samples were received on 07/07/2018; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.3 C.

TOTAL ORGANIC CARBON

Samples SB-3, SB-5, SB-12S and SB-12D were analyzed for total organic carbon in accordance with Lloyd Kahn Method. The samples were analyzed on 07/17/2018 and 07/18/2018.

The continuing calibration blank (CCB) for analytical batch 200-131891 contained Total Organic Carbon above the reporting limit (RL). All reported samples associated with this CCB were either ND for this analyte or contained this analyte at a concentration greater than 10X the value found in the CCB; therefore, re-analysis of samples was not performed.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PERCENT SOLIDS

Samples SB-1, SB-2, SB-3, SB-4, SB-5, SB-6S, SB-6D, SB-7, SB-8, SB-9, SB-10, SB-11, SB-13, SB-12S and SB-12D were analyzed for percent solids in accordance with EPA Moisture. The samples were analyzed on 07/12/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PFOA/PFOS LC/MS/MS

Samples SB-1, SB-2, SB-3, SB-4, SB-5, SB-6S, SB-6D, SB-7, SB-8, SB-9, SB-10, SB-11, SB-13, SB-12S and SB-12D were analyzed for PFOA/PFOS LC/MS/MS in accordance with 537. The samples were prepared on 07/16/2018 and analyzed on 07/26/2018.

Perfluorooctanoic acid (PFOA) failed the recovery criteria low for the MSD of sample SB-1MSD in batch 320-236371.

The matrix spike duplicate (MSD) recoveries for Perfluorooctanoic acid (PFOA) for preparation batch 320-234291 and analytical batch 320-236371 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Case Narrative

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Job ID: 320-40943-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

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Detection Summary

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-1

Lab Sample ID: 320-40943-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.48		0.24	0.034	ng/g	1		☼	537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.35		0.24	0.093	ng/g	1		☼	537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.49		0.24	0.051	ng/g	1		☼	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.42		0.24	0.035	ng/g	1		☼	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	9.3	F1	0.24	0.10	ng/g	1		☼	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.46		0.24	0.043	ng/g	1		☼	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.29		0.24	0.026	ng/g	1		☼	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.33		0.24	0.043	ng/g	1		☼	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.18	J	0.24	0.081	ng/g	1		☼	537 (modified)	Total/NA
Perfluorotridecanoic Acid (PFTriA)	0.14	J	0.24	0.061	ng/g	1		☼	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.12	J	0.24	0.065	ng/g	1		☼	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.037	J	0.24	0.037	ng/g	1		☼	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.70		0.60	0.24	ng/g	1		☼	537 (modified)	Total/NA

Client Sample ID: SB-2

Lab Sample ID: 320-40943-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.44		0.29	0.040	ng/g	1		537 (modified)	Total/NA	
Perfluoropentanoic acid (PFPeA)	0.44		0.29	0.11	ng/g	1		537 (modified)	Total/NA	
Perfluorohexanoic acid (PFHxA)	0.69		0.29	0.060	ng/g	1		537 (modified)	Total/NA	
Perfluoroheptanoic acid (PFHpA)	1.2		0.29	0.042	ng/g	1		537 (modified)	Total/NA	
Perfluorooctanoic acid (PFOA)	22		0.29	0.12	ng/g	1		537 (modified)	Total/NA	
Perfluorononanoic acid (PFNA)	0.26	J	0.29	0.052	ng/g	1		537 (modified)	Total/NA	
Perfluorodecanoic acid (PFDA)	0.24	J	0.29	0.032	ng/g	1		537 (modified)	Total/NA	
Perfluoroundecanoic acid (PFUnA)	0.24	J	0.29	0.052	ng/g	1		537 (modified)	Total/NA	
Perfluorododecanoic acid (PFDoA)	0.14	J	0.29	0.096	ng/g	1		537 (modified)	Total/NA	
Perfluorotridecanoic Acid (PFTriA)	0.099	J	0.29	0.073	ng/g	1		537 (modified)	Total/NA	
Perfluorotetradecanoic acid (PFTeA)	0.096	J	0.29	0.078	ng/g	1		537 (modified)	Total/NA	
Perfluorohexanesulfonic acid (PFHxS)	0.13	J	0.29	0.045	ng/g	1		537 (modified)	Total/NA	
Perfluorooctanesulfonic acid (PFOS)	0.91		0.72	0.29	ng/g	1		537 (modified)	Total/NA	

Client Sample ID: SB-3

Lab Sample ID: 320-40943-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.38		0.31	0.043	ng/g	1		537 (modified)	Total/NA	
Perfluoropentanoic acid (PFPeA)	0.29	J	0.31	0.12	ng/g	1		537 (modified)	Total/NA	
Perfluorohexanoic acid (PFHxA)	0.28	J	0.31	0.064	ng/g	1		537 (modified)	Total/NA	
Perfluoroheptanoic acid (PFHpA)	0.35		0.31	0.044	ng/g	1		537 (modified)	Total/NA	
Perfluorooctanoic acid (PFOA)	3.5		0.31	0.13	ng/g	1		537 (modified)	Total/NA	
Perfluorononanoic acid (PFNA)	0.34		0.31	0.055	ng/g	1		537 (modified)	Total/NA	
Perfluorodecanoic acid (PFDA)	0.31		0.31	0.034	ng/g	1		537 (modified)	Total/NA	
Perfluoroundecanoic acid (PFUnA)	0.24	J	0.31	0.055	ng/g	1		537 (modified)	Total/NA	
Perfluorododecanoic acid (PFDoA)	0.16	J	0.31	0.10	ng/g	1		537 (modified)	Total/NA	
Perfluorotridecanoic Acid (PFTriA)	0.082	J	0.31	0.078	ng/g	1		537 (modified)	Total/NA	
Perfluorotetradecanoic acid (PFTeA)	0.098	J	0.31	0.083	ng/g	1		537 (modified)	Total/NA	
Perfluorooctanesulfonic acid (PFOS)	0.58	J	0.77	0.31	ng/g	1		537 (modified)	Total/NA	
Total Organic Carbon	29000	^	1000	380	mg/Kg	1		Lloyd Kahn	Total/NA	

Client Sample ID: SB-4

Lab Sample ID: 320-40943-5

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-4 (Continued)

Lab Sample ID: 320-40943-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.35		0.23	0.032	ng/g	1		✱	537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.17	J	0.23	0.088	ng/g	1		✱	537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.19	J	0.23	0.048	ng/g	1		✱	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.19	J	0.23	0.033	ng/g	1		✱	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.3		0.23	0.098	ng/g	1		✱	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.27		0.23	0.041	ng/g	1		✱	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.26		0.23	0.025	ng/g	1		✱	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.20	J	0.23	0.041	ng/g	1		✱	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.10	J	0.23	0.077	ng/g	1		✱	537 (modified)	Total/NA
Perfluorotridecanoic Acid (PFTriA)	0.065	J	0.23	0.058	ng/g	1		✱	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.063	J	0.23	0.062	ng/g	1		✱	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.40	J	0.57	0.23	ng/g	1		✱	537 (modified)	Total/NA

Client Sample ID: SB-5

Lab Sample ID: 320-40943-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.47		0.26	0.037	ng/g	1		✱	537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.22	J	0.26	0.10	ng/g	1		✱	537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.44		0.26	0.055	ng/g	1		✱	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.91		0.26	0.038	ng/g	1		✱	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	18		0.26	0.11	ng/g	1		✱	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.32		0.26	0.047	ng/g	1		✱	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.26		0.26	0.029	ng/g	1		✱	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.25	J	0.26	0.047	ng/g	1		✱	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.12	J	0.26	0.088	ng/g	1		✱	537 (modified)	Total/NA
Perfluorotridecanoic Acid (PFTriA)	0.090	J	0.26	0.067	ng/g	1		✱	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.076	J	0.26	0.071	ng/g	1		✱	537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.052	J	0.26	0.041	ng/g	1		✱	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.57	J	0.66	0.26	ng/g	1		✱	537 (modified)	Total/NA
Total Organic Carbon	42000	^	1000	380	mg/Kg	1			Lloyd Kahn	Total/NA

Client Sample ID: SB-6S

Lab Sample ID: 320-40943-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.37		0.23	0.033	ng/g	1		✱	537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.23		0.23	0.090	ng/g	1		✱	537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.34		0.23	0.049	ng/g	1		✱	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.53		0.23	0.034	ng/g	1		✱	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	4.0		0.23	0.10	ng/g	1		✱	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.28		0.23	0.042	ng/g	1		✱	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.29		0.23	0.026	ng/g	1		✱	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.21	J	0.23	0.042	ng/g	1		✱	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.12	J	0.23	0.078	ng/g	1		✱	537 (modified)	Total/NA
Perfluorotridecanoic Acid (PFTriA)	0.080	J	0.23	0.060	ng/g	1		✱	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.46	J	0.58	0.23	ng/g	1		✱	537 (modified)	Total/NA

Client Sample ID: SB-6D

Lab Sample ID: 320-40943-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.057	J	0.22	0.030	ng/g	1		✱	537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-6D (Continued)

Lab Sample ID: 320-40943-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.17	J	0.22	0.046	ng/g	1	✱	537	(modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.24		0.22	0.031	ng/g	1	✱	537	(modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.0		0.22	0.093	ng/g	1	✱	537	(modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.039	J	0.22	0.039	ng/g	1	✱	537	(modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.035	J	0.22	0.024	ng/g	1	✱	537	(modified)	Total/NA

Client Sample ID: SB-7

Lab Sample ID: 320-40943-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.33		0.22	0.031	ng/g	1	✱	537	(modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.23		0.22	0.086	ng/g	1	✱	537	(modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.33		0.22	0.047	ng/g	1	✱	537	(modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.26		0.22	0.032	ng/g	1	✱	537	(modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.7		0.22	0.096	ng/g	1	✱	537	(modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.28		0.22	0.040	ng/g	1	✱	537	(modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.27		0.22	0.025	ng/g	1	✱	537	(modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.20	J	0.22	0.040	ng/g	1	✱	537	(modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.12	J	0.22	0.075	ng/g	1	✱	537	(modified)	Total/NA
Perfluorotridecanoic Acid (PFTriA)	0.060	J	0.22	0.057	ng/g	1	✱	537	(modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.43	J	0.56	0.22	ng/g	1	✱	537	(modified)	Total/NA

Client Sample ID: SB-8

Lab Sample ID: 320-40943-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.43		0.25	0.035	ng/g	1	✱	537	(modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.35		0.25	0.097	ng/g	1	✱	537	(modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.45		0.25	0.053	ng/g	1	✱	537	(modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.35		0.25	0.036	ng/g	1	✱	537	(modified)	Total/NA
Perfluorooctanoic acid (PFOA)	3.9		0.25	0.11	ng/g	1	✱	537	(modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.39		0.25	0.045	ng/g	1	✱	537	(modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.26		0.25	0.028	ng/g	1	✱	537	(modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.21	J	0.25	0.045	ng/g	1	✱	537	(modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.17	J	0.25	0.084	ng/g	1	✱	537	(modified)	Total/NA
Perfluorotridecanoic Acid (PFTriA)	0.079	J	0.25	0.064	ng/g	1	✱	537	(modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.077	J	0.25	0.068	ng/g	1	✱	537	(modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.60	J	0.63	0.25	ng/g	1	✱	537	(modified)	Total/NA

Client Sample ID: SB-9

Lab Sample ID: 320-40943-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.36		0.23	0.033	ng/g	1	✱	537	(modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.30		0.23	0.090	ng/g	1	✱	537	(modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.30		0.23	0.049	ng/g	1	✱	537	(modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.19	J	0.23	0.034	ng/g	1	✱	537	(modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.0		0.23	0.10	ng/g	1	✱	537	(modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.32		0.23	0.042	ng/g	1	✱	537	(modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.31		0.23	0.026	ng/g	1	✱	537	(modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.21	J	0.23	0.042	ng/g	1	✱	537	(modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.11	J	0.23	0.079	ng/g	1	✱	537	(modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.069	J	0.23	0.063	ng/g	1	✱	537	(modified)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-9 (Continued)

Lab Sample ID: 320-40943-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	0.42	J	0.59	0.23	ng/g	1	✱	537 (modified)	Total/NA

Client Sample ID: SB-10

Lab Sample ID: 320-40943-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.29		0.28	0.040	ng/g	1	✱	537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.11	J	0.28	0.11	ng/g	1	✱	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.098	J	0.28	0.041	ng/g	1	✱	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.67		0.28	0.12	ng/g	1	✱	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.22	J	0.28	0.051	ng/g	1	✱	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.32		0.28	0.031	ng/g	1	✱	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.27	J	0.28	0.051	ng/g	1	✱	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.14	J	0.28	0.095	ng/g	1	✱	537 (modified)	Total/NA
Perfluorotridecanoic Acid (PFTriA)	0.10	J	0.28	0.073	ng/g	1	✱	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.097	J	0.28	0.077	ng/g	1	✱	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.42	J	0.71	0.28	ng/g	1	✱	537 (modified)	Total/NA

Client Sample ID: SB-11

Lab Sample ID: 320-40943-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.55		0.28	0.040	ng/g	1	✱	537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.36		0.28	0.11	ng/g	1	✱	537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.72		0.28	0.060	ng/g	1	✱	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.81		0.28	0.041	ng/g	1	✱	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	13		0.28	0.12	ng/g	1	✱	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.39		0.28	0.051	ng/g	1	✱	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.40		0.28	0.031	ng/g	1	✱	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.26	J	0.28	0.051	ng/g	1	✱	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.15	J	0.28	0.095	ng/g	1	✱	537 (modified)	Total/NA
Perfluorotridecanoic Acid (PFTriA)	0.085	J	0.28	0.072	ng/g	1	✱	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.73		0.71	0.28	ng/g	1	✱	537 (modified)	Total/NA

Client Sample ID: SB-13

Lab Sample ID: 320-40943-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.30		0.22	0.031	ng/g	1	✱	537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.12	J	0.22	0.087	ng/g	1	✱	537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.16	J	0.22	0.047	ng/g	1	✱	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.16	J	0.22	0.033	ng/g	1	✱	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.6		0.22	0.097	ng/g	1	✱	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.21	J	0.22	0.040	ng/g	1	✱	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.30		0.22	0.025	ng/g	1	✱	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.24		0.22	0.040	ng/g	1	✱	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.15	J	0.22	0.075	ng/g	1	✱	537 (modified)	Total/NA
Perfluorotridecanoic Acid (PFTriA)	0.096	J	0.22	0.057	ng/g	1	✱	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.073	J	0.22	0.061	ng/g	1	✱	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.41	J	0.56	0.22	ng/g	1	✱	537 (modified)	Total/NA

Client Sample ID: SB-12S

Lab Sample ID: 320-40943-15

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

14

Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-12S (Continued)

Lab Sample ID: 320-40943-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.39		0.22	0.031	ng/g	1		✱	537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.21	J	0.22	0.084	ng/g	1		✱	537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.23		0.22	0.046	ng/g	1		✱	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.20	J	0.22	0.032	ng/g	1		✱	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.3		0.22	0.094	ng/g	1		✱	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.21	J	0.22	0.039	ng/g	1		✱	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.27		0.22	0.024	ng/g	1		✱	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.30		0.22	0.039	ng/g	1		✱	537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.17	J	0.22	0.073	ng/g	1		✱	537 (modified)	Total/NA
Perfluorotridecanoic Acid (PFTriA)	0.11	J	0.22	0.056	ng/g	1		✱	537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.10	J	0.22	0.059	ng/g	1		✱	537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.43	J	0.54	0.22	ng/g	1		✱	537 (modified)	Total/NA
Total Organic Carbon	25000	^	1000	380	mg/Kg	1			Lloyd Kahn	Total/NA

Client Sample ID: SB-12D

Lab Sample ID: 320-40943-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.088	J	0.24	0.033	ng/g	1		✱	537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.11	J	0.24	0.092	ng/g	1		✱	537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.14	J	0.24	0.050	ng/g	1		✱	537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.088	J	0.24	0.034	ng/g	1		✱	537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.3		0.24	0.10	ng/g	1		✱	537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.049	J	0.24	0.043	ng/g	1		✱	537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.046	J	0.24	0.026	ng/g	1		✱	537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.050	J	0.24	0.043	ng/g	1		✱	537 (modified)	Total/NA
Total Organic Carbon	6000		1000	380	mg/Kg	1			Lloyd Kahn	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

15

Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-1

Date Collected: 07/05/18 09:30

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-2

Matrix: Solid

Percent Solids: 82.0

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.48		0.24	0.034	ng/g	☼	07/16/18 13:30	07/26/18 16:07	1
Perfluoropentanoic acid (PFPeA)	0.35		0.24	0.093	ng/g	☼	07/16/18 13:30	07/26/18 16:07	1
Perfluorohexanoic acid (PFHxA)	0.49		0.24	0.051	ng/g	☼	07/16/18 13:30	07/26/18 16:07	1
Perfluoroheptanoic acid (PFHpA)	0.42		0.24	0.035	ng/g	☼	07/16/18 13:30	07/26/18 16:07	1
Perfluorooctanoic acid (PFOA)	9.3	F1	0.24	0.10	ng/g	☼	07/16/18 13:30	07/26/18 16:07	1
Perfluorononanoic acid (PFNA)	0.46		0.24	0.043	ng/g	☼	07/16/18 13:30	07/26/18 16:07	1
Perfluorodecanoic acid (PFDA)	0.29		0.24	0.026	ng/g	☼	07/16/18 13:30	07/26/18 16:07	1
Perfluoroundecanoic acid (PFUnA)	0.33		0.24	0.043	ng/g	☼	07/16/18 13:30	07/26/18 16:07	1
Perfluorododecanoic acid (PFDoA)	0.18	J	0.24	0.081	ng/g	☼	07/16/18 13:30	07/26/18 16:07	1
Perfluorotridecanoic Acid (PFTriA)	0.14	J	0.24	0.061	ng/g	☼	07/16/18 13:30	07/26/18 16:07	1
Perfluorotetradecanoic acid (PFTeA)	0.12	J	0.24	0.065	ng/g	☼	07/16/18 13:30	07/26/18 16:07	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.24	0.030	ng/g	☼	07/16/18 13:30	07/26/18 16:07	1
Perfluorohexanesulfonic acid (PFHxS)	0.037	J	0.24	0.037	ng/g	☼	07/16/18 13:30	07/26/18 16:07	1
Perfluorooctanesulfonic acid (PFOS)	0.70		0.60	0.24	ng/g	☼	07/16/18 13:30	07/26/18 16:07	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	85		25 - 150	07/16/18 13:30	07/26/18 16:07	1
13C5 PFPeA	97		25 - 150	07/16/18 13:30	07/26/18 16:07	1
13C2 PFHxA	81		25 - 150	07/16/18 13:30	07/26/18 16:07	1
13C4-PFHpA	92		25 - 150	07/16/18 13:30	07/26/18 16:07	1
13C4 PFOA	91		25 - 150	07/16/18 13:30	07/26/18 16:07	1
13C5 PFNA	100		25 - 150	07/16/18 13:30	07/26/18 16:07	1
13C2 PFDA	114		25 - 150	07/16/18 13:30	07/26/18 16:07	1
13C2 PFUnA	100		25 - 150	07/16/18 13:30	07/26/18 16:07	1
13C2 PFDoA	92		25 - 150	07/16/18 13:30	07/26/18 16:07	1
13C2-PFTeA	94		25 - 150	07/16/18 13:30	07/26/18 16:07	1
13C3-PFBS	88		25 - 150	07/16/18 13:30	07/26/18 16:07	1
18O2 PFHxS	97		25 - 150	07/16/18 13:30	07/26/18 16:07	1
13C4 PFOS	98		25 - 150	07/16/18 13:30	07/26/18 16:07	1
13C8 FOSA	64		25 - 150	07/16/18 13:30	07/26/18 16:07	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	18.0		0.1	0.1	%			07/12/18 16:45	1
Percent Solids	82.0		0.1	0.1	%			07/12/18 16:45	1

TestAmerica Sacramento

Client Sample Results

16

Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-2

Date Collected: 07/05/18 10:05

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-3

Matrix: Solid

Percent Solids: 69.6

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.44		0.29	0.040	ng/g	☼	07/16/18 13:30	07/26/18 16:30	1
Perfluoropentanoic acid (PFPeA)	0.44		0.29	0.11	ng/g	☼	07/16/18 13:30	07/26/18 16:30	1
Perfluorohexanoic acid (PFHxA)	0.69		0.29	0.060	ng/g	☼	07/16/18 13:30	07/26/18 16:30	1
Perfluoroheptanoic acid (PFHpA)	1.2		0.29	0.042	ng/g	☼	07/16/18 13:30	07/26/18 16:30	1
Perfluorooctanoic acid (PFOA)	22		0.29	0.12	ng/g	☼	07/16/18 13:30	07/26/18 16:30	1
Perfluorononanoic acid (PFNA)	0.26	J	0.29	0.052	ng/g	☼	07/16/18 13:30	07/26/18 16:30	1
Perfluorodecanoic acid (PFDA)	0.24	J	0.29	0.032	ng/g	☼	07/16/18 13:30	07/26/18 16:30	1
Perfluoroundecanoic acid (PFUnA)	0.24	J	0.29	0.052	ng/g	☼	07/16/18 13:30	07/26/18 16:30	1
Perfluorododecanoic acid (PFDoA)	0.14	J	0.29	0.096	ng/g	☼	07/16/18 13:30	07/26/18 16:30	1
Perfluorotridecanoic Acid (PFTriA)	0.099	J	0.29	0.073	ng/g	☼	07/16/18 13:30	07/26/18 16:30	1
Perfluorotetradecanoic acid (PFTeA)	0.096	J	0.29	0.078	ng/g	☼	07/16/18 13:30	07/26/18 16:30	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.29	0.036	ng/g	☼	07/16/18 13:30	07/26/18 16:30	1
Perfluorohexanesulfonic acid (PFHxS)	0.13	J	0.29	0.045	ng/g	☼	07/16/18 13:30	07/26/18 16:30	1
Perfluorooctanesulfonic acid (PFOS)	0.91		0.72	0.29	ng/g	☼	07/16/18 13:30	07/26/18 16:30	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	90		25 - 150				07/16/18 13:30	07/26/18 16:30	1
13C5 PFPeA	97		25 - 150				07/16/18 13:30	07/26/18 16:30	1
13C2 PFHxA	87		25 - 150				07/16/18 13:30	07/26/18 16:30	1
13C4-PFHpA	90		25 - 150				07/16/18 13:30	07/26/18 16:30	1
13C4 PFOA	90		25 - 150				07/16/18 13:30	07/26/18 16:30	1
13C5 PFNA	100		25 - 150				07/16/18 13:30	07/26/18 16:30	1
13C2 PFDA	111		25 - 150				07/16/18 13:30	07/26/18 16:30	1
13C2 PFUnA	104		25 - 150				07/16/18 13:30	07/26/18 16:30	1
13C2 PFDoA	90		25 - 150				07/16/18 13:30	07/26/18 16:30	1
13C2-PFTeDA	80		25 - 150				07/16/18 13:30	07/26/18 16:30	1
13C3-PFBS	90		25 - 150				07/16/18 13:30	07/26/18 16:30	1
18O2 PFHxS	95		25 - 150				07/16/18 13:30	07/26/18 16:30	1
13C4 PFOS	96		25 - 150				07/16/18 13:30	07/26/18 16:30	1
13C8 FOSA	73		25 - 150				07/16/18 13:30	07/26/18 16:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	30.4		0.1	0.1	%			07/12/18 16:45	1
Percent Solids	69.6		0.1	0.1	%			07/12/18 16:45	1

TestAmerica Sacramento

Client Sample Results

17

Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-3

Date Collected: 07/05/18 10:15

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-4

Matrix: Solid

Percent Solids: 63.9

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.38		0.31	0.043	ng/g	☼	07/16/18 13:30	07/26/18 16:38	1
Perfluoropentanoic acid (PFPeA)	0.29	J	0.31	0.12	ng/g	☼	07/16/18 13:30	07/26/18 16:38	1
Perfluorohexanoic acid (PFHxA)	0.28	J	0.31	0.064	ng/g	☼	07/16/18 13:30	07/26/18 16:38	1
Perfluoroheptanoic acid (PFHpA)	0.35		0.31	0.044	ng/g	☼	07/16/18 13:30	07/26/18 16:38	1
Perfluorooctanoic acid (PFOA)	3.5		0.31	0.13	ng/g	☼	07/16/18 13:30	07/26/18 16:38	1
Perfluorononanoic acid (PFNA)	0.34		0.31	0.055	ng/g	☼	07/16/18 13:30	07/26/18 16:38	1
Perfluorodecanoic acid (PFDA)	0.31		0.31	0.034	ng/g	☼	07/16/18 13:30	07/26/18 16:38	1
Perfluoroundecanoic acid (PFUnA)	0.24	J	0.31	0.055	ng/g	☼	07/16/18 13:30	07/26/18 16:38	1
Perfluorododecanoic acid (PFDoA)	0.16	J	0.31	0.10	ng/g	☼	07/16/18 13:30	07/26/18 16:38	1
Perfluorotridecanoic Acid (PFTriA)	0.082	J	0.31	0.078	ng/g	☼	07/16/18 13:30	07/26/18 16:38	1
Perfluorotetradecanoic acid (PFTeA)	0.098	J	0.31	0.083	ng/g	☼	07/16/18 13:30	07/26/18 16:38	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.31	0.038	ng/g	☼	07/16/18 13:30	07/26/18 16:38	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.31	0.048	ng/g	☼	07/16/18 13:30	07/26/18 16:38	1
Perfluorooctanesulfonic acid (PFOS)	0.58	J	0.77	0.31	ng/g	☼	07/16/18 13:30	07/26/18 16:38	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	70		25 - 150	07/16/18 13:30	07/26/18 16:38	1
13C5 PFPeA	78		25 - 150	07/16/18 13:30	07/26/18 16:38	1
13C2 PFHxA	62		25 - 150	07/16/18 13:30	07/26/18 16:38	1
13C4-PFHpA	84		25 - 150	07/16/18 13:30	07/26/18 16:38	1
13C4 PFOA	84		25 - 150	07/16/18 13:30	07/26/18 16:38	1
13C5 PFNA	85		25 - 150	07/16/18 13:30	07/26/18 16:38	1
13C2 PFDA	99		25 - 150	07/16/18 13:30	07/26/18 16:38	1
13C2 PFUnA	86		25 - 150	07/16/18 13:30	07/26/18 16:38	1
13C2 PFDoA	81		25 - 150	07/16/18 13:30	07/26/18 16:38	1
13C2-PFTeDA	73		25 - 150	07/16/18 13:30	07/26/18 16:38	1
13C3-PFBS	80		25 - 150	07/16/18 13:30	07/26/18 16:38	1
18O2 PFHxS	89		25 - 150	07/16/18 13:30	07/26/18 16:38	1
13C4 PFOS	84		25 - 150	07/16/18 13:30	07/26/18 16:38	1
13C8 FOSA	65		25 - 150	07/16/18 13:30	07/26/18 16:38	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	36.1		0.1	0.1	%			07/12/18 16:45	1
Percent Solids	63.9		0.1	0.1	%			07/12/18 16:45	1
Total Organic Carbon	29000	^	1000	380	mg/Kg			07/17/18 13:54	1

TestAmerica Sacramento

Client Sample Results

18

Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-4

Date Collected: 07/05/18 10:25

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-5

Matrix: Solid

Percent Solids: 86.7

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.35		0.23	0.032	ng/g	☼	07/16/18 13:30	07/26/18 16:46	1
Perfluoropentanoic acid (PFPeA)	0.17	J	0.23	0.088	ng/g	☼	07/16/18 13:30	07/26/18 16:46	1
Perfluorohexanoic acid (PFHxA)	0.19	J	0.23	0.048	ng/g	☼	07/16/18 13:30	07/26/18 16:46	1
Perfluoroheptanoic acid (PFHpA)	0.19	J	0.23	0.033	ng/g	☼	07/16/18 13:30	07/26/18 16:46	1
Perfluorooctanoic acid (PFOA)	1.3		0.23	0.098	ng/g	☼	07/16/18 13:30	07/26/18 16:46	1
Perfluorononanoic acid (PFNA)	0.27		0.23	0.041	ng/g	☼	07/16/18 13:30	07/26/18 16:46	1
Perfluorodecanoic acid (PFDA)	0.26		0.23	0.025	ng/g	☼	07/16/18 13:30	07/26/18 16:46	1
Perfluoroundecanoic acid (PFUnA)	0.20	J	0.23	0.041	ng/g	☼	07/16/18 13:30	07/26/18 16:46	1
Perfluorododecanoic acid (PFDoA)	0.10	J	0.23	0.077	ng/g	☼	07/16/18 13:30	07/26/18 16:46	1
Perfluorotridecanoic Acid (PFTriA)	0.065	J	0.23	0.058	ng/g	☼	07/16/18 13:30	07/26/18 16:46	1
Perfluorotetradecanoic acid (PFTeA)	0.063	J	0.23	0.062	ng/g	☼	07/16/18 13:30	07/26/18 16:46	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.029	ng/g	☼	07/16/18 13:30	07/26/18 16:46	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23	0.035	ng/g	☼	07/16/18 13:30	07/26/18 16:46	1
Perfluorooctanesulfonic acid (PFOS)	0.40	J	0.57	0.23	ng/g	☼	07/16/18 13:30	07/26/18 16:46	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	76		25 - 150	07/16/18 13:30	07/26/18 16:46	1
13C5 PFPeA	84		25 - 150	07/16/18 13:30	07/26/18 16:46	1
13C2 PFHxA	66		25 - 150	07/16/18 13:30	07/26/18 16:46	1
13C4-PFHpA	84		25 - 150	07/16/18 13:30	07/26/18 16:46	1
13C4 PFOA	89		25 - 150	07/16/18 13:30	07/26/18 16:46	1
13C5 PFNA	92		25 - 150	07/16/18 13:30	07/26/18 16:46	1
13C2 PFDA	106		25 - 150	07/16/18 13:30	07/26/18 16:46	1
13C2 PFUnA	101		25 - 150	07/16/18 13:30	07/26/18 16:46	1
13C2 PFDoA	94		25 - 150	07/16/18 13:30	07/26/18 16:46	1
13C2-PFTeDA	84		25 - 150	07/16/18 13:30	07/26/18 16:46	1
13C3-PFBS	87		25 - 150	07/16/18 13:30	07/26/18 16:46	1
18O2 PFHxS	92		25 - 150	07/16/18 13:30	07/26/18 16:46	1
13C4 PFOS	93		25 - 150	07/16/18 13:30	07/26/18 16:46	1
13C8 FOSA	75		25 - 150	07/16/18 13:30	07/26/18 16:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	13.3		0.1	0.1	%			07/12/18 16:45	1
Percent Solids	86.7		0.1	0.1	%			07/12/18 16:45	1

TestAmerica Sacramento

Client Sample Results

19

Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-5

Date Collected: 07/05/18 10:35

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-6

Matrix: Solid

Percent Solids: 75.4

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.47		0.26	0.037	ng/g	☼	07/16/18 13:30	07/26/18 16:53	1
Perfluoropentanoic acid (PFPeA)	0.22	J	0.26	0.10	ng/g	☼	07/16/18 13:30	07/26/18 16:53	1
Perfluorohexanoic acid (PFHxA)	0.44		0.26	0.055	ng/g	☼	07/16/18 13:30	07/26/18 16:53	1
Perfluoroheptanoic acid (PFHpA)	0.91		0.26	0.038	ng/g	☼	07/16/18 13:30	07/26/18 16:53	1
Perfluorooctanoic acid (PFOA)	18		0.26	0.11	ng/g	☼	07/16/18 13:30	07/26/18 16:53	1
Perfluorononanoic acid (PFNA)	0.32		0.26	0.047	ng/g	☼	07/16/18 13:30	07/26/18 16:53	1
Perfluorodecanoic acid (PFDA)	0.26		0.26	0.029	ng/g	☼	07/16/18 13:30	07/26/18 16:53	1
Perfluoroundecanoic acid (PFUnA)	0.25	J	0.26	0.047	ng/g	☼	07/16/18 13:30	07/26/18 16:53	1
Perfluorododecanoic acid (PFDoA)	0.12	J	0.26	0.088	ng/g	☼	07/16/18 13:30	07/26/18 16:53	1
Perfluorotridecanoic Acid (PFTriA)	0.090	J	0.26	0.067	ng/g	☼	07/16/18 13:30	07/26/18 16:53	1
Perfluorotetradecanoic acid (PFTeA)	0.076	J	0.26	0.071	ng/g	☼	07/16/18 13:30	07/26/18 16:53	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.26	0.033	ng/g	☼	07/16/18 13:30	07/26/18 16:53	1
Perfluorohexanesulfonic acid (PFHxS)	0.052	J	0.26	0.041	ng/g	☼	07/16/18 13:30	07/26/18 16:53	1
Perfluorooctanesulfonic acid (PFOS)	0.57	J	0.66	0.26	ng/g	☼	07/16/18 13:30	07/26/18 16:53	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	85		25 - 150	07/16/18 13:30	07/26/18 16:53	1
13C5 PFPeA	92		25 - 150	07/16/18 13:30	07/26/18 16:53	1
13C2 PFHxA	81		25 - 150	07/16/18 13:30	07/26/18 16:53	1
13C4-PFHpA	87		25 - 150	07/16/18 13:30	07/26/18 16:53	1
13C4 PFOA	88		25 - 150	07/16/18 13:30	07/26/18 16:53	1
13C5 PFNA	95		25 - 150	07/16/18 13:30	07/26/18 16:53	1
13C2 PFDA	109		25 - 150	07/16/18 13:30	07/26/18 16:53	1
13C2 PFUnA	102		25 - 150	07/16/18 13:30	07/26/18 16:53	1
13C2 PFDoA	89		25 - 150	07/16/18 13:30	07/26/18 16:53	1
13C2-PFTeA	84		25 - 150	07/16/18 13:30	07/26/18 16:53	1
13C3-PFBS	86		25 - 150	07/16/18 13:30	07/26/18 16:53	1
18O2 PFHxS	96		25 - 150	07/16/18 13:30	07/26/18 16:53	1
13C4 PFOS	97		25 - 150	07/16/18 13:30	07/26/18 16:53	1
13C8 FOSA	76		25 - 150	07/16/18 13:30	07/26/18 16:53	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	24.6		0.1	0.1	%			07/12/18 16:45	1
Percent Solids	75.4		0.1	0.1	%			07/12/18 16:45	1
Total Organic Carbon	42000	^	1000	380	mg/Kg			07/17/18 14:01	1

TestAmerica Sacramento

Client Sample Results

20

Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-6S

Date Collected: 07/05/18 10:45

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-7

Matrix: Solid

Percent Solids: 83.9

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.37		0.23	0.033	ng/g	☼	07/16/18 13:30	07/26/18 17:01	1
Perfluoropentanoic acid (PFPeA)	0.23		0.23	0.090	ng/g	☼	07/16/18 13:30	07/26/18 17:01	1
Perfluorohexanoic acid (PFHxA)	0.34		0.23	0.049	ng/g	☼	07/16/18 13:30	07/26/18 17:01	1
Perfluoroheptanoic acid (PFHpA)	0.53		0.23	0.034	ng/g	☼	07/16/18 13:30	07/26/18 17:01	1
Perfluorooctanoic acid (PFOA)	4.0		0.23	0.10	ng/g	☼	07/16/18 13:30	07/26/18 17:01	1
Perfluorononanoic acid (PFNA)	0.28		0.23	0.042	ng/g	☼	07/16/18 13:30	07/26/18 17:01	1
Perfluorodecanoic acid (PFDA)	0.29		0.23	0.026	ng/g	☼	07/16/18 13:30	07/26/18 17:01	1
Perfluoroundecanoic acid (PFUnA)	0.21	J	0.23	0.042	ng/g	☼	07/16/18 13:30	07/26/18 17:01	1
Perfluorododecanoic acid (PFDoA)	0.12	J	0.23	0.078	ng/g	☼	07/16/18 13:30	07/26/18 17:01	1
Perfluorotridecanoic Acid (PFTriA)	0.080	J	0.23	0.060	ng/g	☼	07/16/18 13:30	07/26/18 17:01	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.23	0.063	ng/g	☼	07/16/18 13:30	07/26/18 17:01	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.029	ng/g	☼	07/16/18 13:30	07/26/18 17:01	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23	0.036	ng/g	☼	07/16/18 13:30	07/26/18 17:01	1
Perfluorooctanesulfonic acid (PFOS)	0.46	J	0.58	0.23	ng/g	☼	07/16/18 13:30	07/26/18 17:01	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	73		25 - 150	07/16/18 13:30	07/26/18 17:01	1
13C5 PFPeA	86		25 - 150	07/16/18 13:30	07/26/18 17:01	1
13C2 PFHxA	73		25 - 150	07/16/18 13:30	07/26/18 17:01	1
13C4-PFHpA	87		25 - 150	07/16/18 13:30	07/26/18 17:01	1
13C4 PFOA	91		25 - 150	07/16/18 13:30	07/26/18 17:01	1
13C5 PFNA	99		25 - 150	07/16/18 13:30	07/26/18 17:01	1
13C2 PFDA	112		25 - 150	07/16/18 13:30	07/26/18 17:01	1
13C2 PFUnA	106		25 - 150	07/16/18 13:30	07/26/18 17:01	1
13C2 PFDoA	95		25 - 150	07/16/18 13:30	07/26/18 17:01	1
13C2-PFTeDA	92		25 - 150	07/16/18 13:30	07/26/18 17:01	1
13C3-PFBS	88		25 - 150	07/16/18 13:30	07/26/18 17:01	1
18O2 PFHxS	95		25 - 150	07/16/18 13:30	07/26/18 17:01	1
13C4 PFOS	99		25 - 150	07/16/18 13:30	07/26/18 17:01	1
13C8 FOSA	78		25 - 150	07/16/18 13:30	07/26/18 17:01	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	16.1		0.1	0.1	%			07/12/18 16:45	1
Percent Solids	83.9		0.1	0.1	%			07/12/18 16:45	1

TestAmerica Sacramento

Client Sample Results

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-6D

Date Collected: 07/05/18 11:15

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-8

Matrix: Solid

Percent Solids: 91.7

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.057	J	0.22	0.030	ng/g	☼	07/16/18 13:30	07/26/18 17:17	1
Perfluoropentanoic acid (PFPeA)	ND		0.22	0.084	ng/g	☼	07/16/18 13:30	07/26/18 17:17	1
Perfluorohexanoic acid (PFHxA)	0.17	J	0.22	0.046	ng/g	☼	07/16/18 13:30	07/26/18 17:17	1
Perfluoroheptanoic acid (PFHpA)	0.24		0.22	0.031	ng/g	☼	07/16/18 13:30	07/26/18 17:17	1
Perfluorooctanoic acid (PFOA)	2.0		0.22	0.093	ng/g	☼	07/16/18 13:30	07/26/18 17:17	1
Perfluorononanoic acid (PFNA)	0.039	J	0.22	0.039	ng/g	☼	07/16/18 13:30	07/26/18 17:17	1
Perfluorodecanoic acid (PFDA)	0.035	J	0.22	0.024	ng/g	☼	07/16/18 13:30	07/26/18 17:17	1
Perfluoroundecanoic acid (PFUnA)	ND		0.22	0.039	ng/g	☼	07/16/18 13:30	07/26/18 17:17	1
Perfluorododecanoic acid (PFDoA)	ND		0.22	0.073	ng/g	☼	07/16/18 13:30	07/26/18 17:17	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.22	0.055	ng/g	☼	07/16/18 13:30	07/26/18 17:17	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.059	ng/g	☼	07/16/18 13:30	07/26/18 17:17	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.027	ng/g	☼	07/16/18 13:30	07/26/18 17:17	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.034	ng/g	☼	07/16/18 13:30	07/26/18 17:17	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.54	0.22	ng/g	☼	07/16/18 13:30	07/26/18 17:17	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	92		25 - 150	07/16/18 13:30	07/26/18 17:17	1
13C5 PFPeA	91		25 - 150	07/16/18 13:30	07/26/18 17:17	1
13C2 PFHxA	76		25 - 150	07/16/18 13:30	07/26/18 17:17	1
13C4-PFHxA	86		25 - 150	07/16/18 13:30	07/26/18 17:17	1
13C4 PFOA	87		25 - 150	07/16/18 13:30	07/26/18 17:17	1
13C5 PFNA	96		25 - 150	07/16/18 13:30	07/26/18 17:17	1
13C2 PFDA	105		25 - 150	07/16/18 13:30	07/26/18 17:17	1
13C2 PFUnA	105		25 - 150	07/16/18 13:30	07/26/18 17:17	1
13C2 PFDoA	93		25 - 150	07/16/18 13:30	07/26/18 17:17	1
13C2-PFTeDA	91		25 - 150	07/16/18 13:30	07/26/18 17:17	1
13C3-PFBS	77		25 - 150	07/16/18 13:30	07/26/18 17:17	1
18O2 PFHxS	86		25 - 150	07/16/18 13:30	07/26/18 17:17	1
13C4 PFOS	84		25 - 150	07/16/18 13:30	07/26/18 17:17	1
13C8 FOSA	75		25 - 150	07/16/18 13:30	07/26/18 17:17	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	8.3		0.1	0.1	%			07/12/18 16:45	1
Percent Solids	91.7		0.1	0.1	%			07/12/18 16:45	1

TestAmerica Sacramento

Client Sample Results

22

Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-7

Date Collected: 07/05/18 11:25

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-9

Matrix: Solid

Percent Solids: 88.9

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.33		0.22	0.031	ng/g	☼	07/16/18 13:30	07/26/18 17:25	1
Perfluoropentanoic acid (PFPeA)	0.23		0.22	0.086	ng/g	☼	07/16/18 13:30	07/26/18 17:25	1
Perfluorohexanoic acid (PFHxA)	0.33		0.22	0.047	ng/g	☼	07/16/18 13:30	07/26/18 17:25	1
Perfluoroheptanoic acid (PFHpA)	0.26		0.22	0.032	ng/g	☼	07/16/18 13:30	07/26/18 17:25	1
Perfluorooctanoic acid (PFOA)	2.7		0.22	0.096	ng/g	☼	07/16/18 13:30	07/26/18 17:25	1
Perfluorononanoic acid (PFNA)	0.28		0.22	0.040	ng/g	☼	07/16/18 13:30	07/26/18 17:25	1
Perfluorodecanoic acid (PFDA)	0.27		0.22	0.025	ng/g	☼	07/16/18 13:30	07/26/18 17:25	1
Perfluoroundecanoic acid (PFUnA)	0.20	J	0.22	0.040	ng/g	☼	07/16/18 13:30	07/26/18 17:25	1
Perfluorododecanoic acid (PFDoA)	0.12	J	0.22	0.075	ng/g	☼	07/16/18 13:30	07/26/18 17:25	1
Perfluorotridecanoic Acid (PFTriA)	0.060	J	0.22	0.057	ng/g	☼	07/16/18 13:30	07/26/18 17:25	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.060	ng/g	☼	07/16/18 13:30	07/26/18 17:25	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.028	ng/g	☼	07/16/18 13:30	07/26/18 17:25	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.035	ng/g	☼	07/16/18 13:30	07/26/18 17:25	1
Perfluorooctanesulfonic acid (PFOS)	0.43	J	0.56	0.22	ng/g	☼	07/16/18 13:30	07/26/18 17:25	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	87		25 - 150	07/16/18 13:30	07/26/18 17:25	1
13C5 PFPeA	93		25 - 150	07/16/18 13:30	07/26/18 17:25	1
13C2 PFHxA	77		25 - 150	07/16/18 13:30	07/26/18 17:25	1
13C4-PFHpA	89		25 - 150	07/16/18 13:30	07/26/18 17:25	1
13C4 PFOA	93		25 - 150	07/16/18 13:30	07/26/18 17:25	1
13C5 PFNA	104		25 - 150	07/16/18 13:30	07/26/18 17:25	1
13C2 PFDA	110		25 - 150	07/16/18 13:30	07/26/18 17:25	1
13C2 PFUnA	102		25 - 150	07/16/18 13:30	07/26/18 17:25	1
13C2 PFDoA	93		25 - 150	07/16/18 13:30	07/26/18 17:25	1
13C2-PFTeDA	89		25 - 150	07/16/18 13:30	07/26/18 17:25	1
13C3-PFBS	88		25 - 150	07/16/18 13:30	07/26/18 17:25	1
18O2 PFHxS	95		25 - 150	07/16/18 13:30	07/26/18 17:25	1
13C4 PFOS	92		25 - 150	07/16/18 13:30	07/26/18 17:25	1
13C8 FOSA	74		25 - 150	07/16/18 13:30	07/26/18 17:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11.1		0.1	0.1	%			07/12/18 16:45	1
Percent Solids	88.9		0.1	0.1	%			07/12/18 16:45	1

TestAmerica Sacramento

Client Sample Results

23

Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-8

Date Collected: 07/05/18 11:35

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-10

Matrix: Solid

Percent Solids: 79.1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.43		0.25	0.035	ng/g	☼	07/16/18 13:30	07/26/18 17:33	1
Perfluoropentanoic acid (PFPeA)	0.35		0.25	0.097	ng/g	☼	07/16/18 13:30	07/26/18 17:33	1
Perfluorohexanoic acid (PFHxA)	0.45		0.25	0.053	ng/g	☼	07/16/18 13:30	07/26/18 17:33	1
Perfluoroheptanoic acid (PFHpA)	0.35		0.25	0.036	ng/g	☼	07/16/18 13:30	07/26/18 17:33	1
Perfluorooctanoic acid (PFOA)	3.9		0.25	0.11	ng/g	☼	07/16/18 13:30	07/26/18 17:33	1
Perfluorononanoic acid (PFNA)	0.39		0.25	0.045	ng/g	☼	07/16/18 13:30	07/26/18 17:33	1
Perfluorodecanoic acid (PFDA)	0.26		0.25	0.028	ng/g	☼	07/16/18 13:30	07/26/18 17:33	1
Perfluoroundecanoic acid (PFUnA)	0.21	J	0.25	0.045	ng/g	☼	07/16/18 13:30	07/26/18 17:33	1
Perfluorododecanoic acid (PFDoA)	0.17	J	0.25	0.084	ng/g	☼	07/16/18 13:30	07/26/18 17:33	1
Perfluorotridecanoic Acid (PFTriA)	0.079	J	0.25	0.064	ng/g	☼	07/16/18 13:30	07/26/18 17:33	1
Perfluorotetradecanoic acid (PFTeA)	0.077	J	0.25	0.068	ng/g	☼	07/16/18 13:30	07/26/18 17:33	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.25	0.031	ng/g	☼	07/16/18 13:30	07/26/18 17:33	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.25	0.039	ng/g	☼	07/16/18 13:30	07/26/18 17:33	1
Perfluorooctanesulfonic acid (PFOS)	0.60	J	0.63	0.25	ng/g	☼	07/16/18 13:30	07/26/18 17:33	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	87		25 - 150	07/16/18 13:30	07/26/18 17:33	1
13C5 PFPeA	89		25 - 150	07/16/18 13:30	07/26/18 17:33	1
13C2 PFHxA	74		25 - 150	07/16/18 13:30	07/26/18 17:33	1
13C4-PFHpA	93		25 - 150	07/16/18 13:30	07/26/18 17:33	1
13C4 PFOA	93		25 - 150	07/16/18 13:30	07/26/18 17:33	1
13C5 PFNA	95		25 - 150	07/16/18 13:30	07/26/18 17:33	1
13C2 PFDA	108		25 - 150	07/16/18 13:30	07/26/18 17:33	1
13C2 PFUnA	106		25 - 150	07/16/18 13:30	07/26/18 17:33	1
13C2 PFDoA	95		25 - 150	07/16/18 13:30	07/26/18 17:33	1
13C2-PFTeDA	90		25 - 150	07/16/18 13:30	07/26/18 17:33	1
13C3-PFBS	88		25 - 150	07/16/18 13:30	07/26/18 17:33	1
18O2 PFHxS	92		25 - 150	07/16/18 13:30	07/26/18 17:33	1
13C4 PFOS	89		25 - 150	07/16/18 13:30	07/26/18 17:33	1
13C8 FOSA	75		25 - 150	07/16/18 13:30	07/26/18 17:33	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	20.9		0.1	0.1	%			07/12/18 16:45	1
Percent Solids	79.1		0.1	0.1	%			07/12/18 16:45	1

TestAmerica Sacramento

Client Sample Results

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-9

Date Collected: 07/05/18 11:45

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-11

Matrix: Solid

Percent Solids: 83.8

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.36		0.23	0.033	ng/g	☼	07/16/18 13:30	07/26/18 17:40	1
Perfluoropentanoic acid (PFPeA)	0.30		0.23	0.090	ng/g	☼	07/16/18 13:30	07/26/18 17:40	1
Perfluorohexanoic acid (PFHxA)	0.30		0.23	0.049	ng/g	☼	07/16/18 13:30	07/26/18 17:40	1
Perfluoroheptanoic acid (PFHpA)	0.19	J	0.23	0.034	ng/g	☼	07/16/18 13:30	07/26/18 17:40	1
Perfluorooctanoic acid (PFOA)	2.0		0.23	0.10	ng/g	☼	07/16/18 13:30	07/26/18 17:40	1
Perfluorononanoic acid (PFNA)	0.32		0.23	0.042	ng/g	☼	07/16/18 13:30	07/26/18 17:40	1
Perfluorodecanoic acid (PFDA)	0.31		0.23	0.026	ng/g	☼	07/16/18 13:30	07/26/18 17:40	1
Perfluoroundecanoic acid (PFUnA)	0.21	J	0.23	0.042	ng/g	☼	07/16/18 13:30	07/26/18 17:40	1
Perfluorododecanoic acid (PFDoA)	0.11	J	0.23	0.079	ng/g	☼	07/16/18 13:30	07/26/18 17:40	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.23	0.060	ng/g	☼	07/16/18 13:30	07/26/18 17:40	1
Perfluorotetradecanoic acid (PFTeA)	0.069	J	0.23	0.063	ng/g	☼	07/16/18 13:30	07/26/18 17:40	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.029	ng/g	☼	07/16/18 13:30	07/26/18 17:40	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23	0.036	ng/g	☼	07/16/18 13:30	07/26/18 17:40	1
Perfluorooctanesulfonic acid (PFOS)	0.42	J	0.59	0.23	ng/g	☼	07/16/18 13:30	07/26/18 17:40	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	79		25 - 150				07/16/18 13:30	07/26/18 17:40	1
13C5 PFPeA	87		25 - 150				07/16/18 13:30	07/26/18 17:40	1
13C2 PFHxA	66		25 - 150				07/16/18 13:30	07/26/18 17:40	1
13C4-PFHpA	83		25 - 150				07/16/18 13:30	07/26/18 17:40	1
13C4 PFOA	89		25 - 150				07/16/18 13:30	07/26/18 17:40	1
13C5 PFNA	91		25 - 150				07/16/18 13:30	07/26/18 17:40	1
13C2 PFDA	98		25 - 150				07/16/18 13:30	07/26/18 17:40	1
13C2 PFUnA	94		25 - 150				07/16/18 13:30	07/26/18 17:40	1
13C2 PFDoA	92		25 - 150				07/16/18 13:30	07/26/18 17:40	1
13C2-PFTeDA	81		25 - 150				07/16/18 13:30	07/26/18 17:40	1
13C3-PFBS	86		25 - 150				07/16/18 13:30	07/26/18 17:40	1
18O2 PFHxS	92		25 - 150				07/16/18 13:30	07/26/18 17:40	1
13C4 PFOS	87		25 - 150				07/16/18 13:30	07/26/18 17:40	1
13C8 FOSA	69		25 - 150				07/16/18 13:30	07/26/18 17:40	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	16.2		0.1	0.1	%			07/12/18 16:45	1
Percent Solids	83.8		0.1	0.1	%			07/12/18 16:45	1

TestAmerica Sacramento

Client Sample Results

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-10

Date Collected: 07/05/18 11:55

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-12

Matrix: Solid

Percent Solids: 70.2

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.29		0.28	0.040	ng/g	☼	07/16/18 13:30	07/26/18 17:48	1
Perfluoropentanoic acid (PFPeA)	0.11	J	0.28	0.11	ng/g	☼	07/16/18 13:30	07/26/18 17:48	1
Perfluorohexanoic acid (PFHxA)	ND		0.28	0.060	ng/g	☼	07/16/18 13:30	07/26/18 17:48	1
Perfluoroheptanoic acid (PFHpA)	0.098	J	0.28	0.041	ng/g	☼	07/16/18 13:30	07/26/18 17:48	1
Perfluorooctanoic acid (PFOA)	0.67		0.28	0.12	ng/g	☼	07/16/18 13:30	07/26/18 17:48	1
Perfluorononanoic acid (PFNA)	0.22	J	0.28	0.051	ng/g	☼	07/16/18 13:30	07/26/18 17:48	1
Perfluorodecanoic acid (PFDA)	0.32		0.28	0.031	ng/g	☼	07/16/18 13:30	07/26/18 17:48	1
Perfluoroundecanoic acid (PFUnA)	0.27	J	0.28	0.051	ng/g	☼	07/16/18 13:30	07/26/18 17:48	1
Perfluorododecanoic acid (PFDoA)	0.14	J	0.28	0.095	ng/g	☼	07/16/18 13:30	07/26/18 17:48	1
Perfluorotridecanoic Acid (PFTriA)	0.10	J	0.28	0.073	ng/g	☼	07/16/18 13:30	07/26/18 17:48	1
Perfluorotetradecanoic acid (PFTeA)	0.097	J	0.28	0.077	ng/g	☼	07/16/18 13:30	07/26/18 17:48	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.28	0.036	ng/g	☼	07/16/18 13:30	07/26/18 17:48	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.28	0.044	ng/g	☼	07/16/18 13:30	07/26/18 17:48	1
Perfluorooctanesulfonic acid (PFOS)	0.42	J	0.71	0.28	ng/g	☼	07/16/18 13:30	07/26/18 17:48	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	69		25 - 150				07/16/18 13:30	07/26/18 17:48	1
13C5 PFPeA	83		25 - 150				07/16/18 13:30	07/26/18 17:48	1
13C2 PFHxA	78		25 - 150				07/16/18 13:30	07/26/18 17:48	1
13C4-PFHpA	89		25 - 150				07/16/18 13:30	07/26/18 17:48	1
13C4 PFOA	91		25 - 150				07/16/18 13:30	07/26/18 17:48	1
13C5 PFNA	97		25 - 150				07/16/18 13:30	07/26/18 17:48	1
13C2 PFDA	114		25 - 150				07/16/18 13:30	07/26/18 17:48	1
13C2 PFUnA	115		25 - 150				07/16/18 13:30	07/26/18 17:48	1
13C2 PFDoA	104		25 - 150				07/16/18 13:30	07/26/18 17:48	1
13C2-PFTeDA	98		25 - 150				07/16/18 13:30	07/26/18 17:48	1
13C3-PFBS	112		25 - 150				07/16/18 13:30	07/26/18 17:48	1
18O2 PFHxS	102		25 - 150				07/16/18 13:30	07/26/18 17:48	1
13C4 PFOS	104		25 - 150				07/16/18 13:30	07/26/18 17:48	1
13C8 FOSA	76		25 - 150				07/16/18 13:30	07/26/18 17:48	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	29.8		0.1	0.1	%			07/12/18 16:45	1
Percent Solids	70.2		0.1	0.1	%			07/12/18 16:45	1

TestAmerica Sacramento

Client Sample Results

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-11

Date Collected: 07/05/18 12:05

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-13

Matrix: Solid

Percent Solids: 70.2

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.55		0.28	0.040	ng/g	☼	07/16/18 13:30	07/26/18 17:56	1
Perfluoropentanoic acid (PFPeA)	0.36		0.28	0.11	ng/g	☼	07/16/18 13:30	07/26/18 17:56	1
Perfluorohexanoic acid (PFHxA)	0.72		0.28	0.060	ng/g	☼	07/16/18 13:30	07/26/18 17:56	1
Perfluoroheptanoic acid (PFHpA)	0.81		0.28	0.041	ng/g	☼	07/16/18 13:30	07/26/18 17:56	1
Perfluorooctanoic acid (PFOA)	13		0.28	0.12	ng/g	☼	07/16/18 13:30	07/26/18 17:56	1
Perfluorononanoic acid (PFNA)	0.39		0.28	0.051	ng/g	☼	07/16/18 13:30	07/26/18 17:56	1
Perfluorodecanoic acid (PFDA)	0.40		0.28	0.031	ng/g	☼	07/16/18 13:30	07/26/18 17:56	1
Perfluoroundecanoic acid (PFUnA)	0.26	J	0.28	0.051	ng/g	☼	07/16/18 13:30	07/26/18 17:56	1
Perfluorododecanoic acid (PFDoA)	0.15	J	0.28	0.095	ng/g	☼	07/16/18 13:30	07/26/18 17:56	1
Perfluorotridecanoic Acid (PFTriA)	0.085	J	0.28	0.072	ng/g	☼	07/16/18 13:30	07/26/18 17:56	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.28	0.077	ng/g	☼	07/16/18 13:30	07/26/18 17:56	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.28	0.035	ng/g	☼	07/16/18 13:30	07/26/18 17:56	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.28	0.044	ng/g	☼	07/16/18 13:30	07/26/18 17:56	1
Perfluorooctanesulfonic acid (PFOS)	0.73		0.71	0.28	ng/g	☼	07/16/18 13:30	07/26/18 17:56	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	87		25 - 150				07/16/18 13:30	07/26/18 17:56	1
13C5 PFPeA	97		25 - 150				07/16/18 13:30	07/26/18 17:56	1
13C2 PFHxA	84		25 - 150				07/16/18 13:30	07/26/18 17:56	1
13C4-PFHpA	93		25 - 150				07/16/18 13:30	07/26/18 17:56	1
13C4 PFOA	92		25 - 150				07/16/18 13:30	07/26/18 17:56	1
13C5 PFNA	102		25 - 150				07/16/18 13:30	07/26/18 17:56	1
13C2 PFDA	110		25 - 150				07/16/18 13:30	07/26/18 17:56	1
13C2 PFUnA	102		25 - 150				07/16/18 13:30	07/26/18 17:56	1
13C2 PFDoA	96		25 - 150				07/16/18 13:30	07/26/18 17:56	1
13C2-PFTeDA	93		25 - 150				07/16/18 13:30	07/26/18 17:56	1
13C3-PFBS	90		25 - 150				07/16/18 13:30	07/26/18 17:56	1
18O2 PFHxS	97		25 - 150				07/16/18 13:30	07/26/18 17:56	1
13C4 PFOS	97		25 - 150				07/16/18 13:30	07/26/18 17:56	1
13C8 FOSA	72		25 - 150				07/16/18 13:30	07/26/18 17:56	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	29.8		0.1	0.1	%			07/12/18 16:45	1
Percent Solids	70.2		0.1	0.1	%			07/12/18 16:45	1

TestAmerica Sacramento

Client Sample Results

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-13

Date Collected: 07/05/18 12:15

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-14

Matrix: Solid

Percent Solids: 87.2

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.30		0.22	0.031	ng/g	☼	07/16/18 13:30	07/26/18 18:04	1
Perfluoropentanoic acid (PFPeA)	0.12	J	0.22	0.087	ng/g	☼	07/16/18 13:30	07/26/18 18:04	1
Perfluorohexanoic acid (PFHxA)	0.16	J	0.22	0.047	ng/g	☼	07/16/18 13:30	07/26/18 18:04	1
Perfluoroheptanoic acid (PFHpA)	0.16	J	0.22	0.033	ng/g	☼	07/16/18 13:30	07/26/18 18:04	1
Perfluorooctanoic acid (PFOA)	1.6		0.22	0.097	ng/g	☼	07/16/18 13:30	07/26/18 18:04	1
Perfluorononanoic acid (PFNA)	0.21	J	0.22	0.040	ng/g	☼	07/16/18 13:30	07/26/18 18:04	1
Perfluorodecanoic acid (PFDA)	0.30		0.22	0.025	ng/g	☼	07/16/18 13:30	07/26/18 18:04	1
Perfluoroundecanoic acid (PFUnA)	0.24		0.22	0.040	ng/g	☼	07/16/18 13:30	07/26/18 18:04	1
Perfluorododecanoic acid (PFDoA)	0.15	J	0.22	0.075	ng/g	☼	07/16/18 13:30	07/26/18 18:04	1
Perfluorotridecanoic Acid (PFTriA)	0.096	J	0.22	0.057	ng/g	☼	07/16/18 13:30	07/26/18 18:04	1
Perfluorotetradecanoic acid (PFTeA)	0.073	J	0.22	0.061	ng/g	☼	07/16/18 13:30	07/26/18 18:04	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.028	ng/g	☼	07/16/18 13:30	07/26/18 18:04	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.035	ng/g	☼	07/16/18 13:30	07/26/18 18:04	1
Perfluorooctanesulfonic acid (PFOS)	0.41	J	0.56	0.22	ng/g	☼	07/16/18 13:30	07/26/18 18:04	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	74		25 - 150	07/16/18 13:30	07/26/18 18:04	1
13C5 PFPeA	84		25 - 150	07/16/18 13:30	07/26/18 18:04	1
13C2 PFHxA	82		25 - 150	07/16/18 13:30	07/26/18 18:04	1
13C4-PFHpA	89		25 - 150	07/16/18 13:30	07/26/18 18:04	1
13C4 PFOA	91		25 - 150	07/16/18 13:30	07/26/18 18:04	1
13C5 PFNA	88		25 - 150	07/16/18 13:30	07/26/18 18:04	1
13C2 PFDA	111		25 - 150	07/16/18 13:30	07/26/18 18:04	1
13C2 PFUnA	112		25 - 150	07/16/18 13:30	07/26/18 18:04	1
13C2 PFDoA	85		25 - 150	07/16/18 13:30	07/26/18 18:04	1
13C2-PFTeDA	91		25 - 150	07/16/18 13:30	07/26/18 18:04	1
13C3-PFBS	102		25 - 150	07/16/18 13:30	07/26/18 18:04	1
18O2 PFHxS	99		25 - 150	07/16/18 13:30	07/26/18 18:04	1
13C4 PFOS	85		25 - 150	07/16/18 13:30	07/26/18 18:04	1
13C8 FOSA	74		25 - 150	07/16/18 13:30	07/26/18 18:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12.8		0.1	0.1	%			07/12/18 16:45	1
Percent Solids	87.2		0.1	0.1	%			07/12/18 16:45	1

TestAmerica Sacramento

Client Sample Results

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-12S

Date Collected: 07/05/18 12:30

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-15

Matrix: Solid

Percent Solids: 91.8

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.39		0.22	0.031	ng/g	☼	07/16/18 13:30	07/26/18 18:12	1
Perfluoropentanoic acid (PFPeA)	0.21	J	0.22	0.084	ng/g	☼	07/16/18 13:30	07/26/18 18:12	1
Perfluorohexanoic acid (PFHxA)	0.23		0.22	0.046	ng/g	☼	07/16/18 13:30	07/26/18 18:12	1
Perfluoroheptanoic acid (PFHpA)	0.20	J	0.22	0.032	ng/g	☼	07/16/18 13:30	07/26/18 18:12	1
Perfluorooctanoic acid (PFOA)	2.3		0.22	0.094	ng/g	☼	07/16/18 13:30	07/26/18 18:12	1
Perfluorononanoic acid (PFNA)	0.21	J	0.22	0.039	ng/g	☼	07/16/18 13:30	07/26/18 18:12	1
Perfluorodecanoic acid (PFDA)	0.27		0.22	0.024	ng/g	☼	07/16/18 13:30	07/26/18 18:12	1
Perfluoroundecanoic acid (PFUnA)	0.30		0.22	0.039	ng/g	☼	07/16/18 13:30	07/26/18 18:12	1
Perfluorododecanoic acid (PFDoA)	0.17	J	0.22	0.073	ng/g	☼	07/16/18 13:30	07/26/18 18:12	1
Perfluorotridecanoic Acid (PFTriA)	0.11	J	0.22	0.056	ng/g	☼	07/16/18 13:30	07/26/18 18:12	1
Perfluorotetradecanoic acid (PFTeA)	0.10	J	0.22	0.059	ng/g	☼	07/16/18 13:30	07/26/18 18:12	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.027	ng/g	☼	07/16/18 13:30	07/26/18 18:12	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.034	ng/g	☼	07/16/18 13:30	07/26/18 18:12	1
Perfluorooctanesulfonic acid (PFOS)	0.43	J	0.54	0.22	ng/g	☼	07/16/18 13:30	07/26/18 18:12	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	73		25 - 150	07/16/18 13:30	07/26/18 18:12	1
13C5 PFPeA	89		25 - 150	07/16/18 13:30	07/26/18 18:12	1
13C2 PFHxA	69		25 - 150	07/16/18 13:30	07/26/18 18:12	1
13C4-PFHpA	100		25 - 150	07/16/18 13:30	07/26/18 18:12	1
13C4 PFOA	90		25 - 150	07/16/18 13:30	07/26/18 18:12	1
13C5 PFNA	103		25 - 150	07/16/18 13:30	07/26/18 18:12	1
13C2 PFDA	116		25 - 150	07/16/18 13:30	07/26/18 18:12	1
13C2 PFUnA	116		25 - 150	07/16/18 13:30	07/26/18 18:12	1
13C2 PFDoA	106		25 - 150	07/16/18 13:30	07/26/18 18:12	1
13C2-PFTeDA	101		25 - 150	07/16/18 13:30	07/26/18 18:12	1
13C3-PFBS	99		25 - 150	07/16/18 13:30	07/26/18 18:12	1
18O2 PFHxS	105		25 - 150	07/16/18 13:30	07/26/18 18:12	1
13C4 PFOS	108		25 - 150	07/16/18 13:30	07/26/18 18:12	1
13C8 FOSA	79		25 - 150	07/16/18 13:30	07/26/18 18:12	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	8.2		0.1	0.1	%			07/12/18 16:45	1
Percent Solids	91.8		0.1	0.1	%			07/12/18 16:45	1
Total Organic Carbon	25000	^	1000	380	mg/Kg			07/17/18 14:07	1

TestAmerica Sacramento

Client Sample Results

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-12D

Date Collected: 07/05/18 13:05

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-16

Matrix: Solid

Percent Solids: 83.1

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.088	J	0.24	0.033	ng/g	☼	07/16/18 13:30	07/26/18 18:20	1
Perfluoropentanoic acid (PFPeA)	0.11	J	0.24	0.092	ng/g	☼	07/16/18 13:30	07/26/18 18:20	1
Perfluorohexanoic acid (PFHxA)	0.14	J	0.24	0.050	ng/g	☼	07/16/18 13:30	07/26/18 18:20	1
Perfluoroheptanoic acid (PFHpA)	0.088	J	0.24	0.034	ng/g	☼	07/16/18 13:30	07/26/18 18:20	1
Perfluorooctanoic acid (PFOA)	1.3		0.24	0.10	ng/g	☼	07/16/18 13:30	07/26/18 18:20	1
Perfluorononanoic acid (PFNA)	0.049	J	0.24	0.043	ng/g	☼	07/16/18 13:30	07/26/18 18:20	1
Perfluorodecanoic acid (PFDA)	0.046	J	0.24	0.026	ng/g	☼	07/16/18 13:30	07/26/18 18:20	1
Perfluoroundecanoic acid (PFUnA)	0.050	J	0.24	0.043	ng/g	☼	07/16/18 13:30	07/26/18 18:20	1
Perfluorododecanoic acid (PFDoA)	ND		0.24	0.080	ng/g	☼	07/16/18 13:30	07/26/18 18:20	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.24	0.061	ng/g	☼	07/16/18 13:30	07/26/18 18:20	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.24	0.064	ng/g	☼	07/16/18 13:30	07/26/18 18:20	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.24	0.030	ng/g	☼	07/16/18 13:30	07/26/18 18:20	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.24	0.037	ng/g	☼	07/16/18 13:30	07/26/18 18:20	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.59	0.24	ng/g	☼	07/16/18 13:30	07/26/18 18:20	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	93		25 - 150				07/16/18 13:30	07/26/18 18:20	1
13C5 PFPeA	94		25 - 150				07/16/18 13:30	07/26/18 18:20	1
13C2 PFHxA	77		25 - 150				07/16/18 13:30	07/26/18 18:20	1
13C4-PFHpA	91		25 - 150				07/16/18 13:30	07/26/18 18:20	1
13C4 PFOA	94		25 - 150				07/16/18 13:30	07/26/18 18:20	1
13C5 PFNA	96		25 - 150				07/16/18 13:30	07/26/18 18:20	1
13C2 PFDA	110		25 - 150				07/16/18 13:30	07/26/18 18:20	1
13C2 PFUnA	103		25 - 150				07/16/18 13:30	07/26/18 18:20	1
13C2 PFDoA	94		25 - 150				07/16/18 13:30	07/26/18 18:20	1
13C2-PFTeDA	100		25 - 150				07/16/18 13:30	07/26/18 18:20	1
13C3-PFBS	82		25 - 150				07/16/18 13:30	07/26/18 18:20	1
18O2 PFHxS	90		25 - 150				07/16/18 13:30	07/26/18 18:20	1
13C4 PFOS	88		25 - 150				07/16/18 13:30	07/26/18 18:20	1
13C8 FOSA	82		25 - 150				07/16/18 13:30	07/26/18 18:20	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	16.9		0.1	0.1	%			07/12/18 16:45	1
Percent Solids	83.1		0.1	0.1	%			07/12/18 16:45	1
Total Organic Carbon	6000		1000	380	mg/Kg			07/18/18 16:22	1

TestAmerica Sacramento

Isotope Dilution Summary

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Solid

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	PFHpA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)
320-40943-2	SB-1	85	97	81	92	91	100	114	100
320-40943-2 MS	SB-1	75	91	80	88	89	94	106	103
320-40943-2 MSD	SB-1	83	91	83	90	90	95	100	93
320-40943-3	SB-2	90	97	87	90	90	100	111	104
320-40943-4	SB-3	70	78	62	84	84	85	99	86
320-40943-5	SB-4	76	84	66	84	89	92	106	101
320-40943-6	SB-5	85	92	81	87	88	95	109	102
320-40943-7	SB-6S	73	86	73	87	91	99	112	106
320-40943-8	SB-6D	92	91	76	86	87	96	105	105
320-40943-9	SB-7	87	93	77	89	93	104	110	102
320-40943-10	SB-8	87	89	74	93	93	95	108	106
320-40943-11	SB-9	79	87	66	83	89	91	98	94
320-40943-12	SB-10	69	83	78	89	91	97	114	115
320-40943-13	SB-11	87	97	84	93	92	102	110	102
320-40943-14	SB-13	74	84	82	89	91	88	111	112
320-40943-15	SB-12S	73	89	69	100	90	103	116	116
320-40943-16	SB-12D	93	94	77	91	94	96	110	103
LCS 320-234291/2-A	Lab Control Sample	99	95	90	96	98	98	99	97
MB 320-234291/1-A	Method Blank	96	94	90	96	94	99	100	99

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFDaA (25-150)	PFTDA (25-150)	3C3-PFB (25-150)	PFHxS (25-150)	PFOS (25-150)	PFOSA (25-150)
320-40943-2	SB-1	92	94	88	97	98	64
320-40943-2 MS	SB-1	85	87	88	90	95	73
320-40943-2 MSD	SB-1	83	80	86	92	92	68
320-40943-3	SB-2	90	80	90	95	96	73
320-40943-4	SB-3	81	73	80	89	84	65
320-40943-5	SB-4	94	84	87	92	93	75
320-40943-6	SB-5	89	84	86	96	97	76
320-40943-7	SB-6S	95	92	88	95	99	78
320-40943-8	SB-6D	93	91	77	86	84	75
320-40943-9	SB-7	93	89	88	95	92	74
320-40943-10	SB-8	95	90	88	92	89	75
320-40943-11	SB-9	92	81	86	92	87	69
320-40943-12	SB-10	104	98	112	102	104	76
320-40943-13	SB-11	96	93	90	97	97	72
320-40943-14	SB-13	85	91	102	99	85	74
320-40943-15	SB-12S	106	101	99	105	108	79
320-40943-16	SB-12D	94	100	82	90	88	82
LCS 320-234291/2-A	Lab Control Sample	94	101	92	100	97	83
MB 320-234291/1-A	Method Blank	92	99	91	94	92	81

Surrogate Legend

PFBA = 13C4 PFBA
PFPeA = 13C5 PFPeA
PFHxA = 13C2 PFHxA
PFHpA = 13C4-PFHpA
PFOA = 13C4 PFOA
PFNA = 13C5 PFNA

TestAmerica Sacramento

Isotope Dilution Summary

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

PFDA = 13C2 PFDA
PFUnA = 13C2 PFUnA
PFDoA = 13C2 PFDoA
PFTDA = 13C2-PFTeDA
13C3-PFBS = 13C3-PFBS
PFHxS = 18O2 PFHxS
PFOS = 13C4 PFOS
PFOSA = 13C8 FOSA

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

QC Sample Results

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-234291/1-A

Matrix: Solid

Analysis Batch: 236371

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 234291

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		0.20	0.028	ng/g		07/16/18 13:30	07/26/18 15:51	1
Perfluoropentanoic acid (PFPeA)	ND		0.20	0.077	ng/g		07/16/18 13:30	07/26/18 15:51	1
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.042	ng/g		07/16/18 13:30	07/26/18 15:51	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.029	ng/g		07/16/18 13:30	07/26/18 15:51	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.086	ng/g		07/16/18 13:30	07/26/18 15:51	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.036	ng/g		07/16/18 13:30	07/26/18 15:51	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.022	ng/g		07/16/18 13:30	07/26/18 15:51	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.036	ng/g		07/16/18 13:30	07/26/18 15:51	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.067	ng/g		07/16/18 13:30	07/26/18 15:51	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.20	0.051	ng/g		07/16/18 13:30	07/26/18 15:51	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.054	ng/g		07/16/18 13:30	07/26/18 15:51	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.025	ng/g		07/16/18 13:30	07/26/18 15:51	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.031	ng/g		07/16/18 13:30	07/26/18 15:51	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.50	0.20	ng/g		07/16/18 13:30	07/26/18 15:51	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	96		25 - 150	07/16/18 13:30	07/26/18 15:51	1
13C5 PFPeA	94		25 - 150	07/16/18 13:30	07/26/18 15:51	1
13C2 PFHxA	90		25 - 150	07/16/18 13:30	07/26/18 15:51	1
13C4-PFHpA	96		25 - 150	07/16/18 13:30	07/26/18 15:51	1
13C4 PFOA	94		25 - 150	07/16/18 13:30	07/26/18 15:51	1
13C5 PFNA	99		25 - 150	07/16/18 13:30	07/26/18 15:51	1
13C2 PFDA	100		25 - 150	07/16/18 13:30	07/26/18 15:51	1
13C2 PFUnA	99		25 - 150	07/16/18 13:30	07/26/18 15:51	1
13C2 PFDoA	92		25 - 150	07/16/18 13:30	07/26/18 15:51	1
13C2-PFTeDA	99		25 - 150	07/16/18 13:30	07/26/18 15:51	1
13C3-PFBS	91		25 - 150	07/16/18 13:30	07/26/18 15:51	1
18O2 PFHxS	94		25 - 150	07/16/18 13:30	07/26/18 15:51	1
13C4 PFOS	92		25 - 150	07/16/18 13:30	07/26/18 15:51	1
13C8 FOSA	81		25 - 150	07/16/18 13:30	07/26/18 15:51	1

Lab Sample ID: LCS 320-234291/2-A

Matrix: Solid

Analysis Batch: 236371

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 234291

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	2.00	1.86		ng/g		93	81 - 133
Perfluoropentanoic acid (PFPeA)	2.00	1.88		ng/g		94	79 - 120
Perfluorohexanoic acid (PFHxA)	2.00	1.95		ng/g		98	75 - 125
Perfluoroheptanoic acid (PFHpA)	2.00	1.92		ng/g		96	76 - 124
Perfluorooctanoic acid (PFOA)	2.00	1.73		ng/g		86	76 - 121
Perfluorononanoic acid (PFNA)	2.00	1.83		ng/g		91	74 - 126
Perfluorodecanoic acid (PFDA)	2.00	1.96		ng/g		98	74 - 124
Perfluoroundecanoic acid (PFUnA)	2.00	1.84		ng/g		92	74 - 114
Perfluorododecanoic acid (PFDoA)	2.00	1.87		ng/g		94	75 - 123
Perfluorotridecanoic Acid (PFTriA)	2.00	1.90		ng/g		95	43 - 116

TestAmerica Sacramento

QC Sample Results

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-234291/2-A

Matrix: Solid

Analysis Batch: 236371

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 234291

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorotetradecanoic acid (PFTeA)	2.00	1.90		ng/g		95	22 - 129
Perfluorobutanesulfonic acid (PFBS)	1.77	1.75		ng/g		99	73 - 142
Perfluorohexanesulfonic acid (PFHxS)	1.82	1.57		ng/g		86	75 - 121
Perfluorooctanesulfonic acid (PFOS)	1.86	1.96		ng/g		106	69 - 131
Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits				
13C4 PFBA	99		25 - 150				
13C5 PFPeA	95		25 - 150				
13C2 PFHxA	90		25 - 150				
13C4-PFHpA	96		25 - 150				
13C4 PFOA	98		25 - 150				
13C5 PFNA	98		25 - 150				
13C2 PFDA	99		25 - 150				
13C2 PFUnA	97		25 - 150				
13C2 PFDoA	94		25 - 150				
13C2-PFTeDA	101		25 - 150				
13C3-PFBS	92		25 - 150				
18O2 PFHxS	100		25 - 150				
13C4 PFOS	97		25 - 150				
13C8 FOSA	83		25 - 150				

Lab Sample ID: 320-40943-2 MS

Matrix: Solid

Analysis Batch: 236371

Client Sample ID: SB-1

Prep Type: Total/NA

Prep Batch: 234291

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	0.48		2.41	2.93		ng/g	☼	102	81 - 133
Perfluoropentanoic acid (PFPeA)	0.35		2.41	2.57		ng/g	☼	93	79 - 120
Perfluorohexanoic acid (PFHxA)	0.49		2.41	2.68		ng/g	☼	91	75 - 125
Perfluoroheptanoic acid (PFHpA)	0.42		2.41	2.66		ng/g	☼	93	76 - 124
Perfluorooctanoic acid (PFOA)	9.3	F1	2.41	11.2		ng/g	☼	79	76 - 121
Perfluorononanoic acid (PFNA)	0.46		2.41	2.56		ng/g	☼	87	74 - 126
Perfluorodecanoic acid (PFDA)	0.29		2.41	2.50		ng/g	☼	92	74 - 124
Perfluoroundecanoic acid (PFUnA)	0.33		2.41	2.26		ng/g	☼	80	74 - 114
Perfluorododecanoic acid (PFDoA)	0.18	J	2.41	2.49		ng/g	☼	96	75 - 123
Perfluorotridecanoic Acid (PFTriA)	0.14	J	2.41	2.65		ng/g	☼	104	43 - 116
Perfluorotetradecanoic acid (PFTeA)	0.12	J	2.41	2.33		ng/g	☼	92	22 - 129
Perfluorobutanesulfonic acid (PFBS)	ND		2.13	2.05		ng/g	☼	97	73 - 142
Perfluorohexanesulfonic acid (PFHxS)	0.037	J	2.19	1.94		ng/g	☼	88	75 - 121
Perfluorooctanesulfonic acid (PFOS)	0.70		2.23	2.71		ng/g	☼	90	69 - 131

TestAmerica Sacramento

QC Sample Results

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

<i>Isotope Dilution</i>	<i>MS %Recovery</i>	<i>MS Qualifier</i>	<i>Limits</i>
13C4 PFBA	75		25 - 150
13C5 PFPeA	91		25 - 150
13C2 PFHxA	80		25 - 150
13C4-PFHpA	88		25 - 150
13C4 PFOA	89		25 - 150
13C5 PFNA	94		25 - 150
13C2 PFDA	106		25 - 150
13C2 PFUnA	103		25 - 150
13C2 PFDoA	85		25 - 150
13C2-PFTeDA	87		25 - 150
13C3-PFBS	88		25 - 150
18O2 PFHxS	90		25 - 150
13C4 PFOS	95		25 - 150
13C8 FOSA	73		25 - 150

Lab Sample ID: 320-40943-2 MSD
Matrix: Solid
Analysis Batch: 236371

Client Sample ID: SB-1
Prep Type: Total/NA
Prep Batch: 234291

<i>Analyte</i>	<i>Sample Result</i>	<i>Sample Qualifier</i>	<i>Spike Added</i>	<i>MSD Result</i>	<i>MSD Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec. Limits</i>	<i>RPD</i>	<i>RPD Limit</i>
Perfluorobutanoic acid (PFBA)	0.48		2.41	3.63		ng/g	☼	130	81 - 133	21	30
Perfluoropentanoic acid (PFPeA)	0.35		2.41	2.52		ng/g	☼	90	79 - 120	2	30
Perfluorohexanoic acid (PFHxA)	0.49		2.41	2.50		ng/g	☼	83	75 - 125	7	30
Perfluoroheptanoic acid (PFHpA)	0.42		2.41	2.76		ng/g	☼	97	76 - 124	4	30
Perfluorooctanoic acid (PFOA)	9.3	F1	2.42	10.8	F1	ng/g	☼	64	76 - 121	3	30
Perfluorononanoic acid (PFNA)	0.46		2.41	2.59		ng/g	☼	88	74 - 126	1	30
Perfluorodecanoic acid (PFDA)	0.29		2.41	2.67		ng/g	☼	99	74 - 124	7	30
Perfluoroundecanoic acid (PFUnA)	0.33		2.41	2.48		ng/g	☼	89	74 - 114	9	30
Perfluorododecanoic acid (PFDoA)	0.18	J	2.41	2.42		ng/g	☼	93	75 - 123	3	30
Perfluorotridecanoic Acid (PFTriA)	0.14	J	2.41	2.20		ng/g	☼	85	43 - 116	18	30
Perfluorotetradecanoic acid (PFTeA)	0.12	J	2.41	2.61		ng/g	☼	103	22 - 129	11	30
Perfluorobutanesulfonic acid (PFBS)	ND		2.13	2.07		ng/g	☼	97	73 - 142	1	30
Perfluorohexanesulfonic acid (PFHxS)	0.037	J	2.20	1.95		ng/g	☼	89	75 - 121	1	30
Perfluorooctanesulfonic acid (PFOS)	0.70		2.24	2.89		ng/g	☼	98	69 - 131	6	30

<i>Isotope Dilution</i>	<i>MSD %Recovery</i>	<i>MSD Qualifier</i>	<i>Limits</i>
13C4 PFBA	83		25 - 150
13C5 PFPeA	91		25 - 150
13C2 PFHxA	83		25 - 150
13C4-PFHpA	90		25 - 150
13C4 PFOA	90		25 - 150
13C5 PFNA	95		25 - 150
13C2 PFDA	100		25 - 150
13C2 PFUnA	93		25 - 150
13C2 PFDoA	83		25 - 150
13C2-PFTeDA	80		25 - 150
13C3-PFBS	86		25 - 150
18O2 PFHxS	92		25 - 150
13C4 PFOS	92		25 - 150

TestAmerica Sacramento

QC Sample Results

35

Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: 320-40943-2 MSD
Matrix: Solid
Analysis Batch: 236371

Client Sample ID: SB-1
Prep Type: Total/NA
Prep Batch: 234291

Isotope Dilution	MSD %Recovery	MSD Qualifier	Limits
¹³ C8 FOA	68		25 - 150

Method: D 2216 - Percent Moisture

Lab Sample ID: 320-40943-2 DU
Matrix: Solid
Analysis Batch: 233737

Client Sample ID: SB-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Percent Moisture	18.0		17.3		%		4	20
Percent Solids	82.0		82.7		%		0.8	20

Method: Lloyd Kahn - Organic Carbon, Total (TOC)

Lab Sample ID: MB 200-131891/5
Matrix: Solid
Analysis Batch: 131891

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	ND		1000	380	mg/Kg			07/17/18 13:16	1

Lab Sample ID: LCS 200-131891/6
Matrix: Solid
Analysis Batch: 131891

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	9260	8810		mg/Kg		95	75 - 125

Lab Sample ID: MB 200-131953/5
Matrix: Solid
Analysis Batch: 131953

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	ND		1000	380	mg/Kg			07/18/18 15:44	1

Lab Sample ID: LCS 200-131953/6
Matrix: Solid
Analysis Batch: 131953

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	9260	9330		mg/Kg		101	75 - 125

QC Association Summary

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

LCMS

Prep Batch: 234291

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40943-2	SB-1	Total/NA	Solid	SHAKE	
320-40943-3	SB-2	Total/NA	Solid	SHAKE	
320-40943-4	SB-3	Total/NA	Solid	SHAKE	
320-40943-5	SB-4	Total/NA	Solid	SHAKE	
320-40943-6	SB-5	Total/NA	Solid	SHAKE	
320-40943-7	SB-6S	Total/NA	Solid	SHAKE	
320-40943-8	SB-6D	Total/NA	Solid	SHAKE	
320-40943-9	SB-7	Total/NA	Solid	SHAKE	
320-40943-10	SB-8	Total/NA	Solid	SHAKE	
320-40943-11	SB-9	Total/NA	Solid	SHAKE	
320-40943-12	SB-10	Total/NA	Solid	SHAKE	
320-40943-13	SB-11	Total/NA	Solid	SHAKE	
320-40943-14	SB-13	Total/NA	Solid	SHAKE	
320-40943-15	SB-12S	Total/NA	Solid	SHAKE	
320-40943-16	SB-12D	Total/NA	Solid	SHAKE	
MB 320-234291/1-A	Method Blank	Total/NA	Solid	SHAKE	
LCS 320-234291/2-A	Lab Control Sample	Total/NA	Solid	SHAKE	
320-40943-2 MS	SB-1	Total/NA	Solid	SHAKE	
320-40943-2 MSD	SB-1	Total/NA	Solid	SHAKE	

Analysis Batch: 236371

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40943-2	SB-1	Total/NA	Solid	537 (modified)	234291
320-40943-3	SB-2	Total/NA	Solid	537 (modified)	234291
320-40943-4	SB-3	Total/NA	Solid	537 (modified)	234291
320-40943-5	SB-4	Total/NA	Solid	537 (modified)	234291
320-40943-6	SB-5	Total/NA	Solid	537 (modified)	234291
320-40943-7	SB-6S	Total/NA	Solid	537 (modified)	234291
320-40943-8	SB-6D	Total/NA	Solid	537 (modified)	234291
320-40943-9	SB-7	Total/NA	Solid	537 (modified)	234291
320-40943-10	SB-8	Total/NA	Solid	537 (modified)	234291
320-40943-11	SB-9	Total/NA	Solid	537 (modified)	234291
320-40943-12	SB-10	Total/NA	Solid	537 (modified)	234291
320-40943-13	SB-11	Total/NA	Solid	537 (modified)	234291
320-40943-14	SB-13	Total/NA	Solid	537 (modified)	234291
320-40943-15	SB-12S	Total/NA	Solid	537 (modified)	234291
320-40943-16	SB-12D	Total/NA	Solid	537 (modified)	234291
MB 320-234291/1-A	Method Blank	Total/NA	Solid	537 (modified)	234291
LCS 320-234291/2-A	Lab Control Sample	Total/NA	Solid	537 (modified)	234291
320-40943-2 MS	SB-1	Total/NA	Solid	537 (modified)	234291
320-40943-2 MSD	SB-1	Total/NA	Solid	537 (modified)	234291

General Chemistry

Analysis Batch: 131891

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40943-4	SB-3	Total/NA	Solid	Lloyd Kahn	
320-40943-6	SB-5	Total/NA	Solid	Lloyd Kahn	
320-40943-15	SB-12S	Total/NA	Solid	Lloyd Kahn	
MB 200-131891/5	Method Blank	Total/NA	Solid	Lloyd Kahn	

TestAmerica Sacramento

QC Association Summary

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

General Chemistry (Continued)

Analysis Batch: 131891 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 200-131891/6	Lab Control Sample	Total/NA	Solid	Lloyd Kahn	

Analysis Batch: 131953

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40943-16	SB-12D	Total/NA	Solid	Lloyd Kahn	
MB 200-131953/5	Method Blank	Total/NA	Solid	Lloyd Kahn	
LCS 200-131953/6	Lab Control Sample	Total/NA	Solid	Lloyd Kahn	

Analysis Batch: 233737

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40943-2	SB-1	Total/NA	Solid	D 2216	
320-40943-3	SB-2	Total/NA	Solid	D 2216	
320-40943-4	SB-3	Total/NA	Solid	D 2216	
320-40943-5	SB-4	Total/NA	Solid	D 2216	
320-40943-6	SB-5	Total/NA	Solid	D 2216	
320-40943-7	SB-6S	Total/NA	Solid	D 2216	
320-40943-8	SB-6D	Total/NA	Solid	D 2216	
320-40943-9	SB-7	Total/NA	Solid	D 2216	
320-40943-10	SB-8	Total/NA	Solid	D 2216	
320-40943-11	SB-9	Total/NA	Solid	D 2216	
320-40943-12	SB-10	Total/NA	Solid	D 2216	
320-40943-13	SB-11	Total/NA	Solid	D 2216	
320-40943-14	SB-13	Total/NA	Solid	D 2216	
320-40943-15	SB-12S	Total/NA	Solid	D 2216	
320-40943-16	SB-12D	Total/NA	Solid	D 2216	
320-40943-2 DU	SB-1	Total/NA	Solid	D 2216	

Lab Chronicle

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-1

Date Collected: 07/05/18 09:30

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-2

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			233737	07/12/18 16:45	SSS	TAL SAC

Client Sample ID: SB-1

Date Collected: 07/05/18 09:30

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-2

Matrix: Solid

Percent Solids: 82.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.07 g	10.00 mL	234291	07/16/18 13:30	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			236371	07/26/18 16:07	S1M	TAL SAC

Client Sample ID: SB-2

Date Collected: 07/05/18 10:05

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-3

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			233737	07/12/18 16:45	SSS	TAL SAC

Client Sample ID: SB-2

Date Collected: 07/05/18 10:05

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-3

Matrix: Solid

Percent Solids: 69.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.00 g	10.00 mL	234291	07/16/18 13:30	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			236371	07/26/18 16:30	S1M	TAL SAC

Client Sample ID: SB-3

Date Collected: 07/05/18 10:15

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-4

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			233737	07/12/18 16:45	SSS	TAL SAC
Total/NA	Analysis	Lloyd Kahn		1			131891	07/17/18 13:54	MDK	TAL BUR

Client Sample ID: SB-3

Date Collected: 07/05/18 10:15

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-4

Matrix: Solid

Percent Solids: 63.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.10 g	10.00 mL	234291	07/16/18 13:30	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			236371	07/26/18 16:38	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-4

Date Collected: 07/05/18 10:25

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-5

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			233737	07/12/18 16:45	SSS	TAL SAC

Client Sample ID: SB-4

Date Collected: 07/05/18 10:25

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-5

Matrix: Solid

Percent Solids: 86.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.04 g	10.00 mL	234291	07/16/18 13:30	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			236371	07/26/18 16:46	S1M	TAL SAC

Client Sample ID: SB-5

Date Collected: 07/05/18 10:35

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-6

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			233737	07/12/18 16:45	SSS	TAL SAC
Total/NA	Analysis	Lloyd Kahn		1			131891	07/17/18 14:01	MDK	TAL BUR

Client Sample ID: SB-5

Date Collected: 07/05/18 10:35

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-6

Matrix: Solid

Percent Solids: 75.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.03 g	10.00 mL	234291	07/16/18 13:30	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			236371	07/26/18 16:53	S1M	TAL SAC

Client Sample ID: SB-6S

Date Collected: 07/05/18 10:45

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-7

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			233737	07/12/18 16:45	SSS	TAL SAC

Client Sample ID: SB-6S

Date Collected: 07/05/18 10:45

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-7

Matrix: Solid

Percent Solids: 83.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.10 g	10.00 mL	234291	07/16/18 13:30	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			236371	07/26/18 17:01	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-6D

Date Collected: 07/05/18 11:15

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-8

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			233737	07/12/18 16:45	SSS	TAL SAC

Client Sample ID: SB-6D

Date Collected: 07/05/18 11:15

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-8

Matrix: Solid

Percent Solids: 91.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.02 g	10.00 mL	234291	07/16/18 13:30	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			236371	07/26/18 17:17	S1M	TAL SAC

Client Sample ID: SB-7

Date Collected: 07/05/18 11:25

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-9

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			233737	07/12/18 16:45	SSS	TAL SAC

Client Sample ID: SB-7

Date Collected: 07/05/18 11:25

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-9

Matrix: Solid

Percent Solids: 88.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.02 g	10.00 mL	234291	07/16/18 13:30	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			236371	07/26/18 17:25	S1M	TAL SAC

Client Sample ID: SB-8

Date Collected: 07/05/18 11:35

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			233737	07/12/18 16:45	SSS	TAL SAC

Client Sample ID: SB-8

Date Collected: 07/05/18 11:35

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-10

Matrix: Solid

Percent Solids: 79.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.04 g	10.00 mL	234291	07/16/18 13:30	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			236371	07/26/18 17:33	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-9

Date Collected: 07/05/18 11:45

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-11

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			233737	07/12/18 16:45	SSS	TAL SAC

Client Sample ID: SB-9

Date Collected: 07/05/18 11:45

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-11

Matrix: Solid

Percent Solids: 83.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.08 g	10.00 mL	234291	07/16/18 13:30	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			236371	07/26/18 17:40	S1M	TAL SAC

Client Sample ID: SB-10

Date Collected: 07/05/18 11:55

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-12

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			233737	07/12/18 16:45	SSS	TAL SAC

Client Sample ID: SB-10

Date Collected: 07/05/18 11:55

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-12

Matrix: Solid

Percent Solids: 70.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.01 g	10.00 mL	234291	07/16/18 13:30	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			236371	07/26/18 17:48	S1M	TAL SAC

Client Sample ID: SB-11

Date Collected: 07/05/18 12:05

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-13

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			233737	07/12/18 16:45	SSS	TAL SAC

Client Sample ID: SB-11

Date Collected: 07/05/18 12:05

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-13

Matrix: Solid

Percent Solids: 70.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.02 g	10.00 mL	234291	07/16/18 13:30	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			236371	07/26/18 17:56	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Client Sample ID: SB-13

Date Collected: 07/05/18 12:15

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-14

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			233737	07/12/18 16:45	SSS	TAL SAC

Client Sample ID: SB-13

Date Collected: 07/05/18 12:15

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-14

Matrix: Solid

Percent Solids: 87.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.10 g	10.00 mL	234291	07/16/18 13:30	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			236371	07/26/18 18:04	S1M	TAL SAC

Client Sample ID: SB-12S

Date Collected: 07/05/18 12:30

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-15

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			233737	07/12/18 16:45	SSS	TAL SAC
Total/NA	Analysis	Lloyd Kahn		1			131891	07/17/18 14:07	MDK	TAL BUR

Client Sample ID: SB-12S

Date Collected: 07/05/18 12:30

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-15

Matrix: Solid

Percent Solids: 91.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.00 g	10.00 mL	234291	07/16/18 13:30	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			236371	07/26/18 18:12	S1M	TAL SAC

Client Sample ID: SB-12D

Date Collected: 07/05/18 13:05

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-16

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			233737	07/12/18 16:45	SSS	TAL SAC
Total/NA	Analysis	Lloyd Kahn		1			131953	07/18/18 16:22	MJZ	TAL BUR

Client Sample ID: SB-12D

Date Collected: 07/05/18 13:05

Date Received: 07/07/18 09:05

Lab Sample ID: 320-40943-16

Matrix: Solid

Percent Solids: 83.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.06 g	10.00 mL	234291	07/16/18 13:30	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			236371	07/26/18 18:20	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Laboratory References:

TAL BUR = TestAmerica Burlington, 30 Community Drive, Suite 11, South Burlington, VT 05403, TEL (802)660-1990
TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

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Accreditation/Certification Summary

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Laboratory: TestAmerica Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-020	01-20-21
ANAB	DoD ELAP		L2468	01-20-21
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-19
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-19
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-19
Illinois	NELAP	5	200060	03-17-19
Kansas	NELAP	7	E-10375	10-31-18
Louisiana	NELAP	6	30612	06-30-19
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-19
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-19
New York	NELAP	2	11666	03-31-19
Oregon	NELAP	10	4040	01-29-19
Pennsylvania	NELAP	3	68-01272	03-31-19
Texas	NELAP	6	T104704399	05-31-19
US Fish & Wildlife	Federal		LE148388-0	07-31-19
USDA	Federal		P330-18-00239	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-19
Vermont	State Program	1	VT-4040	04-30-19
Virginia	NELAP	3	460278	03-14-19
Washington	State Program	10	C581	05-05-19
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	8	8TMS-L	01-28-19

Laboratory: TestAmerica Burlington

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
New York	NELAP	2	10391	04-01-19

Analysis Method	Prep Method	Matrix	Analyte
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TestAmerica Sacramento

Method Summary

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	TAL SAC
D 2216	Percent Moisture	ASTM	TAL SAC
Lloyd Kahn	Organic Carbon, Total (TOC)	EPA	TAL BUR
SHAKE	Shake Extraction with Ultrasonic Bath Extraction	SW846	TAL SAC

Protocol References:

ASTM = ASTM International

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL BUR = TestAmerica Burlington, 30 Community Drive, Suite 11, South Burlington, VT 05403, TEL (802)660-1990

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

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Client: Waite-Heindel Environmental Management
Project/Site: PFAS Projects

TestAmerica Job ID: 320-40943-1
SDG: 320-40943-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-40943-2	SB-1	Solid	07/05/18 09:30	07/07/18 09:05
320-40943-3	SB-2	Solid	07/05/18 10:05	07/07/18 09:05
320-40943-4	SB-3	Solid	07/05/18 10:15	07/07/18 09:05
320-40943-5	SB-4	Solid	07/05/18 10:25	07/07/18 09:05
320-40943-6	SB-5	Solid	07/05/18 10:35	07/07/18 09:05
320-40943-7	SB-6S	Solid	07/05/18 10:45	07/07/18 09:05
320-40943-8	SB-6D	Solid	07/05/18 11:15	07/07/18 09:05
320-40943-9	SB-7	Solid	07/05/18 11:25	07/07/18 09:05
320-40943-10	SB-8	Solid	07/05/18 11:35	07/07/18 09:05
320-40943-11	SB-9	Solid	07/05/18 11:45	07/07/18 09:05
320-40943-12	SB-10	Solid	07/05/18 11:55	07/07/18 09:05
320-40943-13	SB-11	Solid	07/05/18 12:05	07/07/18 09:05
320-40943-14	SB-13	Solid	07/05/18 12:15	07/07/18 09:05
320-40943-15	SB-12S	Solid	07/05/18 12:30	07/07/18 09:05
320-40943-16	SB-12D	Solid	07/05/18 13:05	07/07/18 09:05

TestAmerica Sacramento

TestAmerica Burlington
30 Community Drive
Suite 11
South Burlington, VT 05403-6809
phone 802.660.1990 fax 802.660.1919

Chain of Custody Record

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact		Project Manager:		Site Contact:		Date:		COC No:	
Your Company Name here		Tel/Fax:		Lab Contact:		Carrier:		COCs	
Address 7 Kilburn St, Suite 301		Analysis Turnaround Time		Analysis Turnaround Time		Sampler:		For Lab Use Only:	
City/State/Zip Burlington VT 05401		CALENDAR DAYS		WORKING DAYS		Walk-in Client:		Lab Sampling:	
(xxx) xxx-xxxx Phone 802-860-9400		TAT if different from Below		2 weeks		Job / SDG No.:			
(xxx) xxx-xxxx FAX 802-860-9440		1 week		2 days					
Project Name: Chelsea Sea Side		1 day							
Site:									
PO # 32010990-0									
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Sample Specific Notes:
* Trip Blank		7/5/18	0900	G	H ₂ O	1	NW		
SB-1			0930		Soil	1			
SB-2			1005			1			
SB-3			1015			1			
SB-4			1025			1			
SB-5			1035			1			
SB-6S			1045			1			
SB-6D			1115			1			
SB-7			1125			1			
SB-8			1135			1			
SB-9			1145			1			
SB-10			1155			1			
Preservation Used: 1= Ice, 2= HCl; 3= H ₂ SO ₄ ; 4= HNO ₃ ; 5= NaOH; 6= Other									
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.									
Special Instructions/QC Requirements & Comments:									
Custody Seals Intact: ☐ Yes ☐ No		Custody Seal No.:		Cooler Temp. (°C): Obs'd: 3.3		Corr'd: 3.3		Therm ID No.: A62	
Relinquished by: [Signature]		Company: W-Item		Received by: [Signature]		Company: [Signature]		Date/Time: [Signature]	
Relinquished by: [Signature]		Company: TABUL		Received by: [Signature]		Company: [Signature]		Date/Time: [Signature]	
Relinquished by: [Signature]		Company: [Signature]		Received in Laboratory by: [Signature]		Company: [Signature]		Date/Time: 7/6/18 1125	

Form No. CA-C-WI-002, Rev. 4.14, dated 9/22/2017

Client Contact		Project Manager:		Site Contact:		Date:	
Your Company Name here		Tel/Fax:		Lab Contact:		Carrier:	
City/State/Zip		Analysis Turnaround Time		Perform MS / MSD (Y / N)		COC No:	
(xxx) xxx-xxxx		CALENDAR DAYS ☐ WORKING DAYS ☐		Filtered Sample (Y / N)		2 of 2 COCs	
(xxx) xxx-xxxx		TAT If different from Below		Matrix		Sampler:	
Project Name:		2 weeks ☐		Sample Type (G=Comp, G=Grab)		For Lab Use Only:	
Site:		1 week ☐		Sample Time		Walk-in Client:	
PO #		2 days ☐		# of Cont.		Lab Sampling:	
320 1099 0-0		1 day ☐				Job / SDG No.:	
Sample Identification						Sample Specific Notes:	
SB-11	7/5/18	1205	G	501	1		
SB-13	1215						
SB-12S	1230						
SB-12D	1305						
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other							
Possible Hazard Identification:							
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.							
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown							
Special Instructions/QC Requirements & Comments:							
Custody Seals Intact: ☐ Yes ☐ No		Custody Seal No.:		Cooler Temp. (°C):		Therm ID No.:	
Relinquished by:		Company:		Obs'd: 33		Corr'd: 33	
Relinquished by:		Company:		Received by:		Date/Time:	
Relinquished by:		Company:		Received by:		Date/Time:	
Relinquished by:		Company:		Received in Laboratory by:		Date/Time:	

PRE-LOG IN SAMPLE RECEIPT HANDLING CHECKLIST

49

Tracking Information				
Log-In #		Project #		
PM:		Client :		
Log-In Date:		INTERNAL COC (ICOC) Required? ☐ Yes ☐ No		
Log-In Performed By:		If yes, attach a copy of ICOC Form to Checklist		
Sample Receipt Information				
Date Received: 7/6/18		Received By: Scott Lavigne (Print Name)		
Time Received: 1025		Signature: Scott		
Delivery Type: ☐ Shipping Service ☐ Courier ☒ Hand		# Coolers Received:		
Condition of Shipping Coolers/Containers		Yes	No	NA
There is no evidence of tampering?		☒	☐	☐
Custody seals are present and intact?		☐	☒	☐
Are custody seal numbers provided?		☐	☐	☒
If yes, list custody seal numbers:				
Packing Material: ☐ Bubble Wrap ☐ Cardboard ☐ Corrugated Paper ☐ Shredded Paper ☐ Styrofoam ☐ Vermiculite ☒ None				
☐ Foam Insert ☐ Other (specify)				
Check Performed By: SML		Check Recorded By: SML		
Temperature Check				
Thermal Preservation: ☒ Wet Ice ☐ Blue Ice ☐ None ☐ Other (Specify)				
If none, is thermal preservation required? ☐ Yes ☐ No				
IR Gun ID: 265		IR Gun Correction Factor (CF): -0.2		IR Readings Taken By: SML
IR Readings Recorded By: SML				
Is a temperature blank provided? ☒ Yes ☐ No If yes, use temperature blank for measurement				
If no, specify the sample ID used to take measurement for each cooler for which measurement was taken.				
Record the observed temp reading below. Record the adjusted temp reading in TALS. Adjusted Temp = Observed Temp + CF				
Cooler 1	0.3 °C	ID & Bottle Type:		
Cooler 2	°C	ID & Bottle Type:		
Cooler 3	°C	ID & Bottle Type:		
Cooler 4	°C	ID & Bottle Type:		
Cooler 5	°C	ID & Bottle Type:		
Criteria: Routine: ≤6°C CLP SOW: ≤10°C Summa Canisters, Tedlar Bags, & Geotechnical: Ambient				
Samples should not be frozen unless freezing does not impact integrity of sample, such as for biota or biological tissue.				
Some programs require 4±2°C or other criteria; the PM must apply the proper criteria to their project and notify client of outliers.				
Criteria for samples delivered same day of collection: Evidence of chilling, such as ice in the shipping cooler.				
pH Check for Aqueous Inorganic Samples		Yes	No	NA
pH is within criteria for all methods?		☐	☐	☐
If no, does client require pH adjustment?		☐	☐	☐
If yes, was pH adjustment performed?		☐	☐	☐
Does 24 hour wait time apply for metals?		☐	☐	☐
If pH adjustment was performed, attach a copy of the preservation sheet to this checklist.				
pH Checks Performed By:				
Perchlorate (EPA 331.0 and SW-846 6850)		Yes	No	NA
Headspace: minimum of 1/3 of container?		☐	☐	☐
EPA 522 & RSK-175 Container Preservative (required for all DOD work). Circle NA if these methods are not selected.				
NA	Preservative Type:	Preservative Lot:		Container Lot:
NA	Preservative Type:	Preservative Lot:		Container Lot:
Paperwork Review		Yes	No	NA
Is receipt paperwork complete & legible?		☐	☐	☐
CLP: Is Traffic Report / COC Present?		☐	☐	☐
Notify PM of discrepancies.		☐	☐	☐
Scan COC and Airbill to PDF		☐	☐	☐
Post-Sampling Pressure Check Form attached?		☐	☐	☐
Check Performed By:				
Secondary Label Review Performed By:			Date:	
Comments				

TAL-0090(10

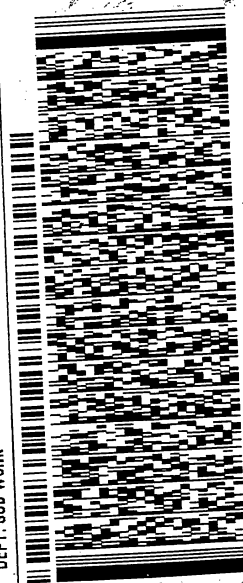
SHIP DATE: 09JUL18
 ACTWT: 16.15 LB
 CRD: 852262/CAFE3210

BILL RECIPIENT

ORIGIN ID: BLUA (916) 373-5600
 SAMPLE RECEIVING
 TESTAMERICA WEST SACRAMENTO
 880 RIVERSIDE PARKWAY
 WEST SACRAMENTO, CA 95605
 UNITED STATES US

TO TIMOTHY BOURDEAU
 TAL BURLINGTON
 30 COMMUNITY DRIVE
 SUITE 11
 SOUTH BURLINGTON VT 05403

REF: SEND OUTS
 (802) 660-1990
 DEPT: SUB WORK

FedEx
Express

TUE - 10 JUL 10:30A
 PRIORITY OVERNIGHT

TRK# 4895 5409 2950
 0201

05403

VT-US

BTB

XH BTVA

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING



320-40943 Field Sheet

Job: _____

Tracking # 4470 3867 6130 SO / PO / FO / UPS / Other _____

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations. File in the job folder with the COC.

Notes: _____

Therm. ID: AK-2 / AK-3 / AK-5 / AK-6 / HACCP / Other _____

Ice X Wet X Gel _____ Other _____

Cooler Custody Seal: 522857

Sample Custody Seal: -

Cooler ID: -

Temp: Observed 1.7c

From: Temp Blank ☒ Sample ☐

NCM Filed: Yes ☐ No ☐

	Yes	No	NA
Perchlorate has headspace?	☐	☐	☒
Alkalinity has no headspace?	☐	☐	☒
CoC is complete w/o discrepancies?	☒	☐	☐
Samples received within holding time?	☒	☐	☐
Sample preservatives verified?	☐	☐	☒
Cooler compromised/tampered with?	☐	☒	☐
Samples compromised/tampered with?	☐	☒	☐
Samples w/o discrepancies?	☒	☒	☐
Sample containers have legible labels?	☒	☐	☐
Containers are not broken or leaking?	☒	☐	☐
Sample date/times are provided.	☒	☐	☐
Appropriate containers are used?	☒	☐	☐
Sample bottles are completely filled?	☒	☐	☐
Zero headspace?*	☐	☐	☒
Multiphasic samples are not present?	☒	☐	☐
Sample temp OK?	☒	☐	☐
Sample out of temp?	☐	☒	☐

Initials: DL Date: 7/7/18 Time: 905

*Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Part # 159469-434 R172 EXP 02/18

ORIGIN ID: BTVA (802) 923-1058
 SAMPLE MANAGEMENT
 TEST AMERICA BURLINGTON
 30 COMMUNITY DRIVE
 SUITE 11
 SOUTH BURLINGTON, VT 05403
 UNITED STATES US

SHIP DATE: 06JUL18
 ACTWGT: 33.30 LB
 CAD: 000890364/CAFE3210
 DIMS: 22x11x12 IN
 BILL RECIPIENT

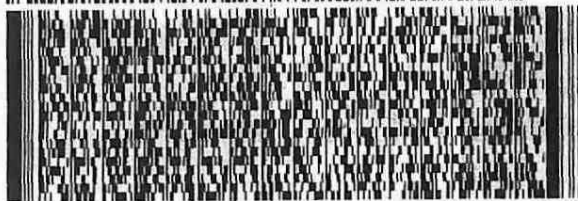
TO **SAMPLE RECEIVING**
TESTAMERICA SACRAMENTO
880 RIVERSIDE PARKWAY

WEST SACRAMENTO CA 95605

(916) 373-5600

REF:

DEPT:



FedEx
Express

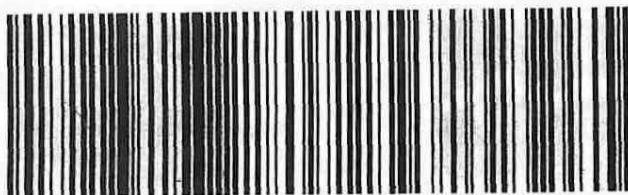


TRK# 4470 3867 6130
 0201

SATURDAY 12:00P
PRIORITY OVERNIGHT

XO BLUA

95605
CA-US SMF



TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 522857

Custody Seal
 DATE 7/6/18
 SIGNATURE Vlc

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 522857

Login Sample Receipt Checklist

Client: Waite-Heindel Environmental Management

Job Number: 320-40943-1

SDG Number: 320-40943-1

Login Number: 40943

List Number: 1

Creator: Her, David A

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Waite-Heindel Environmental Management

Job Number: 320-40943-1

SDG Number: 320-40943-1

Login Number: 40943

List Number: 2

Creator: Lavigne, Scott M

List Source: TestAmerica Burlington

List Creation: 07/10/18 11:20 AM

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	True	Seal present with no number.
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	2.7°C
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	N/A	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX 3

NRCS SOIL REPORTS



A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Bennington County, Vermont

Chelsea Solar Site



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

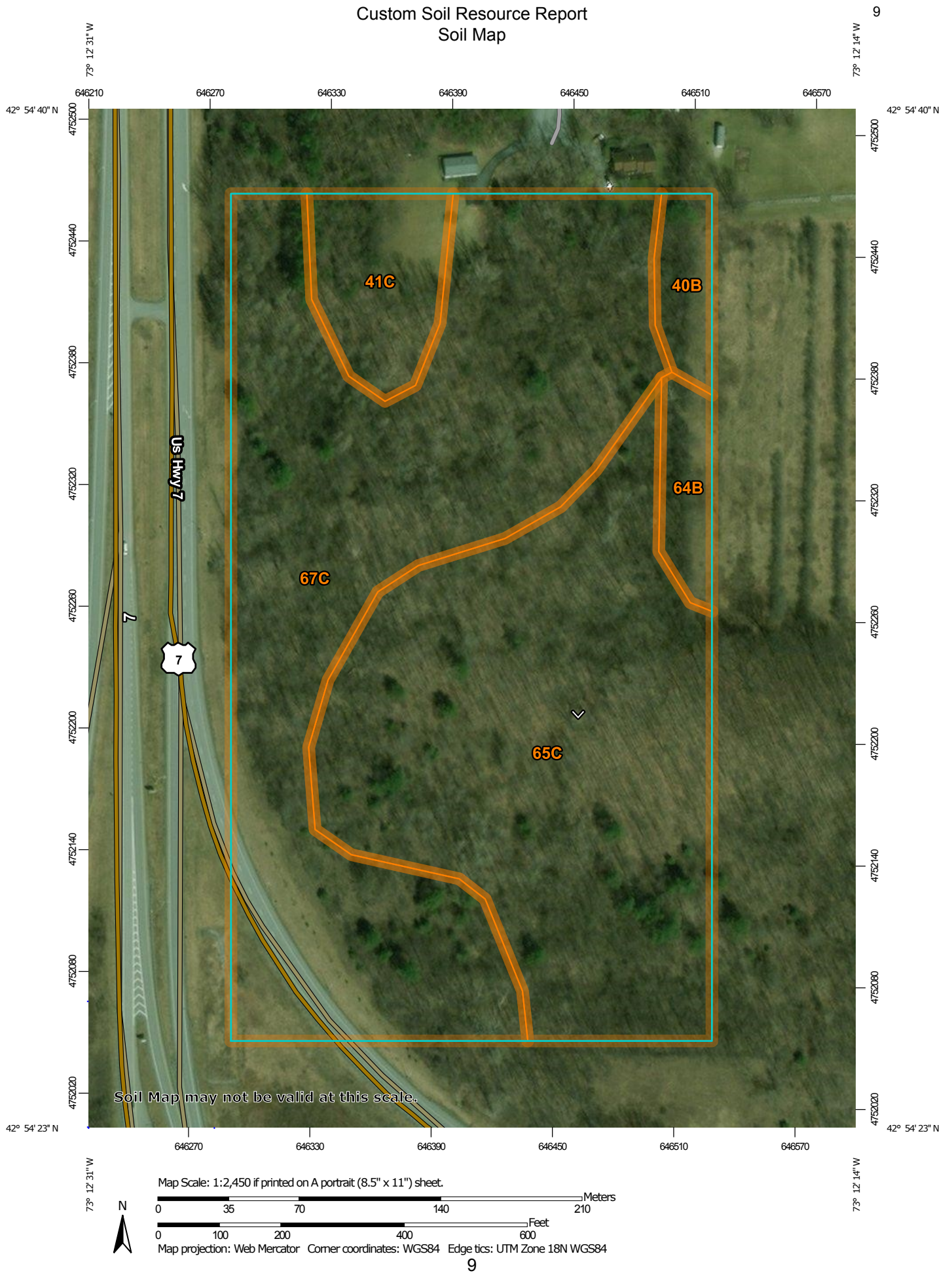
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



MAP LEGEND**Area of Interest (AOI)**
 Area of Interest (AOI)
Soils
 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points
Special Point Features
 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features
Water Features
 Streams and Canals
Transportation
 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads
Background
 Aerial Photography
MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Bennington County, Vermont
Survey Area Data: Version 22, Feb 23, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 10, 2015—Mar 29, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
40B	Galway-Nellis-Farmington complex, 3 to 8 percent slopes, rocky	0.6	2.5%
41C	Galway-Farmington complex, 8 to 15 percent slopes, very rocky	1.4	5.8%
64B	Stockbridge loam, 2 to 8 percent slopes	0.7	2.6%
65C	Stockbridge loam, 8 to 15 percent slopes, very stony	9.9	40.1%
67C	Georgia loam, 8 to 15 percent slopes, very stony	12.1	49.0%
Totals for Area of Interest		24.6	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Bennington County, Vermont

40B—Galway-Nellis-Farmington complex, 3 to 8 percent slopes, rocky

Map Unit Setting

National map unit symbol: 2wrf1
Elevation: 280 to 1,130 feet
Mean annual precipitation: 26 to 65 inches
Mean annual air temperature: 39 to 48 degrees F
Frost-free period: 110 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Galway and similar soils: 40 percent
Nellis and similar soils: 30 percent
Farmington and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Galway

Setting

Landform: Knolls, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Loamy till

Typical profile

H1 - 0 to 2 inches: silt loam
H2 - 2 to 19 inches: loam
H3 - 19 to 30 inches: very gravelly silt loam
R - 30 to 40 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Available water storage in profile: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Nellis**Setting**

Landform: Low hills, terraces, drumlinoid ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy lodgement till derived from limestone

Typical profile

Ap - 0 to 8 inches: silt loam
Bw1 - 8 to 18 inches: loam
Bw2 - 18 to 27 inches: loam
BC - 27 to 37 inches: gravelly loam
C - 37 to 79 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.01 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

Description of Farmington**Setting**

Landform: Knolls, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Loamy till

Typical profile

H1 - 0 to 2 inches: silt loam
H2 - 2 to 18 inches: gravelly loam
R - 18 to 28 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Amenia

Percent of map unit: 5 percent
Landform: Drumlinoid ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Concave
Across-slope shape: Convex
Hydric soil rating: No

Massena

Percent of map unit: 5 percent
Landform: Drumlinoid ridges
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Madrid

Percent of map unit: 4 percent
Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent
Hydric soil rating: Unranked

41C—Galway-Farmington complex, 8 to 15 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 9fx6

Elevation: 510 to 2,910 feet
Mean annual precipitation: 39 to 65 inches
Mean annual air temperature: 40 to 46 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Galway and similar soils: 45 percent
Farmington and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Galway

Setting

Landform: Ridges, knolls, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, interfluvium
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till

Typical profile

O1 - 0 to 2 inches: slightly decomposed plant material, moderately decomposed plant material
O1 - 0 to 2 inches: silt loam
H1 - 2 to 4 inches: loam
H2 - 4 to 21 inches: very gravelly silt loam
H3 - 21 to 32 inches: unweathered bedrock
R - 32 to 42 inches:

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Available water storage in profile: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Farmington

Setting

Landform: Ridges, knolls, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, interfluvium

Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till

Typical profile

O1 - 0 to 3 inches: slightly decomposed plant material, moderately decomposed plant material
O1 - 0 to 3 inches: silt loam
H1 - 3 to 5 inches: gravelly loam
H2 - 5 to 20 inches: unweathered bedrock
R - 20 to 30 inches:

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components**Amenia**

Percent of map unit: 5 percent
Landform: Drainageways, depressions, knolls, hills
Hydric soil rating: No

Massena

Percent of map unit: 5 percent
Landform: Knolls, hills, depressions, drainageways
Hydric soil rating: No

Nellis

Percent of map unit: 5 percent
Landform: Knolls, hills
Hydric soil rating: No

Rock outcrop

Percent of map unit: 5 percent
Landform: Knolls, hills
Hydric soil rating: Unranked

64B—Stockbridge loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9fyq
Elevation: 500 to 1,820 feet
Mean annual precipitation: 39 to 53 inches
Mean annual air temperature: 40 to 46 degrees F
Frost-free period: 110 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Stockbridge and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stockbridge

Setting

Landform: Hills, knolls, ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till

Typical profile

H1 - 0 to 9 inches: loam
H2 - 9 to 24 inches: loam
H3 - 24 to 36 inches: gravelly loam
H4 - 36 to 65 inches: gravelly loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components**Georgia***Percent of map unit:* 3 percent*Landform:* Hills, depressions, drainageways*Hydric soil rating:* No**Massena***Percent of map unit:* 3 percent*Landform:* Hills, depressions, drainageways*Hydric soil rating:* No**Nellis***Percent of map unit:* 3 percent*Landform:* Hills*Hydric soil rating:* No**Galway***Percent of map unit:* 3 percent*Landform:* Hills*Hydric soil rating:* No**Pittsfield***Percent of map unit:* 3 percent*Landform:* Hills*Hydric soil rating:* No**65C—Stockbridge loam, 8 to 15 percent slopes, very stony****Map Unit Setting***National map unit symbol:* 9fyv*Elevation:* 500 to 1,820 feet*Mean annual precipitation:* 39 to 53 inches*Mean annual air temperature:* 40 to 46 degrees F*Frost-free period:* 110 to 180 days*Farmland classification:* Not prime farmland**Map Unit Composition***Stockbridge and similar soils:* 85 percent*Minor components:* 15 percent*Estimates are based on observations, descriptions, and transects of the mapunit.***Description of Stockbridge****Setting***Landform:* Hills, knolls, ridges*Landform position (two-dimensional):* Summit, shoulder, backslope*Landform position (three-dimensional):* Side slope, interfluvium*Down-slope shape:* Convex*Across-slope shape:* Convex*Parent material:* Loamy till

Typical profile

O1 - 0 to 1 inches: moderately decomposed plant material
H1 - 1 to 9 inches: loam
H2 - 9 to 24 inches: loam
H3 - 24 to 36 inches: gravelly loam
H4 - 36 to 65 inches: gravelly loam

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Available water storage in profile: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components**Georgia**

Percent of map unit: 3 percent
Landform: Hills, depressions, drainageways
Hydric soil rating: No

Massena

Percent of map unit: 3 percent
Landform: Hills, depressions, drainageways
Hydric soil rating: No

Nellis

Percent of map unit: 3 percent
Landform: Hills
Hydric soil rating: No

Galway

Percent of map unit: 3 percent
Landform: Hills
Hydric soil rating: No

Pittsfield

Percent of map unit: 3 percent
Landform: Hills
Hydric soil rating: No

67C—Georgia loam, 8 to 15 percent slopes, very stony**Map Unit Setting***National map unit symbol:* 9fz4*Elevation:* 500 to 2,450 feet*Mean annual precipitation:* 39 to 53 inches*Mean annual air temperature:* 40 to 46 degrees F*Frost-free period:* 110 to 180 days*Farmland classification:* Not prime farmland**Map Unit Composition***Georgia and similar soils:* 85 percent*Minor components:* 15 percent*Estimates are based on observations, descriptions, and transects of the mapunit.***Description of Georgia****Setting***Landform:* Hills, knolls, ridges*Landform position (two-dimensional):* Summit, shoulder, backslope*Landform position (three-dimensional):* Side slope, interfluve*Down-slope shape:* Concave*Across-slope shape:* Concave*Parent material:* Loamy till**Typical profile***O1 - 0 to 1 inches:* moderately decomposed plant material*H1 - 1 to 10 inches:* loam*H2 - 10 to 30 inches:* silt loam*H3 - 30 to 65 inches:* gravelly silt loam**Properties and qualities***Slope:* 8 to 15 percent*Percent of area covered with surface fragments:* 1.6 percent*Depth to restrictive feature:* More than 80 inches*Natural drainage class:* Moderately well drained*Runoff class:* High*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)*Depth to water table:* About 15 to 30 inches*Frequency of flooding:* None*Frequency of ponding:* None*Calcium carbonate, maximum in profile:* 10 percent*Available water storage in profile:* High (about 10.4 inches)**Interpretive groups***Land capability classification (irrigated):* None specified*Land capability classification (nonirrigated):* 6s*Hydrologic Soil Group:* C/D*Hydric soil rating:* No

Minor Components**Massena**

Percent of map unit: 4 percent

Landform: Hills, depressions, drainageways

Hydric soil rating: No

Amenia

Percent of map unit: 4 percent

Landform: Hills

Hydric soil rating: No

Galway

Percent of map unit: 4 percent

Landform: Hills, rises

Hydric soil rating: No

Stockbridge

Percent of map unit: 3 percent

Landform: Hills, rises

Hydric soil rating: No

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