



DEPARTMENT OF TECHNOLOGY, MANAGEMENT AND BUDGET
State Facilities Administration
Design & Construction Division

CONSTRUCTION BID ADDENDUM NO. 1

This form identifies an Addendum to Bidding Documents, and incorporates interpretations or clarifications, modifications, acceptance of proposed “or equal” materials, and other information into the Bidding Documents. Addenda will be numbered by the Professional and distributed through www.michigan.gov/SIGMAVSS as an attachment.

TO: ALL BIDDERS		DATE ISSUED 4/23/2026
PROJECT NAME Fort Custer Small Arms Berm		FILE NUMBER 511/26108.SAR
PROFESSIONAL DLZ Michigan, Inc.	PROJECT DIRECTOR Project Director	BID OPENING DATE: 4/29/2026

ADDENDUM ITEMS: (attach additional sheets and drawings if required)

1. Pre-Bid Meeting Sign-In Sheet (Attachment 1)
2. Clarifications to Bidder’s Questions (Attachment 2)
3. Bench Scale Treatability Testing Report at Range 6 (Attachment 3)

ACKNOWLEDGEMENT: This Addendum must be acknowledged by the Bidder in the space provided in the Bid Summary and Bid Form. Failing to acknowledge Addenda may be cause for the Bid to be rejected. Addenda will become part of the Contract Documents.

PROFESSIONAL: DLZ Michigan, Inc.	DATE: 4/23/2026
APPROVED BY:	
PROJECT DIRECTOR:	DATE: Click to enter date

ATTACHMENT 1

Pre-Bid Meeting Sign-In Sheet

Fort Custer Training Center
 1100 Denso Road, Battle Creek, Michigan
Range 5 Berm Remediation
PRE-BID MEETING SIGN-IN SHEET
 April 21, 2026 10:30 AM

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ATTACHMENT 2

Clarifications to Bidder's Questions

CLARIFICATIONS TO BIDDER'S QUESTIONS

Fort Custer Small Arms Berm

File No: 511/26108.SAR

- Q.1** Soil Treatment – Application Rate:
Please provide the required application rate for lime and/or any other acceptable materials for soil treatment.
- A.1** *The anticipated total quantity of lime and/or other stabilization material is 200 pounds.*
- Q.2** Soil Treatment – Mixing Requirements
Please clarify whether the lime is to be applied as a surface treatment only or mixed into the existing soils.
If mixing is required, please provide the specified depth and mixing method (e.g., equipment type, number of passes, uniformity requirements).
- A.2** *The lime and/or other stabilization material is to be applied on the surface of the berm upon removal of the contaminated soil and immediately prior to backfill sand placement. The material is to be applied uniformly over the entire disturbed soil surface and raked in.*
- Q.3** Verification Sampling (VSR)
We understand that the Owner/Professional is responsible for performing verification sampling of the berm prior to backfilling.
Please provide the anticipated turnaround time for sampling, lab analysis, and approval so we can plan backfill operations accordingly
- A.3** *Verification soil samples collected by Professional are for Owner's information purposes only and not for the purposes of approving to proceed with backfilling. Professional will conduct visual inspection and field screening using XRF during the contaminated soil excavation to determine the excavation depth and provide approval to proceed with backfilling. Contractor is expected to conduct soil treatment and complete the backfilling immediately upon completion of excavation to maintain berm stability.*
- Q.4** Seeding Requirements
Please provide specifications for the required grass seed mix for final restoration.
- A.4** *Low maintenance fescue seed mix.*
- Q.5** Erosion Control Requirements
Please clarify the required erosion control measures for restoration, including whether hydroseeding, mulch blanket, erosion control blanket, or other methods are required.
- A.5** *Hydroseeding and drill seeding would be acceptable methods of seeding on berm slope.*

Mulch blankets shall be installed and properly secured immediately upon seeding on the berm face. Straw mulch placement after seeding would be sufficient at other areas.

Q.6 Is any other berm soil data available at the ranges.

A.6 *A bench testing of berm soil at Range 6 (adjacent to Range 5) was conducted in 2023. The report containing various test results are presented in Attachment 3.*

Q.7 Do both sand backfill and top soil need to be tested.

A.7 *Yes, both sand backfill and topsoil need to be tested for Michigan 10 metals, DRO, GRO, ORO, and PFAS (40 compounds).*

ATTACHMENT 3

Bench Scale Treatability Testing Report at Range 6

BENCH SCALE TREATABILITY TESTING

**SMALL ARMS RANGE BERMS
FORT CUSTER TRAINING CENTER
2501 26TH STREET
AUGUSTA, MICHIGAN 49012**

PREPARED FOR:

MICHIGAN DEPARTMENT OF MILITARY & VETERANS AFFAIRS

**FORT CUSTER TRAINING CENTER
2501 26TH STREET
AUGUSTA, MICHIGAN 49012**

PREPARED BY:

**DLZ MICHIGAN, INC.
535 S. BURDICK STREET, SUITE 248
KALAMAZOO, MI 49007**

DLZ PROJECT NO.: 1941-6940-21



**ARCHITECTURE • ENGINEERING • PLANNING
SURVEYING • CONSTRUCTION SERVICES**

MAY 2024

Bench Scale Treatability Testing

**Small Arms Range Berms
Fort Custer Training Center
2501 26th Street
Augusta, Michigan 49012**

Prepared For:

**Michigan Department of Military & Veterans Affairs
Fort Custer Training Center
2501 26th Street
Augusta, Michigan 49012**

Prepared By:

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535 S. Burdick Street, Suite 248
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DLZ Project No.: 1941-6940-21

May 2024

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Appendix E	Laboratory Report – Free Flow Samples
Appendix F	Sevenson MAECTITE Treatability Report
Appendix G	MT2 ECOBOND Treatability Report

1.0 INTRODUCTION

DLZ Michigan, Inc. (DLZ) was retained by the Michigan Department of Military and Veterans Affairs (MDMVA) and contracted by the Michigan Department of Technology, Management, and Budget (MDTMB) under their Indefinite Scope Indefinite Delivery (ISID) Contract to conduct a Small Arms Range Berm Feasibility Study at the Michigan Army National Guard (MIARNG) Fort Custer Training Center (FCTC) located in Augusta, Michigan. The contract was awarded to DLZ based on our proposal dated December 21, 2020, to the Request for Competitive Bid – Package #2021-01 issued on December 4, 2020, and the subsequent addenda. DLZ completed the feasibility study as provided in the Small Arms Range Berm Feasibility Study report dated November 2022. MDMVA secured additional funding for DLZ to conduct bench testing to assess the effectiveness of various reagent(s) in reducing the mobility of lead from the berm soils. The bench testing results and recommendations are presented in this report.

1.1 SITE BACKGROUND

The FCTC is located near Augusta, Michigan, in Kalamazoo and Calhoun Counties in southwestern Michigan (**Figure 1**). The facility occupies approximately 7,570 acres and serves as a training area for both active and reserve military forces. The FCTC is a federally owned property, managed by the State of Michigan. The Small Arms Firing Ranges are comprised of 14 different ranges. Twelve ranges (R1 through R12) are used for live fire weapons training ranging from small caliber pistols and rifles to machine guns and grenade launchers. Two (2) additional ranges, the Light Anti-Tank Weapon (LAW) Range (Range 13) and the M-31 SABOT Artillery/Light Demolition Range (Range 14) are also used periodically.

A Site Location Map and Site Map are provided as **Figures 1 and 2**, respectively. Small arms ranges at FCTC are depicted in **Figures 3 and 4**. The backstop berms at the ranges 2, 3, 4, 5 and 6 (identified as R2, R3, R4, R5 & R6 in the figures) are the subject for the feasibility study and this bench testing.

1.2 FEASIBILITY STUDY

The November 2022 Feasibility Study report prepared by DLZ recommended an alternative that includes the removal of spent ammunition from the soil excavated from the face of the berms and stabilizing the soil to reduce the leaching of lead from the soils. The study recommended the reconstruction of the berms using the stabilized soils that pass through a #4 sieve and dispose of the material retained on a #4 sieve upon removal/recycling of the spent munitions if economically feasible. The feasibility study recommended conducting a stabilization treatability study to evaluate the most suitable stabilization reagent for the site. The bench scale treatability study is to determine the dosing rate, and the most suitable and cost-effective stabilization reagent for stabilizing lead in the soils at the berms. The feasibility study recommended the following lead stabilization reagents for the bench scale treatability study:

- Blastox
- Free Flow
- MAECTITE
- ECOBOND

1.5 SCOPE OF WORK

MDMVA requested DLZ to conduct a bench scale treatability study as recommended in DLZ's November 2022 feasibility study report. The scope of work included collecting the berm soil at Range 6, sieving the material using a #4 sieve, and treating the material with the reagents recommended in the feasibility study at the manufacturer recommended dosage rates for laboratory testing to evaluate the lead stabilization potential of each reagent. Range 6 was selected due to the highest lead levels noted of all small arms ranges during the feasibility study.

The scope of work included the completion of bench testing with the goal of evaluating the effectiveness of the tested reagents in stabilizing lead in the berm soil, and the relative cost-effectiveness.

2.0 SAMPLE COLLECTION & TESTING

The following naming conventions have been used for sample collection/analyses, and this convention will be used throughout the document.

Code	Sample Description
>4S	Composite berm soil sample retained on a #4 sieve (passed through a 3/8-inch sieve), without munitions fragments.
>4S+M20%	Composite berm soil sample retained on a #4 sieve (passed through a 3/8-inch sieve), with 20% by weight munitions fragments.
<4S	Composite berm soil sample passed through a #4 sieve, without munitions fragments.
<4S+M10%	Composite berm soil sample passed through a #4 sieve, with 10% by weight munitions fragments.

2.1 BERM MATERIAL COLLECTION

DLZ collected a composite berm soil sample on April 25, 2023, from Range 6 of the Small Arms Ranges at FCTC. DLZ collected the berm material from the bullet pockets directly behind the targets with the goal of obtaining a representative berm sample with presumed highest concentration of lead. DLZ collected equal volumes of soil from seven (7) different locations at the backstop berm of Range 6 equally spaced over the entire length of the berm. Specifically, berm material was collected from the bullet pockets directly behind target #s 4, 8, 12, 16, 20, 24, and 28. Due to significant soil erosion observed at the Range 6 berm, the berm material was also collected from the base of the berm at each of the bullet pocket sampled. Soil was removed with a shovel to approximately 2 feet from surface at the bullet pocket behind the target at each location. Soil was also collected at the base of the berm to approximately 6 inches below the surface at each location. Approximately three quarters of the sample volume was collected from the bullet pockets and one quarter of the sample volume was collected from the base of the berm. The berm

material was collected in four (4) 5-gallon plastic buckets. The buckets were secured with tight lids and transported to the DLZ office in Lansing.

The berm material was collected from the bullet pockets to test the worst case condition of the berm material for lead and munitions fragments. The berm sample collection locations are depicted in the range layout aerial image as presented in **Appendix A**. All sample excavation locations were flattened using surrounding soil upon completion of sample collection.

2.2 BERM MATERIAL PROCESSING

DLZ transported the berm material to Intertek-psi on April 28, 2023, where the material was placed in a wheelbarrow, mixed, and placed into to a sieve shaker with a #4 (3/16-inch) sieve. The material that passed through the #4 sieve was collected in three buckets and the material retained on the #4 sieve was collected in one bucket. The separated material was brought back to DLZ offices on May 2, 2023, for further processing and sample collection for laboratory testing.

On May 9, 2023, the soil was further processed and prepared to ship to vendors, and to collect baseline samples and treat with reagents for laboratory testing. The soil in three buckets that passed through the #4 sieve was placed in a wheelbarrow and thoroughly mixed to create a composite material, and the soil was placed back in the buckets for sample preparation/collection. The material that passed through the #4 sieve was referenced as <4S in the sample identification for laboratory analyses.

The soil in the bucket that was retained on the #4 sieve was placed in a wheelbarrow and thoroughly mixed and sieved to facilitate further separation. Rocks and pebbles larger than the 3/8-inch sieve were separated out and were not used in the sample preparation. All visible spent ammunition and metal fragments larger than the #4 sieve were removed and placed in a Ziplock bag for using with samples as described in the following sections. All the remaining material that passed through the 3/8-inch sieve and retained on the #4 sieve was thoroughly mixed to create a composite material and placed in a bucket for sample preparation and collection, and this material was referenced as >4S in the sample identification for laboratory analyses.

The particle size distribution of the berm soil sample based on the limited sieve analysis is provided in **Table 1**. Approximately 85% of the berm soils passed through the #4 sieve.

2.3 SAMPLE SHIPMENT FOR VENDOR TESTING

The following two vendors did not provide the reagent to DLZ for testing and requested DLZ to provide the soil for in-house testing:

1. Severson Environmental Services, Inc. – MAECTITE
2. MT2 LLC – ECOBOND

Therefore, DLZ prepared the composite berm material, and shipped the following samples to these two vendors for further in-house sample preparation / laboratory testing:

1. Composite berm soil sample retained on #4 sieve (passed through 3/8-inch sieve) without munitions fragments. (Referenced as '>4S') (Approximately 7 pounds)
2. Composite berm soil sample passed through #4 sieve without munitions fragments. (Referenced as '<4S') (Approximately 15 pounds)
3. Spent munitions and metal fragments retained on 1/4-inch sieve. (Referenced as 'M') (Approximately 200 grams)

2.4 BASELINE SAMPLE COLLECTION FOR LABORATORY TESTING

DLZ collected the following set of four samples for total lead, TCLP lead, SPLP lead, and pH analyses to use as a baseline to compare against the reagent treated soils:

1. Composite berm soil sample retained on #4 sieve (passed through 3/8-inch sieve) without munitions fragments. (Baseline >4S)
2. Composite berm soil sample retained on #4 sieve (passed through 3/8-inch sieve) with 20% (by weight) munitions fragments added. (Baseline >4S+M20%)
3. Composite berm soil sample passed through #4 sieve without munitions fragments. (Baseline <4S)
4. Composite berm soil sample passed through #4 sieve with 10% (by weight) munitions fragments added. (Baseline <4S+M10%)

DLZ collected two 4oz jars of soil for each of the samples that did not contain munitions. The laboratory requires 10 grams of sample for total lead, 110 grams of sample each for TCLP and SPLP lead, and 20 grams for pH extractions. For the baseline samples containing munitions, DLZ prepared four bags of samples for extraction and analysis for the parameters as provided in **Appendix B**.

2.5 REAGENT TREATED SAMPLE COLLECTION FOR LABORATORY ANALYSIS

The following two vendors provided their reagent to DLZ for sample preparation and laboratory testing:

1. J Carpenter Environmental LLC /TDJ Group, Inc. – Blastox 215 (dosage rates 3% & 5%)
2. Free Flow Technologies, Ltd. – Free Flow 300 (dosage rates 4% & 8%)

DLZ prepared the following set of three samples for TCLP lead analysis at each of the two vendor recommended reagent dosage rates (Blastox at 3% & 5% and Free Flow at 4% & 8%):

1. Composite berm soil sample retained on #4 sieve (passed through 3/8-inch sieve) with 20% (by weight) munitions fragments.
2. Composite berm soil sample passed through #4 sieve (no munitions fragments).
3. Composite berm soil sample passed through #4 sieve with 10% (by weight) munitions fragments added after the reagent was mixed with the soil.

The laboratory requires 110 grams of sample for TCLP lead, and 20 grams for pH extractions. A bag of sample (and a second one for backup) was prepared for TCLP lead and one bag was prepared for pH as listed in the tables in **Appendix B**.

3.0 SUMMARY OF TEST RESULTS

3.1 BASELINE SAMPLE RESULTS

The Range 6 berm baseline sample laboratory analytical results are provided as **Appendix C** and summarized in **Table 2**.

The total and TCLP lead levels in all four baseline soil samples are very similar for samples with and without munitions. The average total and TCLP lead levels for the baseline samples are 12,250 mg/Kg and 540 mg/L. These lead TCLP levels in all the samples are extremely high as compared to the Resource Conservation and Recovery Act (RCRA) characteristic hazardous waste limit (5 mg/L) for lead in soil. The berm soil needs to be handled as RCRA hazardous waste if it requires off-site disposal.

The baseline soil samples were also analyzed for lead SPLP, which is more representative of lead leaching from soil in acid rain conditions that are prevalent in the area. Significantly higher SPLP lead levels were present in the soil that pass through #4 sieve as compared to the soil retained on the sieve. The highest SPLP lead level (7.9 mg/L or 7,900 ug/L) detected was in the soil that passed through #4 sieve without munitions. All the SPLP levels overall are significantly higher than EGLE's Groundwater drinking water criteria (4 ug/L), Surface water human drinking water value HDV (14 ug/L), and Surface water human non-drinking water value HNDV (190 ug/L).

The four baseline soil samples were also measured for pH. There has also been no significant difference in the pH of the four samples with an average pH of 7.9. Similar pH levels were also noted in the initial pH prior to acid addition during TCLP extraction of the samples (average pH 8.0). Based on this pH data, the berm soils appear to be slightly alkaline which could be due to the addition of lime during the previous munitions removal activities at the berms.

3.2 BLASTOX TREATABILITY TESTING RESULTS

The Blastox treated soil sample laboratory analytical results are provided as **Appendix D** and summarized in **Table 2**.

Blastox was applied at two dosage rates, 3% and 5% by weight, to the three sets of samples as described in Section 2.5. Both dosage rates were not effective on the soil retained on #4 sieve with 20% munitions, with the samples exhibiting extremely high lead TCLP levels. TCLP lead in both of these samples (1,400 mg/L and 690 mg/L) are much higher than the baseline sample TCLP lead level (420 mg/L). The Blastox treatment at 3% dosage rate was not effective in reducing the lead TCLP levels in the soil that passed through #4 sieve, with and without munitions. At 5% dosage rate Blastox has been effective in reducing the lead TCLP levels to below detection for the soil passed through #4 sieve, with and without munitions.

The initial pH levels prior to acid addition for TCLP extraction were extremely high (average pH 11.3) with higher pH levels noted in the samples retained on #4 sieve (pH 11.49 and 11.53). The final pH of these samples of soil retained on #4 sieve are still high after the addition of #2 extraction fluid.

3.3 FREE FLOW TREATABILITY TESTING RESULTS

The Free Flow treated soil sample laboratory analytical results are provided as **Appendix E** and summarized in **Table 2**.

Free Flow was applied at two dosage rates, 4% and 8% by weight, to the three sets of samples as described in Section 2.5. Both dosage rates were not effective on the soil retained on the #4 sieve with 20% munitions, and the samples exhibited high lead TCLP levels (700 mg/L and 230 mg/L). The Free Flow treatment at 4% dosage rate was effective in reducing the lead TCLP levels to below detection for the soil passed through #4 sieve, with and without munitions. However, higher (8%) dosage rate has been not effective in reducing the lead TCLP on the soil that passed through #4 sieve, with and without munitions.

The initial pH levels prior to acid addition for TCLP extraction were extremely high (average pH 11.7) with higher pH levels noted in the samples retained on the #4 sieve (pH 11.94 and 12.02). The final pH of both soil samples retained on the #4 sieve and also the samples that passed through the #4 sieve treated at 8% dosage rates are still high after the addition of #2 extraction fluid.

3.4 MAECTITE TREATABILITY TESTING RESULTS

The sieved composite berm soil and munitions were provided to Severson for in-house treatability testing using MAECTITE. The treatability test report using various MAECTITE proprietary mixes is provided as **Appendix F** and summarized in **Table 2**.

Severson performed testing of various MAECTITE proprietary mixes on the three sample sets described in Section 2.5. Severson indicated that each of the proprietary mixes is different and an increase in the proprietary mix number generally represent an increase in the MAECTITE dosage rate. TCLP lead analyses of each sample set performed better with increase in the mix number with the exception of Mix#4 on the soil that passed through #4 sieve which exhibited an increase in the TCLP lead as compared to the Mix#2 and Mix#3.

Both MAECTITE Mix#2 and Mix#3 reduced the TCLP lead in soil retained on the #4 sieve with 20% munitions to less than the RCRA characteristic hazardous waste limit of 5 mg/L. Also, MAECTITE Mix#5 reduced the TCLP lead in soil passed through #4 sieve with and without munitions to less than 2 mg/L.

Severson utilized their in-house laboratory for the TCLP testing, and the lab is not Federal/State certified and EPA SW846 methods were not used. Severson could not make the pH available for all samples. Severson indicated that the reagent could be adjusted as needed to bring the final pH after treatment to the neutral range needed.

The initial pH levels prior to acid addition for TCLP extraction were provided for only two samples. The average pH (7.38) was slightly less than the baseline pH levels (average pH 8.0).

3.5 ECOBOND TREATABILITY TESTING RESULTS

The sieved composite berm soil and munitions were provided to MT2 for in-house sample preparation and treatment using ECOBOND. MT2 prepared the samples in-house and submitted the samples to Pace Analytical for laboratory analysis. The treatability test report and the laboratory report are provided as **Appendix G** and the results are summarized in **Table 2**.

ECOBOND was applied at two dosage rates, 2% and 4% by weight, to the three sets of samples as described in Section 2.5. The soil retained on the #4 sieve with 20% munitions at both dosage rates exhibited lead TCLP at levels (32 mg/L and 5.84 mg/L) significantly below baseline sample TCLP level (420 mg/L), however, both exceeded the RCRA characteristic hazardous waste limit of 5 mg/L. MT2 indicated that an increase in the dosage rate to 6% would bring the TCLP lead levels to below 5 mg/L.

The ECOBOND treatment at both 2% and 4% dosage rates was effective in reducing the lead TCLP levels in the soil that passed through the #4 sieve, without munitions.

The ECOBOND treatment at 2% dosage rate was not effective in reducing the lead TCLP levels in the soil that passed through the #4 sieve, with munitions. At a 4% dosage rate ECOBOND has been effective in reducing the lead TCLP levels to <1 mg/L for the soil that passed through #4 sieve, with munitions.

The initial pH levels prior to acid addition for TCLP extraction were slightly higher (average pH 8.7) than the baseline pH levels (average pH 8.0).

4.0 DISCUSSION OF RESULTS

As reviewed in Section 3.0, the results have been mixed for both Blastox and Free Flow, while the results have been positive for both MAECTITE and ECOBOND. This section provides further discussion of the results and an analysis of the potential effectiveness of each reagent in stabilizing lead at the berms, and its long term effectiveness.

4.1 BLASTOX

Blastox Stabilization Reactions

Blastox is a proprietary fine granular material comprising of calcium silicates and aluminates, magnesium oxide and other proprietary mixtures. Blastox produces insoluble heavy metal compounds through chemical conversion, pH adjustment and physical encapsulation. Water or moisture is the catalyst for the Blastox stabilization reactions. The TDJ Group's Technical Bulletin states that Blastox when mixed with soil stabilizes lead in three steps:

1. The addition of Blastox creates an alkaline matrix in which lead is stable. The elevated pH instantaneously stabilizes lead.
2. Silicate reactions change the chemical form of lead from lead oxide, carbonate, or hydroxide to less soluble lead silicate.

3. Hydration reactions encapsulate the waste into cementitious mass which limits water access and leaching.

Blastox has high pH and its treatment increases soil pH significantly. The change in alkalinity (pH) is a byproduct of silicate and hydration reactions.

Blastox Bench Test Results

Although Blastox was effective on soil passing through #4 sieve at high dosage rate, Blastox was not effective on the soil retained on #4 sieve with munitions at both dosage rates. Extremely high lead TCLP levels were noted in the samples at both dosage rates on the soil retained on #4 sieve. The soil pH after Blastox treatment was extremely high (average pH 11.3) with higher pH levels noted in the samples retained on #4 sieve (pH 11.49 and 11.53).

Solubility of various lead compounds vary with pH; and the solubility of most lead compounds increase with increase in acidity (pH<4) or alkalinity (pH>11) (ITRC, 2003). Blastox treatment resulted in extremely high alkaline levels (pH>11) in the soils, which may have increased the solubility of lead and resulted in high TCLP lead concentrations for the soils retained on #4 sieve.

4.2 FREE FLOW

Free Flow Stabilization Reactions

Free Flow is a proprietary fine granular dry reagent containing phosphate based compounds. Free Flow has high pH (10.0-12.0) and increases soil pH upon treatment. The Free Flow Technologies specification sheet states that Free Flow is capable of achieving results below universal treatment standard and produces a stabilized material with long-term stabilization characteristics.

Free Flow Bench Test Results

Although Free Flow was effective in reducing the TCLP lead to below detection at low dosage rate for soil passing through #4 sieve; however, high levels of TCLP lead were present in samples treated with high dosage rate of Free Flow. Free Flow was not effective at both dosage rates on the soil retained on #4 sieve.

The soil pH after Free Flow treatment was extremely high (average pH 11.7) with higher pH levels noted in the samples retained on the #4 sieve (pH 11.94 and 12.02). pH levels were also higher in samples treated with 8% Free Flow as compared to 4% Free Flow. These high pH levels may be negatively impacting the lead stabilization at higher dosage rates (8%) in the soil passing through the #4 sieve.

Similar to Blastox, Free Flow reagent treatment resulted in extremely alkaline levels (pH>11) in the soils, which may have increased the solubility of lead and resulted in high TCLP lead concentrations. The stabilization of lead appears to be compromised at the extremely high pH levels.

4.3 MAECTITE

MAECTITE Stabilization Reactions

MAECTITE is a patented and proprietary liquid reagent which chemically converts leachable lead into less soluble phosphate and sulfate-based minerals within the soil matrix. MAECTITE was accepted into the EPA Superfund Innovative Technology program. MAECTITE has been applied successfully since 1989 to stabilize lead and other RCRA metal contaminated soils throughout the country including the small arms ranges at the Massachusetts Military Reservation, Cape Cod, MA in 1998.

MAECTITE Bench Test Results

MAECTITE was effective on both the soil retained on and passed through the #4 sieve with and without munitions. Severson performed testing various MAECTITE proprietary mixes to identify the ideal mix in reducing the leachability of lead from the soils to an acceptable range.

Severson provided pH for two samples after the MAECTITE treatment, and a neutral soil pH (average pH 7.38) was noted. Severson indicated that the reagent could be adjusted as needed to bring the final soil pH after treatment to the neutral range needed.

Based on the results, MAECTITE appears to be highly effective and predictable in reducing the leachate potential of lead in soil. The validity of these in-house test results should be confirmed at a third party analytical laboratory as the in-house testing did not utilize standardized test methods.

4.4 ECOBOND

ECOBOND Stabilization Reactions

ECOBOND is a proprietary granular dry reagent which chemically stabilizes the lead in soils. ECOBOND can be applied in dry form and wet form depending on the application. The MT2 brochure states that ECOBOND is capable of treating metals to below RCRA and universal treatment standard. In addition to the ECOBOND, MT2 offers a proprietary density/pneumatic equipment for the separation of bullets and metal fragments in soil post screening.

ECOBOND Bench Test Results

MT2 prepared the samples in-house and submitted the samples to Pace Analytical for laboratory analysis. ECOBOND was effective on the soil passed through the #4 sieve with and without munitions. ECOBOND also reduced the TCLP lead levels in the soil retained on the #4 sieve, but the levels exceeded the RCRA characteristic hazardous waste limit of 5 mg/L. An increase in the dosage appear to reduce the TCLP lead levels to below the characteristic hazardous waste limit, and MT2 indicated that a 6% dosage rate would meet the RCRA disposal standards.

A slight increase in the soil pH (average pH 8.7) was noted after the ECOBOND treatment. Most lead compounds have low solubility at the neutral to slight alkaline conditions.

Based on the results, ECOBOND appears to be highly effective and predictable in reducing the leachate potential of lead in soil; however, further testing is needed at higher dosage.

4.5 DISCUSSION

The solubility of various lead compounds will vary with pH; however, the solubility of most lead compounds increases with increase in acidity (pH<4) or alkalinity (pH>11) (ITRC, 2003). Both the Blastox and Free Flow reagent treatments resulted in extremely high alkaline levels (pH>11) in the soils, which may have increased the solubility of lead and resulted in high and unpredictable TCLP lead concentrations. DLZ does not recommend the use of Blastox or Free Flow due to the extremely high soil alkalinity that could result from treatment and the failure to consistently reduce the leachability of lead.

Both MAECTITE and ECOBOND performed well by consistently reducing the leachability of lead in soil while maintaining the soil pH in the neutral to slightly alkaline range. Severson indicated the pH can be maintained in the neutral zone with any MAECTITE mix needed for the soil. A slightly elevated pH was noted with ECOBOND treatment. In addition, ECOBOND at high dosage (4%) could not reduce the lead TCLP to below 5 mg/L for the soil retained on the #4 sieve with munitions. Therefore, the applicability of ECOBOND would require additional testing at a higher (6%) dosage rate for the soil retained on #4 sieve with munitions. In addition, the soil pH was increased to 9.49 with 4% ECOBOND treatment, for the soil retained on #4 sieve with munitions. The increase in ECOBOND dosage rate to 6% could potentially increase the soil pH to levels that may adversely impact the lead stabilization. Therefore, further testing would be needed to evaluate if ECOBOND can provide acceptable TCLP lead reduction while maintaining neutral soil pH.

Based on the bench testing, MAECTITE appears to be the most suitable lead stabilization product for the small arms range berm soils at the Fort Custer Training Center.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are made based on the treatability testing data:

1. Blastox reduced the leachability of lead in soil that passed through #4 sieve; however, it did not reduce the leachability of soil retained on the #4 sieve containing munitions at both dosage rates. Blastox does not appear to be suitable for the Fort Custer berm material based on the test results, especially for soils retained on the #4 sieve, and due to the extremely high soil pH resulted from the treatment.
2. Free Flow reduced the leachability of lead in soil that passed through #4 sieve at a low dosage rate, but the treatment is ineffective at high dosage rate. In addition, Free Flow did not reduce the leachability of soil retained on the #4 sieve containing munitions at both dosage rates. Free Flow does not appear to be suitable for the Fort Custer berm material based on the test results, and due to the extremely high soil pH resulting from the treatment.
3. MAECTITE reduced the leachability of lead in the soil retained on #4 sieve with munitions and the soil that passed through #4 sieve with and without munitions. The levels in the treated soils were reduced to acceptable range for potential off-site disposal and/or on-site reuse for berm reconstruction. MAECTITE appears to be suitable for use at Fort Custer based on the test results; however, the testing was not performed by a third-party laboratory.

4. ECOBOND reduced the leachability of lead in the soil retained on #4 sieve with munitions and the soil that passed through #4 sieve with and without munitions. ECOBOND reduced the TCLP lead levels in the soil retained on #4 sieve, but the levels did not meet the RCRA characteristic hazardous waste limit of 5 mg/L for non-hazardous off-site disposal. MT2 indicated an increase the ECOBOND dosage would meet the RCRA standard. ECOBOND appear to be suitable for use at Fort Custer based on the test results; however, a higher dosage rate would be needed than 4% for the material retained on #4 sieve.

5.1 BERM REMEDIATION

MAECTITE is recommended for the berm soil stabilization at FCTC based on the bench scale treatability testing results. Due to the potential funding limitations, cost estimates were obtained from Severson based on a per berm remediation process. Because addressing each berm individually will significantly reduce the amount of soil that undergoes treatment during each mobilization; Severson has revised the remediation approach. The revised approach will eliminate the need to screen the soils to separate the munitions and material larger than #4 sieve for treatment and disposal. Instead, Severson recommends removing the entire soil removed from the berm treated with MAECTITE and followed by off-site disposal. This option is considered more feasible due to the high mobilization costs and the potential difficulty in obtaining approval for non-hazardous disposal of the relatively low volume of soil retained on #4 sieve containing munitions fragments.

The per berm budgetary cost estimate is provided on Table 3. This estimate includes Severson conducting: a material treatability and dosage assessment, MACETITE chemical reagent application, waste characterization sampling, off-site disposal as non-hazardous waste, and reconstruction of the berms using clean sand. This estimate also includes conducting pre- and post-treatment sampling and analysis, and DLZ's contractor procurement and oversight.

6.0 REFERENCES

Interstate Technology and Regulatory Council (ITRC). January 2003. Characterization and Remediation of Soils at Closed Small Arms Firing Ranges. Technical/Regulatory Guidance.

Interstate Technology and Regulatory Council (ITRC). February 2005. Environmental Management at Operating Outdoor Small Arms Firing Ranges. Technical Guidance.

DLZ. November 2022. Small Arms Range Berm Feasibility Study, Fort Custer Training Center.

The TDJ Group, Inc. Technical Bulletin, Blastox Stabilization Reactions. TB-006 Issued 1-98.

Free Flow Technologies, Ltd. FF-300 Specifications Sheet.

Federal Remediation Technologies Roundtable. September 7, 2022. Stabilization at the Massachusetts Military Reservation, Training Range and Impact Area, Cape Cod, MA.

Sevenson Environmental Services, Inc. Brochure. MAECTITE Chemical Treatment Process.

MT2 Firing Range Services. Brochure. Overview of ECOBOND Technologies.

TABLES

Table 1
Particle Size Distribution of Berm Soil Sample
Fort Custer Training Center - Range 6

Sample Material	Weight (pounds)	% weight of Total	% weight of >#4 sieve
Soil retained on #4 (3/16-inch) sieve (minus pebbles retained on 3/8-inch sieve and munitions)	16.1	8.80%	57.50%
Munitions retained on #4 sieve (manually separated the munitions)	7.7	4.20%	27.50%
Pebbles removed from sample – retained on 3/8-inch sieve (not used in the sample collection for laboratory testing)	4.2	2.30%	15%
Soil passed though #4 sieve	155	84.70%	--
Total	183	100%	--

Notes

Sieved the entire soil collected from 7 locations of the berm at Range 6

Table 2
Bench Test Analytical Results Summary
Fort Custer Training Center - Range 6

Sample Description	Lead Total (mg/kg)	Lead TCLP (mg/L)	TCLP - Initial pH	TCLP - pH after acid addition	Extraction Fluid #	Lead SPLP (mg/L)	pH
Baseline >4S	13,000	540	8.09	1.59	1	0.960	8.00
Baseline >4S+M20%	14,000	420	8.17	1.52	1	0.340	7.92
Baseline <4S	10,000	530	7.84	1.57	1	7.900	7.77
Baseline <4S+M10%	12,000	670	7.81	1.62	1	6.800	7.93
Blastox >4S+M20%+B3%	NA	1,400	11.49	9.01	2		
Blastox >4S+M20%+B5%	NA	690	11.53	9.53	2		
Blastox <4S+B3%	NA	340	11.14	2.43	1		
Blastox <4S+B5%	NA	<1	11.30	2.52	1		
Blastox <4S+M10%+B3%	NA	280	11.19	1.96	1		
Blastox <4S+M10%+B5%	NA	<1	11.34	4.80	1		
Free Flow >4S+M20%+FF4%	NA	700	11.94	9.39	2		
Free Flow >4S+M20%+FF8%	NA	230	12.02	9.51	2		
Free Flow <4S+FF4%	NA	<1	11.53	2.31	1		
Free Flow <4S+FF8%	NA	350	11.76	6.32	2		
Free Flow <4S+M10%+FF4%	NA	<1	11.50	3.38	1		
Free Flow <4S+M10%+FF8%	NA	390	11.62	5.39	2		
Baseline* >4S	2,770	729					
Baseline* <4S	20,700	589					
MAECTITE >4S+M20%+Mix#1	NA	71.80					
MAECTITE >4S+M20%+Mix#2	NA	4.80					
MAECTITE >4S+M20%+Mix#3	NA	2.00					
MAECTITE <4S+Mix#1	NA	10.40					
MAECTITE <4S+Mix#2	NA	5.40					
MAECTITE <4S+Mix#3	NA	3.70					
MAECTITE <4S+Mix#4	NA	8.56					
MAECTITE <4S+Mix#5	NA	1.24	7.36		1		
MAECTITE <4S+M10%+Mix#3	NA	17.30					
MAECTITE <4S+M10%+Mix#4	NA	11.70					
MAECTITE <4S+M10%+Mix#5	NA	1.27	7.39		1		
ECOBOND >4S+M20%+Eco2%	644	32.0	8.17	6.45	1		
ECOBOND >4S+M20%+Eco4%	110,000	5.84	9.65	6.82	1		
ECOBOND <4S+Eco2%	6,450	0.976	8.15	5.61	1		
ECOBOND <4S+Eco4%	8,750	0.614	7.52	6.40	1		
ECOBOND <4S+M10%+Eco2%	6,260	23.3	9.49	5.69	1		
ECOBOND <4S+M10%+Eco4%	6,740	0.406	9.19	6.59	1		

Notes

TCLP Fluid #1: is a buffered solution of acetic acid and sodium hydroxide; with a pH of 4.93

TCLP Fluid #2: is an unbuffered solution of acetic acid; with a pH of 2.88

>4S: Soil retained on #4 sieve

<4S: Soil passed through #4 sieve

M20%: Munitions added, 20% of total sample weight

M10%: Munitions added, 10% of total sample weight

Baseline*: These baseline samples were analyzed by Severson prior to treatment

Table 3
Cost Estimate for Berm Remediation
Fort Custer Training Center

Description	unit	Berm 2	Berm 3	Berm 4	Berm 5	Berm 6	Total of All Berms
Berm Length	(feet)	141	139	65	63	286	-
Berm Height	(feet)	20	20	22	22	38	-
Excavation Depth	(feet)	3	3	3	3	3	-
Soil Volume	(cubic yards)	313	309	159	154	1,208	2,143
Total Soil Quantity ¹	(tons)	522	501	247	247	1,971	3,488
DLZ Planning ²	\$	\$ 4,000	\$ 4,000	\$ 2,000	\$ 2,000	\$ 8,000	\$ 20,000
Sevenson Costs ³	\$	\$ 169,810	\$ 166,052	\$ 97,190	\$ 96,317	\$ 544,873	\$ 1,074,242
Pre/Post Sampling ⁴	\$	\$ 12,800	\$ 12,800	\$ 11,200	\$ 11,200	\$ 15,800	\$ 63,800
DLZ Oversight ⁵	\$	\$ 29,500	\$ 29,500	\$ 20,000	\$ 20,000	\$ 47,500	\$ 146,500
Total Cost	\$	\$ 212,110	\$ 208,352	\$ 128,390	\$ 127,517	\$ 608,173	\$ 1,284,542

Assumptions

1. Total Soil Quantity (tons) is estimated by Sevenson for disposal after treatment with MAECTITE.
2. Cost estimate includes planning, design and sub-contractor procurement.
3. Cost includes dosage assessment, treatment, characterization, disposal, and reconstruction.
4. Cost estimate includes pre-treatment material characterization, and post-treatment sampling/analysis.
5. Cost estimate includes sub-contractor administration and oversight.

FIGURES

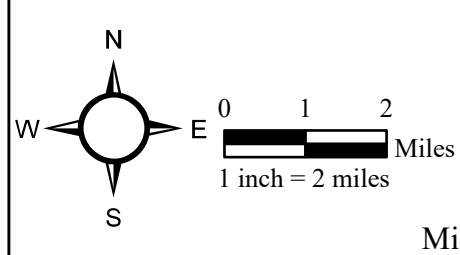
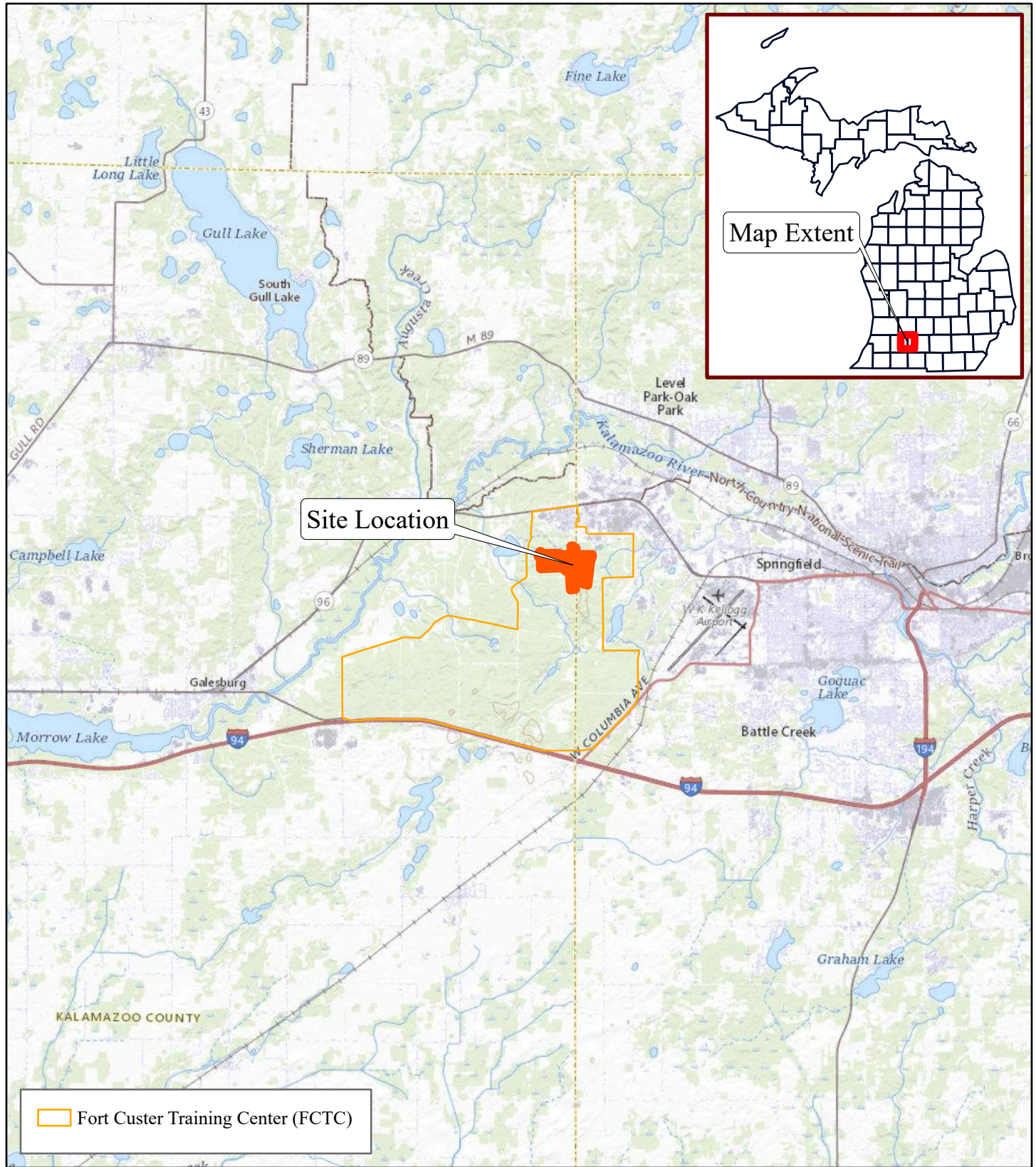


Figure: 1
Site Location
Fort Custer Training Center
2501 26th St
Augusta, MI 49012
Michigan Department of Military and Veterans Affairs



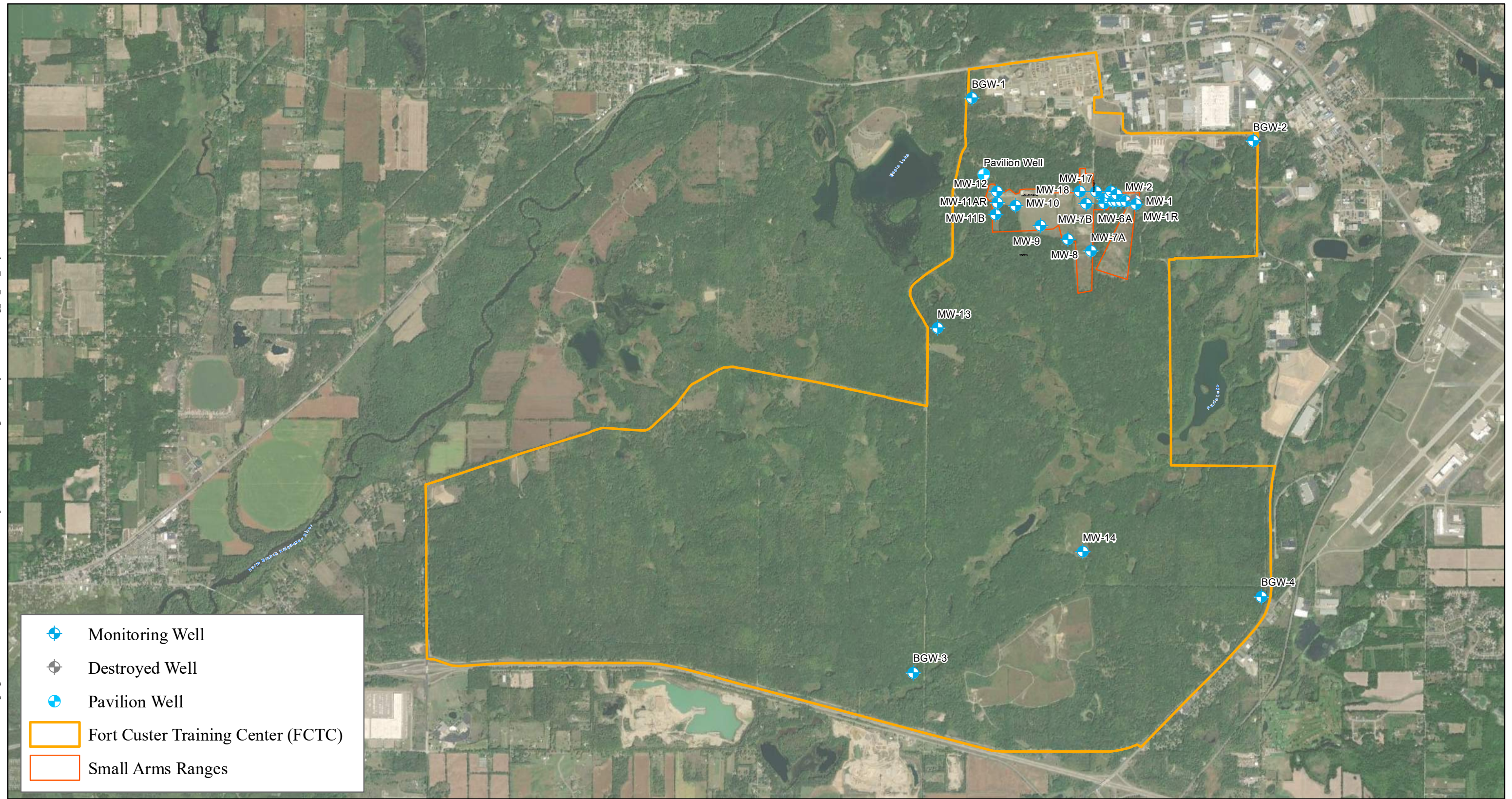
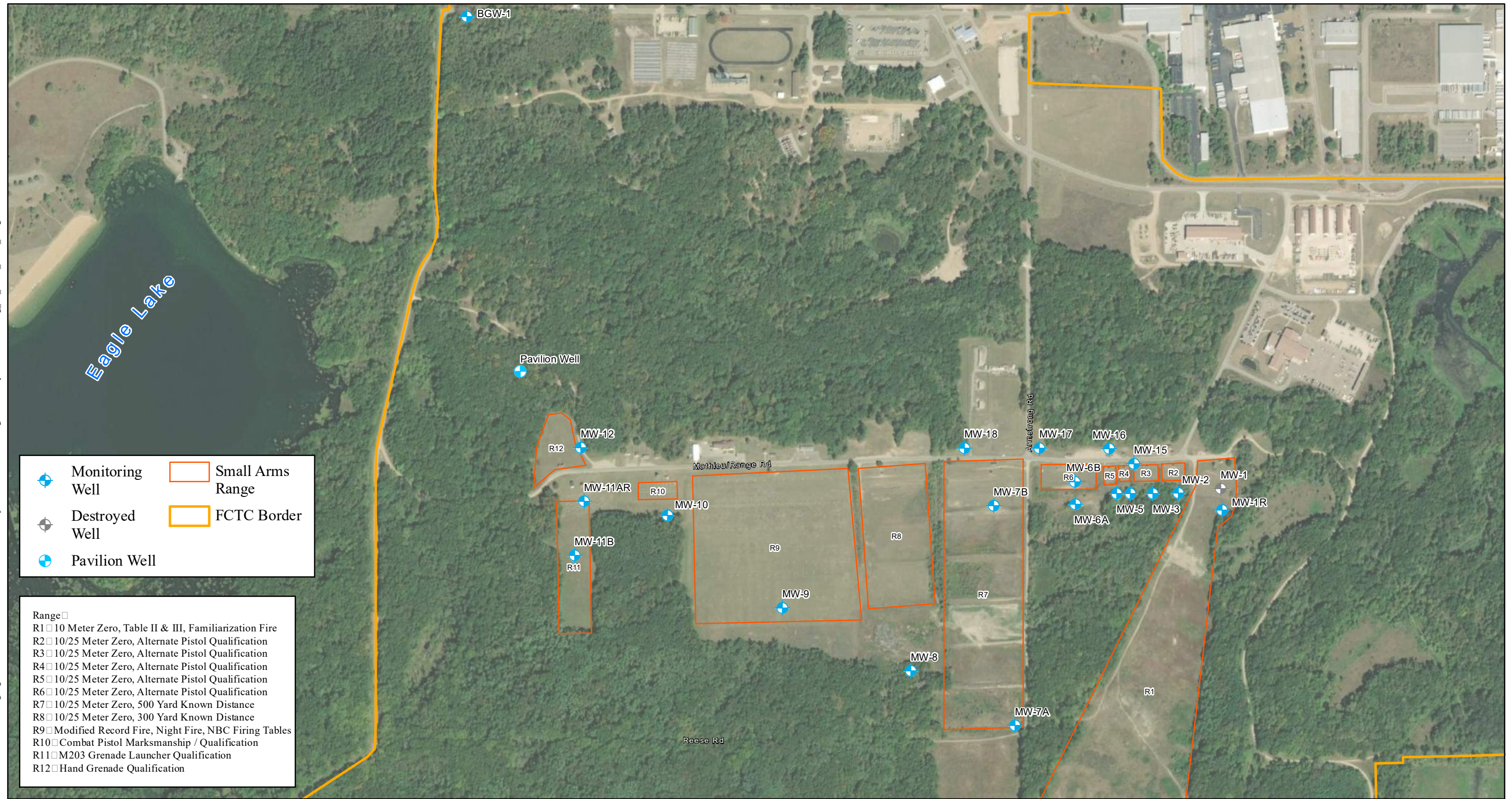


Figure: 2
 Site Map
 Fort Custer Training Center
 2501 26th St
 Augusta, MI 49012
 Michigan Department of Military and Veterans Affairs



Fig: 2



	Monitoring Well		Small Arms Range
	Destroyed Well		FCTC Border
	Pavilion Well		

- Range
- R1 10 Meter Zero, Table II & III, Familiarization Fire
 - R2 10/25 Meter Zero, Alternate Pistol Qualification
 - R3 10/25 Meter Zero, Alternate Pistol Qualification
 - R4 10/25 Meter Zero, Alternate Pistol Qualification
 - R5 10/25 Meter Zero, Alternate Pistol Qualification
 - R6 10/25 Meter Zero, Alternate Pistol Qualification
 - R7 10/25 Meter Zero, 500 Yard Known Distance
 - R8 10/25 Meter Zero, 300 Yard Known Distance
 - R9 Modified Record Fire, Night Fire, NBC Firing Tables
 - R10 Combat Pistol Marksmanship / Qualification
 - R11 M203 Grenade Launcher Qualification
 - R12 Hand Grenade Qualification

0 325 650

1 inch = 650 feet

Figure: 3
Small Arms Ranges
Fort Custer Training Center
 2501 26th St
 Augusta, MI 49012
 Michigan Department of Military and Veterans Affairs

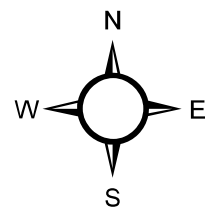


Fig: 3

C:\Users\agonguela\OneDrive - DLZ\Documents\ArcGIS\Projects\FCTC Berm FS Figures\mxd-aprx\07-13-2022\Fig_04_Small_Arms_Ranges_2_3_4_5_6.mxd



 Monitoring Well




0 40 80

 1 inch = 80 feet

Figure: 4
 Small Arms Ranges - 2,3,4,5 and 6
 Fort Custer Training Center
 2501 26th St
 Augusta, MI 49012
 Michigan Department of Military and Veterans Affairs



Fig: 4

APPENDIX A

FIELD SAMPLE LOCATION MAP

Range 6

- SAMPLE LOCATION AT BULLET POCKET
- SAMPLE LOCATION AT TOE OF BERM
- 4 TARGET NUMBER



TOP OF BACKSTOP BERM

BASE OF BERM

BULLET IMPACT POCKET



APPENDIX B

SAMPLE WEIGHTS FOR LABORATORY ANALYSIS

Table B-1
Baseline Sample Collection for Laboratory Testing
Weight of Soil-Munitions for Extraction for each Analytical Parameter

	Sample 2 Retained on #4 sieve (Baseline >4S+M20%)		Sample 4 Passed thru #4 sieve (Baseline <4S+M10%)	
	Soil (grams)	Munitions 20% (grams)	Soil (grams)	Munitions 10% (grams)
Total lead	8	2	9	1
TCLP lead	88	22	99	11
SPLP lead	88	22	99	11
pH	16	4	18	2

Table B-2
Blastox Treated Soil Samples for Laboratory Analysis
Weight of Soil-Munitions-Blastox Reagent for each Sample
(Fibertec CoC 214453)

Lab CoC Sample #	Analysis	Soil		Ammunition		Blastox	
		Sieve	(grams)	Added	(grams)	Dosage	(grams)
1	TCLP	>4	84.7	20%	22	3%	3.3
	pH		15.4		4		0.6
2	TCLP	>4	82.5	20%	22	5%	5.5
	pH		15		4		1
3	TCLP	<4	106.7	0%	0	3%	3.3
	pH		19.4		0		0.6
4	TCLP	<4	104.5	0%	0	3%	5.5
	pH		19		0		1
5	TCLP	<4	95.7	10%	11	3%	3.3
	pH		17.4		2		0.6
6	TCLP	<4	93.5	10%	11	5%	5.5
	pH		17		2		1

Table B-3
Free-Flow Treated Soil Samples for Laboratory Analysis
Weight of Soil-Munitions-Free Flow Reagent for each Sample
(Fibertec CoC 214452)

Lab CoC Sample #	Analysis	Soil		Ammunition		Free-Flow	
		Sieve	(grams)	Added	(grams)	Dosage	(grams)
1	TCLP	>4	83.6	20%	22	4%	4.4
	pH		15.2		4		0.8
2	TCLP	>4	79.2	20%	22	8%	8.8
	pH		14.4		4		1.6
3	TCLP	<4	105.6	0%	0	4%	4.4
	pH		19.2		0		0.8
4	TCLP	<4	101.2	0%	0	8%	8.8
	pH		18.4		0		1.6
5	TCLP	<4	94.6	10%	11	4%	4.4
	pH		17.2		2		0.8
6	TCLP	<4	90.2	10%	11	8%	8.8
	pH		16.4		2		1.6

APPENDIX C

LABORATORY REPORT – BASELINE SAMPLES

Tuesday, May 16, 2023

Fibertec Project Number: A15045
Project Identification: FCTC (1941-6940-21) /1941-6940-21
Submittal Date: 05/09/2023

Mr. Sarat Bobba
DLZ Michigan, Inc. - Lansing
1425 Keystone Avenue
Lansing, MI 48911

Dear Mr. Bobba,

Thank you for selecting Fibertec Environmental Services as your analytical laboratory. The samples you submitted have been analyzed in accordance with NELAC standards and the results compiled in the attached report. Any exceptions to NELAC compliance are noted in the report. These results apply only to those samples submitted. Please note TO-15 samples will be disposed of 7 calendar days after the reporting date. All other samples will be disposed of 30 days after the reporting date.

Please note that samples were received at 23.2°C which exceeds the maximum criteria of 6°C.

This report has been amended to correct the sample descriptors on -003 and -004. This replaces the report sent on 5/16/23.

If you have any questions regarding these results or if we may be of further assistance to you, please contact me at (517) 699-0345.

Sincerely,



By Sue Ricketts at 4:35 PM, May 16, 2023

For Heather L. Smith
Director of Laboratory Operations

Enclosures

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F: (231) 775-8584

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: Baseline >4S	Chain of Custody: 214454
Client Project Name: FCTC (1941-6940-21)	Sample No: 1	Collect Date: 05/09/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Toxicity Characteristic Leaching Procedure (TCLP)
Method: EPA 1311

Aliquot ID: **A15045-001** Matrix: **Soil/Solid**
Description: **Baseline >4S**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. TCLP Date	5/10/2023		NA	NA	1.0	NA	NA	05/10/23	NA	EZ

Synthetic Precipitation Leaching Procedure (SPLP)
Method: EPA 1312

Aliquot ID: **A15045-001** Matrix: **Soil/Solid**
Description: **Baseline >4S**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. SPLP Date	5/10/2023		NA	NA	1.0	NA	NA	05/10/23	NA	EZ

Trace Elements by ICP/MS
Method: EPA 0200.2/EPA 6020A

Aliquot ID: **A15045-001** Matrix: **Soil/Solid**
Description: **Baseline >4S**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	13000000		µg/kg	20000	2000	05/16/23	PT23E15C	05/16/23	T423E16A	CJA

Corrosivity (Waste Characterization); Soil/waste pH measured in water at the reported temperature
Method: EPA 9045D

Aliquot ID: **A15045-001** Matrix: **Soil/Solid**
Description: **Baseline >4S**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 1. Corrosivity (pH)	8.00	H	pH Units	-1.00	1.0	NA	NA	05/11/23 09:42	WD23E11A	CM
‡ 2. Temperature	21.6		°C	0.0	1.0	NA	NA	05/11/23 09:42	WD23E11A	CM



A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15045
Laboratory Sample Number: A15045-001

Order: A15045
 Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: Baseline >4S	Chain of Custody: 214454
Client Project Name: FCTC (1941-6940-21)	Sample No: 1	Collect Date: 05/09/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

SPLP Metals by ICP/MS Aliquot ID: **A15045-001B** Matrix: **SPLP Extract**
 Method: **EPA 3005A (Total Recoverable)/EPA 6020A** Description: **Baseline >4S**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	960		µg/L	3.0	10	05/15/23	PT23E15A	05/15/23	T423E15A	CJA

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F: (517) 699-0388
 F: (810) 220-3311
 F: (231) 775-8584



A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15045
Laboratory Sample Number: A15045-001

Order: A15045
Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing
Sample Description: Baseline >4S
Chain of Custody: 214454
Client Project Name: FCTC (1941-6940-21)
Sample No: 1
Collect Date: 05/09/23
Client Project No: 1941-6940-21
Sample Matrix: Soil/Solid
Collect Time: NA

Sample Comments: Soil results have been calculated and reported on a dry weight basis unless otherwise noted.

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

TCLP Metals by ICP/MS
Method: EPA 3005A (Total Recoverable)/EPA 6020A
Aliquot ID: A15045-001A
Matrix: TCLP Extract
Description: Baseline >4S

Table with 11 columns: Parameter(s), Result, Q, Units, Reporting Limit, Dilution, Preparation (P. Date, P. Batch), Analysis (A. Date, A. Batch, Init.). Row 1: 1. Lead, 540, mg/L, 1.0, 400, 05/16/23, PT23E15B, 05/16/23, T423E16A, CJA

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F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: Baseline >4S+M20%	Chain of Custody: 214454
Client Project Name: FCTC (1941-6940-21)	Sample No: 2	Collect Date: 05/09/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Toxicity Characteristic Leaching Procedure (TCLP)
Method: EPA 1311

Aliquot ID: A15045-002 **Matrix: Soil/Solid**
Description: Baseline >4S+M20%

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. TCLP Date	5/10/2023		NA	NA	1.0	NA	NA	05/10/23	NA	EZ

Synthetic Precipitation Leaching Procedure (SPLP)
Method: EPA 1312

Aliquot ID: A15045-002 **Matrix: Soil/Solid**
Description: Baseline >4S+M20%

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. SPLP Date	5/10/2023		NA	NA	1.0	NA	NA	05/10/23	NA	EZ

Trace Elements by ICP/MS
Method: EPA 0200.2/EPA 6020A

Aliquot ID: A15045-002 **Matrix: Soil/Solid**
Description: Baseline >4S+M20%

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	14000000		µg/kg	20000	10000	05/16/23	PT23E15C	05/16/23	T423E16A	CJA

Corrosivity (Waste Characterization); Soil/waste pH measured in water at the reported temperature
Method: EPA 9045D

Aliquot ID: A15045-002 **Matrix: Soil/Solid**
Description: Baseline >4S+M20%

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 1. Corrosivity (pH)	7.92	H	pH Units	-1.00	1.0	NA	NA	05/11/23 09:45	WD23E11A	CM
‡ 2. Temperature	21.8		°C	0.0	1.0	NA	NA	05/11/23 09:45	WD23E11A	CM



A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15045
Laboratory Sample Number: A15045-002

Order: A15045
 Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: Baseline >4S+M20%	Chain of Custody: 214454
Client Project Name: FCTC (1941-6940-21)	Sample No: 2	Collect Date: 05/09/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

SPLP Metals by ICP/MS Aliquot ID: **A15045-002B** Matrix: **SPLP Extract**
 Method: **EPA 3005A (Total Recoverable)/EPA 6020A** Description: **Baseline >4S+M20%**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	340		µg/L	3.0	10	05/15/23	PT23E15A	05/15/23	T423E15A	CJA

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 F: (231) 775-8584



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Analytical Laboratory Report
Laboratory Project Number: A15045
Laboratory Sample Number: A15045-002

Order: A15045
 Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: Baseline >4S+M20%	Chain of Custody: 214454
Client Project Name: FCTC (1941-6940-21)	Sample No: 2	Collect Date: 05/09/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

TCLP Metals by ICP/MS	Aliquot ID: A15045-002A	Matrix: TCLP Extract
Method: EPA 3005A (Total Recoverable)/EPA 6020A	Description: Baseline >4S+M20%	

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	420		mg/L	1.0	400	05/16/23	PT23E15B	05/16/23	T423E16A	CJA

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Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: Baseline < 4S	Chain of Custody: 214454
Client Project Name: FCTC (1941-6940-21)	Sample No: 3	Collect Date: 05/09/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Toxicity Characteristic Leaching Procedure (TCLP)
 Method: EPA 1311

Aliquot ID: **A15045-003** Matrix: **Soil/Solid**
 Description: **Baseline < 4S**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. TCLP Date	5/10/2023		NA	NA	1.0	NA	NA	05/10/23	NA	EZ

Synthetic Precipitation Leaching Procedure (SPLP)
 Method: EPA 1312

Aliquot ID: **A15045-003** Matrix: **Soil/Solid**
 Description: **Baseline < 4S**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. SPLP Date	5/10/2023		NA	NA	1.0	NA	NA	05/10/23	NA	EZ

Trace Elements by ICP/MS
 Method: EPA 0200.2/EPA 6020A

Aliquot ID: **A15045-003** Matrix: **Soil/Solid**
 Description: **Baseline < 4S**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	10000000		µg/kg	20000	2000	05/16/23	PT23E15C	05/16/23	T423E16A	CJA

Corrosivity (Waste Characterization); Soil/waste pH measured in water at the reported temperature
 Method: EPA 9045D

Aliquot ID: **A15045-003** Matrix: **Soil/Solid**
 Description: **Baseline < 4S**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 1. Corrosivity (pH)	7.77	H	pH Units	-1.00	1.0	NA	NA	05/11/23 09:47	WD23E11A	CM
‡ 2. Temperature	21.8		°C	0.0	1.0	NA	NA	05/11/23 09:47	WD23E11A	CM



A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15045
Laboratory Sample Number: A15045-003

Order: A15045
Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing
Sample Description: Baseline < 4S
Chain of Custody: 214454
Client Project Name: FCTC (1941-6940-21)
Sample No: 3
Collect Date: 05/09/23
Client Project No: 1941-6940-21
Sample Matrix: Soil/Solid
Collect Time: NA

Sample Comments: Soil results have been calculated and reported on a dry weight basis unless otherwise noted.

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

SPLP Metals by ICP/MS
Method: EPA 3005A (Total Recoverable)/EPA 6020A
Aliquot ID: A15045-003B
Matrix: SPLP Extract
Description: Baseline < 4S

Table with 11 columns: Parameter(s), Result, Q, Units, Reporting Limit, Dilution, Preparation (P. Date, P. Batch), Analysis (A. Date, A. Batch), Init. Row 1: 1. Lead, 7900, µg/L, 20, 100, 05/16/23, PT23E15A, 05/16/23, T423E16A, CJA

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Analytical Laboratory Report
Laboratory Project Number: A15045
Laboratory Sample Number: A15045-003

Order: A15045
 Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: Baseline < 4S	Chain of Custody: 214454
Client Project Name: FCTC (1941-6940-21)	Sample No: 3	Collect Date: 05/09/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

TCLP Metals by ICP/MS Aliquot ID: **A15045-003A** Matrix: **TCLP Extract**
Method: EPA 3005A (Total Recoverable)/EPA 6020A Description: **Baseline < 4S**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	530		mg/L	1.0	400	05/16/23	PT23E15B	05/16/23	T423E16A	CJA

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Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: Baseline < 4S+M10%	Chain of Custody: 214454
Client Project Name: FCTC (1941-6940-21)	Sample No: 4	Collect Date: 05/09/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Toxicity Characteristic Leaching Procedure (TCLP)
Method: EPA 1311

Aliquot ID: **A15045-004** Matrix: **Soil/Solid**
Description: **Baseline < 4S+M10%**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. TCLP Date	5/10/2023		NA	NA	1.0	NA	NA	05/10/23	NA	EZ

Synthetic Precipitation Leaching Procedure (SPLP)
Method: EPA 1312

Aliquot ID: **A15045-004** Matrix: **Soil/Solid**
Description: **Baseline < 4S+M10%**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. SPLP Date	5/10/2023		NA	NA	1.0	NA	NA	05/10/23	NA	EZ

Trace Elements by ICP/MS
Method: EPA 0200.2/EPA 6020A

Aliquot ID: **A15045-004** Matrix: **Soil/Solid**
Description: **Baseline < 4S+M10%**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	12000000		µg/kg	20000	10000	05/16/23	PT23E15C	05/16/23	T423E16A	CJA

Corrosivity (Waste Characterization); Soil/waste pH measured in water at the reported temperature
Method: EPA 9045D

Aliquot ID: **A15045-004** Matrix: **Soil/Solid**
Description: **Baseline < 4S+M10%**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 1. Corrosivity (pH)	7.93	H	pH Units	-1.00	1.0	NA	NA	05/11/23 09:51	WD23E11A	CM
‡ 2. Temperature	21.9		°C	0.0	1.0	NA	NA	05/11/23 09:51	WD23E11A	CM



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Analytical Laboratory Report
Laboratory Project Number: A15045
Laboratory Sample Number: A15045-004

Order: A15045
 Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: Baseline < 4S+M10%	Chain of Custody: 214454
Client Project Name: FCTC (1941-6940-21)	Sample No: 4	Collect Date: 05/09/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

SPLP Metals by ICP/MS Aliquot ID: **A15045-004B** Matrix: **SPLP Extract**
 Method: **EPA 3005A (Total Recoverable)/EPA 6020A** Description: **Baseline < 4S+M10%**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	6800		µg/L	20	100	05/16/23	PT23E15A	05/16/23	T423E16A	CJA

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Analytical Laboratory Report
Laboratory Project Number: A15045
Laboratory Sample Number: A15045-004

Order: A15045
 Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: Baseline < 4S+M10%	Chain of Custody: 214454
Client Project Name: FCTC (1941-6940-21)	Sample No: 4	Collect Date: 05/09/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

TCLP Metals by ICP/MS Aliquot ID: **A15045-004A** Matrix: **TCLP Extract**
Method: EPA 3005A (Total Recoverable)/EPA 6020A Description: **Baseline < 4S+M10%**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	670		mg/L	1.0	400	05/16/23	PT23E15B	05/16/23	T423E16A	CJA

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Definitions/ Qualifiers:

- A:** Spike recovery or precision unusable due to dilution.
- B:** The analyte was detected in the associated method blank.
- E:** The analyte was detected at a concentration greater than the calibration range, therefore the result is estimated.
- J:** The concentration is an estimated value.
- M:** Modified Method
- U:** The analyte was not detected at or above the reporting limit.
- X:** Matrix Interference has resulted in a raised reporting limit or distorted result.
- W:** Results reported on a wet-weight basis.
- *:** Value reported is outside QC limits

Exception Summary:

H : Hold time exceeded.

Analysis Locations:

All analyses performed in Holt.



Accreditation Number(s):

T104704518-23-15 (TX)

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Geoprobe
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Chain of Custody #
214454
 PAGE ___ of ___

Client Name: DLZ			PARAMETERS										Matrix Code			Deliverables
Contact Person: Susat Bobba			MATERIAL (SEE RIGHT CORNER FOR CODE)	# OF CONTAINERS	Total lead	TCLP lead	SPLP lead	pH	HOLD SAMPLE	S Soil	GW Ground Water	Level 2				
Project Name/ Number: FCTC 1941-6940-21										A Air	SW Surface Water	Level 3				
Email distribution list: sbobba@dlz.com EnvSampleResults@dlz.com										O Oil	WW Waste Water	Level 4				
Quote# 1523										P Wipe	X Other: Specify	EDD				
Purchase Order#										Remarks:						
Date	Time	Sample #	Client Sample Descriptor													
5/9/23		1	Baseline > 4S													
↓		2	Baseline > 4S + M20%													
↓		3	Baseline < 4S													
↓		4	Baseline < 4S + M10%													
Comments:																
Sampled/Relinquished By: Cristian Vega DLZ			Date/ Time: 5/9/23 4:24			Received By: Brandy Powers 5/9/23 4:24										
Relinquished By:			Date/ Time:			Received By:										
Relinquished By:			Date/ Time:			Received By Laboratory:										
Turnaround Time ALL RESULTS WILL BE SENT BY THE END OF THE BUSINESS DAY										LAB USE ONLY						
<input type="checkbox"/> 1 bus. day <input type="checkbox"/> 2 bus. days <input type="checkbox"/> 3 bus. days <input type="checkbox"/> 4 bus. days <input checked="" type="checkbox"/> 5-7 bus. days (standard) Other (specify time/date requirement): _____										Fibertec project number: A15045 Temperature upon receipt at Lab: 73.2°C						
Please see back for terms and conditions																

1/2

TCLP Blank logbook:

pH Logbook:

Thermometer ID (**):

Thermometer ID (tumbler):

G-589-LOG-(003)

T-509-LOG-(017)

1000 3316

10002547 10003319
E2 5/10/23

Balance ID:

HCl ID:

Tumbler ID:

Tumbler RPM:

TCLP/SPLP Logbook

10000165 11.510-23

6-0002510

10000183/10000184/10004175

32/32

Temp Range °C:

pH strip ID (post tumble):

Filter ID (post tumble):

22.5 - 24.8

~~23.63~~ 25.65 E2 5/11/23

52829

53492

Sample ID	Particle size reduction Yes/No	% Solid	pH Mass (g) 4.6g - 5.4g	Initial pH	pH after acid addition + 10 min @ 50°C (**)	Extraction fluid type/ID used	Extraction fluid pH	Container IC	Weight tumble (g) 100.0g - 100.4g	Extraction fluid amount used (mL)	Date on	Time on	Date off	Time off	X if there is filtrate X when added back	Final pH	Peer Review: Analyst Date
A15035-001	NO	100%	5.026	8.77	6.64	C	2.92	FL	100.117	2000	5/10/23	17:30	5-11-23	9:32		7	
A15045-001			5.147	8.81	1.59	A	4.92	S1	100.038							5	
A15045-002			4.903	8.17	1.52	A	4.92	X1	100.255							5	
A15045-003			5.140	7.81	1.57	A	4.92	K1	100.375							5	
A15045-004			5.216	7.81	1.62	A	4.92	M1	100.270							5	
A15045-001			/	/	/	E	4.16	W1	100.227							7	
A15045-002			/	/	/	E	4.16	C1	100.101							7	
A15045-003			/	/	/	E	4.16	H1	100.055							8	
A15045-004			/	/	/	E	4.16	Q1	100.172							7	
TB123E10A			/	/	/	A	4.92	T1	/							7	
Initials/Date	E2 5/10/23																
Notes:	<div style="display: flex; justify-content: space-between;"> 5-11-23 5-12-23 </div>																

- A TCLP #1: TB123E10A/6-000308
- B TCLP #1:
- C TCLP #2: TB223E10A/6-000306
- D TCLP #2:
- E SPLP #1: SBL23E10A/6-000298
- F SPLP #1:
- G SPLP #2:
- H SPLP #2:

APPENDIX D

LABORATORY REPORT – BLASTOX SAMPLES

Wednesday, May 17, 2023

Fibertec Project Number: A15069
Project Identification: FCTC (1941-6940-21) /1941-6940-21
Submittal Date: 05/10/2023

Mr. Sarat Bobba
DLZ Michigan, Inc. - Lansing
1425 Keystone Avenue
Lansing, MI 48911

Dear Mr. Bobba,

Thank you for selecting Fibertec Environmental Services as your analytical laboratory. The samples you submitted have been analyzed in accordance with NELAC standards and the results compiled in the attached report. Any exceptions to NELAC compliance are noted in the report. These results apply only to those samples submitted. Please note TO-15 samples will be disposed of 7 calendar days after the reporting date. All other samples will be disposed of 30 days after the reporting date.

Please note that samples were received at 23.9°C which exceeds the maximum criteria of 6°C.

If you have any questions regarding these results or if we may be of further assistance to you, please contact me at (517) 699-0345.

Sincerely,



By Sue Ricketts at 3:51 PM, May 17, 2023

For Heather L. Smith
Director of Laboratory Operations

Enclosures



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Analytical Laboratory Report
Laboratory Project Number: A15069
Laboratory Sample Number: A15069-001

Order: A15069
Date: 05/17/23

Client Identification: DLZ Michigan, Inc. - Lansing
Sample Description: >4S+M20%+B3%
Chain of Custody: 214453
Client Project Name: FCTC (1941-6940-21)
Sample No: 1
Collect Date: 05/10/23
Client Project No: 1941-6940-21
Sample Matrix: Soil/Solid
Collect Time: NA

Sample Comments: Soil results have been calculated and reported on a dry weight basis unless otherwise noted.

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

Toxicity Characteristic Leaching Procedure (TCLP)
Method: EPA 1311

Aliquot ID: A15069-001 Matrix: Soil/Solid
Description: >4S+M20%+B3%

Table with 11 columns: Parameter(s), Result, Q, Units, Reporting Limit, Dilution, Preparation (P. Date, P. Batch), Analysis (A. Date, A. Batch), Init. Row 1: 1. TCLP Date, 5/15/2023, NA, NA, NA, 1.0, NA, NA, 05/15/23, NA, ARC

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Analytical Laboratory Report
Laboratory Project Number: A15069
Laboratory Sample Number: A15069-001

Order: A15069
 Date: 05/17/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: >4S+M20%+B3%	Chain of Custody: 214453
Client Project Name: FCTC (1941-6940-21)	Sample No: 1	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

TCLP Metals by ICP/MS	Aliquot ID: A15069-001A	Matrix: TCLP Extract
Method: EPA 3005A (Total Recoverable)/EPA 6020A	Description: >4S+M20%+B3%	

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	1400		mg/L	4.0	2000	05/17/23	PT23E17B	05/17/23	T423E17B	RJM

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Analytical Laboratory Report
Laboratory Project Number: A15069
Laboratory Sample Number: A15069-002

Order: A15069
 Date: 05/17/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: >4S+M20%+B5%	Chain of Custody: 214453
Client Project Name: FCTC (1941-6940-21)	Sample No: 2	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

Toxicity Characteristic Leaching Procedure (TCLP)
Method: EPA 1311

Aliquot ID: A15069-002 **Matrix: Soil/Solid**
Description: >4S+M20%+B5%

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. TCLP Date	5/15/2023		NA	NA	1.0	NA	NA	05/15/23	NA	ARC

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A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15069
Laboratory Sample Number: A15069-002

Order: A15069
Date: 05/17/23

Client Identification: DLZ Michigan, Inc. - Lansing
Sample Description: >4S+M20%+B5%
Chain of Custody: 214453
Client Project Name: FCTC (1941-6940-21)
Sample No: 2
Collect Date: 05/10/23
Client Project No: 1941-6940-21
Sample Matrix: Soil/Solid
Collect Time: NA

Sample Comments: Soil results have been calculated and reported on a dry weight basis unless otherwise noted.

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

TCLP Metals by ICP/MS

Method: EPA 3005A (Total Recoverable)/EPA 6020A

Aliquot ID: A15069-002A

Matrix: TCLP Extract

Description: >4S+M20%+B5%

Table with 11 columns: Parameter(s), Result, Q, Units, Reporting Limit, Dilution, Preparation (P. Date, P. Batch), Analysis (A. Date, A. Batch, Init.). Row 1: 1. Lead, 690, mg/L, 1.0, 400, 05/17/23, PT23E17B, 05/17/23, T423E17B, RJM

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Analytical Laboratory Report
Laboratory Project Number: A15069
Laboratory Sample Number: A15069-003

Order: A15069
 Date: 05/17/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: <4S+B3%	Chain of Custody: 214453
Client Project Name: FCTC (1941-6940-21)	Sample No: 3	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

Toxicity Characteristic Leaching Procedure (TCLP)
Method: EPA 1311

Aliquot ID: A15069-003 **Matrix: Soil/Solid**
Description: <4S+B3%

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. TCLP Date	5/15/2023		NA	NA	1.0	NA	NA	05/15/23	NA	ARC

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A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15069
Laboratory Sample Number: A15069-003

Order: A15069
 Date: 05/17/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: <4S+B3%	Chain of Custody: 214453
Client Project Name: FCTC (1941-6940-21)	Sample No: 3	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

TCLP Metals by ICP/MS Aliquot ID: **A15069-003A** Matrix: **TCLP Extract**
Method: EPA 3005A (Total Recoverable)/EPA 6020A Description: **<4S+B3%**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	340		mg/L	1.0	200	05/17/23	PT23E17B	05/17/23	T423E17B	RJM

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Analytical Laboratory Report
Laboratory Project Number: A15069
Laboratory Sample Number: A15069-004

Order: A15069
 Date: 05/17/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: <4S+B5%	Chain of Custody: 214453
Client Project Name: FCTC (1941-6940-21)	Sample No: 4	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

Toxicity Characteristic Leaching Procedure (TCLP)
Method: EPA 1311

Aliquot ID: A15069-004 **Matrix: Soil/Solid**
Description: <4S+B5%

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. TCLP Date	5/15/2023		NA	NA	1.0	NA	NA	05/15/23	NA	ARC

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A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15069
Laboratory Sample Number: A15069-004

Order: A15069
 Date: 05/17/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: <4S+B5%	Chain of Custody: 214453
Client Project Name: FCTC (1941-6940-21)	Sample No: 4	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

TCLP Metals by ICP/MS	Aliquot ID: A15069-004A	Matrix: TCLP Extract
Method: EPA 3005A (Total Recoverable)/EPA 6020A	Description: <4S+B5%	

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	U		mg/L	1.0	20	05/17/23	PT23E17B	05/17/23	T423E17B	RJM

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Analytical Laboratory Report
Laboratory Project Number: A15069
Laboratory Sample Number: A15069-005

Order: A15069
 Date: 05/17/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: <4S+M10%+B3%	Chain of Custody: 214453
Client Project Name: FCTC (1941-6940-21)	Sample No: 5	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

Toxicity Characteristic Leaching Procedure (TCLP)
Method: EPA 1311

Aliquot ID: A15069-005 **Matrix: Soil/Solid**
Description: <4S+M10%+B3%

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. TCLP Date	5/15/2023		NA	NA	1.0	NA	NA	05/15/23	NA	ARC

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A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15069
Laboratory Sample Number: A15069-005

Order: A15069
 Date: 05/17/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: <4S+M10%+B3%	Chain of Custody: 214453
Client Project Name: FCTC (1941-6940-21)	Sample No: 5	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

TCLP Metals by ICP/MS Aliquot ID: **A15069-005A** Matrix: **TCLP Extract**
Method: EPA 3005A (Total Recoverable)/EPA 6020A Description: **<4S+M10%+B3%**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	280		mg/L	1.0	200	05/17/23	PT23E17B	05/17/23	T423E17B	RJM

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Analytical Laboratory Report
Laboratory Project Number: A15069
Laboratory Sample Number: A15069-006

Order: A15069
 Date: 05/17/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: <4S+M10%+B5%	Chain of Custody: 214453
Client Project Name: FCTC (1941-6940-21)	Sample No: 6	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

Toxicity Characteristic Leaching Procedure (TCLP)
Method: EPA 1311

Aliquot ID: A15069-006 **Matrix: Soil/Solid**
Description: <4S+M10%+B5%

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. TCLP Date	5/15/2023		NA	NA	1.0	NA	NA	05/15/23	NA	ARC

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A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15069
Laboratory Sample Number: A15069-006

Order: A15069
 Date: 05/17/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: <4S+M10%+B5%	Chain of Custody: 214453
Client Project Name: FCTC (1941-6940-21)	Sample No: 6	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

TCLP Metals by ICP/MS Aliquot ID: **A15069-006A** Matrix: **TCLP Extract**
Method: EPA 3005A (Total Recoverable)/EPA 6020A Description: **<4S+M10%+B5%**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	U		mg/L	1.0	20	05/17/23	PT23E17B	05/17/23	T423E17B	RJM

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Definitions/ Qualifiers:

- A:** Spike recovery or precision unusable due to dilution.
- B:** The analyte was detected in the associated method blank.
- E:** The analyte was detected at a concentration greater than the calibration range, therefore the result is estimated.
- J:** The concentration is an estimated value.
- M:** Modified Method
- U:** The analyte was not detected at or above the reporting limit.
- X:** Matrix Interference has resulted in a raised reporting limit or distorted result.
- W:** Results reported on a wet-weight basis.
- *:** Value reported is outside QC limits

Exception Summary:

Analysis Locations:

All analyses performed in Holt.



Accreditation Number(s):

T104704518-23-15 (TX)

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TCLP Blank logbook: G-589-LOG-(003)
 pH Logbook: T-509-LOG-(017)
 Thermometer ID (**): 1000 33/16
 Thermometer ID (tumbler): 10002547

TCLP/SPLP Logbook
 Balance ID: 10000165 MAC 5-16-23
 HCl ID: G-0002540
 Tumbler ID: 10000183 / 10000184 / 10004175
 Tumbler RPM: 32 / 33

Temp Range °C: 22.34 - 23.31
 pH strip ID (post tumble): 50992
 Filter ID (post tumble): 53492

Sample ID	Particle size reduction Yes/No	% Solid	pH Mass (g) 4.6g - 5.4g	Initial pH	pH after acid addition + 10 min @ 50°C (**)	Extraction fluid type/ID used	Extraction fluid pH	Container ID	Weight tumble (g) 100.0g - 100.4g	Extraction fluid amount used (mL)	Date on	Time on	Date off	Time off	X if there is filtrate X when added back	Final pH	Peer Review: Analyst Date
A15069-001	No	100	4.929	11.49	9.01	C	2.88	Y1	100.025	2000	5-15-23 ²³	16:39	5-16-23	8:49		5	
-002			4.826	11.53	9.53	C	2.88	T1	100.113							5	
-003			5.098	11.14	2.43	A	4.95	F1	100.063							6	
-004			5.005	11.30	2.52	A		P1	100.128							8	
-005			5.038	11.19	1.96	A		H1	100.114							6	
-006			4.953	11.34	4.80	A		C1	100.019							8	
A15101-001			5.064	9.10	2.05	A		M1	100.061							5	
A15104-001			4.978	9.16	5.15	C	2.88	W1	100.058							5	
-002			5.074	9.15	2.60	A	4.95	K1	100.034							6	
-003			4.990	9.09	1.92	A		N1	100.181							5	
Initials/Date	ARC 5-15-23																

Notes: A15101-001 has oil smell

TB123E15A: Container ID E1, pH 4.95 5
 TB223E15A: Container ID X1, pH 2.88 3

A TCLP #1: TB123E15A/6-000310 E SPLP #1:
 B TCLP #1: F SPLP #1:
 C TCLP #2: TB223E15A/6-000309 G SPLP #2:
 D TCLP #2: H SPLP #2:

APPENDIX E

LABORATORY REPORT – FREE FLOW SAMPLES

Tuesday, May 16, 2023

Fibertec Project Number: A15067
Project Identification: FCTC (1941-6940-21) /1941-6940-21
Submittal Date: 05/10/2023

Mr. Sarat Bobba
DLZ Michigan, Inc. - Lansing
1425 Keystone Avenue
Lansing, MI 48911

Dear Mr. Bobba,

Thank you for selecting Fibertec Environmental Services as your analytical laboratory. The samples you submitted have been analyzed in accordance with NELAC standards and the results compiled in the attached report. Any exceptions to NELAC compliance are noted in the report. These results apply only to those samples submitted. Please note TO-15 samples will be disposed of 7 calendar days after the reporting date. All other samples will be disposed of 30 days after the reporting date.

Please note that samples were received at 23.9°C which exceeds the maximum criteria of 6°C.

If you have any questions regarding these results or if we may be of further assistance to you, please contact me at (517) 699-0345.

Sincerely,



By Sue Ricketts at 2:40 PM, May 16, 2023

For Heather L. Smith
Director of Laboratory Operations

Enclosures



A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15067
Laboratory Sample Number: A15067-001

Order: A15067
 Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: >4S+M20%+FF4%	Chain of Custody: 214452
Client Project Name: FCTC (1941-6940-21)	Sample No: 1	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Toxicity Characteristic Leaching Procedure (TCLP)
Method: EPA 1311

Aliquot ID: A15067-001 **Matrix: Soil/Solid**
Description: >4S+M20%+FF4%

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. TCLP Date	5/11/2023		NA	NA	1.0	NA	NA	05/11/23	NA	EZ

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A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15067
Laboratory Sample Number: A15067-001

Order: A15067
 Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: >4S+M20%+FF4%	Chain of Custody: 214452
Client Project Name: FCTC (1941-6940-21)	Sample No: 1	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

TCLP Metals by ICP/MS Aliquot ID: **A15067-001A** Matrix: **TCLP Extract**
Method: EPA 3005A (Total Recoverable)/EPA 6020A Description: **>4S+M20%+FF4%**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	700		mg/L	1.0	400	05/16/23	PT23E15B	05/16/23	T423E16A	CJA

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Analytical Laboratory Report
Laboratory Project Number: A15067
Laboratory Sample Number: A15067-002

Order: A15067
Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing
Sample Description: >4S+M20%+FF8%
Chain of Custody: 214452
Client Project Name: FCTC (1941-6940-21)
Sample No: 2
Collect Date: 05/10/23
Client Project No: 1941-6940-21
Sample Matrix: Soil/Solid
Collect Time: NA

Sample Comments: Soil results have been calculated and reported on a dry weight basis unless otherwise noted.

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

Toxicity Characteristic Leaching Procedure (TCLP)
Method: EPA 1311

Aliquot ID: A15067-002
Matrix: Soil/Solid
Description: >4S+M20%+FF8%

Table with 11 columns: Parameter(s), Result, Q, Units, Reporting Limit, Dilution, Preparation (P. Date, P. Batch), Analysis (A. Date, A. Batch), Init. Row 1: 1. TCLP Date, 5/11/2023, NA, NA, NA, 1.0, NA, NA, 05/11/23, NA, EZ

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Analytical Laboratory Report
Laboratory Project Number: A15067
Laboratory Sample Number: A15067-002

Order: A15067
 Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: >4S+M20%+FF8%	Chain of Custody: 214452
Client Project Name: FCTC (1941-6940-21)	Sample No: 2	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

TCLP Metals by ICP/MS	Aliquot ID: A15067-002A	Matrix: TCLP Extract
Method: EPA 3005A (Total Recoverable)/EPA 6020A	Description: >4S+M20%+FF8%	

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	230		mg/L	1.0	200	05/16/23	PT23E15B	05/16/23	T423E16A	CJA

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A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15067
Laboratory Sample Number: A15067-003

Order: A15067
 Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: <4S+FF4%	Chain of Custody: 214452
Client Project Name: FCTC (1941-6940-21)	Sample No: 3	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

Toxicity Characteristic Leaching Procedure (TCLP)
Method: EPA 1311

Aliquot ID: A15067-003 **Matrix: Soil/Solid**
Description: <4S+FF4%

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. TCLP Date	5/11/2023		NA	NA	1.0	NA	NA	05/11/23	NA	EZ

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 F: (810) 220-3311
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A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15067
Laboratory Sample Number: A15067-003

Order: A15067
 Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: <4S+FF4%	Chain of Custody: 214452
Client Project Name: FCTC (1941-6940-21)	Sample No: 3	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

TCLP Metals by ICP/MS	Aliquot ID: A15067-003A	Matrix: TCLP Extract
Method: EPA 3005A (Total Recoverable)/EPA 6020A	Description: <4S+FF4%	

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	U		mg/L	1.0	20	05/15/23	PT23E15B	05/15/23	T423E15A	CJA

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 T: (231) 775-8368

F: (517) 699-0388
 F: (810) 220-3311
 F: (231) 775-8584



A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15067
Laboratory Sample Number: A15067-004

Order: A15067
 Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: <4S+FF8%	Chain of Custody: 214452
Client Project Name: FCTC (1941-6940-21)	Sample No: 4	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

Toxicity Characteristic Leaching Procedure (TCLP)
Method: EPA 1311

Aliquot ID: A15067-004 **Matrix: Soil/Solid**
Description: <4S+FF8%

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. TCLP Date	5/11/2023		NA	NA	1.0	NA	NA	05/11/23	NA	EZ

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A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15067
Laboratory Sample Number: A15067-004

Order: A15067
 Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: <4S+FF8%	Chain of Custody: 214452
Client Project Name: FCTC (1941-6940-21)	Sample No: 4	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

TCLP Metals by ICP/MS Aliquot ID: **A15067-004A** Matrix: **TCLP Extract**
Method: EPA 3005A (Total Recoverable)/EPA 6020A Description: **<4S+FF8%**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	350		mg/L	1.0	200	05/16/23	PT23E15B	05/16/23	T423E16A	CJA

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 T: (231) 775-8368

F: (517) 699-0388
 F: (810) 220-3311
 F: (231) 775-8584



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Analytical Laboratory Report
Laboratory Project Number: A15067
Laboratory Sample Number: A15067-005

Order: A15067
 Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: <4S+M10%+FF4%	Chain of Custody: 214452
Client Project Name: FCTC (1941-6940-21)	Sample No: 5	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

Toxicity Characteristic Leaching Procedure (TCLP)
Method: EPA 1311

Aliquot ID: A15067-005 **Matrix: Soil/Solid**
Description: <4S+M10%+FF4%

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. TCLP Date	5/11/2023		NA	NA	1.0	NA	NA	05/11/23	NA	EZ

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 T: (231) 775-8368

F: (517) 699-0388
 F: (810) 220-3311
 F: (231) 775-8584



A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15067
Laboratory Sample Number: A15067-005

Order: A15067
 Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: <4S+M10%+FF4%	Chain of Custody: 214452
Client Project Name: FCTC (1941-6940-21)	Sample No: 5	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

TCLP Metals by ICP/MS Aliquot ID: **A15067-005A** Matrix: **TCLP Extract**
Method: EPA 3005A (Total Recoverable)/EPA 6020A Description: **<4S+M10%+FF4%**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	U		mg/L	1.0	20	05/15/23	PT23E15B	05/15/23	T423E15A	CJA

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 T: (231) 775-8368

F: (517) 699-0388
 F: (810) 220-3311
 F: (231) 775-8584



A METIRI GROUP COMPANY

Analytical Laboratory Report
Laboratory Project Number: A15067
Laboratory Sample Number: A15067-006

Order: A15067
 Date: 05/16/23

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: <4S+M10%+FF8%	Chain of Custody: 214452
Client Project Name: FCTC (1941-6940-21)	Sample No: 6	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

Toxicity Characteristic Leaching Procedure (TCLP)
Method: EPA 1311

Aliquot ID: A15067-006 **Matrix: Soil/Solid**
Description: <4S+M10%+FF8%

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. TCLP Date	5/11/2023		NA	NA	1.0	NA	NA	05/11/23	NA	EZ

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 T: (231) 775-8368

F: (517) 699-0388
 F: (810) 220-3311
 F: (231) 775-8584

Client Identification: DLZ Michigan, Inc. - Lansing	Sample Description: <4S+M10%+FF8%	Chain of Custody: 214452
Client Project Name: FCTC (1941-6940-21)	Sample No: 6	Collect Date: 05/10/23
Client Project No: 1941-6940-21	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable †: Parameter not included in NELAC Scope of Analysis.

TCLP Metals by ICP/MS

Method: EPA 3005A (Total Recoverable)/EPA 6020A

Aliquot ID: A15067-006A

Matrix: TCLP Extract

Description: <4S+M10%+FF8%

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead	390		mg/L	1.0	400	05/16/23	PT23E15B	05/16/23	T423E16A	CJA

Definitions/ Qualifiers:

- A:** Spike recovery or precision unusable due to dilution.
- B:** The analyte was detected in the associated method blank.
- E:** The analyte was detected at a concentration greater than the calibration range, therefore the result is estimated.
- J:** The concentration is an estimated value.
- M:** Modified Method
- U:** The analyte was not detected at or above the reporting limit.
- X:** Matrix Interference has resulted in a raised reporting limit or distorted result.
- W:** Results reported on a wet-weight basis.
- *:** Value reported is outside QC limits

Exception Summary:

Analysis Locations:

All analyses performed in Holt.



Accreditation Number(s):

T104704518-23-15 (TX)

1914 Holloway Drive
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T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

TCLP Blank logbook: G-589-LOG-(004)
 pH Logbook: T-509-LOG-(07)
 Thermometer ID (**): 1000 2316
 Thermometer ID (tumbler): 10002547 10002543

TCLP/SPLP Logbook
 Balance ID: 10000165
 HCl ID: 5-090 2540
 Tumbler ID: 10000183 / 10000184 / 10004175
 Tumbler RPM: 32

Temp Range °C: 22.92-23.4
 pH strip ID (post tumble): 52830
 Filter ID (post tumble): 53492

Sample ID	Particle size reduction Yes/No	% Solid	pH Mass (g) 4.6g - 5.4g	Initial pH	pH after acid addition + 10 min @ 50°C (**)	Extraction fluid type/ID used	Extraction fluid pH	Container ID	Weight tumble (g) 100.0g - 100.4g	Extraction fluid amount used (mL)	Date on	Time on	Date off	Time off	X if there is filtrate X when added back	Final pH	Peer Review: Analyst Date
TB123E11A	/	/	/	/	/	A	4.98	B1	/	2000	5/11/23	5:57	5-12-23	1057		5	
TB223E11A	/	/	/	/	/	^{B2} 4/1/23 B C	2.87	3L	/							3	
A15067-001	No	100%	5.360	11.91	9.39	B C	2.87	R1	100.068							5	
A15067-002			5.296	12.52	9.51	B C	2.87	U1	100.093							5	
A15067-003			5.287	11.53	2.31	A	4.98	L1	100.107							7	
A15067-004			5.208	11.76	6.32	^{B2} 5/11/23 B C	2.87	Q1	100.291							5	
A15067-005			5.137	11.5	3.38	A	4.98	T1	100.302							7	
A15067-006	↓	↓	5.055	11.62	5.39	C	2.87	N1	100.159							5	
Initials/Date																	
BZ 5/11/23												JLW 5-12-23		JLW 5-15-23		CA 5/15/23	

Notes:

A TCLP #1: TB123E11A/G-000308 E SPLP #1:
 B TCLP #1: F SPLP #1:
 C TCLP #2: TB223E11A/G-000309 G SPLP #2:
 D TCLP #2: H SPLP #2:

2285
2585

APPENDIX F

SEVENSON MAECTITE TREATABILITY REPORT

Fort Custer Berm

TCLP Pb treatability Study
5/31/23-6/9/23

As received

Sample	Treatment	TCLP Pb result (mg/L)	Total Pb (mg/Kg dry)
Passing #4 sieve	as received	589	20,700
Retained #4 sieve	as received	729	2,770

Treatability Study

Sample	Treatment	TCLP Pb result (mg/L)
Passing #4 sieve	Proprietary mix #1	10.40
Passing #4 sieve	Proprietary mix #2	5.40
Passing #4 sieve	Proprietary mix #3	3.70
Retained #4 sieve + 20% munitions	Proprietary mix #1	71.80
Retained #4 sieve + 20% munitions	Proprietary mix #2	4.80
Retained #4 sieve + 20% munitions	Proprietary mix #3	2.00
Passing #4 sieve + 10% munition post treatment	Proprietary mix #3	17.30
Passing #4 sieve	Proprietary mix #4	8.56
Passing #4 sieve + 10% munition post treatment	Proprietary mix #4	11.70
Passing #4 sieve	Proprietary mix #5	1.24
Passing #4 sieve + 10% munition post treatment	Proprietary mix #5	1.27

green = quoted treatment

DISCLAIMER: The Sevenson Laboratory is not certified by any State or Federal agency - these results are for informational purposes only.

Signature _____



John Wright, Research and Development Manager

Fort Custer Berm

TCLP Pb treatability Study

5/31/23-6/9/23

As received

Sample	Treatment	TCLP Pb result (mg/L)	pH	Fluid used:	
Retained #4 sieve + 20% munitions	Proprietary mix #3	2.00			
Passing #4 sieve	Proprietary mix #5	1.24	7.36	1	
Passing #4 sieve + 10% munition post treatment	Proprietary mix #5	1.27	7.39	1	

green = quoted treatment

APPENDIX G

MT2 ECOBOND TREATABILITY REPORT



Treatability Study Report

FCTC

Prepared for:

Sarat Bobba

Prepared by:

Metals Treatment Technologies, LLC

14045 W 66th Avenue

Arvada, CO 80004

www.mt2.com

888-435-6645

June 2023

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OBJECTIVE

The objective of this report is to present the findings of a laboratory treatability study conducted on the samples analyzed on May 24, 2023. This study is designed to determine the leachable lead (Pb) from Pb contaminated samples and to develop a chemical formulation of ECOBOND® to reduce the leachability of Pb as measured by the US EPA Toxicity Characteristic Leaching Procedure (TCLP). The RCRA TCLP criteria for Pb is 5.0 mg/L.

SAMPLE DESCRIPTION AND CHARACTERIZATION

Samples of Pb contaminated material were delivered to MT2 laboratory and analyzed on May 24, 2023. Client provided the following data for baseline analysis.

Table 1- Sample Description and Characterization

Sample ID	TCLP Pb (mg/L)
Baseline >4S	540
Baseline >4S + 20%M	420
Baseline < 4S	530
Baseline <4S +10%M	670

Samples >4S + 20%M, < 4S, and <4S +10%M were used for treatment.

PRE-TREATMENT ANALYSIS AND ECOBOND® TREATMENT STUDIES

The ECOBOND® Pb formula was applied and mixed with the samples. After mixing with the treatment material, the samples were allowed to cure and stabilize overnight. A sub-sample was taken and extracted for Pb implementing EPA’s SW-846 Method No. 1311 “Toxicity Characterization Leaching Procedure” (TCLP). The extraction fluids were then filtered and analyzed by ICP using EPA’s SW846 Method 6010. The results of the subsequent analyses are presented in Table 2.

Table 2- Pre-Treatment TCLP Results

Sample ID	MT2 Lab ID	Ecobond® Treatment (Wt%)	Total Pb (mg/kg)	TCLP Pb (mg/L)
>4S + 20%M	113-61-1	2	644	32
>4S + 20%M	113-61-2	4	110,000*	5.84
< 4S	113-61-3	2	6450	0.976
< 4S	113-61-4	4	8750	0.614
<4S +10%M	113-61-5	2	6260	23.3
<4S +10%M	113-61-5	4	6740	0.406
Project Criteria				5.0 mg/L

*This high result is most likely from what MT2 refers to as “the nugget effect.” This occurs when a piece of concentrated lead finds its way into the sample and skews the results high and is not considered representative of the general material.

CONCLUSIONS AND RECOMMENDATIONS

The addition of ECOBOND® at up to 4.0 weight percent significantly reduced the leachability of Pb as measured by TCLP. If using the RCRA criteria of 5.0 mg/L TCLP for lead, the sample with the added 20% munitions should be treated at a higher percentage as 4% Ecobond did not quite successfully treat the sample. MT2 recommends that material with >10% additional munitions be treated with 5%-6% ECOBOND® to lower the TCLP to below 5.0 mg/L.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

MT2

Sample Delivery Group: L1620324
Samples Received: 05/26/2023
Project Number:
Description: FCTC

Report To: Trevor Schwaab
14045 W. 66th Ave.
Arvada, CO 80004

Entire Report Reviewed By:



Chris Ward
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

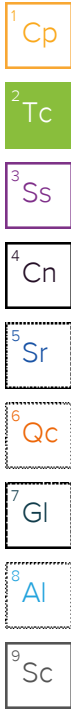


Pace Analytical National

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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SAMPLE SUMMARY

113-61-1 L1620324-01 Solid

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICP) by Method 6010B	WG2067720	1	05/27/23 19:44	05/30/23 19:48	ZSA	Mt. Juliet, TN

Collected by
Collected date/time
Received date/time

05/25/23 14:20 05/26/23 09:00

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

113-61-1 L1620324-02 Waste

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Preparation by Method 1311	WG2068270	1	05/30/23 09:50	05/30/23 09:50	JTM	Mt. Juliet, TN
Metals (ICP) by Method 6010D	WG2069153	1	05/31/23 11:50	06/01/23 01:00	SPL	Mt. Juliet, TN

Collected by
Collected date/time
Received date/time

05/25/23 14:20 05/26/23 09:00

113-61-2 L1620324-03 Solid

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICP) by Method 6010B	WG2067720	20	05/27/23 19:44	05/31/23 01:17	SPL	Mt. Juliet, TN

Collected by
Collected date/time
Received date/time

05/25/23 14:20 05/26/23 09:00

113-61-2 L1620324-04 Waste

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Preparation by Method 1311	WG2068270	1	05/30/23 09:50	05/30/23 09:50	JTM	Mt. Juliet, TN
Metals (ICP) by Method 6010D	WG2069153	1	05/31/23 11:50	06/01/23 01:17	SPL	Mt. Juliet, TN

Collected by
Collected date/time
Received date/time

05/25/23 14:20 05/26/23 09:00

113-61-3 L1620324-05 Solid

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICP) by Method 6010B	WG2067720	1	05/27/23 19:44	05/31/23 01:20	SPL	Mt. Juliet, TN

Collected by
Collected date/time
Received date/time

05/25/23 14:20 05/26/23 09:00

113-61-3 L1620324-06 Waste

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Preparation by Method 1311	WG2068270	1	05/30/23 09:50	05/30/23 09:50	JTM	Mt. Juliet, TN
Metals (ICP) by Method 6010D	WG2069153	1	05/31/23 11:50	06/01/23 01:20	SPL	Mt. Juliet, TN

Collected by
Collected date/time
Received date/time

05/25/23 14:20 05/26/23 09:00

113-61-4 L1620324-07 Solid

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICP) by Method 6010B	WG2067720	5	05/27/23 19:44	05/31/23 01:23	SPL	Mt. Juliet, TN

Collected by
Collected date/time
Received date/time

05/25/23 14:20 05/26/23 09:00

113-61-4 L1620324-08 Waste

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Preparation by Method 1311	WG2068270	1	05/30/23 09:50	05/30/23 09:50	JTM	Mt. Juliet, TN
Metals (ICP) by Method 6010D	WG2069153	1	05/31/23 11:50	06/06/23 00:41	SPL	Mt. Juliet, TN

Collected by
Collected date/time
Received date/time

05/25/23 14:20 05/26/23 09:00

SAMPLE SUMMARY

113-61-5 L1620324-09 Solid

Collected by
Collected date/time
Received date/time

05/25/23 14:20 05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICP) by Method 6010B	WG2067720	1	05/27/23 19:44	05/31/23 01:25	SPL	Mt. Juliet, TN

1 Cp

2 Tc

3 Ss

113-61-5 L1620324-10 Waste

Collected by
Collected date/time
Received date/time

05/25/23 14:20 05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Preparation by Method 1311	WG2068270	1	05/30/23 09:50	05/30/23 09:50	JTM	Mt. Juliet, TN
Metals (ICP) by Method 6010D	WG2069153	1	05/31/23 11:50	06/06/23 00:44	SPL	Mt. Juliet, TN

4 Cn

5 Sr

6 Qc

113-61-6 L1620324-11 Solid

Collected by
Collected date/time
Received date/time

05/25/23 14:20 05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICP) by Method 6010B	WG2067720	1	05/27/23 19:44	05/31/23 01:28	SPL	Mt. Juliet, TN

7 Gl

8 Al

113-61-6 L1620324-12 Waste

Collected by
Collected date/time
Received date/time

05/25/23 14:20 05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Preparation by Method 1311	WG2068270	1	05/30/23 09:50	05/30/23 09:50	JTM	Mt. Juliet, TN
Metals (ICP) by Method 6010D	WG2069153	1	05/31/23 11:50	06/06/23 00:47	SPL	Mt. Juliet, TN

9 Sc

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Chris Ward
Project Manager

Sample Delivery Group (SDG) Narrative

Sample quantity was not sufficient to complete analysis per recommended method guidelines for the following samples.

<u>Lab Sample ID</u>	<u>Project Sample ID</u>	<u>Method</u>
L1620324-02	113-61-1	1311
L1620324-04	113-61-2	1311
L1620324-06	113-61-3	1311
L1620324-08	113-61-4	1311
L1620324-10	113-61-5	1311
L1620324-12	113-61-6	1311

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Lead	644		0.500	1	05/30/2023 19:48	WG2067720

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		5/30/2023 9:50:45 AM	WG2068270
Initial pH	8.17		5/30/2023 9:50:45 AM	WG2068270
Final pH	6.45		5/30/2023 9:50:45 AM	WG2068270

Metals (ICP) by Method 6010D

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Lead	32.0	J3 J6	0.100	5	1	06/01/2023 01:00	WG2069153

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Lead	110000		10.0	20	05/31/2023 01:17	WG2067720

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		5/30/2023 9:50:45 AM	WG2068270
Initial pH	9.65		5/30/2023 9:50:45 AM	WG2068270
Final pH	6.82		5/30/2023 9:50:45 AM	WG2068270

Metals (ICP) by Method 6010D

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Lead	5.84		0.100	5	1	06/01/2023 01:17	WG2069153

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Lead	6450		0.500	1	05/31/2023 01:20	WG2067720

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		5/30/2023 9:50:45 AM	WG2068270
Initial pH	8.15		5/30/2023 9:50:45 AM	WG2068270
Final pH	5.61		5/30/2023 9:50:45 AM	WG2068270

Metals (ICP) by Method 6010D

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Lead	0.976		0.100	5	1	06/01/2023 01:20	WG2069153

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Lead	8750		2.50	5	05/31/2023 01:23	WG2067720

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		5/30/2023 9:50:45 AM	WG2068270
Initial pH	7.52		5/30/2023 9:50:45 AM	WG2068270
Final pH	6.40		5/30/2023 9:50:45 AM	WG2068270

Metals (ICP) by Method 6010D

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Lead	0.614		0.100	5	1	06/06/2023 00:41	WG2069153

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Lead	6260		0.500	1	05/31/2023 01:25	WG2067720

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		5/30/2023 9:50:45 AM	WG2068270
Initial pH	9.49		5/30/2023 9:50:45 AM	WG2068270
Final pH	5.69		5/30/2023 9:50:45 AM	WG2068270

Metals (ICP) by Method 6010D

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Lead	23.3		0.100	5	1	06/06/2023 00:44	WG2069153

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Lead	6740		0.500	1	05/31/2023 01:28	WG2067720

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		5/30/2023 9:50:45 AM	WG2068270
Initial pH	9.19		5/30/2023 9:50:45 AM	WG2068270
Final pH	6.59		5/30/2023 9:50:45 AM	WG2068270

Metals (ICP) by Method 6010D

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Lead	0.406		0.100	5	1	06/06/2023 00:47	WG2069153

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3930786-1 05/30/23 19:07

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Lead	U		0.208	0.500

1 Cp

2 Tc

3 Ss

Laboratory Control Sample (LCS)

(LCS) R3930786-2 05/30/23 19:10

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Lead	100	101	101	80.0-120	

4 Cn

5 Sr

L1620334-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1620334-01 05/30/23 19:13 • (MS) R3930786-5 05/30/23 19:20 • (MSD) R3930786-6 05/30/23 19:23

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Lead	99.9	7.40	106	95.5	99.0	88.1	1	75.0-125			10.9	20

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3931515-1 06/01/23 00:54

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Lead	U		0.0333	0.100

Laboratory Control Sample (LCS)

(LCS) R3931515-2 06/01/23 00:57

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Lead	10.0	9.30	93.0	80.0-120	

L1620324-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1620324-02 06/01/23 01:00 • (MS) R3931515-4 06/01/23 01:05 • (MSD) R3931515-5 06/01/23 01:08

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Lead	10.0	32.0	42.6	16.1	106	0.000	1	75.0-125		J3 J6	90.3	20

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

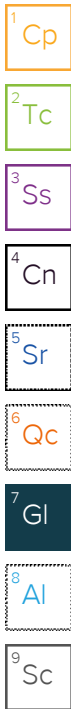
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.



ACCREDITATIONS & LOCATIONS

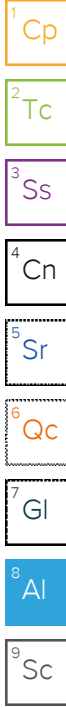
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.



Billing Information: _____

Pres Chk _____

Analysis / Container / Preservative

Chain of Custody Page ___ of ___



12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859



Report to: **Trevor Schwaab**

Email To: **tschwaab@mt2.com**

Project Description: **FCTC**

City/State Collected: **MI**

Please Circle: PT MT CT ET

Phone: _____ Client Project # _____ Lab Project # _____

Collected by (print): _____ Site/Facility ID # _____ P.O. # _____

Collected by (signature): _____

Rush? (Lab MUST Be Notified)
 Same Day Five Day
 Next Day 5 Day (Rad Only)
 Two Day 10 Day (Rad Only)
 Three Day

Quote # _____ Date Results Needed _____

Immediately Packed on Ice N Y _____

No. of Cntrs _____

SDG # **U620524**

Table # **B022**

Acct _____

Template: _____

Prelogin: _____

PM: _____

PB: _____

Shipped Via: _____

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	Total Pb	TCLP Pb	SPLP Pb											
113-61-1	Comp	SS		5/25/23	14:20		X	X												-01,04
113-61-2	Comp	SS		↓	↓		X	X												-03,04
113-61-3	Comp	SS		↓	↓		X	X												-05,06
113-61-4	Comp	SS		↓	↓		X	X												-07,08
113-61-5	Comp	SS		↓	↓		X	X												-09,10
113-61-6	Comp	SS		↓	↓		X	X												-11,12
	Comp	SS																		
	Comp	SS																		
	Comp	SS																		
	Comp	SS																		

* Matrix: SS - Soil AIR - Air F - Filter
 GW - Groundwater B - Bioassay
 WW - WasteWater
 DW - Drinking Water
 OT - Other

Remarks: _____

Samples returned via: UPS FedEx Courier _____

Tracking # **5217 3309 3044**

pH _____ Temp _____

Flow _____ Other _____

Relinquished by: (Signature) _____ Date: **5/25/23** Time: **14:20**

Received by: (Signature) _____ Trip Blank Received: Yes / No _____

Relinquished by: (Signature) _____ Date: _____ Time: _____

Received by: (Signature) _____ Temp: **15.17C** Bottles Received: **22-210=22.2**

Relinquished by: (Signature) _____ Date: _____ Time: _____

Received for lab by: (Signature) **g 10** Date: **5.26.23** Time: **9:00**

Condition: **OK**

Sample Receipt Checklist

COC Seal Present/Intact: <input checked="" type="checkbox"/> NP	Y	N
COC Signed/Accurate: <input checked="" type="checkbox"/>	Y	N
Bottles arrive intact: <input checked="" type="checkbox"/>	Y	N
Correct bottles used: <input checked="" type="checkbox"/>	Y	N
Sufficient volume sent: <input checked="" type="checkbox"/>	Y	N
If Applicable		
VOA Zero Headspace: <input checked="" type="checkbox"/>	Y	N
Preservation Correct/Checked: <input checked="" type="checkbox"/>	Y	N
RAD Screen <0.5 mR/hr: <input checked="" type="checkbox"/>	Y	N