

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673



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February 03, 2022

Trent Stockman
Jackson, City of
161 W. Michigan Ave.
Jackson, MI 49201

RE: Trace Project 22A0582
Client Project Biosolids

Enclosed are your analytical results. The results of this report relate only to the samples listed in the body of this report.

All reports were examined through Trace's validation process to ensure that requirements for quality and completeness were satisfied. All reported analytical results were obtained in accordance with the methods referenced on the reports. Every practical effort was made to meet the reporting limit specifications for this work, however, some results may have raised reporting limits to correct for percent solids.

For clients that require NELAP Accreditation, Trace certifies that these test results meet all requirements of the NELAP Standard, except for those analytes with a "N" notation. These analytes have not been evaluated by NELAP at Trace's discretion and will not be reported unless requested by client.

If you have questions concerning this report, please contact me at 231.773.5998 or by email at tbrewer@trace-labs.com.

Sincerely,

A handwritten signature in black ink that reads "Timothy W. Brewer".

Tim Brewer
Project Manager
Enclosures



NJDEP Accreditation No. MI008

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SAMPLE SUMMARY

Trace Project ID: 22A0582
Client Project ID: Biosolids

| Trace ID | Sample ID | Matrix | Collected By | Date Collected | Date Received |
|------------|------------------------------------|--------|--------------|----------------|----------------|
| 22A0582-01 | North Tank Composite | Sludge | Client | 01/20/22 10:00 | 01/20/22 10:07 |
| 22A0582-02 | North Tank Fecals | Sludge | Client | 01/20/22 10:00 | 01/20/22 10:07 |
| 22A0582-03 | North Tank Fecals | Sludge | Client | 01/20/22 10:00 | 01/20/22 10:07 |
| 22A0582-04 | North Tank Fecals | Sludge | Client | 01/20/22 10:00 | 01/20/22 10:07 |
| 22A0582-05 | North Tank Fecals | Sludge | Client | 01/20/22 10:00 | 01/20/22 10:07 |
| 22A0582-06 | North Tank Fecals | Sludge | Client | 01/20/22 10:00 | 01/20/22 10:07 |
| 22A0582-07 | North Tank Fecals | Sludge | Client | 01/20/22 10:00 | 01/20/22 10:07 |
| 22A0582-08 | North Tank Fecals | Sludge | Client | 01/20/22 10:00 | 01/20/22 10:07 |
| 22A0582-09 | North Tank Fecals - Geometric Mean | Sludge | Client | 01/20/22 10:00 | 01/20/22 10:07 |

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AN EXPLANATION OF TERMS AND SYMBOLS WHICH MAY OCCUR IN THIS REPORT

DEFINITIONS

| | |
|------------|--|
| LCS | Laboratory Control Sample |
| LCSD | Laboratory Control Sample Duplicate |
| MS | Matrix Spike |
| MSD | Matrix Spike Duplicate |
| RPD | Relative Percent Difference |
| DUP | Matrix Duplicate |
| RDL | Reporting Detection Limit |
| MCL | Maximum Contamination Limit |
| TIC | Tentatively Identified Compound |
| <, ND or U | Indicates the compound was analyzed for but not detected |
| * | Indicates a result that exceeds its associated MCL or Surrogate control limits |
| N | Indicates that the laboratory is not accredited by NELAP for this compound |
| NA | Indicates that the compound is not available. |

NOTE: Samples for volatiles that have been extracted with a water miscible solvent were corrected for the total volume of the solvent/water mixture.
Solid matrices Method Blanks are at 100% solids as such results are the same wet or dry.

DATA QUALIFIERS

Trace ID: 22A0582-01

Analysis: EPA 6020B

| | |
|---------------|---|
| Lead | Note 205 : The MS and MSD recoveries were out of control low. The result and reporting limit for this analyte, in the non-spiked version of the sample, must be considered estimated. |
| Silver | Note 202 : The MS recovery was out of control low, resulting in an out of control RPD between the MS and the MSD. The result and reporting limit for this analyte, in the non-spiked version of the sample, must be considered estimated. |

Trace ID: T118945-MSD1

Analysis: EPA 300.0 Rev. 2.1

| | |
|---------------------|--|
| Chloride | Note 222.5 : The MS and MSD recoveries were out of control. Because the sample background concentration of this analyte is greater than the spike amount, no data require qualification. |
| Nitrate as N | Note 208 : The MS recovery was out of control. Because the MSD recovery and the RPD between the MS and the MSD were in control, no data require qualification. |

Trace ID: T118950-BLK1

Analysis: EPA 6010D

| | |
|------------------|---|
| Magnesium | Note 630 : A positive result for this analyte was found in the method blank. Because the concentration in the blank was less than 10% of the sample concentration, no qualification of data is necessary. |
|------------------|---|

Trace ID: T118950-MSD1

Analysis: EPA 6010D

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| | |
|----------------------------|---|
| Calcium | Note 223 : The MS and MSD recoveries and the RPD were out of control. Because the background concentration of this analyte is greater than four times the spike amount, no data require qualification. |
| Phosphorus | Note 223 : The MS and MSD recoveries and the RPD were out of control. Because the background concentration of this analyte is greater than four times the spike amount, no data require qualification. |
| Potassium | Note 222 : The MS and MSD recoveries were out of control. Because the sample background concentration of this analyte is greater than four times the spike amount, no data require qualification. |
| Sodium | Note 209 : The MSD recovery was out of control. Because the MS recovery and the RPD between the MS and the MSD were in control, no data require qualification. |
| Analysis: EPA 6020B | |
| Arsenic | Note 222 : The MS and MSD recoveries were out of control. Because the sample background concentration of this analyte is greater than four times the spike amount, no data require qualification. |
| Barium | Note 222 : The MS and MSD recoveries were out of control. Because the sample background concentration of this analyte is greater than four times the spike amount, no data require qualification. |
| Chromium | Note 222 : The MS and MSD recoveries were out of control. Because the sample background concentration of this analyte is greater than four times the spike amount, no data require qualification. |
| Copper | Note 222 : The MS and MSD recoveries were out of control. Because the sample background concentration of this analyte is greater than four times the spike amount, no data require qualification. |
| Lead | Note 205 : The MS and MSD recoveries were out of control low. The result and reporting limit for this analyte, in the non-spiked version of the sample, must be considered estimated. |
| Silver | Note 202 : The MS recovery was out of control low, resulting in an out of control RPD between the MS and the MSD. The result and reporting limit for this analyte, in the non-spiked version of the sample, must be considered estimated. |
| Zinc | Note 222 : The MS and MSD recoveries were out of control. Because the sample background concentration of this analyte is greater than four times the spike amount, no data require qualification. |

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ANALYTICAL RESULTS

Trace Project ID: 22A0582
Client Project ID: Biosolids

Trace ID: 22A0582-01 Matrix: Sludge Date Collected: 01/20/22 10:00
Sample ID: North Tank Composite Date Received: 01/20/22 10:07

| PARAMETERS | RESULTS UNITS | RDL | DILUTION | PREPARED | BY | ANALYZED | BY | NOTES | MCL |
|------------|---------------|-----|----------|----------|----|----------|----|-------|-----|
|------------|---------------|-----|----------|----------|----|----------|----|-------|-----|

METALS, TOTAL

Analysis Method: EPA 7471B

Batch: T119040

| | | | | | | | | | |
|---------|-----------------|------|---|----------|----|----------|----|--|--|
| Mercury | <0.53 mg/kg dry | 0.53 | 1 | 01/26/22 | dc | 01/26/22 | dc | | |
|---------|-----------------|------|---|----------|----|----------|----|--|--|

METALS, TOTAL

Analysis Method: EPA 6010D

Batch: T118950

| | | | | | | | | | |
|------------|-----------------|-----|----|----------|----|----------|-----|---|--|
| Calcium | 32000 mg/kg dry | 420 | 50 | 01/21/22 | dc | 01/26/22 | ckd | | |
| Magnesium | 4500 mg/kg dry | 19 | 5 | 01/21/22 | dc | 01/26/22 | ckd | | |
| Phosphorus | 41000 mg/kg | 270 | 50 | 01/21/22 | dc | 01/26/22 | ckd | N | |
| Potassium | 2000 mg/kg | 200 | 5 | 01/21/22 | dc | 01/26/22 | ckd | | |
| Sodium | 3300 mg/kg dry | 42 | 5 | 01/21/22 | dc | 01/26/22 | ckd | | |

Analysis Method: EPA 6020B

Batch: T118950

| | | | | | | | | | |
|------------|----------------|------|----|----------|----|----------|-----|-----|--|
| Arsenic | 18 mg/kg dry | 2.0 | 5 | 01/21/22 | dc | 01/26/22 | acs | | |
| Barium | 620 mg/kg dry | 21 | 25 | 01/21/22 | dc | 01/26/22 | acs | | |
| Cadmium | 2.4 mg/kg dry | 0.20 | 5 | 01/21/22 | dc | 01/26/22 | acs | | |
| Chromium | 240 mg/kg dry | 0.85 | 5 | 01/21/22 | dc | 01/26/22 | acs | | |
| Copper | 520 mg/kg dry | 1.1 | 25 | 01/21/22 | dc | 01/26/22 | acs | | |
| Lead | 36 mg/kg dry | 10 | 25 | 01/21/22 | dc | 01/26/22 | acs | 205 | |
| Molybdenum | 15 mg/kg dry | 1.3 | 5 | 01/21/22 | dc | 01/26/22 | acs | N | |
| Nickel | 38 mg/kg dry | 1.0 | 5 | 01/21/22 | dc | 01/26/22 | acs | | |
| Selenium | 5.2 mg/kg dry | 0.25 | 5 | 01/21/22 | dc | 01/26/22 | acs | | |
| Silver | 2.6 mg/kg dry | 0.21 | 5 | 01/21/22 | dc | 01/26/22 | acs | 202 | |
| Zinc | 1400 mg/kg dry | 11 | 25 | 01/21/22 | dc | 01/26/22 | acs | | |

WET CHEMISTRY

Analysis Method: ASTM D2974-07a

Batch: T118952

| | | | | | | | | | |
|----------|--------------|------|---|----------|----|----------|----|---|--|
| % Solids | 6.4 % by Wt. | 0.10 | 1 | 01/21/22 | mr | 01/21/22 | mr | N | |
|----------|--------------|------|---|----------|----|----------|----|---|--|

Analysis Method: ASTM D854-91

Batch: T119028

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ANALYTICAL RESULTS

Trace Project ID: 22A0582

Client Project ID: Biosolids

Trace ID: 22A0582-01

Matrix: Sludge

Date Collected: 01/20/22 10:00

Sample ID: North Tank Composite

Date Received: 01/20/22 10:07

| PARAMETERS | RESULTS UNITS | RDL | DILUTION | PREPARED | BY | ANALYZED | BY | NOTES | MCL |
|-------------------------------------|------------------------|------|----------|----------|-----|----------|-----|-------|-----|
| WET CHEMISTRY | | | | | | | | | |
| Specific Gravity | 1.0 mg/cm ² | | 1 | 01/25/22 | kr | 01/25/22 | kr | N | |
| Analysis Method: Calculation | | | | | | | | | |
| Batch: [CALC] | | | | | | | | | |
| Total Nitrogen | 46000 mg/kg dry | 6200 | 1 | 01/27/22 | | 01/28/22 | mr | N | |
| Analysis Method: EPA 300.0 Rev. 2.1 | | | | | | | | | |
| Batch: T118945 | | | | | | | | | |
| Chloride | 3500 mg/kg dry | 200 | 5 | 01/21/22 | kr | 01/21/22 | kr | N | |
| Nitrate as N | 130 mg/kg dry | 1.0 | 1 | 01/21/22 | kr | 01/21/22 | kr | N | |
| Nitrite as N | 1.6 mg/kg dry | 1.0 | 1 | 01/21/22 | kr | 01/21/22 | kr | N | |
| Sulfate as SO ₄ | 57 mg/kg dry | 50 | 1 | 01/21/22 | kr | 01/21/22 | kr | N | |
| Analysis Method: EPA 350.1 Rev. 2.0 | | | | | | | | | |
| Batch: T119048 | | | | | | | | | |
| Ammonia as N | 23000 mg/kg dry | 94 | 10 | 01/25/22 | ans | 01/28/22 | ans | N | |
| Analysis Method: EPA 351.2 Rev. 2.0 | | | | | | | | | |
| Batch: T118993 | | | | | | | | | |
| Total Kjeldahl Nitrogen | 46000 mg/kg dry | 400 | 1 | 01/27/22 | mr | 01/28/22 | mr | N | |
| Analysis Method: EPA 9045D | | | | | | | | | |
| Batch: T118963 | | | | | | | | | |
| Corrosivity-pH | 7.59 | | 1 | 01/21/22 | jh | 01/21/22 | jh | | |
| pH measured at temperature (°C) | 21.5 | | 1 | 01/21/22 | jh | 01/21/22 | jh | N | |
| Analysis Method: PLUMB | | | | | | | | | |
| Batch: T119081 | | | | | | | | | |
| Volatile Solids | 50 % by Wt. | 0.10 | 1 | 01/26/22 | ans | 01/27/22 | ans | N | |

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ANALYTICAL RESULTS

Trace Project ID: 22A0582

Client Project ID: Biosolids

Trace ID: 22A0582-02

Matrix: Sludge

Date Collected: 01/20/22 10:00

Sample ID: North Tank Fecals

Date Received: 01/20/22 10:07

| PARAMETERS | RESULTS UNITS | RDL | DILUTION | PREPARED | BY | ANALYZED | BY | NOTES | MCL |
|------------|---------------|-----|----------|----------|----|----------|----|-------|-----|
|------------|---------------|-----|----------|----------|----|----------|----|-------|-----|

WET CHEMISTRY

Analysis Method: ASTM D2974-07a

Batch: T118952

| | | | | | | | | | |
|----------|--------------|------|---|----------|----|----------|----|---|--|
| % Solids | 6.3 % by Wt. | 0.10 | 1 | 01/21/22 | mr | 01/21/22 | mr | N | |
|----------|--------------|------|---|----------|----|----------|----|---|--|

Analysis Method: SM 9222D-97

Batch: T118938

| | | | | | | | | | |
|-----------------|---------------|-----|----|----------|-----|----------|-----|---|--|
| Fecal Coliforms | 280 CFU/g dry | 140 | 10 | 01/21/22 | drm | 01/22/22 | drm | N | |
|-----------------|---------------|-----|----|----------|-----|----------|-----|---|--|

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ANALYTICAL RESULTS

Trace Project ID: 22A0582
Client Project ID: Biosolids

Trace ID: 22A0582-03 Matrix: Sludge Date Collected: 01/20/22 10:00
Sample ID: North Tank Fecals Date Received: 01/20/22 10:07

| PARAMETERS | RESULTS UNITS | RDL | DILUTION | PREPARED | BY | ANALYZED | BY | NOTES | MCL |
|--|---------------|------|----------|----------|-----|----------|-----|-------|-----|
| WET CHEMISTRY | | | | | | | | | |
| Analysis Method: ASTM D2974-07a | | | | | | | | | |
| <i>Batch: T118952</i> | | | | | | | | | |
| % Solids | 6.3 % by Wt. | 0.10 | 1 | 01/21/22 | mr | 01/21/22 | mr | N | |
| Analysis Method: SM 9222D-97 | | | | | | | | | |
| <i>Batch: T118938</i> | | | | | | | | | |
| Fecal Coliforms | 560 CFU/g dry | 140 | 10 | 01/21/22 | drm | 01/22/22 | drm | N | |

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ANALYTICAL RESULTS

Trace Project ID: 22A0582

Client Project ID: Biosolids

Trace ID: 22A0582-04

Matrix: Sludge

Date Collected: 01/20/22 10:00

Sample ID: North Tank Fecals

Date Received: 01/20/22 10:07

| PARAMETERS | RESULTS UNITS | RDL | DILUTION | PREPARED | BY | ANALYZED | BY | NOTES | MCL |
|------------|---------------|-----|----------|----------|----|----------|----|-------|-----|
|------------|---------------|-----|----------|----------|----|----------|----|-------|-----|

WET CHEMISTRY

Analysis Method: ASTM D2974-07a

Batch: T118952

| | | | | | | | | | |
|----------|--------------|------|---|----------|----|----------|----|---|--|
| % Solids | 6.3 % by Wt. | 0.10 | 1 | 01/21/22 | mr | 01/21/22 | mr | N | |
|----------|--------------|------|---|----------|----|----------|----|---|--|

Analysis Method: SM 9222D-97

Batch: T118938

| | | | | | | | | | |
|-----------------|---------------|-----|----|----------|-----|----------|-----|---|--|
| Fecal Coliforms | 380 CFU/g dry | 130 | 10 | 01/21/22 | drm | 01/22/22 | drm | N | |
|-----------------|---------------|-----|----|----------|-----|----------|-----|---|--|

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ANALYTICAL RESULTS

Trace Project ID: 22A0582
Client Project ID: Biosolids

Trace ID: 22A0582-05 Matrix: Sludge Date Collected: 01/20/22 10:00
Sample ID: North Tank Fecals Date Received: 01/20/22 10:07

| PARAMETERS | RESULTS UNITS | RDL | DILUTION | PREPARED | BY | ANALYZED | BY | NOTES | MCL |
|--|---------------|------|----------|----------|-----|----------|-----|-------|-----|
| WET CHEMISTRY | | | | | | | | | |
| Analysis Method: ASTM D2974-07a | | | | | | | | | |
| <i>Batch: T118952</i> | | | | | | | | | |
| % Solids | 6.5 % by Wt. | 0.10 | 1 | 01/21/22 | mr | 01/21/22 | mr | N | |
| Analysis Method: SM 9222D-97 | | | | | | | | | |
| <i>Batch: T118938</i> | | | | | | | | | |
| Fecal Coliforms | <98 CFU/g dry | 98 | 10 | 01/21/22 | drm | 01/22/22 | drm | N | |

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ANALYTICAL RESULTS

Trace Project ID: 22A0582

Client Project ID: Biosolids

Trace ID: 22A0582-06

Matrix: Sludge

Date Collected: 01/20/22 10:00

Sample ID: North Tank Fecals

Date Received: 01/20/22 10:07

| PARAMETERS | RESULTS UNITS | RDL | DILUTION | PREPARED | BY | ANALYZED | BY | NOTES | MCL |
|------------|---------------|-----|----------|----------|----|----------|----|-------|-----|
|------------|---------------|-----|----------|----------|----|----------|----|-------|-----|

WET CHEMISTRY

Analysis Method: ASTM D2974-07a

Batch: T118952

| | | | | | | | | | |
|----------|--------------|------|---|----------|----|----------|----|---|--|
| % Solids | 6.5 % by Wt. | 0.10 | 1 | 01/21/22 | mr | 01/21/22 | mr | N | |
|----------|--------------|------|---|----------|----|----------|----|---|--|

Analysis Method: SM 9222D-97

Batch: T118938

| | | | | | | | | | |
|-----------------|---------------|-----|----|----------|-----|----------|-----|---|--|
| Fecal Coliforms | 470 CFU/g dry | 120 | 10 | 01/21/22 | drm | 01/22/22 | drm | N | |
|-----------------|---------------|-----|----|----------|-----|----------|-----|---|--|

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ANALYTICAL RESULTS

Trace Project ID: 22A0582

Client Project ID: Biosolids

Trace ID: 22A0582-07

Matrix: Sludge

Date Collected: 01/20/22 10:00

Sample ID: North Tank Fecals

Date Received: 01/20/22 10:07

| PARAMETERS | RESULTS UNITS | RDL | DILUTION | PREPARED | BY | ANALYZED | BY | NOTES | MCL |
|--|---------------|------|----------|----------|-----|----------|-----|-------|-----|
| WET CHEMISTRY | | | | | | | | | |
| Analysis Method: ASTM D2974-07a | | | | | | | | | |
| <i>Batch: T118952</i> | | | | | | | | | |
| % Solids | 6.5 % by Wt. | 0.10 | 1 | 01/21/22 | mr | 01/21/22 | mr | N | |
| Analysis Method: SM 9222D-97 | | | | | | | | | |
| <i>Batch: T118938</i> | | | | | | | | | |
| Fecal Coliforms | 250 CFU/g dry | 120 | 10 | 01/21/22 | drm | 01/22/22 | drm | N | |

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ANALYTICAL RESULTS

Trace Project ID: 22A0582

Client Project ID: Biosolids

Trace ID: 22A0582-08

Matrix: Sludge

Date Collected: 01/20/22 10:00

Sample ID: North Tank Fecals

Date Received: 01/20/22 10:07

| PARAMETERS | RESULTS UNITS | RDL | DILUTION | PREPARED | BY | ANALYZED | BY | NOTES | MCL |
|------------|---------------|-----|----------|----------|----|----------|----|-------|-----|
|------------|---------------|-----|----------|----------|----|----------|----|-------|-----|

WET CHEMISTRY

Analysis Method: ASTM D2974-07a

Batch: T118952

| | | | | | | | | | |
|----------|--------------|------|---|----------|----|----------|----|---|--|
| % Solids | 6.5 % by Wt. | 0.10 | 1 | 01/21/22 | mr | 01/21/22 | mr | N | |
|----------|--------------|------|---|----------|----|----------|----|---|--|

Analysis Method: SM 9222D-97

Batch: T118938

| | | | | | | | | | |
|-----------------|----------------|-----|----|----------|-----|----------|-----|---|--|
| Fecal Coliforms | <140 CFU/g dry | 140 | 10 | 01/21/22 | drm | 01/22/22 | drm | N | |
|-----------------|----------------|-----|----|----------|-----|----------|-----|---|--|

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ANALYTICAL RESULTS

Trace Project ID: 22A0582

Client Project ID: Biosolids

Trace ID: 22A0582-09

Matrix: Sludge

Date Collected: 01/20/22 10:00

Sample ID: North Tank Fecals - Geometric Mean

Date Received: 01/20/22 10:07

| PARAMETERS | RESULTS UNITS | RDL | DILUTION | PREPARED | BY | ANALYZED | BY | NOTES | MCL |
|------------|---------------|-----|----------|----------|----|----------|----|-------|-----|
|------------|---------------|-----|----------|----------|----|----------|----|-------|-----|

WET CHEMISTRY

Analysis Method: ASTM D2974-07a

Batch: T118952

| | | | | | | | | | |
|----------|--------------|------|---|----------|----|----------|----|---|--|
| % Solids | 100 % by Wt. | 0.10 | 1 | 01/21/22 | mr | 01/21/22 | mr | N | |
|----------|--------------|------|---|----------|----|----------|----|---|--|

Analysis Method: SM 9222D-97

Batch: T118938

| | | | | | | | | | |
|-----------------|---------------|-----|---|----------|-----|----------|-----|---|--|
| Fecal Coliforms | 280 CFU/g dry | 1.0 | 1 | 01/21/22 | drm | 01/22/22 | drm | N | |
|-----------------|---------------|-----|---|----------|-----|----------|-----|---|--|

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Thursday, February 03, 2022

Fibertec Project Number: A06604
Project Identification: 22A0582 /22A0582
Submittal Date: 01/24/2022

Mr. Tim Brewer
Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444

Dear Mr. Brewer,

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.

Percent Solids for sample -001 were reported at 10.3%.

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,

A handwritten signature in black ink that reads "Sue Ricketts". The signature is fluid and cursive.

By Sue Ricketts at 11:56 AM, Feb 03, 2022

For Daryl P. Strandbergh
Laboratory Director

Enclosures

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Analytical Laboratory Report
Laboratory Project Number: A06604
Laboratory Sample Number: A06604-001

Order: A06604
Page: 2 of 3
Date: 02/03/22

| | | | | | |
|------------------------|--|---------------------|------------------|-------------------|-----------------|
| Client Identification: | Trace Analytical Laboratories, Inc. | Sample Description: | Biosolids | Chain of Custody: | N/A |
| Client Project Name: | 22A0582 | Sample No: | 22A0582 | Collect Date: | 01/20/22 |
| Client Project No: | 22A0582 | Sample Matrix: | Biosolids | Collect Time: | 10:00 |

Sample Comments:

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

| PFAS | | | | | | Aliquot ID: A06604-001 | Matrix: Biosolids | | | |
|------------------------|--------|------|-------|-----------------|----------|------------------------|-------------------|----------|----------|-------|
| Method: ASTM D7968-17a | | | | | | Description: Biosolids | | | | |
| Parameter(s) | Result | Q | Units | Reporting Limit | Dilution | Preparation | | Analysis | | |
| | | | | | | P. Date | P. Batch | A. Date | A. Batch | Init. |
| ‡ 1.ADONA | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 2.9CI-PF3ONS | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 3.11CI-PF3OUdS | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 4.N-EtFOSAA | 8.7 | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 5.FtS 4:2 | U | EIS+ | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 6.FtS 6:2 | U | EIS+ | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 7.FtS 8:2 | U | EIS+ | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 8.HFPO-DA | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 9.N-MeFOSAA | 25 | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 10.PFBA | 3.1 | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 11.PFBS | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 12.PFDA | 4.5 | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 13.PFDoA | 2.7 | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 14.PFDS | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 15.PFHpA | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 16.PFHpS | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 17.PFHxA | 2.3 | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 18.PFHxS-Total | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 19.PFNA | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 20.PFNS | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 21.PFOA | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 22.PFOSA | 3.4 | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 23.PFOS-Total | 23 | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 24.PFPeA | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 25.PFPeS | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 26.PFTeA | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 27.PFTriA | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |
| ‡ 28.PFUnA | U | | µg/kg | 2.0 | 1.0 | 01/31/22 | PS22A31G | 01/31/22 | SM22A31B | SKG |

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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:

EIS+ : The Isotope Dilution/Extracted Internal Standard area exceeds the upper control limit.

Analysis Locations:

All analyses performed in Holt.



Accreditation Number(s):

T104704518-19-8 (TX)

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QUALITY CONTROL RESULTS

Trace Project ID: 22A0582

Client Project ID: Biosolids

QC Batch: T119040

Analysis Description: Mercury, Total, EPA 7470/7471

QC Batch Method: EPA 7471B Prep

Analysis Method: EPA 7471B

METHOD BLANK: T119040-BLK1

| Parameter | Units | Blank Result | Reporting Limit | Notes |
|-----------|-----------|--------------|-----------------|-------|
| Mercury | mg/kg wet | <0.050 | 0.050 | |

LABORATORY CONTROL SAMPLE: T119040-BS1

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limit | Notes |
|-----------|-----------|-------------|------------|-----------|-------------|-------|
| Mercury | mg/kg wet | 0.800 | 0.844 | 106 | 80-120 | |

Trace Project ID: 22A0582

Client Project ID: Biosolids

QC Batch: T118950

Analysis Description: Potassium, Total

QC Batch Method: EPA 3051 Microwave Assisted Digestions
for Solids

Analysis Method: EPA 6010D

METHOD BLANK: T118950-BLK1

| Parameter | Units | Blank Result | Reporting Limit | Notes |
|------------------|------------------|----------------|-----------------|------------|
| Calcium | mg/kg dry | <100 | 100 | |
| Potassium | mg/kg | <20 | 20 | |
| Magnesium | mg/kg dry | <4.6 | 4.6 | 630 |
| Sodium | mg/kg dry | <10 | 10 | |
| Phosphorus | mg/kg | <6.3 | 6.3 | |

LABORATORY CONTROL SAMPLE: T118950-BS1

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limit | Notes |
|------------|-----------|-------------|------------|-----------|-------------|-------|
| Calcium | mg/kg dry | 400 | 383 | 96 | 80-120 | |
| Potassium | mg/kg | 400 | 349 | 87 | 80-120 | |
| Magnesium | mg/kg dry | 400 | 370 | 93 | 80-120 | |
| Sodium | mg/kg dry | 400 | 343 | 86 | 80-120 | |
| Phosphorus | mg/kg | 400 | 378 | 94 | 80-120 | |

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MATRIX SPIKE / MATRIX SPIKE DUPLICATE: T118950-MSD1

Original: **22A0582-01**

| Parameter | Units | Original Result | Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limit | RPD | Max RPD | Notes |
|------------|-----------|-----------------|-------------|-----------|------------|----------|-----------|-------------|-----|---------|-------|
| Calcium | mg/kg dry | 32300 | 399 | 32400 | 32800 | 29 | 140 | 75-125 | 131 | 20 | 223 |
| Potassium | mg/kg | 2000 | 399 | 2550 | 2570 | 156 | 144 | 75-125 | 8 | 20 | 222 |
| Magnesium | mg/kg dry | 4540 | 399 | 4970 | 5000 | 121 | 117 | 75-125 | 4 | 20 | |
| Sodium | mg/kg dry | 3340 | 399 | 3770 | 3840 | 122 | 126 | 75-125 | 3 | 20 | 209 |
| Phosphorus | mg/kg | 40800 | 399 | 39400 | 39400 | -388 | -346 | 75-125 | -12 | 20 | 223 |

Trace Project ID: 22A0582

Client Project ID: Biosolids

QC Batch: T118950

Analysis Description: Chromium, Total

QC Batch Method: EPA 3051 Microwave Assisted Digestions
for Solids

Analysis Method: EPA 6020B

METHOD BLANK: T118950-BLK1

| Parameter | Units | Blank Result | Reporting Limit | Notes |
|------------|-----------|--------------|-----------------|-------|
| Silver | mg/kg dry | <0.50 | 0.50 | |
| Arsenic | mg/kg dry | <2.0 | 2.0 | |
| Barium | mg/kg dry | <10 | 10 | |
| Cadmium | mg/kg dry | <0.20 | 0.20 | |
| Chromium | mg/kg dry | <2.0 | 2.0 | |
| Copper | mg/kg dry | <1.0 | 1.0 | |
| Molybdenum | mg/kg dry | <3.0 | 3.0 | |
| Nickel | mg/kg dry | <1.0 | 1.0 | |
| Lead | mg/kg dry | <10 | 10 | |
| Selenium | mg/kg dry | <0.60 | 0.60 | |
| Zinc | mg/kg dry | <5.0 | 5.0 | |

LABORATORY CONTROL SAMPLE: T118950-BS1

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limit | Notes |
|------------|-----------|-------------|------------|-----------|-------------|-------|
| Silver | mg/kg dry | 5.00 | 5.22 | 104 | 80-120 | |
| Arsenic | mg/kg dry | 5.00 | 4.62 | 92 | 80-120 | |
| Barium | mg/kg dry | 40.0 | 37.4 | 93 | 80-120 | |
| Cadmium | mg/kg dry | 40.0 | 38.1 | 95 | 80-120 | |
| Chromium | mg/kg dry | 40.0 | 36.9 | 92 | 80-120 | |
| Copper | mg/kg dry | 40.0 | 37.1 | 93 | 80-120 | |
| Molybdenum | mg/kg dry | 40.0 | 40.1 | 100 | 80-120 | |
| Nickel | mg/kg dry | 40.0 | 38.2 | 96 | 80-120 | |
| Lead | mg/kg dry | 40.0 | 37.3 | 93 | 80-120 | |
| Selenium | mg/kg dry | 5.00 | 4.32 | 86 | 80-120 | |

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LABORATORY CONTROL SAMPLE: T118950-BS1

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limit | Notes |
|-----------|-----------|-------------|------------|-----------|-------------|-------|
| Zinc | mg/kg dry | 40.0 | 36.0 | 90 | 80-120 | |

MATRIX SPIKE / MATRIX SPIKE DUPLICATE: T118950-MSD1

Original: 22A0582-01

| Parameter | Units | Original Result | Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limit | RPD | Max RPD | Notes |
|------------|-----------|-----------------|-------------|-----------|------------|----------|-----------|-------------|-----|---------|-------|
| Silver | mg/kg dry | 2.56 | 4.99 | 8.54 | 7.51 | 136 | 99 | 75-125 | 31 | 20 | 202 |
| Arsenic | mg/kg dry | 17.8 | 4.99 | 23.9 | 24.4 | 137 | 131 | 75-125 | 4 | 20 | 222 |
| Barium | mg/kg dry | 616 | 39.9 | 684 | 689 | 194 | 184 | 75-125 | 5 | 20 | 222 |
| Cadmium | mg/kg dry | 2.39 | 39.9 | 36.1 | 40.7 | 96 | 96 | 75-125 | 0.3 | 20 | |
| Chromium | mg/kg dry | 235 | 39.9 | 280 | 286 | 127 | 128 | 75-125 | 0.7 | 20 | 222 |
| Copper | mg/kg dry | 515 | 39.9 | 494 | 498 | -61 | -43 | 75-125 | -35 | 20 | 222 |
| Molybdenum | mg/kg dry | 14.6 | 39.9 | 51.8 | 55.9 | 105 | 103 | 75-125 | 2 | 20 | |
| Nickel | mg/kg dry | 38.2 | 39.9 | 68.7 | 72.5 | 87 | 86 | 75-125 | 0.7 | 20 | |
| Lead | mg/kg dry | 35.9 | 39.9 | 62.0 | 65.1 | 74 | 73 | 75-125 | 0.9 | 20 | 205 |
| Selenium | mg/kg dry | 5.16 | 4.99 | 9.82 | 10.1 | 106 | 99 | 75-125 | 7 | 20 | |
| Zinc | mg/kg dry | 1390 | 39.9 | 1320 | 1340 | -188 | -129 | 75-125 | -37 | 20 | 222 |

Trace Project ID: 22A0582

Client Project ID: Biosolids

QC Batch: T118952

Analysis Description: Solids, Dry Weight

QC Batch Method: % Solids

Analysis Method: ASTM D2974-07a

SAMPLE DUPLICATE: T118952-DUP1

Original: 22A0582-01

| Parameter | Units | Original Result | DUP Result | RPD | Max RPD | Notes |
|-----------|----------|-----------------|------------|-----|---------|-------|
| % Solids | % by Wt. | 6.42 | 6.33 | 2 | 20 | |

Trace Project ID: 22A0582

Client Project ID: Biosolids

QC Batch: T119028

Analysis Description: Specific Gravity

QC Batch Method: ASTM D854-91

Analysis Method: ASTM D854-91

Trace Project ID: 22A0582

Client Project ID: Biosolids

QC Batch: [CALC]

Analysis Description: Total Nitrogen (individual components)

QC Batch Method:

Analysis Method: Calculation

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Trace Project ID: 22A0582

Client Project ID: Biosolids

QC Batch: T118945

QC Batch Method: IC Prep S

Analysis Description: Sulfate

Analysis Method: EPA 300.0 Rev. 2.1

METHOD BLANK: T118945-BLK1

| Parameter | Units | Blank Result | Reporting Limit | Notes |
|----------------|-----------|--------------|-----------------|-------|
| Chloride | mg/kg wet | <200 | 200 | |
| Nitrate as N | mg/kg wet | <1.0 | 1.0 | |
| Nitrite as N | mg/kg wet | <1.0 | 1.0 | |
| Sulfate as SO4 | mg/kg wet | <50 | 50 | |

LABORATORY CONTROL SAMPLE: T118945-BS1

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limit | Notes |
|----------------|-----------|-------------|------------|-----------|-------------|-------|
| Chloride | mg/kg wet | 45.1 | <200 | 104 | 80-120 | |
| Nitrate as N | mg/kg wet | 9.01 | 9.60 | 107 | 80-120 | |
| Nitrite as N | mg/kg wet | 9.01 | 9.44 | 105 | 80-120 | |
| Sulfate as SO4 | mg/kg wet | 45.1 | 51.2 | 114 | 80-120 | |

MATRIX SPIKE / MATRIX SPIKE DUPLICATE: T118945-MSD1

Original: 22A0582-01

| Parameter | Units | Original Result | Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limit | RPD | Max RPD | Notes |
|----------------|-----------|-----------------|-------------|-----------|------------|----------|-----------|-------------|-----|---------|-------|
| Chloride | mg/kg dry | 3540 | 752 | 4550 | 4690 | 132 | 152 | 75-125 | 15 | 20 | 222.5 |
| Nitrate as N | mg/kg dry | 125 | 150 | 236 | 250 | 72 | 83 | 75-125 | 14 | 20 | 208 |
| Nitrite as N | mg/kg dry | 1.58 | 150 | 147 | 143 | 94 | 94 | 75-125 | 0.8 | 20 | |
| Sulfate as SO4 | mg/kg dry | 57.0 | 752 | 737 | 744 | 88 | 91 | 75-125 | 3 | 20 | |

Trace Project ID: 22A0582

Client Project ID: Biosolids

QC Batch: T119048

QC Batch Method: EPA 350.1 Rev. 2.0

Analysis Description: Nitrogen, Ammonia

Analysis Method: EPA 350.1 Rev. 2.0

METHOD BLANK: T119048-BLK1

| Parameter | Units | Blank Result | Reporting Limit | Notes |
|--------------|-----------|--------------|-----------------|-------|
| Ammonia as N | mg/kg wet | <2.5 | 2.5 | |

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LABORATORY CONTROL SAMPLE: T119048-BS1

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limit | Notes |
|--------------|-----------|-------------|------------|-----------|-------------|-------|
| Ammonia as N | mg/kg wet | 30.0 | 32.5 | 108 | 90-110 | |

Trace Project ID: 22A0582
Client Project ID: Biosolids

QC Batch: T118993

Analysis Description: Total Kjeldahl Nitrogen

QC Batch Method: EPA 351.2 Rev. 2.0

Analysis Method: EPA 351.2 Rev. 2.0

METHOD BLANK: T118993-BLK1

| Parameter | Units | Blank Result | Reporting Limit | Notes |
|-------------------------|-----------|--------------|-----------------|-------|
| Total Kjeldahl Nitrogen | mg/kg wet | <20 | 20 | |

LABORATORY CONTROL SAMPLE: T118993-BS1

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limit | Notes |
|-------------------------|-----------|-------------|------------|-----------|-------------|-------|
| Total Kjeldahl Nitrogen | mg/kg wet | 250 | 250 | 100 | 90-110 | |

Trace Project ID: 22A0582
Client Project ID: Biosolids

QC Batch: T118963

Analysis Description: Corrosivity (pH for waste), 9040/9045

QC Batch Method: EPA 9045D

Analysis Method: EPA 9045D

SAMPLE DUPLICATE: T118963-DUP1

Original: 22A0582-01

| Parameter | Units | Original Result | DUP Result | RPD | Max RPD | Notes |
|---------------------------------|---------|-----------------|------------|-----|---------|-------|
| Corrosivity-pH | [blank] | 7.59 | 7.59 | 0 | 200 | |
| pH measured at temperature (°C) | [blank] | 21.5 | 21.5 | 0 | 200 | |

Trace Project ID: 22A0582
Client Project ID: Biosolids

QC Batch: T119081

Analysis Description: Volatile Solids

QC Batch Method: PLUMB

Analysis Method: PLUMB

Trace Project ID: 22A0582
Client Project ID: Biosolids

QC Batch: T118938

Analysis Description: Fecal Coliform

QC Batch Method: SM 9222D-97

Analysis Method: SM 9222D-97

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22A0582

Jackson, City of
Project Manager: Tim Brewer

Sample Log In Checklist

| | | | | | | | |
|-------------------------------|----------------------|-----------------------|-------------------|--------------------|-----------------------|------------|---------------|
| Date: 1/21/22 | Original Observation | Corrected Temperature | IR-9 (CF: +0.4°C) | IR-10 (CF: +0.4°C) | 20B12743 (CF: -0.2°C) | Temp Blank | Client Sample |
| Time: 8:30 | | | | | | | |
| Logged by: <i>td</i> | | | | | | | |
| Package Description: Cooler | | | | | | | |
| Package Temp °C | -2.0 | -1.6 | ✓ | ✓ | ✓ | ✓ | ✓ |
| Representative Sample Temp °C | 2.3 | 2.7 | ✓ | ✓ | ✓ | ✓ | ✓ |

Sample Receipt

| | | |
|-------------------------------------|-------------------------------------|--------------------------------------|
| Yes | No | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Received on ice or other coolant |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Ice still present upon receipt |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Custody seals present |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Trace Courier |
| <input type="checkbox"/> | <input type="checkbox"/> | Client Drop-off |
| <input type="checkbox"/> | <input type="checkbox"/> | Yes |
| <input type="checkbox"/> | <input type="checkbox"/> | No |
| <input type="checkbox"/> | <input type="checkbox"/> | Custody seals intact (if applicable) |
| <input type="checkbox"/> | <input type="checkbox"/> | UPS |
| <input type="checkbox"/> | <input type="checkbox"/> | Fed Ex |
| <input type="checkbox"/> | <input type="checkbox"/> | US Mail |
| <input type="checkbox"/> | <input type="checkbox"/> | Other |

Sample Condition

| | | | |
|-------------------------------------|--------------------------|-------------------------------------|--|
| Yes | No | N/A | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | All sample containers arrived unbroken and labeled |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Sufficient sample to run requested analyses |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Correct chemical preservative added to samples |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Samples preserved at Trace |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Chemical preservation verified, check EMD pH test strip used (if applicable) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | pH 0-2.5 (Lot: HC046681) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | pH 11.0-13.0 (Lot: HC022540) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Other |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Air bubbles absent from VOAs |

Chain of Custody (COC)

| | | |
|-------------------------------------|--------------------------|----------------------------------|
| Yes | No | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | All bottle labels agree with COC |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | COC filled out properly |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | COC signed by client |

Notes:

Pts 2-9: Fecal Coliform biosolids samples came in 2 1 L plastic containers to run analysis instead of 7 sterile Coliform bottles.

Pt 1: There was another 1 L plastic to run other analyses on & also a biosolids PFAS kit.

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