



2022 ANNUAL BIOSOLIDS NON-AGRICULTURAL SOURCE MATERIAL (NASM) SUMMARY REPORT

Including Biosolids Land Application Program and Biosolids Centralized Storage Facility (BCSF)

1. GENERAL INFORMATION

Oxford County (the County) prepares a report summarizing the Biosolids Land Application Program and performance of the Biosolids Off-site Dedicated Storage. The report details the latest quality testing results, quantity statistics and any non-compliance conditions that may have occurred. It is available for review by the end of March on the County website at <http://www.oxfordcounty.ca/waterwastewater> or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is accurate as possible.

If you have any questions or comments concerning the report, please contact the County at the address and phone number listed below or by email at wastewater@oxfordcounty.ca.

The BCSF Facility description is provided below:

Biosolids Off-site Dedicated Storage:	BCSF
Environmental Compliance Approval (ECA):	3816-76HRTS (April 3, 2020)
Reporting Period:	January 1, 2022 – December 31, 2022

BCSF Owner & Contact Information:

Oxford County Public Works Department - Wastewater Services
P.O. Box 1614
21 Reeve Street
Woodstock, ON N4S 7Y3
Telephone: 519-539-9800
Toll Free: 866-537-7778
Email: wastewater@oxfordcounty.ca

The County owns and operates nine wastewater treatment plants (WWTP). They are listed in the table below along with their predominant treatment system and method of biosolids treatment and handling.

Plant Name	Plant Process	Biosolids Processing and Handling
Woodstock WWTP	Conventional Activated Sludge	Anaerobic digestion, centrifuge dewatering, and transported to storage at BCSF prior to land application
Ingersoll WWTP	Conventional Activated Sludge	Anaerobic digestion, centrifuge dewatering, and transported to storage at BCSF prior to land application
Tillsonburg WWTP	Conventional Activated Sludge	Aerobic digestion, centrifuge dewatering, and transported to storage at BCSF prior to land application
Thamesford WWTP	Extended aeration	Aerobic digestion, removed for further treatment at the Ingersoll WWTP
Drumbo WWTP	Sequencing Batch Reactor	No digestion, co-thickened sludge removed for further treatment at the Woodstock WWTP
Tavistock WWTP	Lagoon System	Stored in lagoons on site until land applied usually between 15 to 25 years storage
Norwich WWTP	Lagoon System	Stored in lagoons on site until land applied usually between 15 to 25 years storage
Plattsville WWTP	Lagoon System	Stored in lagoons on site until land applied usually between 15 to 25 years storage
Mount Elgin WWTP	Black/Grey Water Recirculation Sand Filter and Common Drainage field.	Homeowners have septic tanks maintained by the County requiring septage removal once every 3 to 5 years and transported to the Ingersoll or Woodstock WWTP

2. Biosolids Land Application Program Description

The biosolids land application program for the beneficial reuse as a nutrient was developed based on the County Biosolids Management Master Plan (BMMP). The five main elements of the BMMP include: more enforcement of the County Sewer Use By-law, dewatering of stabilized biosolids at each of the major wastewater treatment plants, transporting thickened sludge from smaller plants to the nearest major wastewater treatment plant for processing, land application of all biosolids on farms having a non-

agricultural source material (NASM) plan, and centralized storage of biosolids when the material cannot be land applied.

The BCSF houses dewatered biosolids for periods such as winter months when the dewatered product cannot be directly land applied. The storage building is designed to provide a minimum of 240 days storage. It is also designed with segregated storage bays so that should material be determined to be non-compliant, it can be removed and taken to landfill and not mixed with compliant biosolids destined for land application.

The BCSF has sufficient room to house 7,000 m³ of material and was built in two phases. The pre-existing building (Phase 1) included 12 bays; and Phase 2 became operational in 2019, with the addition of four more bays. The BCSF has sufficient space to accommodate the 240-day storage requirements for all of the wastewater treatment plants. The individual bays are slightly inclined with cement walls to allow for easy piling of the material. The incoming material is segregated by system and month and is deposited in the appropriate bay, after which Oxford County staff push the biosolids into higher piles at the back of the bay using a loader.

The enforcement of the County Sewer Use By-law was an important step in protecting the quality of the biosolids, and to this end, maintains an active monitoring and enforcement group with the goal of improving the quality and reducing the quantity of biosolids produced.

The following table summarizes the quantity of biosolids generated in 2022 by source. In 2022, there was 5,503 wet tonnes of dewatered biosolids land applied.

Facility	2022 Biosolids Land Applied	2022 Liquid Biosolids Generated	2022 Total Biosolids Generated	Biosolids Type	Destination
Woodstock WWTP	3,070 wet tonnes/Digester Cleanout 3,621 m ³	Digester Cleanout 4,500 m ³	3,517 wet tonnes	Anaerobic dewatered	BCSF & Land Application
Ingersoll WWTP	1,171 wet tonnes	377 m ³ transferred to Woodstock WWTP	1,308 wet tonnes	Anaerobic dewatered	BCSF & Land Application
Tillsonburg WWTP	1,262 wet tonnes	1,160 m ³ transferred to Ingersoll WWTP 174 m ³ transferred to Woodstock WWTP	1,682 wet tonnes	Aerobic dewatered	BCSF & Land Application
Thamesford WWTP	--	1,971 m ³ transferred to Ingersoll WWTP 613 m ³ transferred to Woodstock WWTP	--	Aerobic Liquid	Ingersoll & Woodstock WWTP
Drumbo SBR	--	1,812 m ³ transferred to Woodstock WWTP	--	Co-thickened Primary Sludge	Woodstock WWTP
Mount Elgin WWTP	--	140 m ³ transferred to Ingersoll WWTP 35 m ³ transferred to Woodstock WWTP	--	Tank maintenance-septage	Ingersoll WWTP

3. SUMMARY AND INTERPREATION OF MONIITORING DATA

3.1 Biosolids Quality Assurance and Control Measures

Sampling Procedure

Sampling is carried out as per the ECA.

Biosolids analysis is provided to the contractor and farmer for their use at the time of land application.

The biosolids are resampled at the time of land application for verification purposes.

Laboratory and Field Testing

The samples are analyzed by SGS Lakefield Research Ltd., a CAEAL certified lab. The results are entered into an excel spreadsheet and reviewed for compliance with the regulations. The analytical results of the dewatered biosolids are also summarized and used for the calculation of monthly and yearly averages (Appendix A).

3.2 Biosolids Quality

The table below highlights the analytical results for metals versus the regulated maximum criteria. All sources of biosolids were compliant and were acceptable to be used as a nutrient for the land application program. More information can be found in Appendix A.

The results of the on-site verification sampling of biosolids prior to land application can be found in Appendix A. These samples provide a further check on the quality of the material. All 2022 samples complied with the Nutrient Management Act (NMA) criteria.

The Biosolids Contractor provides nutrient reports to individual farmers on each application to aid in the beneficial use of the product as a nutrient. The contractor's table of NASM plans indicating spreading applications is included in Appendix A.

In summary, the County's Biosolids Management program provided effective production, transport, storage, and eventual reuse as a nutrient via land application of all biosolids generated under the program. All operation and maintenance activities were performed by Oxford County staff in the WWTPs.

The transportation of the biosolids from the wastewater treatment facilities to the storage building was done by the County's Wastewater Services staff under ECA # A900939.

Comparison of Generated Biosolids to NMA Criteria for Metals in mg/kg Dry Solids.

Parameter	Woodstock WWTP	Ingersoll WWTP	Tillsonburg WWTP	Regulatory Limit
Metals mg/kg dry solids	2022 Annual Average	2022 Annual Average	2022 Annual Average	Maximum
Arsenic	6.0	5.4	5.0	170
Cadmium	1.2	0.9	0.6	34
Cobalt	4.3	4.1	2.1	340
Chromium	71	49	19	2800
Copper	701	642	536	1700
Mercury	0.7	0.5	1.0	11
Molybdenum	12.9	33.3	7.4	94
Nickel	55.4	29.6	50.1	420
Lead	30.6	15.1	13.7	1100
Selenium	6.9	7.0	7.0	34
Zinc	1317	1140	660	4200

The Biosolids land applied from all facilities were compliant with the NMA regulations governing NASM.

4. NON-COMPLIANCE AND COMPLAINTS

There were no upsets or spills during the year of operation and no complaints were received in 2022.

5. OPERATION OF THE STORMWATER MANAGEMENT POND FOR THE BCSF

The stormwater management pond services a total drainage area of 4.85 ha consisting of leaf and yard waste composting pad as well as the BCSF. It was designed to attenuate storm water runoff from storm events and was constructed as per the amended ECA 4022-A8YQ6R.

5.1. Sampling Procedure

Samples are collected semi-annually during spring and fall after a significant rainfall event and analyzed for the following:

Alkalinity	Total Ammonia Nitrogen
Chloride	Iron
Nitrate Nitrogen	Nitrite Nitrogen
TKN	Total Phosphorus
Total Suspended Solids	Sulphate
CBOD	COD
Phenol	pH
Temperature	Conductivity
Dissolved Oxygen	

5.2. Stormwater Management Facility Performance and Effluent

The stormwater management facility provided effective attenuation of stormwater in 2022. In 2022 there were no adverse or abnormal condition occurrences.

The stormwater management facility is inspected regularly and a log book of the inspections is maintained at the BCSF. The results of the sampling program are included in Appendix A in a summary table.

5.3. Spills, Upset and Abnormal Conditions

There were no spills or abnormal discharge events in 2022.

6. INSPECTION OF THE BCSF

The BCSF was cleaned and an in-house inspection by staff took place on September 22, 2022.

Waste Management Facility staff swept the building prior to inspection. Not all bays were completely empty.

The following is a list of items found during inspection and the actions taken:

Inspection Item	Action Taken
There are cracks in the concrete floor at the aisle end of the concrete divider wall of bays 1 through 12, all of the cracks in the floor appear to be hairline cracks	No action required at this time
All cracks and chips appear to be minor, and not increasing in size	No action required at this time
In the center aisle east of bin 5 there is a piece of concrete reinforcing steel exposed	No action required at this time

Inspection Item	Action Taken
In bay 12 on the south side near the west end there are two places in the floor that are broken	No action required at this time
There are some chips in the floor of bays 2, 4, 5, 8, 10 & 12, the chips are only approximately a ½ inch deep	No action required at this time
There are minor cracks in the exterior walls on all sides of the building, some have minor staining, but none of them have opened up	No action required at this time
In bay 11 near the east opening, on the south side there is a broken piece of concrete approximately 24" in diameter	No action required at this time
The 4 bay addition on the south end of the building is now being used	No action required at this time
The two furthest bays in the south west corner are being used for recycling	No action required at this time
Bays 13 & 15 and the common alley in front have multiple cracks and depressions	No action required at this time

7. SUMMARY

The BCSF provided effective winter storage for the County biosolids land application program and was in excellent overall condition. No complaints were received about the operation of either facility in 2022.

Appendix A



Annual Report

NASM Plan:	25050
Material Applied:	Woodstock
Date of Application:	18-Aug-22

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Month Avg.	10800	1357.14	1.2	9442.86	1358.34	698.57	31000.00	1371.43	25.97
Average (kg/tonne)	1.08	0.14	0.00	0.94	0.14	0.07	3.10	0.14	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	22.40	Total Volume Applied (t)	582.55	Application Rate	26.00	tonne/Ha	Dry Ton /acre	3.00
Total Area: ac	55.36				10.53			

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	24.56	3.53	1.82	80.62	3.57	0.07
LBS/ Acre	21.91	3.15	1.62	71.94	3.18	0.06

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	6.57
Year 2	10%	2.19
Year 3	5%	1.10

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	28.78
Year 2	40%	28.78

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.007	0.002	0.003	0.080	0.773	0.001	0.013	0.062	0.030	0.008	1.518
LBS/ Arce	0.036	0.009	0.019	0.436	4.212	0.005	0.071	0.336	0.164	0.042	8.268
Maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report

NASM Plan:	24573
Material Applied:	Woodstock
Date of Application:	12-May-22

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Month Avg.	10800	1137.5	1.55	9662.50	1139.05	732.50	32500.00	1337.50	25.68
Average (kg/tonne)	1.08	0.11	0.00	0.97	0.11	0.07	3.25	0.13	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	30.36	Total Volume Applied (t)	1228.93	Application Rate	40.50	tonne/Ha	Dry Ton/Acre	4.60
Total Area: ac	74.99				16.40			

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	39.11	4.61	2.97	131.56	5.41	0.10
LBS/ Acre	34.90	4.11	2.65	117.39	4.83	0.09

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	10.47
Year 2	10%	3.49
Year 3	5%	1.75

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	46.96
Year 2	40%	46.96

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.011	0.002	0.006	0.121	1.249	0.001	0.019	0.083	0.056	0.011	2.281
LBS/ Arce	0.058	0.012	0.035	0.659	6.802	0.006	0.101	0.450	0.304	0.060	12.420
Maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report

NASM Plan:	23766
Material Applied:	Woodstock
Date of Application:	18-May-22

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Month Avg.	10600	1187.5	1.35	9412.50	1188.85	731.25	31800.00	1337.50	25.69
Average (kg/tonne)	1.06	0.12	0.00	0.94	0.12	0.07	3.18	0.13	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	11.29	Total Volume Applied (t)	432.18	Application Rate	38.30	Dry Ton /acre	4.40
Total Area: ac	27.88				15.51		

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	36.03	4.55	2.80	121.73	5.12	0.10
LBS/ Acre	32.15	4.06	2.50	108.62	4.57	0.09

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	9.65
Year 2	10%	3.22
Year 3	5%	1.61

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	43.45
Year 2	40%	43.45

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.010	0.002	0.006	0.114	1.180	0.001	0.017	0.079	0.051	0.011	2.158
LBS/ Arce	0.054	0.010	0.032	0.619	6.424	0.007	0.094	0.432	0.280	0.059	11.750
Maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report

NASM Plan:	23766
Material Applied:	Tillsonburg
Date of Application:	20-May-22

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Month Avg.	11700	324.29	177.34	11375.71	501.63	600.00	34700.00	718.57	22.13
Average (kg/tonne)	1.17	0.03	0.02	1.14	0.05	0.06	3.47	0.07	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	3.30	Total Volume Applied (t)	156.49	Application Rate	47.50	tonne/Ha	Dry Ton /acre	4.70
Total Area: ac	8.14				19.23	ton/ac		

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	53.94	2.38	2.85	164.55	3.41	0.10
LBS/ Acre	48.14	2.12	2.54	146.83	3.04	0.09

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	14.44
Year 2	10%	4.81
Year 3	5%	2.41

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	58.73
Year 2	40%	58.73

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.009	0.001	0.004	0.034	1.034	0.001	0.012	0.089	0.027	0.012	1.238
LBS/ Arce	0.047	0.006	0.021	0.185	5.631	0.007	0.067	0.483	0.149	0.066	6.744
Maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report

NASM Plan:	23766
Material Applied:	Woodstock
Date of Application:	20-May-22

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Month Avg.	10600	1187.5	1.35	9412.50	1188.85	731.25	31800.00	1337.50	25.69
Average (kg/tonne)	1.06	0.12	0.00	0.94	0.12	0.07	3.18	0.13	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	12.98	Total Volume Applied (t)	579.78	Application Rate	44.70	tonne/Ha	Dry Ton /acre	5.10
Total Area: ac	32.05				18.10			

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	42.04	5.31	3.27	142.04	5.97	0.11
LBS/ Acre	37.52	4.74	2.91	126.74	5.33	0.10

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	11.25
Year 2	10%	3.75
Year 3	5%	1.88

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	50.70
Year 2	40%	50.70

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.012	0.002	0.007	0.133	1.377	0.001	0.020	0.093	0.060	0.013	2.518
LBS/ Arce	0.063	0.012	0.037	0.723	7.498	0.008	0.110	0.504	0.327	0.069	13.714
Maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report

NASM Plan:	25089
Material Applied:	Ingersoll
Date of Application:	10-Aug-22

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Month Avg.	10700	1677.78	18.69	9022.22	1696.47	698.89	36000.00	1211.11	21.14
Average (kg/tonne)	1.07	0.17	0.00	0.90	0.17	0.07	3.60	0.12	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	41.10	Total Volume Applied (t)	1171.23	Application Rate	28.50	tonne/Ha	Dry Ton /acre	2.70
Total Area: ac	101.55				11.54			

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	25.71	4.83	1.99	102.59	3.45	0.06
LBS/ Acre	22.94	4.31	1.78	91.54	3.08	0.05

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	6.88
Year 2	10%	2.29
Year 3	5%	1.15

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	36.62
Year 2	40%	36.62

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.005	0.001	0.004	0.055	0.690	0.001	0.026	0.033	0.003	0.007	1.196
LBS/ Arce	0.027	0.005	0.022	0.299	3.760	0.003	0.140	0.181	0.018	0.038	6.515
Maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report

NASM Plan:	25089
Material Applied:	Tillsonburg
Date of Application:	10-Aug-22

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Month Avg.	11200	241.67	72.55	10958.33	314.22	506.67	35200.00	596.67	20.72
Average (kg/tonne)	1.12	0.02	0.01	1.10	0.03	0.05	3.52	0.06	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	14.07	Total Volume Applied (t)	419.21	Application Rate	29.80	tonne/Ha	Dry Ton /acre	2.70
Total Area: ac	34.76				12.06			

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	32.65	0.94	1.51	104.88	1.78	0.06
LBS/ Acre	29.13	0.84	1.35	93.58	1.59	0.06

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	8.74
Year 2	10%	2.91
Year 3	5%	1.46

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	37.43
Year 2	40%	37.43

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.005	0.001	0.002	0.018	0.513	0.001	0.006	0.042	0.012	0.007	0.604
LBS/ Arce	0.028	0.003	0.011	0.096	2.793	0.003	0.032	0.228	0.067	0.039	3.290
Maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report

NASM Plan:	25049
Material Applied:	Tillsonburg
Date of Application:	16-Aug-22

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Month Avg.	11200	241.67	72.55	10958.33	314.22	506.67	35200.00	596.67	20.72
Average (kg/tonne)	1.12	0.02	0.01	1.10	0.03	0.05	3.52	0.06	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	23.15	Total Volume Applied (t)	685.82	Application Rate	29.60	tonne/Ha	Dry Ton /acre	2.70
Total Area: ac	57.20				11.98			

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	32.46	0.93	1.50	104.28	1.77	0.06
LBS/ Acre	28.97	0.83	1.34	93.05	1.58	0.05

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	8.69
Year 2	10%	2.90
Year 3	5%	1.45

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	37.22
Year 2	40%	37.22

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.005	0.001	0.002	0.018	0.510	0.001	0.006	0.042	0.012	0.007	0.600
LBS/ Arce	0.027	0.003	0.011	0.096	2.775	0.003	0.032	0.226	0.067	0.038	3.267
Maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report

NASM Plan:	25049
Material Applied:	Woodstock
Date of Application:	16-Aug-22

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Month Avg.	10800	1357.14	1.2	9442.86	1358.34	698.57	31000.00	1371.43	25.97
Average (kg/tonne)	1.08	0.14	0.00	0.94	0.14	0.07	3.10	0.14	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	9.23	Total Volume Applied (t)	246.41	Application Rate	26.70	tonne/Ha	Dry Ton /acre	3.10
Total Area: ac	22.80				10.81			

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	25.21	3.63	1.86	82.76	3.66	0.07
LBS/ Acre	22.49	3.24	1.66	73.85	3.27	0.06

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	6.75
Year 2	10%	2.25
Year 3	5%	1.12

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	29.54
Year 2	40%	29.54

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.007	0.002	0.003	0.082	0.794	0.001	0.013	0.063	0.031	0.008	1.559
LBS/ Arce	0.037	0.009	0.019	0.448	4.325	0.005	0.072	0.345	0.168	0.043	8.491
Maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



2022 Woodstock Land Application Report

Site	NASM#	Expiry	Lot	Conc	Township	Area Spread (ha)	Total Volume (m3)	Dates Spread
MS1005	25077	2026	11-13	Conc 20 W of Centre Rd	Williams	17.56	1716.90	Oct 3-14
MS1010	25214	2026	18	7 E of Centre Rd	McGillivray	6	650.70	Oct 15-27
MS10	24324	2024	20	15	London	4.55	432.00	Nov 4 & 5
SC1506	25213	2026	2	15	Sarnia	8.81	801.00	Nov 2-9
HN1084	25183	2026	17&18	2	Townsend	0.05	20.00	Nov 10
					TOTAL	36.97	3620.60	



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Fax: E-mail
Email: matt@wessuc.com

Work Order No.:2635462
 Received : 2022-05-25
 PO Number: 2022-315
 Reported: 2022-06-02
 Project Name: Woodstock Digester
 Chain of Custody No.: 2635462

Client Sample ID	Sample Date	Lab ID	Parameter	Result	Unit	RDL	Date Analyzed	Method
Woodstock Dig 3	2022-05-20	720318	Ammonia (Total)	888	mg/L	0.03	2022-05-25	APHA 4500
			Ammonium	880	mg/L	0.03	2022-05-25	APHA 4500
			Arsenic	0.116	mg/L	0.040	2022-05-26	EPA 6010C
			Cadmium	0.01	mg/L	0.01	2022-05-26	EPA 6010C
			Chromium	1.14	mg/L	0.04	2022-05-26	EPA 6010C
			Cobalt	0.07	mg/L	0.01	2022-05-26	EPA 6010C
			Copper	11.5	mg/L	0.320	2022-05-26	EPA 6010C
			E.coli (Biosolids/Sludge)	113000	CFU/g dry	4000	2022-05-25	MOE E3433
			Lead	0.56	mg/L	0.04	2022-05-26	EPA 6010C
			Mercury	<0.10	mg/L	0.10	2022-05-27	Hydride/Vapour Gen.
			Molybdenum	0.20	mg/L	0.02	2022-05-26	EPA 6010C
			Nickel	0.95	mg/L	0.02	2022-05-26	EPA 6010C
			NO2 (Nitrite)	0.030	mg/L	0.004	2022-05-30	APHA 4500
			NO3 (Nitrate)	<0.04	mg/L	0.04	2022-05-30	APHA 4500
			pH	7.33	SU	N/A	2022-05-30	APHA 4500 H-B
			Potassium	102	mg/L	1	2022-05-26	EPA 6010C
			Selenium	0.062	mg/L	0.040	2022-05-26	EPA 6010C
			TKN	1960	mg/L	0.2	2022-05-27	APHA 4500-NorgD
			TP	735	mg/L	0.02	2022-05-27	APHA 4500
			TS (Total Solids)	2.6	%	0.1	2022-05-30	APHA 2540 B mod
			VS (Dry Weight)	57.2	%	0.1	2022-05-30	APHA 2540E,G (GRAV)
			Zinc	23.0	mg/L	0.24	2022-05-26	EPA 6010C
Woodstock Dig 3-1	2022-05-20	720319	Ammonia (Total)	891	mg/L	0.03	2022-05-25	APHA 4500
			Ammonium	884	mg/L	0.03	2022-05-25	APHA 4500
			Arsenic	0.133	mg/L	0.040	2022-05-26	EPA 6010C
			Cadmium	0.02	mg/L	0.01	2022-05-26	EPA 6010C
			Chromium	1.34	mg/L	0.04	2022-05-26	EPA 6010C
			Cobalt	0.08	mg/L	0.01	2022-05-26	EPA 6010C
			Copper	12.9	mg/L	0.320	2022-05-26	EPA 6010C
			E.coli (Biosolids/Sludge)	112000	CFU/g dry	4000	2022-05-25	MOE E3433
			Lead	0.65	mg/L	0.04	2022-05-26	EPA 6010C
			Mercury	<0.10	mg/L	0.10	2022-05-27	Hydride/Vapour Gen.
			Molybdenum	0.23	mg/L	0.02	2022-05-26	EPA 6010C
Nickel	1.08	mg/L	0.02	2022-05-26	EPA 6010C			

Reported by:

Nilou Ghazi, Ph.D.,P.Eng.
 Laboratory Manager

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Tel: 519-465-7385

Fax: E-mail
Email: matt@wessuc.com

Work Order No.:2635462
Received : 2022-05-25
PO Number:
Reported: 2022-06-02
Project Name:
Chain of Custody No.: 2635462

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date		Method
	Date	Lab ID					Analyzed		
Woodstock Dig 3-1	2022-05-20	720319	NO2 (Nitrite)	0.027	mg/L	0.004	2022-05-30	APHA 4500	
			NO3 (Nitrate)	<0.04	mg/L	0.04	2022-05-30	APHA 4500	
			pH	7.28	SU	N/A	2022-05-30	APHA 4500 H-B	
			Potassium	104	mg/L	1	2022-05-26	EPA 6010C	
			Selenium	0.079	mg/L	0.040	2022-05-26	EPA 6010C	
			TKN	1980	mg/L	0.2	2022-05-27	APHA 4500-NorgD	
			TP	781	mg/L	0.02	2022-05-27	APHA 4500	
			TS (Total Solids)	2.5	%	0.1	2022-05-30	APHA 2540 B mod	
			VS (Dry Weight)	57.5	%	0.1	2022-05-30	APHA 2540E,G (GRAV)	
			Zinc	26.9	mg/L	0.24	2022-05-26	EPA 6010C	
Woodstock Dig 3-2	2022-05-20	720320	Ammonia (Total)	901	mg/L	0.03	2022-05-25	APHA 4500	
			Ammonium	893	mg/L	0.03	2022-05-25	APHA 4500	
			Arsenic	0.142	mg/L	0.040	2022-05-26	EPA 6010C	
			Cadmium	0.02	mg/L	0.01	2022-05-26	EPA 6010C	
			Chromium	1.43	mg/L	0.04	2022-05-26	EPA 6010C	
			Cobalt	0.08	mg/L	0.01	2022-05-26	EPA 6010C	
			Copper	13.3	mg/L	0.320	2022-05-26	EPA 6010C	
			E.coli (Biosolids/Sludge)	97000	CFU/g dry	4000	2022-05-25	MOE E3433	
			Lead	0.63	mg/L	0.04	2022-05-26	EPA 6010C	
			Mercury	<0.10	mg/L	0.10	2022-05-27	Hydride/Vapour Gen.	
			Molybdenum	0.24	mg/L	0.02	2022-05-26	EPA 6010C	
			Nickel	1.12	mg/L	0.02	2022-05-26	EPA 6010C	
			NO2 (Nitrite)	0.027	mg/L	0.004	2022-05-30	APHA 4500	
			NO3 (Nitrate)	<0.04	mg/L	0.04	2022-05-30	APHA 4500	
			pH	7.31	SU	N/A	2022-05-30	APHA 4500 H-B	
			Potassium	104	mg/L	1	2022-05-26	EPA 6010C	
			Selenium	0.052	mg/L	0.040	2022-05-26	EPA 6010C	
			TKN	1930	mg/L	0.2	2022-05-27	APHA 4500-NorgD	
			TP	718	mg/L	0.02	2022-05-27	APHA 4500	
			TS (Total Solids)	2.6	%	0.1	2022-05-30	APHA 2540 B mod	
VS (Dry Weight)	57.4	%	0.1	2022-05-30	APHA 2540E,G (GRAV)				
Zinc	27.2	mg/L	0.24	2022-05-26	EPA 6010C				
Woodstock Dig 3-3	2022-05-20	720321	Ammonia (Total)	906	mg/L	0.03	2022-05-25	APHA 4500	
			Ammonium	898	mg/L	0.03	2022-05-25	APHA 4500	

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 Tel: 519-465-7385

Fax: E-mail
Email: matt@wessuc.com

Work Order No.:2635462
 Received : 2022-05-25
 PO Number:
 Reported: 2022-06-02
 Project Name:
 Chain of Custody No.: 2635462

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date	
	Date	Lab ID					Analyzed	Method
Woodstock Dig 3-3	2022-05-20	720321	Arsenic	0.152	mg/L	0.040	2022-05-26	EPA 6010C
			Cadmium	0.02	mg/L	0.01	2022-05-26	EPA 6010C
			Chromium	1.37	mg/L	0.04	2022-05-26	EPA 6010C
			Cobalt	0.08	mg/L	0.01	2022-05-26	EPA 6010C
			Copper	13.4	mg/L	0.320	2022-05-26	EPA 6010C
			E.coli (Biosolids/Sludge)	73000	CFU/g dry	4000	2022-05-25	MOE E3433
			Lead	0.63	mg/L	0.04	2022-05-26	EPA 6010C
			Mercury	<0.10	mg/L	0.10	2022-05-27	Hydride/Vapour Gen.
			Molybdenum	0.23	mg/L	0.02	2022-05-26	EPA 6010C
			Nickel	1.10	mg/L	0.02	2022-05-26	EPA 6010C
			NO2 (Nitrite)	0.029	mg/L	0.004	2022-05-30	APHA 4500
			NO3 (Nitrate)	<0.04	mg/L	0.04	2022-05-30	APHA 4500
			pH	7.29	SU	N/A	2022-05-30	APHA 4500 H-B
			Potassium	104	mg/L	1	2022-05-26	EPA 6010C
			Selenium	0.053	mg/L	0.040	2022-05-26	EPA 6010C
			TKN	1920	mg/L	0.2	2022-05-27	APHA 4500-NorgD
			TP	726	mg/L	0.02	2022-05-27	APHA 4500
			TS (Total Solids)	2.6	%	0.1	2022-05-30	APHA 2540 B mod
			VS (Dry Weight)	57.1	%	0.1	2022-05-30	APHA 2540E,G (GRAV)
			Zinc	27.1	mg/L	0.24	2022-05-26	EPA 6010C



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Work Order No.:2635462
Received : 2022-05-25
PO Number:
Reported: 2022-06-02
Project Name:
Chain of Custody No.: 2635462

Quality Control Summary

Lab ID	Analyte	QC Recovery	QC limits	Spike Recovery	Spike Limits	Dup RPD	Dup Limits	Blank
720318	Ammonia (Total)	103	80-120	103	80-120	2	0-20	<0.03
	Ammonium							<0.03
	Arsenic	85	80-120	106	80-120	0	0-20	<0.040
	Cadmium	92	80-120	96	80-120	0	0-20	<0.01
	Chromium	87	80-120	94	80-120	5	0-20	<0.04
	Cobalt	101	80-120	93	80-120	0	0-20	<0.01
	Copper	92	80-120	98	80-120	7	0-20	<0.320
	E.coli (Biosolids/Sludge)							
	Lead	90	80-120	96	80-120	2	0-20	<0.04
	Mercury	99	80-120	94	70-130	0	0-20	<0.10
	Molybdenum	85	80-120	98	80-120	1	0-20	<0.02
	Nickel	110	80-120	93	80-120	7	0-20	<0.02
	NO2 (Nitrite)	103	80-120	97	80-120	0	0-20	<0.004
	NO3 (Nitrate)	105	80-120	104	80-120	0	0-20	<0.04
	pH	100	80-120	N/A	N/A	0	0-20	N/A
	Potassium	97	80-120	113	80-120	0	0-20	<1
	Selenium	80	80-120	108	80-120	0	0-20	<0.040
	TKN	98	80-120	100	80-120	1	0-20	<0.2
	TP	95	80-120	101	80-120	1	0-20	<0.02
	TS (Total Solids)	109	80-120	N/A	N/A	1	0-20	<0.1
VS (Dry Weight)	95	80-120	N/A	N/A	1	0-20	<0.1	
Zinc	89	80-120	93	80-120	1	0-20	<0.24	
720319	Ammonia (Total)	103	80-120	103	80-120	2	0-20	<0.03
	Ammonium							<0.03
	Arsenic	85	80-120	106	80-120	0	0-20	<0.040
	Cadmium	92	80-120	96	80-120	0	0-20	<0.01
	Chromium	87	80-120	94	80-120	5	0-20	<0.04
	Cobalt	101	80-120	93	80-120	0	0-20	<0.01
	Copper	92	80-120	98	80-120	7	0-20	<0.320
	E.coli (Biosolids/Sludge)							
	Lead	90	80-120	96	80-120	2	0-20	<0.04
	Mercury	99	80-120	94	70-130	0	0-20	<0.10
	Molybdenum	85	80-120	98	80-120	1	0-20	<0.02
	Nickel	110	80-120	93	80-120	7	0-20	<0.02

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 Reported: 2022-06-02
 Project Name:
 Chain of Custody No.: 2635462

Quality Control Summary

Lab ID	Analyte	QC Recovery	QC limits	Spike Recovery	Spike Limits	Dup RPD	Dup Limits	Blank
720319	NO2 (Nitrite)	103	80-120	97	80-120	0	0-20	<0.004
	NO3 (Nitrate)	105	80-120	104	80-120	0	0-20	<0.04
	pH	100	80-120	N/A	N/A	0	0-20	N/A
	Potassium	97	80-120	113	80-120	0	0-20	<1
	Selenium	80	80-120	108	80-120	0	0-20	<0.040
	TKN	98	80-120	100	80-120	1	0-20	<0.2
	TP	95	80-120	101	80-120	1	0-20	<0.02
	TS (Total Solids)	109	80-120	N/A	N/A	1	0-20	<0.1
	VS (Dry Weight)	95	80-120	N/A	N/A	1	0-20	<0.1
	Zinc	89	80-120	93	80-120	1	0-20	<0.24
720320	Ammonia (Total)	103	80-120	103	80-120	2	0-20	<0.03
	Ammonium							<0.03
	Arsenic	85	80-120	106	80-120	0	0-20	<0.040
	Cadmium	92	80-120	96	80-120	0	0-20	<0.01
	Chromium	87	80-120	94	80-120	5	0-20	<0.04
	Cobalt	101	80-120	93	80-120	0	0-20	<0.01
	Copper	92	80-120	98	80-120	7	0-20	<0.320
	E.coli (Biosolids/Sludge)							
	Lead	90	80-120	96	80-120	2	0-20	<0.04
	Mercury	99	80-120	94	70-130	0	0-20	<0.10
	Molybdenum	85	80-120	98	80-120	1	0-20	<0.02
	Nickel	110	80-120	93	80-120	7	0-20	<0.02
	NO2 (Nitrite)	103	80-120	97	80-120	0	0-20	<0.004
	NO3 (Nitrate)	105	80-120	104	80-120	0	0-20	<0.04
	pH	100	80-120	N/A	N/A	0	0-20	N/A
	Potassium	97	80-120	113	80-120	0	0-20	<1
	Selenium	80	80-120	108	80-120	0	0-20	<0.040
	TKN	98	80-120	100	80-120	1	0-20	<0.2
	TP	95	80-120	101	80-120	1	0-20	<0.02
	TS (Total Solids)	109	80-120	N/A	N/A	1	0-20	<0.1
VS (Dry Weight)	95	80-120	N/A	N/A	1	0-20	<0.1	
Zinc	89	80-120	93	80-120	1	0-20	<0.24	
720321	Ammonia (Total)	103	80-120	103	80-120	2	0-20	<0.03
	Ammonium							<0.03



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Reported: 2022-06-02
Project Name:
Chain of Custody No.: 2635462

Quality Control Summary

Lab ID	Analyte	QC Recovery	QC limits	Spike Recovery	Spike Limits	Dup RPD	Dup Limits	Blank
720321	Arsenic	85	80-120	106	80-120	0	0-20	<0.040
	Cadmium	92	80-120	96	80-120	0	0-20	<0.01
	Chromium	87	80-120	94	80-120	5	0-20	<0.04
	Cobalt	101	80-120	93	80-120	0	0-20	<0.01
	Copper	92	80-120	98	80-120	7	0-20	<0.320
	E.coli (Biosolids/Sludge)							
	Lead	90	80-120	96	80-120	2	0-20	<0.04
	Mercury	99	80-120	94	70-130	0	0-20	<0.10
	Molybdenum	85	80-120	98	80-120	1	0-20	<0.02
	Nickel	110	80-120	93	80-120	7	0-20	<0.02
	NO2 (Nitrite)	103	80-120	97	80-120	0	0-20	<0.004
	NO3 (Nitrate)	105	80-120	104	80-120	0	0-20	<0.04
	pH	100	80-120	N/A	N/A	0	0-20	N/A
	Potassium	97	80-120	113	80-120	0	0-20	<1
	Selenium	80	80-120	108	80-120	0	0-20	<0.040
	TKN	98	80-120	100	80-120	1	0-20	<0.2
	TP	95	80-120	101	80-120	1	0-20	<0.02
	TS (Total Solids)	109	80-120	N/A	N/A	1	0-20	<0.1
	VS (Dry Weight)	95	80-120	N/A	N/A	1	0-20	<0.1
	Zinc	89	80-120	93	80-120	1	0-20	<0.24



CERTIFICATE OF ANALYSIS

Client:	Robert Mills	Work Order Number:	477623
Company:	Wessuc Inc.	PO #:	
Address:	1693 Colborne St. East Brantford, ON, N3T 5L4	Regulation:	None
Phone:	(519) 770-9751	Project #:	Woodstock Digester
Email:	robert.mills@wessuc.com	DWS #:	
		Sampled By:	Austin Vanveen
Date Order Received:	9/22/2022	Analysis Started:	9/22/2022
Arrival Temperature:	34.8 °C	Analysis Completed:	9/28/2022

WORK ORDER SUMMARY

ANALYSES WERE PERFORMED ON THE FOLLOWING SAMPLES. THE RESULTS RELATE ONLY TO THE ITEMS TESTED.

Sample Description	Lab ID	Matrix	Type	Comments	Date Collected	Time Collected
Woodward Digester 1	1802689	Wastewater	None		9/22/2022	12:00 PM
Woodward Digester 2	1802690	Wastewater	None		9/22/2022	12:00 PM
Woodward Digester 3	1802691	Wastewater	None		9/22/2022	12:00 PM
Woodward Digester 4	1802692	Wastewater	None		9/22/2022	12:00 PM

METHODS AND INSTRUMENTATION

THE FOLLOWING METHODS WERE USED FOR YOUR SAMPLE(S):

Method	Lab	Description	Reference
Ammonia Water (A42)	Kirkland Lake	Determination of Ammonia/Ammonium in Water	Modified from EPA 350.1
Anions Water (mg/L by IC) (A5)	Mississauga	Determination of Anions in Water by Ion Chromatography	Modified from SW846-9056A
E.coli by MF on mFC-BCIG (A10)	Mississauga	Determination of E. coli in water by Membrane Filtration on mFC-BCIG media	Modified from MOE E3371
ICPMS Tot. Water (A13)	Mississauga	Determination of Total Metals in Water by ICP/MS with Digestion	Modified from SW846-6020
pH of Water (A2.0)	Mississauga	Determination of Water pH by Ion Selective Electrode	Modified from APHA-4500H+ B
TKN Water Dig. (A58)	Kirkland Lake	Determination of Total Kjeldahl Nitrogen in Waters with Block Digestion.	Modified from SM-4500 NORG-D
TP Water (A23.2)	Kirkland Lake	Determination of Total Phosphorus in Water.	Modified from EPA 365.3 and ESS 310.2,
TS (A27)	Mississauga	Determination of Total Solids in water by gravimetry	Modified from SM-2540



TESTMARK Laboratories Ltd.

Committed to Quality and Service

CERTIFICATE OF ANALYSIS

Wessuc Inc.

Work Order Number: 477623

REPORT COMMENTS

Non-Testmark containers received 09/22/22 YH

This report has been approved by:

Marc Creighton
Laboratory Director



CERTIFICATE OF ANALYSIS

Wessuc Inc.

Work Order Number: 477623

WORK ORDER RESULTS

Sample Description	Woodward Digester 1		Woodward Digester 2		Woodward Digester 3		Woodward Digester 4		
Sample Date	9/22/2022 12:00 PM		9/22/2022 12:00 PM		9/22/2022 12:00 PM		9/22/2022 12:00 PM		
Lab ID	1802689		1802690		1802691		1802692		
Anions	Result	MDL	Result	MDL	Result	MDL	Result	MDL	Units
Nitrate (as N)	1.31	0.05	1.18	0.05	0.98	0.05	1.12	0.05	mg/L
Nitrite (as N)	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	mg/L

Sample Description	Woodward Digester 1		Woodward Digester 2		Woodward Digester 3		Woodward Digester 4		
Sample Date	9/22/2022 12:00 PM		9/22/2022 12:00 PM		9/22/2022 12:00 PM		9/22/2022 12:00 PM		
Lab ID	1802689		1802690		1802691		1802692		
General Chemistry	Result	MDL	Result	MDL	Result	MDL	Result	MDL	Units
Ammonia (as N)	531	4	715	4	845	6	928	6	mg/L
pH	7.51	N/A	7.49	N/A	7.46	N/A	7.45	N/A	pH
Total Kjeldahl Nitrogen	659	8	623	8	800	8	709	8	mg/L
Total Phosphorus (as P)	290	1	198	1	211	1	220	1	mg/L

Sample Description	Woodward Digester 1		Woodward Digester 2		Woodward Digester 3		Woodward Digester 4		
Sample Date	9/22/2022 12:00 PM		9/22/2022 12:00 PM		9/22/2022 12:00 PM		9/22/2022 12:00 PM		
Lab ID	1802689		1802690		1802691		1802692		
Metals (Total)	Result	MDL	Result	MDL	Result	MDL	Result	MDL	Units
Total Arsenic	65	10	63	10	36	10	61	10	ug/L
Total Cadmium	19.6	0.2	18.4	0.2	15.4	0.2	20.1	0.2	ug/L
Total Chromium	1150	10	1030	10	958	10	1000	10	ug/L
Total Cobalt	77	1	68	1	62	1	71	1	ug/L



CERTIFICATE OF ANALYSIS

Wessuc Inc.

Work Order Number: 477623

Sample Description	Woodward Digester 1		Woodward Digester 2		Woodward Digester 3		Woodward Digester 4		
Sample Date	9/22/2022 12:00 PM		9/22/2022 12:00 PM		9/22/2022 12:00 PM		9/22/2022 12:00 PM		
Lab ID	1802689		1802690		1802691		1802692		
Metals (Total)	Result	MDL	Result	MDL	Result	MDL	Result	MDL	Units
Total Copper	5770	100	6090	100	3170	100	5850	100	ug/L
Total Lead	371	1	375	1	326	1	397	1	ug/L
Total Mercury	5	1	5	1	3	1	6	1	ug/L
Total Molybdenum	109	10	112	10	67	10	122	10	ug/L
Total Nickel	976	10	897	10	861	10	904	10	ug/L
Total Selenium	45	5	52	5	29	5	43	5	ug/L
Total Zinc	25300	1000	21400	1000	20300	1000	20700	1000	ug/L

Sample Description	Woodward Digester 1		Woodward Digester 2		Woodward Digester 3		Woodward Digester 4		
Sample Date	9/22/2022 12:00 PM		9/22/2022 12:00 PM		9/22/2022 12:00 PM		9/22/2022 12:00 PM		
Lab ID	1802689		1802690		1802691		1802692		
Microbiology	Result	MDL	Result	MDL	Result	MDL	Result	MDL	Units
Escherichia coli	2000 [3000]	1000	1000	1000	1000	1000	1000	1000	CFU/100mL

Sample Description	Woodward Digester 1		Woodward Digester 2		Woodward Digester 3		Woodward Digester 4		
Sample Date	9/22/2022 12:00 PM		9/22/2022 12:00 PM		9/22/2022 12:00 PM		9/22/2022 12:00 PM		
Lab ID	1802689		1802690		1802691		1802692		
Solids	Result	MDL	Result	MDL	Result	MDL	Result	MDL	Units
Total Solids	23700 [23200]	30	19900	30	20100	30	20900	30	mg/L



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CERTIFICATE OF ANALYSIS

Wessuc Inc.

Work Order Number: 477623

LEGEND

Dates: Dates are formatted as mm/dd/year throughout this report.

MDL: Method detection limit or minimum reporting limit.

[]: Results for laboratory replicates are shown in square brackets immediately below the associated sample result for ease of comparison.

Quality Control: All associated Quality Control data is available on request.

Field Data: Reports containing Field Parameters represent data that has been collected and provided by the client. Testmark is not responsible for the validity of this data which may be used in subsequent calculations.

Sample Condition Deviations: A noted sample condition deviation may affect the validity of the result. Results apply to the sample(s) as received.

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ICPMS Dustfall Insoluble: The ICPMS Dustfall Insoluble Portion method analyzes only the particulate matter from the Dustfall Sampler which is retained on the analysis filter during the Dustfall method.

Regulation Comparisons: Disclaimer: Please note that regulation criteria are provided for comparative purposes, however the onus on ensuring the validity of this comparison rests with the client.