



**2021 ANNUAL 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 www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports 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 publicworks@oxfordcounty.ca.

The BCSF Facility description is provided below:

Biosolids Off-site Dedicated Storage:	BCSF
Environmental Compliance Approval (ECA) Number:	3816-76HRTS (April 3, 2020)
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: publicworks@oxfordcounty.ca
Reporting Period:	January 1, 2021 – December 31, 2021

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.

Plant Name	Plant Process	Biosolids Processing and Handling
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 2021 by source. In 2021, there was 5,814 wet tonnes of dewatered biosolids land applied.

Facility	2021 Biosolids Land Applied	2021 Liquid Biosolids Generated	2021 Total Biosolids Generated	Biosolids Type	Destination
Woodstock WWTP	3,345 wet tonnes		3,924 wet tonnes	Anaerobic dewatered	BCSF & Land Application
Ingersoll WWTP	1,015 wet tonnes	85 m ³ transferred to Woodstock WWTP	1,245 wet tonnes	Anaerobic dewatered	BCSF & Land Application
Tillsonburg WWTP	1,454 wet tonnes	95 m ³ transferred to Ingersoll WWTP 82 m ³ transferred to Woodstock WWTP	1,623 wet tonnes	Aerobic dewatered	BCSF & Land Application
Thamesford WWTP		3,149 m ³ transferred to Ingersoll WWTP 75 m ³ transferred to Woodstock WWTP	3,224 m ³	Aerobic Liquid	Ingersoll & Woodstock WWTP
Drumbo SBR		1,812 m ³ transferred to Woodstock WWTP	1,812 m ³	Co-thickened Primary Sludge	Woodstock WWTP
Mount Elgin WWTP		113 m ³ transferred to Ingersoll WWTP	113 m ³	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 2021 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	2021 Annual Average	2021 Annual Average	2021 Annual Average	Maximum
Arsenic	5.9	5.9	4.0	170
Cadmium	1.4	0.9	0.5	34
Cobalt	4.6	3.9	2.2	340
Chromium	70	45	19	2800
Copper	671	619	499	1700
Mercury	0.8	0.5	0.8	11
Molybdenum	12.4	28.1	8.7	94
Nickel	40.7	28.5	49.4	420
Lead	31.0	16.5	14.0	1100
Selenium	5.1	5.0	5.0	34
Zinc	1162	1044	590	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 2021.

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 2021. In 2021 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 2021.

6. INSPECTION OF THE BCSF

The BCSF was cleaned and an in-house inspection by staff took place on October 15, 2021.

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.	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.
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.

Inspection Item	Action Taken
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.

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 2021.

Appendix A



Annual Report

NASM Plan:	
Material Applied:	
Date of Application:	

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. Average (kg/tonne)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha		Total Volume Applied (t)		Application Rate		tonne/Ha	Dry Tonnes /ha
Total Area: ac	0.00				0.00	ton/ac	

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphourus	Zinc	Total Solids
Kg/Ha	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
LBS/ Acre	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	#DIV/0!
Year 2	10%	#DIV/0!
Year 3	5%	#DIV/0!

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	#DIV/0!
Year 2	40%	#DIV/0!

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha											
LBS/ Arce	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Maximum allowable addition (kg/ha) per 5 years	1.4	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:	7-May-21

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. Average (kg/tonne)	11700	1173.33	2.1	10526.67	1175.43	645.00	31000	1100.00	25.13
	1.17	0.12	0.00	1.05	0.12	0.06	3.10	0.11	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	10.33	Total Volume Applied (t)	444.42	Application Rate	42.90	tonne/Ha	Dry Tonnes /ha	11.85
Total Area: ac	25.52				19.11	ton/ac		

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	45.29	5.06	2.77	133.37	4.73	0.11
LBS/ Acre	40.41	4.51	2.48	119.01	4.22	0.10

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	12.12
Year 2	10%	4.04
Year 3	5%	2.02

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	47.60
Year 2	40%	47.60

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.050	0.013	0.036	0.706	6.970	0.008	0.117	0.439	0.306	0.049	11.886
LBS/ Arce	0.045	0.012	0.032	0.630	6.219	0.007	0.104	0.392	0.273	0.044	10.606
Maximum allowable addition (kg/ha) per 5 years	1.4	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:	10-May-21

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. Average (kg/tonne)	11700	1173.33	2.1	10526.67	1175.43	645.00	3100	1100.00	25.13
	1.17	0.12	0.00	1.05	0.12	0.06	0.31	0.11	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	12.36	Total Volume Applied (t)	392.92	Application Rate	31.70	tonne/Ha	Dry Tonnes /ha	8.00
Total Area: ac	30.53				14.12	ton/ac		

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	33.46	3.74	2.05	9.85	3.50	0.08
LBS/ Acre	29.86	3.33	1.83	8.79	3.12	0.07

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	8.96
Year 2	10%	2.99
Year 3	5%	1.49

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	3.52
Year 2	40%	3.52

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.037	0.009	0.027	0.520	5.138	0.006	0.086	0.324	0.226	0.036	8.763
LBS/ Arce	0.033	0.008	0.024	0.464	4.585	0.005	0.077	0.289	0.202	0.032	7.819
Maximum allowable addition (kg/ha) per 5 years	1.4	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:	22913
Material Applied:	Woodstock
Date of Application:	11-May-21

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. Average (kg/tonne)	11700	1173.33	2.1	10526.67	1175.43	645.00	3100	1100.00	25.13
	1.17	0.12	0.00	1.05	0.12	0.06	0.31	0.11	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	33.15	Total Volume Applied (t)	1034.02	Application Rate	31.20	tonne/Ha	Dry Tonnes /ha	7.80
Total Area: ac	81.88				13.89	ton/ac		

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	32.83	3.67	2.01	9.67	3.43	0.08
LBS/ Acre	29.30	3.27	1.80	8.63	3.06	0.07

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	8.79
Year 2	10%	2.93
Year 3	5%	1.46

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	3.45
Year 2	40%	3.45

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.037	0.009	0.026	0.512	5.057	0.006	0.085	0.319	0.222	0.035	8.625
LBS/ Arce	0.033	0.008	0.023	0.457	4.512	0.005	0.076	0.285	0.198	0.031	7.696
Maximum allowable addition (kg/ha) per 5 years	1.4	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:	24624
Material Applied:	Tillsonburg
Date of Application:	10-Aug-21

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. Average (kg/tonne)	10100	100	34.99	10000.00	134.99	458.57	2200	521.43	19.09
	1.01	0.01	0.00	1.00	0.01	0.05	0.22	0.05	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	35.01	Total Volume Applied (t)	1387	Application Rate	39.60	tonne/Ha	Dry Tonnes /ha	7.60
Total Area: ac	86.47				17.64	ton/ac		

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	39.62	0.53	1.82	8.72	2.07	0.08
LBS/ Acre	35.35	0.48	1.62	7.78	1.84	0.07

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	10.61
Year 2	10%	3.54
Year 3	5%	1.77

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	3.11
Year 2	40%	3.11

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.022	0.003	0.013	0.121	3.467	0.004	0.049	0.306	0.096	0.028	3.942
LBS/ Arce	0.020	0.003	0.012	0.108	3.094	0.004	0.044	0.273	0.086	0.025	3.517
Maximum allowable addition (kg/ha) per 5 years	1.4	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:	24625
Material Applied:	Ingersoll
Date of Application:	16-Aug-21

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. Average (kg/tonne)	10100	1625	163.09	8475.00	1788.09	570.00	33400	908.75	20.58
	1.01	0.16	0.02	0.85	0.18	0.06	3.34	0.09	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	30.20	Total Volume Applied (t)	1015	Application Rate	33.60	tonne/Ha	Dry Tonnes /ha	6.90
Total Area: ac	74.59				14.96	ton/ac		

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	28.48	6.01	1.92	112.25	3.05	0.07
LBS/ Acre	25.42	5.36	1.71	100.17	2.73	0.06

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	7.62
Year 2	10%	2.54
Year 3	5%	1.27

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	40.07
Year 2	40%	40.07

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.034	0.006	0.021	0.233	3.941	0.004	0.183	0.150	0.111	0.027	6.284
LBS/ Arce	0.030	0.005	0.019	0.208	3.517	0.004	0.163	0.134	0.099	0.024	5.607
Maximum allowable addition (kg/ha) per 5 years	1.4	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:	24625
Material Applied:	Woodstock
Date of Application:	16-Aug-21

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. Average (kg/tonne)	11400	1200	3.63	10200.00	1203.63	628.57	28300	1098.57	26.99
	1.14	0.12	0.00	1.02	0.12	0.06	2.83	0.11	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	9.16	Total Volume Applied (t)	277	Application Rate	30.20	tonne/Ha	Dry Tonnes /ha	8.20
Total Area: ac	22.63				13.45	ton/ac		

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	30.84	3.64	1.90	85.58	3.32	0.08
LBS/ Acre	27.52	3.25	1.70	76.36	2.96	0.07

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	8.26
Year 2	10%	2.75
Year 3	5%	1.38

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	30.55
Year 2	40%	30.55

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.043	0.014	0.026	0.516	5.123	0.006	0.095	0.284	0.242	0.036	8.954
LBS/ Arce	0.038	0.012	0.023	0.460	4.571	0.005	0.085	0.253	0.216	0.032	7.990
Maximum allowable addition (kg/ha) per 5 years	1.4	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:	24628
Material Applied:	Woodstock
Date of Application:	20-Aug-21

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. Average (kg/tonne)	11400	1200	3.63	10200.00	1203.63	628.57	28300	1098.57	26.99
	1.14	0.12	0.00	1.02	0.12	0.06	2.83	0.11	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	18.19	Total Volume Applied (t)	557	Application Rate	30.60	tonne/Ha	Dry Tonnes /ha	8.30
Total Area: ac	44.93				13.63	ton/ac		

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	31.23	3.69	1.92	86.66	3.36	0.08
LBS/ Acre	27.87	3.29	1.72	77.33	3.00	0.07

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	8.36
Year 2	10%	2.79
Year 3	5%	1.39

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	30.93
Year 2	40%	30.93

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.044	0.014	0.026	0.523	5.191	0.006	0.097	0.288	0.245	0.037	9.073
LBS/ Arce	0.039	0.012	0.023	0.467	4.632	0.005	0.087	0.257	0.219	0.033	8.096
Maximum allowable addition (kg/ha) per 5 years	1.4	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:	23517
Material Applied:	Woodstock
Date of Application:	24-Aug-21

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. Average (kg/tonne)	11700	1266.67	3.23	10433.33	1269.90	625.00	27300	1098.33	27.01
	1.17	0.13	0.00	1.04	0.13	0.06	2.73	0.11	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	17.77	Total Volume Applied (t)	640	Application Rate	36.00	tonne/Ha	Dry Tonnes /ha	9.70
Total Area: ac	43.89				16.03	ton/ac		

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	37.58	4.57	2.25	98.32	3.96	0.10
LBS/ Acre	33.53	4.08	2.01	87.73	3.53	0.09

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	10.06
Year 2	10%	3.35
Year 3	5%	1.68

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	35.09
Year 2	40%	35.09

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.052	0.018	0.031	0.613	6.077	0.008	0.115	0.331	0.295	0.044	10.680
LBS/ Arce	0.046	0.016	0.028	0.547	5.423	0.007	0.103	0.295	0.263	0.039	9.530
Maximum allowable addition (kg/ha) per 5 years	1.4	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:	23517
Material Applied:	Tillsonburg
Date of Application:	24-Aug-21

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. Average (kg/tonne)	10600	125	96.65	10475.00	221.65	461.25	31000	543.75	19.86
	1.06	0.01	0.01	1.05	0.02	0.05	3.10	0.05	0.00

** Sample results from SGS Lakefield Research Limited

Total Area: ha	1.55	Total Volume Applied (t)	67	Application Rate	43.00	tonne/Ha	Dry Tonnes /ha	8.50
Total Area: ac	3.83				19.15	ton/ac		

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphourus	Zinc	Total Solids
Kg/Ha	45.28	0.96	1.99	134.00	2.35	0.09
LBS/ Acre	40.40	0.85	1.78	119.57	2.10	0.08

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	12.12
Year 2	10%	4.04
Year 3	5%	2.02

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	47.83
Year 2	40%	47.83

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.026	0.004	0.016	0.147	3.939	0.004	0.057	0.342	0.108	0.031	4.644
LBS/ Arce	0.023	0.004	0.014	0.131	3.515	0.004	0.051	0.305	0.096	0.028	4.144
Maximum allowable addition (kg/ha) per 5 years	1.4	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