Varna Drinking Water System

Waterworks # 260019630
System Category – Small Municipal Residential

Annual Drinking Water Report

Prepared For: The Municipality of Bluewater

Reporting Period of January 1 – December 31, 2024

Issued: February 11, 2025

Revision: 0

Operating Authority:

OCWA

ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

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Overview

This report fulfills requirements of Ontario Regulation 170/03 Section 11 and Schedule 22. The report must be made available to anyone that requests a copy of the report. By March 31, 2025 the report must be provided to members of municipal council.

Report Availability

This system does not serve more than 10 000 residences and the annual reports will be available to residents at the Municipal Office as well as on the municipal website. Notification will be at the Municipal Office and copies provided free of charge if requested. The Municipal Office is located at 14 Mill Ave, Zurich, Ontario, N0M 2T0.

System Process Description

The Varna Drinking Water System serves the community of Varna located in the Municipality of Bluewater; approximate population served is 154.

Water is sourced from a 73 m deep well. The well has a 15.2 cm diameter casing installed to a depth of 57.3 m and extends above grade approximately 33 cm. A 100 mm diameter sleeve is installed from 57.3 m to 73 m and is equipped with a 1.6 L/s submersible pump. The well pump was installed at a depth of 65.8 m with 32 mm diameter galvanized steel discharge piping.
There are three 450 L chlorine contact tanks in the pump house to achieve primary and secondary disinfection requirements. A 12 kW standby propane generator provides backup power to the system. Other equipment includes: three pressure tanks, a 60 L chlorine storage tank, two chlorine pumps, and various other pressure gauges, meters, and sample taps.

The normal operating pressure in the system is set by the pressure switch in the well house to be between 275 and 415 kPa; typical operating pressures in this system are in the range of 250 to 400 kPa.

A 50 mm diameter watermain is installed throughout the distribution system. There are no fire hydrants on the Varna Drinking Water System, however, there is a connection for emergency supply and multiple blow-offs for flushing.

Treatment Chemicals used during the reporting year

Sodium Hypochlorite 12% is used to achieve primary disinfection in the Varna Drinking Water System. Refer to Table 1 below for supplier information.

Table 1: *Treatment Chemicals in the Varna Drinking Water System*

Chemical Name	Use	Supplier
Sodium Hypochlorite 12%	Primary Treatment	Jutzi Water Technologies

Summary of Non-Compliance

Adverse Water Quality Incidents

Under the *Safe Drinking Water Act*, O. Reg 170/03, any adverse water quality incidents (AWQI) are required to be reported to the Ministry of the Environment, Conservation and Parks (MECP) and corrective action taken. Refer to Table 2 below for a summary of AWQI incidents in 2024.

Table 2: *Adverse Water Quality Incidents*

Date	AWQI #	Location	Problem	Details	Legislation	Corrective Action Taken
April 28, 2024	164895	Distribution	Loss of pressure and free chlorine residual that didn't meet primary disinfection	Back-up generator failed during power failure	O. Reg 170/03	Resampled April 28 and April 30 (well house and distribution). All samples met regulatory requirements. Boil Water Advisory issued by Health Unit – lifted May 1. Generator repaired; system flushed to restore primary disinfection.

Non-Compliance

Under the *Safe Drinking Water Act*, O. Reg 170/03, any events where legislative requirements were not met are required to be reported to the MECP and corrective actions taken. Refer to Table 3 below for a summary of non-compliance incidents in 2024.

Table 3: *Summary of Non-Compliance Incidents*

Legislation	Requirement(s) system failed to meet	Duration of the failure (ie. Dates(s))	Corrective Action
O. Reg 170/03, Section 6-5 (3)	Continuous monitoring test results must be examined within 72 hours after tests are conducted. Results were not monitored in this time frame due to operator error related to illness.	January 29, 2024, 08:54 – February 1, 2024, 11:09.	A discussion was held with Operators about the importance and requirement of the 72-hour trending review and to obtain back up from another operator if they are unable to fulfill their duties.
O. Reg 170/03, Section 6-5 (1)	Continuous monitoring of free chlorine residual must be tested and recorded at a minimum frequency of five minutes. This did not occur due to a power failure and subsequent UPS failure.	May 27, 2024, 06:36 - 07:35	Upon arrival to the Varna well house at 07:35, an Operator obtained free chlorine grab samples every five minutes until the power returned at 07:47. A new UPS was installed shortly thereafter.
O. Reg 170/03, Section 6-5 (1)	Continuous monitoring of free chlorine residual must be tested and	September 30, 2024, 16:24 - October 1, 2024, 10:01	On October 1, 2024, at 10:01, the issue was resolved by tightening a

	recorded at a minimum frequency of five minutes. This did not occur due to a loose wire on the analyzer's chlorine probe which caused a faulty reading on the analyzer.		loose wire on the chlorine probe which caused the analyzer error.

Non-Compliance Identified in a Ministry Inspection

MECP inspections occur within an April 1 to March 31 fiscal year. The last inspection occurred in 2023 and there were no MECP inspections in 2024, therefore no non-compliances identified.

Flows

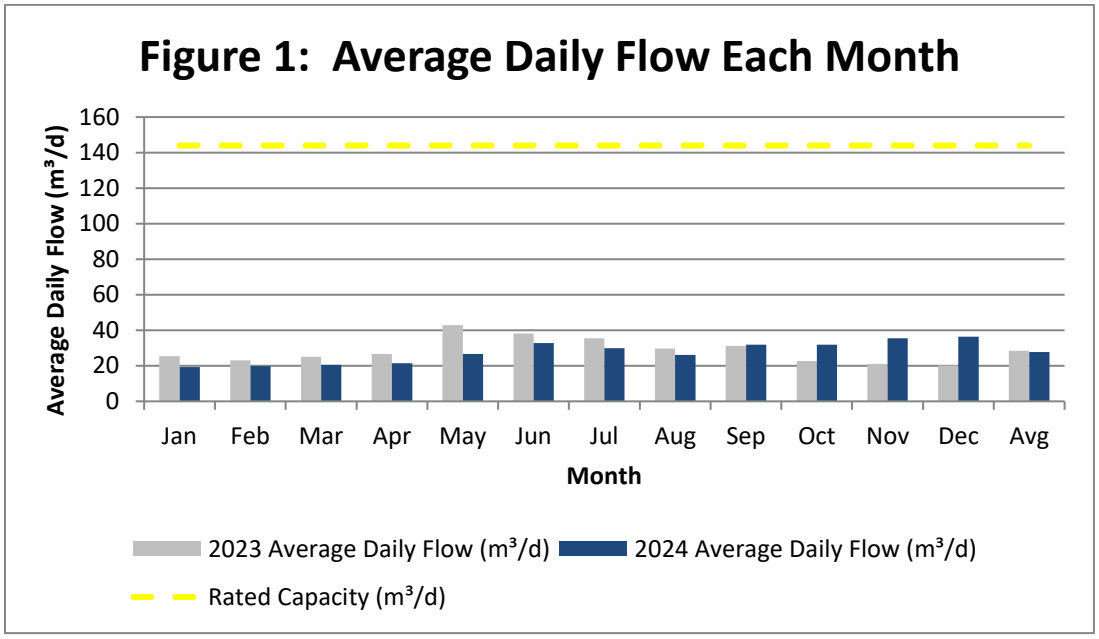
Raw and Treated Water Flows

The raw and treated water flows are regulated under the Permit to Take Water (PTTW #0266-AE9NRG) and Municipal Drinking Water Licence (MDWL #045-106). The 2024 daily raw flow was submitted to the Ministry electronically under the PTTW number. A copy of the data that was submitted is attached in Appendix A.

The total volume of treated water in 2024 was 10 136 m^3. In 2023, the total volume was 10 417 m^3.

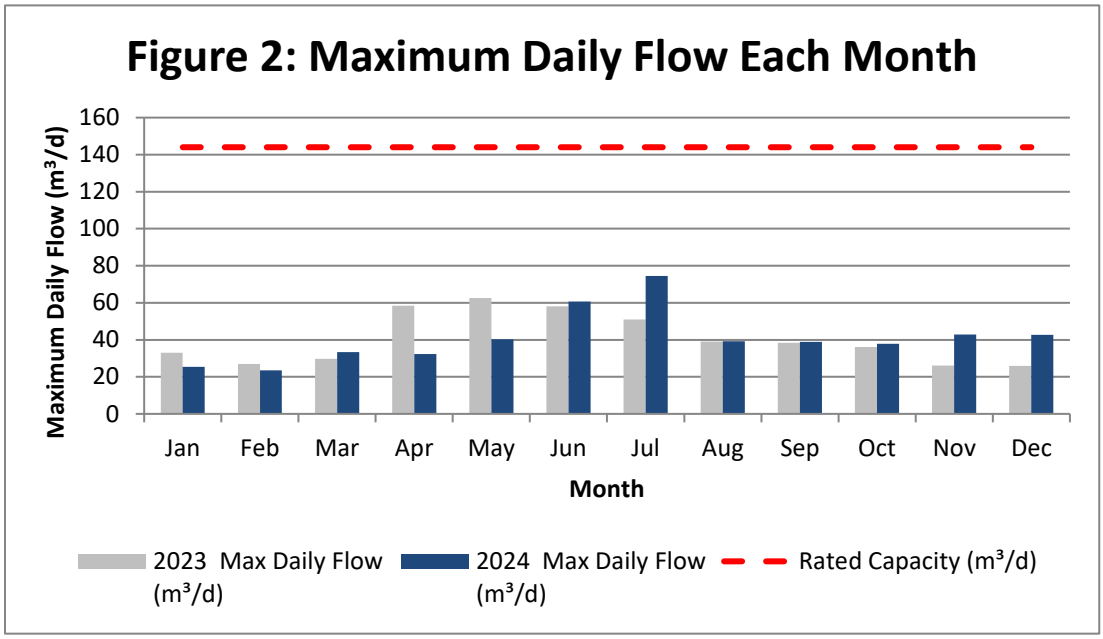
The Varna DWS pumps water from its onsite well where the flow is measured. This flow measures the raw water for the PTTW and the treated water for the rated capacity for the MDWL. Both of these (PTTW and MDWL) limit the flow to 144 m^3/d. The average daily flow in 2024 was 28 m^3 compared to 29 m^3 in 2023 (Figure 1). The system is currently operating at 19% of its rated capacity.

Figure 1: *Average Daily Flows*



The maximum daily flow in 2024 was 74 m^3/d compared to 63 m^3/d in 2023 (Figure 2). The limit for water taking as per the PTTW is 100 L/min or 144 m^3/d. This limit was not exceeded in 2024.

Figure 2: *Maximum Daily Flow*



Regulatory Sample Results Summary

Microbiological Testing

To meet regulatory requirements, raw water (RW) is sampled monthly and distribution water (DW) weekly to test for E. coli, Total Coliforms and heterotrophic plate count (HPC). The regulatory limit for Total Coliform and E. coli is zero, heterotrophic plate count (HPC) doesn't have a limit. Additional treated water samples were taken for monitoring purposes. Refer to Table 4 below for a summary of testing results.

Table 4: *Microbiological Testing Summary*

	No. of Samples Collected	Range of E.Coli Results (cfu/100mL)		Range of Total Coliform Results		No. of HPC Samples Collected	Range of HPC Results (cfu/mL)	
		Min	Max	Min	Max		Min	Max
Raw Water	12	0	0	0	0	n/a	n/a	n/a
Treated Water	3	0	0	0	0	n/a	n/a	n/a
Distribution Water	55	0	0	0	0	55	10	60

Operational Testing

As per the *Safe Drinking Water Act*, O. Reg 170/03, raw water turbidity is required to be monitored monthly with an objective of turbidity less than 1 NTU. Free chlorine residuals are required to be continuously monitored with an online chlorine analyzer. Free chlorine residuals are also monitored throughout the distribution system to ensure adequate secondary disinfection is provided. The

regulatory requirement for free chlorine residual is a minimum of 0.05 mg/L with an objective of 0.20 mg/L throughout the distribution system. Refer to Table 5 for turbidity and free chlorine residual results.

Table 5: *Turbidity and Free Chlorine Residual Monitoring*

Parameter	No. of Samples Collected	Range of Results	
		Minimum	Maximum
Turbidity, grab (NTU) – RW	12	0.23	0.48
Free Chlorine Residual, On-Line (mg/L) - TW	8760	0.0*	2.02
Free Chlorine Residual, grab (mg/L) - DW	105	0.77	1.63

*AWQI April 28, 2024 - refer to Table 2 for details.

Inorganic Parameters

Inorganic parameters are tested as a requirement under O. Reg. 170/03 every 60 months, including sodium and fluoride. Nitrate and Nitrite are tested quarterly as required under O. Reg. 170/03. In the event any of the parameters (except Sodium and Fluoride) exceed half of the maximum allowable concentration, the parameter is required to be sampled quarterly. Refer to Table 6 below.

Table 6: *Inorganic Parameter Testing*

Treated Water (TW)	Sample Date (yyyy/mm/dd)	Sample Result	MAC	Number of Exceedances	
				MAC	1/2 MAC
Antimony: Sb (ug/L) - TW	2022/11/01	<MDL 0.6	6.0	0	0
Arsenic: As (ug/L) - TW	2022/11/01	1.5	10.0	0	0
Barium: Ba (ug/L) - TW	2022/11/01	123.0	1000.0	0	0
Boron: B (ug/L) - TW	2022/11/01	69.0	5000.0	0	0
Cadmium: Cd (ug/L) - TW	2022/11/01	0.005	5.0	0	0
Chromium: Cr (ug/L) - TW	2022/11/01	<MDL 0.08	50.0	0	0
Mercury: Hg (ug/L) - TW	2022/11/01	<MDL 0.01	1.0	0	0
Selenium: Se (ug/L) - TW	2022/11/01	0.11	50.0	0	0
Uranium: U (ug/L) - TW	2022/11/01	1.11	20.0	0	0
Additional Inorganics					
Fluoride (mg/L) - TW	2022/11/01	1.15	1.5	0	n/a
Nitrite (mg/L) - TW	2024/01/02	<MDL 0.003	1.0	0	0
Nitrite (mg/L) - TW	2024/04/02	<MDL 0.003	1.0	0	0
Nitrite (mg/L) - TW	2024/07/02	<MDL 0.003	1.0	0	0
Nitrite (mg/L) - TW	2024/10/01	<MDL 0.003	1.0	0	0
Nitrate (mg/L) - TW	2024/01/02	<MDL 0.006	10.0	0	0
Nitrate (mg/L) - TW	2024/04/02	<MDL 0.006	10.0	0	0
Nitrate (mg/L) - TW	2024/07/02	<MDL 0.006	10.0	0	0
Nitrate (mg/L) - TW	2024/10/01	<MDL 0.006	10.0	0	0
Sodium: Na (mg/L) - TW	2022/11/01	10.6	20*	n/a	n/a

MAC = Maximum Allowable Concentration as per O.Reg 169/03
MDL = Below the laboratory method detection level
*There is no "MAC" for Sodium. The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified mg/L when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium-restricted diets.

Schedule 15.1 Sampling:

Schedule 15.1 Sampling is required under O. Reg 170/03. This includes sampling for lead, alkalinity and pH. The Varna Drinking Water System is under reduced sampling. As such, no residential plumbing samples were required to be collected. Monitoring the pH and alkalinity in the distribution system is essential to ensure adequate buffering for corrosion control and to minimize exposure to metals such as lead. Refer to Table 7 below.

Table 7: *Schedule 15.1 Sampling Results*

Distribution System	Number of Sampling Points	Number of Samples	Range of Results		MAC (ug/L)	Number of Exceedances
			Minimum	Maximum		
Alkalinity (mg/L)	2	4	228	269	n/a	n/a
pH	2	4	7.02	7.45	n/a	n/a
Lead (ug/l)	2	4	0.03	0.30	10	0

Organic Parameters

Organic parameters are tested every 60 months as a requirement under O. Reg 170/03. In the event any of the parameters exceed half of the maximum allowable concentration the parameter is required to be sampled quarterly. Organic parameter test results for treated water are listed below in Table 8.

Chlorine byproducts including Trihalomethane and Haloacetic Acid are tested quarterly in the distribution system. Results are listed in Table 8 below.

Table 8: *Organic Parameter Testing*

Treated Water (TW)	Sample Date (yyyy/mm/dd)	Sample Result	MAC	Number of Exceedances	
				MAC	1/2 MAC
Alachlor (ug/L) - TW	2022/11/01	<MDL 0.02	5.0	0	0
Atrazine + N-dealkylated metabolites (ug/L) - TW	2022/11/01	<MDL 0.01	5.0	0	0
Azinphos-methyl (ug/L) – TW	2022/11/01	<MDL 0.05	20.0	0	0
Benzene (ug/L) – TW	2022/11/01	<MDL 0.32	1.0	0	0
Benzo(a)pyrene (ug/L) – TW	2022/11/01	<MDL 0.004	0.01	0	0
Bromoxynil (ug/L) – TW	2022/11/01	<MDL 0.33	5.0	0	0
Carbaryl (ug/L) – TW	2022/11/01	<MDL 0.05	90.0	0	0
Carbofuran (ug/L) - TW	2022/11/01	<MDL 0.01	90.0	0	0
Carbon Tetrachloride (ug/L) - TW	2022/11/01	<MDL 0.17	2.0	0	0
Chlorpyrifos (ug/L) - TW	2022/11/01	<MDL 0.02	90.0	0	0
Diazinon (ug/L) – TW	2022/11/01	<MDL 0.02	20.0	0	0
Dicamba (ug/L) – TW	2022/11/01	<MDL 0.2	120.0	0	0
1,2-Dichlorobenzene (ug/L) – TW	2022/11/01	<MDL 0.41	200.0	0	0
1,4-Dichlorobenzene (ug/L) – TW	2022/11/01	<MDL 0.36	5.0	0	0
1,2-Dichloroethane (ug/L) – TW	2022/11/01	<MDL 0.35	5.0	0	0
1,1-Dichloroethylene (ug/L) – TW	2022/11/01	<MDL 0.33	14.0	0	0
Dichloromethane (ug/L) – TW	2022/11/01	<MDL 0.35	50.0	0	0
2,4-Dichlorophenol (ug/L) – TW	2022/11/01	<MDL 0.15	900.0	0	0
2,4-Dichlorophenoxy acetic acid (ug/L) – TW	2022/11/01	<MDL 0.19	100.0	0	0
Diclofop-methyl (ug/L) – TW	2022/11/01	<MDL 0.4	9.0	0	0

Treated Water (TW)	Sample Date (yyyy/mm/dd)	Sample Result	MAC	Number of Exceedances	
				MAC	1/2 MAC
Dimethoate (ug/L) – TW	2022/11/01	<MDL 0.06	20.0	0	0
Diquat (ug/L) – TW	2022/11/01	<MDL 1.0	70.0	0	0
Diuron (ug/L) – TW	2022/11/01	<MDL 0.03	150.0	0	0
Glyphosate (ug/L) – TW	2022/11/01	<MDL 1.0	280.0	0	0
Malathion (ug/L) – TW	2022/11/01	<MDL 0.02	190.0	0	0
2-Methyl-4chlorophenoxyacetic Acid (MCPA)	2022/11/01	<MDL 0.01	50.0	0	0
Metolachlor (ug/L) – TW	2022/11/01	<MDL 0.02	80.0	0	0
Metribuzin (ug/L) – TW	2022/11/01	<MDL 0.3	80.0	0	0
Monochlorobenzene (Chlorobenzene) (ug/L) -	2022/11/01	<MDL 1.0	10.0	0	0
Paraquat (ug/L) – TW	2022/11/01	<MDL 0.04	3.0	0	0
PCB (ug/L) – TW	2022/11/01	<MDL 0.15	60.0	0	0
Pentachlorophenol (ug/L) – TW	2022/11/01	<MDL 0.01	2.0	0	0
Phorate (ug/L) – TW	2022/11/01	<MDL 1.0	190.0	0	0
Picloram (ug/L) – TW	2022/11/01	<MDL 0.03	1.0	0	0
Prometryne (ug/L) – TW	2022/11/01	<MDL 0.01	10.0	0	0
Simazine (ug/L) – TW	2022/11/01	<MDL 0.01	1.0	0	0
Terbufos (ug/L) – TW	2022/11/01	<MDL 0.35	10.0	0	0
Tetrachloroethylene (ug/L) – TW	2022/11/01	<MDL 0.2	100.0	0	0
2,3,4,6-Tetrachlorophenol (ug/L) – TW	2022/11/01	<MDL 0.01	230.0	0	0
Triallate (ug/L) - TW	2022/11/01	<MDL 0.44	5.0	0	0
Trichloroethylene (ug/L) – TW	2022/11/01	<MDL 0.25	5.0	0	0
2,4,6-Trichlorophenol (ug/L) – TW	2022/11/01	<MDL 0.12	100.0	0	0
Trifluralin (ug/L) – TW	2022/11/01	<MDL 0.02	45.0	0	0
Vinyl Chloride (ug/L) – TW	2022/11/01	<MDL 0.17	1.0	0	0
Distribution Water					
Trihalomethane: Total (ug/L) Annual Average	2024	2.23	100.0	0	0
Haloacetic Acid: Total (ug/L) Annual Average	2024	5.3	80.0	0	0

MAC = Maximum Allowable Concentration as per O. Reg 169/03
MDL = Below the laboratory method detection level

Additional Legislated Samples

There are no additional sampling requirements within the Varna Drinking Water System.

Major Maintenance and Capital Summary

The Varna Drinking Water System completed repairs and replacements as listed below in Table 9. These represent the major expenses incurred in 2024.

Table 9: *Major Maintenance*

Item	Description
1	Pipe Repair – Varna Well House
2	Sump Pump and Sump Pump Float Replacement
3	Chlorine Injectors, Pump 1 and 2 Replacement
4	Generator Repaired
5	UPS Replacement

Revision History

Date	Revision #	Revision
February 11, 2025	0	Issued Report

Appendix A

Permit to Take Water (PTTW) Data

Ontario Clean Water Agency

Annual Water Taking and Transfer Report

From 1/1/2024 To 12/31/2024

VARNA DRINKING WATER SYSTEM - 1388

PTTW # 0266-AE9NRG

Flow Recorded in L/d

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	20507.9994	17531.9996	17951.0002	22002.0008	21903.9993	33874.0009	28021.9994	27222.9996	30238.0009	32116.0011	30415.0009	36105.9990
2	20923.9998	18059.9995	19687.0003	18080.9994	23201.9997	30345.9995	26049.9992	22218.9999	32384.9983	29365.9992	32431.9992	34744.9989
3	19346.0007	19207.0007	20183.0006	19791.0004	19882.0000	26023.0007	27290.0009	23139.9994	31635.0002	32362.9990	34622.0016	34839.0007
4	17492.0006	21263.9999	18916.0004	19295.0001	32794.9995	32304.0009	27531.0001	23563.0002	29038.0001	28020.0005	33028.9993	37519.0010
5	17007.9994	18357.9998	18207.0007	18194.0002	32722.9996	28966.9991	20920.0001	24311.0008	31051.0006	35292.9993	34273.9983	37995.9984
6	18856.0009	18875.0000	22447.0005	17916.0004	19875.0000	27475.9998	39153.9993	20729.0001	27337.9993	29396.9994	39013.9999	36882.9994
7	19899.9996	21662.0007	19079.9999	23607.9998	20188.9992	27194.9997	74491.9968	20853.0006	29149.9996	31340.0002	34587.0018	37466.9991
8	19361.9995	18666.0004	19965.0002	20709.9991	21111.9995	24718.9999	42169.9982	21882.9994	28895.9994	37900.0015	37467.9985	38277.0004
9	20093.9999	23236.9995	22357.0004	18198.9994	21187.9997	27527.0004	30260.9997	24823.0000	30337.9993	30472.9996	35263.9999	36882.9994
10	17600.0004	19051.0006	22374.0005	19104.9995	22337.9993	28309.0008	21187.9997	23201.9997	34182.9987	32909.9998	36379.0016	34598.9990
11	16985.0006	23076.0002	20190.0005	17590.0002	22667.9993	29327.9991	25256.0005	25263.9999	35049.9992	29659.0004	34248.0011	35209.9991
12	18474.0009	18700.0008	29523.0007	19382.0000	23600.0004	33033.0009	34105.9990	29805.0003	31649.0002	32118.0000	33455.0018	36354.9995
13	20974.0009	20170.9995	20597.0001	21003.0003	21823.9994	32527.0004	42902.9999	22062.0003	30958.0002	31580.9994	32874.0005	33840.9996
14	21864.9998	19700.0008	19572.0005	23545.9995	21399.9996	36670.0007	28853.0006	22462.9993	30326.0002	34013.9999	34165.0009	35033.0009
15	19568.0008	16944.0002	18725.0004	19600.9998	22659.0004	60612.0008	21444.9997	26336.9999	38623.0011	33055.0003	32437.0003	36544.9982
16	21954.0005	18763.9999	17486.9995	19270.9999	21555.0003	59141.9983	22857.9998	21736.9995	31604.0001	32523.9983	35757.0000	39083.0002
17	19916.0004	18787.0007	21780.0007	19284.0004	23226.9993	48909.0004	22962.9993	21906.0001	29895.0005	32556.9992	40056.9992	36911.9987
18	17569.9997	23541.9998	18863.0009	19408.0009	24587.9993	59176.9981	25490.9992	21073.0000	32165.0009	29858.9993	34562.0003	35347.0001
19	16884.0008	22899.9996	19864.9998	18839.0007	29288.0001	36462.0000	22198.0000	21615.9992	34293.9987	34528.9993	35737.9990	34244.9989
20	20065.0005	19285.9993	19084.9991	25086.9999	38113.9992	33203.9986	29427.9995	26087.9993	30597.9996	33847.9996	34823.0019	34162.9982
21	20746.0003	19604.9995	33402.9999	21875.0000	27123.9993	35946.0013	42313.9992	23687.9997	38915.0009	32830.0018	42876.9989	39985.0006
22	17319.0002	21184.0000	19202.9991	19944.0002	28489.0003	36518.0016	25349.0009	28002.0008	31896.9994	31992.0006	34560.0014	39888.9999
23	25459.9991	18846.0007	19645.9999	24447.0005	30339.0007	32602.0012	28565.0005	31590.9996	29538.0001	29142.9996	36581.0013	35449.0013
24	20405.0007	20681.9992	21704.0005	27368.9995	32074.0013	27040.0009	26000.0000	31788.0001	32259.9983	29370.0008	37985.0006	38001.9989
25	18613.0009	22382.9994	19309.9995	18216.9991	27219.9993	19406.9996	25955.9994	37701.9997	33613.9984	28163.9996	34271.9994	34363.9984
26	16760.9997	18665.0009	20669.0006	20104.0001	40229.0001	21146.9994	24042.9993	39209.9991	32040.0009	32025.0015	37854.9995	34828.9986
27	17749.0005	17725.0004	20659.0004	29945.0005	26666.0004	21632.0000	27108.9993	30684.9995	30024.0002	34376.9989	36098.9990	34008.9989
28	21916.9998	19354.9995	17069.9997	32381.9998	32555.9998	26066.0000	38870.9984	26343.0004	31166.0004	30014.9994	36271.9994	34731.9984
29	19193.0008	20528.9993	19593.0007	23358.9993	33804.0009	21655.0007	25330.9994	30520.9999	35236.9995	33269.0010	36219.0018	42694.0002
30	17885.0002		18645.9999	23424.9992	32250.9995	23802.9995	20997.9992	29371.0003	31270.9999	34098.9990	37865.0017	37213.0013
31	18534.0004		19466.9991		31027.9999		27158.0009	28291.9998		32134.9983		37402.0004