Memphrémagog Conservation

NEWSVT Casella landfill site in Coventry, Vermont

Capacity of Lake Champlain to better accept leachate from the Coventry site than Lake Memphremagog

Pretreatment discharge permit no 3-1406

APPENDIX D2

Prepared by
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Volunteer technical consultant with MCI
December 20, 2023 – 44 pages

MCI OBJECTIVE that NEWSVT Coventry leachate final disposal even pretreated will be forever outside Lake Memphremagog watershed

Lake Champlain watershed has a better capacity to accept leachate from the Coventry site than the Lake Memphremagog basin

NEWSVT Casella in Coventry Vermont

MCI's objectives are clear and simple: remove Newport's municipal waste treatment plant from the list of destinations for the leachate from NEWSVT Coventry even after pretreatment and ensure that the final destination of the leachate be outside the Lake Memphremagog watershed 'in perpetuity'.

MCI presents the following arguments which show that the Lake Champlain watershed is a more appropriate destination for final disposition of the Coventry leachate than the Lake Memphremagog watershed.

Technical arguments: greater treatment capacity in Montpelier than in Newport

The leachate is currently being sent for treatment to the Montpelier waste treatment plant in the Lake Champlain watershed roughly 100 Km (62 miles) from Coventry. The treatment capacity of the Montpelier plant is triple that of the Newport plant. Most of the leachate has been treated in Montpelier since 2005. Leachate was sent to Newport from 1993 to 2004 and then partially from 2010 to 2019. Limitations on arsenic and the organic content have limited the maximum volumes that can be treated during the last period in Newport. Thus, on a technical level, Montpelier is preferable to Newport to better incorporate the leachate, and to reduce the concentration of contaminants in the discharge at the Montpelier plant.

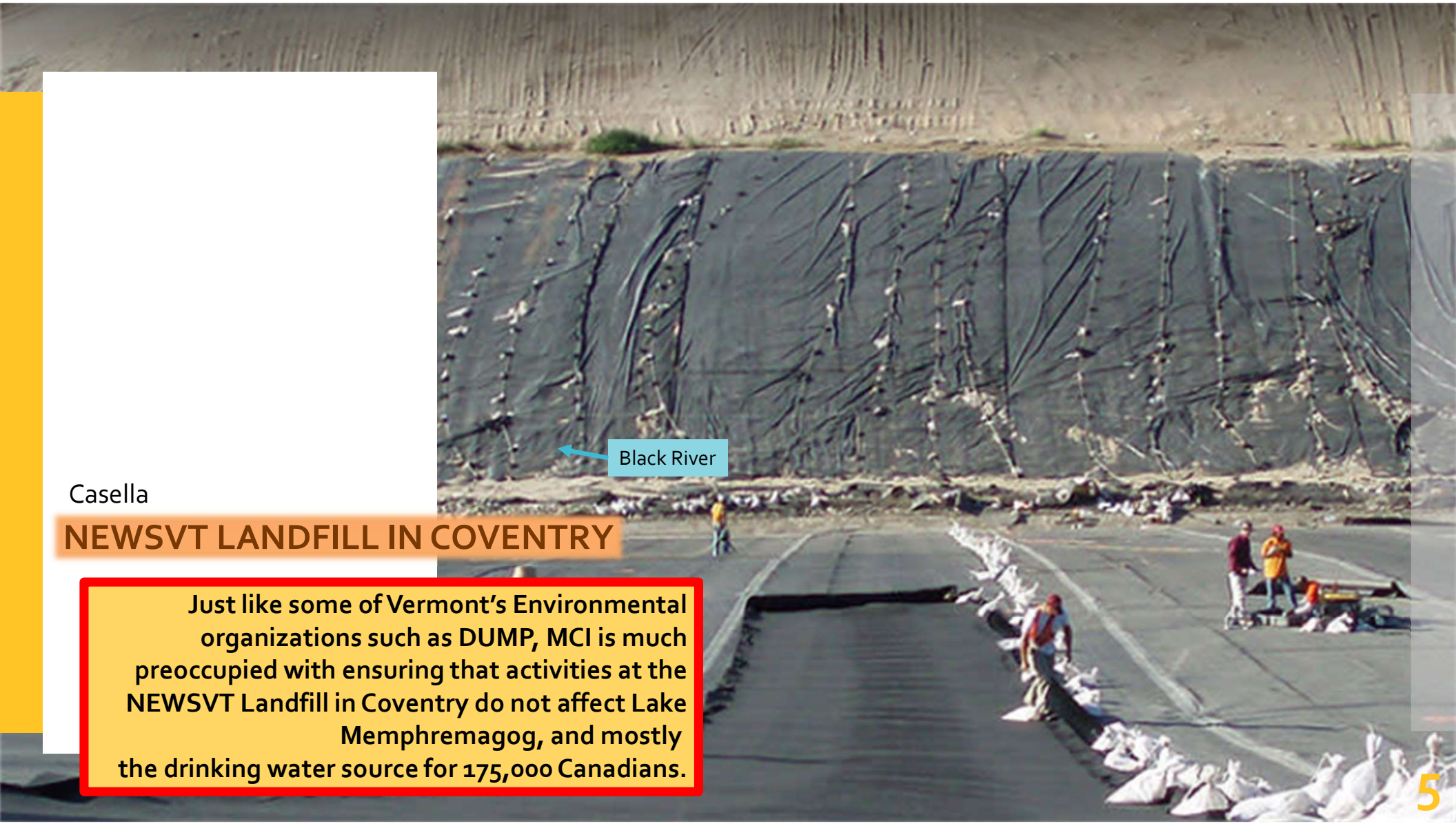
Environmental arguments: Better capacity to incorporate leachate as the flow is higher and the route to the aquatic border is longer

The very long aquatic route in Lake Champlain of more than 170 km (105 miles) before the Canada/US border compared to the rather short distance of 8 km (5 miles) between the Newport plant and the border ensures a greater probability of retaining the contaminants in the American portion of Lake Champlain.

As well, the flow of the Richelieu river is triple that of the Magog river. A better dilution is ensured for the remaining contaminants in the leachate that will reach the aquatic Canada/US border.

Equitable argument: The majority of the garbage sent to Coventry comes from residents of the Lake Champlain basin

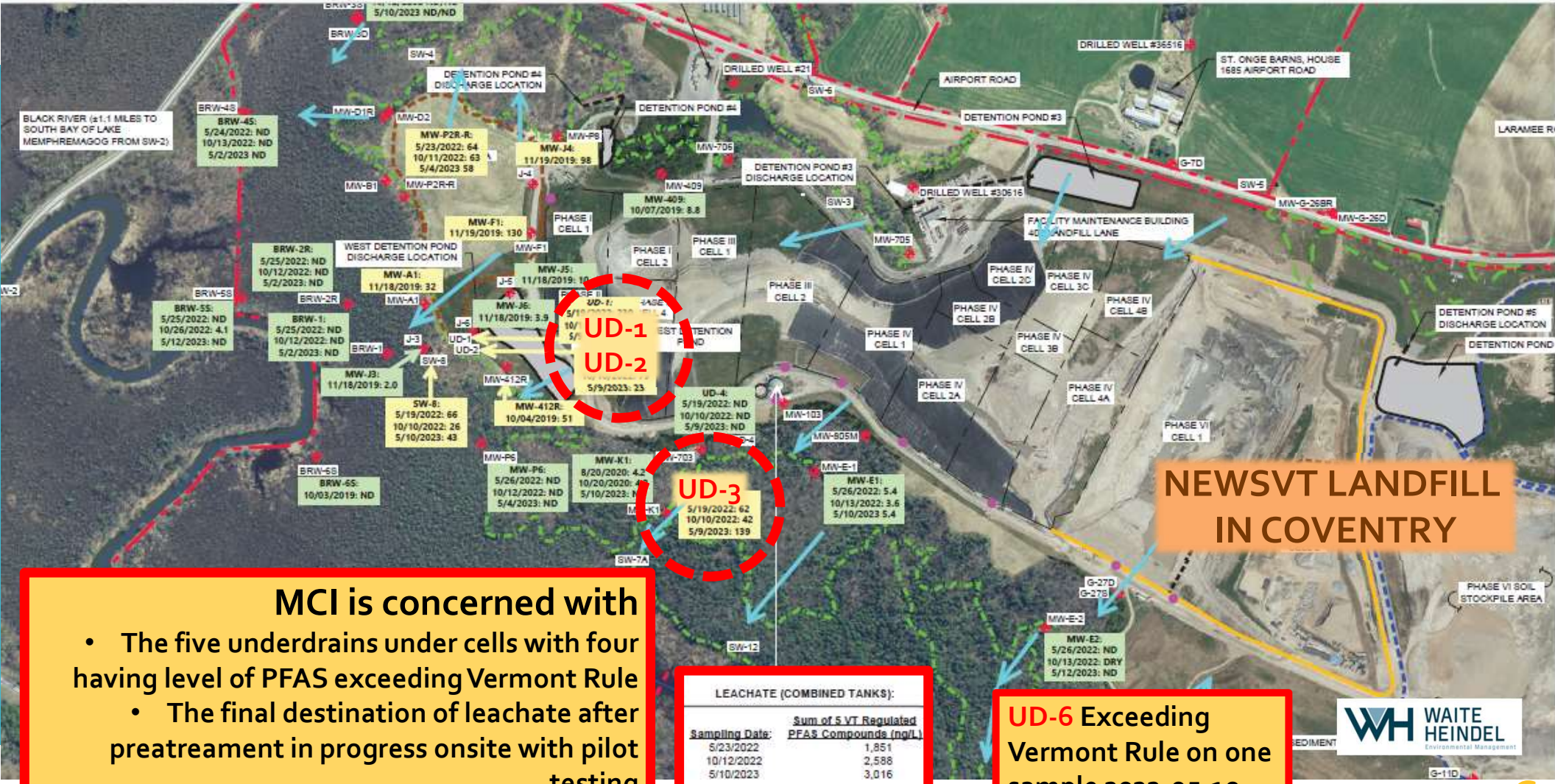
The Coventry landfill receives roughly 80% of its garbage from Vermont and the rest from neighbouring states, including New York. More than 95% of the garbage comes from populations and activities outside of the American portion of the Lake Memphremagog watershed. If the American portion of the Lake Memphremagog watershed somehow got stuck with Vermont's only operational solid and other waste landfill site, does it have the obligation to also accept the dumping of leachate, even pretreated, in our surface waters? For equity's sake, shouldn't the leachate definitely be handled by the major generators of the garbage buried at the Coventry landfill, who are outside the Lake Memphremagog watershed and principally in that of Lake Champlain?



Casella

NEWSVT LANDFILL IN COVENTRY

Just like some of Vermont's Environmental organizations such as DUMP, MCI is much preoccupied with ensuring that activities at the NEWSVT Landfill in Coventry do not affect Lake Memphremagog, and mostly the drinking water source for 175,000 Canadians.



MCI is concerned with

- The five underdrains under cells with four having level of PFAS exceeding Vermont Rule
- The final destination of leachate after preatreament in progress onsite with pilot testing

LEACHATE (COMBINED TANKS):

Sampling Date:	Sum of 5 VT Regulated PFAS Compounds (ng/L)
5/23/2022	1,851
10/12/2022	2,588
5/10/2023	3,016

LEACHATE

UD-6 Exceeding Vermont Rule on one sample 2022-05-19

PFAS Vermont Rule & Regulations

Vermont Rule or Regulations PFAS	Vermont Groundwater Protection Rule & Strategy	Vermont Water Supply Rule	Vermont Hazardous Waste Management Regulations	*Vermont Surface Water Quality*
Adopted	July 6, 2019	March 17, 2020	February 1, 2022	*Expected for 2024*
Description	Action Level	Maximum Contaminant Level (MCL)	Classified as hazardous wastes	
Value	20 ng/L	20 ng/L	>= 20 ng/L	
PFAS considered	Sum of five PFAS in groundwater • **PFOA** • **PFOS** • **PFHxS** • **PFHpA** • **PFNA**	Sum of five PFAS in drinking water • **PFOA** • **PFOS** • **PFHxS** • **PFHpA** • **PFNA**	Sum of two PFAS in liquid wastes • **PFOA** • **PFOS**	
Description		Preventive Action Level		
Value		2 ng/L for sum of five PFAS		

UNDERDRAIN UD-3

NEWSVT Landfills
Coventry, Vermont
Underdrain Analyses
Perfluoroalkyl Substances (PFAS)

				Perfluoro-octanoic acid (PFOA)	Perfluoro-octane sulfonic acid (PFOS)	Perfluoro-hexane sulfonic acid (PFHxS)	Perfluoro heptanoic acid (PFHpA)	Perfluoro-nonanoic acid (PFNA)	**Sum of 5 Detected PFAS Compounds Regulated by VT in Groundwater**		**Sum of All Detected PFAS Compounds**	
	Water Quality Standards:		None	(ng/L)	(ng/L)	(ng/L)	(ng/L)	(ng/L)	(ng/L)	n	(ng/L)	n
Location	Sampling Date	Lab	Method									
Phase 3 Underdrain Outlet	2019-09-19	AA	537 (M), 122	**9,19**	ND / < 1,83	ND / < 1,83	**14,5**	ND / < 1,83	**24**	**2**	**222**	**6**
	2019-10-31	AA	537 (M) 134, LCMSMS-ID	**24,2**	ND / < 1,82	ND / < 1,82	**23,6**	ND / < 1,82	**48**	**2**	**330**	**6**
	2020-02-06	AA	537 (M) 134, LCMSMS-ID	**30,7**	ND / < 1,84	ND / < 1,84	**28,4**	ND / < 1,84	**59**	**2**	**392**	**7**
	2020-05-07	AA	537 (M) 134, LCMSMS-ID	**40,0**	ND / < 1,75	ND / < 1,75	**37,2**	ND / < 1,75	**77**	**2**	**489**	**6**
	2020-10-15	AA	537 (M) 134, LCMSMS-ID	**7,56 F**	ND / < 1,78	ND / < 1,78	**15,2**	ND / < 1,78	**23**	**2**	**226**	**6**
	2021-05-10	AA	537 (M) 134, LCMSMS-ID	**38,4**	ND / < 1,80	ND / < 1,80	**34,5**	ND / < 1,80	**73**	**2**	**427**	**6**
	2021-10-12	AA	537 (M) 134, LCMSMS-ID	**9,76**	ND / < 1,78	ND / < 1,78	**17,7**	ND / < 1,78	**27**	**2**	**247**	**6**
	2022-05-19	AA	537 (M) 134, LCMSMS-ID	**31,2**	ND / < 1,78	ND / < 1,78	**30,7**	ND / < 1,78	**62**	**2**	**378**	**6**
	2022-10-10	AA	537 (M) 134, LCMSMS-ID	**16,0**	ND / < 1,82	ND / < 1,82	**26,0**	ND / < 1,82	**42**	**2**	**329**	**7**
	2023-05-09	AA	537 (M) 134, LCMSMS-ID	**79,8**	ND / < 1,82	ND / < 1,82	**59,2**	ND / < 1,82	**139**	**2**	**657**	**6**

Vermont Hazardous Waste Management Regulations Effective February 1, 2022
PFOA+PFOS >= 20 ng/L

2 overruns on a 3 periods

Vermont Drinking Water Standard March 17, 2020 : 20 ng/L PFAS-5 >>> In excess 10 / 10

Vermont Groundwater Protection Rule July 6, 2019 : 20 ng/L PFAS-5 >>> In excess 6 / 6

LEACHATE FROM ABOVE GROUND TANK

NEW SVT Landfills
Coventry, Vermont
Combined Leachate Analyses
Perfluoroalkyl Substances (PFAS)

Location	Sampling Date	Lab	Method	Perfluoro-octanoic acid (PFOA) (ng/L)	Perfluoro-octane sulfonic acid (PFOS) (ng/L)	PFOA + PFOS (ng/L)	Perfluoro-hexane sulfonic acid (PFHxS) (ng/L)	Perfluoro heptanoic acid (PFHpA) (ng/L)	Perfluoro-nonanoic acid (PFNA) (ng/L)	Sum of 5 Detected PFAS Compounds Regulated by VT in Groundwater (ng/L)	n
Combined AST	2018-01-10	SGS	MLA 110	1 850	244	2094	397	748	125	3 364	5
	2019-05-02	TA	537 (mod) QSM 5.1, Table B-15	1 080	127	1207	*271*	550	63,7	2 092	5
	2019-10-31	AA	537 (M) 134, LCMSMS-ID	1 700	199	1899	427	655	112	3 093	5
	2020-05-19	AA	537 (M) 134, LCMSMS-ID	2 360	336	2696	475	736	219	4 126	5
	2020-10-16	AA	537 (M) 134, LCMSMS-ID	1 680	160	1840	308	768	99,1	3 015	5
	2021-05-18	AA	537 (M) 134, LCMSMS-ID	1 790	220	2010	381	747	118,0	3 256	5
	2021-10-19	AA	537 (M) 134, LCMSMS-ID	1 520	174	1694	387	769	99,7	2 950	5
	2022-05-26	AA	537 (M) 134, LCMSMS-ID	992	90	1082	238	481	50,2	1 851	5
	2022-10-12	AA	537 (M) 134, LCMSMS-ID	1 490	132	1622	286	680	ND / < 100	2 688	4
	2023-05-10	AA	537 (M) 134, LCMSMS-ID	1 710	235	1945	363	619	89,3	3 016	5
				Average	Average	Average	Average	Average	Average	Average	
				1 617	192	1 809	353	675	108	2 945	

Average 3 last periods : 1 550

Vermont Hazardous Waste Management Regulations
Effective February 1, 2022 PFOA+PFOS >= 20 ng/L

PFOA + PFOS concentration of last 3 periods
1,550 ng/L is 77 times over 20 ng/L

Onsite PFAS Treatment for Underdrain UD-3

Granular Activated Carbon (GAC)

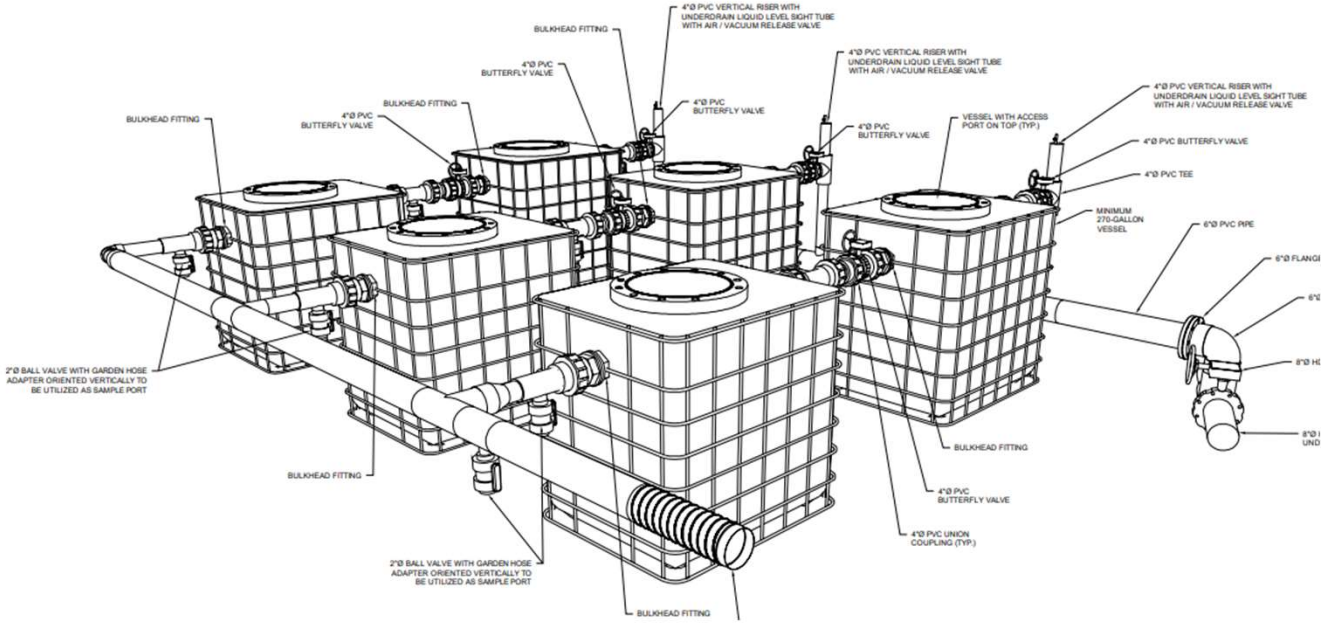
Flow : 5 gpm (7,200 gpd)

Gravity system located at arrival of UD-3 on the ground

Objective PFAS-5 equal or below 2 ng/L, Preventive Action Level of Vermont Water Supply Rule

Replacement of GAC when saturated; spent GAC sent to landfill

Treated water discharge in Black River watershed



1 PHASE III UNDERDRAIN PFAS TREATMENT SYSTEM ISOMETRIC VIEW

NOT TO SCALE

- NOT FOR CONSTRUCTION -
FOR BIDDING PURPOSES ONLY
12/10/21

SANBORN HEAD

Onsite PFAS Pretreatment for Leachate

Surface Active Foam Fractionation (SAFF) from EPOC

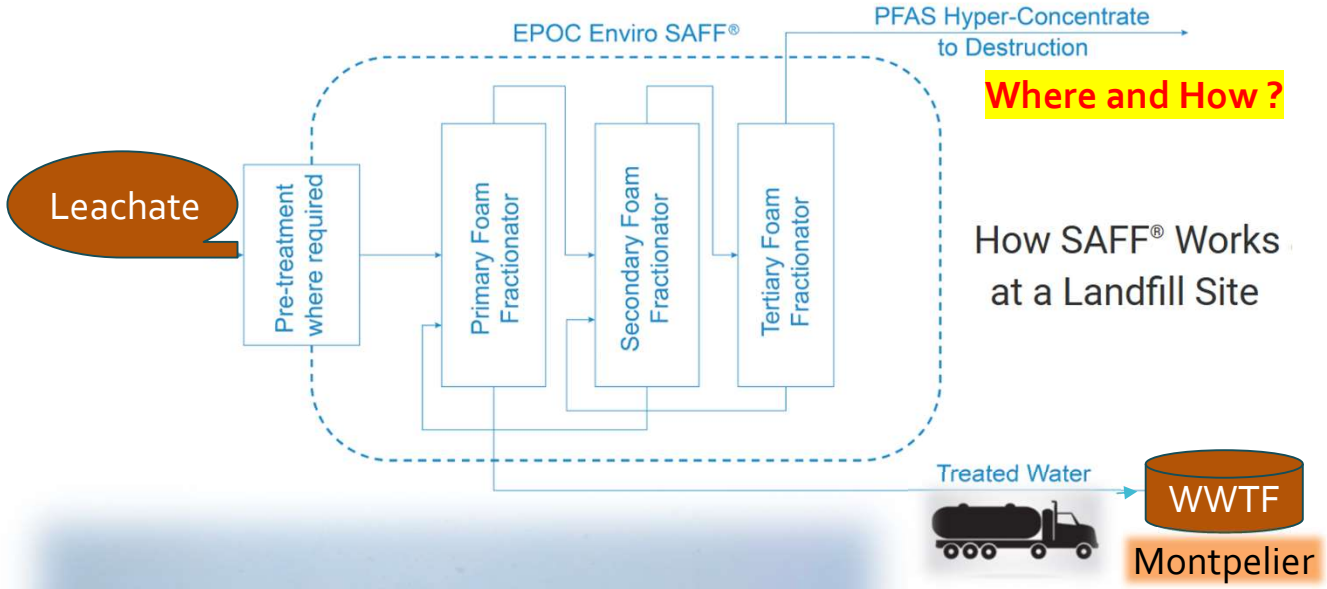
Capacity : 30,000 gpd

Pumping, bubbling to remove PFAS, additional stages to concentrate PFAS

Objective PFAS-5 reduced to ??? [maybe not to be a hazardous liquid waste so PFOA + PFOS <= 20 ng/L]

Concentrate PFAS : destruction or stabilization ???

Pretreated leachate sent to WWTF in Montpelier



Picture and blue diagram from EPOC web site

May not exactly represented what is done at NEWSVT Coventry

vtdigger.org/2022/11/15/casella-moves-to-remove-pfas-from-landfill-leachate-but-northeast-kingdom-residents-say-theyve-had-enough/

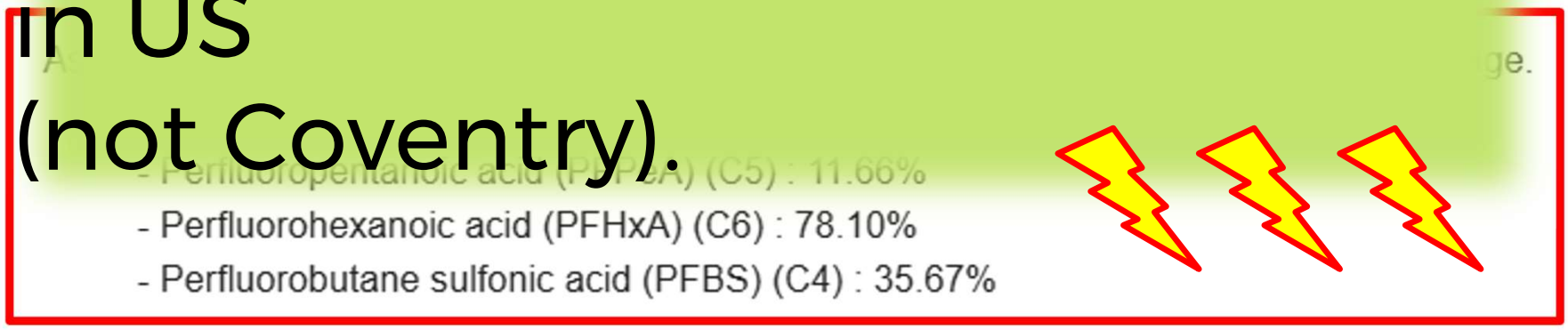
The Casella Waste Systems facility in Coventry is seen in January. Northeast Kingdom residents say they're concerned that a new building for PFAS treatment would allow Casella to eventually discharge treated leachate into Lake Memphremagog. State officials say they haven't ruled that out.
File photo by Riley Robinson/VTDigger

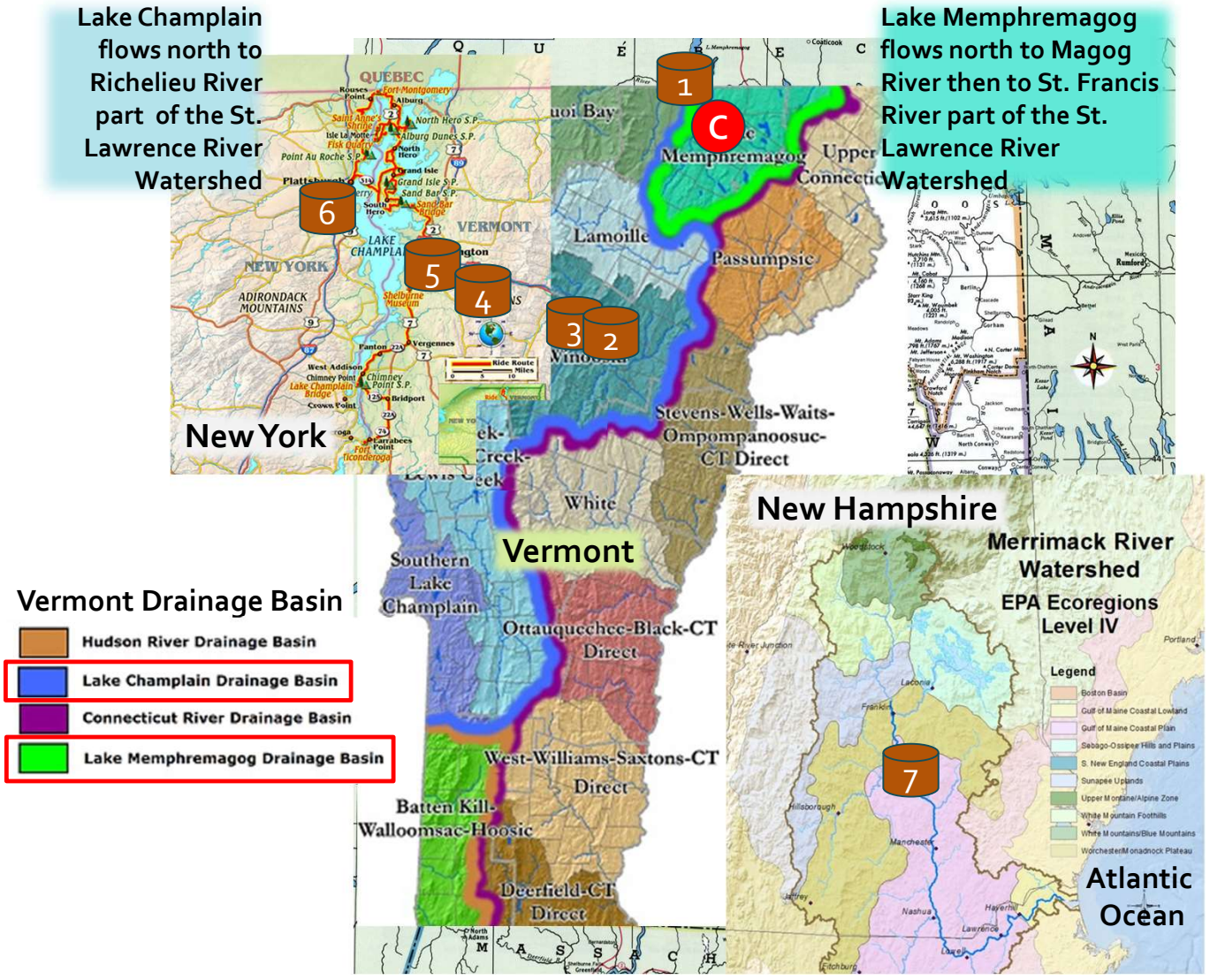
MCI has the same concern as the Northeast Kingdom residents that Vermont State officials allow after PFAS pretreatment the discharge of leachate into Lake Memphremagog watershed via Newport WWTF

Pretreatment with foam fractionation does not well remove short-chain PFAS.

That is shown from EPOC data from an anony[illegible] landfill site in US (not Coventry).

https://epocenviro.com/applications/landfill-leachate/





C **Casella NEWSVT Landfill in Coventry**

Agreements to truck leachate to 7 Wastewater Treatment Facilities -

Lake Memphremagog Watershed

In Vermont
- 1 Newport 6 miles

Lake Champlain Watershed

In Vermont
- 2 Barre 62 miles
- 3 Montpelier 64 miles
- 4 Essex 70 miles
- 5 Burlington N 78 miles

In New York State
- 6 Plattsburgh 100 miles

Merrimack River Watershed

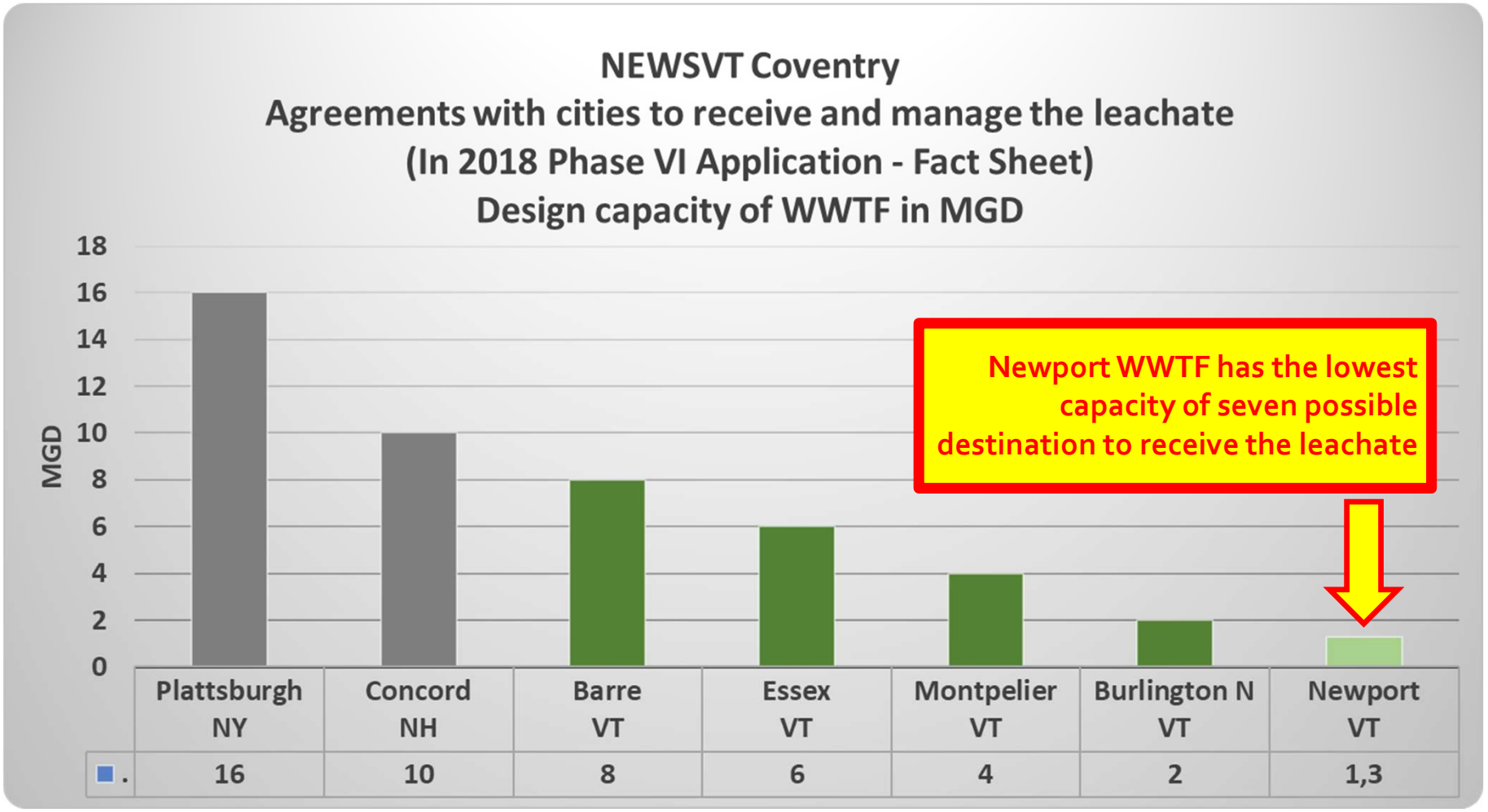
In New Hampshire
- 7 Concord 150 miles

Wastewater Treatment Facilities approved to received leachate from NEWSVT Coventry

	Newport VT	Barre VT	Montpelier VT	Essex VT	Burlington N VT	Plattsburgh NY	Concord NH
Population	5,500	17,000	8,000	28,000	10,000	20,000	44,000
Design capacity	1.3 MGD	8 MGD	4 MGD	6 MGD	2 MGD	16 MGD	10 MGD
Active Capacity	0.6 MGD		1.8 MGD			6 MGD	4 MGD
Distance from Coventry	**6 miles**	**62 miles**	**64 miles**	**70 miles**	**78 miles**	**100 miles**	**150 miles**
Watershed	Lake Memphremagog	Lake Champlain	Lake Champlain	Lake Champlain	Lake Champlain	Lake Champlain	Merrimack River
Flow to Canada	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	**NO**
Leachate For 30 years 1992-2022	Only from 2009-2019 At reduced volume (1)	?	Most of the time since 1992	?	?	?	?
Total leachate volume since 1992							

Data come many sources and time periods so order of magnitude and not precise value for 2023

Note 1 : Leachate volume was limited at Newport because of arsenic and organic load


NEWSVT Coventry
Agreements with cities to receive and manage the leachate
(In 2018 Phase VI Application - Fact Sheet)
Design capacity of WWTF in MGD
MGD
18
16
14
12
10
8
6
4
2
0
Newport WWTF has the lowest capacity of seven possible destination to receive the leachate
Plattsburgh NY
Concord NH
Barre VT
Essex VT
Montpelier VT
Burlington N VT
Newport VT
16
10
8
6
4
2
1,3

Leachate was sent to Newport from 2009 to 2019, representing a third of the time during period 1992 to 2003

Only a fraction of the leachate was sent to Newport during that period because of arsenic and organic load limitations

For most of the past thirty years, leachate was sent to Montpelier WWTF

Comparative advantage for the disposal of leachate from Coventry in the Lake Champlain watershed rather than the Lake Memphremagog basi

	Wastewater Treatment Facility	Flow July 28, 2023	Distance from the treatment facility to the aquatic US/Can border	County population
Lake Champlain watershed	Montpelier 1,8 MGD	Richelieu river 650 m.cu./s	Winooski river Lake Champlain 170 km +	6 counties 404 000
Lake Memphremagog watershed	Newport 0,6 MGD	Magog river 195 m.cu./s	Lake Memphremagog 8 km	Orleans County 28 000
Ratio favouring the Lake Champlain watershed to accept leachate	3	3	21	15

The residential solid waste tonnage is proportional to population

Wastewater Treatment Facility

Montpelier
1,8 MGD

Newport
0,6 MGD

3

TECHNICAL ARGUMENT in favor of Montpelier WWTF in Lake Champlain basin to continue to receive NEWSVT leachate

Approximately 1.8 million gallons

The Montpelier Water Resource Recovery Facility treats **approximately 1.8 million gallons** of sewage daily.

Water Resource Recovery Facility | Montpelier, VT
www.montpelier-vt.org/174/Water-Resource-Recovery

TECHNICAL ARGUMENT

Active capacity of treatment of Montpelier is 3 times Newport

According to the city of **Newport** web site, the waste treatment facility treats between **500 000 to 600 000 gallons of waste water daily**, even though it is authorized to treat 1,2 million gallons daily.

Flow
July 28, 2023

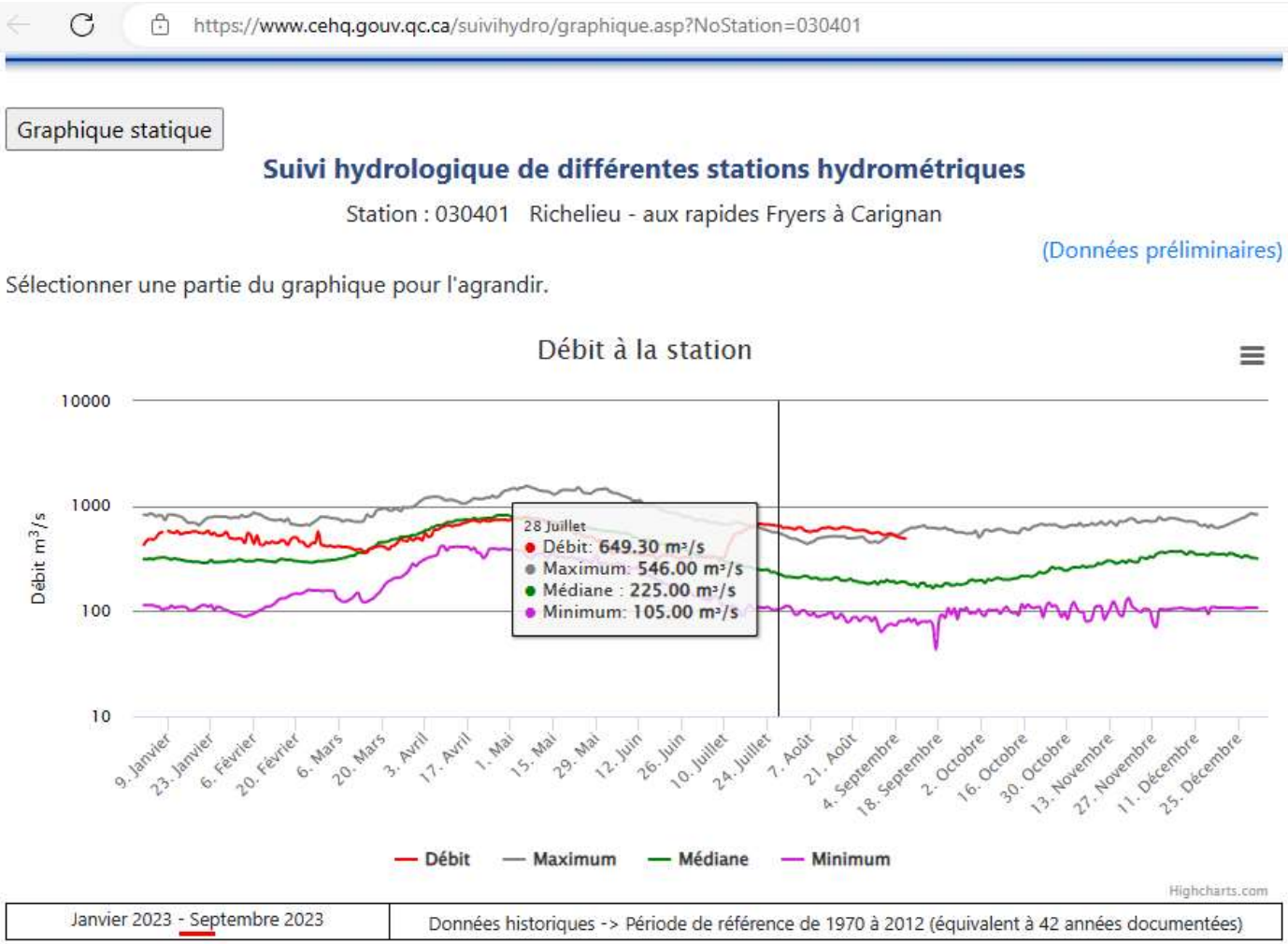
Richelieu river
650 m.cu./s

Magog river
195 m.cu./s

3

ENVIRONMENTAL ARGUMENT

in favor of Lake Champlain basin to continue to receive NEWSVT leachate



The outflow of the Memphremagog dam was maintained at **195 cubic metres cubes per second** July 28, 2023

ENVIRONMENTAL ARGUMENT

Flow ratios at July 28, 2023

Richelieu 650 m.cu./s
Magog 195 m.cu./s

= 3.3

Better dilution

cehq.gouv.qc.ca/suivihydro/graphique.asp?NoStation=030401

Distance from the treatment facility to the aquatic US/Can border

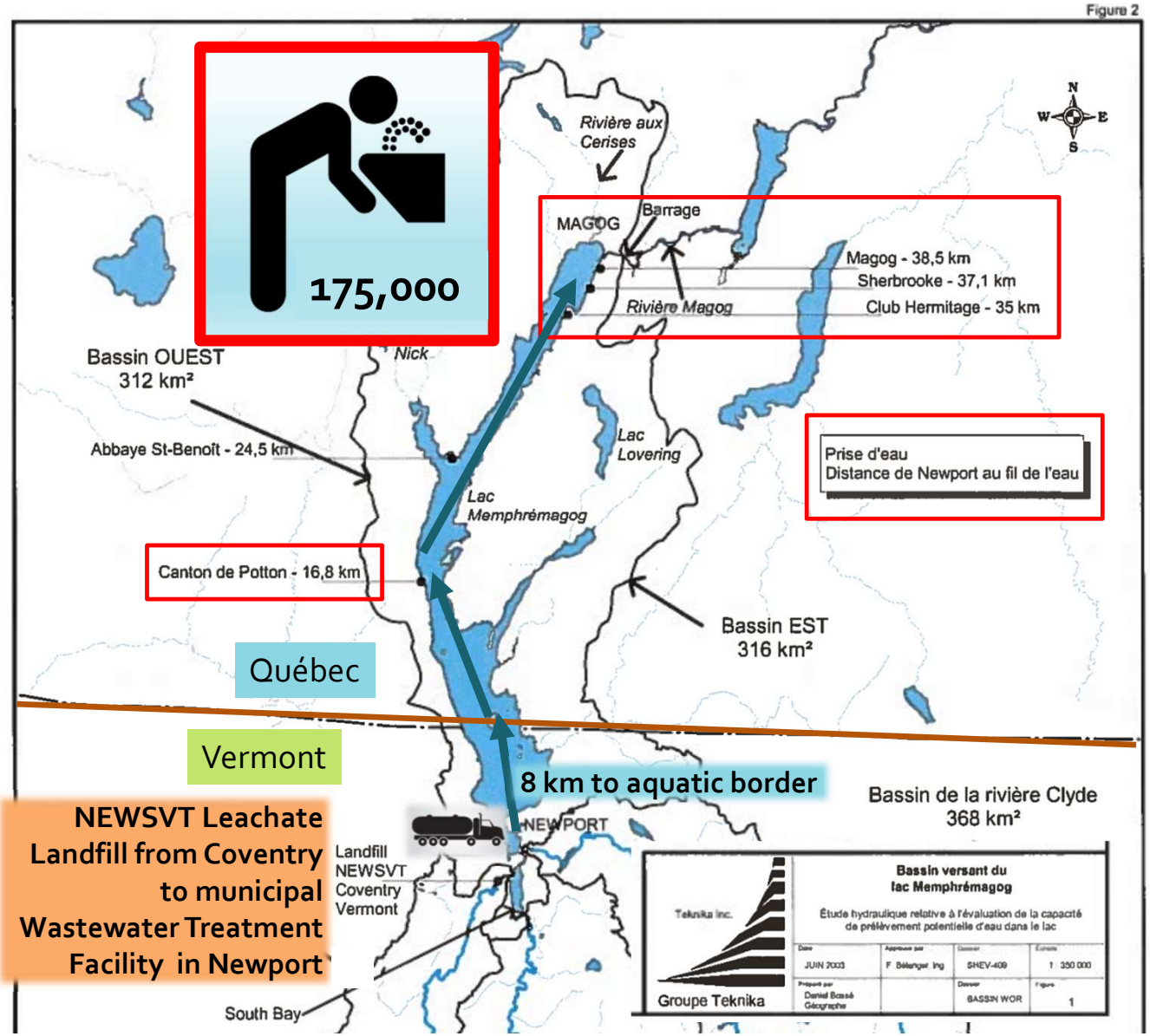
Winooski river Lake Champlain 170 km +

Lake Memphremagog 8 km

21

ENVIRONMENTAL ARGUMENT

in favor of Lake Champlain basin to continue to receive NEWSVT leachate



NEWSVT Leachate Landfill from Coventry to municipal Wastewater Treatment Facility in Newport

Drinking Water

Main Water Intakes in Québec

Distance from Newport

- **Canton de Potton : 16,8 km**
- **Sherbrooke : 37,1 km**
- **Magog : 38,5 km**

Between Newport and the main water intakes in Québec

- **Mitigation >> Load Reduction**
- **Dilution in river and lake volume**

Lake Memphremagog Watershed

Lake Champlain Watershed

Drinking Water

Main Water Intakes in Québec

Aquatic distance from Montpelier

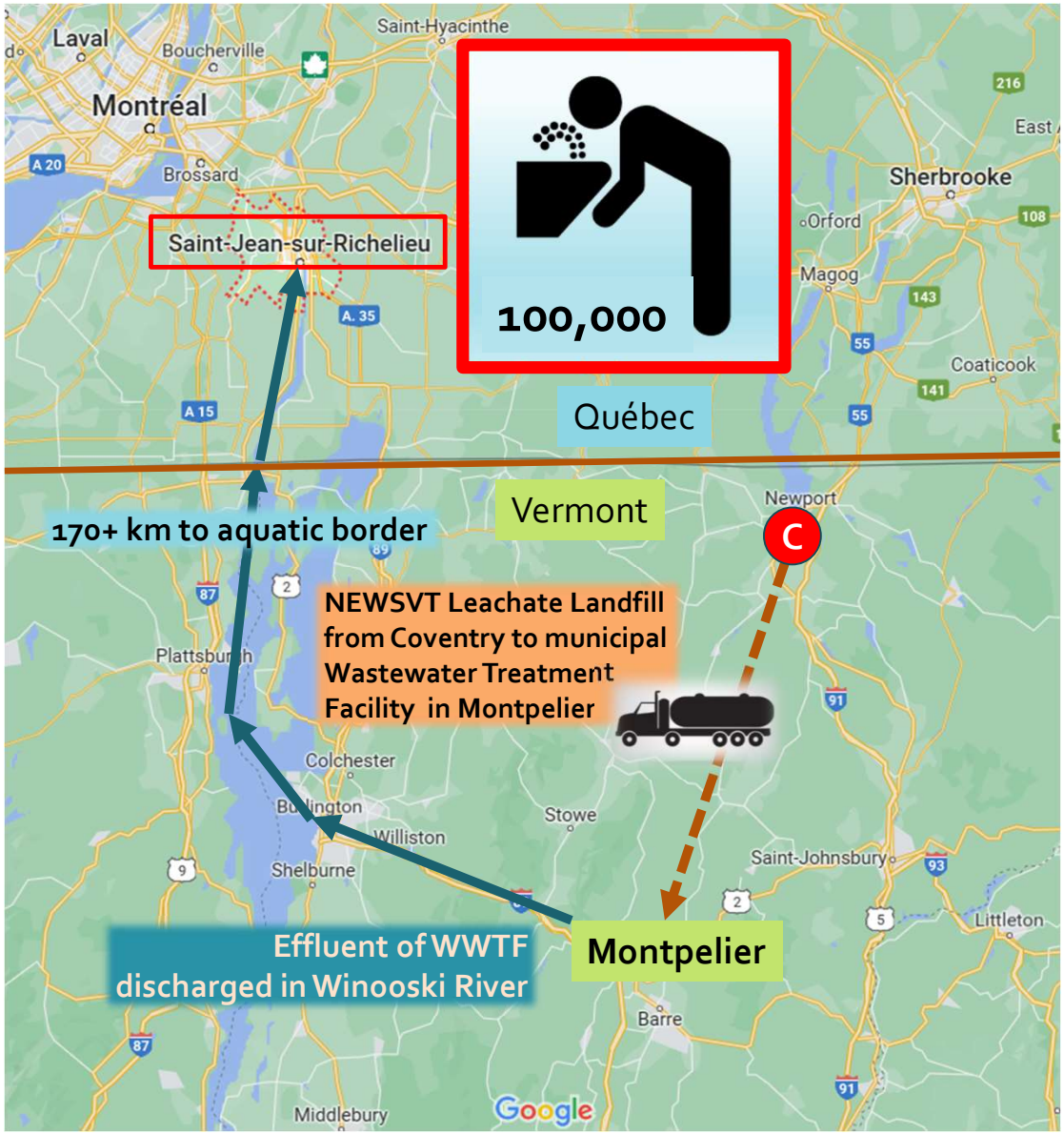
- **Saint-Jean-sur-Richelieu : 220+ km**

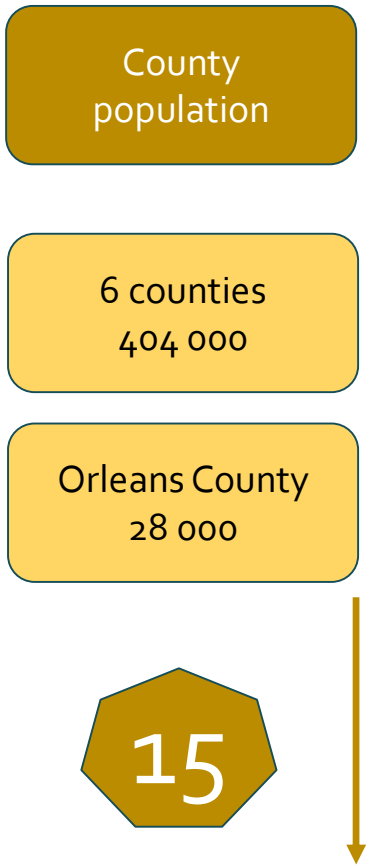
ENVIRONMENTAL ARGUMENT

Longer distance in Lake Champlain Watershed before aquatic border :

21 times more than in Lake Memphremagog basin

Increased mitigation with load reduction





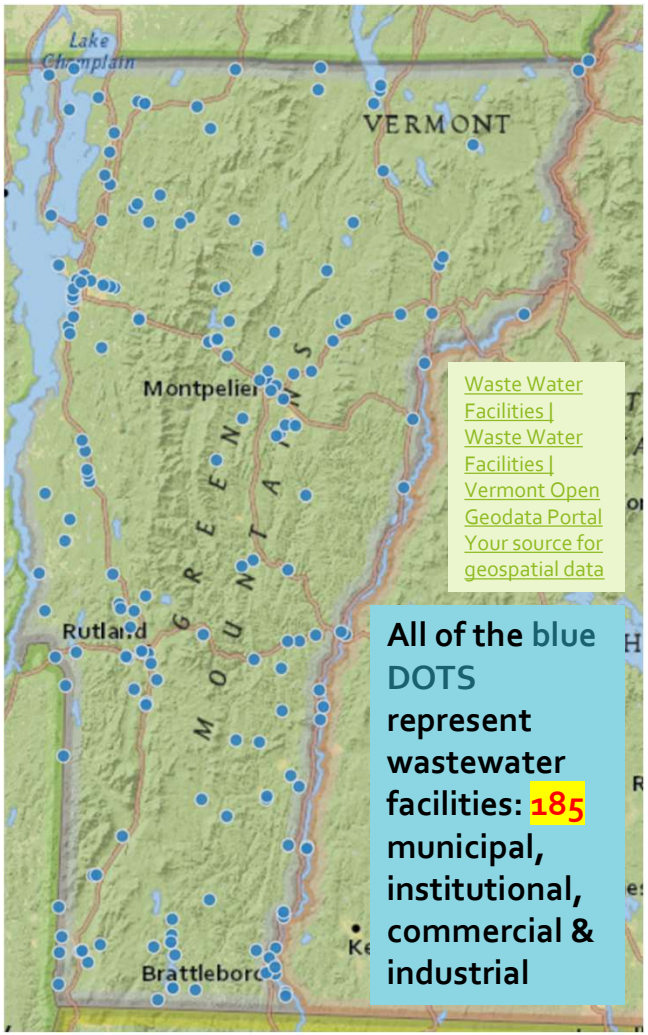
EQUITABLE ARGUMENT

in favor of Lake Champlain basin to continue to receive NEWSVT leachate

The residential solid waste tonnage is proportional to population

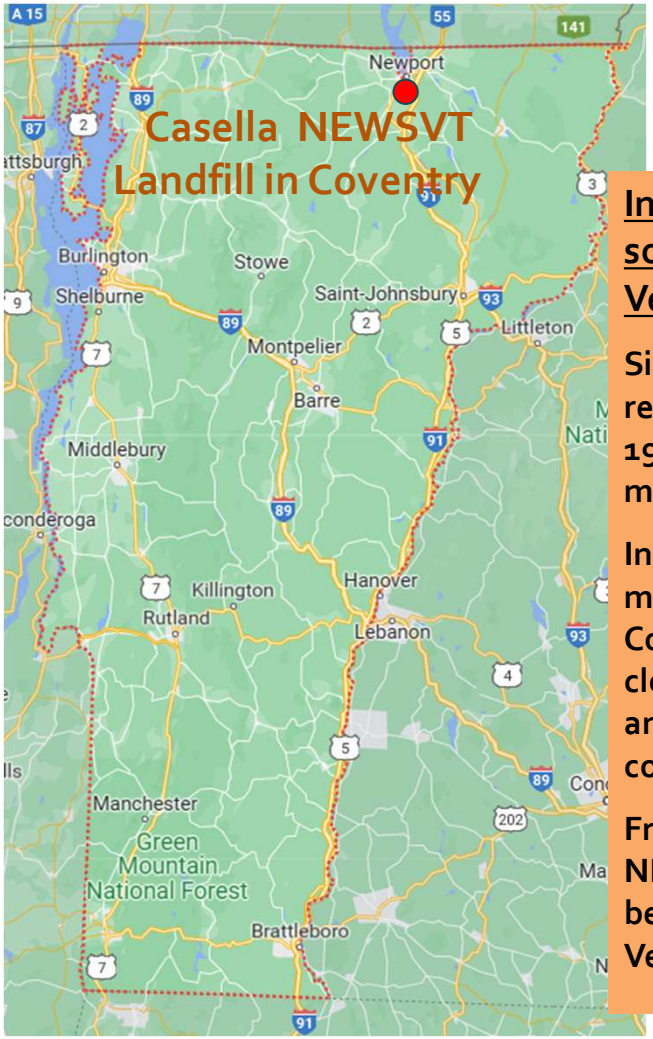
VERMONT WASTE WATER FACILITIES

Stay decentralized over time



VERMONT SOLID WASTE LANDFILL

Went from decentralized to monopolistic



In 2023, 1 landfill site for solid waste in operation in Vermont

Since the adoption of the new regulation on solid waste in 1989 in Vermont, sites without membranes have closed.

In 1999, two sites had membranes, Moretown and Coventry. In 2013, Moretown closed following odor problems and groundwater contamination.

From 2013, the Casella NEWSVT site in Coventry has become the only site in Vermont to receive solid waste.

Vermont Liquid Sewage Disposal

- The **BURDEN** is spread along individual and municipalities
  - Septic System for rural people
  - Municipal wastewater treatment facilities

Vermont Solid Waste Disposal

- The **BURDEN** is transferred to one area of the state in the only landfill in operation located in Coventry
- Some Vermonters' solid waste goes in adjacent states, and adjacent states waste come in Vermont to that one landfill

Vermont Liquid Sewage Disposal

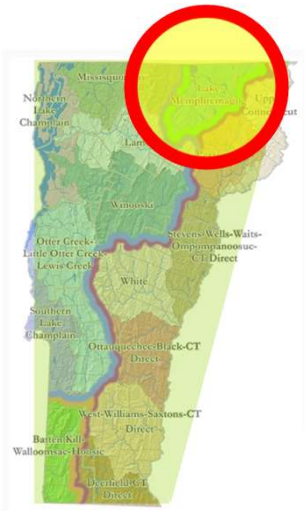
- The **BURDEN** is spread

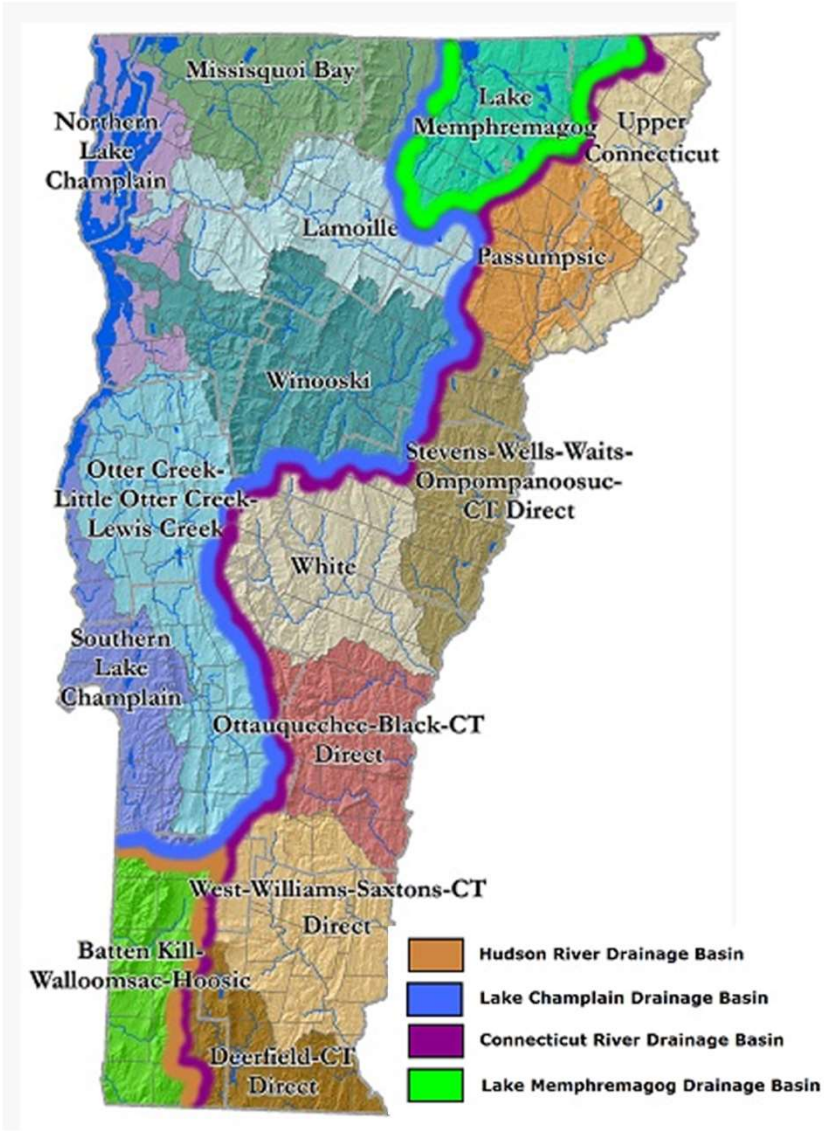
Vermont Solid Waste Disposal

- **The BURDEN**

is concentrated in Lake Memphremagog Basin

Lake Memphremagog Watershed





AREA

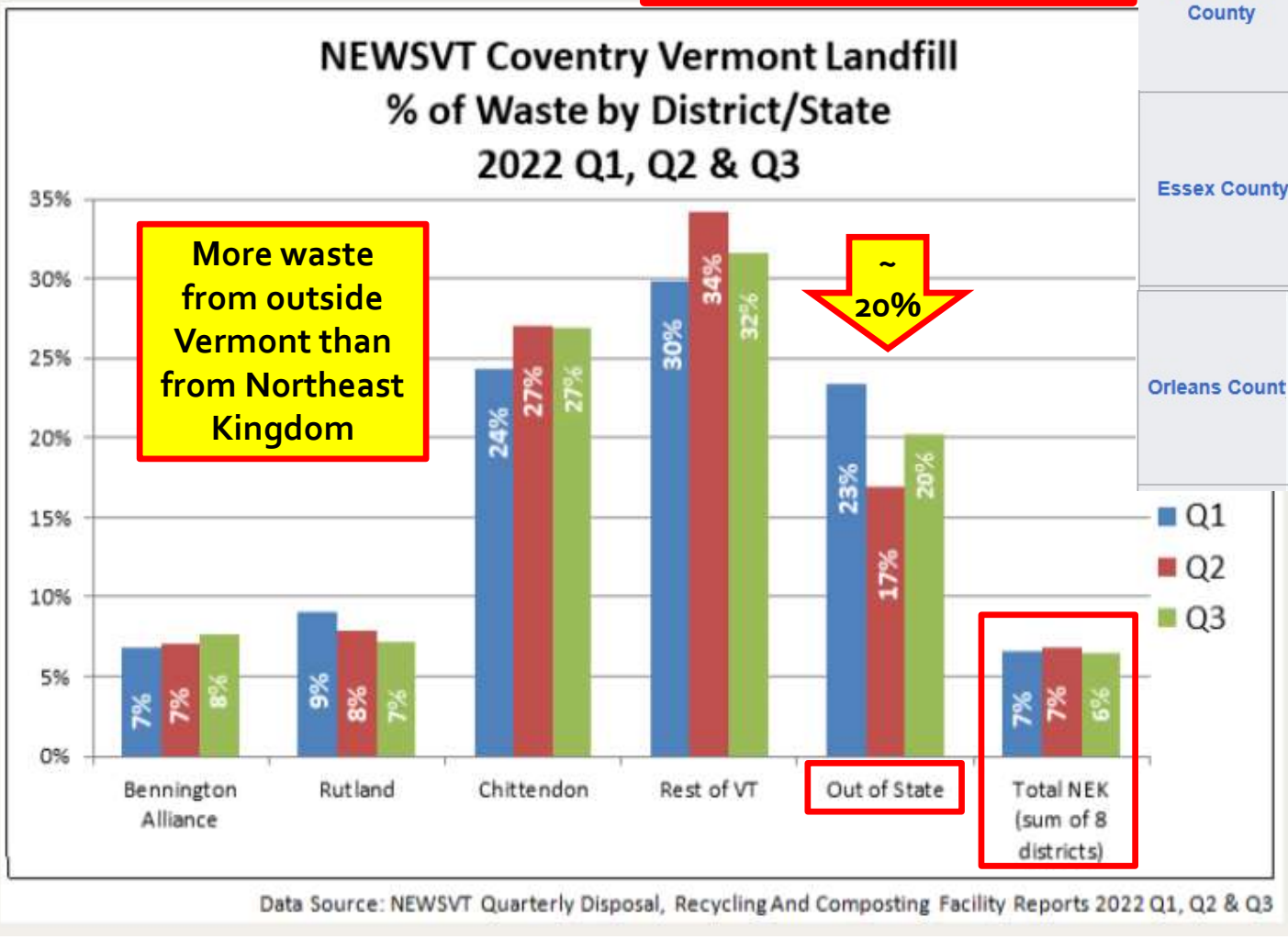
- Vermont Lake Memphremagog Watershed
  - 1,265km²
- State of Vermont
  - 24,923 km²
- RATIO : **5.1%**

POPULATION

- Vermont Lake Memphremagog Watershed
  - ~28,000
- State of Vermont
  - ~647,000
- RATIO : **4.3%**

nolakedump.com

NEK Northeast Kingdom >>>



Caledonia County	30,579	651 sq mi (1,686 km^2)	
Essex County	5,994	665 sq mi (1,722 km^2)	
Orleans Count	27,666	697 sq mi (1,805 km^2)	

64 239 Population

% for Orleans 43%

So, total waste from Lake Memphremagog watershed could be less than 5%

~95%

of the solid wastes landfilled at Coventry is coming from outside Lake Memphremagog watershed

For **1 garbage truck** coming from Lake Memphremagog watershed,

5%

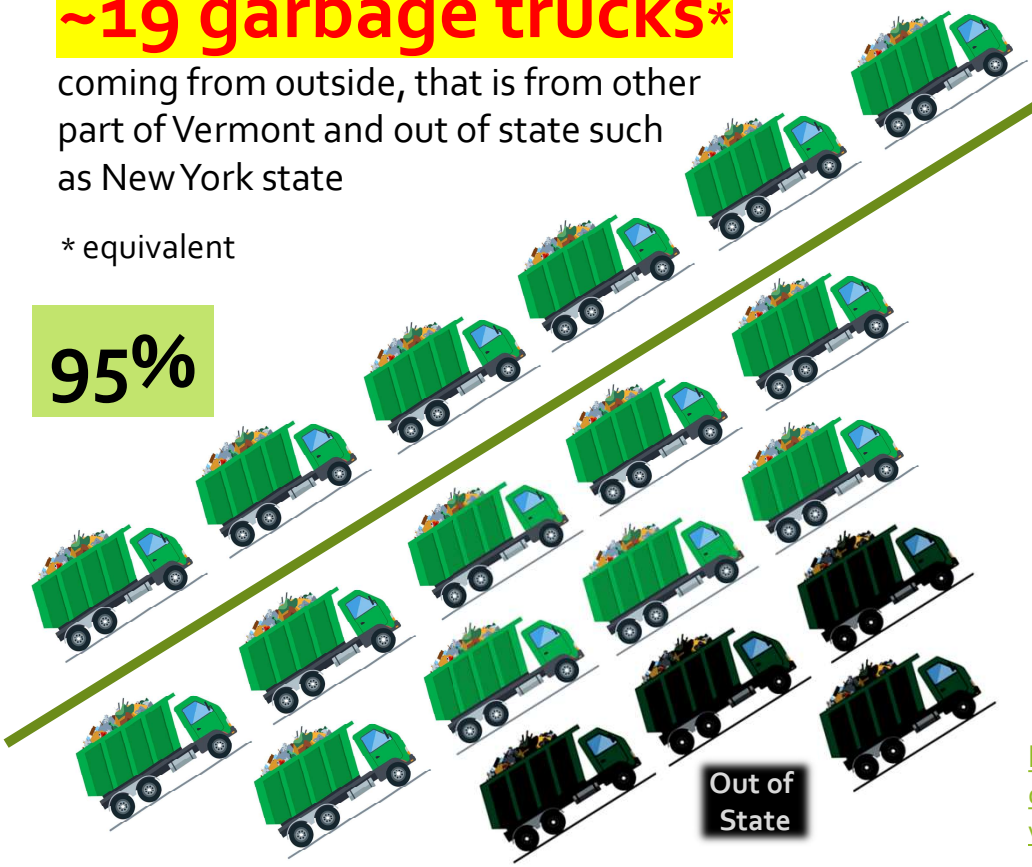
there are

~19 garbage trucks*

coming from outside, that is from other part of Vermont and out of state such as New York state

* equivalent

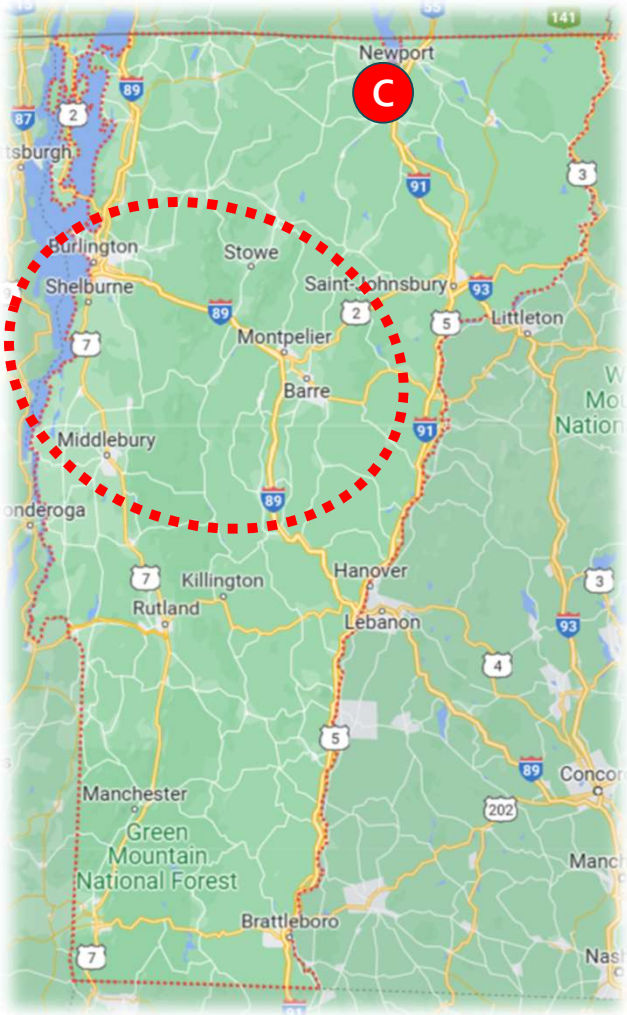
95%



TOXIC SPECIES ???

For Northeast Kingdom residents, could we say those are

https://static.vecteezy.com/ti/vecteur-libre/p2/2098951-un-camion-charge-de-dechets-va-a-une-decharge-illustrationle-plat-vectoriel.jpg



Approximate Mass Center of Solid Waste

If there were to be one landfill site in Vermont, where would it be best located to minimize trucking ?

It would be at the mass center of the solid waste produced.

About 2/3 of Vermonters live in the Lake Champlain basin, so we could say that the mass center must be there, south-east of Burlington, the most populous city and urban area of Vermont.

The Moretown landfill located along highway 89 and the Winooski River between Montpelier and Waterbury was better located being a lot closer from the mass center of solid waste than Coventry located at the outskirts of Vermont's northern border with Canada. It closed in 2013.

Conclusion

https://th.bing.com/th/id/OIP.ccsLTMsLBZjGtljmcm8kBQHaCj?pid=ImgDet&rs=1

If we, MCI people sharing Lake Memphremagog watershed with northern Vermonters, put ourselves in their Shoes, we may think this way …

Lake Memphremagog watershed Vermonters talking to Vermonters of another watershed

« You DUMP your garbage in our land

It's already enough of a BURDEN

So, bring back your garbage juice »

Vermont Environmental Justice Bill

No. 154
2022 (S.148) Page 6 of 20

No. 154. An act relating to environmental justice in Vermont.

(3) "Environmental justice" means all individuals are afforded equitable access to and distribution of environmental benefits; equitable distribution of environmental burdens; and fair and equitable treatment and meaningful participation in decision-making processes, including the development, implementation, and enforcement of environmental laws, regulations, and policies. Environmental justice recognizes the particular needs of individuals

For the people of Vermont living in Lake Memphremagog basin, does having on its territory the only active landfill site for solid waste disposal in Vermont constitute a NOT « equitable distribution of environmental BURDENS » ?

Comparative advantage for the disposal of leachate from Coventry in the Lake Champlain watershed rather than the Lake Memphremagog basi

The equitable, technical and environmental choice	Wastewater Treatment Facility	Flow July 28, 2023	Distance from the treatment facility to the aquatic US/Can border	County population
Lake Champlain watershed	Montpelier 1,8 MGD	Richelieu river 650 m.cu./s	Winooski river Lake Champlain 170 km +	6 counties 404 000
~~Lake Memphremagog watershed~~	Newport 0,6 MGD	Magog river 195 m.cu./s	Lake Memphremagog 8 km	Orleans County 28 000
Ratio favouring the Lake Champlain watershed to accept leachate	3	3	21	15

The residential solid waste tonnage is proportional to population

From the facts presented, isn't *the equitable, technical and environmental choice* Lake Champlain basin for continuing to receive NEWSVT Coventry pretreated leachate?

MCI objectives are simple and clear : to have Newport WWTF removed

«forever»

from the NEWSVT Coventry list of leachate destination even after treatment and have the leachate final destination out of Lake Memphremagog basin

«forever»

What is the state of Vermont's position on MCI's request to completely ban the disposal of raw, pretreated or treated leachate from the NEWSVT Coventry site to the Newport WWTF or elsewhere in the Lake Memphremagog basin?


Lac Memphrémagog
Lake Memphremagog
Un environnement
partagé à préserver
pour toujours
A shared environment
to preserve forever
Photo MCI Gisèle Benoit
MERCI ! THANK YOU !