The Regional Municipality of Durham

Works Committee Revised Agenda

Wednesday, May 8, 2024, 9:30 a.m.
Regional Council Chambers
Regional Headquarters Building
605 Rossland Road East, Whitby

If this information is required in an accessible format, please contact 1-800-372-1102 ext. 2097.

Note: This meeting will be held in a hybrid meeting format with electronic and in-person participation. Committee meetings may be viewed via live streaming.

Pages

1. Roll Call
2. Declarations of Pecuniary Interest
3. Adoption of Minutes
   - 3.1 Works Committee meeting - April 3, 2024 — 4
   - 3.2 Closed Works Committee meeting - April 3, 2024
     Under Separate Cover
4. Statutory Public Meetings
   There are no statutory public meetings
5. Presentations
   - *5.1 Matthew Adams, Ph. D., Director of the Centre for Urban Environments and Associate Professor, University of Toronto, Geography, Geomatics and Environment Department — *20*
     Re: Durham York Energy Centre - Analysis of Ambient Air and Emissions Monitoring to Identify Local Airshed Impacts (2024-WR-5)
     [Item 7.2 a.]
6. Delegations
   - *6.1 Linda Gasser, Whitby Resident (Virtual Attendance) — *41*
     Re: the Durham York Energy Centre (DYEC) Throughput Increase Proposed by Durham and York Regions
   - *6.2 Linda Gasser, Whitby Resident (Virtual Attendance) — *48*

Re: Durham York Energy Centre – Analysis of Ambient Air and Emissions Monitoring to Identify Local Airshed Impacts (2024-WR-5) [Item 7.2 a.]

*6.3 Wendy Bracken, Clarington Resident (Virtual Attendance)
Re: the Proposal to Increase Throughput at the Durham York Energy Centre (DYEC)

*6.4 Wendy Bracken, Clarington Resident (Virtual Attendance) *56*
Re: AMESA Monitoring/Reporting at the Durham York Energy (DYEC)

*6.5 Wendy Bracken, Clarington Resident (Virtual Attendance) *66*
Re: Durham York Energy Centre – Analysis of Ambient Air and Emissions Monitoring to Identify Local Airshed Impacts (2024-WR-5) [Item 7.2 a.]

7. Waste

7.1 Correspondence

*a. Correspondence received from the Ministry of the Environment, Conservation and Parks (MECP), dated April 22, 2024 *77*
Re: Durham York Energy Centre (DYEC) Elevation Requests

Recommendation: Receive for Information

7.2 Reports

a. Report #2024-WR-5 82
Durham York Energy Centre – Analysis of Ambient Air and Emissions Monitoring to Identify Local Airshed Impacts

b. Report #2024-WR-6 140
Sole Source Agreement with Circular Materials for Collection, Haulage, Processing and Marketing of Blue Box Recyclables Collected at the Regional Municipality of Durham Waste Management Facilities

8. Works

8.1 Correspondence

a. Correspondence received from the City of Pickering, dated April 29, 2024 146
Re: Request for Traffic Signals at Brock Road and Palmer's Sawmill Road in the City of Pickering

Recommendation: Refer to Staff for Follow-Up

b. Certification of Proclamation, dated May 1, 2024 148
Re: National Public Works Week (May 19-25, 2024)

Recommendation: Receive for Information

8.2 Reports

a. Report #2024-W-15 150
Tender Award and Additional Financing for Regional Municipality of Durham Contract #D2023-55 for the Blackstock Well #7 Upgrades in the Township of Scugog (Blackstock)

b. Report #2024-W-16 155
Update on the New Provincial Housing-Enabling Water Systems Fund, Approval to Negotiate Sole Source Agreements, and Approval of Unbudgeted Capital Work and Related Financing for the Structural Rehabilitation, Equipment Replacement, and System Redundancy Improvements that Supports Regional System Expansion at the Oshawa Water Supply Plant, City of Oshawa

9. Advisory Committee Resolutions

There are no advisory committee resolutions to be considered

10. Confidential Matters

There are no confidential matters to be considered

11. Other Business

12. Date of Next Meeting

Wednesday, June 5, 2024 at 9:30 AM

13. Adjournment

Notice regarding collection, use and disclosure of personal information:

Written information (either paper or electronic) that you send to Durham Regional Council or Committees, including home address, phone numbers and email addresses, will become part of the public record. This also includes oral submissions at meetings. If you have any questions about the collection of information, please contact the Regional Clerk/Director of Legislative Services.

If this information is required in an accessible format, please contact 1-800-372-1102 ext. 2097.

The Regional Municipality of Durham

MINUTES

WORKS COMMITTEE

Wednesday, April 3, 2024

A regular meeting of the Works Committee was held on Wednesday, April 3, 2024 in Council Chambers, Regional Headquarters Building, 605 Rossland Road East, Whitby, Ontario at 9:30 AM. Electronic participation was offered for this meeting.

1. Roll Call

Present: Councillor Barton, Chair
Councillor Marimpietri, Vice-Chair
Councillor Cook*
Councillor Crawford
Councillor Mulcahy
Councillor Nicholson
Councillor Yamada* attended for part of the meeting
Regional Chair Henry left the meeting at 11:36 AM on municipal business
***denotes Councillors participating electronically**

Absent: None

Also Present: Councillor Carter* left the meeting at 9:57 AM
Councillor Garrod*
Councillor Jubb* attended the meeting at 9:48 AM
Councillor Neal*
Councillor Schummer*
Councillor Wotten*
***denotes visiting Councillors participating electronically**

Staff Present: E. Baxter-Trahair, Chief Administrative Officer
A. Burgess, Director, Communications & Engagement
S. Ciani, Committee Clerk, Corporate Services – Legislative Services
S. Dessureault, Committee Clerk, Corporate Services – Legislative Services
M. Duhig, Project Manager, Transportation Infrastructure
C. Dunkley, Director of Corporate Infrastructure and Strategic Business Services, Works Department
K. Dykman*, Supervisor, Waste Services
A. Evans, Director of Waste Management Services
P. Gee, Manager, Transportation Infrastructure
B. Holmes*, General Manager of Transit
M. Hubble, Director of Environmental Services

J. Hunt, Regional Solicitor/Director of Legal Services, Corporate Services – Legal Services
R. Inacio, Systems Support Specialist, Corporate Services – IT
R. Jagannathan, Acting Commissioner of Works
E. Lamain, Manager, Maintenance Operations
L. Saha, Manager, Waste Services
D. Waechter, Acting Director of Transportation and Field Services
* **denotes staff participating electronically**

2. Declarations of Pecuniary Interest

There were no declarations of pecuniary interest.

3. Adoption of Minutes

Moved by Councillor Marimpietri, Seconded by Councillor Mulcahy,
(20) That the minutes of the regular Works Committee meeting held on Wednesday, March 6, 2024, be adopted.

CARRIED

4. Statutory Public Meetings

There were no statutory public meetings.

5. Presentations

There were no presentations heard.

6. Delegations

There were no delegations heard.

7. Waste

7.1 Correspondence

There were no communication items considered.

7.2 Reports

A) Sole Source of Promotion and Education Services to be Provided by The Regional Municipality of Durham for Circular Materials Ontario for the Blue Box Program under Extended Producer Responsibility (2024-WR-3)

Report #2024-WR-3 from R. Jagannathan, Acting Commissioner of Works, was received.

Moved by Councillor Marimpietri, Seconded by Councillor Mulcahy,

(21) That we recommend to Council:

A) That staff be authorized to negotiate a sole source agreement with Circular Materials Ontario, for the Regional Municipality of Durham to provide promotion and education services for the Blue Box program for an initial term of eighteen months, from July 1, 2024, to December 31, 2025, with the option to extend the agreement for three additional one-year periods, for an estimated revenue of $159,000 for the initial contract term and $480,000 over the full term; and

B) That the Commissioner of Finance be authorized to execute the necessary documents for the negotiated agreement.

CARRIED

B) Proposed Automated Cart-Based Garbage Collection Pilot Project (2024-WR-4)

Report #2024-WR-4 from R. Jagannathan, Acting Commissioner of Works, was received.

Detailed discussion ensued regarding what the impacts and benefits would be of an automated cart-based garbage collection system on Durham's waste collection operations.

Staff responded to questions from the Committee regarding what metrics will be measured to determine whether the pilot was successful; how the pilot project is being funded; what an expansion of the pilot could look like; space requirements for the waste carts; accessibility aspects; automated garbage cart collection in other municipalities and the advantages they have found for moving to a cart-based collection system; and how multi-residential units will be addressed. Committee members noted that residents, in conversations with Councillors asked why the Region does not utilize a cart system.

Concerns were raised by Councillor Nicholson regarding the City of Oshawa having to pay for the proposed pilot project as they provide their own waste collection services, as does the Town of Whitby. Councillor Mulcahy noted that the Town of Whitby is considering an automated garbage cart collection system.

Moved by Councillor Crawford, Seconded by Councillor Mulcahy,
(22) That we recommend to Council:

A) That Regional Council direct staff to implement a one-year pilot project to assess the impacts of an automated cart-based residential garbage collection pilot project;

B) That staff be authorized to procure the necessary carts that are compatible with the automated collection vehicle to be used in the proposed pilot project from Miller Waste at a cost not to exceed $49,500;

C) That the estimated cost of $50,000 for this pilot project be financed from within the 2024 Waste Management Business Plans and Budget; and

D) That staff be required to report back to Regional Council on the results and recommended next steps for the project.

CARRIED

8. Works

8.1 Correspondence

A) Correspondence received from the City of Oshawa, dated March 6, 2024, re: Hwy 401 Interchange at Townline Road (Ward 5)

Detailed discussion ensued regarding the urgent need to assess the interchanges along Highway 401 in the City of Oshawa and the Municipality of Clarington due to ongoing traffic and safety concerns, and whether an interchange at Townline Road would help to alleviate those concerns; continued advocacy for the GO Train East extension into the Municipality of Clarington; and the removal of the Highway 407 tolls to help alleviate traffic concerns.

Further discussion ensued regarding the need for a meeting between City of Oshawa staff, Municipality of Clarington staff, and Region of Durham staff to discuss the feasibility of an interchange at Townline Road; and the Region's rationale for considering an interchange at Prestonvale Road over Townline Road, as identified in the 2017 Transportation Master Plan (TMP).

Moved by Councillor Mulcahy, Seconded by Councillor Crawford,
(23) That a vote on the matter be now taken.

CARRIED ON THE FOLLOWING RECORDED VOTE (A 2/3rds VOTE WAS ATTAINED):

Yes	No
Councillor Barton, Chair	Councillor Marimpietri
Councillor Cook	Councillor Nicholson
Councillor Crawford	
Regional Chair Henry	
Councillor Mulcahy	

Members Absent: Councillor Yamada

Declarations of Interest: None

Moved by Regional Chair Henry, Seconded by Councillor Mulcahy,

(24) That the correspondence received from the City of Oshawa, dated March 6, 2024, regarding the Hwy 401 interchange at Townline Road (Ward 5) be received for information.

CARRIED ON THE FOLLOWING RECORDED VOTE:

Yes	No
Councillor Barton, Chair	Councillor Marimpietri
Councillor Cook	Councillor Nicholson
Councillor Crawford	
Regional Chair Henry	
Councillor Mulcahy	
Councillor Yamada	

Members Absent: None

Declarations of Interest: None

8.2 Reports

A) Declaration of Lands as Surplus and Approval to Transfer the Surplus Lands to the Hamilton-Oshawa Port Authority's wholly owned subsidiary Great Lakes Port Management Inc. (2024-W-9)

Report #2024-W-9 from R. Jagannathan, Acting Commissioner of Works, was received.

Discussion ensued regarding the benefits that transferring the surplus lands to the Hamilton-Oshawa Port Authority wholly owned subsidiary Great Lakes Port Management Inc. would have for the City of Oshawa and the Region of Durham.

Moved by Councillor Marimpietri, Seconded by Councillor Mulcahy,
(25) That we recommend to Council:

A) That Part of Lot 5, Broken Front Concession, in the Geographic Township of East Whitby, now in the City of Oshawa, in the Regional Municipality of Durham, identified as part of the PIN 16378-0001 (LT) and described further as Part 1 on Reference Plan 40R-32006 (the Lands) be declared as surplus to Regional Municipality of Durham requirements;

B) That sections 3 and 4 (1) of Regional By-law #52-95 be waived to facilitate the land transfer from the Regional Municipality of Durham to Great Lakes Port Management Inc.;

C) That Regional staff be authorized to transfer the Lands to Great Lakes Port Management Inc., a wholly owned subsidiary of the Hamilton Oshawa Port Authority (HOPA), for a compensation amount of $433,000;

D) That the transfer authorized by Recommendation C) in Report #2024-W-9 of the Acting Commissioner of Works be subject to the following being registered on title to the Lands:

i. Easements for the landowner, McAsphalt Industries Limited, of the adjacent properties at 1221 Farewell Street and 1241 Farewell Street for access to the Lands; and

ii. Easements for municipal services and existing utilities/services provided by Bell Canada, Enbridge Gas, Oshawa Power and Utilities Commission, and the Regional Municipality of Durham for access, maintenance, and repairs;

E) That authority be granted to the Commissioner of Works to execute all documents associated with this land transfer;

F) That the Regional Road By-law #22-2018 be amended to remove the Lands from the by-law, and that Regional staff prepare the required amending bylaw and present it to Regional Council for passage to give effect thereto;

G) That Regional Council pass a stop-up and close by-law with the consent of HOPA being obtained pursuant to Section 34(2) (b) of the Municipal Act, 2001, to permit the transfer of the Lands per the requirements under the Municipal Act. The draft bylaw is attached as Attachment #3 to Report #2024-W-9; and

H) That a copy of Report #2024-W-9 be provided to the City of Oshawa and Hamilton Oshawa Port Authority for information.

CARRIED

B) Expropriation of Lands Required for the Oshawa/Whitby Works Depot Construction Project at 951 Winchester Road East, in the City of Oshawa (2024-W-10)

This item was dealt with later in the meeting. See pages 13 to 15 of these minutes.

C) Tender Award and Additional Financing for Regional Municipality of Durham Contract #D2023-24 for the Stage 3 Liquids and Miscellaneous Remedial Works at the Duffin Creek Water Pollution Control Plant in the City of Pickering (2024-W-11)

Report #2024-W-11 from R. Jagannathan, Acting Commissioner of Works, was received.

Moved by Councillor Marimpietri, Seconded by Councillor Mulcahy,

(26) That we recommend to Council:

A) That the lowest compliant bid of Kenaidan Contracting Ltd., in the amount of $45,388,258*, be awarded for Regional Municipality of Durham Contract #D2023-24 for the Stage 3 Liquids and Miscellaneous Remedial Works at the Duffin Creek Water Pollution Control Plant in the City of Pickering, for a total project cost of $68,557,350;

B) That the previously approved project budget of $55,000,000 for Regional Municipality of Durham Contract #D2023-24 be increased by $13,557,350 to a revised total project budget of $68,557,350;

C) That the additional financing of $2,711,470, representing Durham Region's 20 per cent share, be provided from the following sources:

Previously Approved Financing

Sanitary Sewer Capital Budget - Duffin Creek Water Pollution Control Plant

(Project ID: Y2001):

User Rate	$11,000,000
York Region Financing	30,800,000
York Capital Asset Share	$13,200,000
Total Approved Financing	**$55,000,000**

Additional Financing

2024 Sanitary Sewerage Budget
Item No.24, Sanitary Sewerage Works to Rectify Identified System Deficiencies (Project ID: M2499)

User Rate	$425,623

2024 Sanitary Sewerage Budget

Item #35 Replacement of sanitary sewer on Mary Street from Rossland Rd to Robert Street., Oshawa (Project ID: O2202)

User Rate	$321,400

Item #46 Replacement of sanitary sewer on Roselawn Avenue and Bickle Drive., Oshawa (Project ID: O2305)

User Rate	$1,700,000

Corbett Creek Water Pollution Control Plant Emergency Digester (Project ID: D1932)

User Rate	264,447
Durham Region Additional Financing	$2,711,470
York Region Additional Financing	$10,845,880
Total Additional Financing	$13,557,350
Total Revised Project Financing	$68,557,350

D) That a copy of Report #2024-W-11 of the Acting Commissioner of Works be provided to York Region.
(*) before applicable taxes

CARRIED

D) Sole Source Procurement of Equipment, Maintenance Service and Parts for Equipment Installed at Various Water and Wastewater Facilities throughout the Regional Municipality of Durham (2024-W-12)

Report #2024-W-12 from R. Jagannathan, Acting Commissioner of Works, was received.

Moved by Councillor Marimpietri, Seconded by Councillor Nicholson,
(27) That we recommend to Council:

A) That staff be authorized to negotiate and award sole source agreements in 2024 for the unanticipated or end of life replacement of existing equipment installed at various Water and Wastewater Facilities throughout the Regional Municipality of Durham, but not for new construction or new installations, where using a different manufacturer would require significant structural, electrical, mechanical, communication, instrumentation and other modifications;

B) That financing for the sole source agreements be provided from the approved annual Water Supply Operating Budget;

C) That staff be authorized to negotiate and award sole source agreements for maintenance service and parts supply for the existing equipment installed as components of various water facilities throughout the Regional Municipality of Durham, with terms not to exceed five years;

D) That financing for the sole source maintenance service and/or parts supply agreements be provided from the approved annual Water Supply Operating Budget at an estimated annual cost of $2,550,000;

E) That the negotiated sole source agreements be awarded as follows:

Authorized Supplier	Manufacturer	Estimated Annual Costs (excluding HST)
Syntec	Fontaine; Tideflex; Netzsch; Trueline; Val-Matic; Red Valve; Singer	$250,000
Westburne	Allen Bradley	$100,000
Benshaw	Benshaw	$100,000
Cutler-Hammer / Eaton	Cutler-Hammer / Eaton	$250,000
SCG Process	ProMinent; De Nora	$125,000
Bisan	Watson-Marlow	$100,000
Vissers Sales	Pulsafeeder	$100,000
Evoqua	Wallace & Tiernan	$250,000
SPD Sales	MSA	$100,000
Lakeside Process Controls	Emerson; Fisher Control; Rosemount	$100,000
Endress+Hauser	Endress+Hauser	$100,000
ACG-Envirocan	KROHNE	$100,000
Franklin Empire	Siemens	$100,000
Rotork	Rotork	$150,000
Troy-Ontor	AUMA	$150,000
H2Flow	Trojan Technologies	$275,000
Hach Canada Sales and Service	Hach Canada Sales and Service	$100,000
Flowpoint Systems	Flowpoint	$100,000
-	**TOTAL**	**$2,550,000***

F) That the Commissioner of Finance be authorized to execute the necessary maintenance service and parts supply agreements.

CARRIED

E) Additional Financing for the Award of Request for Proposal #1088-2023 for Engineering Services for Ajax Zone 1 Water Storage Facility, Harwood Avenue Water Pumping Station - modifications to maximize water supply availability from Whitby-Oshawa-Courtice System and the potential for additional onsite storage for the pumping station to manage transient pressures in the Town of Ajax (2024-W-13)

Report #2024-W-13 from R. Jagannathan, Acting Commissioner of Works, was received.

Staff responded to questions from the Committee regarding the intent of the project to modify the Harwood Avenue Water Pumping Station in order to maximize the water supply availability from the Whitby-Oshawa-Courtice system and review the need for additional water storage on the current site to control dynamic fluctuations; and why the additional financing was not included as part of the 2024 budget deliberations.

Moved by Councillor Crawford, Seconded by Councillor Mulcahy,
(28) That we recommend to Council:

That financing for Engineering Services for the Ajax Zone 1 Water Storage Facility, Harwood Avenue Water Pumping Station modification project, in the Town of Ajax be provided from the approved project budget and the reallocation of funds as follows:

Previously Approved Funding Zone 1 Water Storage Facility (Project ID: D1911)

Residential Development Charges	$1,812,000
Commercial Development Charges	$52,400
Industrial Development Charges	$45,600
User Revenue	$90,000
Total Approved Financing	$2,000,000

Reallocation of funding from the following source:

Zone 3 feedermain on Garrard Rd. from north of the Mid-Block Arterial to Winchester Rd., Whitby (Region's Share) (Project ID: D2409)

Residential Development Charges	$2,870,600
Commercial Development Charges	$89,900
Industrial Development Charges	$117,800

User Revenue	$21,700
Total Additional Financing	$3,100,000
Total Revised Project Financing	**$5,100,000**

CARRIED

F) Beaver River Bridge Closure and Replacement, Regional Road 15, Township of Brock (2024-W-14)

Report #2024-W-14 from R. Jagannathan, Acting Commissioner of Works, was received.

In response to a question from the Committee regarding the ownership of the Beaver River bridge, R. Jagannathan advised that the bridge is owned by the Ministry of Transportation (MTO) but that the MTO plans to begin the process to immediately transfer ownership of the bridge to the Region of Durham, and to seek approvals to provide funding to the Region for the completion of the design and construction of the new bridge.

Detailed discussion ensued regarding concerns with respect to not receiving a commitment from the MTO for the funding in writing before replacing the bridge temporarily or permanently; impacts of the bridge closure, and whether the bridge closure should be declared an emergency; and whether receiving a resolution from the Township of Brock providing the Region permission to act on their behalf to further support the position of Durham's staff would be appropriate.

Staff responded to questions from the Committee regarding the cost of a temporary bridge, and whether referring Report #2024-W-14 back to staff until a written commitment from the MTO with respect to funding the bridge replacement has been received would delay the project.

Moved by Councillor Marimpietri, Seconded by Regional Chair Henry,
(29) That we recommend to Council:

A) That the Ministry of Transportation be advised that the Regional Municipality of Durham strongly disagrees with their recently stated position and decision to transfer ownership of the closed Beaver River Bridge, located on Regional Road 15 over Beaver River immediately west of Highway 12, prior to the design and construction of the replacement bridge by the Ministry;

B) That the Ministry of Transportation be requested to provide an immediate commitment to seek Treasury Board approval to provide the Regional Municipality of Durham the necessary funding for all project costs related to the replacement of the Beaver River Bridge, including a temporary bridge for a period of up to three years. This includes design, tendering, construction,

temporary bridge rental, staff time, consultant costs, and associated expenditures;

C) That Regional staff be authorized to continue the assignment with the current consultant, WSP, to advance the design of the permanent bridge replacement, upon receipt of the commitment in Recommendation B) of Report #2024-W-14 of the Acting Commissioner of Works;

D) That Regional staff be authorized to tender and construct a temporary and permanent bridge replacement, upon receipt of notification by the Ministry of Transportation that they have received Treasury Board approval for the funding;

E) That authority be granted to the Commissioner of Works to execute all documents, including management of liabilities, associated with the potential transfer and the works described above; and

F) That a copy of Report #2024-W-14 be provided to Laurie Scott, MPP-Haliburton-Kawartha Lakes-Brock, Prabmeet Sarkaria, Minister of Transportation, the Ministry of Transportation, and the Township of Brock.

REFERRED BACK TO STAFF ON A RECORDED VOTE
(See Following Motion)

Moved by Councillor Crawford, Seconded by Councillor Mulcahy,

(30) That Item 8.2 F) Beaver River Bridge Closure and Replacement, Regional Road 15, Township of Brock (2024-W-14), be referred back to staff for additional information with respect to receiving an actual guarantee from the Ministry of Transportation (MTO) that they will be funding all related costs before the Region of Durham completes any work.

CARRIED ON THE FOLLOWING RECORDED VOTE:

Yes	No
Councillor Barton, Chair	Regional Chair Henry
Councillor Cook	Councillor Marimpietri
Councillor Crawford	Councillor Nicholson
Councillor Mulcahy	
Councillor Yamada	

Members Absent: None

Declarations of Interest: None

It was the consensus of the Committee that the agenda be altered in order to consider Item 8.2 B) Expropriation of Lands Required for the Oshawa/Whitby Works

Depot Construction Project at 951 Winchester Road East, in the City of Oshawa (2024-W-10), at this time.

Moved by Councillor Nicholson, Seconded by Councillor Marimpietri,
(31) That the meeting be closed to the public in order to consider a matter with respect to the proposed or pending acquisition or disposition of land as it relates to the expropriation of lands required for the Oshawa/Whitby Works Depot Construction Project at 951 Winchester Road East, in the City of Oshawa.

CARRIED

It was the consensus of the Committee to recess for 10 minutes.

Committee recessed at 11:37 AM and reconvened at 11:47 AM.

A roll call was conducted following the recess and all members of Committee were present with the exception of Regional Chair Henry.

[Refer to the Closed Meeting minutes of April 3, 2024]

Chair Barton advised that during the closed session there were no motions made.

8. Works

8.2 Reports

B) Expropriation of Lands Required for the Oshawa/Whitby Works Depot Construction Project at 951 Winchester Road East, in the City of Oshawa (2024-W-10)

Report #2024-W-10 from R. Jagannathan, Acting Commissioner of Works, was received.

Moved by Councillor Crawford, Seconded by Councillor Mulcahy,
(33) That we recommend to Council:

A) That authority be granted to Regional Municipality of Durham (Region) staff to initiate expropriation proceedings where necessary for the property requirements at 951 Winchester Road East, in the City of Oshawa, as depicted in Attachment #1 of Report #2024-W-10 of the Acting Commissioner of Works and such other property requirements as may be determined and identified by Regional staff for the Oshawa/Whitby Works Depot construction project;

B) That authority be granted to the Regional Clerk and Regional Chair to execute any notices and forms as may be statutorily mandated by the Expropriations Act, R.S.O. 1990, C. E.26 to give effect to Recommendation C) in Report #2024-W-10, including the notices of Application of Approval to Expropriate;

C) That authority be granted to Regional staff to serve and publish Notices of Application for Approval to Expropriate the property requirements as described in Recommendation A) of Report #2024-W-10 and to forward to the Ontario Land Tribunal any requests for hearing received, to attend the hearings to present the Region's position, and to present the Ontario Land Tribunal's recommendations to Regional Council for consideration; and

D) That all agreements successfully negotiated and reports required for amicable property acquisitions and all agreements and reports required for settlements pursuant to the Expropriations Act, R.S.O. 1990, C. E.26 related to the Oshawa/Whitby Works Depot Construction Project approved in accordance with the Delegation of Authority By-law 04-2023 or by Regional Council, be deemed confidential for any reporting requirements to Regional Council pursuant to Section 239 (2)(C) of the Municipal Act, 2001, S.O. 2001, C. 25, as it relates to a proposed or pending acquisition or disposition of land for Regional Corporate purposes, and only be released publicly by the Commissioner of Works once all claims for compensation have been resolved on a full and final basis.

REFERRED BACK TO STAFF ON A RECORDED VOTE
(See Following Motion)

Moved by Councillor Mulcahy, Seconded by Councillor Nicholson,

(34) That Item 8.2 B) Expropriation of Lands Required for the Oshawa/Whitby Works Depot Construction Project at 951 Winchester Road East, in the City of Oshawa (2024-W-10) be referred back to staff for additional information with respect to other sites that might be available to build the infrastructure required for the new Oshawa/Whitby Works Depot; and to ensure that the lands are assessed at fair market value.

CARRIED ON THE FOLLOWING RECORDED VOTE:

Yes	No
Councillor Barton, Chair	Councillor Marimpietri
Councillor Cook	
Councillor Crawford	
Councillor Mulcahy	
Councillor Nicholson	
Councillor Yamada	

Members Absent: Regional Chair Henry

Declarations of Interest: None

9. Advisory Committee Resolutions

There were no advisory committee resolutions to be considered.

10. Confidential Matters

There were no confidential matters to be considered.

11. Other Business

11.1 Dig Safe Month

Chair Barton advised that the month of April has been declared as Dig Safe Month which is dedicated to raising awareness of safe digging practices across the province to improve safety and reduce damages to underground infrastructure.

11.2 Spring Litter Clean-Up

In response to a question from the Committee regarding early complaints that have been received regarding litter pick up and whether students will be hired earlier in the year to help, staff advised that they are currently in the process of hiring and that the students should be starting within two weeks.

Staff further advised that complaints can be sent to 311 and that the 311 staff are being trained on where to send these complaints to in order to ensure it reaches the appropriate Works staff to be addressed. R. Jagannathan advised that staff could outline the complaint process and forward it to Committee members.

12. Date of Next Meeting

The next regularly scheduled Works Committee meeting will be held on Wednesday, May 8, 2024 at 9:30 AM in Council Chambers, Regional Headquarters Building, 605 Rossland Road East, Whitby.

13. Adjournment

Moved by Councillor Nicholson, Seconded by Councillor Crawford,
(35) That the meeting be adjourned.
CARRIED

The meeting adjourned at 12:29 PM

Respectfully submitted,

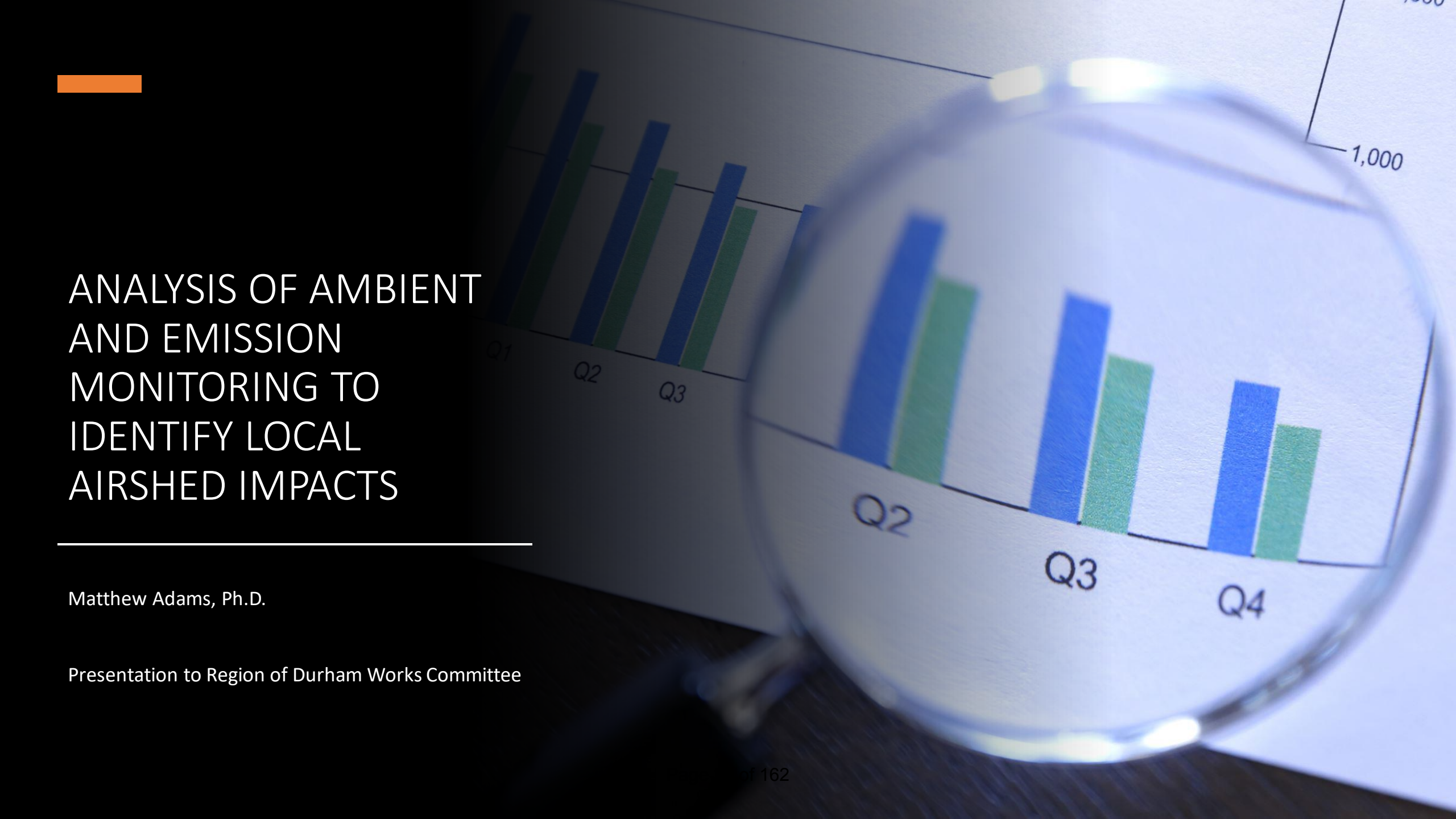
D. Barton, Chair

S. Ciani, Committee Clerk

ANALYSIS OF AMBIENT AND EMISSION MONITORING TO IDENTIFY LOCAL AIRSHED IMPACTS

Matthew Adams, Ph.D.

Presentation to Region of Durham Works Committee



Introduction

- Professor in the Department of Geography, Geomatics and Environment at the University of Toronto
- Director of the Centre of Urban Environments at the University of Toronto
- Research program examines urban air pollution exposure and the underlying processes
- Independent study of DYEC data

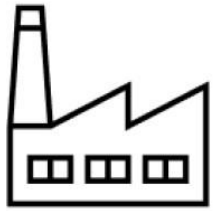
Time-series analysis of the Continuous Emission Monitoring (CEM) and Ambient Air Monitoring Stations

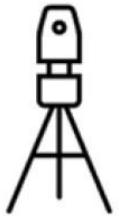
Objective

Identify if the Durham York Energy Centre's (DYEC) emissions have a significant impact on ambient air while ensuring local meteorological or background air pollution concentrations are not skewing the findings.

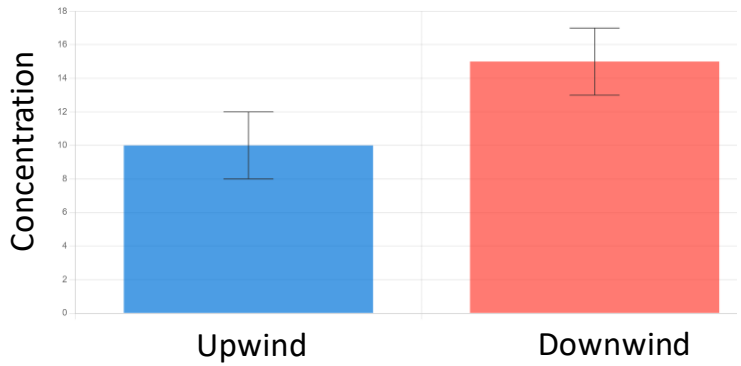
Approach

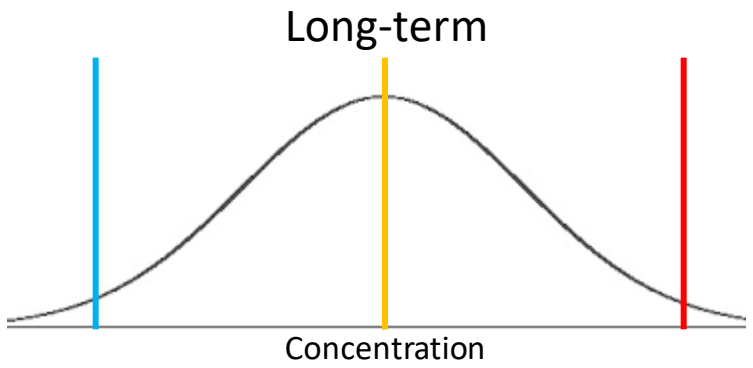
Upwind
Air Monitor





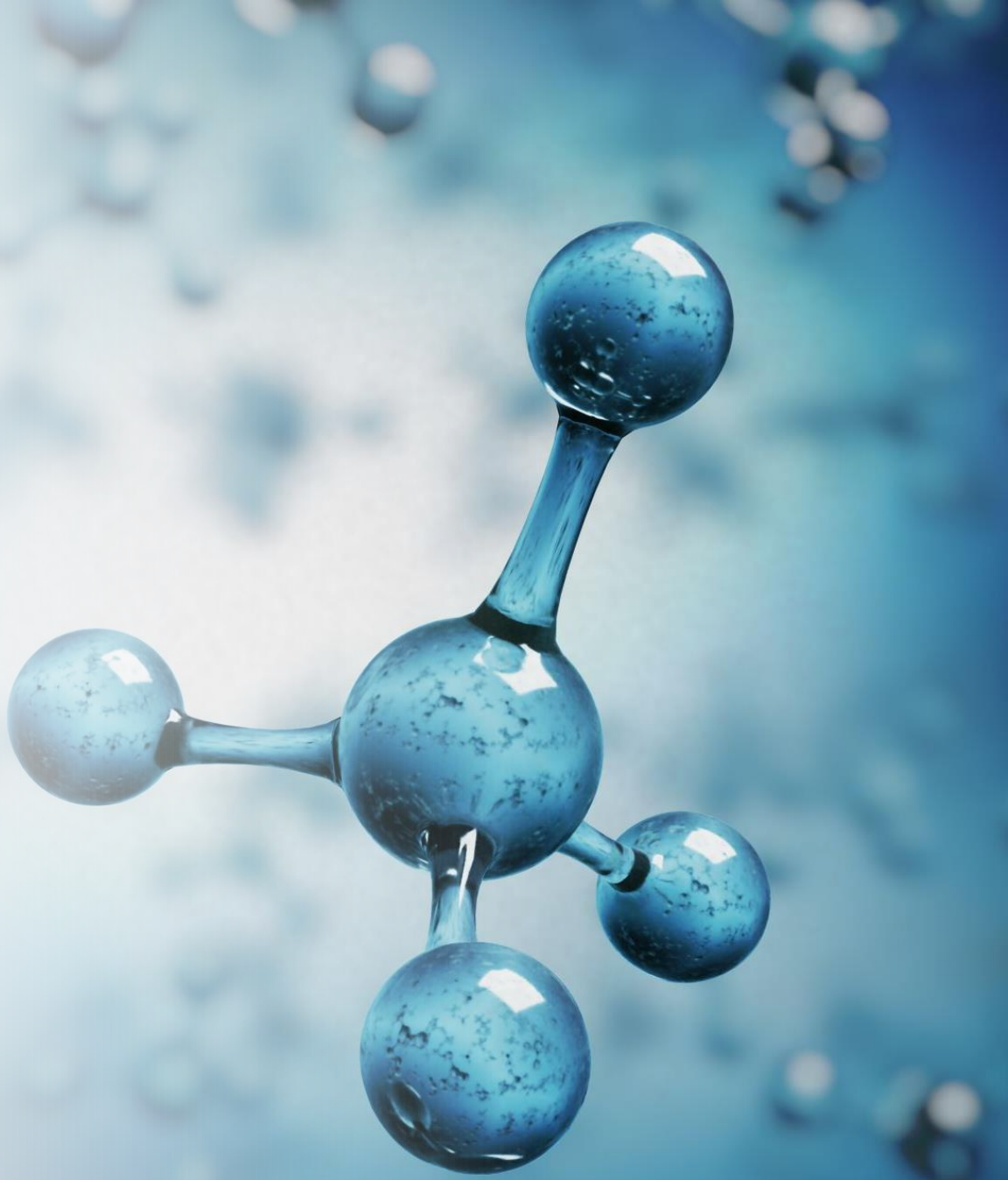
Downwind
Air Monitor





Pollutants Examined

- Polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/PCDF)
    - Dioxins and Furans
- Polycyclic aromatic hydrocarbons (PAHs)
- Total suspended particulate (TSP) including the concentrations of metals.
- Nitrogen oxides (NO_X)
- Sulphur dioxide (SO_2)
- Particulate matter 2.5 microns or smaller in aerodynamic diameter ($PM_{2.5}$)



Analysis Approaches

1. Discrete Monitoring (PCDD/PCDF, PAH & TSP)
2. Ambient air monitoring analysis with continuous emissions monitoring (NO_X & SO_2)
3. Ambient air monitoring analysis without continuous emissions monitoring ($PM_{2.5}$)

Discrete Monitoring

Hypothesis

If air pollution emissions from the DYEC affect the local air, downwind concentrations will be statistically significantly higher than the upwind concentrations due to the additional pollution.

However, if higher concentrations occurred during non-downwind conditions, it would suggest potential local sources other than the DYEC.

- Each observation was assigned to Rundle Downwind, Courtice Downwind or Crosswind conditions (45° window for both downwind conditions)
- Concentration data during each period were compared using a statistical analysis to determine if any significant difference occurred between the values

Discrete Monitoring Results

- Data: TSP (330 days), PAHs (173 days) and dioxins and furans (94 days)
- No pollutants were significantly higher when the Courtice monitor was downwind
- 18 pollutants significantly higher when Rundle Road was downwind, however:
  - 10 of those were also significantly higher during cross-wind conditions
  - Remaining eight were higher (not significant) during cross-wind conditions

Discrete Monitoring Dioxins and Furans Interpretation

- Mean toxic equivalency (TEQ) per m^3 for all samples is below MECP Ambient Air Quality Criteria (0.1 pg TEQ/m^3)
  - Rundle Road (0.0157 pg TEQ/m^3)
  - Courtice (0.0127 pg TEQ/m^3)

- National Pollutant Release Inventory indicates DYEC emits a small portion within the region
  - 2.2% of total emissions between 2015 and 2021

- The analysis in this report does not suggest that DYEC emissions impact local concentrations of dioxins and furans

Dioxins and Furans Comparisons

DYEC's annual emissions are emitted by Canada's largest emitter in less than one day.

The DYEC emits 0.63% of dioxins and furans compared to Canada's forest fires each year.

Discrete Monitoring PAH Interpretation

- Nine compounds higher (Rundle Downwind); however, all of those were higher during crosswind conditions.
- Concentrations generally much below criteria:
  - 1-Methylnaphthalene 12,000 ng/m^3 (Courtice: 5.5 ng/m^3; Rundle: 8.5 ng/m^3)
  - 2-Methylnaphthalene 10,000 ng/m^3 (Courtice: 9.7 ng/m^3; Rundle: 15.9 ng/m^3)
  - Acenaphthylene 3,500 ng/m^3 (Courtice: 0.2 ng/m^3; Rundle: 0.3 ng/m^3)
  - Anthracene 200 ng/m^3 (Courtice: 0.2 ng/m^3; Rundle: 0.5 ng/m^3)
  - Naphthalene 22,500 ng/m^3 (Courtice: 24 ng/m^3; Rundle: 28 ng/m^3).
  - Benzo(a)pyrene AAQC - 0.05 ng/m^3 (Courtice: 0.03 ng/m^3; Rundle: 0.04 ng/m^3)
    - O. Reg. 419/05 Schedule Upper Risk Thresholds: 5 ng/m3

Discrete Monitoring PAH Interpretation (BaP)

- Benzo(a)pyrene was not statistically significantly higher at the downwind air monitor compared to upwind concentrations
- Concentrations were consistently higher at the Rundle Road air monitor regardless of the wind direction
- The smallest increase in concentrations between Rundle Road and Courtice occurred when Rundle Road was downwind
    - If the DYEC was responsible, that is when the highest increase should have occurred.

Discrete Monitoring TSP Interpretation

- Average concentrations measured at both the Courtice (25 µg/m^3) and Rundle Road (32 µg/m^3) are below annual AAQC (60 µg/m^3)
- A few components of TSP were higher when Rundle was downwind; however, all of those were higher or significantly higher during cross-wind conditions.
- DYEC reports manganese emissions to Canada's National Pollutant Release Inventory; within Durham and York regions, the DYEC emitted <0.001% of emissions between 2015 and 2021.
- No evidence that TSP ambient concentrations are impacted by the DYEC

Metals General Comparison

- In one day, brake wear from passenger vehicles emit more Zinc, Manganese, and Copper along the 401 than the DYEC does in a year.
  - Arsenic equivalent emissions is reached in 39 days.
  - Lead in 50 days.

Ambient air monitoring analysis with continuous emissions monitoring (NO_X & SO_2)

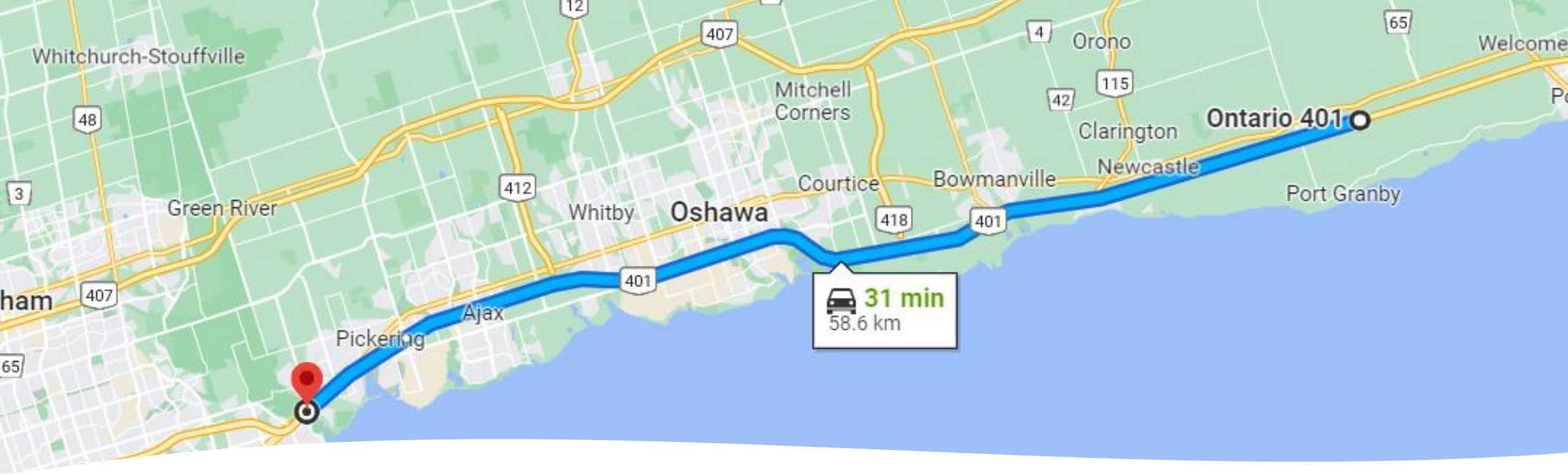
- Hypothesis: if air pollution emissions from the DYEC affect the local air, measured emissions will explain the differences in downwind concentrations.
- The difference in downwind and upwind concentrations should be related to changes in emissions.
- A linear regression model was applied where the emissions were regressed against the difference in concentrations (Rundle Road Downwind Conditions).

NO_X & SO_2 Results

- Rundle Road downwind conditions for NO_X were 7.5 ppb at Rundle Road and 7.1 ppb at the Courtice monitor
  - NO_2 AAQC (100 ppb)
  - Statistical model demonstrated no relationship between emissions and downwind increases

- Rundle Road downwind conditions demonstrated higher concentrations at the Courtice monitor (1.80 ppb) compared to the downwind Rundle Road monitor (0.65 ppb)
  - Annual AAQC (4 ppb)
  - Statistical model demonstrated no relationship between emissions and downwind increases

- Neither pollutant demonstrated any impact by the DYEC
  - A local SO_2 source likely occurs impacting the Courtice monitor



NO_X General Comparison

Annual emissions of the DYEC is equivalent to 15 days of vehicle emissions along the 401 in Durham Region.

Ambient Monitoring ($PM_{2.5}$)

- $PM_{2.5}$ data were separated by wind direction (Rundle Downwind, Courtice Downwind & Crosswind)
- A statistical test was applied to determine if the measured concentrations during those conditions were statistically significantly different ($p < 0.05$) between the Courtice and Rundle Road concentrations.

$PM_{2.5}$ Results

No difference observed during any wind condition

Mean Concentration (µg/m³)					
Wind Condition	Courtice	Rundle Road	t	df	p
Rundle Downwind	8.0	8.0	-0.18	1005	0.86
Courtice Downwind	6.6	7.0	-0.77	330	0.44
Crosswind	5.8	5.9	-0.09	3165	0.93

NPRI EMISSIONS (Durham and York)

2015 to 2021

		Emissions		
Pollutant	Units	DYEC	Regional	DYEC Contribution (%)
Ammonia	tonnes	39.187	3777.381	**1.037**
Arsenic	kg	0.27	42.43	**0.64**
Cadmium	kg	0.67	195.83	**0.34**
Cobalt	kg	0.43	31.83	**1.35**
Copper	tonnes	0.0131	0.9686	**1.35**
Dioxins and furans - Total	g TEQ	0.1904	8.8316	**2.16**
Hexachlorobenzene	grams	Zero	3451.24	**Zero**
Lead	kg	2.96	3558.90	**0.08**
Manganese	tonnes	0.0095	115.0316	**0.0082**
Mercury	kg	2.24	1192.57	**0.19**
Nitrogen oxides	tonnes	975.70	27346.03	**3.57**
Phosphorus	tonnes	Zero	0.57	**Zero**
PM_{10}	tonnes	2.0990	3644.5190	**0.058**
$PM_{2.5}$	tonnes	1.5960	1530.6871	**0.104**
Zinc	tonnes	0.0311	54.6885	**0.057**

Conclusion

After conducting my analysis, none of the pollutants analyzed indicate any notable contribution from the DYEC to ambient air pollution concentrations.

Delegation to Works Committee re proposed DYEC throughput increase from 140,000 -160,000 tonnes per year

Linda Gasser

May 8, 2024.

Agenda Item 7.1 a) Minister of the Environment's (MECP) April 22nd letter to Durham and York Staff re proposed throughput increase to 160,000 tpy

- Should require a staff report to COW/Council to evaluate AND confirm IF it is in BEST interest of Durham to pursue increase. This council should have opportunity to decide whether to burn or focus on reducing garbage.
- The vote to incinerate in June 2009 was 16-12. Close and contentious.
- Minister suggested posting to project website the attachment to her letter (not included in your agenda) to inform public.
- April 22nd letter NOT yet posted –you must advise the public.
- DYEC's throughput increase to 160K webpage link: https://www.durhamyorkwaste.ca/en/facility-approvals/increasing-capacity-to-160000.aspx

How much is Covanta fee in excess of 140,000 tpy?
Does Ontario power subsidy apply to tonnage beyond 140K?
Current cost per tonne to landfill tonnage in excess of Durham's 110,000?
Require update of 2019 financial assumptions in Report 2019 COW-3, page 13/41

Footnotes:

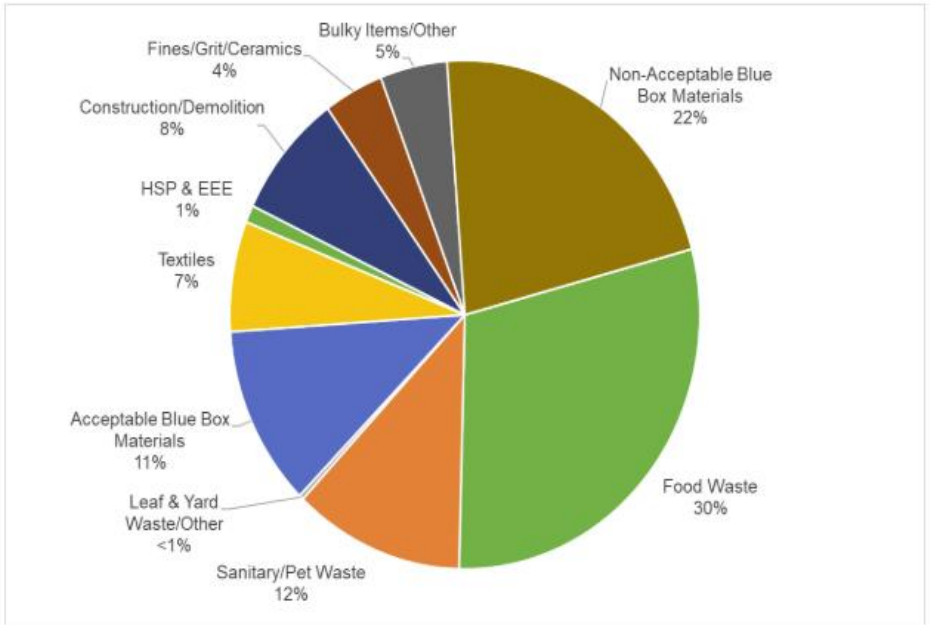
1. Reduced Covanta fee based on deduction of landfill charge and reduced processing fee for tonnages beyond 140,000 tonnes processed (estimated at $35.45 per tonne in 2019, increasing to an estimated $38.03 per tonne by 2023). It is assumed York Region uses its full 21.4 per cent share of amended capacity.
2. Includes materials recovery facility residue tonnes, which are the cost responsibility of the MRF contractor (approximate recovery of $0.3 million).
3. Landfill fees are assumed to escalate from $90.00 per tonne in 2019 to $98.21 per tonne in 2023.
4. Power revenues escalation estimates are based on 35 per cent CPI per the IESO Power Purchase Agreement. Conservatively, revenues for ferrous and non-ferrous metals recoveries are not assumed to escalate.

Request to Council to increase in 2019. Last public consultation December 2019. You owe Durham residents an update.

- A lot has changed since 2019's staff request to increase throughput including proposed programs proposed to reduce residual waste.
- Effective July 1, 2024, enhanced green bin to allow material such as pet waste (including cat litter), diapers and sanitary produces. Could divert approx. 10,000 tonnes per year.
- Effective possibly by 2025, Durham will offer source separated organics collection to multi-residential residents. Increasing share of new units will be multi-res.
- According to page 6 of 2022 Waste Management Annual Report (most recent) ***"61% of households place a green bin out for curbside collection".***
- There's LOTS of opportunity to increase participation & capture of organics.

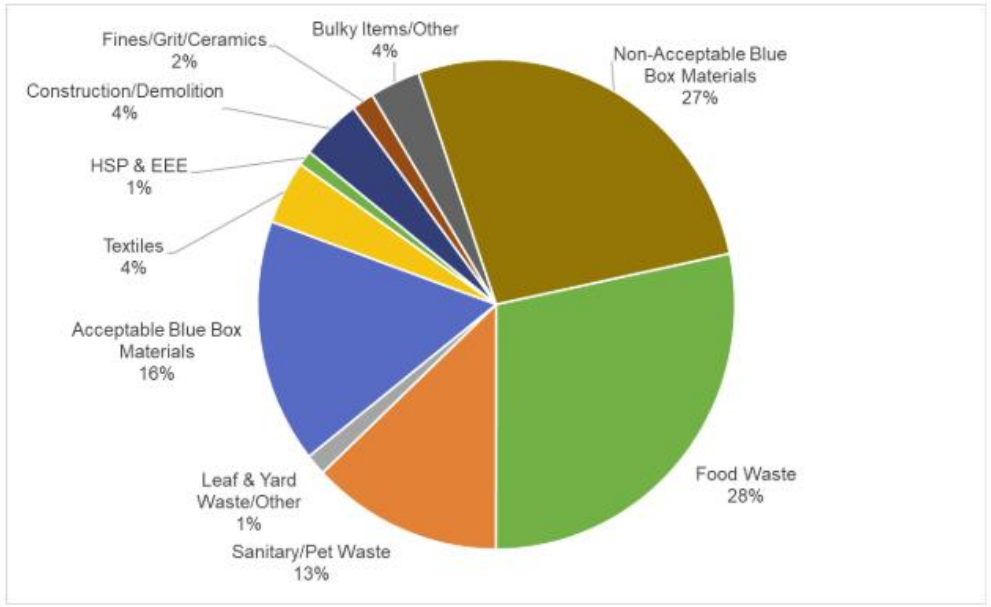
Pages 28-30 Attach. 2, Report 2022-WR-1 Long Term Waste Plan: *"In summary, the waste profiles of single-family and multi-residential garbage are quite similar, with the largest component of garbage consisting of food waste (which was found in almost equal proportions for each sector)."*

Figure 9: Single-family Garbage Composition (2018)



Source: 2018 Waste Composition Study – Single-family

Figure 10: Multi-residential Garbage Composition (2018)



Source: 2018 Waste Composition Study – Multi-residential

Capacity increase =14.28%.
COW/Council should review impacts of increase including additional air pollution loading and increased GHGs

- Updated Audit info would help identify materials that could be diverted to existing programs AND those that should be investigated for new programs.
- There is little incentive to reduce waste is you apply to burn more!
- DYEC already Durham's largest GHG corporate emitter, even with only non-biogenic emissions reported. (Report 2024-COW-12).
- Additional loading of pollutants to Durham air shed is NOT insignificant.
- If Durham got serious about reducing waste and succeeded, then York Region could burn more garbage to use up the contracted capacity –they don't care, they don't live here.
- The more you burn, the more ash that you send to landfills outside Durham. Incineration = burning AND burying.
- In 2023, 25,087 tonnes of bottom ash sent to the US and 11,132 tonnes fly ash to Thorold landfill in Ontario – YOU are already exporting problem waste.

Recommend an update report to COW/Council on costs and potential impacts of capacity increase. THIS council should decide

- Works should recommend to council that staff be required to produce a report that updates 2019 assumptions including:
- potential environmental & health impacts
- Includes opinion of Durham's Medical Officer of Health on potential health impacts of capacity increase
- Identify ALL costs associated with capacity increase including required study costs etc.
- Includes material provided to MECP since the Dec. 2021 Environmental Screening Report AND the Ministry's comments over the course of the capacity increase application.
- Report should provide results of recent waste audits. New audit should be requested if no update since 2018 audit data in 2022 Long Term Waste Plan.
- Works should direct staff to POST attachment to Minister's letter on DYEC website immediately to inform public and continue to update capacity increase web pages.
- IF proceeding, Council should direct staff to request/recommend that ECA application(s) be posted to the ERO and commit to posting all ECA study data to the DYEC project website promptly.
- THANK YOU – QUESTIONS?

Delegation to Works Committee re Report 2024-WR-5 “Analysis of Ambient Air & Emissions Monitoring to Identify Local Airshed Impacts” Adams July 17.2023

Linda Gasser

May 8, 2024

2024 WR-5 incl. Dr. Adams' July 17, 2023 "analysis"

- From page 1 of staff report, Sec. 2:

"Dr. Matthew Adams was retained by the Regions (Regional Municipality of Durham and York Region) to conduct a Study of the local airshed in the vicinity of the Durham York Energy Centre (DYEC). The Study included an analysis of ambient air monitoring data, wind direction, air pollution, and National Pollution Release Inventory (NPRI) data in an effort to improve the community understanding of how the DYEC contributes to the local ambient air conditions."

- WHO commissioned the July 2023 Adams "analysis"?
- HOW much did this cost and WHO paid?

Short notice: REQUIRES detailed review of hypotheses, methodology & data

- Getting this report last Friday with a requirement to provide my presentation to you by Tuesday doesn't allow for a detailed review of the underlying data referenced, the validity of the hypotheses and methodology.
- This "analysis" doesn't provide a complete picture of the impacts of DYEC Air Emissions nor of potential impacts to human health and the natural environment.
- Should have included an assessment of total mass loadings per annum by pollutant so that you know what the DYEC is dumping into the local air shed.
- Attempts to minimize DYEC's emissions by comparing them to forest fires and non-point sources such as from traffic on Highway 401 is meaningless.
- Embarassingly similar to futile attempts by the incineration industry and supporters to distract from the well documental impacts of burning garbage.
- DYEC is an AVOIDABLE point source of emissions. You don't have to burn garbage, which creates harmful pollutants like ultrafine particulate, dioxins and furans. There are LESS harmful disposal options.

DYEC Monitoring – Note the Limitations

Continuous Emissions Monitoring (CEMS) for a few parameters.

nitrogen oxides (NOx)

sulphur dioxide (SO2),

hydrochloric acid (HCl)

hydrogen fluoride (HF)

ammonia (NH3)

Opacity, temperature, moisture

At economizer (before pollution control) continuously measures oxygen (O2), carbon monoxide (CO), organic matter (THC)

- In October 2013, Durham council voted against CEMS for Particulate Matter & Mercury. W. Bracken provided detailed PPT to Council Oct. 2013 – technology available and successfully used elsewhere.
- IF moving forward with Capacity Increase, will Durham improve/upgrade monitoring?

Ambient Air Monitoring

- Ambient Air monitoring results should always be considered in conjunction with all other monitoring results.
- Statement on page 2 "*No difference was observed for PCDDs/PCDFs*" is meaningless absent a review of full AMESA data for Dioxins & Furans.

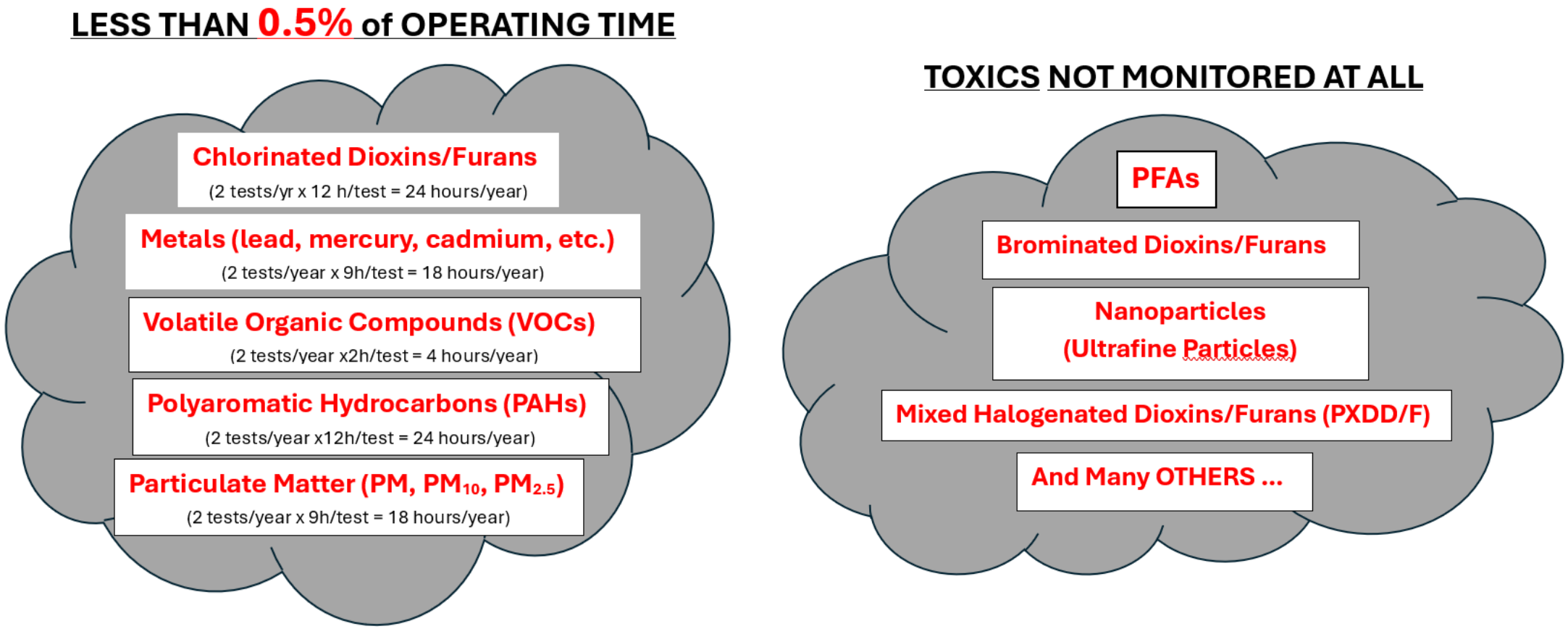
Only TWO Ambient Air monitoring stations remain:

Monitored continuously: SO_2, NO_2, PM 2.5

Non-Continuous: Metals, TSP, PAH's, Dioxins & Furans)

- E.g. Dioxins & Furans monitored for 24 hours every 24 days, i.e. approximately 15.2 days of the year, or 4.2% of annual operating time.
- Ambient Air data should be considered together with soil monitoring results.

MOST Pollutants are Stack Tested Less Than 0.5% of Operating Time through Pre-Arranged Stack Tests conducted under Optimal Operating Conditions, OR are Not Monitored AT ALL



Ministry of the Environment: outdated air standards

Source page 5, Sept. 17, 2023 MECP letter to W. Bracken, copied to Durham & York staff

Contaminant	CAS #	Basis	Year
Arsenic and compounds	7440-38-2	Health-based air guideline	1981
Lead and Lead Compounds	7439-92-1	Health-based air standard	2007
Nickel and Nickel Compounds	7440-02-0	Health-based air standard	2011
Zinc	7440-66-6	Particulate-based air standard	1974
Copper	7440-50-8	Health-based air standard	1974
Mercury (Hg)	7439-97-6	Health-based air standard	1974
Lithium (other than hydrides)	7439-93-2	Health-based air standard	1974
Ozone	10028-15-6	Health-based air standard	1974
Particulate matter	N/A	Visibility; air standard	2005
Carbon monoxide	630-08-0	Health-based air standard	1974

2024-WR-5, Attach. 1, page 20: "***Overall**, it is concluded that they DYEC's **Air Emissions Monitoring Plan** effectively controls emissions so that it does not significantly contribute to air pollution in the local air shed"*

- That statement provides no assurances whatsoever because it's not the **monitoring plan(s)** that control(s) emissions.
- Monitoring plans determined what would be measured and how frequently via various monitoring technologies. Durham does NOT monitor for all parameters that are technically feasible.
- One potentially useful statement found on page 20: "***Future exceedances should be individually evaluated***…" Wendy Bracken requested that for the 2018 DYEC dioxins AA exceedance. Mystifying was that AMESA data for that exceedance was not reviewed by MECP. Page 7 MECP letter Sept.17.2019 letter to W. Bracken, copied to Durham & York staff.
- NO analysis of potential emissions impacts to local air shed is complete without a review of full AMESA Dioxins/Furans data, which Durham does not release.
- Quarterly AMESA reports from provided from 2021 onwards available in timely fashion, some with some sampling periods invalidated. **Still waiting for 2023 Quarters 3 & 4 to be posted on DYEC website.**
- **REQUEST:** Report 2024-WR-5 and the Adams' report should be referred back to staff with our delegations, requesting a review of concerns raised about the hypotheses, study methodology and conclusions.
- THANK YOU. QUESTIONS?

Delegation to Works Committee
May 8, 2024

W. Bracken

AMESA Monitoring and Reporting of Dioxins/Furans at the Durham York Incinerator

Stack Test Results Cannot Accurately Represent Annual Emissions

- Pre-arranged, conducted under ideal (steady state) conditions
- For example, **stack source testing for dioxins and furans** is done in Durham only twice a year (or **less than 0.5% of the operating time**). Short-term stack concentrations are unknown for the remaining 99.5% of the time.
- Durham's facility exceeded the dioxin/furan limit during source stack tests in both 2015 and 2016. The May 2016 stack tests found dioxin/furan emissions at 13 x their allowable limit. This event showed that the very limited list of continuously monitored pollutants and parameters cannot ensure public safety.

ORTECH, *Covanta Durham York Renewable Energy Limited Partnership Durham York Energy Centre 2022 Compliance Emission Testing in Accordance with Amended Environmental Compliance Approval (ECA) No. 7306-8FDKNX*, Date: March 1, 2023, Section 4.4, page 19, states each dioxins/furans test lasts 240 minutes =4 hours and Section 4.1 states triplicate tests are done for dioxins/furans and other SVOCs, 3 tests x 4 hours/test = 12 hours. DYEC has two source tests per year, 2 tests/year x 12 hours/test = 24 hours/year; operating hours per year is estimated using Hours/year – Outage Hours in 2022 Annual Report page 44 = 8760 hours – 635 hours=8125 hours, 24 hours/8125 hours=0.3%<0.5%

Much Higher Emissions Risk During Other Than Normal Conditions (OTNOC) - Startups, Shutdowns, Malfunctions

Weber et al. Environ Sci Eur (2018) 30:42
https://doi.org/10.1186/s12302-018-0166-9

Environmental Sciences Europe

REVIEW Open Access

Reviewing the relevance of dioxin and PCB sources for food from animal origin and the need for their inventory, control and management

Roland Weber[1*], Christine Herold[1], Henner Hollert[2], Josef Kamphues[3], Markus Blepp[4] and Karlheinz Ballschmiter[5]

The total PCDD/F emissions from incinerators are sometimes underestimated by short-term measurements normally conducted during stable operation. However, during the start-up and unstable combustion periods, even state-of-the-art incinerators emit PCDD/Fs in stack gases at concentrations that are up to 1000 times higher than under normal operation [205–207]. Therefore, incinerators and other continuous sources with variation in PCDD/F release into air are better assessed and controlled by long-term sampling [206].

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6224007/pdf/12302_2018_Article_166.pdf

Arkenbout, A. (2018). *Hidden Emissions: A story from the Netherlands*, *a case study*; Zero Waste Europe

https://www.toxicowatch.org/_files/ugd/8b2c54_a4360271e0a945f88a8d9b25ffe121f5.pdf

Figure 3 shows the results of a **20,139** hours long-term sampling of dioxins (PCDD/Fs) from August 2015 until December 2017, revealing that excess emissions ("outlier events") are not exceptional, but rather constitute a regular feature of the REC incineration operation. The results of long-term sampling clearly show the shortcomings of regulatory short-term measurements[14].

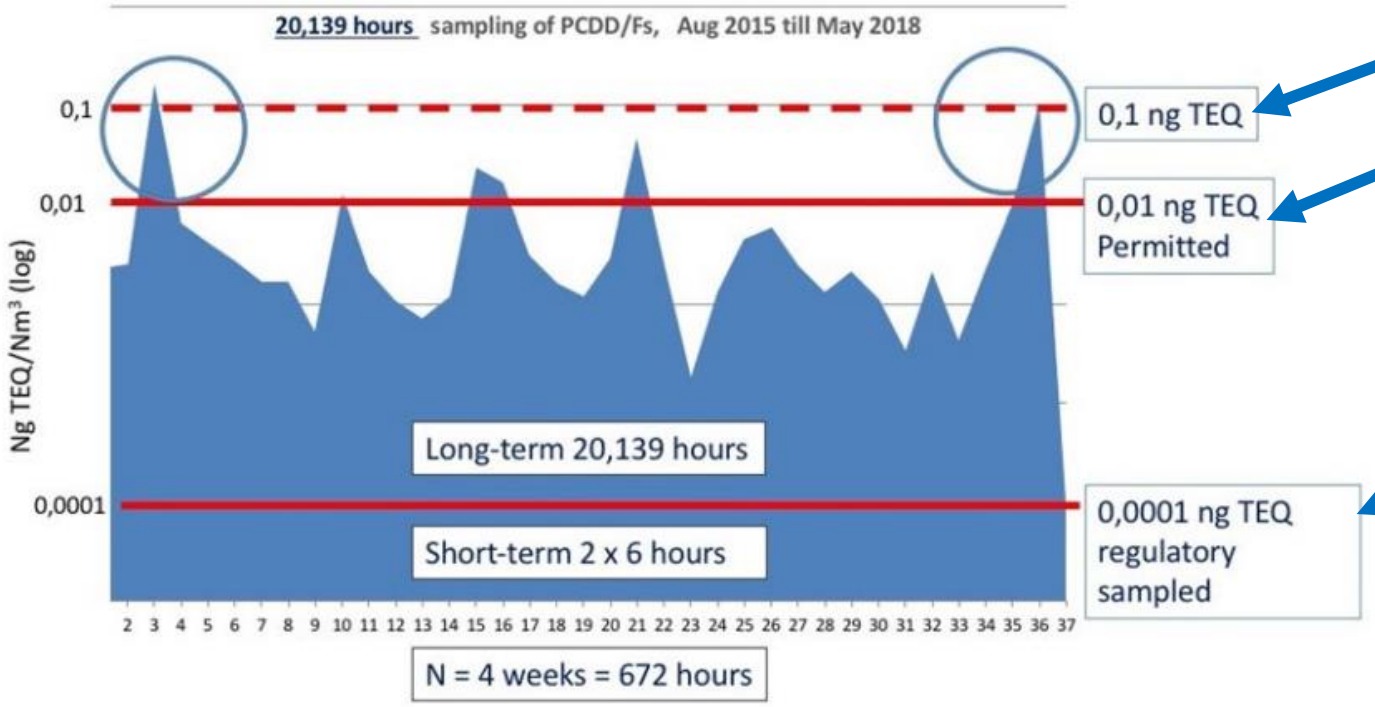


Figure 3: Results of 20,139 hours AMESA long-term sampling PCDD/Fs, REC Harlingen

EU Limit = 100 pg TEQ

NLD REC Limit= 10 pg TEQ

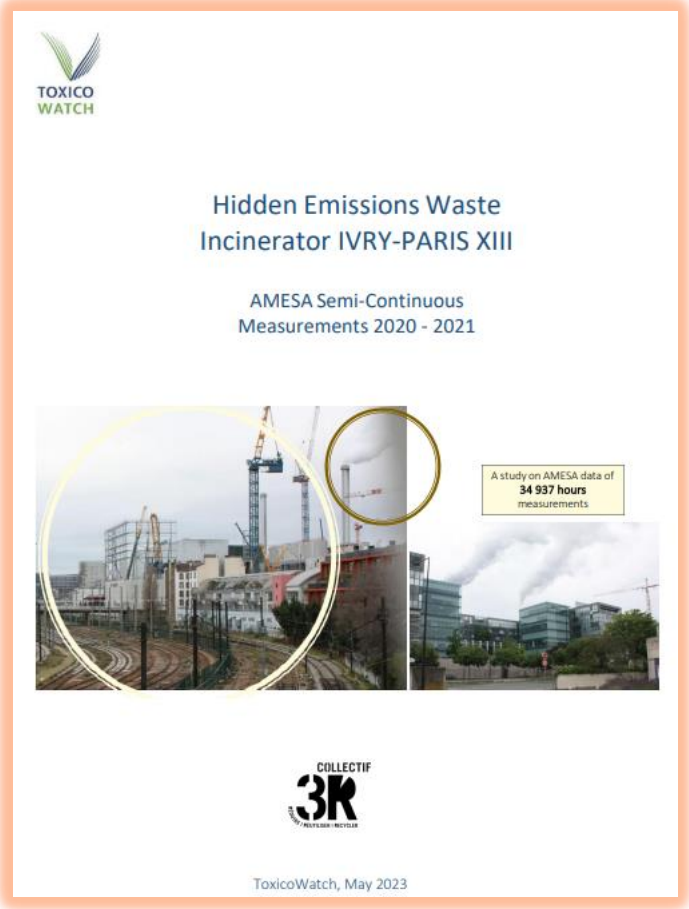
(DYEC Limit = 60 pg TEQ)

REC Stack Test
Measurement = 0.1 pg TEQ

Arkenbout, A. (2018). *Hidden Emissions: A story from the Netherlands, a case study*; Zero Waste Europe, page 4/11

https://www.toxicowatch.org/_files/ugd/8b2c54_a4360271e0a945f88a8d9b25ffe121f5.pdf

ToxicoWatch Study of Paris Incinerator; French Government Warns Millions Not to Eat Backyard Chicken Eggs



> ***"The emissions data show that the waste incineration process is extremely vulnerable to disturbances****...the AMESA was found to be out of service for more than 3,000 hours per furnace, i.e. 125 days or 4 months over 2 years."*[10]

> ***"OTNOC is directly correlated with the possibility of high dioxin emissions, as research on OTNOC events has shown."***[11]

Millions in France warned not to eat eggs from backyard chickens due to forever chemical pollution

https://www.euronews.com/green/2023/11/21/millions-in-france-warned-not-to-eat-eggs-from-backyard-chickens-due-to-forever-chemical-p#vuukle-comments-2419688

More Issues at the DYEC With Dioxins/Furans:

Long-Term (monthly) sampling of Dioxins/Furans reporting is very incomplete, and it is neither traceable nor transparent.

The public advocated for this monitoring and pays for it yet,

- **Regions have withheld the monthly AMESA data for years 2015 to 2019**
- **For 2020 onward** some data provided, however, **many months of data have been invalidated or unavailable** and underlying lab reports, documents have not been provided
- **Monthly results that have exceeded 64 pg TEQ/RM^3** (the stack test ECA limit is 60) **have been invalidated according to protocol established by Covanta and the Regions**
- Reasons cited include operational issues known to have potential to produce high dioxin/furan emissions

Many Hours and Months of Dioxin/Furan AMESA Data Invalidated/Omitted/Missing From 2020 to 2023

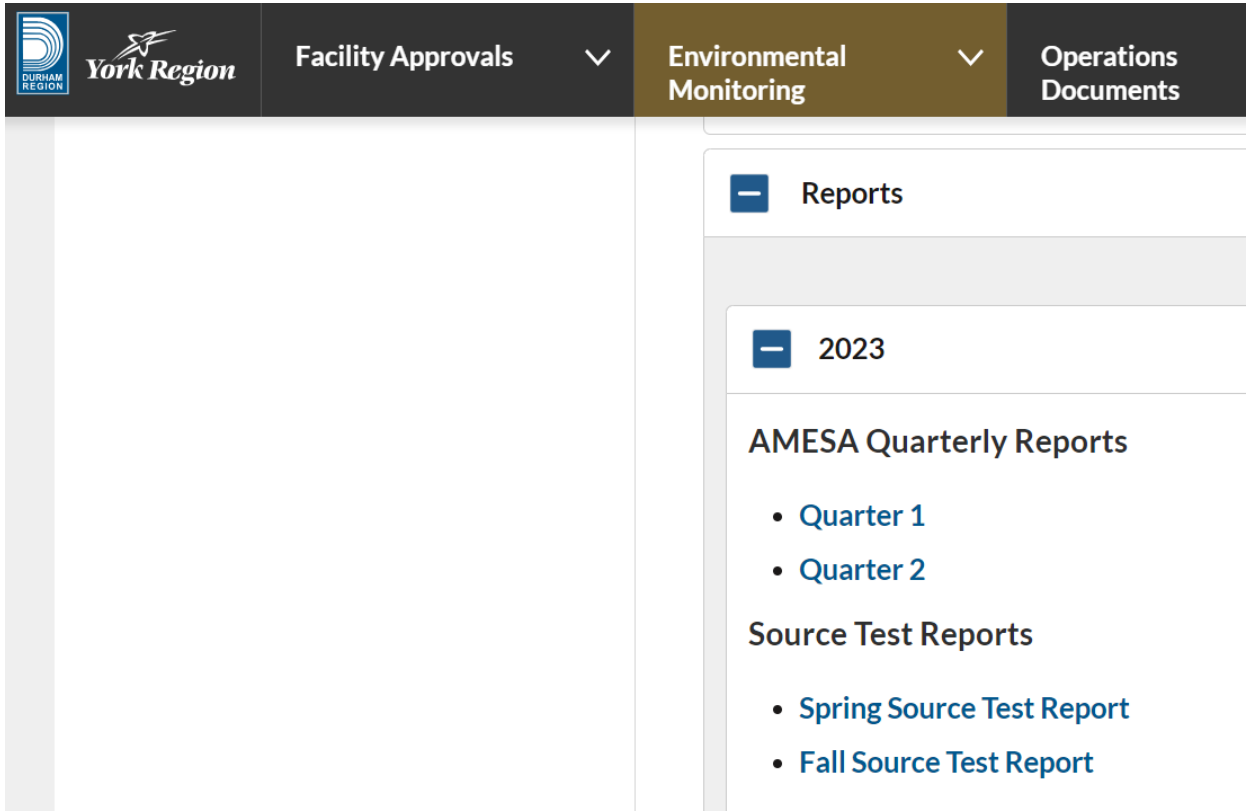
https://www.durhamyorkwaste.ca/en/environmental-monitoring/air-emissions.aspx#Reports

2020 Q4	October	B1: **INVALIDATED**	AMESA malfunctions
2021 Q1	Feb 10 – Feb 26	B1: **No result**	Repair of defective AMESA pump
2021 Q3	Aug 18- Sept 23	B1: **INVALIDATED**	Failed economizer tube
		(outage revealed accumulated ash reducing gas flow)	
2021 Q4	Oct 13 – Nov 10	B1: **INVALIDATED**	"Several incidents" identified including plugged economizer hopper with potential to lead to creation of dioxins/furans
2022 Q2	Apr 26 – May 25	B1: **Not Shown**	Sample compromised at lab
2022 Q3	June 24 – July 25	B2: **INVALIDATED**	"burner reliability issue"
2022 Q3	July 25 – Aug 26	B1: **INVALIDATED**	Plugged economizer

Note: As of March 1st, 2024, Last posted AMESA Report was 2023 Q2

Screenshot May 2, 2024
2023 Q2 is Last Report Posted
10+ Months of AMESA Data is Not Posted!

- https://www.durhamyorkwaste.ca/en/environmental-monitoring/air-emissions.aspx#2023



The Public Has a Right to This Data
The Region Needs to Be Transparent

- Release 2015 to 2019 AMESA data
- Independent Scientific Review of AMESA Protocol and AMESA Reporting
- Invalidating entire months of data when events occur is unacceptable
- AMESA Reports must be posted in a timely manner; current status unacceptable

Delegation to Works Committee
May 8, 2024

W. Bracken

Report #2024-WR-5

Durham York Energy Centre – Analysis of Ambient Air and Emissions Monitoring to Identify Local Airshed Impacts

Executive Summary page 5

The hypothesis in the research assumed that if the DYEC contributed emissions that impacted local air quality, it would be observed in the change in air pollution concentrations between the upwind ambient air monitoring data and the downwind ambient air monitoring data. The increases would occur if the DYEC were adding to the background concentrations of air pollutants. The analysis leverages the long-term ambient air monitoring from the Courtice and Rundle Road ambient air monitoring sites and includes continuous emission monitoring concentrations from the DYEC. The monitoring is conducted as part of the DYEC's Ambient Air Quality Monitoring Plan and Air Emissions Monitoring Plan.

Report: research or established science?

Dictionary

Definitions from Oxford Languages · Learn more

hy·poth·e·sis

/hīˈpäTHəsəs/

noun

a supposition or proposed explanation made on the basis of limited evidence as a starting point for further investigation.
"professional astronomers attacked him for popularizing an unconfirmed hypothesis"

Similar: theory | theorem | thesis | conjecture | supposition | speculation

- **PHILOSOPHY**
  a proposition made as a basis for reasoning, without any assumption of its truth.
  "the **hypothesis that** every event has a cause"

Executive Summary Concluding Statement is nonsensical and unsupportable.

It can be concluded that the DYEC's Air Emissions Monitoring Plan effectively controls emissions so that it does not make any significant contributions to air pollution in the local airshed.

Definition of Impact Misleads,Highly Inappropriate; Methodology Fundamentally Flawed

DURHAM YORK ENERGY CENTRE
ANALYSIS OF AMBIENT AND EMISSION MONITORING TO IDENTIFY LOCAL AIRSHED IMPACT

July 17, 2023

1 STUDY OBJECTIVE

This study aims to determine if the Durham York Energy Centre (DYEC) emissions impact air quality in the local airshed. An impact is defined in this study as a statistically significant increase in any air pollutant measured relative to the background concentrations. Statistically significant increases would occur when concentration changes are outside of the natural variation in the monitoring data, i.e. it is due to an outside factor and not measurement error. Ambient air quality measurements, such as those utilized in this work, quantify the sum of local, regional, and transboundary sources of natural and anthropogenic pollution. In this report, we overcome regional and transboundary source influences because of the short distance between the upwind and downwind monitoring locations; however, we have applied different approaches to control for other local emission effects.

Report contains errors

3.2 Wind Direction Analysis

Both Rundle Road and Courtice monitoring stations include measurements for wind direction and speed on an hourly basis. Data between January 2016 and June 2022 were analyzed to identify the frequency of upwind and downwind conditions for each monitor and crosswind conditions. Hourly measurements were averaged to daily wind direction and speed measurements by converting speed (m/s) and direction (degrees) into the component vector winds, which were then averaged (mean value) for each day and back-transformed to wind direction and wind speed. Wind calculations were conducted with the rWind package version 1.1.7 (Fernández-López and Schliep, 2019). Wind information was calculated daily to align with the 24-hour air sampling period.

Figure 3.1 presents a map of the ambient air monitoring locations and their relative positions to the DYEC. The pink line connecting the Courtice monitor to the Rundle Road Monitor is 46°, with north being 0°, which means the Rundle Road Monitor is directly downwind from the Courtice monitor when the wind direction is 224° (southwest wind); the Courtice Monitor is downwind from the Rundle Road monitor when the wind is blowing from the north east (46°). Therefore, measuring from the stack to each monitor in their downwind configuration would result in the

More Errors

DURHAM YORK ENERGY CENTRE
ANALYSIS OF AMBIENT AND EMISSION MONITORING TO IDENTIFY LOCAL AIRSHED IMPACT

July 17, 2023

Courtice monitor being directly downwind during 43° winds and the Rundle Road being directly downwind during winds from 236°. For each wind observation, it was identified when the Courtice monitor was downwind from the stack (43°) and when the Rundle Road monitor was downwind from the stack (236°). We included +/- 22.5 degrees in the downwind direction to ensure sufficient data. Observations that did not fall within either downwind classification were identified as crosswind conditions.

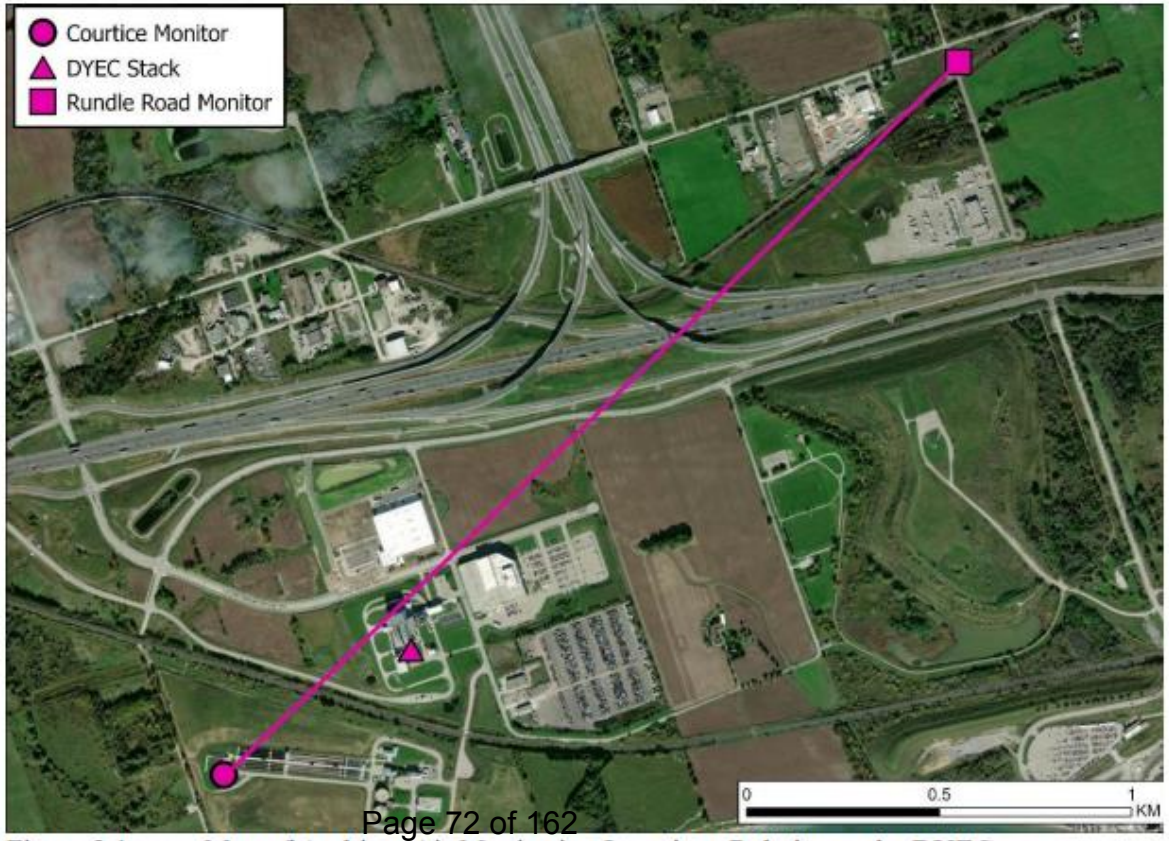


Figure 3.1 Map of Ambient Air Monitoring Locations Relative to the DYEC

Flawed Methodology

3.2 Wind Direction Analysis

Both Rundle Road and Courtice monitoring stations include measurements for wind direction and speed on an hourly basis. Data between January 2016 and June 2022 were analyzed to identify the frequency of upwind and downwind conditions for each monitor and crosswind conditions. Hourly measurements were averaged to daily wind direction and speed measurements by converting speed (m/s) and direction (degrees) into the component vector winds, which were then averaged (mean value) for each day and back-transformed to wind direction and wind speed. Wind calculations were conducted with the rWind package version 1.1.7 (Fernández-López and Schliep, 2019). Wind information was calculated daily to align with the 24-hour air sampling period.

Flawed Methodology

3.3.1 Discrete Monitoring Ambient Data Analysis

The pollutants measured with discrete monitoring were quantified into multiple chemical species in the laboratory, which allows for analysis of the specific components and the sum of their parts. The species analyzed for each pollutant class (PCDD/PCDF, PAH & TSP) are listed in Table 3.1. Each sample was a 24-hour integrated measurement, and the concentrations were determined by laboratory processing following sample collection.

Daily wind direction data were assigned to each 24-hour air pollution observation to identify upwind-downwind relationships between the air monitors and the DYEC stack. Downwind alignments are based on the relative position of the monitor to the emission stack. Concentration data for each pollutant were separated into the following three conditions: (1) Rundle Road monitor downwind (Courtice monitor upwind), (2) Courtice monitor downwind (Rundle Road monitor upwind), or (3) Crosswind conditions neither monitor downwind.

Regional Comparisons Misleading

4.5 Regional Emissions

Regional emissions will impact Durham and York Regions' airshed. Comparing the emission quantities from the DYEC with NPRI-reported regional emissions (NPRI Emissions in Durham and York Regions) contextualizes the scale of emissions. The emissions for each pollutant reported by the DYEC are compared against the regional outputs between 2015 and 2021, provided in Table 4.5. The DYEC emits 3.6 percent or less of total regional emissions for each pollutant reported to the NPRI. Ten reported pollutants represent less than one percent of regional emissions from the DYEC. Maps highlighting the percentage of regional emissions by location for each pollutant listed in Table 4.5 are available in Appendix C.

Unsupportable statement.
Misleading statement. Attachment #2, page 5

Attachment #2 to Report #2024-WR-5

DURHAM YORK ENERGY CENTRE
SUMMARY OF ANALYSIS OF AMBIENT AND EMISSION MONITORING TO IDENTIFY LOCAL AIRSHED IMPACT

July 17, 2023

DYEC's annual dioxins and furan emissions are emitted by Canada's largest emitter in less than one day.

The DYEC emits 0.63% of dioxins and furans yearly compared to Canada's forest fires.

Ministry of the Environment, Conservation and Parks

Office of the Minister

777 Bay Street, 5th Floor
Toronto ON M7A 2J3
Tel.: 416-314-6790

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Bureau duministre

777, rue Bay, 5e étage
Toronto (Ontario) M7A 2J3
Tél. : 416.314.679

Ontario

357-2024-265

April 22, 2024

Andrew Evans, P.Eng.
Director, Waste Management Services
Regional Municipality of Durham
605 Rossland Road East
Whitby ON L1N 6A3
Email: andrew.evans@durham.ca

Kyle Catney
General Manager, Operations & Services
Regional Municipality of York
17250 Yonge Street
Newmarket ON L3Y 6Z1
Email: kyle.catney@york.ca

Dear Andrew Evans and Kyle Catney,

I am writing you regarding the elevation requests submitted for the Regional Municipalities of York and Durham's (Regions) proposed change to the Durham York Energy Centre. The Regions are proposing to increase the amount of waste that can be treated at the site from 140,000 to 160,000 tonnes per year (the Project). I received seven elevation requests asking that the Regions be required to prepare a comprehensive environmental assessment for the Project.

Please be advised that changes were made to the environmental assessment program as of February 22, 2024. To implement Ontario's move to a project list approach, Part II of the *Environmental Assessment Act* (EAA) and O. Reg. 101/07 were revoked and Part II.3 of the EAA, and O. Reg. 50/24 and O. Reg. 53/24 came into force. In addition, the *Guide to Environmental Assessment Requirements for Waste Management Projects* was amended and the screening process was renamed the Environmental Screening Process for Waste Management Projects. Section 23 of O. Reg. 50/24 designates your Project as a Part II.3 Project and O. Reg. 53/24 transitions your project under the new provisions without further assessment requirements.

Based on all of the information before me, I have decided to deny the requests for elevation. I am satisfied that an environmental assessment for the Project would not be beneficial. My decision was made after careful consideration of the factors set out in the screening process, including the concerns raised in the elevation requests and Regions' responses, the Project documentation and consultation undertaken with Indigenous communities, the public and government agencies.

The reasons for my decision may be found in the attached letter to the requesters. In the interest of transparency, I encourage you to make my letter to you available to the public on the Project website.

With this decision having been made, the Regions can now proceed with the Project, subject to any other required permits or approvals. The Regions must ensure the Project is implemented in the manner described in the Project documentation, and inclusive of all mitigating measures, commitments, and environmental and other provisions therein.

Lastly, please note that failure to comply with the EAA or the provisions of the screening process or failure to implement the Project in the manner described in the Project documents are contraventions of the EAA and may result in prosecution under section 38 of the EAA.

I am confident that Regions recognizes the importance and value of the EAA and will ensure that its requirements and those of the screening process are satisfied.

Sincerely,

Andrea Khanjin
Minister of the Environment, Conservation and Parks

c: Kathleen O'Neill, Director, Environmental Assessment Branch, MECP, Kathleen.oneill@ontario.ca

Ministry of the Environment, Conservation and Parks

Office of the Minister

777 Bay Street, 5th Floor
Toronto ON M7A 2J3
Tel.: 416-314-6790

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Bureau duministre

777, rue Bay, 5e étage
Toronto (Ontario) M7A 2J3
Tél. : 416.314.679

Ontario

357-2024-265

April 22, 2024

Dear Sir/Madam,

I am writing to you in response to your request for a comprehensive environmental assessment for the Regional Municipalities of York and Durham's (Regions) proposed increase in treatment capacity at the Durham York Energy Centre (DYEC) from 140,000 to 160,000 tonnes per year (the Project).

Following the publication of the Notice of Completion of the Environmental Screening Process, the Ministry of the Environment, Conservation and Parks (ministry) received seven elevation requests asking that the Regions be required to prepare an environmental assessment for the Project.

Please be aware that changes were made to the environmental assessment program as of February 22, 2024. To implement Ontario's move to a project list approach, Part II of the *Environmental Assessment Act* (EAA) and O. Reg. 101/07 (Waste Projects) were revoked and Part II.3 of the EAA, and O. Reg. 50/24 (Part II.3 Projects – Designations and Exemptions) and O. Reg. 53/24 (General and Transitional Matters) came into force. In addition, the *Guide to Environmental Assessment Requirements for Waste Management Projects* (the Guide) was amended and the screening process was renamed the Environmental Screening Process for Waste Management Projects. The new regulations designate the Project as a Part II.3 Project and also transition the project under the new provisions without further assessment requirements.

Based on all of the information before me, I have decided to deny the requests for elevation for the reasons set out below. In making my decision, I have carefully considered the factors set out in the screening process, including the concerns raised in the elevation requests I received, the Regions' response to the requests, the Regions' Environmental Screening Process documentation, and the consultation record.

Reasons

Part B of the Guide establishes the process through which projects of this type can be carried out, and includes identifying, describing and assessing potential environmental effects of a project, including completing relevant studies, undertaking consultation with interested persons and Indigenous communities, and developing impact management measures. The results of the screening process and conclusions reached are documented in an Environmental Screening Report. Based on the Environmental

Screening Report for the Project, the Regions have carried out the process in accordance with the screening process.

The concerns raised in support of the elevation requests received included the potential for negative impacts to air quality and public heath, ecological impacts, water impacts, proximity of the DYEC to specified areas, and concerns about the adequacy of reports and responses provided by the Regions. Based on all of the information before me, I am satisfied that the concerns raised in the requests have been addressed by the Regions through the previous environmental assessment processes and through commitments made in its Environmental Screening Report.

The Environmental Screening Report demonstrates that the anticipated emissions associated with the Project would be within regulated provincial limits. I am therefore satisfied that the anticipated emissions from the Project are not likely to adversely impact air quality, groundwater or surface water. The Regions have committed to completing an updated Human Health and Ecological Risk Assessment for any future expansions of the DYEC to assess any potential impacts to human and ecological health.

Additionally, further technical review of air emissions will occur through the application process for an amendment to the DYEC Environmental Compliance Approval (ECA) for Air. The ECA regulates air emissions from the facility and includes conditions of approval that are protective of human health and the natural environment.

I am also satisfied that meaningful opportunities for public, government agency, and Indigenous engagement and consultation were provided by the Regions during the process.

Based on the above, I am of the opinion that there is no public benefit from requiring the Project to proceed through a comprehensive environmental assessment.

With this decision having been made, the Regions can now proceed with the Project, subject to any other permits or approvals required. The Regions must ensure that the Project is implemented in the manner set out in the Environmental Screening Report, and inclusive of all mitigating measures and commitments, and environmental and other provisions therein.

I would like to thank you for bringing your concerns to the ministry’s attention.

Sincerely,

Andrea Khanjin
Minister of the Environment, Conservation and Parks

c: Kathleen O’Neill, Director, Environmental Assessment Branch, MECP, Kathleen.oneill@ontario.ca

If this information is required in an accessible format, please contact 1-800-372-1102 ext. 3540.

The Regional Municipality of Durham Report

To:	Works Committee
From:	Commissioner of Works
Report:	#2024-WR-5
Date:	May 8, 2024

Subject:

Durham York Energy Centre – Analysis of Ambient Air and Emissions Monitoring to Identify Local Airshed Impacts

Recommendation:

That the Works Committee recommends to Regional Council:

That Report #2024-WR-5 of the Commissioner of Works be received for information.

Report:

1. Purpose

1.1 The purpose of this report is to update the Works Committee and Regional Council members regarding the summary of the Durham York Energy Centre (DYEC) ambient and emission monitoring study (Study) conducted by Matthew Adams, Ph.D., an Associate Professor within the University of Toronto's department of Geography, Geomatics, and the Environment.

2. Background

2.1 Dr. Matthew Adams was retained by the Regions (Regional Municipality of Durham and York Region) to conduct a Study of the local airshed in the vicinity of the Durham York Energy Centre (DYEC). The Study included an analysis of ambient air monitoring data, wind direction, air pollution, and National Pollution Release Inventory (NPRI) data in an effort to improve the community understanding of how the DYEC contributes to the local ambient air conditions.

2.2 As a requirement of the DYEC's environmental approval, conditions within the facility are monitored, as are conditions within the general area of the facility, which is referred to as the ambient environment. While measurements within the facility are directly attributed to the operations, measurements within the ambient environment can be influenced by a number of sources. The Region recognizes the importance of understanding and communicating information surrounding the DYEC to the community.

2.3 This report aligns with the following strategic goals and priorities in the Durham Region Strategic Plan:

a. Goal 1: Environmental Sustainability

- 1.4 Demonstrate leadership in sustainability and addressing climate change

b. Goal 5: Service Excellence

- 5.3 Demonstrate commitment to continuous quality improvement and communicating results.

3. Study Conclusion

3.1 The results from the study concluded that the Durham York Energy Centre's Air Emissions Monitoring Plan effectively measures emissions, and the emissions from the Durham York Energy Centre are below the Ministry of Environment, Conservation and Parks' Ontario Ambient Air Quality Criteria. The study compared the emissions reported by the DYEC to the National Pollutant Release Inventory(NPRI) with all reported emission sources in Durham and York Regions.

3.2 The analysis determined that none of the pollutants analyzed indicate any notable contribution from the Durham York Energy Centre to ambient air pollution concentrations. Overall, the Durham York Energy Centre does not significantly impact the local airshed.

3.3 Dr. Matthew Adams will be presenting the highlights of the Study and conclusions to the Works Committee on May 8, 2024.

3.4 This report has been reviewed by Legal Services – Office of the CAO.

3.5 For additional information, contact Andrew Evans, Director, Waste Management Services, at 905-668-7711, extension 4102.

4. Attachments

4.1 Attachment #1: Analysis of Ambient and Emissions Monitoring Report to Identify Local Airshed Impacts

4.2 Attachment #2: Summary of Analysis of Ambient and Emissions Monitoring to Identify Local Airshed Impacts

4.3 Attachment #3: Examining Air Pollution Sources in the Proximity of Durham York Energy Centre

4.4 Attachment #4: Analysis of Ambient Air Exceedances in the Proximity of Durham York Energy Centre

Respectfully submitted,

Original signed by:

Ramesh Jagannathan, M.B.A., M.Eng., P.Eng., P.T.O.E.
Commissioner of Works

Recommended for Presentation to Committee

Original signed by:

Elaine C. Baxter-Trahair
Chief Administrative Officer

DURHAM YORK ENERGY CENTRE

ANALYSIS OF AMBIENT AND EMISSION MONITORING TO IDENTIFY LOCAL AIRSHED IMPACTS

Prepared for:

The Regional Municipality of Durham
605 Rossland Road E
Whitby, ON L1N 6A3

The Regional Municipality of York
17250 Yonge Street,
Newmarket, ON L3Y 6Z1

Prepared by:

Matthew Adams, Ph.D.

Executive Summary

An analysis was conducted to identify if the Durham York Energy Centre (DYEC) impacts local air quality by contributing emissions that elevate ambient air pollution concentrations. The evaluation included ambient air monitoring data from two air monitoring stations, one located upwind and one downwind of the DYEC, and emission monitoring data from the DYEC.

The air pollutants included fine particulate matter ($PM_{2.5}$), nitrogen oxides (NO_X), sulphur dioxide (SO_2), total suspended particulate (TSP) including metals, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDDs/PCDFs). Additionally, the relative contribution of emissions reported to the National Pollutant Release Inventory for the DYEC were compared with all reported emission sources in Durham and York Regions. All the pollutants analyzed in this report have additional local and regional sources that contribute to air pollution measurements in Durham and York Regions.

The hypothesis in the research assumed that if the DYEC contributed emissions that impacted local air quality, it would be observed in the change in air pollution concentrations between the upwind ambient air monitoring data and the downwind ambient air monitoring data. The increases would occur if the DYEC were adding to the background concentrations of air pollutants. The analysis leverages the long-term ambient air monitoring from the Courtice and Rundle Road ambient air monitoring sites and includes continuous emission monitoring concentrations from the DYEC. The monitoring is conducted as part of the DYEC's Ambient Air Quality Monitoring Plan and Air Emissions Monitoring Plan.

Differences in concentrations were observed between upwind and downwind ambient air pollution; however, these differences varied in the response, at times, with the downwind concentrations demonstrating lower air pollution concentration. No difference was observed for PCDDs/PCDFs. Some PAHs demonstrated higher downwind concentrations but were higher at the downwind station when the wind blew from other directions, suggesting a different local source. In some cases, PAHs were lower downwind than upwind. TSP concentrations were high at the downwind ambient air monitor (Rundle Road) during all wind conditions, which suggests emissions from another local source. NO_X concentrations did not vary between upwind and downwind locations. SO_2 concentrations are higher upwind than downwind. $PM_{2.5}$ concentrations were the same at the upwind and downwind locations.

It can be concluded that the DYEC's Air Emissions Monitoring Plan effectively controls emissions so that it does not make any significant contributions to air pollution in the local airshed.

Table of Contents

1 STUDY OBJECTIVE

This study aims to determine if the Durham York Energy Centre (DYEC) emissions impact air quality in the local airshed. An impact is defined in this study as a statistically significant increase in any air pollutant measured relative to the background concentrations. Statistically significant increases would occur when concentration changes are outside of the natural variation in the monitoring data, i.e. it is due to an outside factor and not measurement error. Ambient air quality measurements, such as those utilized in this work, quantify the sum of local, regional, and transboundary sources of natural and anthropogenic pollution. In this report, we overcome regional and transboundary source influences because of the short distance between the upwind and downwind monitoring locations; however, we have applied different approaches to control for other local emission effects.

2 INTRODUCTION

This report analyzes the DYEC's impact on local air quality. The analysis is completed with ambient air monitoring data from two air monitoring stations located upwind and downwind of the DYEC and emission monitoring at the DYEC. The objective of the analysis is to determine if monitoring data indicates an impact from the DYEC on the local airshed, primarily defined by changes in ambient air measurements at two air pollution monitoring stations.

The DYEC is a 12-hectare facility that produces energy from municipal waste combustion and processes 140,000 tonnes of municipal waste from Durham and York Regions. The facility is about two kilometres west of the Darlington Nuclear Generating Station, one-half kilometre south of the 401 and one-half kilometre north of Lake Ontario. The site is surrounded by industrial and commercial lands, which transition into agricultural lands. The energy generated is sold to the Ontario provincial power grid under a Power Purchase Agreement through the Ontario Power Authority; the 17.5 megawatts (14 MW net output) is sufficient to power about 10,000 homes annually. The DYEC is publicly owned by Durham and York Regions and is operated by Covanta.

The DYEC facility includes two boilers using thermal mass burn with Martin GmbH stoker grate combustion technology. A minimum boiler temperature of 1,000°C is maintained to control emissions of volatile organic compounds (VOCs), dioxins and furans. The mass burn process generates electricity with a steam-powered turbine where the steam is generated from waste burning. The stoker grate is responsible for transporting waste through the furnace and agitating the debris to ensure proper airflow and complete combustion. In addition, the stoker grate moves the bottom ash to the ash management system. Each boiler is capable of processing over 200 tonnes of material per day. Emissions from the facility are emitted through a central stack with a height of 87.6 metres.

Each of the boilers has an air pollution control system that includes six primary components to limit the emissions of nitrogen oxides (NO_X), acid gas (gas mixtures that form acidic compounds

when mixed with water), mercury, dioxin and furans, and particulate matter. A selective non-catalytic reduction system is included to reduce NO_X emissions, which converts NO_X into elemental nitrogen (outdoor air is 78 percent nitrogen) and water by injecting ammonia into the flue gas. In addition to the selective non-catalytic reduction system, the very low NO_X (VLN^{TM}) system developed by Covanta and Martin GmbH is included, where flue gas composition is maintained to minimize NO_X emissions. Flue gas is cooled and increased in humidity in an evaporative cooling tower that improves conditions for the dry lime reactor, which neutralizes acidic chemical compounds with lime. Activated carbon is injected into the flue gas for mercury and dioxin control, which adsorb to the carbon and are captured in the bag house as the pollutants are adsorbed onto particles. Particulate matter emissions are controlled with a fabric filter baghouse, a series of filters that the flue gases pass through before being emitted into the atmosphere.

Air pollution dispersion modelling was conducted for the environmental assessment of the DYEC and examined emissions from the on-site stack. The results from the modelling were utilized along with air monitor citing criteria to identify the locations for long-term air pollution monitoring. Three sites were identified, upwind, downwind, and property line. Property line monitoring was required for only one year in the Ambient Air Quality Monitoring Plan but operated until June 2018. The downwind monitoring location was selected because its location aligned with the wind direction that could result in pollution being directed toward nearby residents and that long-term dispersion models highlighted maximum concentrations to occur within 1 to 2 km from the stack. In addition, the then Ministry of the Environment, currently the Ministry of Environment, Conservation and Parks, requested that the upwind site be south or southwest of the DYEC to capture background air pollution concentrations (Stantec Consulting Ltd., 2012). Data measured at these two ambient air sampling locations are the basis for this analysis and report, representing real-world air pollution measurements.

3 METHODOLOGY

3.1 AIR POLLUTION DATA

The DYEC Ambient Air Quality Monitoring and Reporting Plan includes continuous and non-continuous ambient air (outdoor air) monitoring to comply with Condition 11 of the EA Notice of Approval and Condition 7(4) Environmental Compliance Approval (ECA). Continuous monitoring instruments measure air pollution in real-time as outdoor air is drawn through the device. Non-continuous approaches (discrete samplers) sample air for a specific period; the air is either contained in a specialized canister or passes through a filter where pollutants are retained. These discrete sampling approaches require the sample to be processed in a laboratory where the amount of pollutant retained is measured and divided by the amount of air sampled to determine the ambient concentration.

Three ambient air monitoring stations were established based on the Ambient Air Quality Monitoring Plan (Stantec Consulting Ltd., 2012), with one upwind, one downwind and one property line (required operation for one year, operated until June 2018). This analysis considers the upwind and downwind sites, which are currently operational. The two monitoring locations were identified based on general wind patterns: upwind (Courtice Station) and downwind (Rundle Road Station) relative to the DYEC. The upwind monitoring location, Courtice Station, is currently located at the west end of the Courtice Water Pollution Control Plant (Latitude: 43.87128; Longitude: -78.75913); previously (before this analysis period), it was located about 140 metres west of its current location (Latitude: 43.8716; Longitude: -78.7609). The upwind monitoring location was identified based on feedback from the then Ontario Ministry of the Environment (currently Ministry of Environment, Conservation and Parks [MECP]) to select a site in the predominantly upwind direction from the DYEC (Stantec Consulting Ltd., 2012). The downwind location, known as the Rundle Road station (Latitude: 43.88743; Longitude: -78.73477), is located east of Rundle Road and south of Baseline Road West. Highway 401 lies between the DYEC and Rundle Road air monitor. The Ambient Air Quality Monitoring Plan identified characteristics at Rundle Road's location that made it suitable to measure conditions downwind. In particular, two of those characteristics are very important: (1) relative to the DYEC, it is in the dominant downwind direction that aligns with winds that would pass by the DYEC towards the residential areas, and (2) it is located within the 1-2 km range of the facility where previous dispersion models identified the highest potential air pollution impact would occur (Stantec Consulting Ltd., 2012).

The Air Emissions Monitoring Plan (Golder Associates, 2013) specifies continuous emissions monitoring. Selected air pollutants are monitored at the DYEC for the two boilers, providing real-time air emissions data posted to the DYEC website.

3.2 Wind Direction Analysis

Both Rundle Road and Courtice monitoring stations include measurements for wind direction and speed on an hourly basis. Data between January 2016 and June 2022 were analyzed to identify the frequency of upwind and downwind conditions for each monitor and crosswind conditions. Hourly measurements were averaged to daily wind direction and speed measurements by converting speed (m/s) and direction (degrees) into the component vector winds, which were then averaged (mean value) for each day and back-transformed to wind direction and wind speed. Wind calculations were conducted with the rWind package version 1.1.7 (Fernández-López and Schliep, 2019). Wind information was calculated daily to align with the 24-hour air sampling period.

Figure 3.1 presents a map of the ambient air monitoring locations and their relative positions to the DYEC. The pink line connecting the Courtice monitor to the Rundle Road Monitor is 46°, with north being 0°, which means the Rundle Road Monitor is directly downwind from the Courtice monitor when the wind direction is 224° (southwest wind); the Courtice Monitor is downwind from the Rundle Road monitor when the wind is blowing from the north east (46°). Therefore, measuring from the stack to each monitor in their downwind configuration would result in the

Courtice monitor being directly downwind during 43° winds and the Rundle Road being directly downwind during winds from 236°. For each wind observation, it was identified when the Courtice monitor was downwind from the stack (43°) and when the Rundle Road monitor was downwind from the stack (236°). We included +/- 22.5 degrees in the downwind direction to ensure sufficient data. Observations that did not fall within either downwind classification were identified as crosswind conditions.

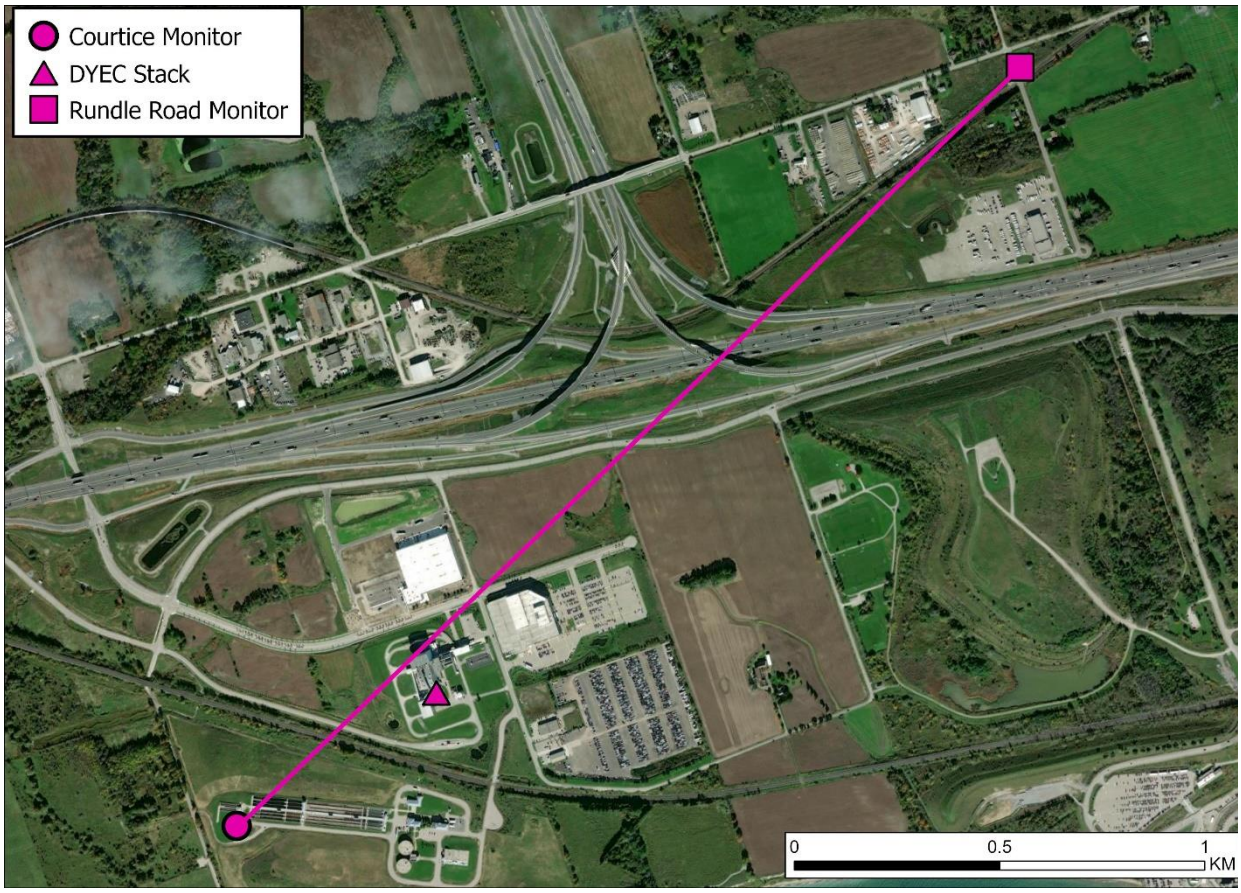


Figure 3.1 Map of Ambient Air Monitoring Locations Relative to the DYEC

3.3 Upwind Downwind Air Pollution Analysis

Three approaches have been implemented to analyze the ambient air pollution data determined by the data availability and air monitoring approach: 1) pollutants measured by discrete 24-hour sampling, 2) pollutants monitored by ambient monitoring (Courtice and Rundle Road) with continuous emissions monitoring available, and 3) pollutants monitored by ambient monitoring without continuous emissions monitoring. Discrete air pollution monitoring included three pollutant groups: 1) polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/PCDF), often referred to as dioxins and furans, 2) polycyclic aromatic hydrocarbons (PAHs), and 3) total suspended particulate (TSP) including the concentrations of metals. Furthermore, ambient air and emission monitoring are conducted for nitrogen oxides (NO_X) and

sulphur dioxide (SO_2). In addition, ambient monitoring is undertaken for particulate matter 2.5 microns or smaller in aerodynamic diameter ($PM_{2.5}$).

3.3.1 Discrete Monitoring Ambient Data Analysis

The pollutants measured with discrete monitoring were quantified into multiple chemical species in the laboratory, which allows for analysis of the specific components and the sum of their parts. The species analyzed for each pollutant class (PCDD/PCDF, PAH & TSP) are listed in Table 3.1. Each sample was a 24-hour integrated measurement, and the concentrations were determined by laboratory processing following sample collection.

Daily wind direction data were assigned to each 24-hour air pollution observation to identify upwind-downwind relationships between the air monitors and the DYEC stack. Downwind alignments are based on the relative position of the monitor to the emission stack. Concentration data for each pollutant were separated into the following three conditions: (1) Rundle Road monitor downwind (Courtice monitor upwind), (2) Courtice monitor downwind (Rundle Road monitor upwind), or (3) Crosswind conditions neither monitor downwind.

Hypothesis: if air pollution emissions from the DYEC affect the local air, downwind concentrations will be statistically significantly higher than the upwind air monitor due to the additional pollution. However, if higher concentrations occurred during non-downwind conditions, it would suggest potential local sources other than the DYEC.

During each wind condition (Rundle Downwind, Courtice Downwind & Crosswind), a *t-test* was applied to determine if the measured concentrations during those conditions were statistically significantly different ($p < 0.05$) between the Courtice and Rundle Road concentrations.

3.3.2 Ambient Air Monitoring Analysis with Emissions Monitoring

Nitrogen oxides and SO_2 were measured by ambient air and continuous emissions monitoring at the DYEC. With the addition of continuous emissions monitoring, the analysis can be extended beyond comparing differences only and explore relationships between the upwind and downwind differences with respect to changes in measured emissions.

Hypothesis: if air pollution emissions from the DYEC affect the local air, measured emissions will statistically significantly explain the differences in downwind concentrations. For example, when emissions are high, it would be expected that downwind concentrations are higher than background (upwind) due to the additional pollution.

The statistical analysis included a linear regression model with the difference between the Rundle Road monitor and the Courtice monitor as the dependent variable, regressed against the sum of NO_X emissions from the CEMS during Rundle Road downwind conditions. Concentrations were averaged daily to align with the discrete air pollution analysis and reduce the number of temporally correlated values.

Table 3.1 Discrete Monitoring Classes and Chemical Species

PCDD/PCDF	Total Suspended Particulate	Polycyclic Aromatic Hydrocarbons
1,2,3,4,6,7,8-HeptaCDD	Particulate (TSP)	1-methylnaphthalene
1,2,3,4,6,7,8-HeptaCDF	Aluminum (Al)	2-methylnaphthalene
1,2,3,4,7,8-HexaCDD	Antimony (Sb)	Acenaphthene
1,2,3,4,7,8-HexaCDF	Arsenic (As)	Acenaphthylene
1,2,3,4,7,8,9-HeptaCDF	Barium (Ba)	Anthracene
1,2,3,6,7,8-HexaCDD	Beryllium (Be)	Benzo(a)anthracene
1,2,3,6,7,8-HexaCDF	Bismuth (Bi)	Benzo(a)fluorene
1,2,3,7,8-PentaCDD	Boron (B)	Benzo(a)pyrene
1,2,3,7,8-PentaCDF	Cadmium (Cd)	Benzo(b)fluoranthene
1,2,3,7,8,9-HexaCDD	Chromium (Cr)	Benzo(b)fluorene
1,2,3,7,8,9-HexaCDF	Cobalt (Co)	Benzo(e)pyrene
2,3,4,6,7,8-HexaCDF	Copper (Cu)	Benzo(g,h,i)perylene
2,3,4,7,8-PentaCDF	Iron (Fe)	Benzo(k)fluoranthene
2,3,7,8-TetraCDD	Lead (Pb)	Biphenyl
2,3,7,8-TetraCDF	Magnesium (Mg)	Chrysene
OctaCDD	Manganese (Mn)	Dibenz(a,h)anthracene
OctaCDF	Mercury (Hg)	Dibenzo(a,c) anthracene + Picene
Total Toxic Equivalency	Molybdenum (Mo)	Fluoranthene
	Nickel (Ni)	Fluorene
	Phosphorus (P)	Indeno(1,2,3-cd)pyrene
	Selenium (Se)	Naphthalene
	Silver (Ag)	O-terphenyl
	Strontium (Sr)	Perylene
	Thallium (Tl)	Phenanthrene
	Thorium (Th)	Pyrene
	Tin (Sn)	Tetralin
	Titanium (Ti)	Total PAH*
	Uranium (Ur)	
	Vanadium (V)	
	Zinc (Zn)	
	Zirconium (Zr)	

*Total PAH excludes Dibenzo(a,c) anthracene + Picene, and Fluorene as they were not monitored during the entire study period.

3.3.2.2 AMBIENT MONITORING ANALYSIS WITHOUT CEMS

The analysis of $PM_{2.5}$ aligned with the approach for the discrete air sampling. The goal was to identify significant downwind air pollution differences to identify any local impact on air quality from the DYEC.

Hypothesis: if air pollution emissions from the DYEC affect the local air, downwind concentrations will be statistically significantly higher than the upwind air monitor due to the additional pollution. However, if higher concentrations occurred during non-downwind conditions, it would suggest potential local sources other than the DYEC.

During each wind condition (Rundle Downwind, Courtice Downwind & Crosswind), a *t-test* was applied to determine if the measured concentrations during those conditions were statistically significantly different ($p < 0.05$) between the Courtice and Rundle Road concentrations.

3.4 Regional Emissions

Reported industrial emissions data were obtained from the Canadian National Pollutant Release Inventory, including emissions reporting data required for facilities that meet published reporting requirements under the Canadian Environmental Protection Act. The DYEC is required to report air releases of 15 compounds since 2015. The data examined included 2015 to 2021 emissions data for Ammonia, Arsenic, Cadmium, Cobalt, Copper, Dioxins and Furans - Total, Hexachlorobenzene, Lead, Manganese, Mercury, Nitrogen Oxides, Phosphorus, PM_{10}, $PM_{2.5}$, and Zinc. All emitters that were in Durham and York regions were selected for analysis. In addition, emissions by facility were mapped for Durham and York regions.

3.5 Ambient Measurements During Non-Operation Periods

Each year the two boilers are turned off for maintenance at the DYEC, which has occurred independently or concurrently. During concurrent shutdowns, it allows analyzing the air pollution concentration data to identify background differences between the Courtice and Rundle Road without emissions from the DYEC. The shutdown periods are provided in Table 3.2. In addition, mean concentrations for NO_X, SO_2 and $PM_{2.5}$ during the seven overlapping periods were calculated and compared to explore the baseline variation between the Rundle Road and Courtice air monitoring locations when the DYEC is not operational.

Table 3.2 Offline periods for DYEC boilers.

Year	Boiler 1	Boiler 2	Overlapping Shutdowns
2016	Feb 21 – Mar 7	Mar 12 – Mar 28 Sept 30 – Oct 6	
2017	Feb 6 – Mar 20 Aug 13 – Aug 20	Jan 28 – Mar 16 Aug 21 – Aug 28	Feb 6 – Mar 16
2018	Mar 11 – Mar 29 Sept 24 – Sept 29	Feb 11 – Mar 1 Oct 9 – Oct 19	
2019	Mar 17 – Apr 2 Sept 20 – Sept 30	Mar 18 – Apr 3 Sept 21 – Oct 1	Mar 18 – Apr 2 Sept 21 – Sept 30
2020	Mar 1 – Mar 14 Sept 26 – Oct 5	Feb 29 – Mar 13 Sept 27 – Oct 10	Mar 1 – Mar 13 Sept 27 – Oct 5
2021	Feb 28 – Mar 14 Sept 25 – Oct 7	Mar 2 – Mar 15 Sept 26 – Oct 6	Mar 2 – Mar 14 Sept 26 – Oct 6

4 RESULTS

4.1 WIND DIRECTION ANALYSIS RESULTS

Wind roses for the Courtice and Rundle Road monitors with data from January 1, 2016, until June 30, 2022, are presented in Figure 4.1. The wind data were hourly averages for wind speed and direction, totalling 56,952 hourly records. The Courtice data included 395 missing wind speed observations and 659 missing wind direction observations; in all cases, when wind speed data were missing, so were wind direction. The Rundle Road data included 1,408 missing wind speed observations and 3,773 missing wind direction observations; in all cases, when wind speed data were missing, so were wind direction. The data are audited by the Ministry of the Environment, Conservation and Parks and comply with data availability requirements.

In Figure 4.1, we observe for both stations that the dominant wind direction is from the west (northwest to the southwest), with Rundle Road showing a more dominant wind pattern from the west and southwest, which aligns with the data used in dispersion modelling to identify upwind and downwind air monitor locations. East winds dominate a secondary wind direction at both stations. The average wind speed was 3.3 m/s at Courtice and 2.6 m/s at Rundle Road, with maximum wind speeds of 19.2 m/s at Courtice and 14.0 m/s at Rundle. The higher wind speeds at Courtice are expected as the wind passes over Lake Ontario, which has a low surface roughness; as the wind reaches land, the surface roughness increases (e.g. due to vegetation and buildings), creating more mechanical turbulence and decreasing wind speed.

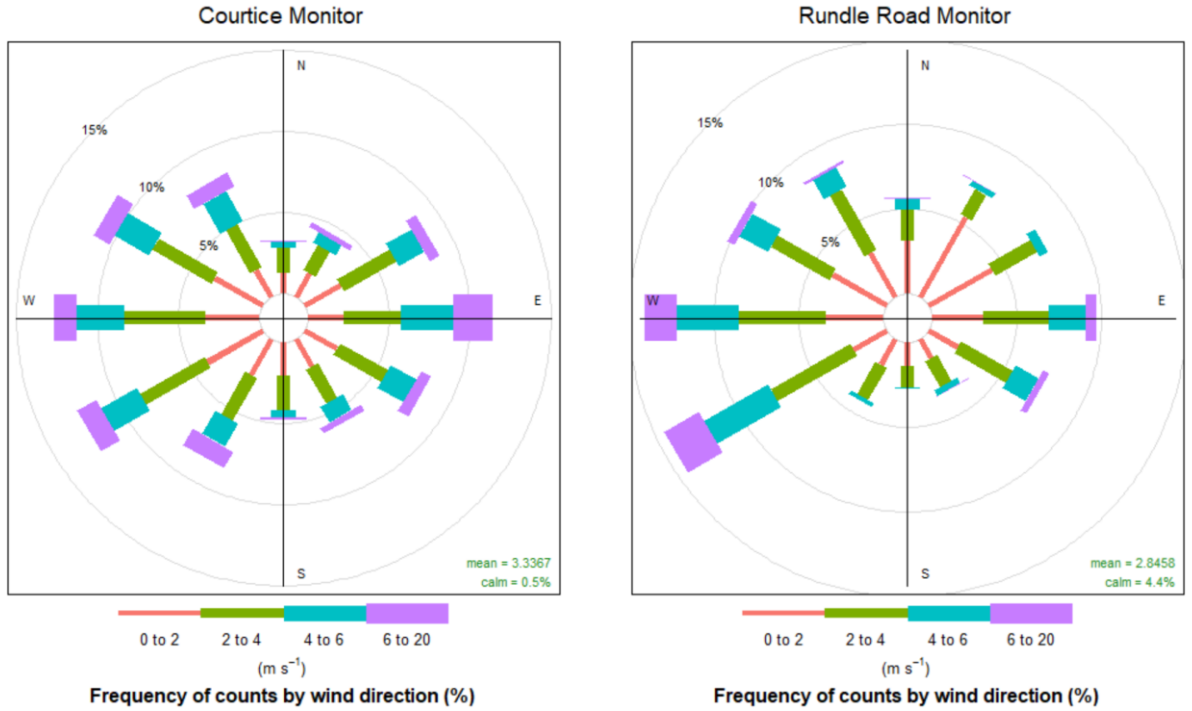


Figure 4.1 Wind roses for Courtice and Rundle Road Monitor for January 1, 2016, to June 30, 2022.

4.2 DISCRETE MONITORING AMBIENT DATA ANALYSIS

The number of monitored days varied for the three pollutant classes because of different sampling schedules. Valid data were available at both ambient air monitoring locations for TSP for 330 days, PAHs for 173 days and dioxins and furans for 94 days. Two PAH species were not measured during all sampling dates, which included Fluorene (67 days), and the combined total of Dibenzo(a,c) anthracene + Picene (68 days) and were excluded from the Total PAH value (sum of all other PAHs). Thorium (Th) speciation of the TSP was only included in 70 samples and excluded from the analysis. The mean concentrations of each pollutant by air monitor are presented in Appendix A.

Average concentrations separated by wind conditions are in Appendix B, which include when the Rundle Road downwind, Rundle Road upwind, and crosswind condition. The table includes the count of the number of sample days by wind condition, *t*-statistic and *p-value* for each *t-test*. No pollutants were significantly higher when the Courtice monitor was downwind. However, eighteen pollutants were significantly higher at the Rundle Road monitor when it was downwind compared to the Courtice monitor, which are included in Table 4.1.

Table 4.1 Cases when Rundle Road (Downwind) was significantly higher than Courtice

Class	Pollutant	Courtice (Upwind)	Rundle (Downwind)	*N*	*t*	*p*
PAH	1-methylnaphthalene	5.6745	9.3537	38	-2.26	0.03
PAH	2-methylnaphthalene	9.7107	17.1487	38	-2.35	0.02
PAH	Acenaphthene	3.4952	8.9259	38	-2.65	0.01
PAH	Anthracene	0.1532	0.5164	38	-3.12	<0.01
PAH	Biphenyl	2.8577	5.011	38	-2.42	0.02
PAH	fluoranthene	0.794	2.3357	38	-3.47	<0.01
PAH	Phenanthrene	4.1318	11.7618	38	-3.27	<0.01
PAH	Pyrene	0.3472	1.0432	38	-3.7	<0.01
PAH	Total PAH	58.789	93.572	38	-2.31	0.02
TSP	Aluminum (Al)	0.1389	0.2144	76	-2.52	0.01
TSP	Copper (Cu)	0.028	0.0436	76	-2.9	<0.01
TSP	Iron (Fe)	0.403	0.5466	76	-2.3	0.02
TSP	Magnesium (Mg)	0.2318	0.3153	76	-2.09	0.04
TSP	Manganese (Mn)	0.0131	0.0177	76	-2.15	0.03
TSP	Molybdenum (Mo)	0.0012	0.0024	76	-2.28	0.03
TSP	Particulate (TSP)	26.8154	37.9709	76	-2.78	0.01
TSP	Strontium (Sr)	0.0048	0.008	76	-3.1	<0.01
TSP	Titanium (Ti)	0.0068	0.0103	76	-2.65	0.01

Units: PAH (ng/m^3); TSP ($\mu g/m^3$)

Examining the 18 statistically significant Rundle Road downwind elevated pollutants; ten were also significantly increased at Rundle Road relative to Courtice during crosswind conditions, which are included in Table 4.2.

Table 4.2 Pollutants significantly higher at Rundle Road during crosswind conditions for pollutants, which were significantly higher during Rundle downwind conditions.

Class	Pollutant	Courtice	Rundle	*N*	*t*	*p*
PAH	Anthracene	0.1755	0.4912	120	-3.43	<0.01
PAH	Fluoranthene	0.744	1.7009	120	-4.09	<0.01
PAH	Phenanthrene	4.2106	9.635	120	-2.55	0.01
PAH	Pyrene	0.3488	0.7867	120	-4.33	<0.01
TSP	Aluminum (Al)	0.1375	0.1742	216	-2.41	0.02
TSP	Copper (Cu)	0.026	0.0311	216	-2.33	0.02
TSP	Magnesium (Mg)	0.1925	0.2345	216	-2.32	0.02
TSP	Molybdenum (Mo)	0.001	0.0013	216	-2.95	<0.01
TSP	Particulate (TSP)	24.803	30.762	216	-2.85	<0.01
TSP	Strontium (Sr)	0.0049	0.007	216	-3.22	<0.01

Units: PAH (ng/m^3); TSP ($\mu g/m^3$)

Though not statistically significantly higher, the remaining eight pollutants demonstrated higher concentrations at Rundle Road during crosswind conditions; those values are presented in Table 4.3. Given the non-statistical significance, these pollutants should be relied upon less in any interpretations as it may be due to natural variability in the data.

Table 4.3 Pollutants higher at Rundle Road during crosswind conditions for pollutants, which were significantly higher during Rundle downwind conditions.

Class	Pollutant	Courtice	Rundle	*N*	*t*	*p*
PAH	1-methylnaphthalene	5.4272	8.5793	120	-1.48	0.14
PAH	2-methylnaphthalene	9.5086	16.1301	120	-1.47	0.14
PAH	Acenaphthene	3.8539	8.7218	120	-1.74	0.08
PAH	Biphenyl	2.6843	4.1689	120	-1.32	0.19
PAH	Total PAH	65.4708	92.5924	120	-1.17	0.24
TSP	Iron (Fe)	0.4003	0.4176	216	-0.49	0.63
TSP	Manganese (Mn)	0.0114	0.012	216	-0.63	0.53
TSP	Titanium (Ti)	0.0071	0.0084	216	-1.76	0.08

Units: PAH (ng/m^3); TSP ($\mu g/m^3$)

4.3 AMBIENT AIR MONITORING WITH EMISSIONS MONITORING

The ambient concentrations during Rundle Road downwind conditions for NO_X were 7.5 ppb at Rundle Road and 7.1 ppb at the Courtice monitor, which indicates a slight increase in NO_X ambient conditions during Rundle Road downwind conditions. The linear regression model indicated a non-statistically significant relationship between the downwind difference and the DYEC CEMS

data: coefficient of 0.1401 (t = 1.899, p = 0.06). The model's adjusted R^2 was insignificant at 0.01 (p = 0.06, F: 3.604, degrees of freedom: 399). The NO_X model demonstrates no relationship between emission and downwind pollution concentration intensification.

Sulphur dioxide ambient concentrations during Rundle Road downwind conditions demonstrated higher concentrations at the Courtice monitor (1.80 ppb) compared to the downwind Rundle Road monitor (0.65 ppb). The statistical modelling indicated no statistically significant relationship between DYEC emissions and the difference in ambient concentrations with a negative coefficient of -0.074 (p = 0.08). The model's adjusted R^2 was insignificant at <0.01 (p = 0.08, F: 2.987, degrees of freedom: 398). The SO_2 model demonstrates no relationships between emission and downwind concentration intensification.

4.4 Ambient Air Monitoring Data Without Emissions Monitoring

Particulate matter 2.5 microns or smaller in aerodynamic diameter concentrations did not demonstrate a significant difference during the three wind conditions, presented in Table 4.4.

Table 4.4 $PM_{2.5}$ concentrations separated by wind conditions with *t-test values*.

	Mean Concentration (µg/m³)				
Wind Condition	**Courtice**	**Rundle Road**	**t**	**df**	**p**
Rundle Downwind	8.0	8.0	-0.18	1005	0.86
Courtice Downwind	6.6	7.0	-0.77	330	0.44
Crosswind	5.8	5.9	-0.09	3165	0.93

4.5 Regional Emissions

Regional emissions will impact Durham and York Regions' airshed. Comparing the emission quantities from the DYEC with NPRI-reported regional emissions (NPRI Emissions in Durham and York Regions) contextualizes the scale of emissions. The emissions for each pollutant reported by the DYEC are compared against the regional outputs between 2015 and 2021, provided in Table 4.5. The DYEC emits 3.6 percent or less of total regional emissions for each pollutant reported to the NPRI. Ten reported pollutants represent less than one percent of regional emissions from the DYEC. Maps highlighting the percentage of regional emissions by location for each pollutant listed in Table 4.5 are available in Appendix C.

4.6 Ambient Concentrations During Dual Boiler Shutdowns

When both boilers are offline, the DYEC does not generate combustion-related emissions. During the boiler shutdowns, $PM_{2.5}$ concentrations were similar, 5.5 µg/m³ at Courtice and 5.9 µg/m³ at Rundle Road. NO_X and SO_2 concentrations were higher at the Courtice air monitor (NO_X = 7.4 ppb; SO_2 = 2.0) compared to the Rundle Road air monitor (NO_X = 4.8 ppb; SO_2 = 0.3). We observe a 7% difference for $PM_{2.5}$, a 43% difference for NO_X and a 148% difference for SO_2. In terms of the air pollution units, we observe differences of < 1 µg/m³ for $PM_{2.5}$, 2.6 ppb for NO_X and 1.7 ppb for SO_2.

Table 4.5 Regional Emissions of DYEC Reported Pollutants between 2015 and 2021

		Emissions		
Pollutant	**Units**	**DYEC**	**Regional**	**DYEC Contribution (%)**
Ammonia	tonnes	39.187	3777.381	1.037
Arsenic	kg	0.27	42.43	0.64
Cadmium	kg	0.67	195.83	0.34
Cobalt	kg	0.43	31.83	1.35
Copper	tonnes	0.0131	0.9686	1.35
Dioxins and furans - Total	g TEQ	0.1904	8.8316	2.16
Hexachlorobenzene	grams	Zero	3451.24	Zero
Lead	kg	2.96	3558.90	0.08
Manganese	tonnes	0.0095	115.0316	0.0082
Mercury	kg	2.24	1192.57	0.19
Nitrogen oxides	tonnes	975.70	27346.03	3.57
Phosphorus	tonnes	Zero	0.57	Zero
PM_{10}	tonnes	2.0990	3644.5190	0.058
$PM_{2.5}$	tonnes	1.5960	1530.6871	0.104
Zinc	tonnes	0.0311	54.6885	0.057

5 DISCUSSION

Evaluating a single source's impact on an airshed is challenging due to the multiple natural and anthropogenic sources within the airshed. In addition, ambient air pollution is affected by regional and transboundary air pollution and unravelling those nuances is not always possible. This report has assessed the DYECs impact on local air quality by analyzing ambient air pollution measurements from two monitoring stations implemented to monitor air pollution from the DYEC. The ambient air monitoring design for the DYEC leveraged the Rundle Road air monitor as predominately downwind from the DYEC and the Courtice location to serve as an upwind location to provide background air pollution concentrations.

Examining the wind direction and speed data measured at both Courtice and Rundle Road between Jan 1, 2016, and June 30, 2022, confirmed that the anticipated primary wind pattern was from the west. The average wind speed was lower at the Rundle Road Monitor, likely due to friction from increased surface roughness as the air masses transition from passing over water (low friction) to increased turbulence from the natural and anthropogenic features on land. The reduced wind speed would indicate a lower ability for pollutants to disperse at the Rundle Road monitor. Our analysis considered three wind patterns in most of the analysis that included periods when each monitor was in a relative downwind position to the other and then crosswinds. A 45-degree window was selected to define downwind conditions, which was selected to find the smallest window possible while ensuring enough samples for our analysis. The primary limiting factor was the discrete samples for dioxins and furans, which are the least frequently sampled.

5.1 DIOXINS AND FURANS

Polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzo-furans (PCDFs) exposure has been associated with health effects that include skin disorders, liver problems, impacts to developing nervous systems, certain types of cancers, and impairment of the endocrine system, immune system and reproductive functions. The risk of the health effects is dose and exposure dependent; however, minimizing exposure to PCDD/PCDFs is clear. Dioxins and furans are generated during combustion (Mukherjee et al., 2016; Peng et al., 2020).

Dioxin and furan sampling occurred with discrete sampling for 94 days. Seventeen compounds are analyzed in each sample, which can be analyzed individually, or toxic equivalency (TEQ) values can be calculated. To determine the TEQ, toxic equivalency factors (TEF) are applied that provide a relative factor for each chemical with the most toxic form of dioxin (2,3,7,8-TCDD; TEF = 1). Then, each compound's concentration is multiplied by its TEF, and the sum of the 17 compounds can be compared with the MECP Ambient Air Quality Criteria, which is 0.1 pg TEQ/m^3. The dioxins and furans AAQC was established based on human health (Ontario Ministry of the Environment, Conservation and Parks, 2020).

The mean TEQ/m^3 values across all samples for both Rundle Road (0.0157) and Courtice (0.0127) are below the MECP Ambient Air Quality Criteria (AAQC), which indicates that ambient air is between 12.7% and 15.7% of the MECP AAQC. In addition, during downwind conditions for both air monitors, no statistically significant increase occurred between the upwind and downwind air monitors. This suggests that the DYEC was not emitting concentrations to cause a notable change in air pollution concentrations from the background conditions.

The DYEC is a minor contributor to Durham and York Regions' dioxin and furan industrial emissions. Data from the NPRI between 2015 (the start of DYEC reporting) and 2021 (most recent data available), the DYEC contributed only 2.2% of the total emissions in the region. However, to the west of the DYEC, five other locations emit these compounds, with two sites releasing between 25-50% of total regional emissions. These sites are likely why Courtice and Rundle Road during westerly winds (Rundle Road downwind) demonstrate their highest concentrations compared to concentrations during the other two wind patterns.

The data analysis in this report does not suggest that DYEC emissions likely impact local concentrations of dioxins and furans. The concentrations are below the Ontario AAQCs, which is also a positive given the additional sources in the airshed.

5.2 PAHs

Polycyclic aromatic hydrocarbons (PAHs) are formed during incomplete combustion, including burning coal, oil, gas, wood, and garbage (Abdel-Shafy and Mansour, 2016). PAH effects include toxicity, mutagenic properties (causing a mutation in DNA), and they are known carcinogens. In the atmosphere, PAHs may occur as a gas (smaller compounds) or bound to particulate matter (larger compounds). Many PAH compounds exist, but most regulations and reporting focus on between 14 and 20 compounds (Abdel-Shafy and Mansour, 2016). The Ambient Air Quality Monitoring Plan for the DYEC includes monitoring 25 PAHs and then summing those to obtain a total PAH concentration. Unlike dioxins and furans, no toxic equivalency factors or similar adjustments are applied, and the values are summed across all concentrations evenly. Six of the PAHs have MECP criteria to compare measured concentrations against, which include 1-Methylnaphthalene (12,000 ng/m^3), 2-Methylnaphthalene (10,000 ng/m^3), acenaphthylene (3,500 ng/m^3), anthracene (200 ng/m^3), benzo(a)pyrene (Ambient Air Quality Criteria: 0.05 ng/m^3; O. Reg. 419/05 Schedule Upper Risk Thresholds: 5 ng/m^3) and naphthalene (22,500 ng/m^3). Within Ontario, benzo(a)pyrene has been selected as a surrogate for all PAHs during monitoring, and the AAQC was determined based on the carcinogenicity of PAH exposure (Standards Development Branch Ontario Ministry of the Environment, 2011). The benzo(a)pyrene AAQC was developed to be protective of human health (Ontario Ministry of the Environment, Conservation and Parks, 2020).

The mean concentrations for all monitoring at both Courtice and Rundle Road are far below the MECP criteria applied to the DYEC monitoring program for 1-Methylnaphthalene (Courtice: 5.5 ng/m^3 and Rundle Road: 8.5 ng/m^3), 2-Methylnaphthalene (Courtice: 9.7 ng/m^3 and Rundle Road: 15.9 ng/m^3), Acenaphthylene (Courtice: 0.2 ng/m^3 and Rundle Road: 0.3 ng/m^3), Anthracene (Courtice: 0.2 ng/m^3 and Rundle Road: 0.5 ng/m^3), and Naphthalene (Courtice: 24 ng/m^3 and Rundle Road: 28 ng/m^3). Benzo(a)pyrene concentrations are below the AAQC with concentrations of 0.03 ng/m^3 at Courtice and 0.04 ng/m^3 measured at Rundle Road.

Benzo(a)pyrene was not statistically significantly higher at the downwind air monitor compared to upwind concentrations when either Courtice or Rundle Road monitors were downwind. However, concentrations were consistently higher at the Rundle Road air monitor regardless of the wind direction. The difference between the monitoring stations was the highest during crosswind conditions (Rundle Road +0.0177 ng/m^3), followed by Rundle Road being upwind (+0.0144 ng/m^3), and Rundle Road showed the smallest increase when it was downwind of the DYEC (+0.0092 ng/m^3). Examining concentrations during upwind conditions indicate that the area's background conditions range from 0.0315 ng/m^3 (Courtice Upwind) to 0.0521 ng/m^3 (Rundle Downwind).

The analyzed ambient air monitoring data does not suggest that the DYEC impacts PAH ambient air quality.

5.3 TOTAL SUSPENDED PARTICULATE

Total suspended particulate measures all particles in the air, including particulate matter size fractions of PM_{10} and $PM_{2.5}$. Total suspended particulate is measured as a mass per volume of air, where most of the mass is made up of larger particles, which would deposit out of the atmosphere quicker than smaller particles. This rapid deposition means TSP is a good indicator of local effects. The body typically filters the larger particles in the upper respiratory tract, whereas smaller particles, such as $PM_{2.5}$, can travel deeper into the body. The MECP Ambient Air Quality Criteria for TSP is 120 µg/m^3 for 24-hour samples and 60 µg/m^3 for annual concentrations. Because TSP is composed of many types of particles, chemical species are often identified within the sample (speciation). Ambient air monitoring for the DYEC quantifies 29 metals in TSP.

Average concentrations measured at both the Courtice (25 µg/m^3) and Rundle Road (32 µg/m^3) air monitors are below the MECP 24-hour and Annual Air Quality Criteria, as well all metals species analyzed with MECP Criteria demonstrate concentrations below the criteria at both Courtice and Rundle Road.

Downwind TSP concentrations at the Rundle Road air monitor are statistically significantly higher than at Courtice; however, like PAHs, TSP is higher at Rundle Road during all wind conditions (statistically significant during crosswinds). Eight metals species were higher (statistically significant) at the Rundle Road monitor when it was downwind compared to the Courtice monitor; however, only three were not significantly higher at Rundle Road during crosswind conditions (Iron, Manganese and Titanium). The DYEC reports manganese emissions to Canada's National Pollutant Release Inventory; within Durham and York regions, the DYEC emitted <0.001% of emissions between 2015 and 2021.

Overall, measured TSP concentrations are well below the Ontario AAQC. The data and analysis do not suggest any significant patterns of increased concentrations in TSP or subsets of metal species due to emissions from the DYEC. However, the consistently higher concentrations at the Rundle Road air monitor suggest a local source impacting TSP air pollution concentrations may be present.

5.4 NITROGEN OXIDES

Two measures were available for NO_X: ambient air monitoring and continuous emission monitoring. Long-term concentrations at Rundle Road (7.5 ppb) are similar to those at Courtice (7.1 ppb), which is a smaller difference than the difference in concentrations observed between the two monitors when the DYEC boilers were offline (2.6 ppb difference). In addition, the analysis explored the relationship between emission concentrations and the difference between upwind and downwind concentrations at Rundle Road relative to Courtice. No relationship existed between emissions and the difference in ambient air downwind concentrations.

The analysis does not indicate an impact from the DYEC on ambient air pollution concentrations within the airshed. Additionally, mapping the NPRI emission sources identifies the presence of additional local point sources of NO_X.

5.5 Sulphur Dioxide

The same measurement data were available for SO_2 as NO_X. As with NO_X, our modelling of measured emissions compared with differences in ambient measurements did not demonstrate any relationship. However, SO_2 concentrations are much higher at the Courtice monitor when it is upwind of the Rundle Road air monitor, which suggests there may be a nearby emission source. Additionally, Courtice concentrations were higher than Rundle Road when the DYEC boilers were offline. If a local SO_2 air pollution source is present, the concentrations are diluted by dispersion in the short distance to the Rundle Road air monitor.

None of the SO_2 analyses indicated an impact from the DYEC emissions on local SO_2 concentrations. However, the evidence suggests a local source exists near the Courtice air monitor.

5.6 Particulate Matter

The DYEC reports 0.1% of industrial emissions for $PM_{2.5}$ in Durham and York Regions from the NPRI. The concentrations measured at the two monitoring stations did not differ meaningfully. Both monitoring locations reported the same 8.0 µg/m3 concentration during Rundle Road downwind conditions. NPRI emission mapping of industrial sources demonstrates many sources, with no single source representing more than 25% of emissions. The analysis does not suggest any impact from the DYEC.

6 Conclusions

The analysis of ambient air pollution data for PCDD/PCDFs, PAHs, TSP, NO_X, SO_2 and $PM_{2.5}$ indicates that the DYEC is not impacting the local airshed. The region has multiple known stressors, such as those high emitters identified in the NPRI data. After reviewing the ambient monitoring data, one primary concern arose, which included elevated concentrations of benzo(a)pyrene that have included individual samples exceeding Ontario AAQC during the period evaluated. These elevated concentrations do not seem influenced by DYEC emission, and while they may be elevated at Rundle Road, it is not possible to infer the expected concentrations at residential locations within the region. Future exceedances should be individually evaluated to examine the relative wind directions during the exceedance and identify baseline conditions using the upwind monitor; however, the analysis indicates that local and regional sources influence the ambient air monitors, both Courtice and Rundle Road.

Overall, it is concluded that the DYEC's Air Emissions Monitoring Plan effectively controls emissions so that it does not significantly contribute to air pollution in the local airshed.

7 REFERENCES

Abdel-Shafy, H.I., Mansour, M.S.M., 2016. A review on polycyclic aromatic hydrocarbons: Source, environmental impact, effect on human health and remediation. Egyptian Journal of Petroleum 25, 107–123. https://doi.org/10.1016/j.ejpe.2015.03.011

Fernández-López, J., Schliep, K., 2019. rWind: download, edit and include wind data in ecological and evolutionary analysis. Ecography 42, 804–810. https://doi.org/10.1111/ecog.03730

Golder Associates, 2013. DYEC Air Emissions Monitoring Plan.

Mukherjee, A., Debnath, B., Ghosh, S.K., 2016. A Review on Technologies of Removal of Dioxins and Furans from Incinerator Flue Gas. Procedia Environmental Sciences, Waste Management for Resource Utilisation 35, 528–540. https://doi.org/10.1016/j.proenv.2016.07.037

Ontario Ministry of the Environment, Conservation and Parks, 2020. AMBIENT AIR QUALITY CRITERIA. Human Toxicology and Air Standards Section, Technical Assessment and Standards Development Branch, Ontario Ministry of the Environment, Conservation and Parks. Ontario Ministry of the Environment, Conservation and Parks (MECP), Toronto, Canada.

Peng, Y., Lu, S., Li, X., Yan, J., Cen, K., 2020. Formation, Measurement, and Control of Dioxins from the Incineration of Municipal Solid Wastes: Recent Advances and Perspectives. Energy Fuels 34, 13247–13267. https://doi.org/10.1021/acs.energyfuels.0c02446

Standards Development Branch Ontario Ministry of the Environment, 2011. ONTARIO AIR STANDARDS FOR BENZO[A]PYRENE AS A SURROGATE FOR POLYCYCLIC AROMATIC HYDROCARBONS.

Stantec Consulting Ltd., 2012. AMBIENT AIR QUALITY MONITORING PLAN.

Appendix A: Long-term Mean Concentration of Air Pollutants

Pollutant (WHO2005 TEFs)	Courtice Monitor	Rundle Monitor	MECP Criteria
Dioxins and Furans (pg/m^3)			
1,2,3,4,6,7,8-HeptaCDD (EF = 0.01)	0.047947	0.060058	-
1,2,3,4,6,7,8-HeptaCDF (EF = 0.01)	0.013002	0.010458	-
1,2,3,4,7,8-HexaCDD (EF = 0.1)	0.002864	0.003478	-
1,2,3,4,7,8-HexaCDF (EF = 0.1)	0.004946	0.004445	-
1,2,3,4,7,8,9-HeptaCDF (EF = 0.01)	0.003752	0.003403	-
1,2,3,6,7,8-HexaCDD (EF = 0.1)	0.004179	0.004727	-
1,2,3,6,7,8-HexaCDF (EF = 0.1)	0.003228	0.003188	-
1,2,3,7,8-PentaCDD (EF = 1)	0.003295	0.004075	-
1,2,3,7,8-PentaCDF (EF = 0.03)	0.002948	0.002922	-
1,2,3,7,8,9-HexaCDD (EF = 0.1)	0.005281	0.006545	-
1,2,3,7,8,9-HexaCDF (EF = 0.1)	0.002773	0.002978	-
2,3,4,6,7,8-HexaCDF (EF = 0.1)	0.003525	0.003544	-
2,3,4,7,8-PentaCDF (EF = 0.3)	0.003792	0.004108	-
2,3,7,8-TetraCDD (EF = 1)	0.003008	0.003083	-
2,3,7,8-TetraCDF (EF = 0.1)	0.005146	0.004919	-
OctaCDD (EF = 0.0003)	0.160438	0.223894	-
OctaCDF (EF = 0.0003)	0.013056	0.011172	-
Total Toxic Equivalency	0.0127	0.0157	0.1
Polycyclic Aromatic Hydrocarbons (ng/m^3)			
1-methylnaphthalene	5.513639	8.51748	12000
2-methylnaphthalene	9.690533	15.89989	10000
Acenaphthene	3.77011	8.348541	-
Acenaphthylene	0.177239	0.243071	3500
Anthracene	0.17102	0.477141	200
Benzo(a)anthracene	0.04945	0.058863	-
Benzo(a)fluorene	0.097637	0.118325	-
Benzo(a)pyrene	0.028554	0.043789	0.05
Benzo(b)fluoranthene	0.070012	0.086179	-
Benzo(b)fluorene	8.36149	8.373876	-
Benzo(e)pyrene	0.097021	0.109319	-
Benzo(g,h,i)perylene	0.059328	0.071442	-
Benzo(k)fluoranthene	0.063267	0.0769	-
Biphenyl	2.734306	4.223189	-
Chrysene	0.084293	0.105784	-
Dibenz(a,h)anthracene	0.042405	0.045388	-
Fluoranthene	0.74818	1.800712	-
Indeno(1,2,3-cd)pyrene	0.058402	0.071871	-
Naphthalene	24.44774	27.66692	22500

O-terphenyl	0.083036	0.086836	-
Perylene	0.078419	0.084692	-
Phenanthrene	4.135605	9.767028	-
Pyrene	0.349923	0.828773	-
Tetralin	3.08E+00	3.40E+00	-
Total PAH	63.99649	90.50697	-
Total Suspended Particulate (µg/m^3)			
Aluminum (Al)	0.133826	0.1798	4.8
Antimony (Sb)	0.001836	0.001742	25
Arsenic (As)	0.001453	0.001927	0.3
Barium (Ba)	0.00748	0.007885	10
Beryllium (Be)	0.000162	0.000161	0.01
Bismuth (Bi)	0.00115	0.00114	-
Boron (B)	0.00687	0.006901	120
Cadmium (Cd)	0.000575	0.00056	0.025
Chromium (Cr)	0.002666	0.002683	0.5
Cobalt (Co)	0.000558	0.000562	0.1
Copper (Cu)	0.026417	0.033667	50
Iron (Fe)	0.389	0.437037	4
Lead (Pb)	0.002349	0.002259	0.5
Magnesium (Mg)	1.96E-01	2.48E-01	-
Manganese (Mn)	0.011413	0.013066	0.4
Mercury (Hg)	1.16E-05	1.12E-05	2
Molybdenum (Mo)	1.03E-03	1.50E-03	120
Nickel (Ni)	1.15E-03	1.22E-03	0.2
Particulate (TSP)	24.70522	31.8486	120
Phosphorus (P)	0.229783	0.237141	-
Selenium (Se)	0.002758	0.002733	10
Silver (Ag)	0.000823	0.000815	1
Strontium (Sr)	0.004752	0.007102	120
Thallium (Tl)	0.001391	0.001373	-
Tin (Sn)	0.00186	0.002086	10
Titanium (Ti)	0.006859	0.008669	120
Uranium (Ur)	7.80E-05	7.76E-05	1.5
Vanadium (V)	0.00166	0.00181	2
Zinc (Zn)	0.033215	0.02916	120
Zirconium (Zr)	0.00106	0.001036	20

Appendix B: Statistical test values comparing upwind, downwind and crosswind air pollution concentrations.

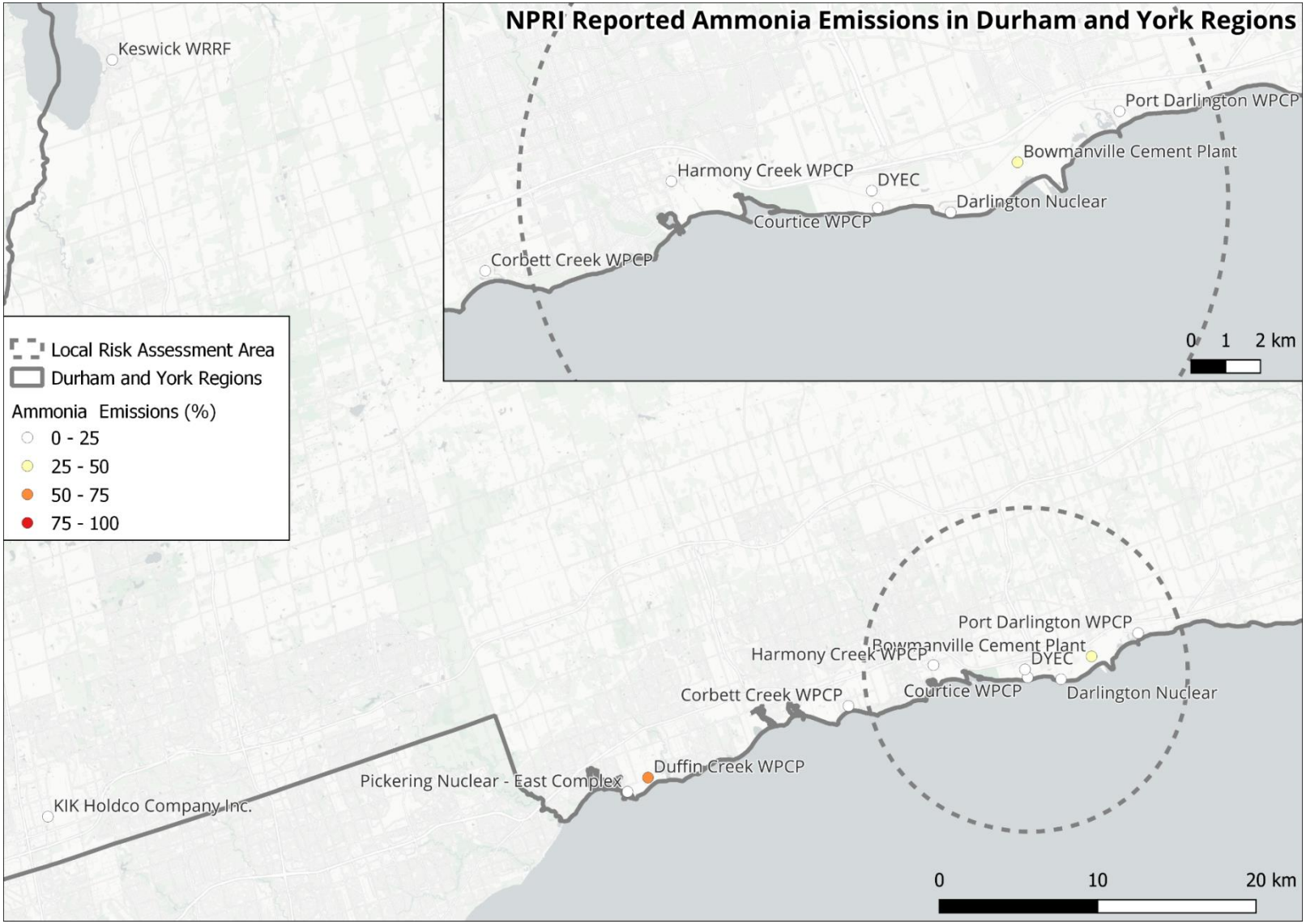
Red cells indicate statistically significant values.

	Rundle Road Downwind					Courtice Downwind					Crosswind				
Pollutant	Courtice	Rundle	*N*	*t*	*p*	Courtice	Rundle	*N*	*t*	*p*	Courtice	Rundle	*N*	*t*	*p*
Dioxins and Furans (pg/m^3)															
1,2,3,4,6,7,8-HeptaCDD	0.0973	0.129	22	-0.33	0.75	0.0335	0.0306	6	0.13	0.9	0.0339	0.0412	63	-0.76	0.45
1,2,3,4,6,7,8-HeptaCDF	0.027	0.0226	22	0.2	0.85	0.0075	0.0035	6	1.31	0.23	0.0092	0.0073	63	0.58	0.56
1,2,3,4,7,8-HexaCDD	0.0042	0.006	22	-0.8	0.43	0.0037	0.0026	6	0.71	0.5	0.0024	0.0028	63	-0.81	0.42
1,2,3,4,7,8-HexaCDF	0.0104	0.0099	22	0.05	0.96	0.0029	0.0027	6	0.17	0.87	0.0035	0.0029	63	0.46	0.65
1,2,3,4,7,8,9-HeptaCDF	0.0071	0.0068	22	0.05	0.96	0.0042	0.0025	6	0.9	0.39	0.0027	0.0025	63	0.44	0.66
1,2,3,6,7,8-HexaCDD	0.007	0.0081	22	-0.23	0.82	0.0042	0.0028	6	0.75	0.47	0.0034	0.0039	63	-0.75	0.45
1,2,3,6,7,8-HexaCDF	0.006	0.0063	22	-0.05	0.96	0.0028	0.0023	6	0.42	0.69	0.0024	0.0023	63	0.2	0.84
1,2,3,7,8-PentaCDD	0.0039	0.0056	22	-1.17	0.25	0.004	0.0034	6	0.4	0.7	0.0031	0.0036	63	-0.94	0.35
1,2,3,7,8-PentaCDF	0.0048	0.0045	22	0.11	0.91	0.0048	0.0033	6	0.72	0.49	0.0023	0.0024	63	-0.38	0.7
1,2,3,7,8,9-HexaCDD	0.0096	0.0131	22	-0.41	0.68	0.0054	0.0026	6	1.17	0.28	0.004	0.0049	63	-0.82	0.42
1,2,3,7,8,9-HexaCDF	0.0037	0.0044	22	-0.57	0.57	0.0042	0.0032	6	0.54	0.6	0.0024	0.0026	63	-0.34	0.74
2,3,4,6,7,8-HexaCDF	0.0057	0.007	22	-0.29	0.77	0.0038	0.0029	6	0.59	0.57	0.0029	0.0025	63	0.48	0.64
2,3,4,7,8-PentaCDF	0.0068	0.008	22	-0.22	0.82	0.0048	0.0035	6	0.73	0.49	0.0028	0.003	63	-0.33	0.74
2,3,7,8-TetraCDD	0.0041	0.004	22	0.07	0.95	0.0032	0.0029	6	0.23	0.83	0.0027	0.0028	63	-0.46	0.65
2,3,7,8-TetraCDF	0.012	0.0112	22	0.07	0.94	0.0032	0.0028	6	0.34	0.74	0.0032	0.0031	63	0.07	0.94
OctaCDD	0.3387	0.4984	22	-0.39	0.7	0.1447	0.102	6	0.61	0.56	0.1062	0.149	63	-1.25	0.21
OctaCDF	0.0261	0.0247	22	0.07	0.94	0.0104	0.0038	6	1.56	0.16	0.0093	0.0076	63	0.5	0.62
Total Toxic Equivalency	0.0183	0.0252	22	-0.78	0.44	0.0134	0.0114	6	0.56	0.59	0.0111	0.0131	63	-1.19	0.24
Polycyclic Aromatic Hydrocarbons (ng/m^3)															
1-methylnaphthalene	5.6745	9.3537	38	-2.26	*0.03*	6.2659	8.9751	11	-0.81	0.43	5.4272	8.5793	120	-1.48	0.14
2-methylnaphthalene	9.7107	17.1487	38	-2.35	*0.02*	11.3871	17.0566	11	-0.85	0.41	9.5086	16.1301	120	-1.47	0.14
Acenaphthene	3.4952	8.9259	38	-2.65	*0.01*	4.119	9.2643	11	-1.13	0.28	3.8539	8.7218	120	-1.74	0.08
Acenaphthylene	0.1602	0.2369	38	-1.42	0.16	0.2876	0.3098	11	-0.21	0.83	0.1684	0.2413	120	-1.33	0.18
Anthracene	0.1532	0.5164	38	-3.12	*<0.01*	0.2383	0.6179	11	-1.42	0.18	0.1755	0.4912	120	-3.43	*<0.01*
Benzo(a)anthracene	0.0563	0.0635	38	-0.73	0.47	0.0648	0.0829	11	-0.85	0.41	0.0478	0.0575	120	-1.37	0.17

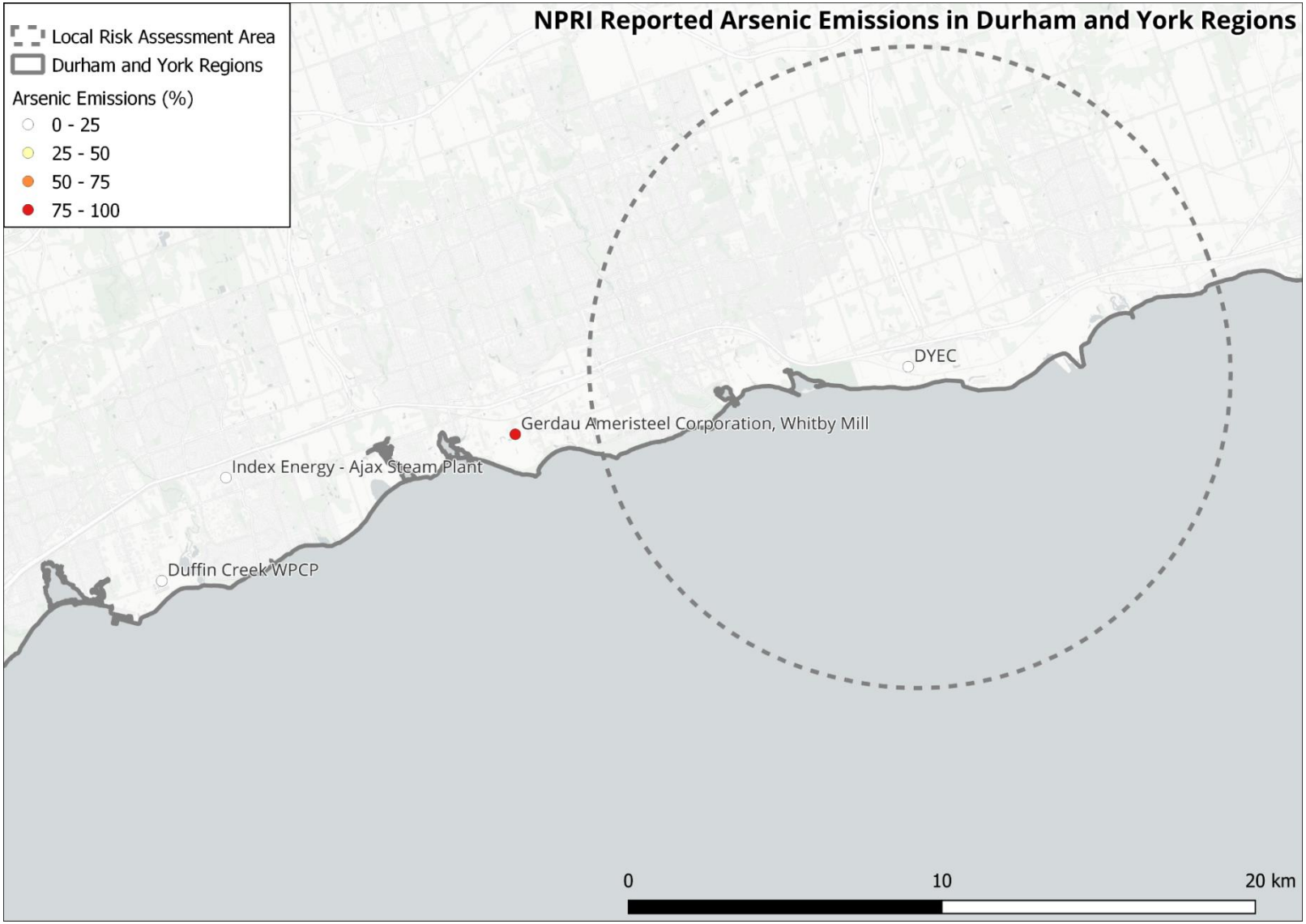
Benzo(a)fluorene	0.1131	0.129	38	-0.8	0.43	0.13	0.155	11	-0.84	0.41	0.0939	0.1163	120	-1.88	0.06
Benzo(a)pyrene	0.0315	0.0407	38	-1.19	0.24	0.0377	0.0521	11	-0.73	0.48	0.0272	0.0449	120	-1.67	0.1
Benzo(b)fluoranthene	0.0695	0.0911	38	-1.63	0.11	0.1164	0.1199	11	-0.07	0.94	0.0679	0.0841	120	-1.38	0.17
Benzo(b)fluorene	0.1066	0.118	38	-0.54	0.59	0.1222	0.1336	11	-0.34	0.74	12.011	12.0245	120	0	1
Benzo(e)pyrene	0.1102	0.1232	38	-0.64	0.52	0.1283	0.1328	11	-0.13	0.9	0.094	0.1075	120	-1.06	0.29
Benzo(g,h,i)perylene	0.0611	0.0708	38	-1.06	0.29	0.0713	0.0726	11	-0.08	0.94	0.0591	0.0733	120	-1.22	0.22
Benzo(k)fluoranthene	0.0646	0.0766	38	-1.33	0.19	0.0902	0.0753	11	0.49	0.63	0.0623	0.0797	120	-1.69	0.09
Biphenyl	2.8577	5.011	38	-2.42	*0.02*	3.3462	4.1444	11	-0.51	0.62	2.6843	4.1689	120	-1.32	0.19
Chrysene	0.0826	0.1004	38	-1.67	0.1	0.1019	0.1263	11	-0.66	0.52	0.0839	0.1068	120	-1.76	0.08
Dibenz(a,h)anthracene	0.0497	0.0533	38	-0.32	0.75	0.0586	0.0618	11	-0.17	0.87	0.0409	0.0441	120	-0.53	0.6
Fluoranthene	0.794	2.3357	38	-3.47	*<0.01*	0.9704	2.8397	11	-1.5	0.16	0.744	1.7009	120	-4.09	*<0.01*
Indeno(1,2,3-cd)pyrene	0.0628	0.0729	38	-1.08	0.29	0.0698	0.0887	11	-0.96	0.35	0.0573	0.0717	120	-1.4	0.16
Naphthalene	27.8317	33.2584	38	-1.03	0.3	32.0028	34.3206	11	-0.21	0.83	22.7916	26.0021	120	-1.01	0.31
O-terphenyl	0.0992	0.1054	38	-0.27	0.78	0.117	0.1228	11	-0.16	0.88	0.0789	0.0822	120	-0.28	0.78
Perylene	0.0945	0.1015	38	-0.3	0.77	0.1126	0.1215	11	-0.23	0.82	0.0753	0.0816	120	-0.53	0.6
Phenanthrene	4.1318	11.7618	38	-3.27	*<0.01*	4.971	12.8784	11	-1.37	0.2	4.2106	9.635	120	-2.55	*0.01*
Pyrene	0.3472	1.0432	38	-3.7	*<0.01*	0.5005	1.3031	11	-1.65	0.13	0.3488	0.7867	120	-4.33	*<0.01*
Tetralin	2.6309	2.8337	38	-0.23	0.82	8.3494	6.681	11	0.21	0.83	2.7584	3.1609	120	-0.38	0.71
Total PAH	58.789	93.572	38	-2.31	*0.02*	73.6591	99.7363	11	-0.76	0.46	65.4708	92.5924	120	-1.17	0.24
Total Suspended Particulate (µg/m^3)															
Aluminum (Al)	0.1389	0.2144	76	-2.52	*0.01*	0.1041	0.1463	27	-1.52	0.13	0.1375	0.1742	216	-2.41	*0.02*
Antimony (Sb)	0.0022	0.0021	76	0.49	0.62	0.0022	0.0021	27	0.15	0.88	0.0018	0.0017	216	0.62	0.54
Arsenic (As)	0.0015	0.0015	76	0.03	0.97	0.0016	0.0062	27	-0.98	0.34	0.0014	0.0016	216	-0.88	0.38
Barium (Ba)	0.0084	0.0098	76	-1.78	0.08	0.007	0.0076	27	-0.44	0.66	0.0074	0.0075	216	-0.21	0.84
Beryllium (Be)	2.00E-04	2.00E-04	76	0.04	0.97	2.00E-04	2.00E-04	27	0.01	0.99	2.00E-04	2.00E-04	216	0.07	0.94
Bismuth (Bi)	0.0013	0.0013	76	0.07	0.94	0.0013	0.0013	27	0.06	0.95	0.0011	0.0011	216	0.18	0.85
Boron (B)	0.0058	0.0059	76	-0.14	0.89	0.0056	0.0055	27	0.12	0.91	0.0072	0.0072	216	0.02	0.98
Cadmium (Cd)	6.00E-04	6.00E-04	76	0.52	0.61	6.00E-04	6.00E-04	27	0.22	0.83	6.00E-04	6.00E-04	216	0.34	0.74
Chromium (Cr)	0.0026	0.0029	76	-1.02	0.31	0.0031	0.0028	27	0.5	0.62	0.0027	0.0026	216	0.61	0.54

Cobalt (Co)	5.00E-04	5.00E-04	76	0.12	0.9	6.00E-04	5.00E-04	27	0.12	0.9	6.00E-04	6.00E-04	216	-0.26	0.8
Copper (Cu)	0.028	0.0436	76	-2.9	*<0.01*	0.0296	0.0292	27	0.06	0.95	0.026	0.0311	216	-2.33	*0.02*
Iron (Fe)	0.403	0.5466	76	-2.3	*0.02*	0.3322	0.3658	27	-0.51	0.61	0.4003	0.4176	216	-0.49	0.63
Lead (Pb)	0.0029	0.003	76	-0.31	0.76	0.0025	0.0023	27	0.37	0.71	0.0022	0.002	216	1.02	0.31
Magnesium (Mg)	0.2318	0.3153	76	-2.09	*0.04*	0.1594	0.2171	27	-1.47	0.15	0.1925	0.2345	216	-2.32	*0.02*
Manganese (Mn)	0.0131	0.0177	76	-2.15	*0.03*	0.0096	0.0113	27	-0.77	0.44	0.0114	0.012	216	-0.63	0.53
Mercury (Hg)	0	0	76	0.52	0.61	0	0	27	-0.43	0.67	0	0	216	0.58	0.56
Molybdenum (Mo)	0.0012	0.0024	76	-2.28	*0.03*	0.0011	0.0013	27	-0.67	0.51	0.001	0.0013	216	-2.95	*<0.01*
Nickel (Ni)	0.0012	0.0013	76	-0.85	0.4	0.0011	0.001	27	1.1	0.28	0.0012	0.0012	216	-0.8	0.42
Particulate (TSP)	26.8154	37.9709	76	-2.78	*0.01*	23.029	31.2536	27	-1.4	0.17	24.803	30.762	216	-2.85	*<0.01*
Phosphorus (P)	0.1762	0.159	76	0.4	0.69	0.1762	0.1789	27	-0.03	0.97	0.2564	0.2717	216	-0.4	0.69
Selenium (Se)	0.0027	0.0026	76	0.2	0.84	0.0028	0.0028	27	0.1	0.92	0.0028	0.0028	216	0.31	0.75
Silver (Ag)	9.00E-04	9.00E-04	76	0.05	0.96	0.001	0.001	27	0.04	0.96	8.00E-04	8.00E-04	216	0.16	0.88
Strontium (Sr)	0.0048	0.008	76	-3.1	*<0.01*	0.0045	0.0072	27	-1.78	0.08	0.0049	0.007	216	-3.22	*<0.01*
Thallium (Tl)	0.0017	0.0017	76	0.05	0.96	0.0018	0.0018	27	0.04	0.97	0.0013	0.0013	216	0.13	0.9
Tin (Sn)	0.0022	0.0026	76	-1.01	0.32	0.0022	0.0033	27	-0.97	0.34	0.0018	0.002	216	-0.86	0.39
Titanium (Ti)	0.0068	0.0103	76	-2.65	*0.01*	0.0056	0.0072	27	-1	0.32	0.0071	0.0084	216	-1.76	0.08
Uranium (Ur)	1.00E-04	1.00E-04	76	0.11	0.91	1.00E-04	1.00E-04	27	0.06	0.95	1.00E-04	1.00E-04	216	0.02	0.98
Vanadium (V)	0.0016	0.0016	76	-0.63	0.53	0.0017	0.0017	27	-0.01	0.99	0.0017	0.0019	216	-0.97	0.33
Zinc (Zn)	0.0382	0.0396	76	-0.39	0.7	0.0341	0.0286	27	0.9	0.37	0.0319	0.0262	216	2.37	*0.02*
Zirconium (Zr)	0.0011	0.0011	76	0.08	0.94	0.0012	0.0012	27	0.23	0.82	0.001	0.001	216	0.54	0.59

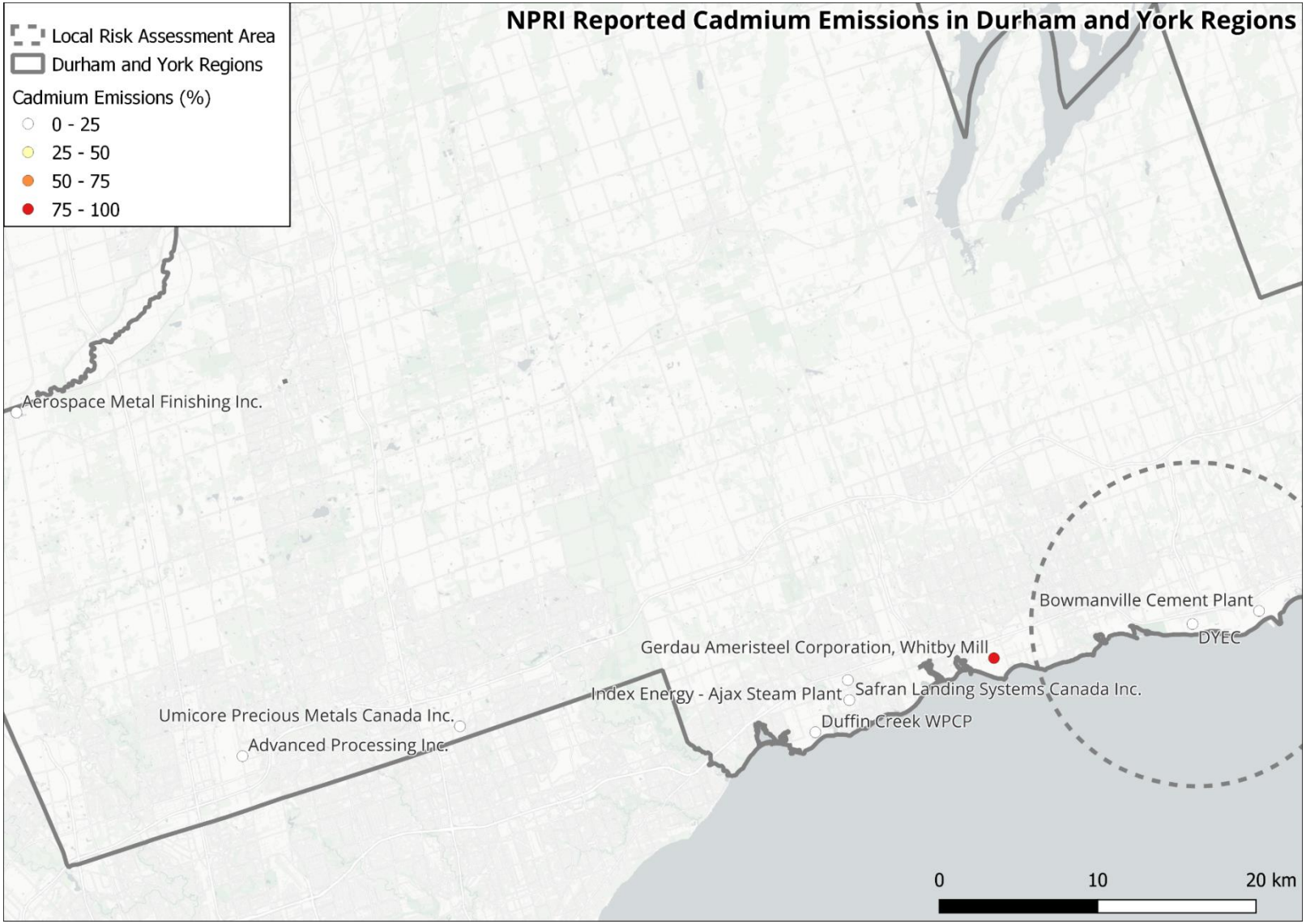
Appendix C.1: NPRI Ammonia Emissions Map



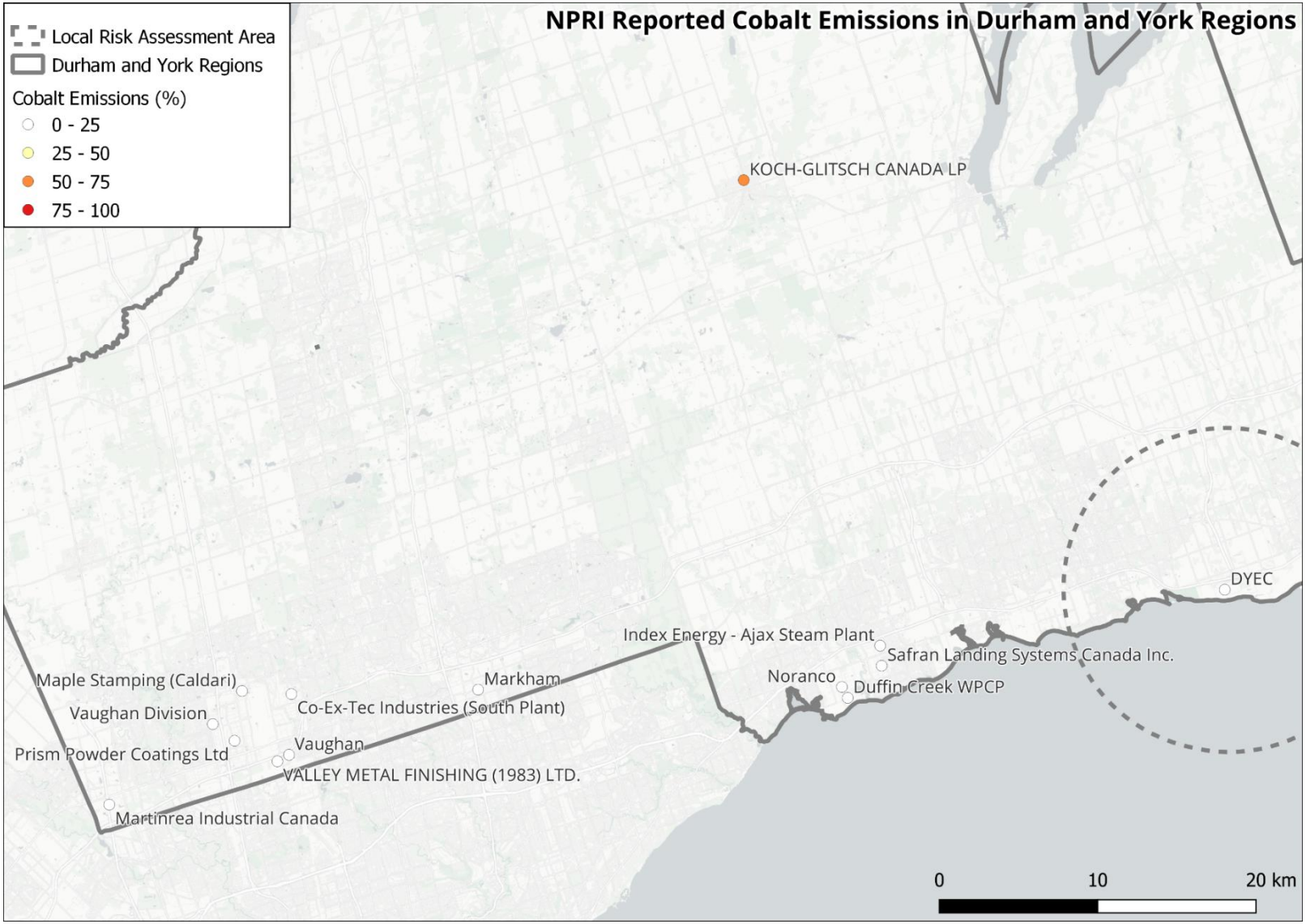
Appendix C.2: NPRI Arsenic Emission Map



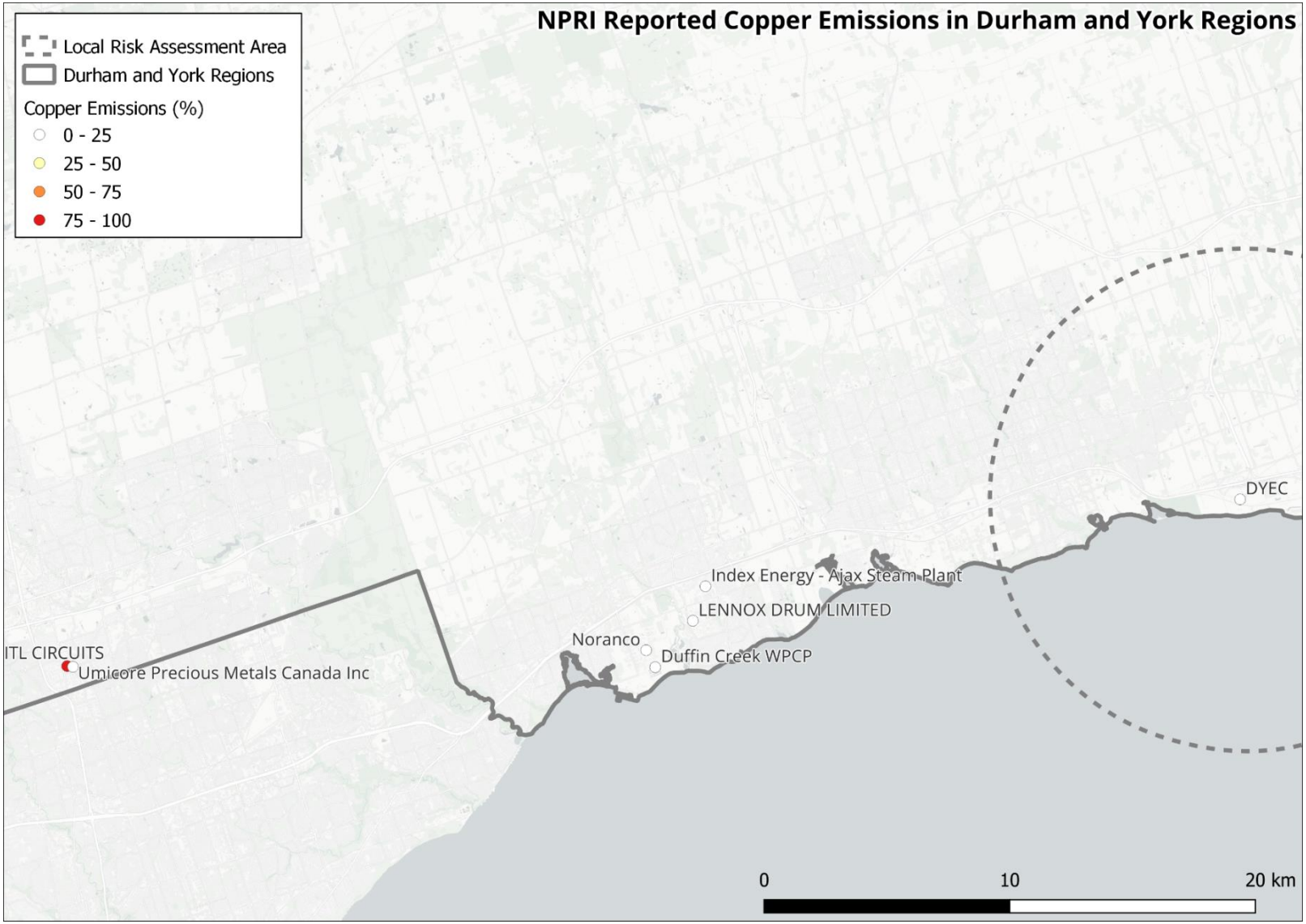
Appendix C.3: NPRI Cadmium Emissions Map



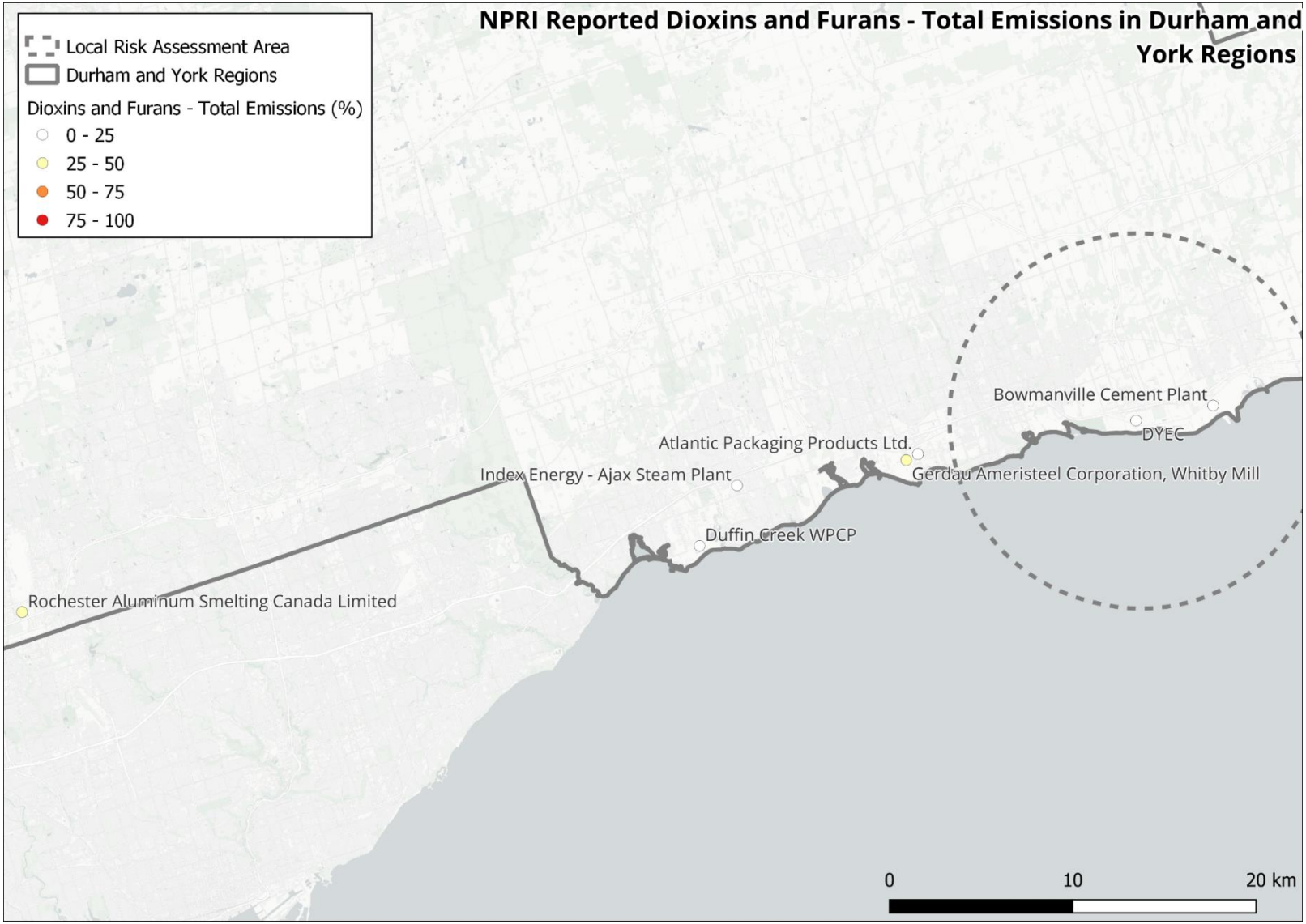
Appendix C.4: NPRI Cobalt Emissions Map



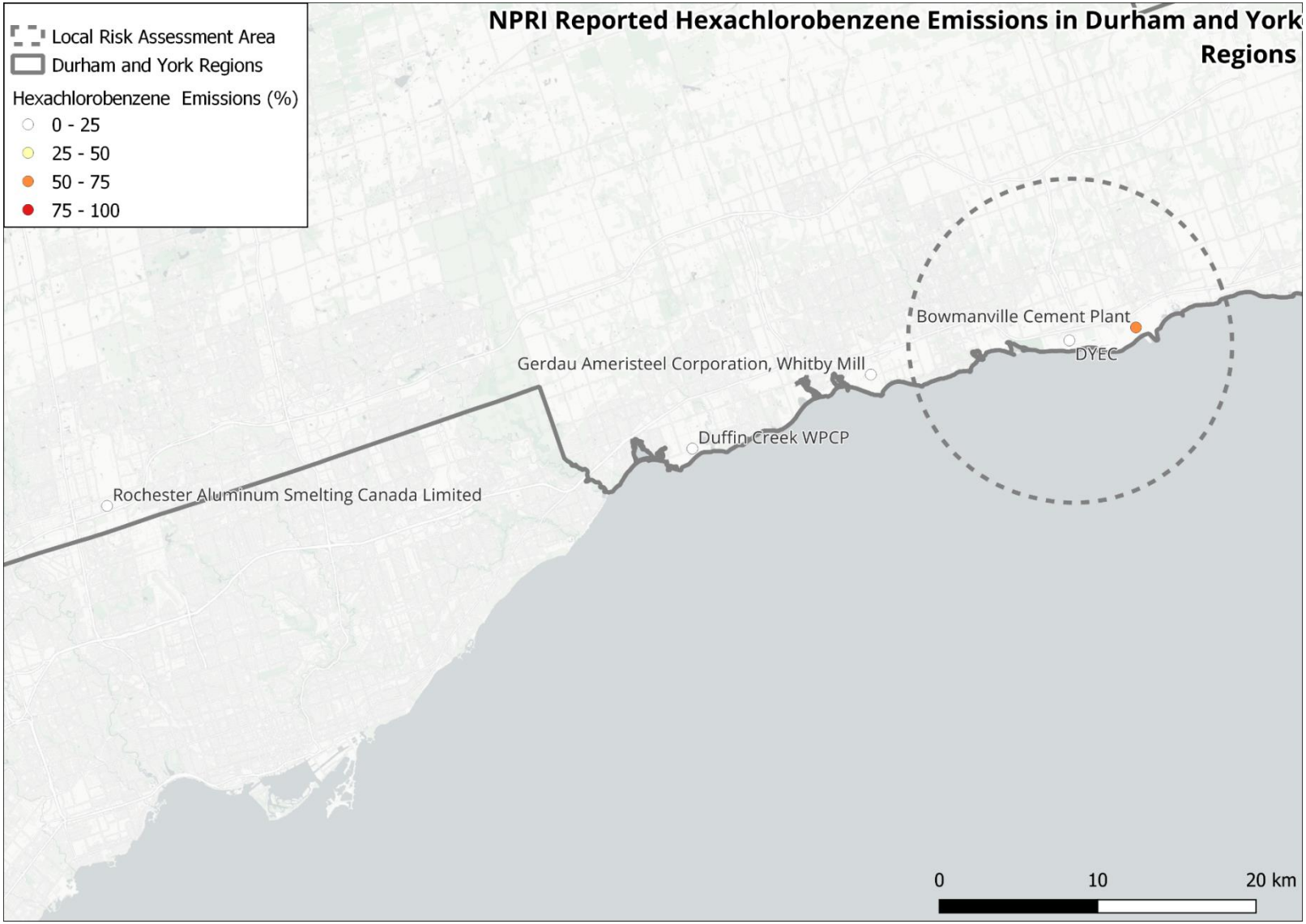
Appendix C.5: NPRI Copper Emissions Map



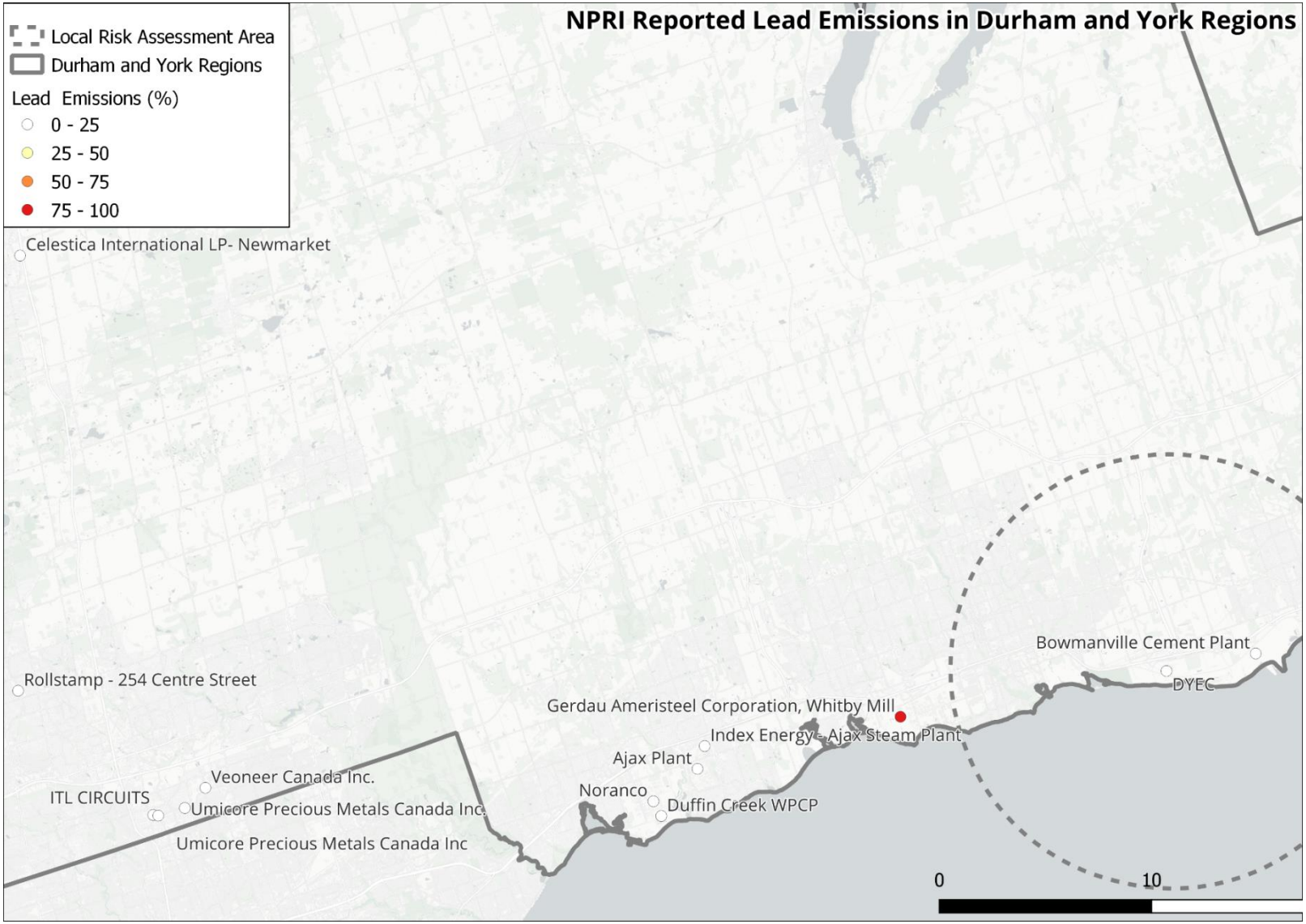
Appendix C.6: NPRI Dioxins and Furans Emissions Map



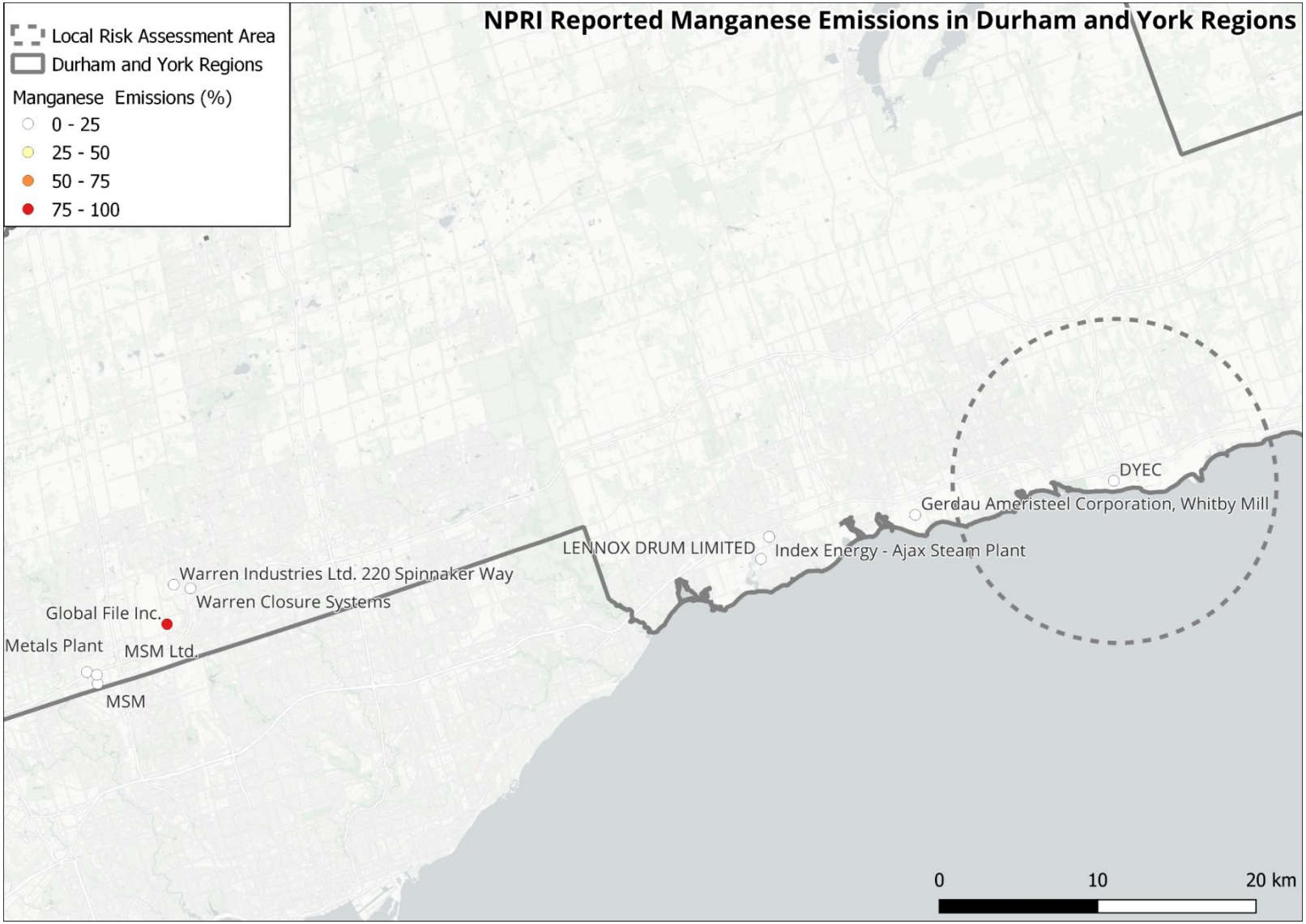
Appendix C.7: NPRI Hexachlorobenzene Emisssions Map



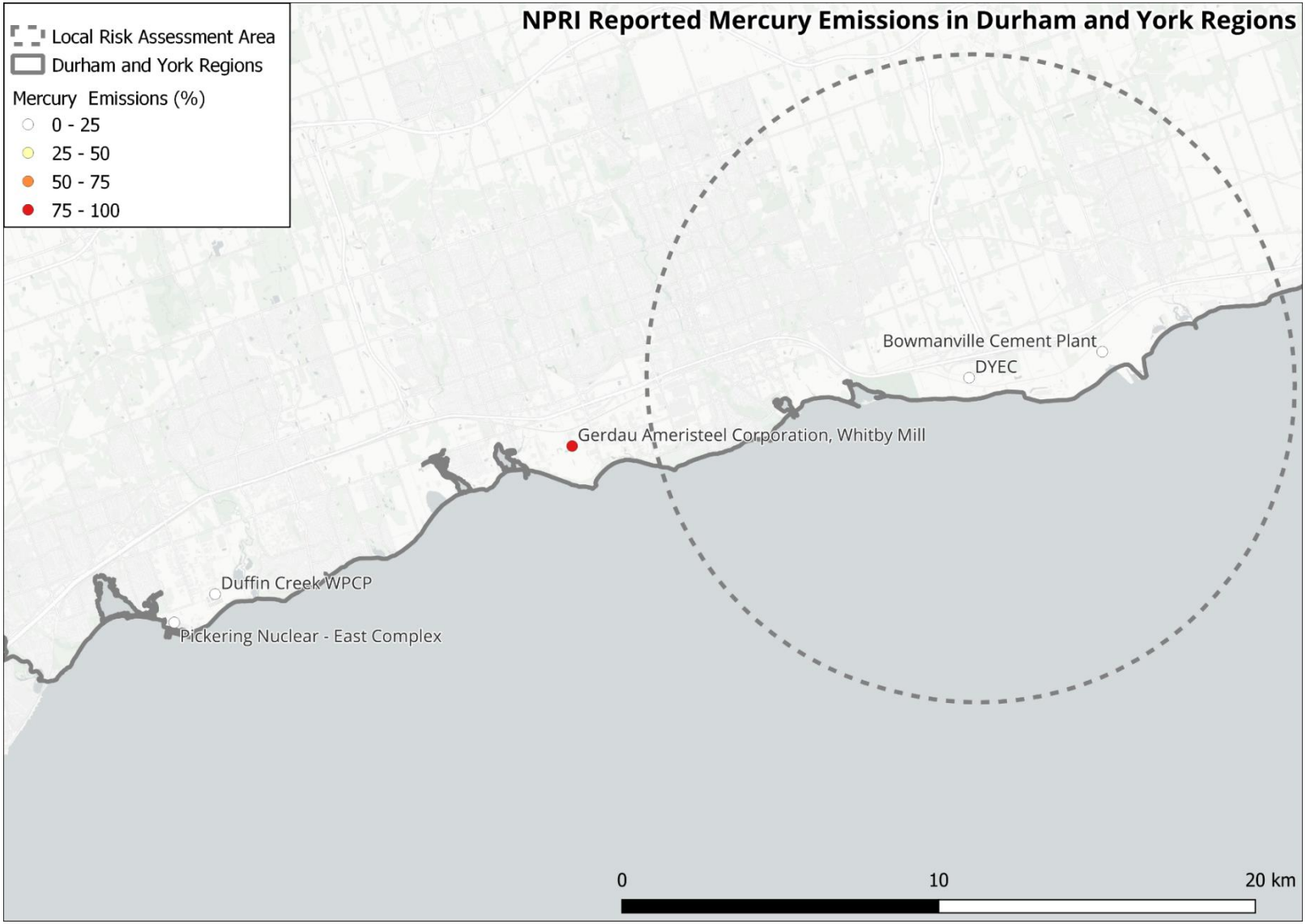
Appendix C.8: NPRI Lead Emissions Map



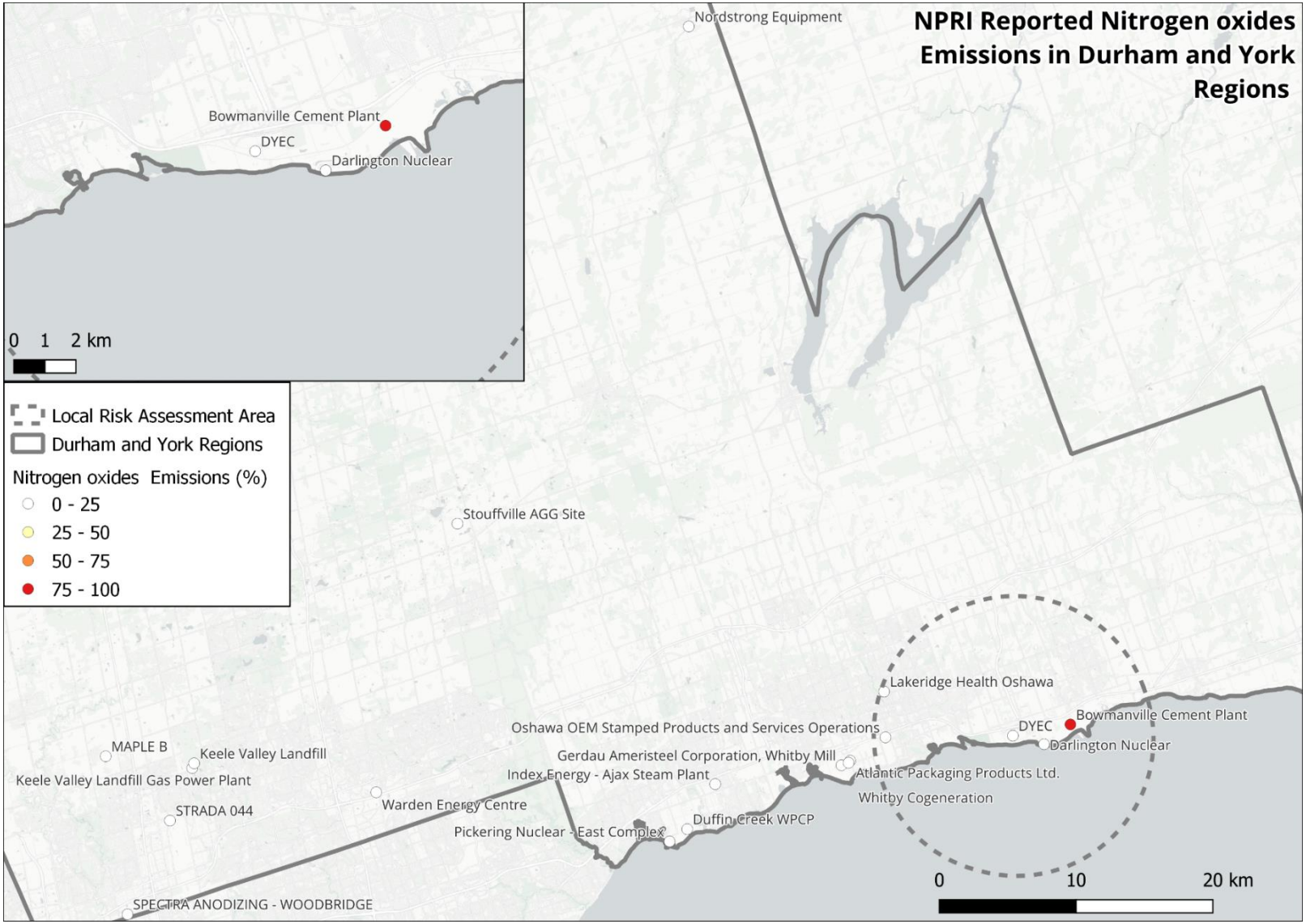
Appendix C.9: NPRI Manganese Emissions Map



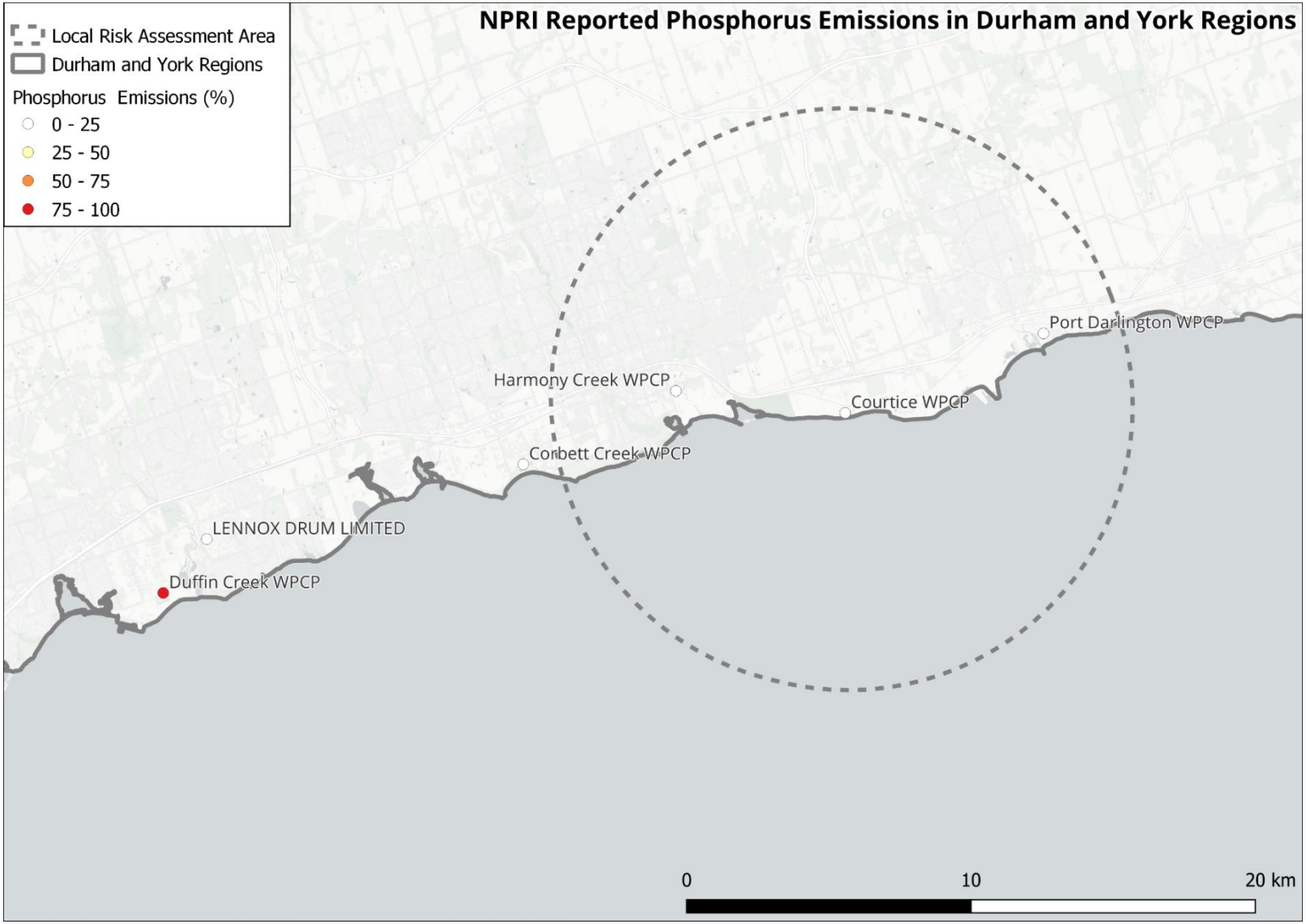
Appendix C.10: NPRI Mercury Emissions Map



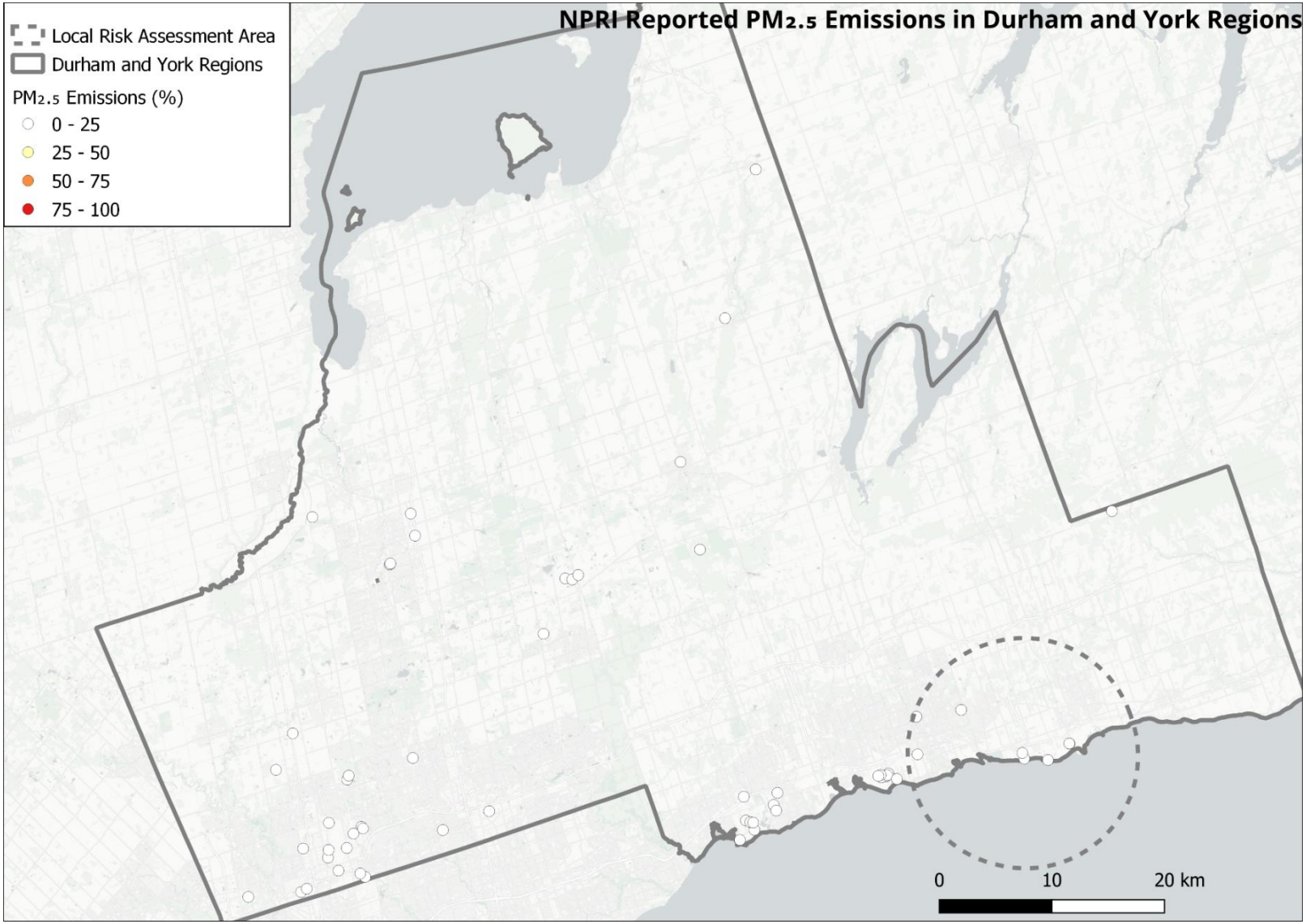
Appendix C.11: NPRI Nitrogen Oxides Emissions Map



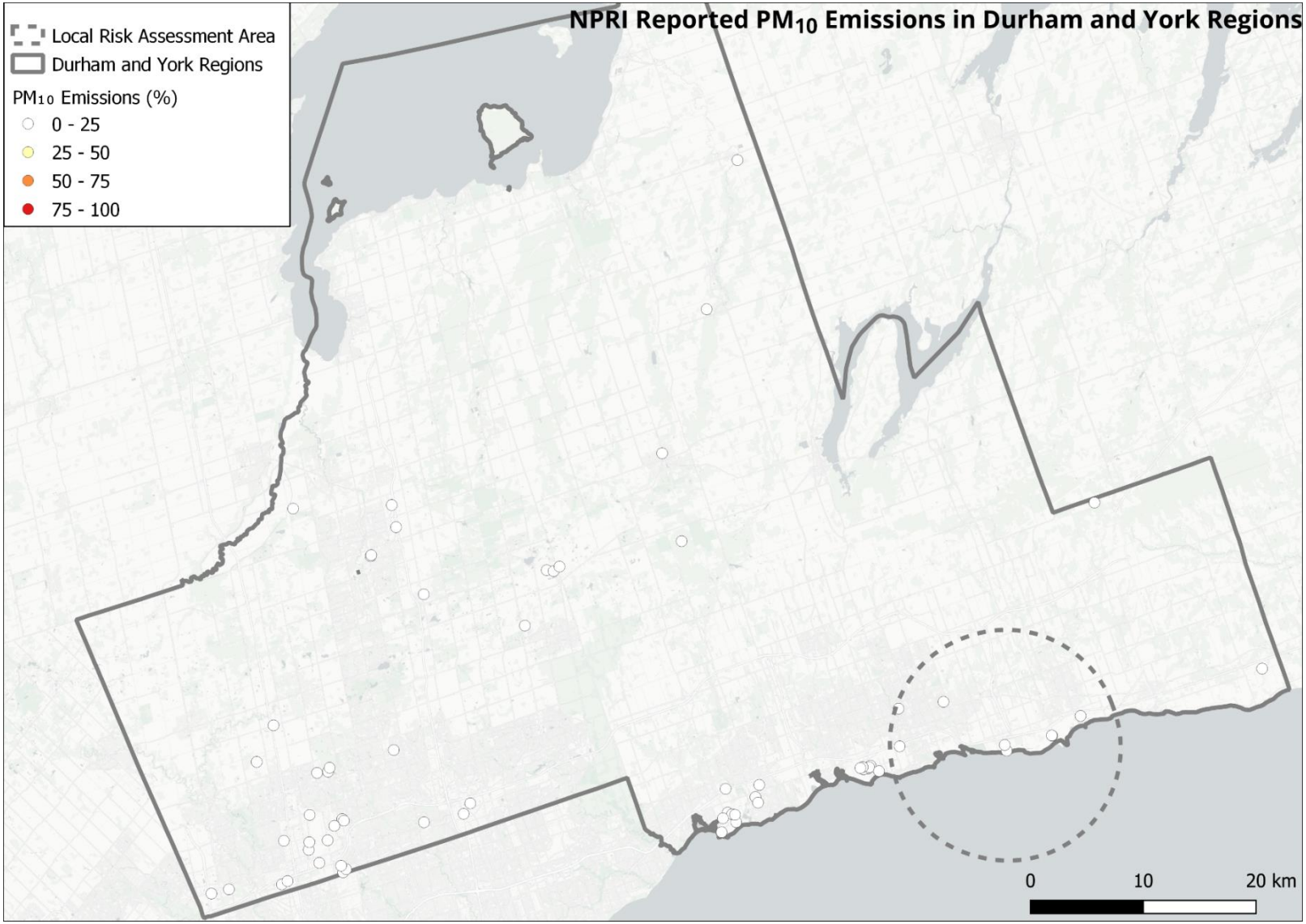
Appendix C.12: NPRI Phosphorus Emissions Map



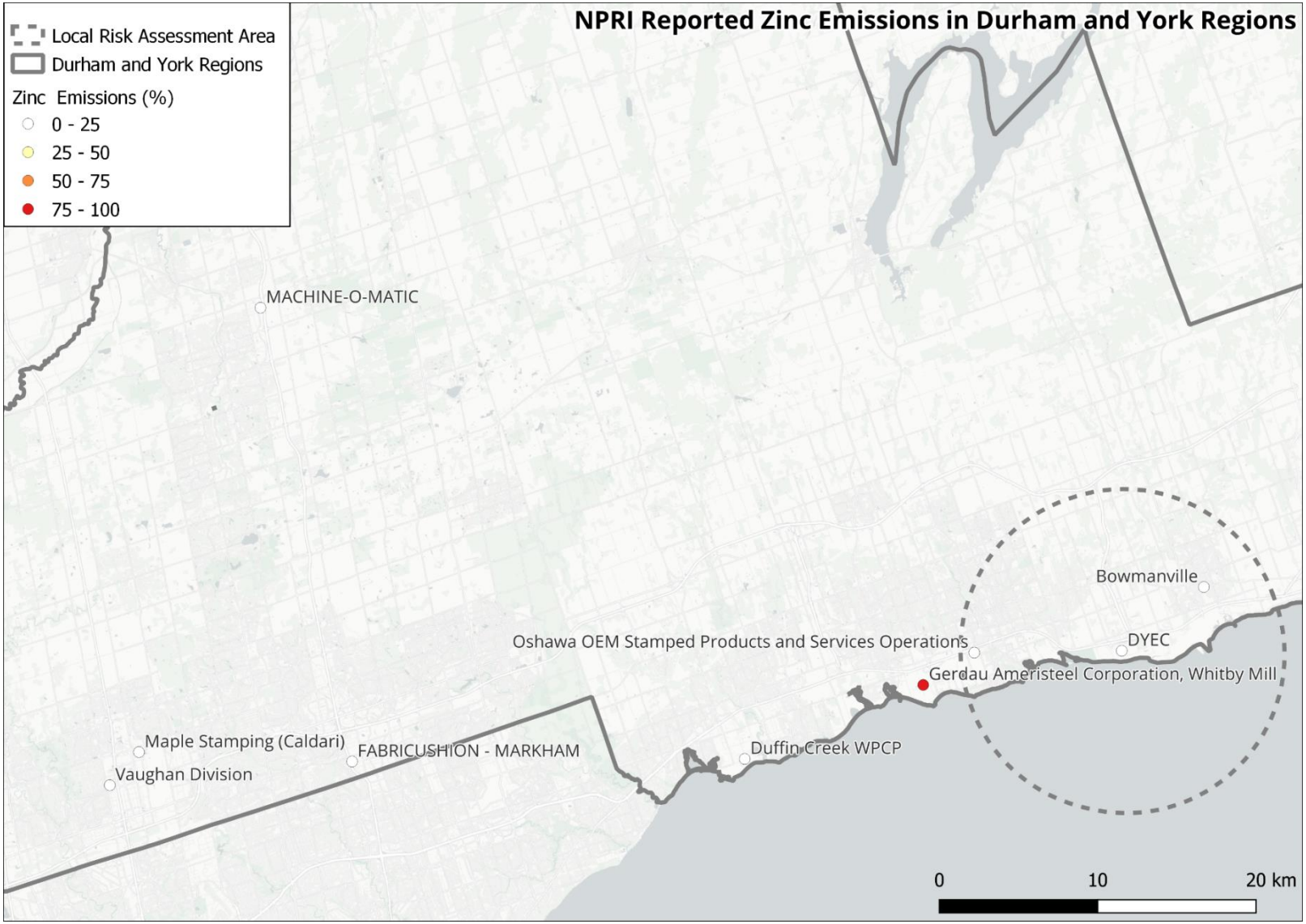
Appendix C.13: NPRI PM2.5 Emissions Map



Appendix C.14: NPRI PM10 Emissions Map



Appendix C.15: NPRI Zinc Emissions Map



DURHAM YORK ENERGY CENTRE

SUMMARY OF ANALYSIS OF AMBIENT AND EMISSION MONITORING TO IDENTIFY LOCAL AIRSHED IMPACTS

Prepared for:

The Regional Municipality of Durham
605 Rossland Road E
Whitby, ON L1N 6A3

The Regional Municipality of York
17250 Yonge Street,
Newmarket, ON L3Y 6Z1

Prepared by:

Matthew Adams, Ph.D.

Summary

This analysis aimed to determine whether the Durham York Energy Centre (DYEC) affects local air quality by releasing pollutants that increase air pollution levels. The study examined data from two ambient air monitoring stations, one located upwind and the other downwind of the DYEC and emission data from the DYEC itself. The pollutants analyzed in this report included fine particulate matter ($PM_{2.5}$), nitrogen oxides (NO_X), sulphur dioxide (SO_2), total suspended particulate (TSP) including metals, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDDs/PCDFs). The study compared the emissions reported by the DYEC to the National Pollutant Release Inventory with all reported emission sources in Durham and York Regions. The results showed that the DYEC's emissions did not significantly contribute to air pollution in the local area, as indicated by the measurements taken at the upwind and downwind monitoring stations. For a more comprehensive report, please review ANALYSIS OF AMBIENT AND EMISSION MONITORING TO IDENTIFY LOCAL AIRSHED IMPACTS, 2023.

Data

The DYEC has a plan in place to monitor and report on the quality of the outdoor air. This plan is required to comply with conditions set out in the Environmental Assessment Notice of Approval and the Environmental Compliance Approval. The monitoring includes both continuous and non-continuous methods. Continuous monitoring devices measure air pollution in real time as air is drawn through the device. Non-continuous methods involve sampling the air for a specific period and then analyzing the sample in a laboratory to determine the amount of pollutants present.

Three monitoring stations were established according to the plan, with one located upwind, one downwind, and one at the property line. For this analysis, we focus on the upwind and downwind sites, which are currently operational. The locations were chosen based on wind patterns, with the upwind station situated west of the DYEC and the downwind station located east of Rundle Road. The Rundle Road station was selected because it is in the dominant downwind direction from the DYEC and within the range where the highest potential air pollution impact is expected. The two monitoring stations and the DYEC stack location are presented in Figure 1.

The DYEC also has an Air Emissions Monitoring Plan in place, which involves continuous monitoring of selected pollutants emitted by the boilers at the facility. The real-time emissions data is made available on the DYEC website.

Overall, these monitoring plans ensure that the DYEC is actively monitoring the air quality in the surrounding area and complying with regulations regarding emissions.

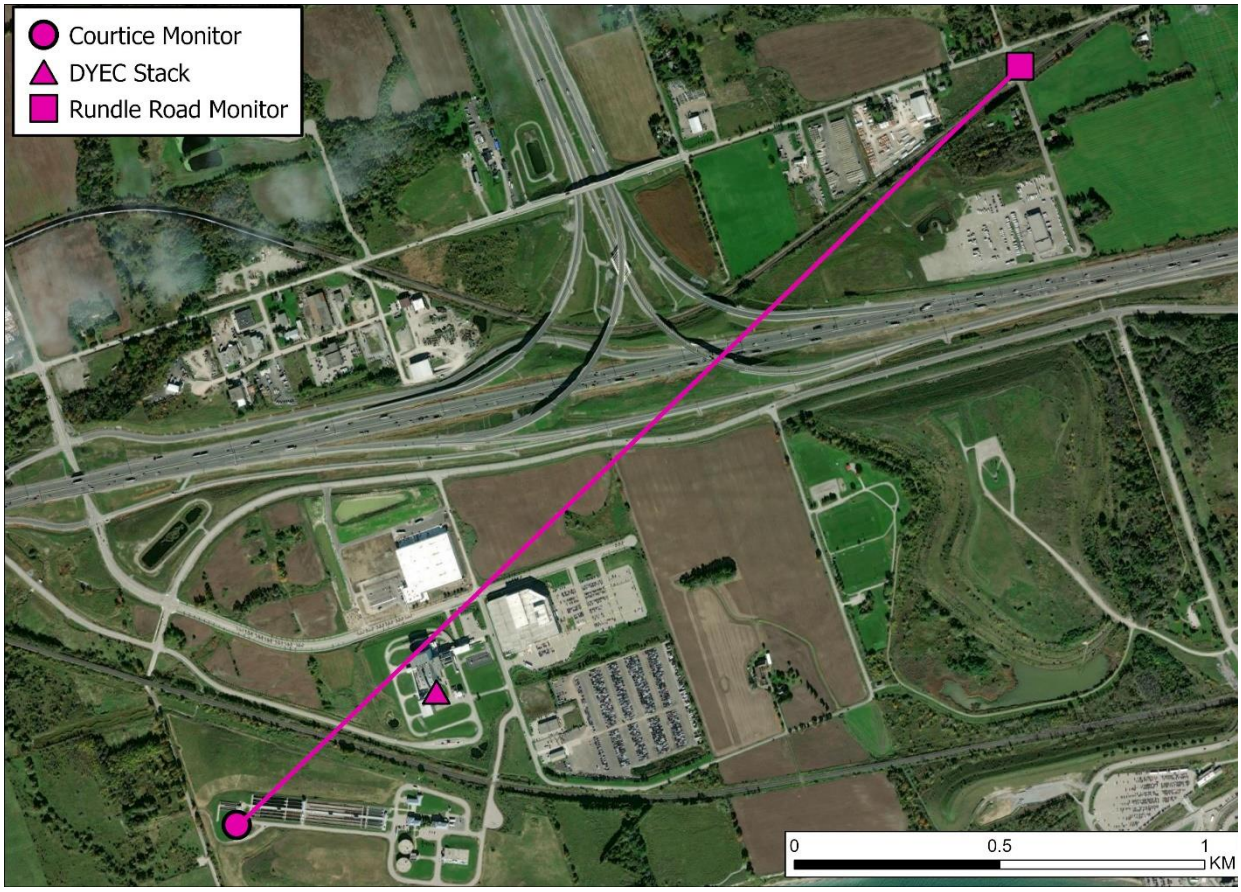


Figure 1: Map of Ambient Air Monitoring Locations Relative to the DYEC

Analysis

Upwind and downwind air monitoring data were compared. If the DYEC impacted local air quality, the downwind air monitor should demonstrate a consistently higher concentration than the upwind air monitor (Figure 2).

There are three approaches used to analyze the data on air pollution. These approaches are based on the availability of data and the air monitoring method.

The first approach is for three groups of pollutants: dioxins and furans (PCDD/PCDF), polycyclic aromatic hydrocarbons (PAHs), and total suspended particulate (TSP) including metals. Pollution in the air was sampled for 24-hour periods to obtain a 24-hour average concentration. This sampling method is known as discrete sampling.

The second approach is for nitrogen oxides (NO_X) and sulphur dioxide (SO_2), where hourly measurements were conducted at the Courtice and Rundle Road locations. In addition, both pollutants were monitored continuously at the DYEC stack.

The third approach also involves ambient monitoring but does not include continuous emissions monitoring. Fine particulate matter was included in this approach.

By using these approaches, we can analyze data on various pollutants present in the air. This information is crucial for identifying potential impacts to air quality.

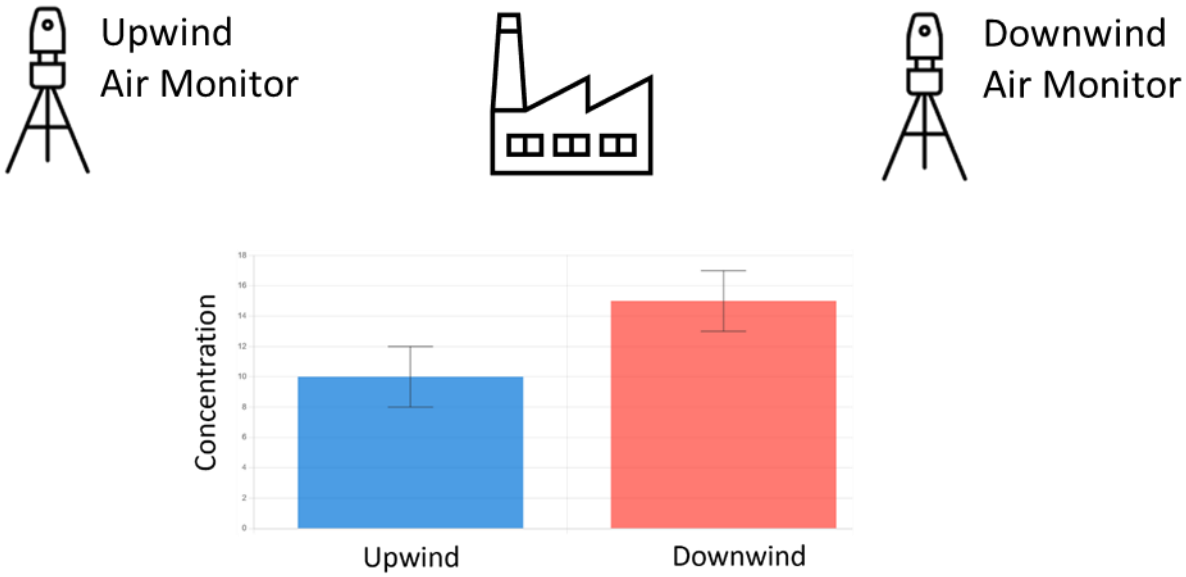


Figure 2: Concept of Upwind and Downwind Air Monitoring Comparison. The graph shown in this figure is not an actual representation of the air quality surrounding the DYEC. Instead, it illustrates what one may expect to see downwind if the DYEC was consistently contributing to the emissions to the ambient air.

Findings

This report aims to assess the impact of the Durham York Energy Centre (DYEC) on local air quality. Analyzing data from two monitoring stations, one upwind and one downwind of the DYEC, helps understand its influence. However, evaluating a single source's impact on air quality is complex due to other natural and human-caused sources in the area. The monitoring stations were strategically placed, with Rundle Road as the downwind location and Courtice as the upwind reference. Examining wind direction and speed data from January 2016 to June 2022 confirmed that Rundle Road was predominantly downwind.

DIOXINS AND FURANS

Exposure to polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzo-furans (PCDFs) has been linked to various health problems, including skin disorders, liver issues, developmental effects on the nervous system, certain cancers, and disruptions to the endocrine, immune, and reproductive

systems. Minimizing exposure to these substances is important due to their potential risks. Dioxins and furans are produced during combustion processes.

Dioxins and furans were sampled using discrete sampling for 94 days. Seventeen compounds were analyzed in each sample, and toxic equivalency (TEQ) values were calculated. TEQ is determined by applying toxic equivalency factors (TEF) to each compound, with the most toxic form of dioxin (2,3,7,8-TCDD) assigned a TEF of 1. The concentrations of each compound are then multiplied by their respective TEFs, and the sum of the 17 compounds can be compared to the Ontario Ministry of the Environment, Conservation and Parks (MECP) Ambient Air Quality Criteria (AAQC) of 0.1 pg TEQ/m^3.

The average TEQ/m^3 values for Rundle Road (0.0157) and Courtice (0.0127) were below the MECP AAQC, indicating that the ambient air contained only 12.7% to 15.7% of the allowable TEQ concentration. Additionally, no significant increases were observed between upwind and downwind conditions, suggesting that the DYEC did not significantly contribute to changes in air pollution levels.

DYEC's annual dioxins and furan emissions are emitted by Canada's largest emitter in less than one day.

The DYEC accounts for a small proportion (2.2%) of regional dioxins and furans emissions reported to the National Pollutant Release Inventory in the Durham and York Regions (Figure 3). Other nearby sources were responsible for a larger share of emissions. Five other locations to the west of the DYEC emit these compounds, with two sites releasing 25-50% of total regional emissions. These sites are likely why Courtice and Rundle Road during westerly winds (Rundle Road downwind) demonstrate their highest concentrations compared to concentrations during the other two wind patterns, which may explain why Courtice and Rundle Road recorded higher concentrations during westerly winds (with Rundle Road being downwind).

The DYEC emits 0.63% of dioxins and furans yearly compared to Canada's forest fires.

The forest fire emission quantity is estimated based on 5.8 ng toxic equivalent of PCDD/F per kg of carbon burned[1] and 2.7 x 10^{10} kg of carbon burned in Canadian forest fires based on historic amounts[2].

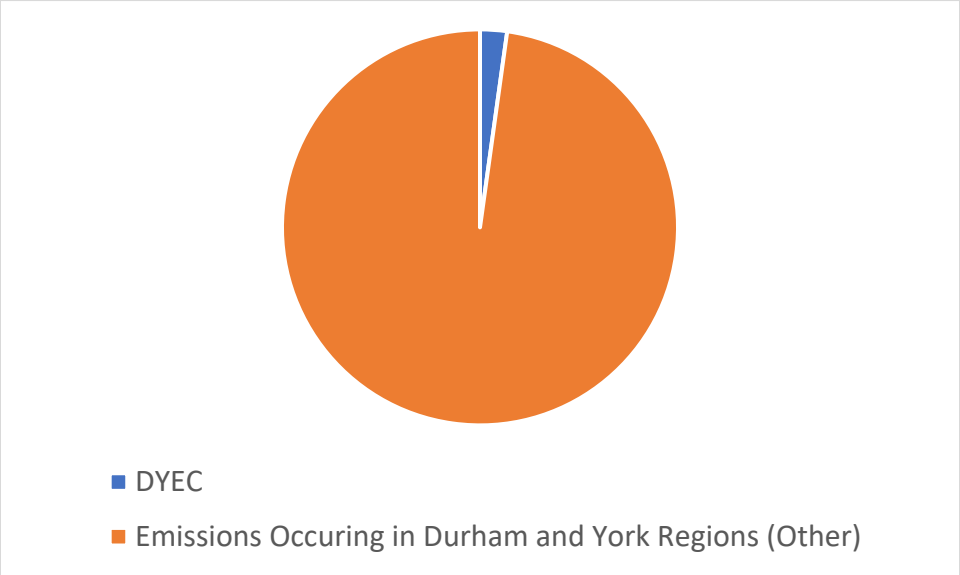


Figure 3: DYEC Proportion of Regional Dioxins and Furans Emissions

Based on the data analysis, it is unlikely that DYEC emissions significantly impact local concentrations of dioxins and furans. The concentrations measured were below the Ontario AAQC, which is positive considering other emission sources in the area.

PAHs

PAHs are chemicals that form when burning coal, oil, gas, wood, and garbage. They can be harmful, cause mutations in DNA, and are known to cause cancer. In the air, PAHs can exist as gases or attached to particles. Although many PAH compounds exist, regulations and reporting usually focus on around 14 to 20. The DYEC's monitoring plan measures 25 PAHs and adds their concentrations to get a total level. Unlike dioxins and furans, no special adjustments are made, and the values are added together evenly. Six PAHs have specific criteria to compare the measured concentrations. One of them, benzo(a)pyrene, is used to represent all PAHs during monitoring. The AAQC for benzo(a)pyrene was set to protect human health based on the cancer-causing effects of PAH exposure.

Benzo(a)pyrene concentrations are below the set limits, with measurements of 0.03 ng/m^3 at Courtice and 0.04 ng/m^3 at Rundle Road. (Ontario Ambient Air Quality Criteria: 0.05 ng/m^3; O. Reg. 419/05 Schedule Upper Risk Thresholds: 5 ng/m^3)

There was no significant increase in benzo(a)pyrene levels at the downwind air monitor compared to the upwind monitors when either Courtice or Rundle Road were downwind. However, concentrations consistently tended to be higher at the Rundle Road monitor regardless of the wind direction. The largest difference between the monitoring stations occurred during crosswind conditions, with Rundle Road showing an increase of +0.0177 ng/m^3. When Rundle Road was

upwind, the increase was +0.0144 ng/m^3, and when it was downwind, the increase was the smallest at +0.0092 ng/m^3. Upwind monitor conditions indicated a background level from 0.0315 ng/m^3 (Courtice Upwind) to 0.0521 ng/m^3 (Rundle Downwind).

Based on the ambient air monitoring data analysis, no evidence suggests that the DYEC impacts the ambient air quality in terms of PAHs.

Total Suspended Particulate

Total suspended particulate (TSP) measures all particles in the air, including larger particles that settle quickly and smaller particles that can travel deeper into the body. TSP is a good indicator of local effects because it represents the mass of particles in a given volume of air. The MECP sets criteria for TSP levels, and the DYEC monitors 29 metals within TSP. The average concentrations at Courtice (25 µg/m^3) and Rundle Road (32 µg/m^3) are below the criteria (60 µg/m^3) see Figure 4, and all metal species analyzed also fall below the criteria at both locations. Rundle Road consistently shows higher TSP concentrations during all wind conditions. Eight metal species are higher at Rundle Road when downwind, except for Iron, Manganese, and Titanium during crosswinds. The DYEC's manganese emissions are minimal compared to regional emissions. Overall, the measured TSP concentrations are below the set standards. The data does not indicate any significant patterns of increased TSP or metal species concentrations due to the DYEC emissions. However, the higher concentrations at Rundle Road during all wind conditions suggest that a local source may contribute to TSP pollution.

In one day, brake dust from passenger vehicles emits more Zinc, Manganese, and Copper along the 401 in Durham than the DYEC does in a year.

Passenger vehicle counts were obtained from the MTO iCorridor tool (https://icorridor-mto-on-ca.hub.arcgis.com/), which indicated 91,500 daily passenger vehicles along the 401 through Durham Region on the 401 (58.6 km in length) for a total of 5,361,900 km driven per day. Particulate matter from brake wear was estimated from the average of many studies in a review paper, which was a rate of 5.7 mg per km driven[3]. The daily emissions were 30.8 kg of particulate matter multiplied by trace metal rates per kilogram of particulate matter[3]. Each rate was provided as a range, and the 20th percentile between those ranges was used.

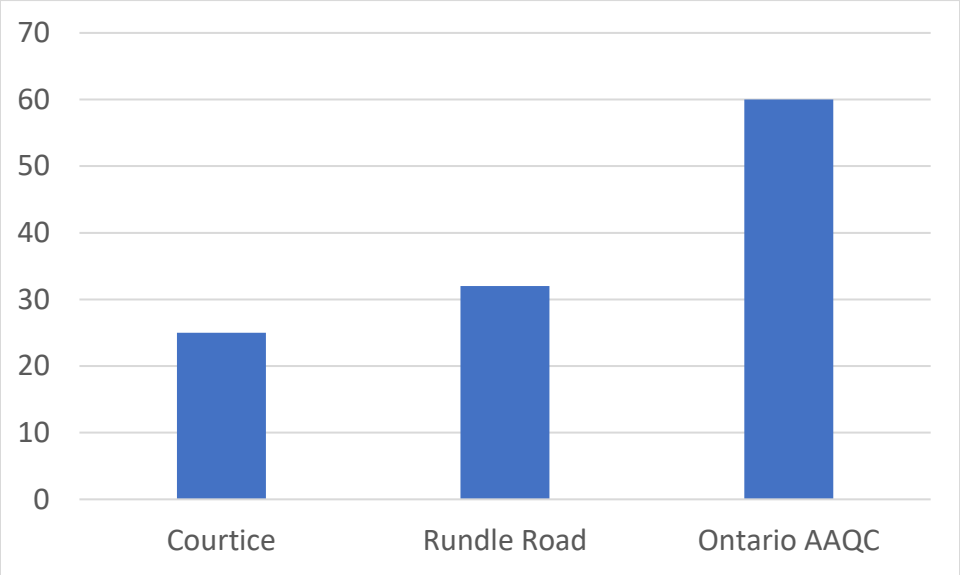


Figure 4: TSP Concentrations (µg/m^3) Compared to Ontario Ambient Air Quality Criteria

Nitrogen Oxides

Two measures were used to monitor nitrogen oxides (NO_X): ambient air monitoring and continuous emission monitoring. The long-term concentrations of NO_X at Rundle Road (7.5 ppb) and Courtice (7.1 ppb) were similar. When the DYEC boilers were not operating, the concentration difference between the two monitors was 2.6 ppb indicating background differences. The analysis also examined the relationship between emission concentrations and the difference in downwind concentrations at Rundle Road compared to Courtice. However, no relationship was found between emissions and the difference in ambient air pollution concentrations. The analysis suggests that the DYEC does not significantly impact the ambient air pollution concentrations in the area. Furthermore, the mapping of emission sources from Canada's National Pollutant Release Inventory (NPRI) indicates the presence of other local sources of NO_X.

Annual NO_X emissions of the DYEC are equivalent to 15 days of vehicle emissions along the 401 in the Durham Region.

Truck and passenger vehicle counts were obtained from the MTO iCooridor tool (https://icorridor-mto-on-ca.hub.arcgis.com/), which indicated 18,000 daily trucks and 91,500 daily passenger vehicles along the 401 through Durham Region on the 401 (58.6 km in length). The number of vehicles was multiplied by emission factors from a near-road air pollution study conducted in Canada[4], which resulted in 7,377 kg of NO_X emitted daily (15 days = 111 tonnes of NO_X emitted).

Sulphur Dioxide

Similar to NO_X, the analysis comparing measured emissions with differences in ambient measurements did not show any relationship. However, we observed that SO_2 concentrations are

significantly higher at the Courtice monitor when it is upwind of the Rundle Road air monitor. This suggests the presence of a nearby emission source. Furthermore, Courtice concentrations were higher than Rundle Road when the DYEC boilers were not operating. If there is a local source of SO_2 pollution, the concentrations are likely diluted as they disperse over the short distance to the Rundle Road air monitor.

Based on the analysis, no evidence suggests that the emissions from the DYEC impact local SO_2 concentrations. However, the findings do indicate the existence of a local source near the Courtice air monitor.

Particulate Matter

The DYEC reports 0.1% of industrial emissions for $PM_{2.5}$ in Durham and York Regions based on the NPRI. The concentrations measured at the two monitoring stations did not differ meaningfully. Both monitoring locations reported the same 8.0 $\mu g/m^3$ concentration during Rundle Road downwind conditions. NPRI emission mapping of industrial sources demonstrates many sources, with no single source representing more than 25% of emissions. The analysis does not suggest any impact from the DYEC on ambient $PM_{2.5}$ concentrations.

Conclusion

The analysis of ambient air pollution data for PCDD/PCDFs, PAHs, TSP, NO_X, SO_2 and $PM_{2.5}$ indicates that the DYEC is not impacting the local airshed. The region has multiple known stressors, such as those high emitters identified in the NPRI data. After reviewing the ambient monitoring data, one primary concern arose, which included elevated concentrations of benzo(a)pyrene that have included individual samples exceeding Ontario AAQC during the period evaluated. These elevated concentrations do not seem influenced by DYEC emission, and while they may be elevated at Rundle Road, it is not possible to infer the expected concentrations at residential locations within the region. Future exceedances should be individually evaluated to examine the relative wind directions during the exceedance and identify baseline conditions using the upwind monitor; however, the analysis indicates that local and regional sources influence the ambient air monitors, both Courtice and Rundle Road. The dual monitoring program effectively compares upwind and downwind concentrations and should be maintained to evaluate future conditions.

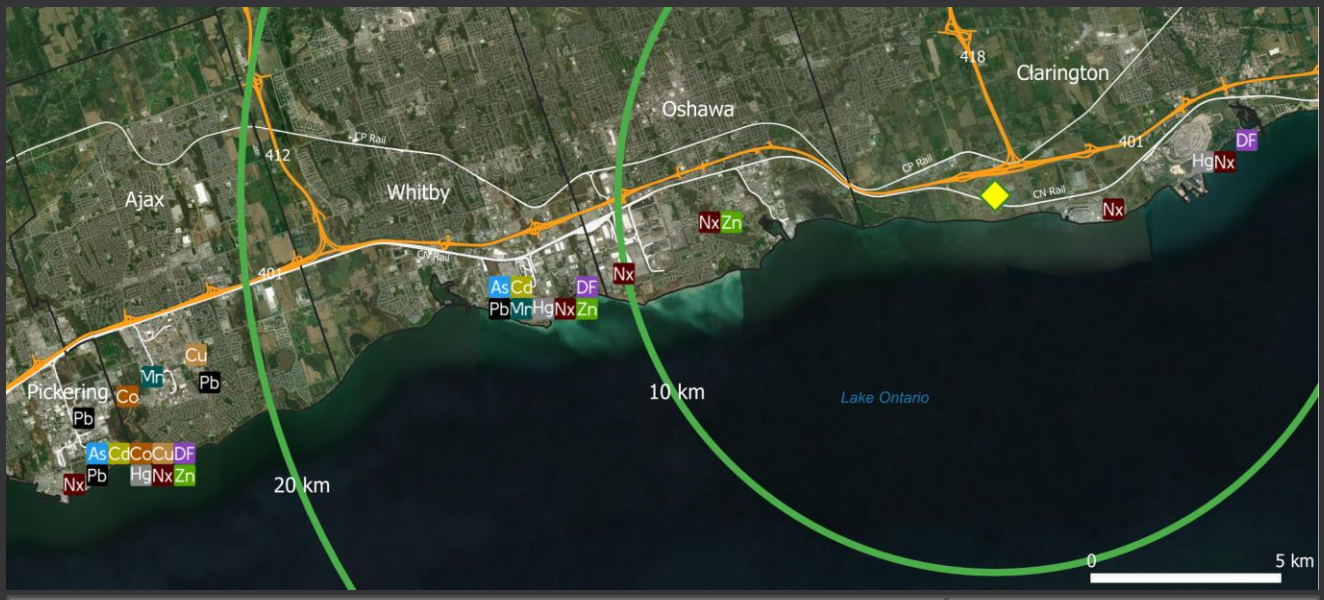
Overall, it is concluded that the DYEC's Air Emissions Monitoring Plan effectively controls emissions so that it does not significantly contribute to air pollution in the local airshed.

References

1. Gullett, B., Touati, A., & Oudejans, L. (2008). PCDD/F and aromatic emissions from simulated forest and grassland fires. *Atmospheric Environment*, *42*(34), 7997-8006.
2. Amiro, B. D., Todd, J. B., Wotton, B. M., Logan, K. A., Flannigan, M. D., Stocks, B. J., ... & Hirsch, K. G. (2001). Direct carbon emissions from Canadian forest fires, 1959-1999. *Canadian Journal of Forest Research*, *31*(3), 512-525.
3. Grigoratos, T., & Martini, G. (2015). Brake wear particle emissions: a review. *Environmental Science and Pollution Research*, *22*, 2491-2504.
4. Evans, G. (2019). *Near-road air pollution pilot study final report*. https://hdl.handle.net/1807/96917

Examining Air Pollution Sources in the Proximity of Durham York Energy Centre

The National Pollutant Release Inventory contains emission values for 320 pollutants from over 7,000 facilities. In 2021, the DYEC reported air emissions for ten pollutants to the NPRI. Below you will find a map highlighting the locations reporting to the NPRI who emit any of those ten pollutants within 30 km of the DYEC.



NPRI Emissions

- As Arsenic
- Cd Cadmium
- Co Cobalt
- Cu Copper
- DF Dioxins & Furans
- Hg Mercury
- Mn Manganese
- Nx Nitrogen oxides
- Pb Lead
- Zn Zinc

DYEC Location

*Areas excluded in the map did not have NPRI emissions.

Additional Sources of Air Pollution

Non-point sources: Non-point source pollution adds to local air pollution along with point sources. It includes contaminants from activities such as construction, vehicles, agriculture, and residential sources. Estimating and controlling non-point sources is challenging due to their dispersed nature, requiring collaboration among different sectors and government levels.

Highways - In the region, the major highways and roads contribute nitrogen oxides from exhaust, particulate matter from brake and tire wear including copper, lead, zinc, cadmium and manganese. These pollutants will impact ambient air quality measurements near the DYEC. For example, the 401 through Durham has more than 130,000 vehicles daily adding pollution to the region.

Industry – Within 20km of the DYEC is a steel mill that in 2022, had the highest air emissions of dioxins and furans in Ontario, one-hundred times greater than the DYEC. Within 10km of the DYEC is a cement plant that was the 8th highest air emitter of dioxins and furans in Ontario (2022), producing eight times the emissions of the DYEC.

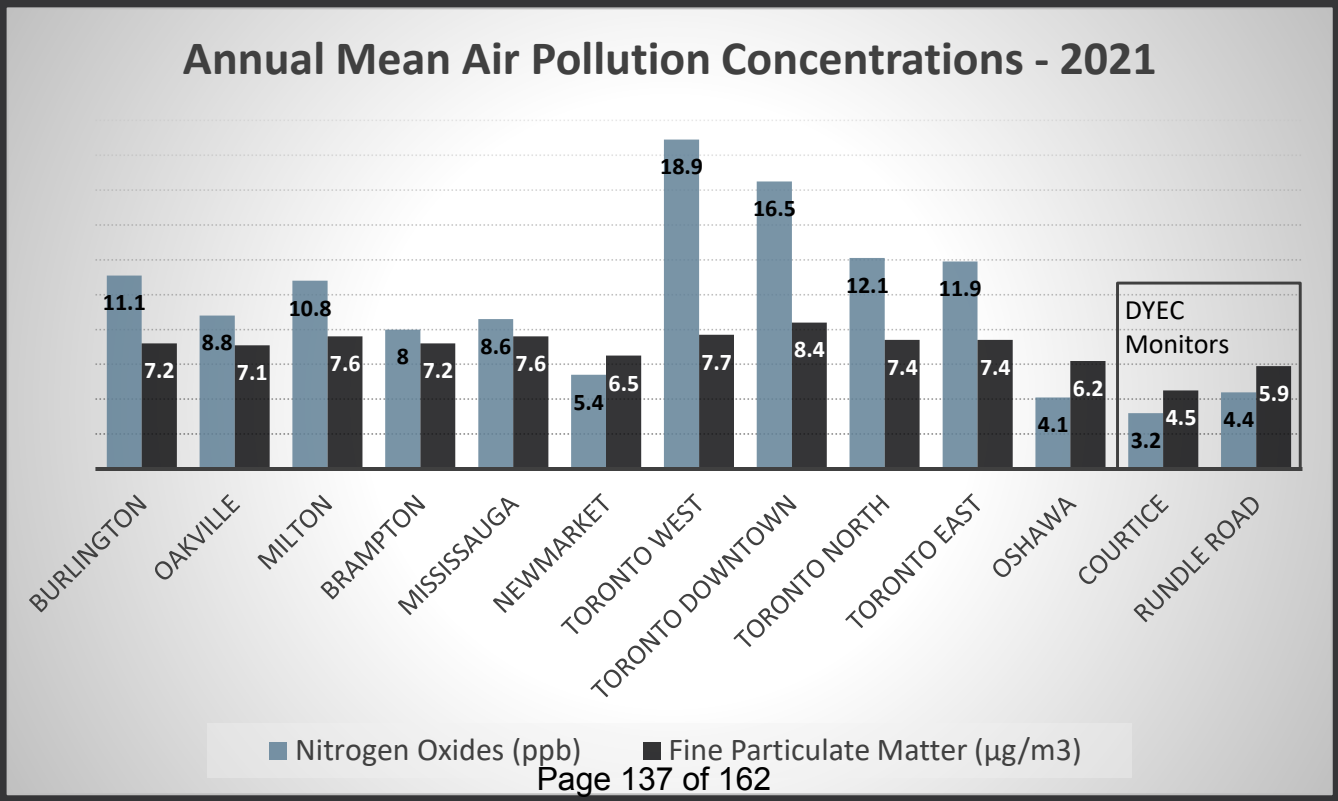
Transboundary Air Pollution

Transboundary air pollution originates in one region or country and crosses international boundaries, affecting neighbouring countries or regions' air quality and environmental conditions. This can occur through the long-range transport of pollutants, such as fine particulate matter, sulphur dioxide, and nitrogen oxide, which can be carried over long distances by wind and weather patterns. As a result, transboundary air pollution can negatively impact human health, natural ecosystems, and economic activities, making it a significant global environmental issue that requires international cooperation and coordinated efforts to mitigate and control its effects.

Durham and York Regions are impacted by nitrogen oxides emitted from coal fire power plants in the Ohio Valley that travel toward Ontario. Additionally, transboundary air pollution contributions account for between 25% and 60% of fine particulate matter concentrations in the region (Air Quality in Ontario 2020 Report).

Ambient Air Quality Regional Comparison

Compared to air pollution concentrations measured by the Ontario Ministry of Environment, Conservation and Parks' air monitors in the GTA, both nitrogen oxides (NO_X) and fine particulate matter ($PM_{2.5}$) near the DYEC (Courtice and Rundle Road) are low compared to regional concentrations.



Prepared by Matthew Adams, Ph.D.

Analysis of Ambient Air Exceedances in the Proximity of Durham York Energy Centre

Air quality at the Durham York Energy Center (DYEC) is monitored at two locations: Courtice (upwind) and Rundle Road (downwind). Various pollutants are measured using continuous monitoring and 24-hour average samples. The concentrations of these pollutants were compared to the Ambient Air Quality Criteria (AAQC) set by The Ontario Ministry of the Environment, Conservation and Parks between 2016 and 2022.

Total Suspended Particulate (TSP)

A 24-hour TSP sample is collected at the Rundle Road and Courtice air monitoring stations every six days. These samples are then analyzed in the laboratory to determine the total amount of particulate matter and its various components, including metals.

The AAQC (24-hour) for TSP is set at 120 µg/m^3, and it was exceeded on seven occasions between 2016 and 2022. However, only three exceedances occurred when the monitoring station was downwind of the DYEC. During these exceedances, DYEC's real-time air emissions data and boiler parameters were all within normal operational range. On one of the exceedance days (May 2, 2018), the boiler was offline for 14 hours. Based on the evidence, it is not likely that the DYEC was the cause of these exceedances.

The components of TSP, including Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Strontium, Tin, Titanium, Uranium, Vanadium, and Zinc, did not exceed their respective ambient air quality criteria between 2016 and 2022.

Polycyclic Aromatic Hydrocarbons (PAHs)

Every 12 days, a 24-hour sample of PAHs is obtained at both the Rundle Road and Courtice air monitoring stations. Two PAHs are included in the Ontario AAQC, benzo(a)pyrene and naphthalene (no exceedances). Benzo(a)pyrene exceeded the AAQC at Courtice (12.5% of samples) and at Rundle Road (22.4% of samples); however, of the 43 exceedances at Rundle Road, during 21 of those, Courtice was also above the AAQC. In addition, more extensive analysis in the "ANALYSIS OF AMBIENT AND EMISSION MONITORING TO IDENTIFY LOCAL AIRSHED IMPACTS" suggests other sources, including a generally high benzo(a)pyrene background, are responsible for the locally high concentrations.

Dioxins and Furans

Every 24 days, a 24-hour sample of dioxins and furans is obtained at each Rundle Road and Courtice air monitoring station. One AAQC is included for dioxins and furans based on the cumulative toxicity of multiple pollutants. Each pollutant is multiplied by a toxicity equivalency factor, which adjusts concentrations based on different levels of associated toxicity. One exceedance of the AAQC has occurred, which happened at the Courtice Monitor on May 26, 2018. The exceedance occurred with Courtice monitor showing an elevated concentration; however, this station was upwind of the DYEC, and the Rundle Road (downwind) concentrations were lower than Courtice. The evidence does not suggest a contribution from the DYEC to this event; however, it may suggest a separate local source impacting air quality near the DYEC.

Nitrogen Dioxide (NO_2)

Air pollution measurements are made continuously at both Courtice and Rundle Road air monitors. Nitrogen dioxide did not exceed the 24-hour Air Quality Criteria (100 ppb) or the 1-hour criteria (200 ppb) at either air monitoring station.

Sulphur Dioxide (SO_2)

The Courtice air monitor identified 151 hourly exceedances; however, only 25 occurred when Courtice was downwind from the DYEC. Far fewer exceedances occurred at Rundle Road (21), which never occurred when Rundle Road was downwind of the DYEC.

Fine Particulate Matter

Few 24-hour exceedances occurred at either Courtice (0.5% of days) or Rundle Road (0.7% of days); however, less than one-quarter of the Rundle Road exceedances occurred when it was downwind of the DYEC, and the Courtice exceedances never occurred when it was downwind of the DYEC. The few exceedances and that they did not generally occur during downwind conditions suggest no impact from the DYEC.

Prepared by Matthew Adams, Ph.D.

If this information is required in an accessible format, please contact 1-800-372-1102 ext. 3540.

The Regional Municipality of Durham Report

To:	Works Committee
From:	Commissioner of Works
Report:	#2024-WR-6
Date:	May 8, 2024

Subject:

Sole Source Agreement with Circular Materials for Collection, Haulage, Processing and Marketing of Blue Box Recyclables Collected at the Regional Municipality of Durham Waste Management Facilities

Recommendation:

That the Works Committee recommends to Regional Council:

A) That staff award a sole source agreement to Circular Materials for the collection and management of Blue Box recyclables at Regional Municipality of Durham Waste Management Facilities from July 1, 2024, to December 31, 2025, with three optional one-year extension periods. The estimated revenue to the Regional Municipality of Durham for 2024 is $212,820 (or $425,280 annually), totalling $1.9 million over the contract term, including optional extensions; and

B) That the Commissioner of Finance be authorized to execute the necessary documents related to this sole source agreement.

Report:

1. Purpose

1.1 The purpose of this report is to seek Regional Municipality of Durham (Region) Council approval to negotiate and award a sole source agreement with Circular Materials (CM) for a term effective July 1, 2024, to December 31, 2025, with three optional one-year extension periods. The agreement will ensure continuous funding and environmentally responsible collection and recycling of blue box materials collected at Regional Waste Management Facilities (WMFs).

2. Background

2.1 The Region accepts blue box recyclables from Durham residents at three Waste Management Facilities in the City of Oshawa and the Townships of Scugog and Brock. The Region also provides curbside blue box collection services in the eight lower-tier municipalities.

2.2 In June 2021, the Province of Ontario released Regulation 391/21 Blue Box under the Resource Recovery and Circular Economy Act, 2016 (the Regulation), which shifts the financial and operational responsibility for recycling from municipalities to the organizations that produce packaging, paper, and packaging-like products (Producers), with the Regulation taking full effect on January 1, 2026.

2.3 On July 1, 2024, the Region will transition its curbside Blue Box collection program to Producers. During the transition period, from July 1, 2024, to December 31, 2025, Producers must maintain the same number of collection sites as the former Blue Box program.

2.4 Circular Materials (CM), the administrator of the new Blue Box program is a Producer Responsibility Organization (PRO) contracted by Producers to oversee Blue Box collection, management, promotion and education services for eligible sources under the Regulation.

2.5 In 2023, the Region diverted approximately 530 tonnes of blue box recyclables at Regional WMFs, which accounts for approximately seven per cent of all materials diverted from disposal at the WMFs.

3. Previous Reports and Decisions

3.1 Regional Council at its meeting of June 14, 2017, received Committee of the Whole Report #2017-COW-178, an update on the Regional Municipality of Durham's Participation and Opportunities to Influence the Implementation of the Waste Diversion Transition Act, 2016, the Resource Recovery and Circular Economy Act, 2016, and the Ministry of the Environment and Climate Change's Strategy for a Waste-Free Ontario: Building the Circular Economy.

3.2 Regional Council at its meeting of January 30, 2019, approved Committee of the Whole Report #2019-COW-3, "2019 Solid Waste Management Servicing and Financing Study."

3.3 Regional Council at its meeting of January 29, 2020, approved Committee of the Whole Report #2020-COW-2, "Solid Waste Management: 2020 Strategic Issues and Financial Forecast."

3.4 Regional Council at its meeting of April 29, 2020, endorsed Report #2020-COW-15, "Council Resolution - Blue Box Transition Date", a resolution on the transition to full Extender Producer Responsibility, and authorized staff to forward a copy of the report to the Minister of the Environment Conservation and Parks and Association of Municipalities of Ontario.

3.5 Regional Council at its meeting of April 24, 2024, endorsed Report #2024-WR-3, "Sole Source of Promotion and Education Services to be Provided by The Regional Municipality of Durham for Circular Materials Ontario for the Blue Box Program under Extended Producer Responsibility", authorizing the Region to enter into an agreement with Circular Materials related to ongoing promotion and education efforts.

4. General Market Analysis

4.1 Currently, there are three registered Blue Box Producer Responsibility Organizations in Ontario, including Circular Materials (CM), Ryse Solutions Ontario Inc. and H2 Compliance Canada Inc., which have entered into agreements with Producers to operate the new Blue Box program on their behalf. CM, Ryse Solutions, and H2 Compliance Canada Inc. have a System Access Agreement (SAA) in place to appoint CM as the administrator of the new Blue Box program.

4.2 As the administrator of the new Blue Box program, CM has appointed Reverse Logistics Group (RLG) as the Operator. As the Operator, RLG will procure and manage collection and receiving facilities for Blue Box materials, including curbside and depot collection.

4.3 RLG will be responsible for the collection, transfer, processing, material marketing, education, and all associated equipment required to continue blue box collection at the WMFs.

4.4 The contract is for an initial term of 18 months, coinciding with the transition period of the province moving to the extended producer responsibility program. There is an option to extend the agreement by three, one-year periods by mutual agreement.

4.5 The proposed agreement with CM includes a provision for RLG to pay the Region to provide waste education and promotion services related to recycling at Waste Management Facilities on its behalf.

5. Financial implications

5.1 In 2023, Producer funding accounted for approximately 55 per cent of WMF operating costs reported to the Resource Productivity and Recovery Authority (RPRA), as outlined in Table 1 below. The program operated at a net cost of $160,949 to the Region.

Table 1: 2023 Depot Blue Box Program Costs

Blue Box Depot Cost/(Revenue)	Total
Depot Operating Cost[1]	$363,994
RPRA WMF funding received	($203,045)
2023 WMF Net Cost	$160,949

[1] – Excludes promotion and education costs.

5.2 The Region will receive funding from RPRA for January 1 to June 30, 2024. The program will transition to Producer responsibility on July 1, 2024.

5.3 CM will be the only administrator of the new Blue Box program for Durham Region. As such any agreement with Producers must be negotiated with CM. Durham Purchasing By-law 16-2020, Section 7.2 permits entering sole source contracting in circumstances where there is no competition.

5.4 Under the proposed agreement with CM, the Region will receive approximately $212,820 net revenue for July 1, to December 31, 2024, as outlined in Table 2 below:

Table 2: 2024 Circular Materials Depot Blue Box Program Funding

2024 Estimated Circular Materials Funding	Total
Depot operations	($85,260)
WMF Promotion and Education	($129,300)
Non-eligible (non-residential) source deduction	$1,740
Total	**($212,820)**

5.5 Future payments from CM will be subject to annual Consumer Price Index (CPI) and monthly Diesel Fuel Index adjustments (excluding WMF promotion and education funding, which is tied to the number of households), as well as deductions based on tonnes of material collected from non-eligible (non-residential) sources.

5.6 In 2025, the Region's estimated annual gross revenue from Circular Materials is $425,280, as per Table 3 below. The funding to be received is anticipated to offset the program's operating costs.

Table 3: 2025 Estimated Circular Materials Depot Blue Box Program Funding

2025 Estimated Circular Materials Funding	Total
Depot operations funding	($170,520)
Promotion and Education funding	($258,600)
Less 2025 non-eligible source deduction	$3,840
Total	($425,280)

6. Relationship to Strategic Plan

6.1 This report aligns with/addresses the following strategic goals and priorities in the Durham Region Strategic Plan:

a. Goal 1: Environmental Sustainability

1.2 Increase waste reduction and resource recovery

b. Goal 5.1 Optimize resources and partnerships to deliver exceptional quality services and value.

7. Conclusion

7.1 It is recommended that Regional Council authorize staff to negotiate and execute a sole source contract with Circular Materials for the collection and management of Blue Box recyclables at the Regional Waste Management facilities, from July 1, 2024, to December 31, 2025. The total revenue to the Regional Municipality of Durham is estimated at up to $1.9 million over the contract term if extension terms are applied. This will ensure service continuity for the Regional Municipality of Durham's residents, continuous program funding, and the proper collection and

management of blue box materials at the Regional Municipality of Durham's Waste Management Facilities.

7.2 Regional staff will continue discussions with Circular Materials to determine if Circular Materials will choose to maintain depot collection services after the Regulation takes full effect on January 1, 2026.

7.3 This report has been reviewed by the Finance Department and the Commissioner of Finance concurs with the financial recommendations.

7.4 For additional information, contact: Andrew Evans, Director, Waste Management Services, at 905-668-7711, extension 4102.

Respectfully submitted,

Original signed by:

Ramesh Jagannathan, MBA, M.Eng., P.Eng., PTOE
Commissioner of Works

Recommended for Presentation to Committee

Original signed by:

Elaine Baxter-Trahair
Chief Administrative Officer

Sent by Email

April 29, 2024

Alexander Harras
Regional Clerk, Director of Legislative Services
The Regional Municipality of Durham
605 Rossland Road East
Whitby, ON L1N 6A3
clerks@durham.ca

Subject: Request for Traffic Signals at Brock Road and Palmer's Sawmill Road

---

The Council of The Corporation of the City of Pickering considered the above matter at a Meeting held on April 22, 2024 and adopted the following resolution:

WHEREAS the intersection of Brock Road and Palmer's Sawmill Road is currently a very busy intersection that is experiencing increasing usage and traffic conflicts - vehicle accidents and near accidents;

And Whereas there are particularly significant delays and difficulties making a safe left turn from Palmer's Sawmill Road to northbound Brock Road and a left turn from northbound Brock Road to westbound Palmer's Sawmill Road;

And Whereas there are 193 units constructed, 334 units under construction to be occupied in the next year, and 589 units approved, but yet to be constructed near Palmer's Sawmill Road that will result in further significant traffic volume increases at this intersection;

And Whereas the Seaton Centre Plaza located at the southwest corner of the intersection is a significant commercial and retail centre that is very busy and has planned further development. This plaza also has significant truck traffic;

And Whereas Brock Road is a heavy truck route and main arterial road connecting highways 407 and 401. It is also an essential road to the Township of Uxbridge and north Pickering;

And Whereas this intersection is planned by the Region of Durham to have full traffic signals installed with the development of the properties on the east side of Brock Road, however this development is not currently underway resulting in unexpected delay in the signalization;

Pickering Civic Complex | One The Esplanade | Pickering, Ontario L1V 6K7
T. 905.420.4611 | F. 905.420.9685 | Toll Free 1.866.683.2760 | clerks@pickering.ca | pickering.ca

Now therefore be it resolved that the Council of The Corporation of the City of Pickering requests:

1. That the Region of Durham undertake further review and warrant studies on signalizing the intersection as early as possible and if not fiscally included for 2024 budget then be included in the 2025 Region of Durham budget for consideration;

2. That the Brock Road median that ends well short of the Palmer's Sawmill Road intersection be extended to the Palmer's Sawmill Road intersection and be clearly marked that u-turns are not permitted; and,

3. That this resolution be sent to the Region of Durham and be copied to the Commissioner of Works, Chair of the Works Committee, and the Regional Chair.

Should you require further information, please do not hesitate to contact the undersigned at 905.420.4660, extension 2019.

Yours truly,

Susan Cassel
City Clerk

SC:am

Copy: John Henry, Regional Chair, Region of Durham
John Presta, Commissioner of Works, Region of Durham

Chief Administrative Officer

The Regional Municipality of Durham

Office of the Regional Chair

605 Rossland Rd. E.
Level 5
PO Box 623
Whitby, ON L1N 6A3
Canada

905-668-7711
1-800-372-1102
john.henry@durham.ca

durham.ca

John Henry
Regional Chair and CEO

May 1, 2024

Works Department
Regional Municipality of Durham
605 Rossland Road East
Whitby, Ontario L1N 6A3

Dear Friends:

Re: "National Public Works Week"

I am pleased to present to you the enclosed certificate proclaiming May 19 - 25, 2024 as "National Public Works Week" in Durham Region.

Kindest personal regards,

John Henry
Regional Chair and CEO

THE REGIONAL MUNICIPALITY OF DURHAM

Certificate of Proclamation

presented to

Works Department
Regional Municipality of Durham

On behalf of the Council of
The Regional Municipality of Durham,
it is my pleasure to proclaim

May 19 - 25, 2024

as

“National Public Works Week”

in Durham Region

Province of Ontario
OFFICE OF THE REGIONAL CHAIR
The Regional Municipality of Durham

John Henry
Regional Chair and CEO

If this information is required in an accessible format, please contact 1-800-372-1102 ext. 3540.

The Regional Municipality of Durham Report

To:	Works Committee
From:	Commissioner of Works
Report:	#2024-W-15
Date:	May 8, 2024

Subject:

Tender Award and Additional Financing for Regional Municipality of Durham Contract #D2023-55 for the Blackstock Well #7 Upgrades in the Township of Scugog (Blackstock)

Recommendations:

That the Works Committee recommends to Regional Council:

A) That the lowest compliant bid of W.A. Stephenson Mechanical Contractors Limited, in the amount of $1,591,150, be awarded for Regional Municipality of Durham Contract #D2023-55 for the Blackstock Well #7 Upgrades in the Township of Scugog (Blackstock) for a total project cost of $3,350,000;

B) That the previously approved project budget of $2,750,000 for Regional Municipality of Durham Contract #D2023-55 be increased by $600,000 to a revised total project budget of $3,350,000; and

C) That the additional financing of $600,000 be provided from the following sources:

Previously Approved Financing

Water Supply Capital Budget

Blackstock Well #7 Upgrades, Project ID# D1838

Water Asset Management Reserve Fund	$100,000
User Revenue	2,650,000

Total Previously Approved Financing	2,750,000
Additional Financing	
Item #123: Watermain on Bickle Drive and Roselawn Avenue, Oshawa (Sun Valley) (Project ID# O2305)	
User Revenue	600,000
Total Additional Financing	600,000
Total Revised Project Financing	**$3,350,000**

Report:

1. Purpose

1.1 The purpose of this report is to obtain approval for additional financing and to award Regional Municipality of Durham (Durham) Contract #D2023-55 for the Blackstock Well #7 Upgrades in the Township of Scugog (Blackstock).

2. Project Background

2.1 The Blackstock Drinking Water System provides potable water to consumers in the Blackstock area. Blackstock has two municipal wells, numbers 7 and 8. Blackstock is a Class Two Distribution and Supply System with an approved combined capacity of 994 cubic metres per day (m^3/d).

2.2 The upgrade works required to be completed at Blackstock Well #7 include rehabilitation work, installation of a new pump, upgrading of equipment, Supervisory and Data Acquisition Control Program (SCADA) integration, electrical upgrades, and the replacement of the header and associated piping. The Blackstock Well #7 upgrade project builds redundancy into the Blackstock water supply system by ensuring that there are two functioning wells operating within the system. Updates to major system components incorporated into this project will make the water supply system more resilient and extend the overall life cycle of the well.

3. Tender Information

3.1 Tenders were received for Regional Contract #D2023-55 for the Blackstock Well #7 Upgrades in the Township of Scugog (Blackstock) on March 28, 2024, with five compliant bids. The tenders received are as follows:

Bidder	Total Tender Amount (excluding applicable taxes)
W.A. Stephenson Mechanical Contractors Limited	$ 1,591,150
BGL Contractors Corp	$ 1,594,400
Peak Construction Group Ltd.	$ 1,641,900
Strong Bros. General Contracting Ltd.	$ 1,989,333
Talon Industries Inc.	$ 2,702,000

3.2 The total approved budget for the project is $2,750,000. The lowest compliant bid amount for the project plus engineering and contract administration services, Regional internal costs, and contingencies total $3,350,000. Therefore, the project will require additional financing of $600,000. The difference between the tendered and budgeted amounts is due to the continued market uncertainty caused by supply chain issues, the volume of capital works projects being tendered by municipalities, cost increases for labour and equipment and increase in unit costs for materials such as stainless-steel pipe and fittings, vertical turbine pumps and process piping valves.

3.3 It is recommended that the lowest compliant bidder, W.A. Stephenson Mechanical Contractors Limited, be awarded Regional Contract #D2023-55.

4. Financial Implications

4.1 Section 15.3 of Durham Region's Budget Management Policy states that the approval of the applicable Standing Committee and Regional Council for additional project financing requirements exceeding $250,000 prior to the award of the applicable contract is required

4.2 Financing for the award of Regional Contract #D2023-55 for the Blackstock Well #7 Upgrades in the Township of Scugog (Blackstock) will be provided from the following sources:

Previously Approved Financing

Water Supply Capital Budget
Blackstock Well #7 Upgrades, Project ID# D1838
Water Asset Management Reserve Fund $100,000

User Revenue	2,650,000
Total Previously Approved Financing	$2,750,000
Additional Financing	
Item #123 - Watermain on Bickle Drive and Roselawn Avenue, Oshawa (Sun Valley) (Project ID# O2305)	
User Revenue	600,000
Total Additional Financing	600,000
Total Revised Project Financing	**$3,350,000**

4.3 The City of Oshawa has deferred the watermain project on Bickle Drive and Roselawn Avenue, Oshawa (Sun Valley) (Project ID# O2305) to fund other priority projects. Financing for the deferred project will be requested as part of the 2025 Business Plans and Budget process.

5. Conclusion

5.1 It is recommended that Regional Council grant approval to award the Regional Municipality of Durham Contract #D2023-55 to the lowest compliant bidder, W.A. Stephenson Mechanical Contractors Limited the Blackstock Well #7 Upgrades in the Township of Scugog (Blackstock)

5.2 It is also recommended that additional financing of $600,000 be approved.

5.3 This report has been reviewed by the Finance Department and the Commissioner of Finance concurs with the financial recommendations.

5.4 For additional information, please contact Dan Waechter, P.Eng., Acting Director, Transportation and Field Services at 905-668-4113, extension 3550.

Respectfully submitted,

Original signed by:

Ramesh Jagannathan, MBA, M.Eng., P.Eng., PTOE
Commissioner of Works

Recommended for Presentation to Committee

Original signed by:

Elaine C. Baxter-Trahair
Chief Administrative Officer

If this information is required in an accessible format, please contact 1-800-372-1102 ext. 3540.

The Regional Municipality of Durham Report

To:	Works Committee
From:	Commissioner of Works
Report:	#2024-W-16
Date:	May 8, 2024

Subject:

Update on the New Provincial Housing-Enabling Water Systems Fund, Approval to Negotiate Sole Source Agreements, and Approval of Unbudgeted Capital Work and Related Financing for the Structural Rehabilitation, Equipment Replacement, and System Redundancy Improvements that Support Regional System Expansion at the Oshawa Water Supply Plant, City of Oshawa

Recommendations:

That the Works Committee recommends to Regional Council:

A) That Regional Council receive for information the details regarding the new Provincial Housing-Enabling Water Systems Fund;

B) That staff be authorized to negotiate and award the following sole source agreements:

   i) With Jacobs Consultancy Canada Inc. for the engineering services related to the rehabilitation of filters 1 to 4, replacement of Low Lift Pumping Station pump # 1 and all shut off and check valves in the station, replacement of the valve chamber, replacement of the Motor Control Centre (MCC), and installation of a standby blower at the Oshawa Water Supply Plant, at a cost not to exceed $2,650,000*; and

   ii) With B.J. Tworzyanski Ltd. for the engineering services related to Generator Control System upgrades at the Oshawa Water Supply Plant, at a cost not to exceed $200,000*.

C) That financing of $2,850,000 for the engineering services at the Oshawa Water Supply Plant for the rehabilitation of filters 1 to 4, replacement of Low Lift Pumping Station pump # 1 and all shut-off and check valves in the station, replacement of the valve chamber, replacement of the Motor Control Centre (MCC), installation of a standby blower, and the upgrades to the Generator Control System at the Oshawa Water Supply Plant, in the City of Oshawa, be provided as follows:

Previously Approved Financing	
Water Supply Capital Budget – Oshawa Water Supply Plant Valve Chamber Upgrades Project ID#: D1923	
User Revenue	$400,000
Water Supply Capital Budget – Oshawa Water Supply Plant Filter 1 to 4 and associated works Project ID# D2424	
Asset Management Reserve Fund	1,000,000
Water Supply Capital Budget – installation of second blower Project ID# D2425	
User Revenue	200,000
Total Approved Financing	$1,600,000
Additional Financing	
2024 Water Supply Capital Budget:	
Item # 123 Watermain on Bickle Drive and Roselawn Avenue, Oshawa, Project ID #: O2305	
User Revenue	$1,100,000
2024 Water Supply Capital Budget:	
Item # 87: Replacement of Watermain on Mary Street from Rossland Road to Robert Street, Oshawa Project ID#: O2202	
User Revenue	$150,000
Total Additional Financing	$1,250,000
Total Revised Project Financing	**$2,850,000**

D) That the Commissioner of Finance be authorized to execute any necessary related agreements.

Report:

1. Purpose

1.1 The purpose of this report is:

a. To inform Regional Council of the new Provincial Housing-Enabling Water Systems Fund (HEWSF);

b. To seek authorization for staff to negotiate and award sole source agreements with Jacobs Consultancy Canada Inc. (Jacobs) and B.J. Tworzyanski Ltd. (Tworzyanski) associated with the HEWSF project to meet the Provincial Government's funding program timelines for construction commencement and project completion; and

c. To obtain Regional Council approval for unbudgeted capital project and related financing to increase the scope of work for Engineering Services for the replacement of the valve chamber, rehabilitation of filters 1 to 4, replacement of Low Lift Pumping Station pump # 1 and all shut-off and check valves in the station, replacement of the Motor Control Centre (MCC), installation of a standby blower, and the upgrades to the Generator Control System at the Oshawa Water Supply Plant.

1.2 Dollar amounts followed by an asterisk (*) are before applicable taxes.

2. Background

2.1 The Provincial Government established the HEWSF in the 2023 Fall Economic Statement and has committed $200 million over three years for repair, rehabilitation, and expansion of core water infrastructure to protect communities and enable new housing development.

2.2 On March 21, 2024, as part of the provincial budget, the Province of Ontario (Province) announced an additional $625 million for the HEWSF.

2.3 The objectives for the grant are to:

a. Enable growth and housing opportunities;

b. Increase access to potable water; and

c. Increase treatment and/or management of wastewater and stormwater.

2 4 To be eligible to obtain the HEWSF, applicants must meet the following criteria:

a. All municipalities that own water infrastructure will be able to apply for one project.

b. The project must focus on either the rehabilitation and repair, reconstruction, or expansion of water infrastructure. Projects can be stand-alone or a component of a larger project.

c. The project must meet the outcomes of the program to enable growth and housing development, increase access to clean drinking water and increase treatment and/or management of wastewater and stormwater.

d. The project must include a capital component, including pre-construction planning and design work.

2.5 The project must start no later than September 30, 2024, and end no later than March 31, 2027. Construction cannot commence before the grant approval has been received. The project must already be in the process of or completed the design and planning phase and meet all relevant provincial regulatory requirements.

2.6 Eligible asset types may be bundled but must demonstrate that each component of the project is interrelated and meets eligibility. Eligible project costs may be cost-shared between the province (73 per cent up to a maximum of $35 million) and the recipient (minimum 27 per cent). The program aims to complement the Ministry of Municipal Affairs and Housing’s Building Faster Fund. The funding intake is a competitive process, and funding approval is not guaranteed.

2.7 A full review was completed on all current water supply and sanitary sewerage projects against the eligible criteria outlined in the program guidelines - 2024 intake file provided on the Ontario Government’s website. The Oshawa Water Supply Plant (WSP) Structural Rehabilitation, Equipment Replacement, and System Redundancy Improvements that supports Regional System Expansion is the recommended project that meets the criteria set out in the guidelines, including mandated construction commencement and completion dates.

a. The recommended project has funding forecasted for future years. The project would be accelerated should the application be successful.

b. All phases of construction for this project will be awarded through the Region's competitive bid process as required in the HEWSF.

2.8 The Region's application for the Oshawa Water Supply Plant project was submitted on Tuesday, April 10, 2024. The HEWSF notes that successful applicants will be notified in July 2024.

3. Sole Source Justification

3.1 Due to the project conditions set out in the HEWSF Ontario Program Guidelines, the project must be in the process of or have completed the design and planning phase. To meet the commencement and completion timelines per the grant guidelines, detailed design must continue on all project components as soon as possible.

3.2 The Region retained Jacobs to complete detailed design services for the replacement/rehabilitation of filters 5 and 6, header, backwash valves and associated piping. Jacobs is already familiar with the work, and there will be a duplication of costs and work should another consulting engineering firm complete subsequent phases. Adding additional engineering services to the existing consulting agreement to include filters 1 to 4, the second blower, the motor control centre and the valve chamber will also ensure the restrictive timelines of the HEWSF are achieved.

3.3 Tworzyanski recently completed the upgrades of the generator control system at several Regional facilities, including the Bayly Street Sewage Pumping Station and the Ajax Water Supply Plant. Tworzyanski specializes in servicing electrical, building services, instrumentation and controls, Supervisory Control and Data Acquisition (SCADA), architecture and mechanical HVAC engineering. Tworzyanski's main areas of expertise include municipal water and wastewater pumping and treatment, control systems, power distribution and lighting, building services and life safety and emergency power systems. Tworzyanski is also currently supporting the emergency replacement of high-voltage power equipment at the Oshawa WSP.

3. 4 Tworzyanski is already familiar with the work, and there will be a duplication of costs and work should another consulting engineering firm be used. Selecting another engineering firm could also result in delays as they would need time to become familiar with the project requirements and site conditions, which could impact the timelines in the HEWSF.

3. 5 It is recommended that sole agreements be awarded to Jacobs and Tworzyanski for the additional engineering services required for the project to ensure cost duplications are mitigated and to meet the HEWSF timeline requirements.

4. Financial Implications

4.1 Section 7.2 of the Region's Purchasing By-law #16-2020 permits the acquisition of goods and services through sole source negotiations under specific circumstances outlined in Appendix 'C'. Section 1.3 which permits negotiations for goods or services to be supplied only by a particular supplier if there is extreme urgency.

4. 2 Appendix "D" of the Purchasing by-law requires approval by the appropriate standing committee and Regional Council for the award of sole source contracts that exceed $100,000 in value, with the Commissioner of Finance authorized to execute the agreements upon Regional Council's approval.

4. 3 Section 14.2 of the Region of Durham's Budget Management Policy states that unbudgeted capital asset expenditures may be incurred provided that the applicable approval is obtained prior to the purchase. Expenditures in excess of $50,000, or those to be financed from other sources, require the approval of the Treasurer and CAO and the applicable Standing Committee and Regional Council.

4.4 Section 15.3 of the Region of Durham's Budget Management Policy states that where additional project financing in excess of $250,000 is required to undertake procurement activities and award contracts, an updated capital project approval report will be submitted to the applicable Standing Committee and Regional Council prior to the award of the applicable contract Funding Source.

4.5 Project financing including the additional $1,250,000, can be provided from the following sources:

Previously Approved Financing

Water Supply Capital Budget – Oshawa Water Supply Plant Valve Chamber Upgrades Project ID#: D1923

User Revenue	$400,000

Water Supply Capital Budget – Oshawa Water Supply Plant Filter 1 to 4 and associated works Project ID# D2424

Asset Management Reserve Fund	1,000,000

Water Supply Capital Budget – installation of second blower

Project ID# D2425	
User Revenue	200,000
Total Approved Financing	$1,600,000
Additional Financing	
2024 Water Supply Capital Budget:	
Item # 123 Watermain on Bickle Drive and Roselawn Avenue, Oshawa, Project ID #: O2305	
User Revenue	$1,100,000
2024 Water Supply Capital Budget:	
Item # 87: Replacement of Watermain on Mary Street from Rossland Road to Robert Street, Oshawa Project ID#: O2202	
User Revenue	$150,000
Total Additional Financing	$1,250,000
Total Revised Project Financing	**$2,850,000**

4.6 The City of Oshawa has deferred the watermain project on Bickle Drive and Roselawn Avenue. The Region will re-budget for this project in the 2025 Business Plans and Budget process. The contract for the replacement of the watermain on Mary Street from Rossland Road to Robert Street in the City of Oshawa has been awarded, and the $350,000 that was earmarked to account for potential cost escalation and approved in the 2024 Water Supply Capital budget has been identified as savings.

4. 7 Regional staff recommend that the reallocation of the funding to provide financing in the amount of $1,250,000 for the engineering services at the Oshawa WSP for the replacement of the motor control centre, the installation of a standby blower, low lift pumping station, and all shut-off and check valves in the station, and generator control system upgrades, in the City of Oshawa be approved.

5. Relationship to Strategic Plan

5.1 This report aligns with/addresses the following strategic goals and priorities in the Durham Region Strategic Plan:

a. Service Excellence Goal #5.1: Optimize resources and partnerships to deliver exceptional quality services and value; and

b. Service Excellence Goal #5.2: Collaborate for a seamless service experience.

6. Conclusion

6. 1 It is recommended that Regional Council authorize the additional financing and the award of sole source contracts to Jacobs Consultancy Canada Inc. and B.J. Tworzyanski Ltd. for the provision of engineering services.

6.2 This report has been reviewed by the Finance Department and the Commissioner of Finance concurs with the financial recommendations.

6.3 For additional information, contact: Mike Hubble, Director of Environmental Services at 905-668-7711 ext. 3460.

Respectfully submitted,

Original signed by:

Ramesh Jagannathan, MBA, M.Eng., P.Eng., PTOE
Commissioner of Works

Recommended for Presentation to Committee

Original signed by:

Elaine C. Baxter-Trahair
Chief Administrative Officer