Thank you for joining us,
we will start at 6:05 pm

Welcome to Public Meeting #2

Alternative Low Carbon Fuel Use at the St Marys Cement Plant

585 Water Street South, St. Marys, Ontario

February 3, 2022

Votorantim Cimentos
Life is made to last

Meeting Format

The project team will provide a presentation with information about the project.

A Q&A portion will be held after the presentation is finished.

Microphones of attendees will not be operational.

Use the questions panel to submit questions or comments throughout the presentation.

Inquiries will be addressed at various points during the presentation, and at the end during the Q&A portion.

The virtual information session is being recorded.

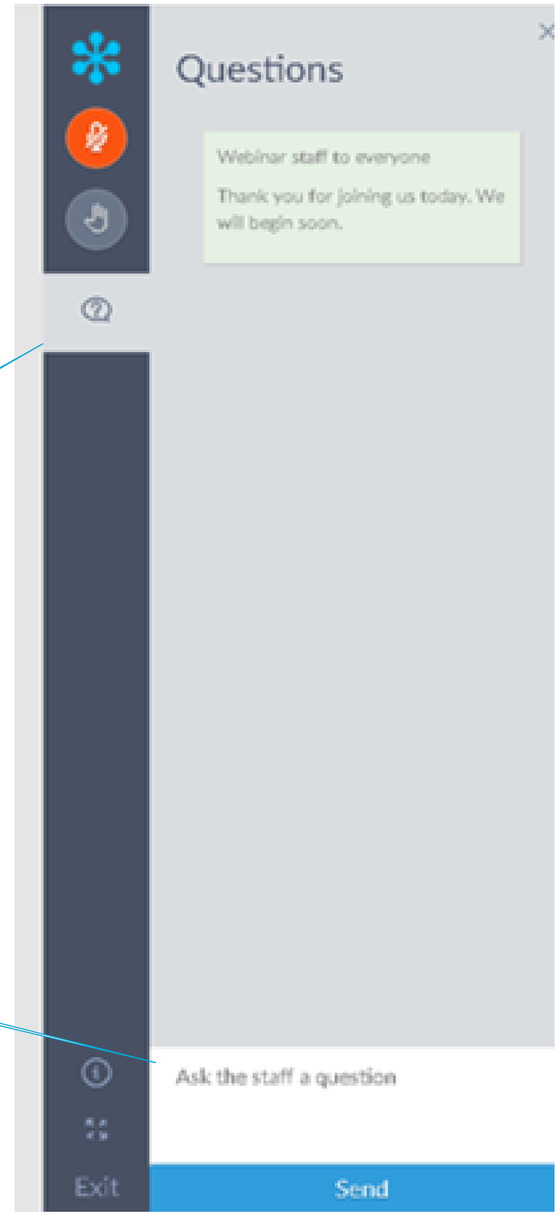
The slide deck will be made available on the project website after the virtual information session.

We look forward to answering your questions and having a meaningful and respectful Q&A session with attendees.

How to Submit Questions

Microphones are not operational and we're going to receive written questions that the moderator will read during the Q&A portion.

During the meeting you are able to submit questions by clicking on the **Question Icon** and writing your questions on the **field.**



Introduction

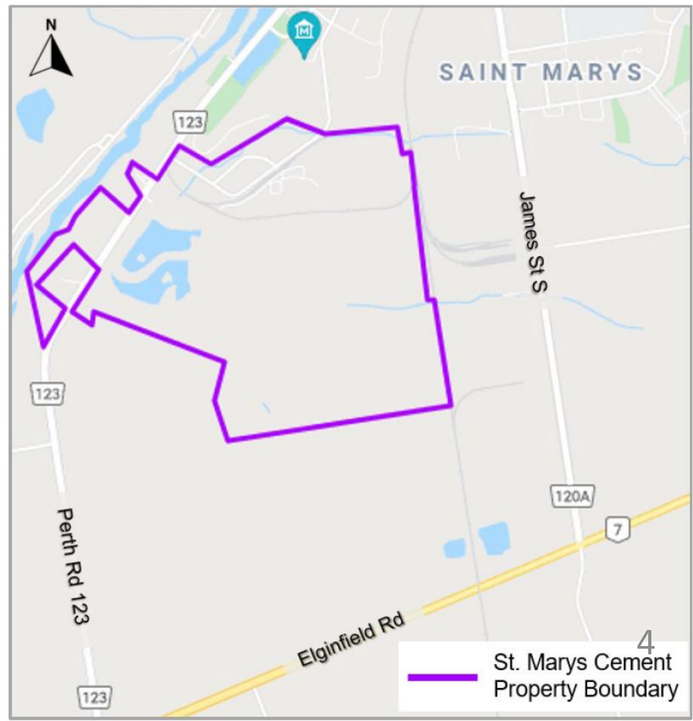
- The St Marys Cement Plant is currently approved to operate under an Environmental Compliance Approval (ECA) that includes kiln operations using conventional fuels

- St Marys Cement (SMC), a company of Votorantim Cimentos North America (VCNA), proposes to use Alternative Low Carbon Fuels (ALCFs) at the Site as part of its strategy to reduce greenhouse gas emissions, adapt to a low-carbon economy, support the circular economy while keeping materials out of landfills, in keeping with best practices implemented around the world

- St Marys Plant has commenced the application to amend the current ECA for the Site to incorporate the following:
  - allow for the permanent use of ALCFs; and
  - include Hydrogen in the list of fuels used at the Site

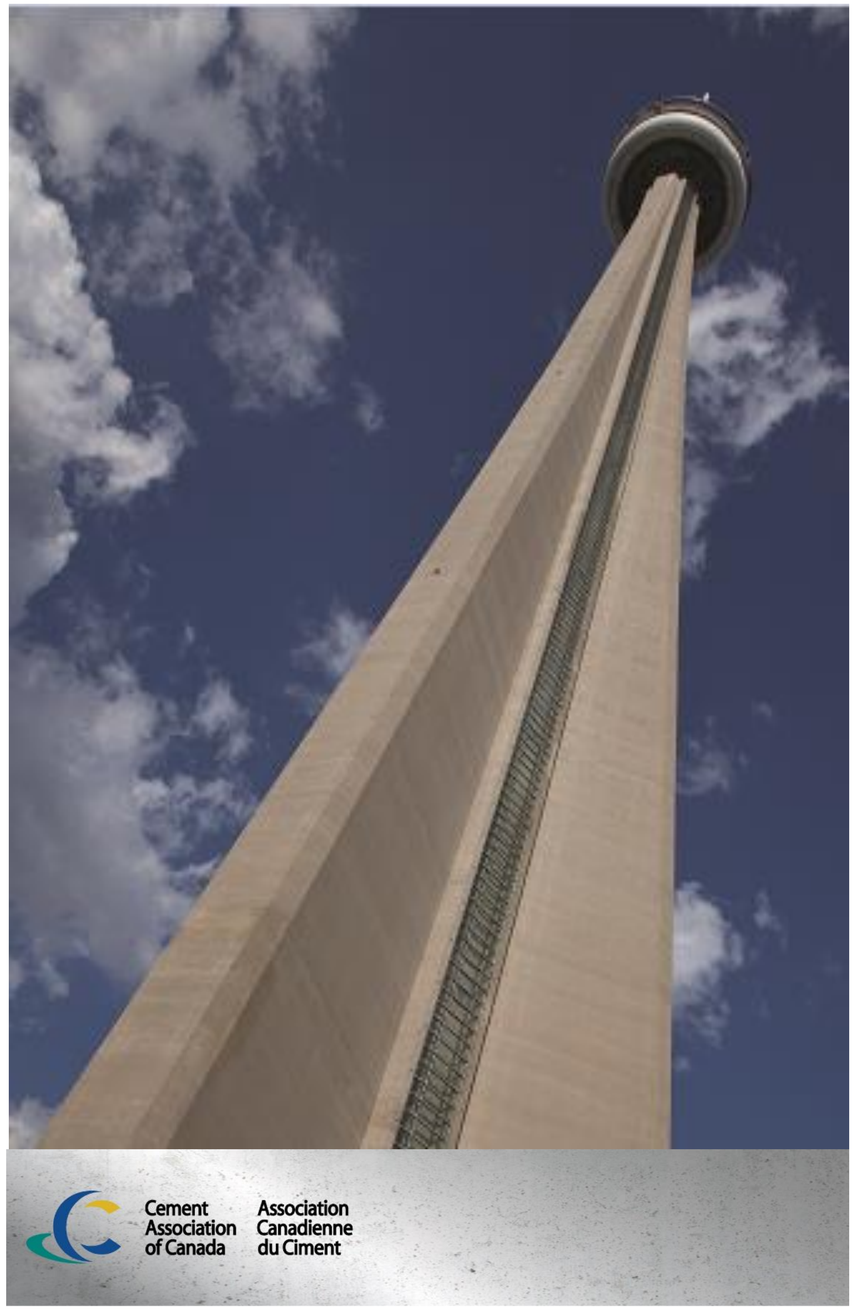
- The amendment application will be prepared under O. Reg. 79/15 - Alternative Low Carbon Fuels (amended by O. Reg. 824/21)

- We are here today to share with you to present the progress since the first public meeting (November 2021)



Cement Association of Canada

- The Cement Association of Canada (CAC) represents the Cement manufacturers of Canada including St Marys Cement
- The Cement Industry is a vital participant in Ontario's economy
  - **50,000** direct and indirect jobs across the province
  - Generates over **$6 billion** in economic activity and supports a **$37 billion** construction industry
- Concrete is the foundation of economic development and prosperity, **the world's most important building material**
  - Twice as much concrete is used than all other materials combined
  - Second most consumed commodity in the world, **second only to water**
- The CAC is a strong supporter of the use of ALCFs as one of the options to reduce green house gases for the Cement Industry



Project Team

St Marys Cement

Kara Terpstra – Environmental Manager
Alejandro Aviles – Operations Manager
Robin Manzer – Production Manager
Vanessa Barr – Human Resources Manager

VCNA

Ruben Plaza – Environmental Manager
Bill Asselstine – Vice President Sustainability
Wayne Probst – Director of Alternative Fuels and Raw Materials
Joe Frost – Environmental Specialist
Ywrrenan Amorim – Environmental Coordinator

HGC Engineering

Petr Chocensky – Senior Engineer

Golder Associates Ltd., Member of WSP

Sean Capstick – Principal, Sustainable Development and Climate Change
Kate Liubansky – Air Quality Specialist
Kyla Suchovs – Environmental Assessment Specialist

BCX Environmental Consulting

Bridget Mills – Senior Environmental Engineer
Xiaoxi (Winnie) Song – Senior Environmental Engineer

Process and Timeline

Initial ALCF Project	Public Meeting #1	Continue Technical Studies	Public Meeting #2	Complete Technical Studies	Permit Application Preparation & Submission	Application Review
• Approval from MECP to undertake a Demonstration Project (completed in May 2011)	• Description of activities • Fuel categories • Approach for technical studies	• Air Emissions Assessment • Carbon Dioxide Emission Intensity Assessment • Traffic Impact Study • Local Air Quality Study **Respond to and address public comments** **[by Dec 17]**	• Summary of comments from Public Meeting #1 • Results from technical studies	• Emission Summary and Dispersion Modelling Report • Noise Statement • Traffic Impact Study **Respond to and address public comments** **[by Feb 24]**	• Consultation Report • All technical studies • Application Package • Submit the ALCF Application under O. Reg. 79/15 for an Amended Environmental Compliance Approval	• MECP application review period 1-year guarantee
2011	November 2021		February 2022		March 2022	2023

We Are Here

MECP: Ministry of the Environment, Conservation and Parks

Process and Timeline

Initial ALCF Project	Public Meeting #1	Continue Technical Studies
• Approval from MECP to undertake a Demonstration Project (completed in May 2011)	• Description of activities • Fuel categories • Approach for technical studies	• Air Emissions Assessment • Carbon Dioxide Emission Intensity Assessment • Traffic Impact Study • Local Air Quality Study **Respond to and address public comments** **[by Dec 17]**
2011	November 2021	

- Public Meeting #1
  - No written comments or questions
  - Topics/comments/questions were recorded by VCNA/SMC/Consultants at the public meeting
- Community Liaison Committee
- Consultation with Indigenous Communities
- MECP - second pre-submission consultation meeting
- Town of St. Marys
- Questions submitted to Project Email:
  - One prior to first public meeting
  - Two after first public meeting

MECP: Ministry of the Environment, Conservation and Parks

Process and Timeline

Initial ALCF Project	Public Meeting #1	Continue Technical Studies	Public Meeting #2
• Approval from MECP to undertake a Demonstration Project (completed in May 2011)	• Description of activities • Fuel categories • Approach for technical studies	• Air Emissions Assessment • Carbon Dioxide Emission Intensity Assessment • Traffic Impact Study • Local Air Quality Study **Respond to and address public comments** **[by Dec 17]**	• Summary of comments from Public Meeting #1 • Results from technical studies
2011	November 2021		February 2022

We Are Here

- Public consultation is a significant component of the permit application process
- Compilation of topics and questions from the consultation associated with the first public meeting
- Presentation of results of all technical studies which helped address the public's topics and questions
- Technical studies and reports that will support the permit application

MECP: Ministry of the Environment, Conservation and Parks

Overview of Public Meeting #2

- Today, our Project Team will present the following topics of interest and respond to questions or concerns
- Our team consists of VCNA and SMC personnel as well as third-party consultants

Background

- SMC Cement Production
- SMC Current Compliance
- Air Quality Monitoring
- ALCFs and O. Reg. 79/15

ALCFs at SMC

- Proposed ALCFs
- Supporting Activities and Processes

Sustainability & Climate Change

- Sustainability Commitments and Environmental Benefits
- Carbon Dioxide Emission Intensity Assessment

ALCFs & Environment

- ALCF Compliance
  - Air Quality
  - Noise

Supplementary Studies

- Archeology
- Traffic Impact Study

Use of ALCFs at St Marys Cement

What Will Remain the Same?

Process

Cement Production Process at Plant
- Kiln operations at 1500°C
- High temperatures and counter-flow of materials to heat result in most of the trace compounds being retained in the product

Compliance - Regulation

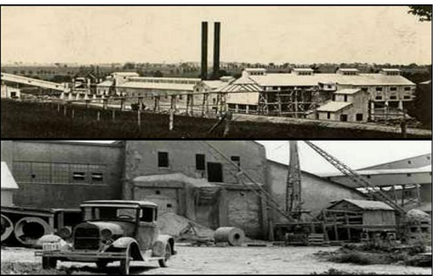
- Continued O. Reg. 419/05 Requirements

Compliance - Permit

- Odour Abatement Plan
- Dust Best Management Practices Plan
- Noise Abatement Action Plan
- Complaint Program

Monitoring

- SMC CEM & CPM
- SMC Source Testing
- MECP Ambient Monitoring



CEM – Continuous Emission Monitoring
CPM – Continuous Process Monitoring
QA/QC – Quality Assurance and Quality Control

What Will Change?

Process

- Reduced amount of conventional fuel use
  - **reduction** in greenhouse gases
- Increased use of ALCFs in rotary kiln
  - **no change** in compliance with O. Reg. 419/05 air quality standards
  - **reduction** in landfill materials
- New Enclosed ALCF Storage
  - **no change** in noise levels
  - **prevention** of odour and dust nuisance

Compliance – Regulation & Permit

New Requirements under O. Reg. 79/15
- Fuel Handling & Testing Manual
- Fuel Material QA/QC

Use of ALCFs at St Marys Cement

Environment

- Continued compliance with all Provincial and Federal regulations and requirements
- MECP limits the substances released into air that can affect human health and the environment through air quality standards through O. Reg. 419/05
- Local air quality has been monitored by the MECP and SMC's programs

Health

- Perth District Health Unit (PDHU) - St. Marys Cement - Health Hazard Investigation Report (2018)
  - Report may be found on the Town of St. Marys website (Air Quality page)
- PDHU found that while emissions from SMC are likely contributing to local air pollution levels, they are within the acceptable standards set out by the MECP to protect the environment and human health
- PDHU examined local health data and data showed that there is no evidence of elevated rates of adverse health outcomes in St. Marys

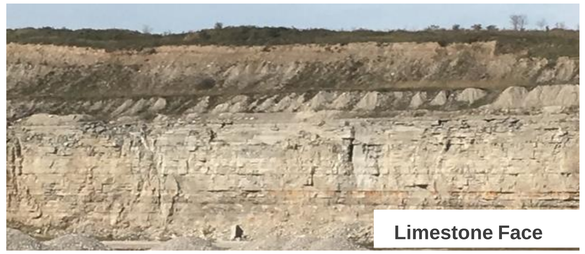
MECP – Ontario Ministry of Environment, Conservation and Parks

Background

St Marys Cement Production Process

Raw Material Processing

- Limestone is blasted from the face of the Quarry.
- Blasts up to 1-2x per week based on production needs.



Limestone Face

- Limestone is combined with other raw materials to get the chemical composition required for clinker production.
- Full analysis is completed on the limestone and the other recycled raw materials feedstock to verify that they meet production and ECA requirements.

Clinker Process

- Raw material mixture is fed counter-flow through a preheater tower into a rotary kiln which transforms the mixture into clinker. The counter-flow system promotes energy efficiency and reduces some air emissions by "scrubbing effect" of the raw feed.

Cement Kiln Flame

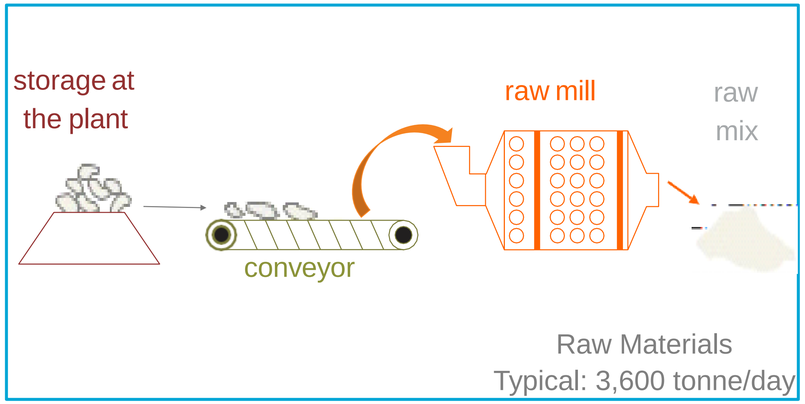
- The primary reaction in the rotary kiln is the conversion of calcium carbonate to calcium oxide under very high temperatures, resulting in raw materials reaching **over 1,500°C**.
- Most trace metals contained in the raw materials are **retained in the clinker** resulting in **very low air emissions** of these compounds.

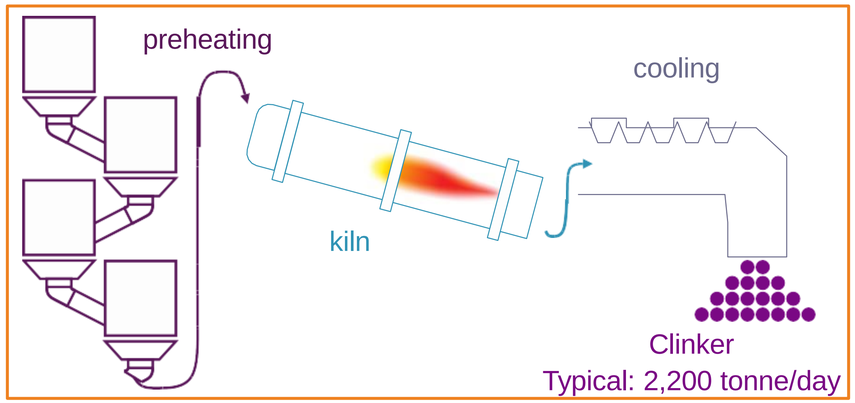
Clinker to Cement

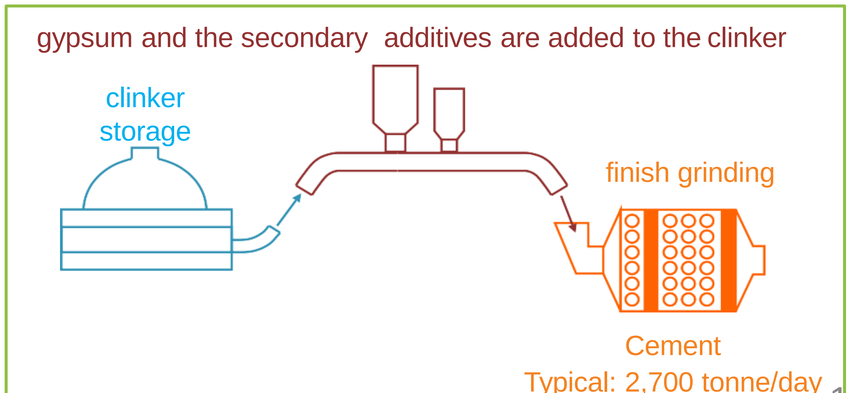
- The clinker is cooled and combined with gypsum and limestone in a grinding mill to make cement.
- SMC manufactures 9 different types of cement, with a range of strengths and set times.

Pyramid Centre in St Marys

- Cement is packaged in bags which can be purchased individually at hardware stores or shipped in bulk trucks for large projects (e.g., the Pyramid Centre in St Marys).
- Cement is essential to our way of life and key to the construction of durable infrastructure around us including buildings, bridges, and roads.







Current Compliance – Air Quality

Compliance with the Ministry Regulatory Air Limits

SMC is operating under their air ECA No. 4546-AQ9GMB, dated August 31, 2017. This ECA is an ECA with limited operational flexibility which requires the facility to keep their air assessment up-to-date and to report to the Ministry annually.

The air assessment requires the facility to demonstrate compliance with the Ministry's Point of Impingement (POI) limits to protect human health and the environment.

Under maximum emissions scenarios, the Facility is below these limits. The latest air assessment (ESDM) results can be found on SMC's website.

The ECA also contains the following conditions:

- Continuous Emissions Monitoring for NOx, SO_2 and Opacity
- Raw materials and conventional fuel analysis
- Best management practices plan for fugitive dust

Emission Control Technology

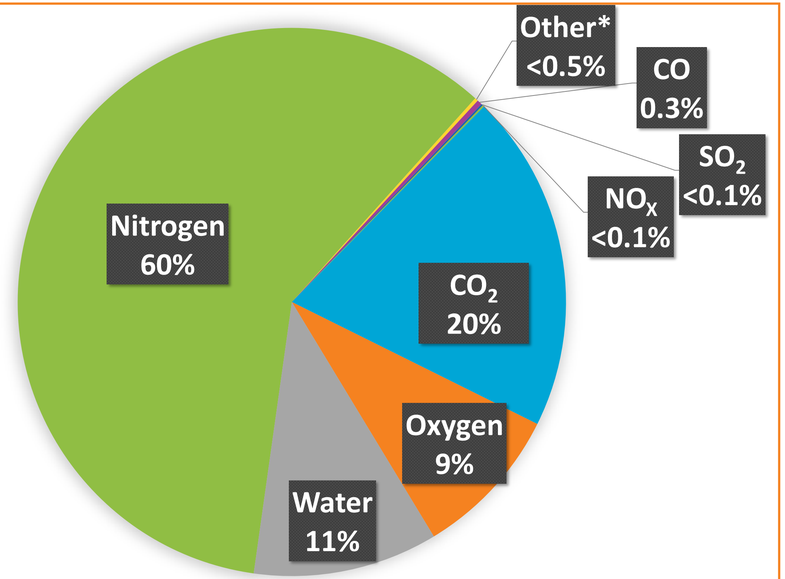
Kiln Stack: Main baghouse and by-pass precipitator (particulate)
Ammonia injection system (NOx)

Material/Product Transfer and Storage: 60+ baghouses

Voluntary Annual Source Testing

The plant conducts annual source testing for key contaminants of concern outside the requirements of the current ECA.

The majority of kiln stack emissions are carbon dioxide, water vapour & ambient air.



*Trace amounts including: Other Sulphur Compounds, Volatile Organic Compounds, Hydrochloric Acid, Particulates, Ammonia, Metals, Polycyclic Aromatic Hydrocarbons,Dioxins & Furans

Odour Abatement Action Plan

Per the ECA, SMC developed and implemented an odour abatement action plan that was approved by the Ministry. The plan included source testing, materials/conventional fuel testing and odour modelling.

Through the plan, SMC identified that the primary source of odours is the natural make up of the raw materials.

To date, SMC has installed a 30m stack extension to improve dispersion. SMC is currently assessing the effectiveness of the stack extension using the Envirosuite monitoring program and complaints data.

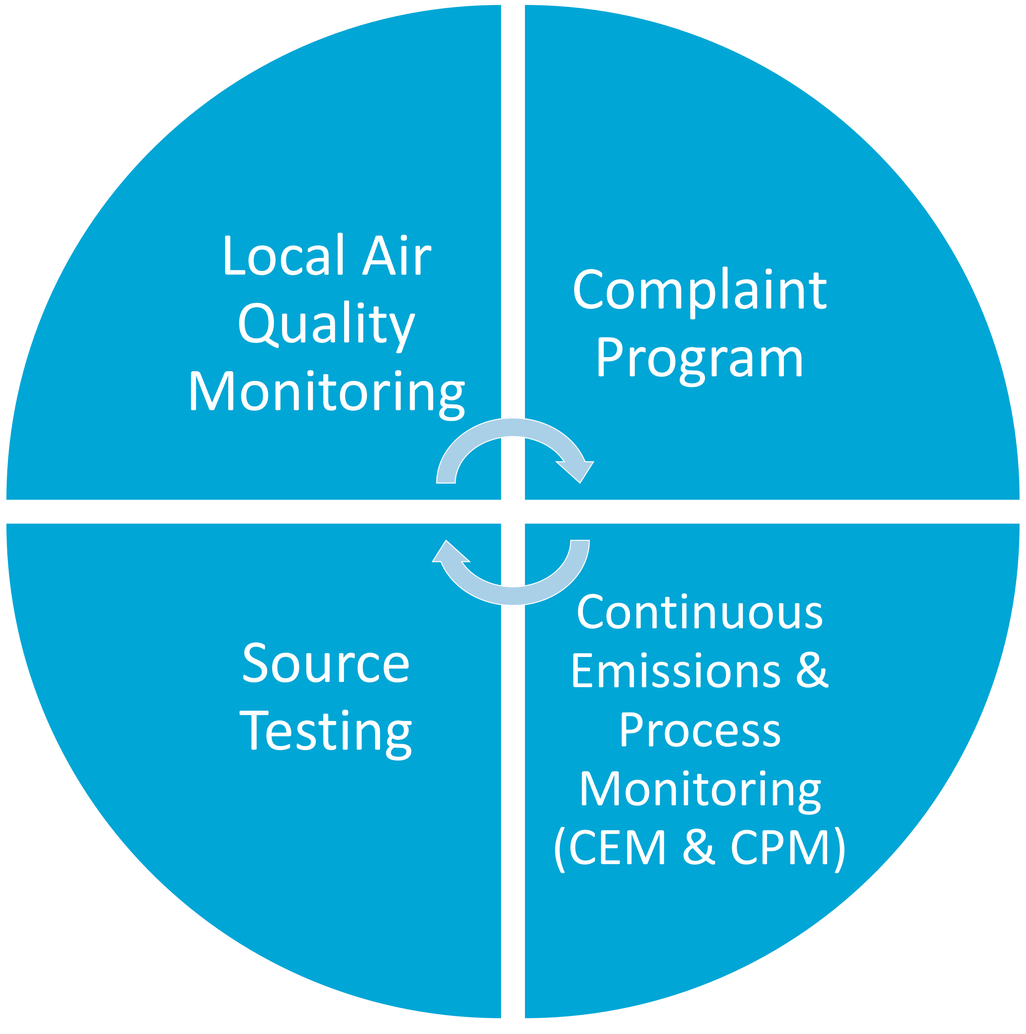
Progress on the plan is reported through the Community Liaison Committee.

Current Compliance – Noise

- Existing noise emissions regulated via Environmental Compliance Approval, number 4546-AQ9GMB
- A 10-year long noise mitigation plan in place since 2017
- Equipment successfully mitigated include exhaust silencer at dryer plant and upgraded walls of secondary crusher building
- Upcoming measures: Main kiln stack
- Future: approximately 40 silencers and enclosures for ventilation fans, replacement cooling fans, etc.

Air Quality Monitoring

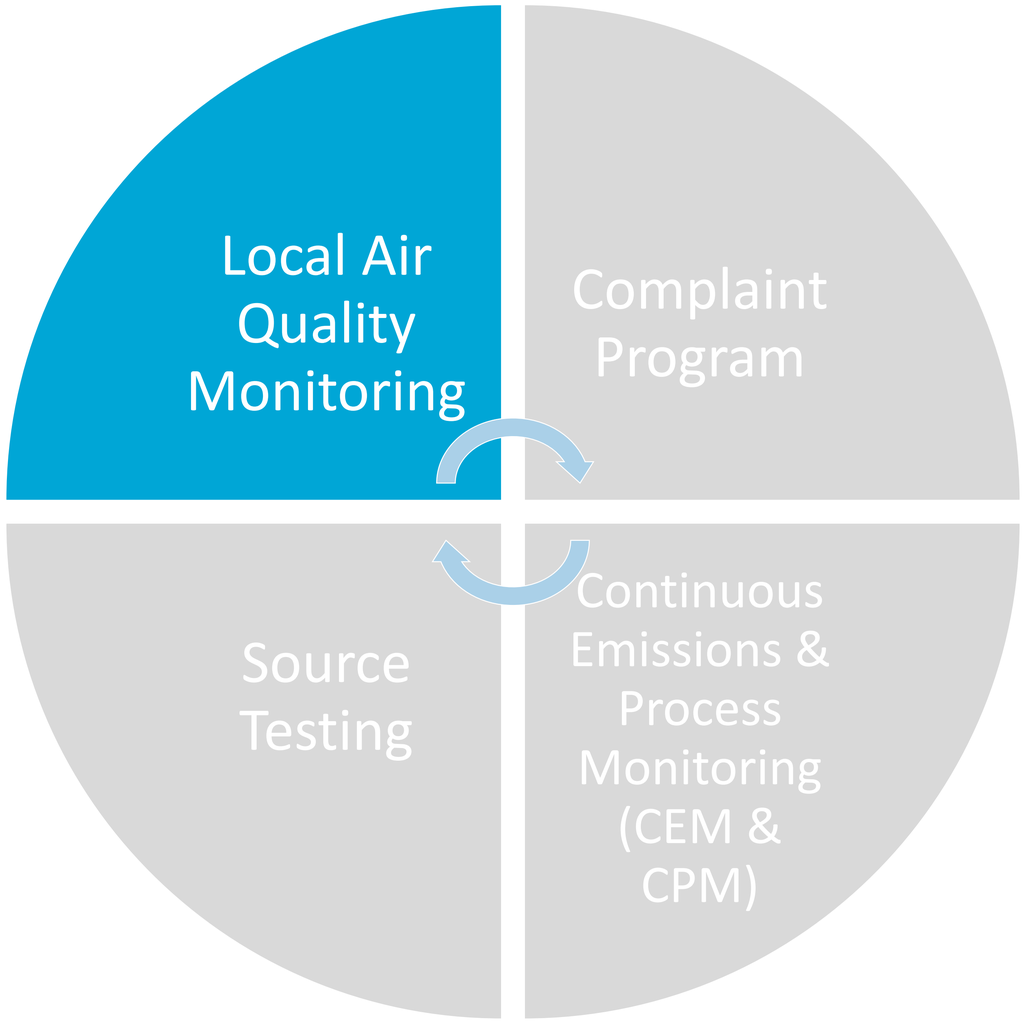
- Air quality monitoring in St. Marys involves the following components:

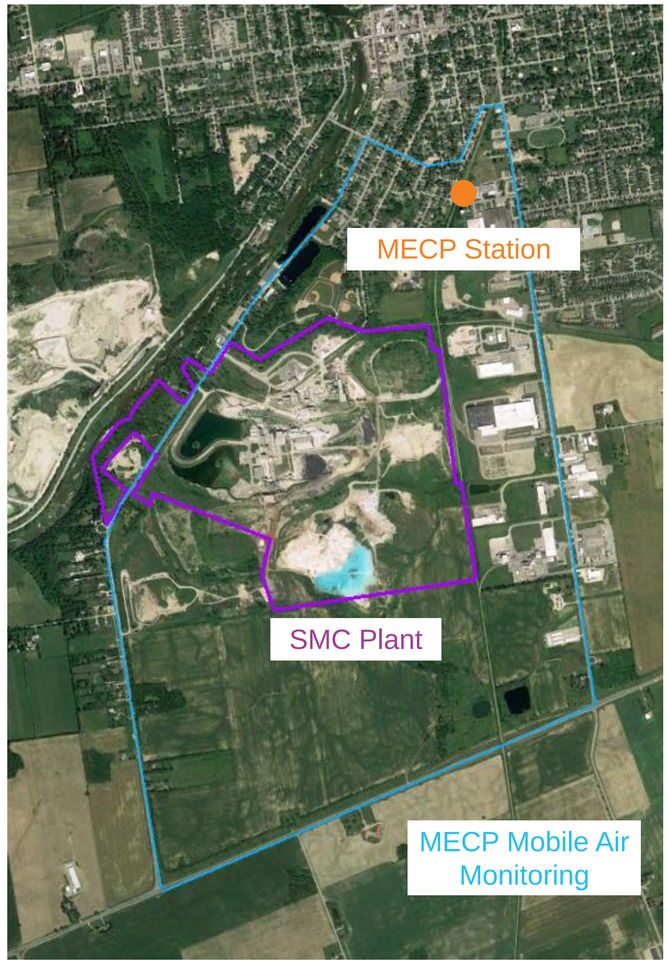


- These components help characterize the air quality in St. Marys

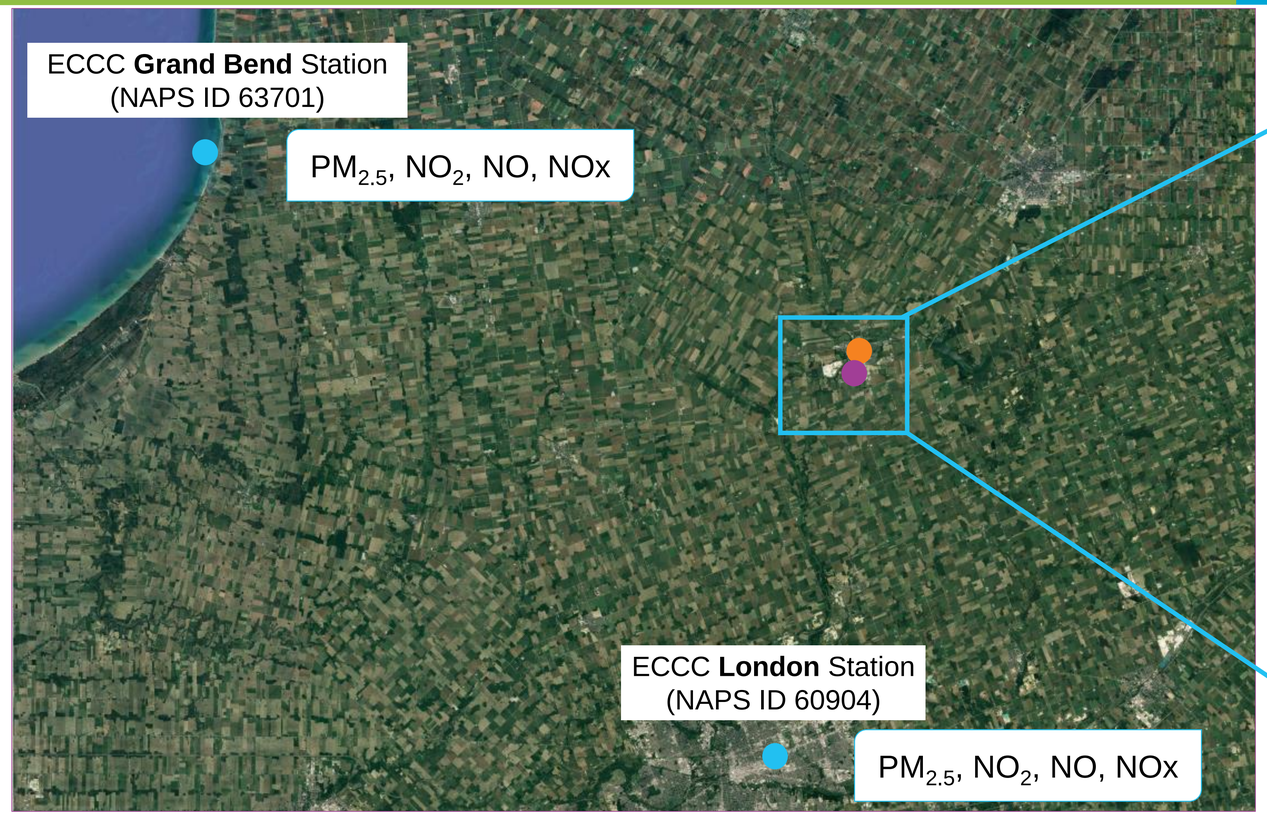
Air Quality Monitoring

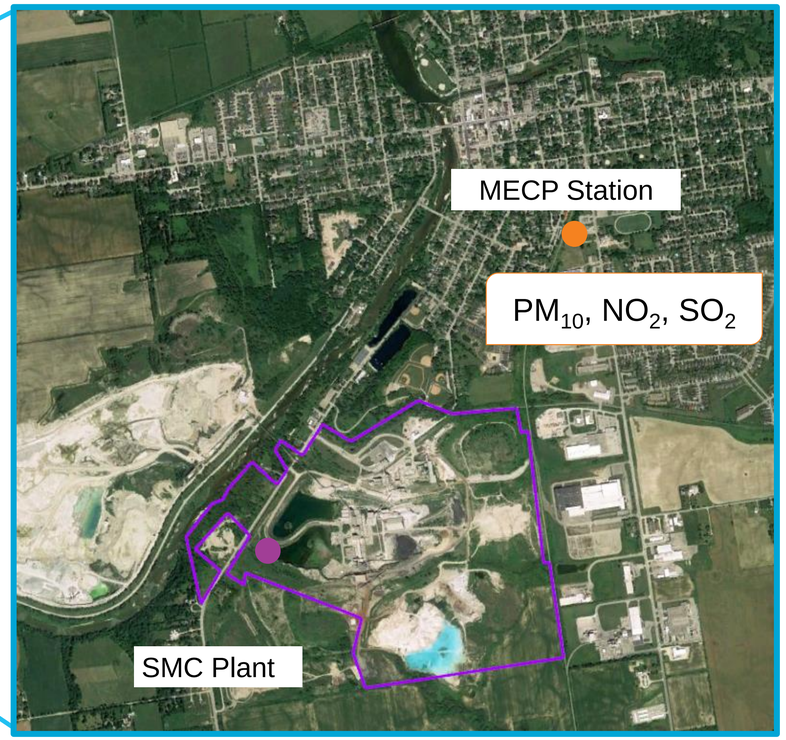
- Local air quality monitoring
  - MECP Stationary Monitor in community (2017-2018)
  - MECP Mobile Air Monitoring Surveys (TAGA) (2016-2020)





Local Air Quality Monitoring – Annual Analysis





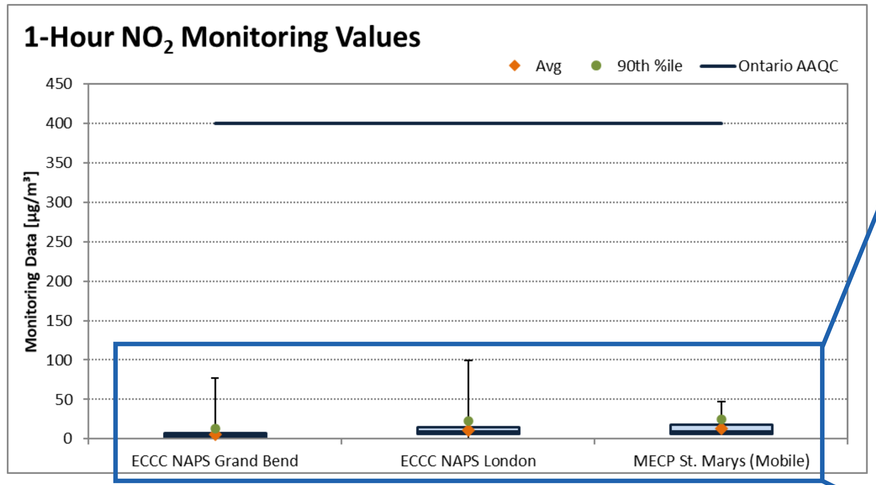
ECCC National Air Pollution Surveillance (NAPS) Monitoring Station
MECP St. Marys Air Monitoring Station (active 2017-2018)
St. Marys Cement (SMC) Plant
St. Marys Cement Plant Boundary

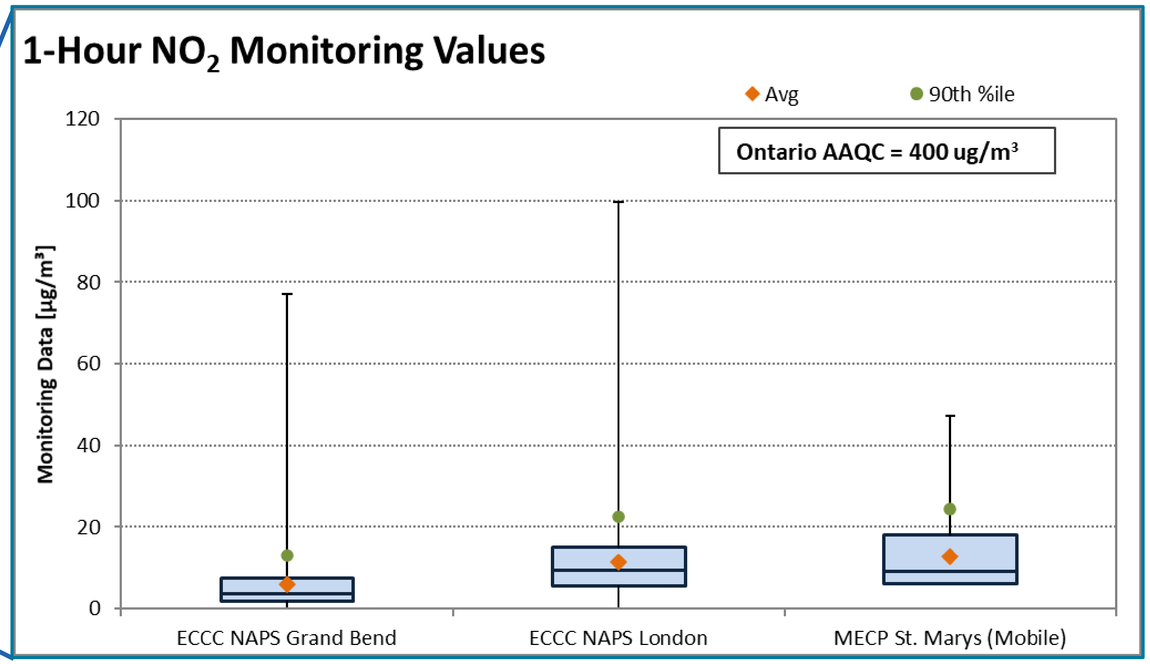
St. Marys local air quality is comparable to London and is below the Annual AAQC/CAAQS

Compound	Annual AAQC [µg/m³]	Annual CAAQS [µg/m³]	SM - Stationary	NAPS - London	NAPS - Grand Bend
			1-year average (Sep 1, 2017 - Aug 31, 2018)	5-year average (2014-2018)	5-year average (2014-2018)
Benzene	0.45	—	Not Measured	**0.4**	Not Measured
SPM	60	—	25.7	25.6	21.8
$PM_{2.5}$	—	8.8	7.7	**7.7**	**6.5**
NO_2	—	22.6	**10.0**	**11.4**	**5.9**
SO_2	10.5	10.5	**2.2**	Not Measured	Not Measured
Notes:	Temperature used for conversion of CAAQS in ppb to µg/m³ = 25°C				
	Bolded numbers represent actual monitored concentrations; remaining values are calculated [PM2.5 = 54% of PM10, PM2.5 = 30% of SPM (Lall et al., 2004)]				
	No Annual AAQC or CAAQS for PM10				

Local Air Quality Monitoring – Hourly Analysis

- 1-hour **NO_2** Monitored Concentration
  - Compiled upwind and downwind data from St. Marys to characterize the local air quality and compare to London and Grand Bend





- 1-hour **SO_2** Monitored Concentration
  - Not measures at London and Grand Bend
  - Mobile St. Marys Monitoring Summary (upwind and downwind):

Compound	**1-hr AAQC [µg/m³]**	**SM – Mobile**	
		90th %ile of data points from monitoring days (2017-2020)	**Maximum** data points from monitoring days (2017-2020)
SO_2	105	0.2	0.7

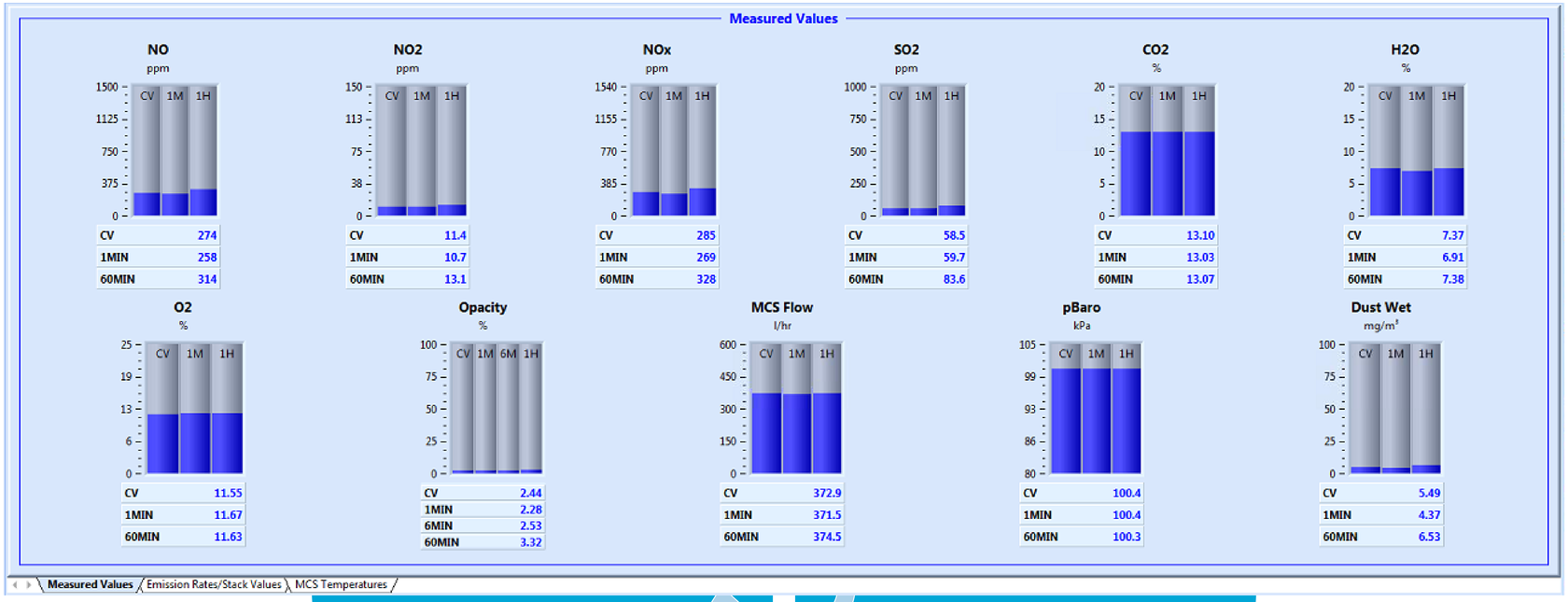
St. Marys local air quality is comparable to London and is below the 1-hour AAQC

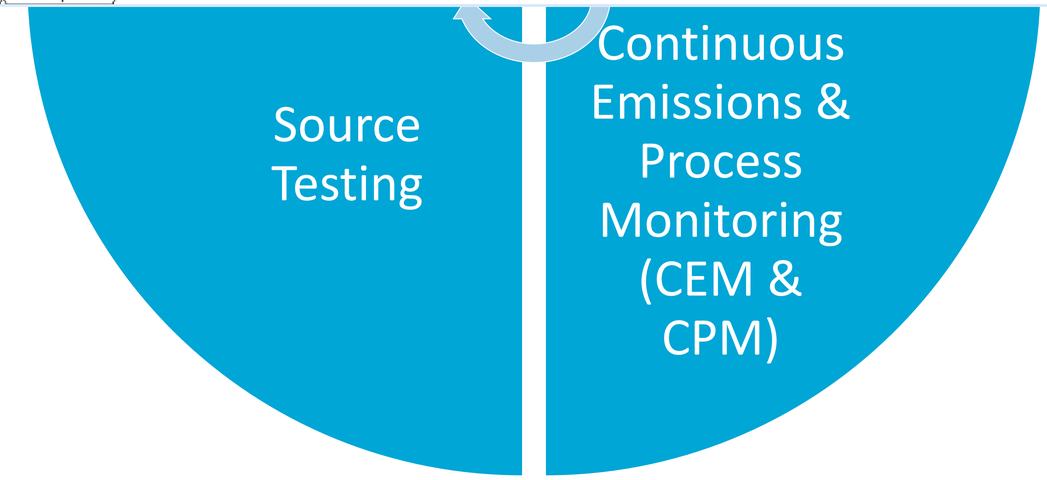
Air Quality Monitoring – Complaint Program

- Complaint Program
  - Envirosuite Complaint Response Tool (trial) - Trajectory Analysis for Received Complaints

Air Quality Monitoring

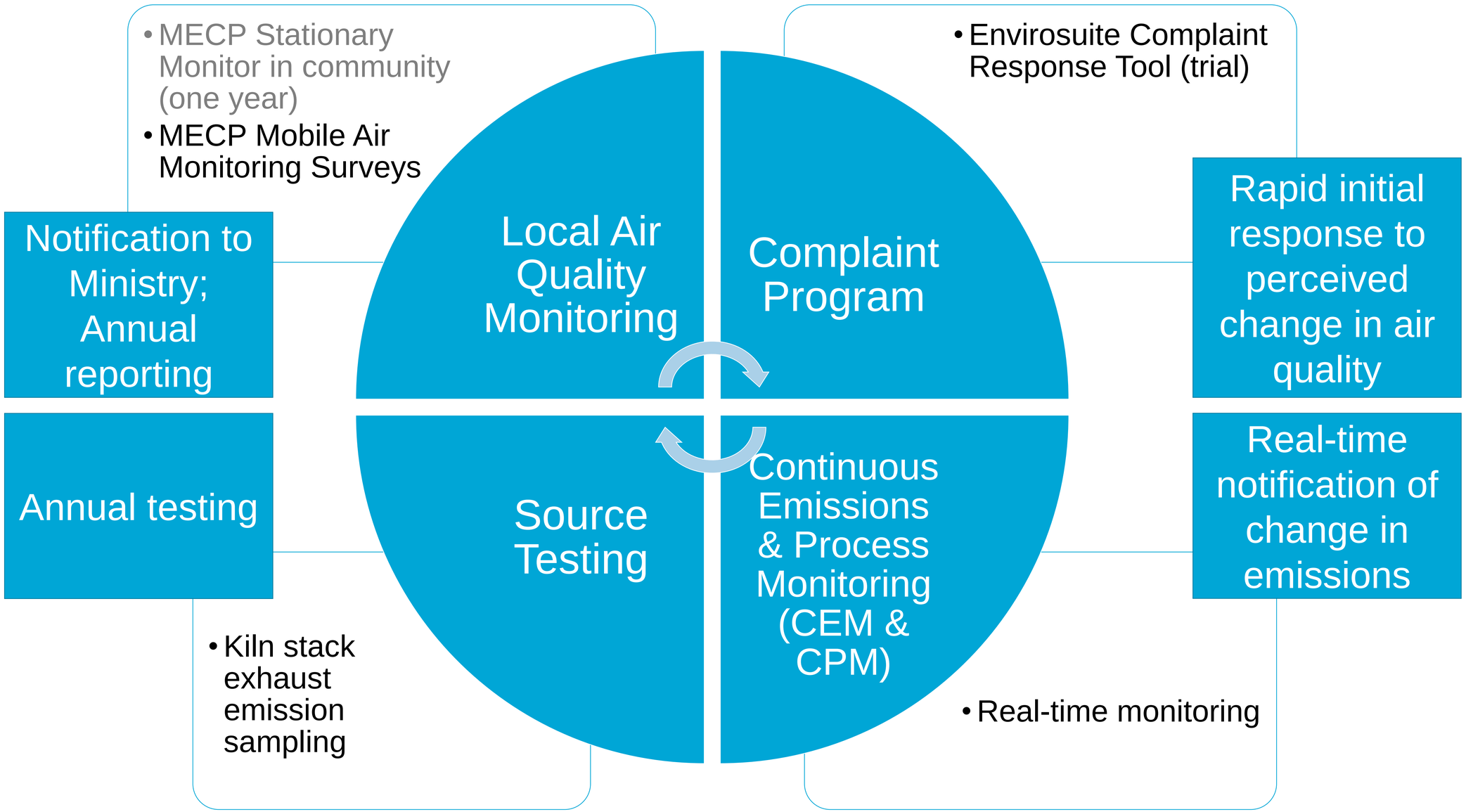
- Two on-site air quality monitoring components:
  - Continuous Emissions & Process Monitoring (CEM & CPM) – real-time monitoring
  - Source Testing – kiln stack exhaust emission sampling





Air Quality Monitoring

- Air quality monitoring is in place to monitor and control the local air quality
- Air quality monitoring will continue during the future use of Alternative Low Carbon Fuels



Questions?

[Background]

ALCFs at St Marys Cement

Ontario Regulation 79/15

What is Ontario Regulation (O. Reg) 79/15?

- O. Reg. 79/15, Alternative Low Carbon Fuels, came into force as of May 1, 2015, under the *Environmental Protection Act* and was recently amended to streamline the approval process
- The Ontario Government put this regulation in place to:
  - **Help** reduce the use of coal and petroleum coke in Ontario
  - **Promote** reduction of greenhouse gases (GHG)
  - **Streamline** the use of Alternative Low Carbon Fuels
- The regulation defines the framework and controls for facilities that want to use the Alternative Low Carbon Fuels in terms of types and quantity of materials that can be used

Potential Set Up for an Enclosed ALCF Storage Container

"There is no 'singular' solution to reducing the impact of society on the environment."

Source: Concrete Council of Canada. Rediscover Concrete, Reducing our Footprint.

ALCFs and O. Reg. 79/15

What are Alternative Low Carbon Fuels (ALCFs)?

In accordance with O. Reg. 97/15, ALCFs are fuels that have a carbon dioxide emission intensity less than coal or petroleum coke when combusted, and meet one of the two following descriptions:

1. The fuel

- Is not derived from or composed of any material set out in Schedule 1 of O. Reg. 79/15;
- Is wholly derived from or composed of materials that are biomass or municipal waste or a combination of both; and
- Has a high heat value of at least 10,000 megajoules per tonne (unless a fuel is wholly derived from or composed of materials that are solid biomass).

2. The fuel is wholly derived from or composed of organic matter, not including peat or peat derivatives, derived from a plant or micro-organism and grown or harvested for the purpose of being used as a fuel.

ALCF materials on conveyor belt

Example of an ALCF path

Construction & Demolition Material

Construction & Demolition Processing Plant

Recyclable Materials

e.g., scrap metal

Non-Recyclable Materials

e.g., treated wood

ALCF

Alternative Low Carbon Fuels

Examples of ALCFs

Non-Recyclable Plastics

- Materials from resource recovery facilities
- Plastics bags
- Shrink wrap packaging

Construction & Demolition

- Carpets and textiles
- Sawdust
- Floor laminates

Non-Recyclable Paper Fiber/Wood/Plastic Composites

- Single-serve coffee pods
- Paper towels
- Trimmings from paper recycling facilities

Biomass Fuel

- Sawdust
- Wood chips
- Wood

Other

- Treated wood
- Asphalt shingles
- Non-recyclable rubber

Examples of Materials That Are Not ALCFs*

Organic waste from food processing, distribution and preparation operations

- Food packing
- Restaurants and grocery stores
- Organic waste from wastewater treatment at food processing/preparation facilities

Biomass Compost

- Soil
- Leaf and yard waste collected or accepted by a leaf and yard waste system
- Compost produced by composting
- Organic waste material from a greenhouse, nursery, garden centre or flower shop

Other

- Waste electrical and electronic equipment
- Used tires, shredded and chipped tires and crumb rubber recovered from used, chipped or shredded tires, except for tire fluff
- Asbestos waste
- Hazardous waste

*Schedule 1 of O. Reg. 79/15

ALCFs and O. Reg. 79/15

- Long history of alternative fuels used in cement production around the world for more than 20 years[1]
- Six Cement Plants across **Ontario**
  - St Marys Cement – St. Marys
  - St Marys Cement – Bowmanville
    - ALCFs: shredded wood from post construction waste, nested plastics and paper, and shredded caps, labels and bags
  - Lafarge (Bath)
    - ALCFs: local supplies such as construction and demolition site debris (wood based), railway ties, and other energy containing materials that cannot be recycled
  - CRH (Mississauga)
  - Lehigh (Picton)
  - Federal White Cement (Woodstock)
- Canada Cement Industry (1990 to 2019)[2]
  - Conventional fuel use: reduced from 97% to 85%
  - Alternative fuels and mixed materials use: increased from 3% to 13%
- Europe has one of the highest alternative fuel substitution rate in the cement sector (almost 40%)

1. The Pembina Institute and Environmental Defence. *Alternative Fuel Use in Cement Manufacturing. Implications, Opportunities and barriers in Ontario,* 2014
2. Global Cement and Concrete Association, GNR PROJECT Reporting CO2 (https://gccassociation.org/gnr/)

ALCFs at St Marys Cement

How will the ALCFs be used in the production process?

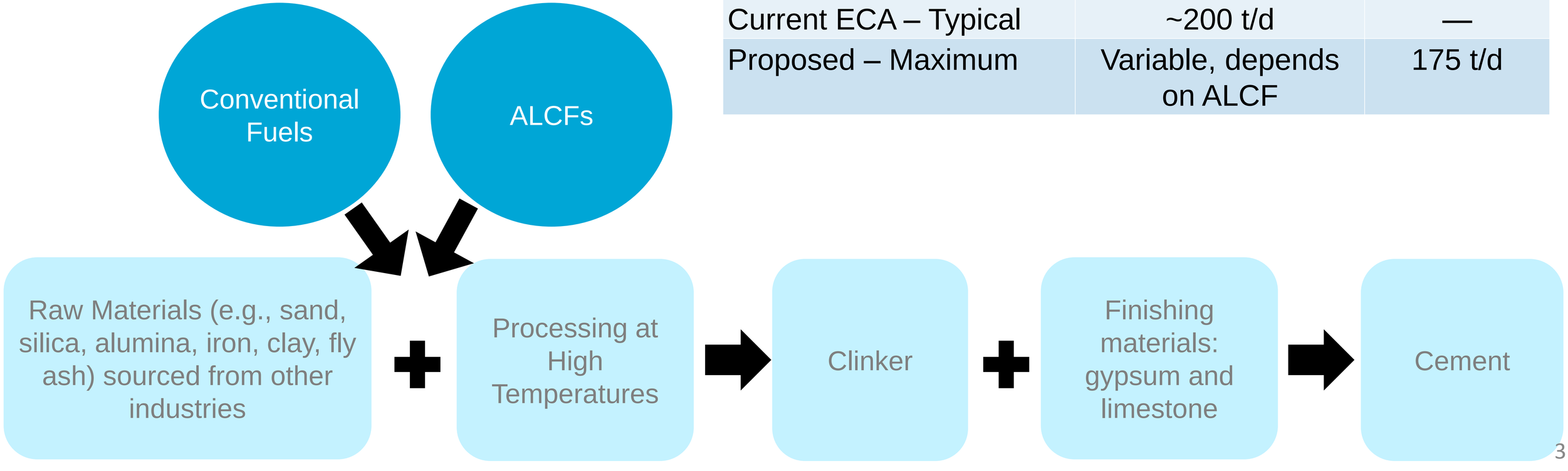
- SMC is currently approved to use petroleum coke (petcoke), coal and natural gas as the conventional fuels for regular firing as well as diesel, propane and natural gas for pre-heating and during start-up
- SMC is also approved to use solid fuel as supplementary fuels, including carbon dust, metallurgical coke and carbon black
- ALCFs will be introduced into the kiln through solid fuel delivery system which operates at extremely high temperatures along with conventional fuels
- The fuel delivery system is interlocked with the plant control system
- ALCFs will not be used during the start-up and shut-down of the kiln

Plant Control System Monitors

Proposed ALCFs

- As part of its Alternative Low Carbon Fuels (ALCFs) Project, St Mary Cement is proposing the following:
  - daily throughput of ALCFs at the Site of up to 175 tonnes per day [t/d]
  - installation of new equipment at the Site to feed ALCFs
  - installation of ALCF storage at the Site using enclosed containers and buildings

	Conventional Fuel	ALCF
Current ECA – Maximum	288 t/d	—
Current ECA – Typical	~200 t/d	—
Proposed – Maximum	Variable, depends on ALCF	175 t/d



Proposed ALCF for St Marys Cement Plant

SMC is considering the use of the following **mixtures** of non-recyclable and non-odorous materials as ALCFs at its Plant to target a 40% thermal replacement:

Non-Recyclable Paper Fiber/Wood/Plastic Composites

single-serve coffee pods, printed papers, paper towels, rejects and trimmings from paper recycling facilities such as ragger tails (residue including plastic trimmings, staples, paper fibre and metal wire), end rolls and cores

Non-Recyclable Plastics

manufacturing rejects, material resource recovery facility rejects, plastics bags and packaging

Biomass Materials

sawdust, wood chips, wood, miscanthus grass, millet, sorghum, hemp, switch grass, and maize

Construction & Demolition By-Products

scrap wood, treated lumber, carpets, textiles, sawdust, floor laminates and asphalt shingles

Rubber Materials

weather stripping or other non-tire derived materials

The ALCF materials that will be used at the Cement Plant are:

- not derived from or composed of any material set out in Schedule 1 of O. Reg. 79/15 (e.g., not hazardous)
- wholly derived from/composed of materials that are biomass/municipal waste/a combination of both
- has a high heat value of at least 10 MJ/kg

Supporting Activities and Processes

- ALCF Handling Procedures and Testing Manual
  - Reception
    - ALCFs will be transported to the Facility in enclosed trailers
    - Material will be unloaded directly from the truck into the ALCF building to prevent fugitive emissions
  - ALCF Vendor Screening
  - Sampling and Testing (Quarterly)
    - Operational objectives: plant must ensure that the materials meet specifications related to particle size and moisture content so that the materials are suitable for injection into the process
      - Parameters: Moisture, total halogen content, caloric value, carbon content (biological and total)
    - Environmental objectives: metals/metal hydrides scan will be completed in accordance with the current adjunct fuel requirements in the plant's ECA
      - Parameters: metals and metal hydrides (e.g., Arsenic, Cadmium, Tin)
  - Storage

Questions?

[ALCFs at St Marys Cement]

Sustainability & Climate Change

Sustainability and Climate Change

- Emissions from cement production account for ~7% of global greenhouse gas (GHG) emissions
- The global cement and concrete manufacturing industry has made commitments to reduce 25% of GHG emissions by 2030 and achieve carbon neutrality by 2050
- The Canadian cement sector is dedicated to reduce GHG emissions through replacing conventional fuels with ALCFs and implementing transformative technologies such as carbon capture and reuse and other manufacturing innovations
- VCNA is committed to following the global and Canadian cement industry's commitments. VCNA is working to develop products that would be carbon neutral by 2050.

St Marys Cement Decarbonization Strategy

Reduce greenhouse gases and create long term value

Emission target: Net Zero CO_2 concrete by 2050

--- Think globally, but act locally ---

Levers	Development	Operating Model
Clinker substitution	SCM Contracts, new sources & suppliers	Own development & partnership with suppliers
Alternative fuels	AFR know how, contracts and supplier quality	Own development & partnership suppliers' development
Energy efficiency	New equipment & learning curve	Own implementation
Innovation (technologies & products)	R&D and operational know how of green solutions	Partnership with industries, peers, universities and value chain

Advocacy: Carbon regulation, Independent verification, AFR, market development, concrete life cycle

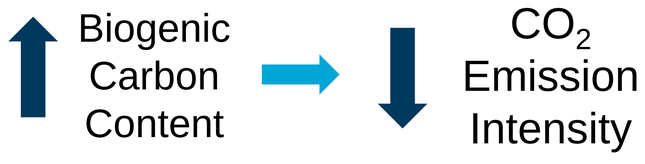
CO_2 Emission Intensity Assessment

What is Carbon Dioxide Emission Intensity?

- Carbon Dioxide Emission Intensity is a form of measurement that allows different fuel types to be compared and is an indicator of the amount of CO_2, which is a GHG, that is emitted into the atmosphere when the fuel is used
- A lower CO_2 Emission Intensity value means that the material will release less CO_2.

How does this project consider and measure Carbon Dioxide Emission Intensity?

- In accordance with O. Reg. 79/15, the CO_2 emission intensity calculations must be based on chemical analysis data of the conventional fuels and proposed ALCFs
- The CO_2 emission intensity calculation for conventional fuels is based on the total amount of carbon as there is no biogenic carbon contained in conventional fuel
- The CO_2 emission intensity calculation for ALCFs is based on the amount of non-biogenic carbon amount as that is the main contributor to climate change



- As the carbon content of ALCFs may vary depending on the fuel supplier, St Marys Cement's fuel testing program to regularly monitor the CO_2 emission intensity of the ALCFs used at the plant will be part of the ALCF Handling Procedures and Testing Manual

CO_2 Emission Intensity Assessment

- Parameters of CO_2 Emission Intensity Calculation:

Type of Fuel	**Conventional Fuel**	**Alternative Low Carbon Fuels**					
		Shredded wood from post construction waste			**Nested plastics and paper**	**Shredded caps, labels and bags**	**Shredded conveyor belt rubber**
	Petcoke	Supplier 1	Supplier 2	Supplier 3	Supplier 4	Supplier 5	Conveyor belt rubber*
High Heat Value [MJ/kg]	32.95	15.61	17.18	17.57	18.34	28.28	34.28
Non-Biological Carbon [% wt]	—	0.39%	0.87%	0.0%	20%	51%	25.5%
CO_2 Emission Intensities [kg CO_2/MJ]	0.0931	0.0009	0.0019	0.0000	0.0401	0.0659	0.0273
Notes:	Petcoke parameters are based on the average of six samples *Published literature was used to estimate CO_2 Emission Intensity while St Marys Cement awaits laboratory results of % biogenic carbon						

- The ALFCs meet the requirements in O. Reg. 79/15
  - CO_2 emission intensity: ALCFs < Petcoke ✓
  - ALCFs High Heat Value > 10 MJ/kg ✓

- CO_2 Emission Intensity Calculations:

Conventional Fuel

CO_2 emission intensity = CC_{total} x 3.67/HHV

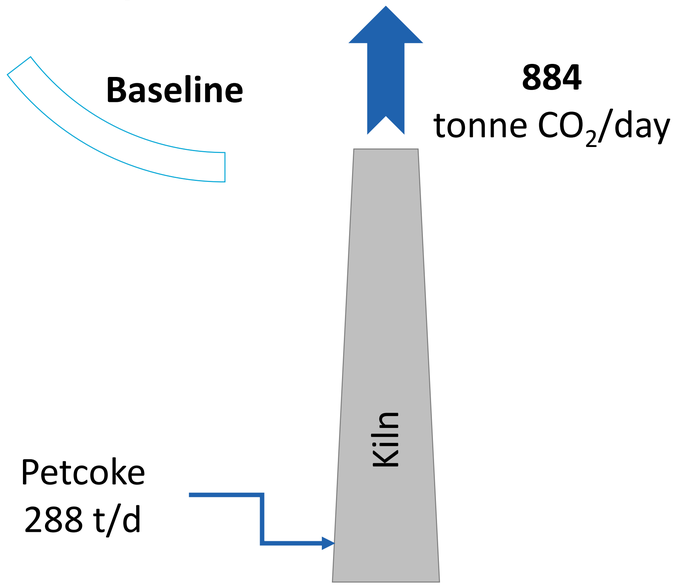
ALCFs

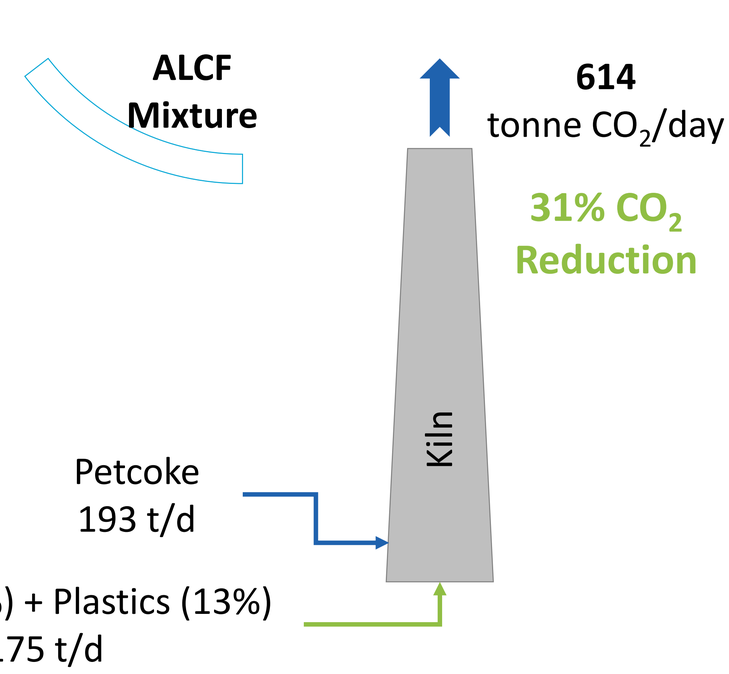
CO_2 emission intensity = $CC_{non\text{-}bio}$ x 3.67/HHV

$CC_{non\text{-}bio}$ = total carbon [%wt] x (1 - biological carbon [% wt])

CO_2 Emission Intensity Assessment

- The maximum throughput of ALCFs is anticipated to be 175 tonnes per day [t/d]
- For comparison, a petcoke-only scenario (Baseline) was compared to an ALCFs blend scenario (ALCF Mixture)





	Petcoke
Maximum Throughput [tonne/day]	288
Average Fuel HHV [MJ/kg]	32.95
Maximum Required Heat Input [GJ/day]	9490

	Petcoke	ALCF Mixture
Maximum Throughput [tonne/day]	193	175
Average Fuel HHV [MJ/kg]	32.95	17.82
Maximum Required Heat Input [GJ/day]	6372	3118

ALCF 33% Thermal Replacement

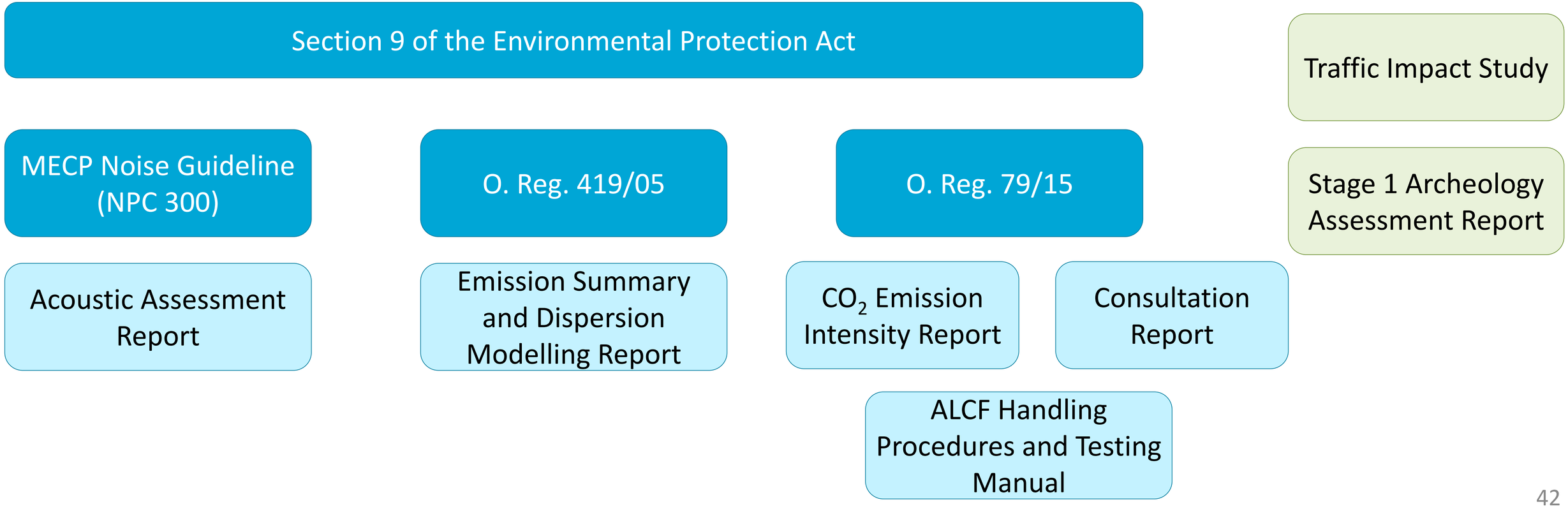
Questions?

[Sustainability & Climate Change]

Environment

ALCF Compliance

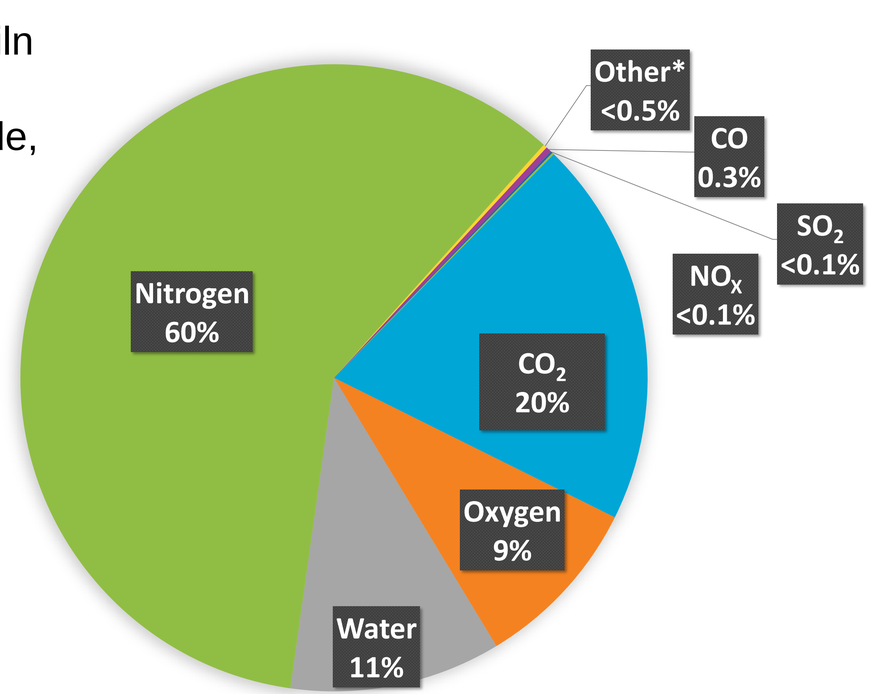
- St Marys Cement is preparing the application to amend the current ECA for the Site to incorporate the following:
  - allow for the permanent use of ALCFs; and
  - include Hydrogen in the list of fuels used at the Site.
- St Marys Cement's application will meet all the requirements under Section 9 of the Environmental Protection Act



ALCF Compliance – Air Quality

- Per the requirements of O. Reg. 419/05, a maximum emissions scenario for all contaminants of concern was assessed.
- A maximum emissions scenario reflects the maximum capacity of the facility and the facility's operational variability including a broad range of ALCFs.
- In reality, a maximum emissions scenario is never reached which means the predicted impacts are overestimated.
- A total of 104 Contaminants of Concern were assessed:
  - Inorganics (trace metals)
  - Chlorinated compounds (HCl and organics)
  - Volatile organic compounds (e.g. benzene)
  - Polycyclic aromatic hydrocarbons (e.g. benzo(a)pyrene)
  - Dioxins and Furans
  - Particulate Matter
  - Nitrogen Oxides and Sulphur Dioxide
  - Carbon Monoxide
  - Ammonia

The majority of kiln stack emissions are carbon dioxide, water vapour & ambient air.



*Trace amounts including: Other Sulphur Compounds, Volatile Organic Compounds, Hydrochloric Acid, Particulates, Ammonia, Metals, Polycyclic Aromatic Hydrocarbons,Dioxins & Furans

ALCF Compliance – Air Quality

- Kiln Stack Emission Estimation Methodology - Maximum Emissions Scenario

  - Two emission estimation methods were used to calculate the maximum emission rates:

Process and Air Pollution Control Equipment Dominant Contaminants	Kiln Input Dominant Contaminants
▪ The maximum emission rate for each contaminant from all tests (2011 demonstration and annual testing) was used.	▪ The maximum emission rate for each contaminant from all tests to date was prorated based on % change in total kiln input for that contaminant.
▪ Particulate, NOx, CO, Ammonia, non-chlorinated VOCs and PAHs	▪ Trace metals, Sulphur-based compounds including SO_2, Chlorinated compounds (HCl, organics including Dioxins and Furans)

  - Actual source testing data from the St Marys Cement Plant and ALCF fuel analysis from the Bowmanville plant were used.

- The Facility will continue with their current monitoring efforts (CEMS and Raw Material QAQC). Once approved, the amended ECA is expected to have requirements for annual stack testing, ALCF material analysis and continuous processing monitoring (CPM) during the use of ALCF.

ALCF Compliance – Air Quality

- ESDM Assessment Results
  - All Compounds for Assessment are **below** their Ministry's Air Quality Standards under O. Reg. 419/05 (MECP POI Limits)
  - The updated ESDM results show that the use of ALCF will not result in a change in local air quality
  - Of the 104 compounds assessed,
    - 82 compounds were below 1% of the MECP POI Limits
      - Dioxins and Furans are less than 1% of the MECP POI Limit
    - 4 compounds were above 30% of the MECP POI Limits : particulate matter, respirable crystalline silica, nitrogen oxides and sulphur dioxide (for the 2023 1-hr standard)
      - Particulate matter is 55% of the POI limit (highest result)

Contaminant Name	CAS #	Maximum Total Emission Rate (g/s)	Air Dispersion Model Used	Maximum POI Concentration	Averaging Period		Ministry POI Limit	Limiting Effect	Ministry Regulation Schedule #	Percentage of Ministry POI Limit
Suspended Particulate Matter	PM	1.13E+01	AERMOD	6.63E+01	24 hr	24 hr	120	Visibility	3	55.2%
Gaseous Compounds										
Nitrogen Dioxide	10102-44-0	4.69E+01	AERMOD	1.95E+02	1 hr	1 hr	400	Health	3	48.8%
Nitrogen Dioxide	10102-44-0	4.69E+01	AERMOD	4.41E+01	24 hr	24 hr	200	Health	3	22.0%
Sulphur Dioxide	7446-09-5	3.45E+01	AERMOD	5.52E+01	1 hr	1 hr	690	Health & Vegetation	3	8.0%
Sulphur Dioxide	7446-09-5	3.45E+01	AERMOD	5.52E+01	1 hr	1 hr	100	Health	3 (July 2023)	55.2%
Sulphur Dioxide	7446-09-5	3.45E+01	AERMOD	8.46E+00	24 hr	24 hr	275	Health & Vegetation	3	3.1%
Sulphur Dioxide	7446-09-5	3.45E+01	AERMOD	1.03E+00	annual	annual	10	Vegetation	3 (July 2023)	10.3%
Metals										
Manganese	7439-96-5	1.86E-02	AERMOD	6.13E-02	24 hr	24 hr	0.4	Health	3	15.3%
Dioxin and Furans										
TOTAL Dioxin and Furans (TEQ)	CCD	1.19E-09	AERMOD	2.90E-10	24 hr	24 hr	0.0000001	Health	3	0.3%
Hydrogen Chloride										
Hydrogen Chloride	7647-01-0	1.23E+00	AERMOD	3.01E-01	24 hr	24 hr	20	Health	3	1.5%
Polycyclic Aromatic Hydrocarbons										
Benzo(a)pyrene	50-32-8	7.00E-06	AERMOD	1.71E-06	24 hr	24 hr	0.005	Health	DAV/URT	<0.1%
Benzo(a)pyrene	50-32-8	7.00E-06	AERMOD	1.63E-07	24 hr	Annual	0.0001	Health	AAV	0.2%
Benzo(a)pyrene	50-32-8	7.00E-06	AERMOD	1.63E-07	Annual	Annual	0.00001	Health	3	1.6%
Volatile Organic Compounds										
Benzene	71-43-2	1.10E+00	AERMOD	2.68E-01	24 hr	24 hr	100	Health	DAV/URT	0.3%
Benzene	71-43-2	1.10E+00	AERMOD	2.56E-02	24 hr	Annual	4.5	Health	AAV	0.6%
Benzene	71-43-2	1.10E+00	AERMOD	2.56E-02	Annual	Annual	0.45	Health	3	5.7%

ALCF Compliance – Noise

- Existing noise emissions regulated by the plant's current ECA
- Noise from the proposed ALCF project will be negligible relative to the overall sound levels from the plant
  - The ALCF operations will be located within a building – noise will be contained indoors
  - Noise from truck deliveries will be minimal – the maximum number of trucks associated with the project are estimated only at 5 between 7 am and 7 pm, and 4 between 7 pm and 7 am

Questions?

[Environment]

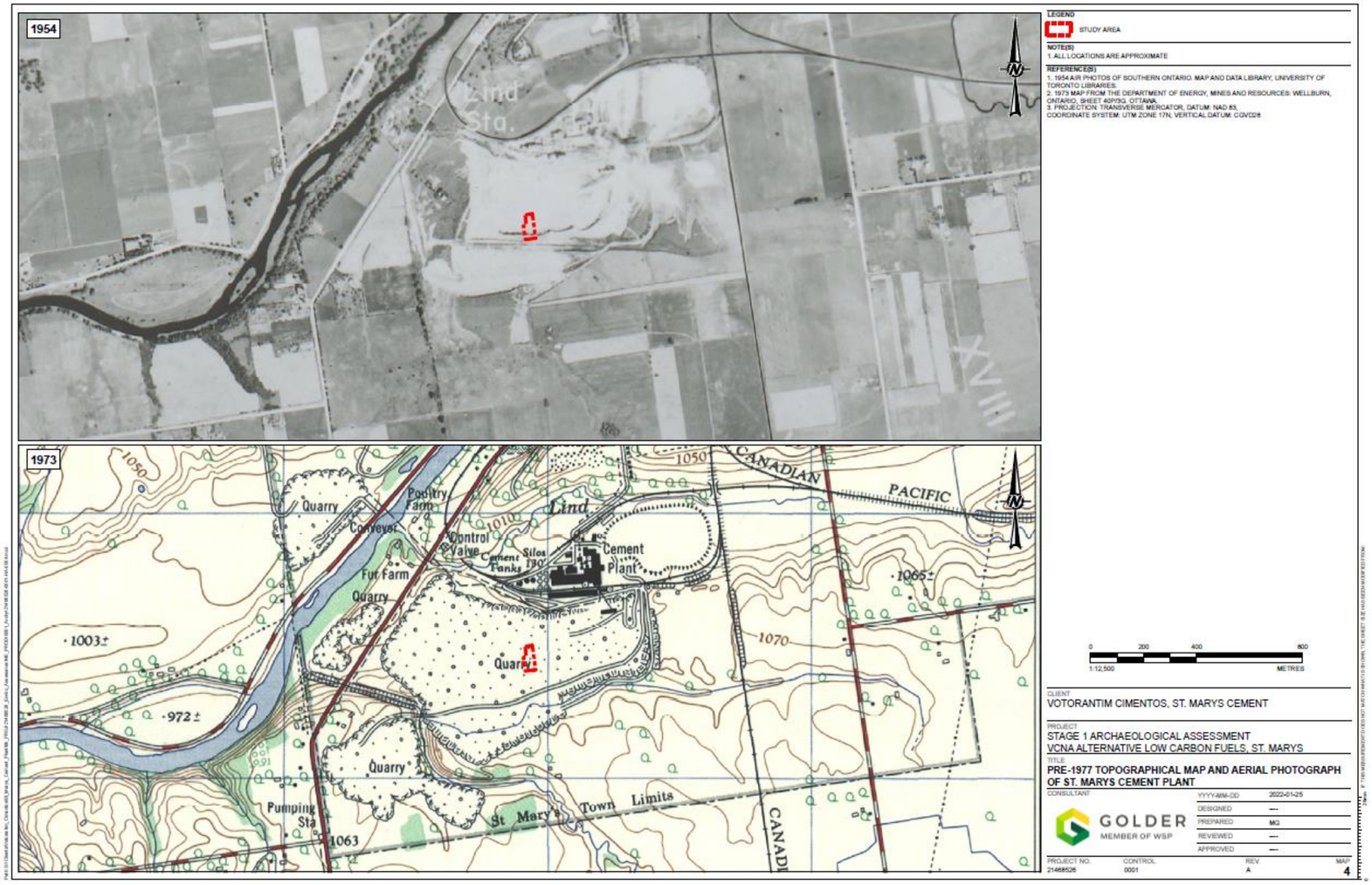
Supplementary Technical Studies

Archeology

- Based on the criteria identified by the Ministry of Heritage, Tourism, Sport and Culture Industries for assessing archaeological potential, and compared to the historical and archaeological context of the Study Area/Proposed Building Footprint, it appeared the Study Area had archaeological potential for pre- and post-contact Indigenous resources as well as historical Euro-Canadian resources
  - This potential was determined by environmental factors such as the proximity of water sources and suitable soils as well as being located in an area of Blanshard Township with historical settlement dating to the mid-19th century

Archeology

- Entire Study Area has been subject to extensive below-grade land disturbance in the 20th century
- It was concluded that any archaeological potential that may have existed in the Study Area has been removed as a result of quarrying in that area during the 20th century
- There is no potential for archaeological resources within the limits of the Study Area and as such no further archaeological work is recommended



Traffic Impact Study

What do we know?

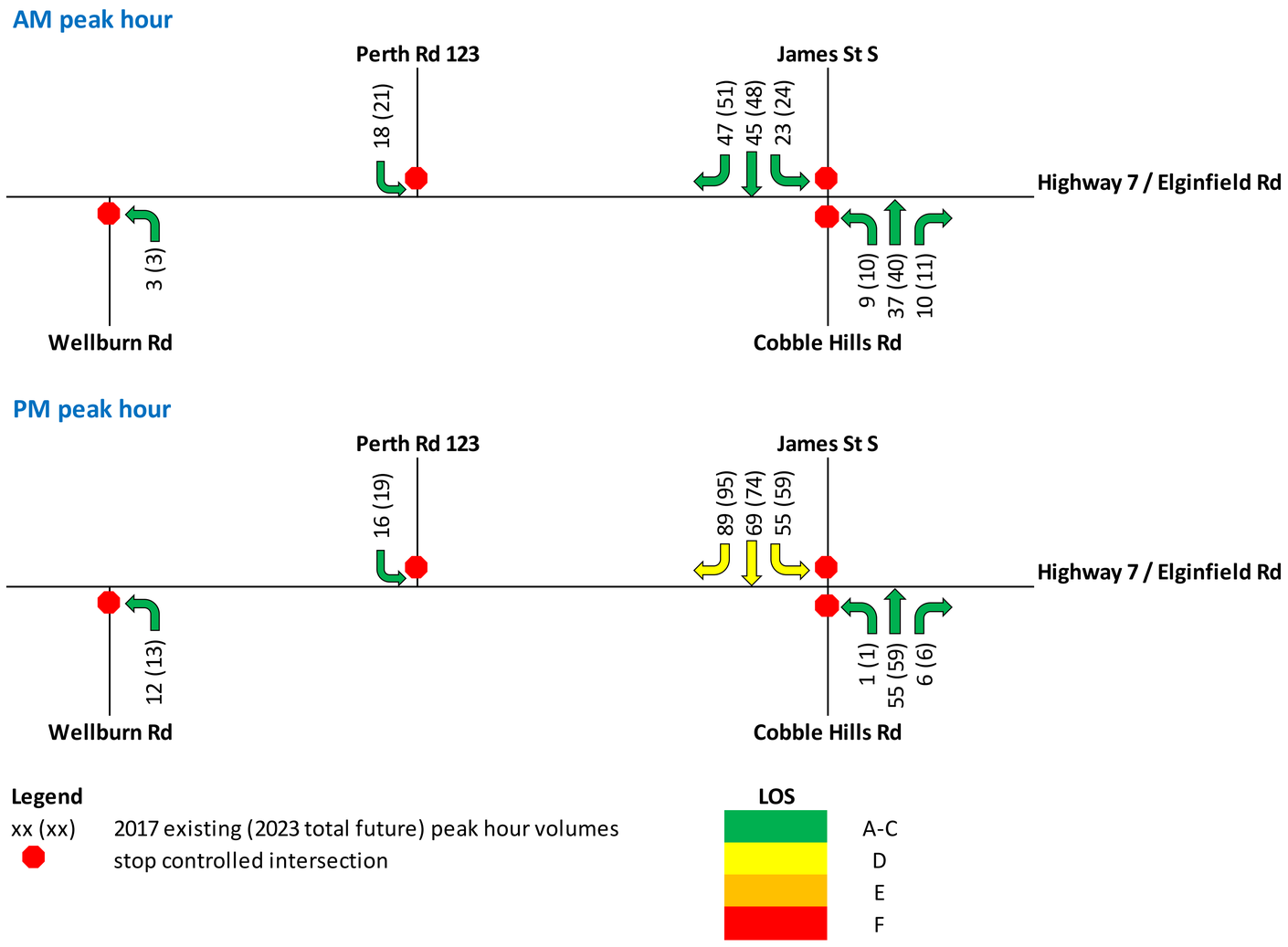
- The suppliers of ALCFs are in the process of being evaluated. St Marys Cement will prioritize proximity to the cement plant
- Trucks serving the St Marys Cement Plant will not be routed through the Town of St. Marys
  - Trucks will use Perth Road 123 (south of facility) as the main access route

Traffic Impact Study

- Traffic volume data
  - Existing conditions based on 2015 and 2017 turning movement counts
  - Future volumes in 2023 based on a 1.2% annual linear growth rate
- Daily peak hours:
  - AM peak: 7:30-8:30 a.m.
  - PM peak: 4:30-5:30 p.m.
- Number of trucks in and out of the Site:
  - Existing conventional trucks:
    - 20 trucks in and 20 trucks out
  - Future ALCF trucks:
    - 2 trucks in and 2 trucks out

Traffic Impact Study

- Current traffic levels meet the Ministry of Transportation of Ontario's acceptable levels
- Traffic performance remains unchanged between existing and future conditions
  - Increase in ALCF trucks during the AM and PM peak hours do not have a major impact on traffic conditions
  - Traffic movements at stop approaches in future conditions continue operating at LOS C or better except for the southbound movement at James Street that operates at LOS D.



LOS – Level-of-Service

Questions?

[Supplementary Technical Studies]

We want to hear from you!

How can you participate in this project?

- Talk to our team members today or fill out a comment form and we will respond
  - We would appreciate if you send your comment forms to us by **February 24, 2022**
- Visit our website: www.stmaryscement.com/Sustainability/St-Marys-Alternative-Low-Carbon-Fuels
  - All notices and presentation materials will be posted on the Project website
- Contact us by Phone or Email: StMarys_ALCF@golder.com

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Questions?