

## **APPENDIX E – PRELIMINARY AIR QUALITY MEMORANDUM**



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## MEMORANDUM

**DATE:** 2025-03-07 **RWDI Reference No.:** 2401722

**TO:** Nathan Farrell | Senior Environmental Planner,  
Egis Group **EMAIL:** [nathan.farrell@egis-group.com](mailto:nathan.farrell@egis-group.com)

**FROM:** John Sproule | Air Quality Engineer, RWDI **EMAIL:** [John.Sproule@rwdi.com](mailto:John.Sproule@rwdi.com)  
Alain Carrière | Senior Project Manager, RWDI [Alain.Carriere@rwdi.com](mailto:Alain.Carriere@rwdi.com)

**RE:** **MTO Rest Centres Class Environmental Assessment (MTO 5023-E-0006)  
Opasatika/Kapuskasing – White River – Wawa  
Preliminary Design – Air Quality  
Northeast Region, ON**

Dear Nathan,

This memorandum details RWDI's air quality preliminary design assessment of three Ontario Ministry of Transportation (MTO) rest centres planned in the Northeast Region, Ontario. This assessment has been completed as per the Terms of Reference under MTO's assignment number: 5023-E-0006. The three proposed rest areas are proposed along Highway 11 at Opasatika/Kapuskasing (GWP 5133-22-00), along Highway 17 at White River (GWP 5134-22-00), and along Highway 17 at Wawa (GWP 5135-22-00). Multiple options (3 or 4) are currently proposed at each location. The objective of this study is to outline the applicable air quality criteria and MTO guidelines, and qualitatively assess the various proposed options from an air quality standpoint.

## APPLICABLE GUIDELINES

Air quality impacts are assessed by comparing the future air contaminant levels with and without the proposed rest areas. The rest areas are anticipated to be associated with stationary sources of air quality contaminants, most notably truck idling. Moreover, the rest areas may impact the overall traffic volumes on the corresponding highways; however, that will be confirmed at a later stage of the project. The main applicable guidelines are Ontario's Ministry of the Environment, Conservation and Parks (MECP) Ambient Air Quality Criteria (AAQC) for concentrations of airborne contaminants (MECP, 2024), Canadian Council for Minister's of the Environment (CCME) Canadian Ambient Air Quality Standards (CAAQS) (CCME, 2024), and the MTO Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects ("MTO Air



Guide”) (MTO, 2020). As noted in the MTO Air Guide, local air quality impacts are assumed to be limited to a distance of approximately 500 metres from the transportation facility, in each direction, with concentrations of road-related pollutants expected to drop to within 10% of background concentrations over this distance.

## Contaminants of Interest

Vehicular traffic produces a variety of air contaminants as a result of fuel combustion inside the engine, evaporation of fuel from the tank, brake and tire wear, and re-suspension (also known as re-entrainment) of loose particles on the road surface (silt) as the vehicle travels over the road surface. The following key contaminants have commonly been assessed in air quality studies for Ontario roadway EA’s (MTO, 2020): nitrogen dioxide, carbon monoxide, inhalable particulate matter (PM<sub>10</sub>), respirable particulate matter (PM<sub>2.5</sub>), benzene, benzo(a)pyrene, 1,3-butadiene, formaldehyde, acetaldehyde, and acrolein.

## Air Quality Thresholds

The AAQCs are effects-based levels in air, based on health and/or other effects. They are used in environmental assessments, special air monitoring studies, and assessments of general air quality to determine the potential for adverse effects. The AAQCs are not enforceable standards but are desirable objectives that municipalities should strive to attain.

The CAAQS are health-based air quality objectives for pollutant concentrations in outdoor air. These objectives are being phased in, with the final and most stringent objective becoming active in the year 2025. The CAAQS were developed for use by provinces and territories to guide air zone management actions. They are not project-level regulatory standards; measures mandated to achieve the CAAQS should consider technical achievability, practicality, and implementation costs (CCME, 2019).

The AAQCs and CAAQS used to assess potential local project impacts are summarized in **Table 1** for the contaminants of interest.

**Table 1: Summary of Relevant Air Quality Thresholds**

Pollutant	Criterion (µg/m <sup>3</sup> )	Averaging Period	Source of Threshold Value
PM <sub>2.5</sub>	27	24-hour	CAAQS
	8.8	Annual	CAAQS
PM <sub>10</sub>	50	24-hour	AAQC
CO	36,200	1-hour	AAQC
	15,700	8-hour	AAQC
NO <sub>2</sub>	400	1-hour	AAQC
	200	24-hour	AAQC
	83.1	1-hour	CAAQS 2025
	23.8	Annual	CAAQS 2025



Pollutant	Criterion ( $\mu\text{g}/\text{m}^3$ )	Averaging Period	Source of Threshold Value
Benzo(a)pyrene	5.0E-05	24-hour	AAQC
	1.0E-05	Annual	AAQC
Acetaldehyde	500	0.5-hour	AAQC
	500	24-hour	AAQC
Acrolein	4.5	1-hour	AAQC
	0.4	24-hour	AAQC
Formaldehyde	65	24-hour	AAQC
Benzene	2.3	24-hour	AAQC
	0.45	Annual	AAQC
1,3-Butadiene	10	24-hour	AAQC
	2	Annual	AAQC

## Existing Ambient Air Quality Measurements

Historical ambient air quality monitoring data from stations within the ECCC National Air Pollution Surveillance (NAPS) Program and MECP ambient air monitoring station network were used to determine background concentrations for the contaminants of interest. These background concentrations will be added to project modelled contaminant concentrations to determine potential cumulative air quality impacts.

In selecting the most appropriate monitoring station(s), consideration was given to whether the station was in a similar land use setting to that of the study area and the availability of the data for the contaminant. There are no representative stations located in northern Ontario for carbon monoxide, polycyclic aromatic hydrocarbons (PAH), carbonyls, and volatile organic compounds, so southern Ontario surrogates were used. The most recent five years of raw data between 2014 and 2022 were downloaded and analyzed to determine the appropriate percentiles, annual mean, and maximums. Some contaminants, such as acrolein, were found to have limited data availability, and the most recent available data was used.

**Table 2** summarizes the MECP and NAPS ambient air monitoring stations that were used in the assessment and a list of the monitored contaminants. These monitoring stations are the ones with recent data available that are most representative of the study area. They provide a reasonable, conservative representation of existing air quality conditions for all rest-area locations in northern Ontario.



**Table 2: Ambient Monitoring Station Information**

NAPS ID	MECP ID	Station Name	Location	Contaminants	Year
60709	71078	Sault Ste. Marie	Sault College, 443 Northern Avenue	PM <sub>2.5</sub> , PM <sub>10</sub> , NO <sub>2</sub>	2018-2022
60440	34021	Toronto North - Downsview	4905 Dufferin Street	CO	2018-2022
62601	N/A	Experimental Farm	Simcoe	Benzo(a)pyrene Acetaldehyde Acrolein Formaldehyde	2017-2022 <sup>[1]</sup> 2015-2019 2014-2017 2015-2019
65101	48006	Newmarket	Eagle St. and McCaffrey Rd.	Benzene 1,3-Butadiene	2017-2022 <sup>[1]</sup> 2017-2022 <sup>[1]</sup>

**Notes:** [1] No data available for 2021.

## Receptors

A receptor is any location that may experience an undesirable impact due to air emissions associated with the project. The MTO Air Guide provides a useful categorization of receptors.

1. Sensitive Receptors: i.e., residential dwellings; and
2. Critical Receptors: i.e., retirement homes, hospitals, childcare centres, schools, and similar institutional buildings.

## Existing Air Quality Conditions

**Table 3** summarizes the ambient air measurements from the air quality monitoring stations previously listed in **Table 2**.

**Table 3: Summary of Background Air Quality**

Contaminant	Averaging Period	Background Concentration <sup>[1]</sup> [µg/m <sup>3</sup> ]	Description	Threshold [µg/m <sup>3</sup> ]	Percent of Threshold (%)
PM <sub>2.5</sub>	24-hour	8.8	90 <sup>th</sup> Percentile	27	33%
	Annual	5	Annual Average	8.8	57%
PM <sub>10</sub>	24-hour	16.3	90 <sup>th</sup> Percentile	50	33%
CO	1-hour	349	90 <sup>th</sup> Percentile	36,200	1%
	8-hour	362	90 <sup>th</sup> Percentile	15,700	2%
NO <sub>2</sub>	1-hour	17.4	90 <sup>th</sup> Percentile	400	4%
	1-hour	17.4	90 <sup>th</sup> Percentile	83.1	21%
	24-hour	15.0	90 <sup>th</sup> Percentile	200	7%
	Annual	8.0	Annual Average	23.7	34%



Contaminant	Averaging Period	Background Concentration <sup>[1]</sup> [µg/m <sup>3</sup> ]	Description	Threshold [µg/m <sup>3</sup> ]	Percent of Threshold (%)
Benzo(a)pyrene	24-hour	3.8E-05	90 <sup>th</sup> Percentile	5.0E-05	75%
	Annual	2.0E-05	Annual Average	1.0E-05	200%
Acetaldehyde	0.5-hour <sup>[2]</sup>	6.17	90 <sup>th</sup> Percentile	500	1%
	24-hour	2.09	90 <sup>th</sup> Percentile	500	0.4%
Acrolein	1-hour <sup>[2]</sup>	0.07	90 <sup>th</sup> Percentile	4.5	1%
	24-hour	0.03	90 <sup>th</sup> Percentile	0.4	7%
Formaldehyde	24-hour	1.32	90 <sup>th</sup> Percentile	65	2%
Benzene	24-hour	0.46	90 <sup>th</sup> Percentile	2.3	20%
	Annual	0.31	Annual Average	0.45	68%
1,3-Butadiene	24-hour	0.03	90 <sup>th</sup> Percentile	10	0.3%
	Annual	0.01	Annual Average	2	1%

**Notes:** [1] For each contaminant, the most recent, applicable available data were used to calculate an average value to represent existing conditions. The 1-hour, 0.5-hour and 24-hour values were calculated based on the 90<sup>th</sup> percentiles over the available years. The values for the annual averaging period were calculated using the annual concentrations averaged over the available years.

[2] 1-hr average and 0.5-hour average converted from 24-hour average background value following Section 4.4 of the Air Dispersion Modelling Guideline for Ontario.

As shown in **Table 3**, background concentrations for the contaminants of interest are below the AAQCs and CAAQS, except for benzo(a)pyrene which is above its annual AAQC.

## POTENTIAL AIR QUALITY IMPACTS

### Highway 11 at Opatatika/Kapuskasing Rest Areas

Four different options have been considered for the rest area along Highway 11 at Opatatika/Kapuskasing. Options 3, 4, 6, and 7 have been communicated to RWDI as the four final options considered for this area as shown in Figures 1 through 4. Option 3 has four residential houses to the northwest at approximately 100 m setback from the property line. Option 4 has one residential house to the south at approximately 100 m setback. Option 6, shown in Figure 3, has a structure that may be a residence approximately 250 m to the east, although the use of this property is not clear from available satellite and street-view imagery. For the purposes of this assessment, it will be assumed to be residential. Option 7 is proposed to the east of the Opatatika Municipal Complex with the residential houses only to the west at approximately 160 m setback as measured from the property lines. As shown in Figure 4b, the proposed rest area layout for Option 7, provided by Egis Group, indicates the truck route is further to the east at a setback greater than 300 m from the nearest residence to the west. Although a 100 m or greater setback generally should be sufficient to minimize potential for exceedance of air quality thresholds due to extended truck idling at a rest area, under



certain meteorological conditions exceedances may still occur. The extent and frequency of potential exceedances would be determined through detailed modelling.

In conclusion, all the proposed alternatives for the rest area at Opasatika/Kapuskasing are anticipated to be feasible from an air quality perspective pending detailed modelling. However, the order of preference would be for Option 7 (based on the proposed layout), followed by Option 6, Option 4, and finally Option 3.

### **Highway 17 at White River Rest Areas**

Three different options have been considered for the rest area along Highway 17 at White River. Options 7, 8 and 9 have been communicated to RWDI as the three final options considered for this area as shown in Figures 5 through 7. Both Options 7 and 8 do not have any identified air quality receptors within 500 m which is ideal from an air quality perspective. Option 9 has White River Motel, with operable windows, located approximately 30 m to the northwest, multiple homes at approximately 60 m to the east, and additional residences within 200 m to the south. These close setback distances may increase the potential for exceedances of the air quality thresholds at multiple residences.

Although located in proximity to existing support facilities such as restaurants, extended truck idling at Option 9 at White River is anticipated to result in potential exceedances of air quality thresholds at nearby residences. On the other hand, no detailed air quality modelling would be required for Options 7 and 8, as no receptors were identified within 500 metres.

### **Highway 17 at Wawa Rest Areas**

Three different options have been considered for the rest area along Highway 17 at Wawa. Options 2, 5 and 6 have been communicated to RWDI as the three final options considered for this area as shown in Figures 8 through 10. Option 2 does not have any identified receptors within 500 m which is ideal from an air quality perspective. Option 5 has one residential home at approximately 200 m to the northwest with anticipated air contaminant concentrations from extended truck idling at the rest areas generally expected to meet air quality thresholds, pending detailed modelling. Option 6 has one nearby receptor which is the Highway 17 Hotel at a setback distance of 60 m from the edge of the proposed rest area.

Options 2 and 5 are anticipated to conform to air quality thresholds. No detailed modelling would be required for Option 2, while potential cumulative air quality impacts for Option 5 should be confirmed with detailed modelling. Option 6 is expected to be the least favorable location with potential for exceedance of the air quality thresholds at the Highway 17 Hotel.



## Potential Impacts During Construction

Construction activities involve heavy equipment that generates air pollutants and dust; however, these impacts are temporary in nature. The emissions are highly variable, difficult to predict, and depend on the specific activities that are taking place and the effectiveness of the mitigation measures. The best manner to deal with these emissions is through diligent implementation of operating procedures such as application of dust suppressants, reduced travel speeds for heavy vehicles, efficient staging of activities and minimization of haul distances, covering up stockpiles, etc. It is recommended that to minimize potential air quality impacts during construction, the construction tendering process should include requirements for implementation of an emissions management plan.

Such a plan would set out established best management practices for dust and other emissions. Some of the best practices include the following, but not limited to:

- Use of reformulated fuels, emulsified fuels, exhaust catalyst and filtration technologies, cleaner engine repowers, and new alternative-fuelled trucks to reduce emissions from construction equipment.
- Regular cleaning of construction sites and access roads to remove construction-caused debris and dust.
- Dust suppression on unpaved haul roads and other traffic areas susceptible to dust, subject to the area being free of sensitive plant, water or other ecosystems that may be affected by dust suppression chemicals.
- Covered loads when hauling fine-grained materials.
- Prompt cleaning of paved streets/roads where tracking of soil, mud or dust has occurred.
- Tire washes and other methods to prevent trucks and other vehicles from tracking soil, mud or dust onto paved streets or roads.
- Covered stockpiles of soil, sand and aggregate as necessary.
- Compliance with posted speed limits and, as appropriate, further reductions in speeds when travelling sites on unpaved surfaces.



MTO Rest Centres Class Environmental Assessment  
Opasatika/Kapusking - White River - Wawa  
RWDI#2401722  
March 7, 2025

## CLOSURE

Three planned MTO rest areas in northeast Ontario have been investigated by RWDI from an air quality standpoint. This assessment represents the preliminary design study and is to be followed by a detailed design study as the project progresses. The applicable guidelines for both operational and construction air quality have been detailed herein. Moreover, the various options for the rest area placement at each of the three locations have been qualitatively assessed and commented on regarding any potential air quality impacts.

Yours truly,

A handwritten signature in black ink that reads "John Sproule".

John Sproule,  
Senior Air Quality Engineer

JS/klm



## STATEMENT OF LIMITATIONS

This document entitled “MTO Rest Centres Class Environmental Assessment (Opasatika/Kapuskasing – White River – Wawa)”, dated March 7, 2025 was prepared by RWDI AIR Inc., (“RWDI”) for Egis Group (formerly McIntosh Perry) (“Client”). The findings and conclusions presented in this document have been prepared for the Client and are specific to the project described herein (“Project”). The conclusions and recommendations contained in this document are based on the information available to RWDI when it was prepared. Since the contents of this document may not reflect the final design of the Project or subsequent changes made after the date of this document, it is recommended that RWDI be retained by the Client during the final stages of the project to verify that the results and recommendations provided in this document have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this document have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the document and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this document carefully review the stated assumptions contained herein to understand the different factors which may impact the conclusions and recommendations provided.



## REFERENCES

Canadian Council of Ministers of the Environment (CCME), 2019. Guidance Document on Air Zone Management. Retrieved November 4, 2024, from [https://ccme.ca/en/res/guidancedocumentonairzonemanagement\\_secured.pdf](https://ccme.ca/en/res/guidancedocumentonairzonemanagement_secured.pdf).

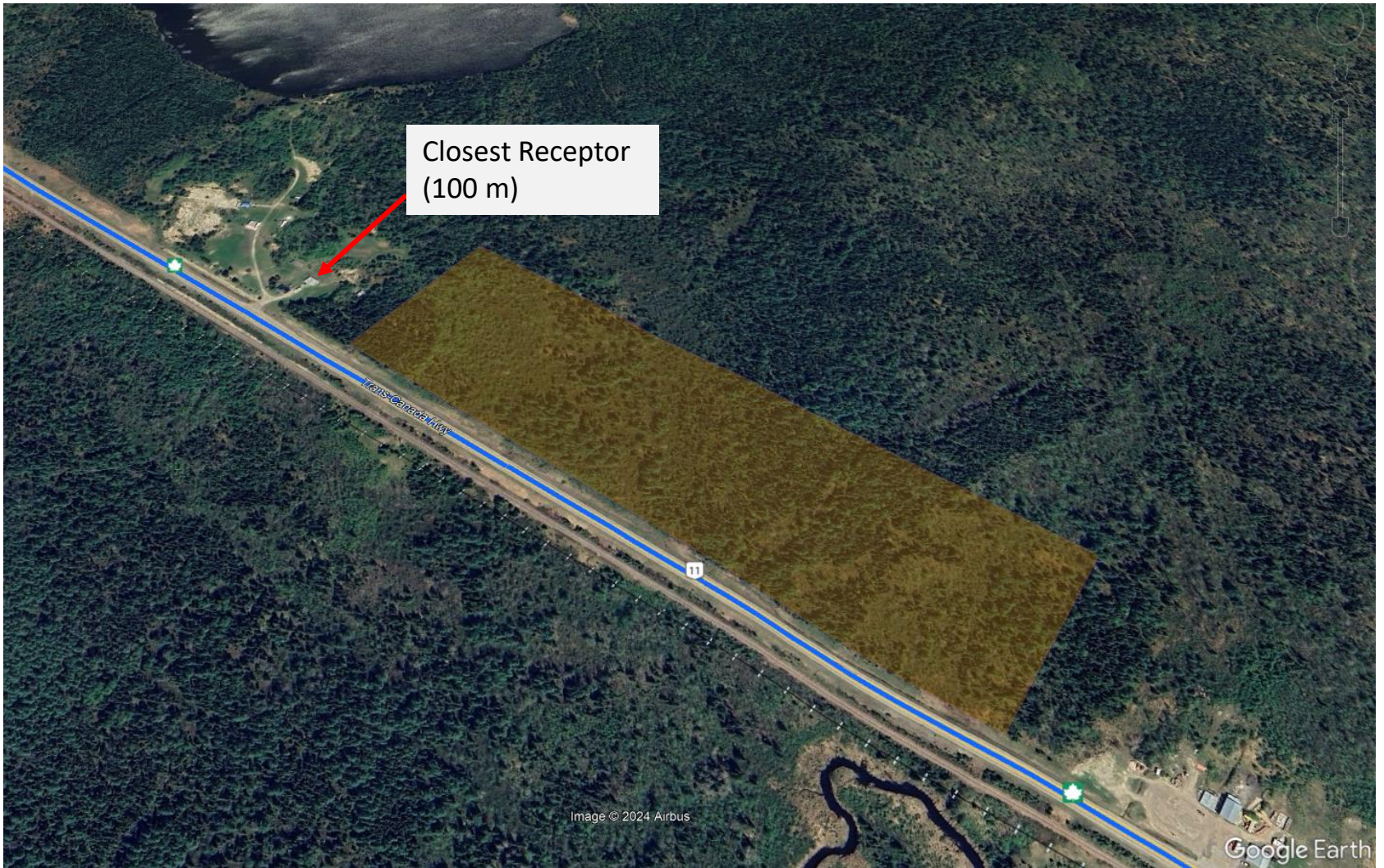
Canadian Council of Ministers of the Environment (CCME), 2024. CAAQS. Retrieved November 4, 2024, from <https://ccme.ca/en/air-quality-report#slide-7>.

Ontario Ministry of the Environment, Conservation and Parks (MECP), 2024. Ontario's Ambient Air Quality Criteria. Retrieved November 4, 2024, from <https://www.ontario.ca/page/ontarios-ambient-air-quality-criteria>.

Ontario Ministry of Transportation (MTO), 2020. Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects.

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# FIGURES



# Opasatika/Kapuskaing MTO Rest Area Option 3

MTO 5023-E-0006 – Northeast Region, ON

Drawn by: AFS/JWS

Figure: 1

Project #:

2401722

Date:

2025-03-07





# Opasatika/Kapuskasung MTO Rest Area Option 4

MTO 5023-E-0006 – Northeast Region, ON

Drawn by: AFS/JWS

Figure: 2

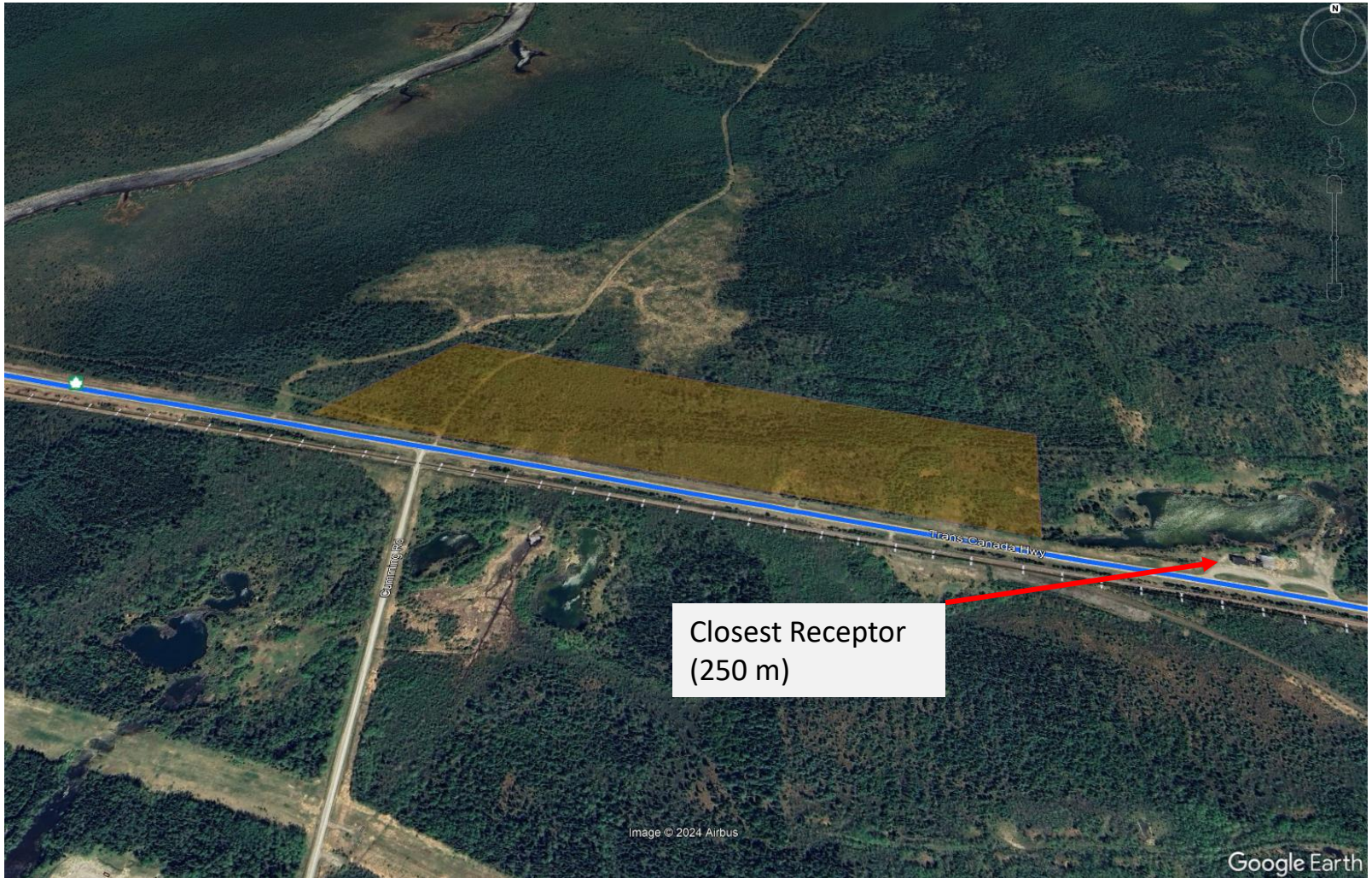
Project #:

2401722

Date:

2025-03-07





# Opasatika/Kapuskasig MTO Rest Area Option 6

MTO 5023-E-0006 – Northeast Region, ON

Drawn by: AFS/JWS

Figure: 3

Project #:

2401722

Date:

2025-03-07





# Opasatika/Kapuskasig MTO Rest Area Option 7

MTO 5023-E-0006 – Northeast Region, ON

Drawn by: AFS/JWS

Figure: 4a

Project #:

2401722

Date:

2025-03-07





# Opasatika/Kapuskasung MTO Rest Area Option 7 – Detail

MTO 5023-E-0006 – Northeast Region, ON

Drawn by: AFS/JWS

Figure: 4b

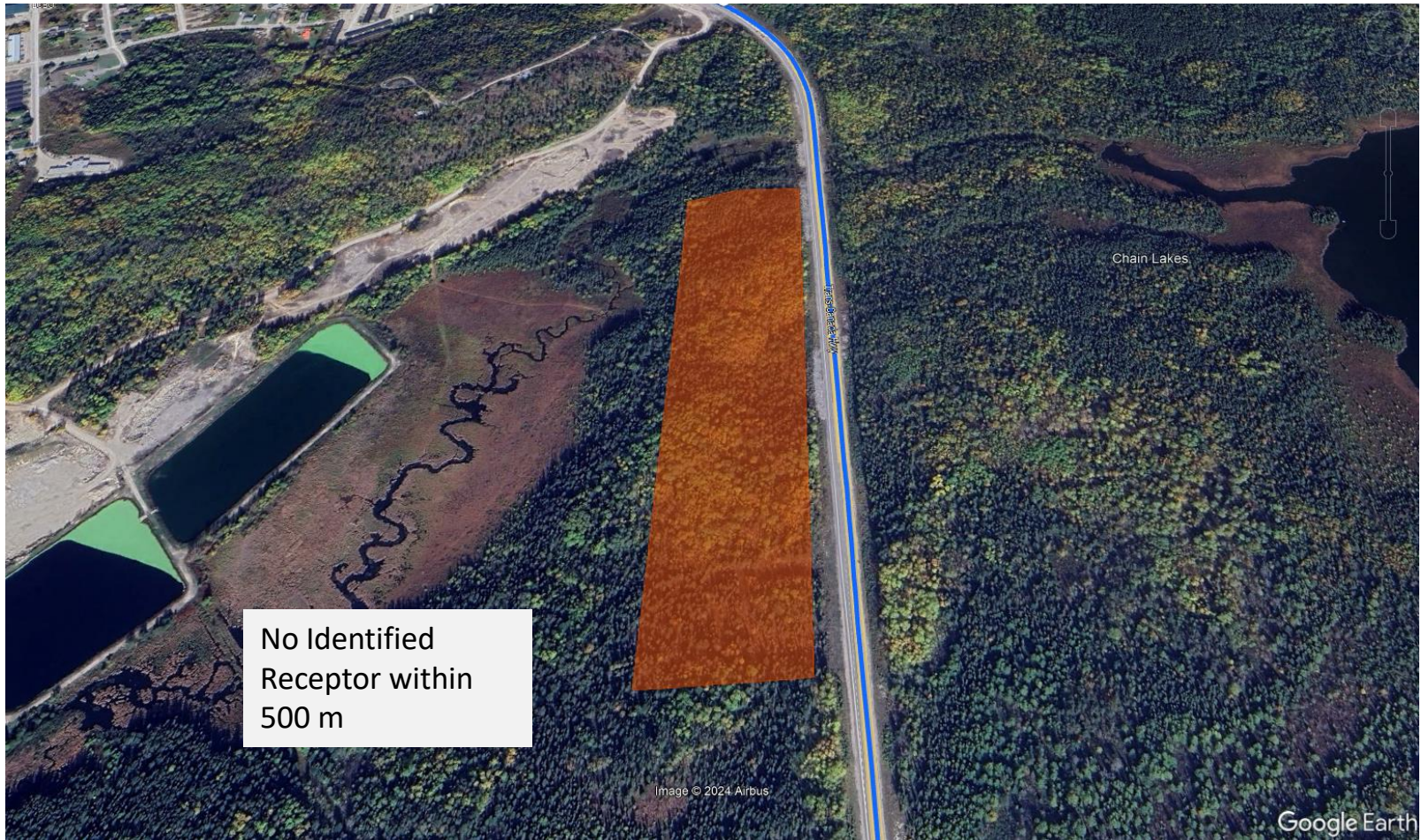
Project #:

2401722

Date:

2025-03-07



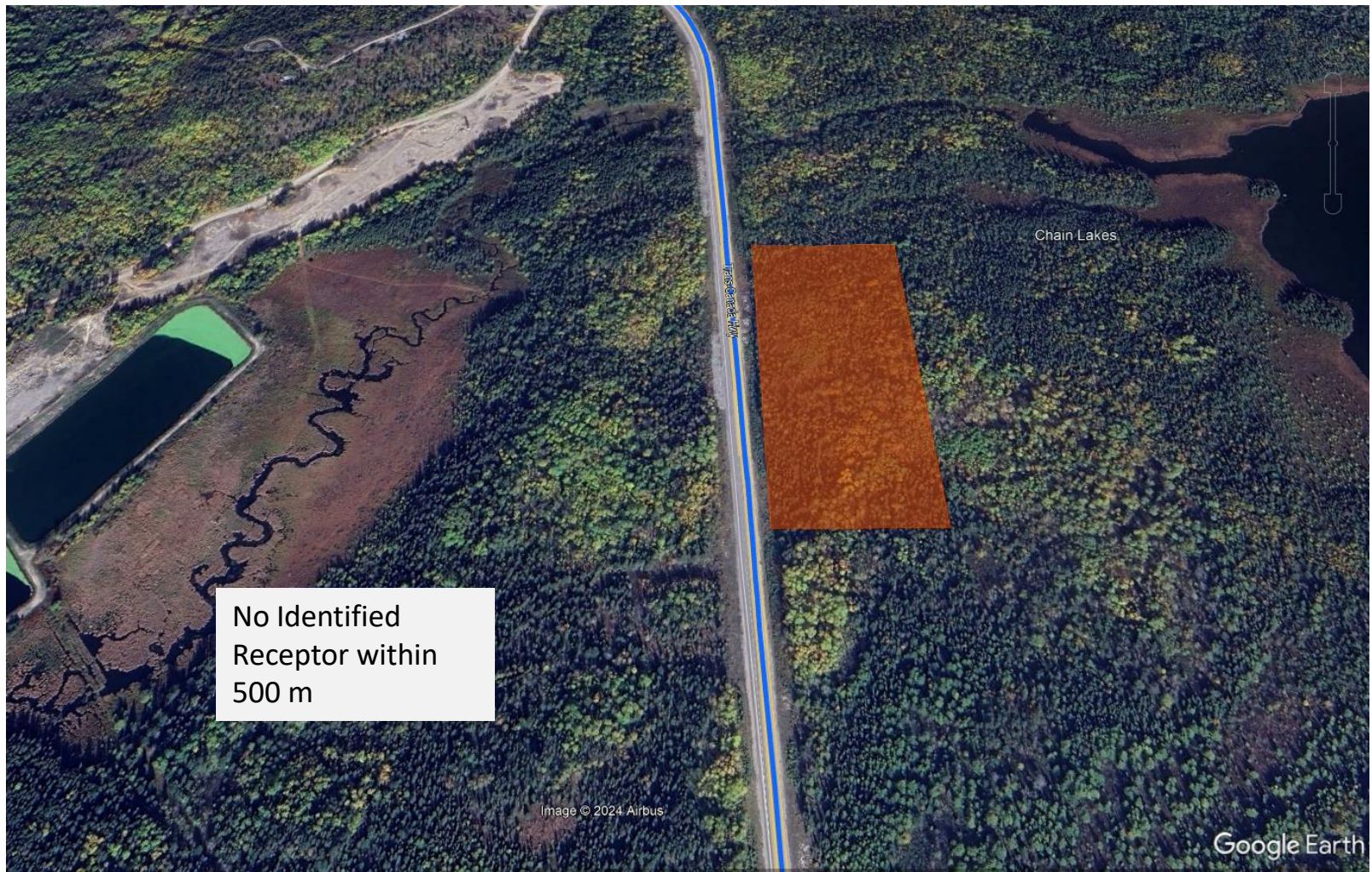


# White River MTO Rest Area Option 7

MTO 5023-E-0006 – Northeast Region, ON

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Project #:	2401722
Date:	2025-03-07





# White River MTO Rest Area Option 8

MTO 5023-E-0006 – Northeast Region, ON

Drawn by: AFS/JWS

Figure: 6

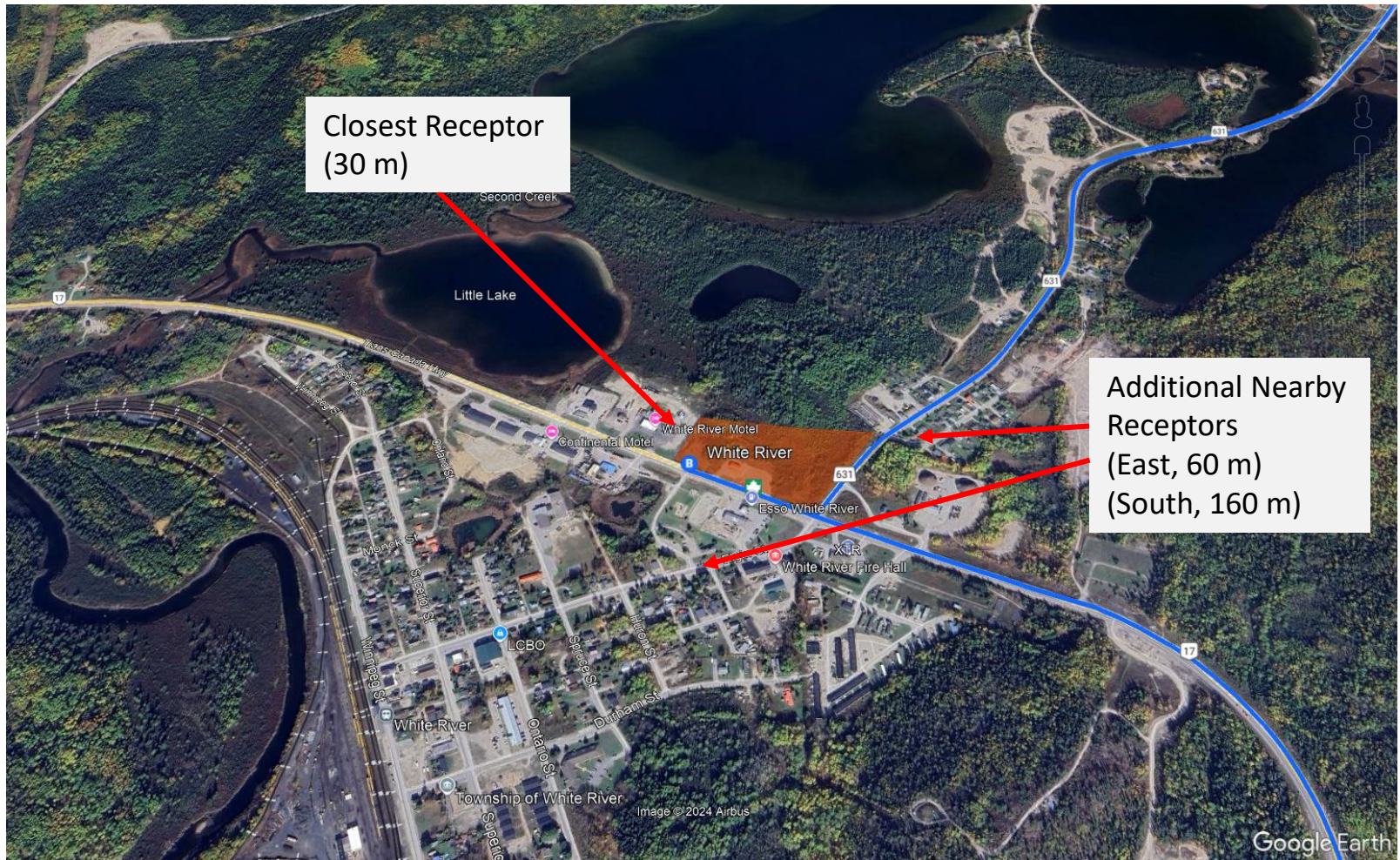
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Date:

2025-03-07





# White River MTO Rest Area Option 9

MTO 5023-E-0006 – Northeast Region, ON

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Figure: 7

Project #:

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Date:

2025-03-07





# Wawa MTO Rest Area Option 2

MTO 5023-E-0006 – Northeast Region, ON

Drawn by: AFS/JWS

Figure: 8

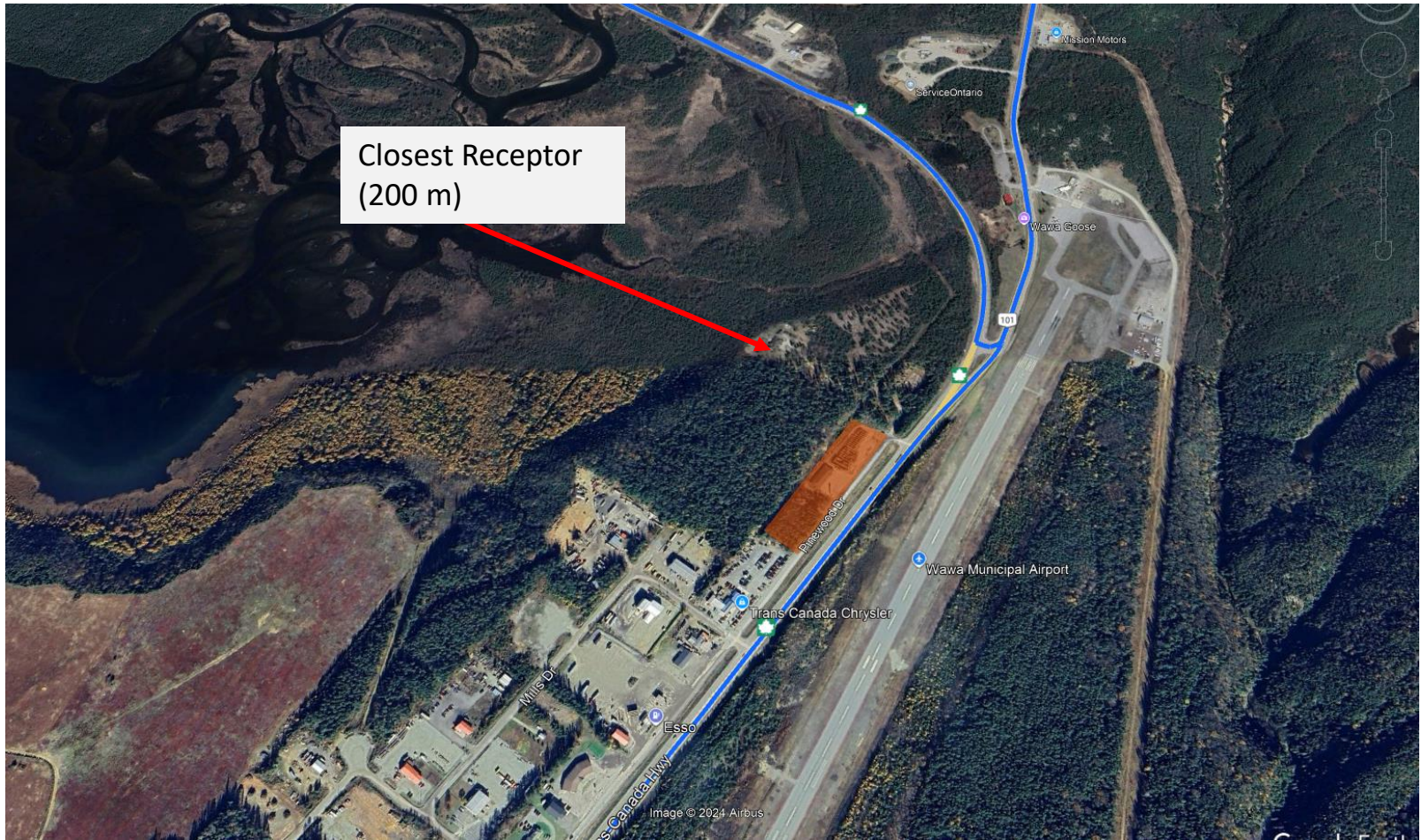
Project #:

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Date:

2025-03-07





# Wawa MTO Rest Area Option 5

MTO 5023-E-0006 – Northeast Region, ON

Drawn by: AFS/JWS

Figure: 9

Project #:

2401722

Date:

2025-03-07





Closest Receptor  
(60 m)

# Wawa MTO Rest Area Option 6

MTO 5023-E-0006 – Northeast Region, ON

Drawn by: AFS/JWS	Figure: 10
Project #:	2401722
Date:	2025-03-07

