

Region of Peel

Shadow Impact Study Report

CP Grade Separation Class EA

Friday, June 10, 2022

B000738



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1 Introduction

CIMA Canada Inc. (CIMA+) was retained by the Region of Peel to conduct a Municipal Class Environmental Assessment (EA) Study for the proposed grade separation of the rail tracks on Coleraine Drive, near Old Ellwood Drive in the Town of Caledon. A Shadow Impact Study is required to accompany a Zoning By-law Amendment application or a Site Plan Application for a development proposal to the Town of Caledon. The Environmental Study Report (ESR) does not require to be accompanied by a Shadow Study, however considering the benefits of knowing the impacts of the proposed overpass in terms of sun and daylight access to the adjacent properties, the project has taken this study as a value-added item.

The purpose of this report is to analyze the shadow impact of the proposed road structure upon the adjacent properties, streets, and public spaces at the above noted location, and provide comment about the level of impact as per the Requirements for Shadow Studies summarized in the Town of Caledon Town-Wide Design Guidelines. A computer-generated model was used to analyse impacts of the proposed road structure (see **Appendix A**).

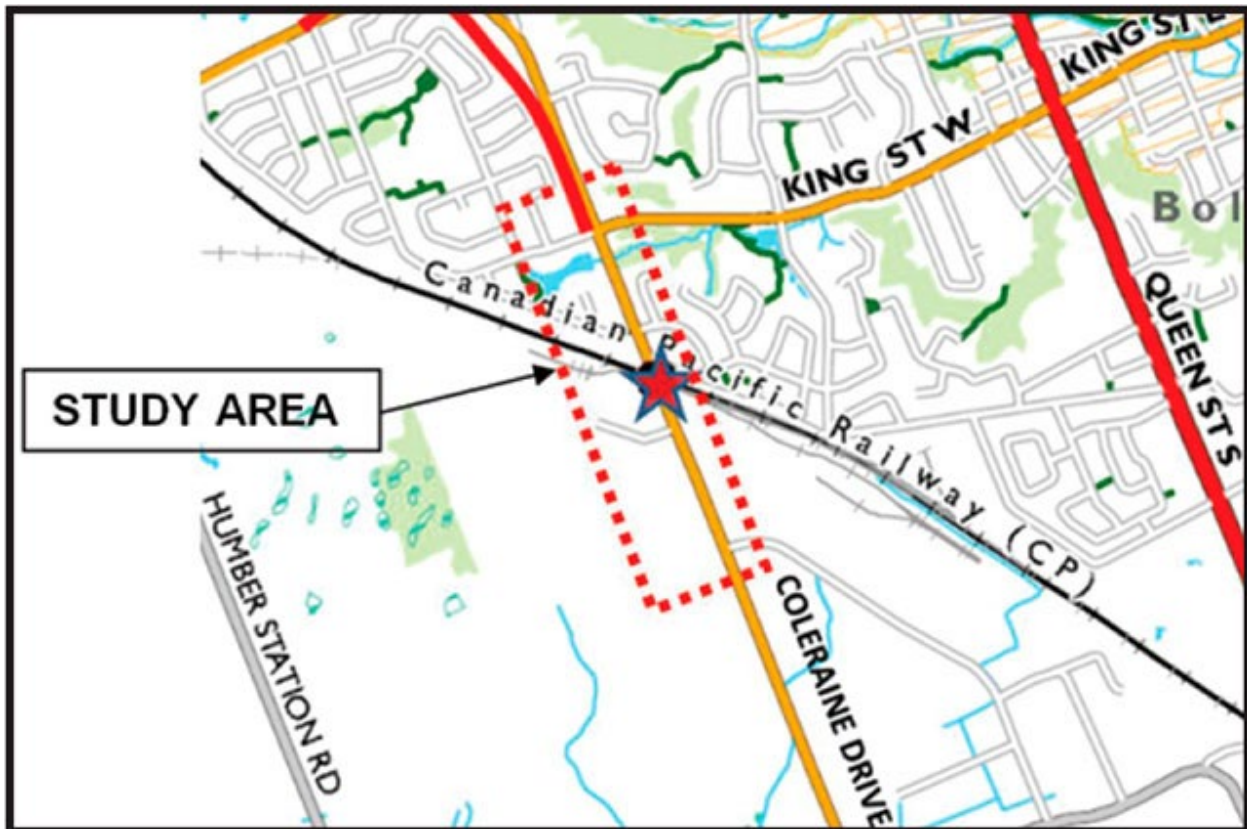


Figure 1: Study Area

2 Description of the Site and Neighbouring Properties

The study area extends from approximately 150 metres north of Harvest Moon Drive to Holland Drive, and the proposed grade separation consists of raising the grade of Coleraine Drive over the CP rail tracks.

The subject lands and neighboring parcels generally appear to be uniform in grade. For the purpose of this analysis, the proposed development and adjacent properties are represented more or less at the same elevation.

Surrounding the site are the following land uses:

East of Coleraine Drive – Immediately East of the subject lands is a residential community consisting of single detached and attached homes. South of the tracks there is industrial development abutting the subject lands.

West of Coleraine Drive - A residential neighbourhood consisting of single and detached homes is located directly west of the subject lands, north of the CP tracks. South of the tracks there is industrial development abutting the subject lands.

This shadow impact study will focus on the residential impact, and impact on public sidewalks.

In undertaking the evaluation of the shadow impact, this report has relied on the following information:

- Town of Caledon Comprehensive Town-Wide Design Guidelines (November 2017), Section 5.3 Requirements for Shadow Studies

3 Method of Analysis

The graphic analysis presented within this report was developed using a computer-generated modelling program in conjunction with satellite imagery with the following criteria specified in the Requirements for Shadow Studies, per the Caledon Comprehensive Town-Wide Design Guidelines (Section 5.3).

Test Dates: March 21, June 21, September 21, and December 21

Test Times: We expanded the test times from the guidelines to include hourly intervals starting at sunrise and ending at sunset.

DATE	TIME
March 21	9:00, 11:00, 13:00, 15:00, 17:00, & 19:00
June 21	
September 21	
December 21	11:00, 13:00, & 15:00

Per the Caledon Town-Wide Design Guidelines, the shadow impact analysis is undertaken to identify that:

- There are at least 5 consecutive hours of full sunlight between the test hours in March, June and September
- Shadows are not cast on more than 50% of outdoor residential amenities, (throughout the seasons): and,
- Shadows are not cast on the opposite sidewalk during the spring and fall.

The computer-generated modelling is based on the following:

Geographic Coordinates: 43.8692094 N, 79.7473904 W

Standard Time: UTC -5:00

Daylight Savings Time: UTC -4:00

4 Evaluation

The image documentation of the Sun / Shadow Study can be found in **Appendix A** of this report.

The evaluation of shadow impacts on sensitive uses focuses on:

- a) the sidewalk of adjacent streets, particularly Ellwood Drive, Aida Court and Grapevine Road, and
- b) the existing residential amenity spaces for the low-rise residential properties located north of the CP rail tracks adjacent to Coleraine Drive.

There will be shadow impact on the existing residential properties to the east of Coleraine Drive (Aida Court, Ellwood Drive West and Natureway Court).

4.1 The shadow impact on public sidewalks:

- East of Coleraine Drive; Ellwood Drive and Aida Court network are perpendicular to Coleraine Drive, which means the proposed road structure will have minimal shadow impact on the streets and sidewalks during spring, summer and fall.

- West of Coleraine Drive; shadow impact on Grapevine Road will be negligible and there is currently no sidewalk.

4.2 The shadow impact on residential amenity spaces:

4.2.1 Spring (March 21)

The spring test period indicates an impact on seven (7) properties to the East of the subject structure not exceeding five (5) consecutive hours of full sunlight within the test times of 9:00 to 19:00. The study shows that the impact is upon the following properties:

- One (1) residential property on Aida Court is impacted before 14:00 until sundown – resulting in a total of approximately 5.5 hours of shadow and 4.5 hours of sunlight within the times of 9:00 to 19:00.
- One (1) residential property on Ellwood Drive West is impacted before 14:00 until sundown – resulting in a total of approximately 5.5 hours of shadow and 4.5 hours of sunlight within the times of 9:00 to 19:00.
- Five (5) residential properties on Natureway Court are impacted before 14:00 until sundown – resulting in a total of approximately 5.5 hours of shadow and 4.5 hours of sunlight within the times of 9:00 to 19:00.

4.2.2 Summer (June 21)

The summer test period does not indicate an impact on any adjacent properties to the West or East of the subject structure exceeding five (5) consecutive hours of full sunlight between the test times of 9:00 to 19:00.

Shadows are cast on more than 50% of outdoor residential amenities on nine (9) properties to the East of the subject structure within the test times of 9:00 to 19:00. The study shows that the impact is upon the following:

- One (1) residential property on Aida Court
- One (1) residential property on Ellwood Drive West
- Seven (7) residential properties on Natureway Court

4.2.3 Fall (September 21)

The fall test period indicates an impact on six (6) properties to the East of the subject structure not exceeding five (5) consecutive hours of full sunlight within the test times of 9:00 to 19:00. The study shows that the impact is upon the following properties:

- One (1) residential property on Aida Court is impacted before 14:00 until sundown – resulting in a total of approximately 5.5 hours of shadow and 4.5 hours of sunlight within the times of 9:00 to 19:00.
- One (1) residential property on Ellwood Drive West is impacted before 14:00 until sundown – resulting in a total of approximately 5.5 hours of shadow and 4.5 hours of sunlight within the times of 9:00 to 19:00.
- Four (4) residential properties on Natureway Court are impacted before 14:00 until sundown – resulting in a total of approximately 5.5 hours of shadow and 4.5 hours of sunlight within the times of 9:00 to 19:00.

Shadows are cast on more than 50% of outdoor residential amenities on forty-six (46) properties to the East of the subject structure within the test times of 9:00 to 19:00. The study shows that the impact is upon the following:

- Fifteen (15) residential properties on Aida Court
- Nineteen (19) residential properties on Ellwood Drive West
- Twelve (12) residential properties on Natureway Court

4.2.4 Winter (December 31)

The requirement for 5 consecutive hours of full sunlight is not applicable during the Winter Solstice (December 21), according to the Town of Caledon Comprehensive Town-Wide Design Guidelines.

Shadows are cast on more than 50% of outdoor residential amenities on twenty (20) properties to the East of the subject structure within the test times of 11:00 to 15:00. The study shows that the impact is upon the following:

- Five (5) residential properties on Aida Court
- Three (3) residential properties on Ellwood Drive West
- Twelve (12) residential properties on Natureway Court

5 Summary

Following is a summary of the analysis of the Shadow Impact Study for the proposed road structure on Coleraine Drive.

The shadow impact on A) public sidewalks:

- East of Coleraine Drive, the proposed road structure will have minimal shadow impact on the neighbouring streets and sidewalks surrounding the subject lands such as Ellwood Drive and Aida Court during spring, summer and fall.

- West of Coleraine Drive, shadow impact on Grapevine Road will be negligible.

The shadow impact on B) residential amenity spaces:

- **The spring (March 21)** test period indicates an impact on seven (7) properties to the East of the subject structure not exceeding five (5) consecutive hours of full sunlight within the test times. Shadows are cast on more than 50% of outdoor residential amenities on thirty-two (32) properties to the East of the subject structure within the test times of 9:00 to 19:00.
- **The summer (June 21)** test period does not indicate an impact on any adjacent properties to the West or East of the subject structure exceeding five (5) consecutive hours of full sunlight between the test times. Shadows are cast on more than 50% of outdoor residential amenities on nine (9) properties to the East of the subject structure within the test times of 9:00 to 19:00.
- **The fall (September 21)** test period indicates an impact on six (6) properties to the East of the subject structure not exceeding five (5) consecutive hours of full sunlight within the test times. Shadows are cast on more than 50% of outdoor residential amenities on forty-six (46) properties to the East of the subject structure within the test times of 9:00 to 19:00.
- **Winter (December 21)** The requirement for 5 consecutive hours of full sunlight is not applicable during the Winter Solstice. Shadows are cast on more than 50% of outdoor residential amenities on twenty (20) properties to the East of the subject structure within the test times of 11:00 to 15:00.

Table 1: Summary of Results

Seasons	Less than 5 consecutive hours of full sunlight			50% of outdoor residential amenities		
	Aida Court	Ellwood Drive West	Natureway Court	Aida Court	Ellwood Drive West	Natureway Court
Spring (March 21)	1	1	5	15	5	12
Summer (June 21)	-	-	-	1	1	7
Fall (September 21)	1	1	4	15	19	12
Winter (December 21)	-	-	-	5	3	12

Note:

- 1) The quantity shown above is expressed as number of properties
- 2) Test time: Spring, summer, and fall 9:00 to 19:00. Winter 11:00 to 15:00

This type of road structure produces a wide shadow that moves slowly across the terrain. The design and orientation of the proposed road structure will have shadow impact on neighbouring residential amenity spaces throughout the day during each of the seasons on the east side of the proposed road structure.

6 Conclusion

Based on the evaluation undertaken in this report and the Requirements for Shadow Studies in the Town of Caledon Comprehensive Town-Wide Design Guidelines (Section 5.3), it is concluded that:

- The level of shadow on neighbouring streets and sidewalks from the proposed road structure will be minimal and not considered an impact, per the guidelines.
- The level of shadow on neighbouring low-rise residential amenity spaces immediately east of the road structure does not meet the requirements of the Town's guidelines (i.e., some homes will not receive five hours of consecutive full sunlight at certain times of the year, and some homes will have shadow cast on more than 50% of their outdoor residential amenities (i.e., back gardens).

A

Appendix A: Image Documentation of the Sun / Shadow Study

COLERAINE DRIVE



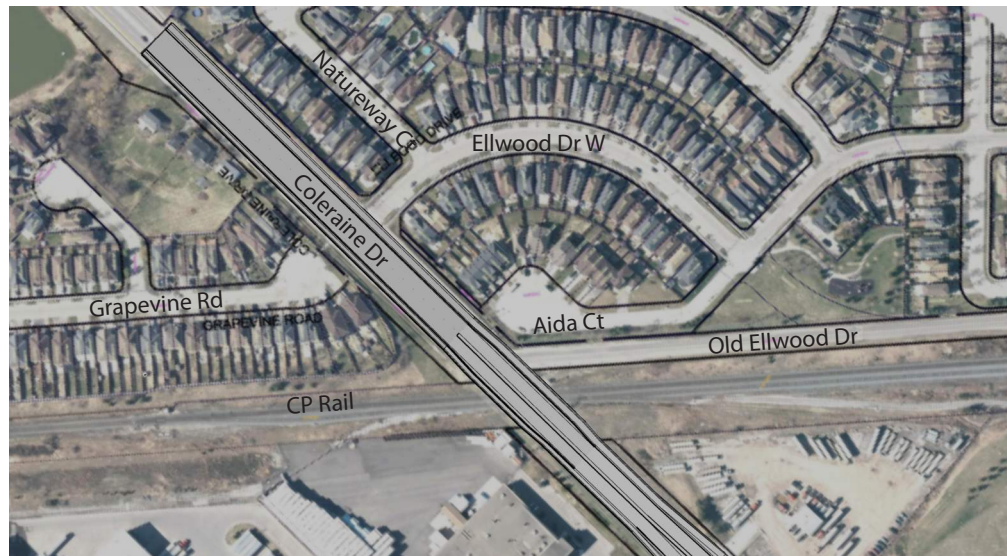
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8:00



9:00



10:00



11:00



12:00



13:00



14:00



15:00



COLERAINE DRIVE



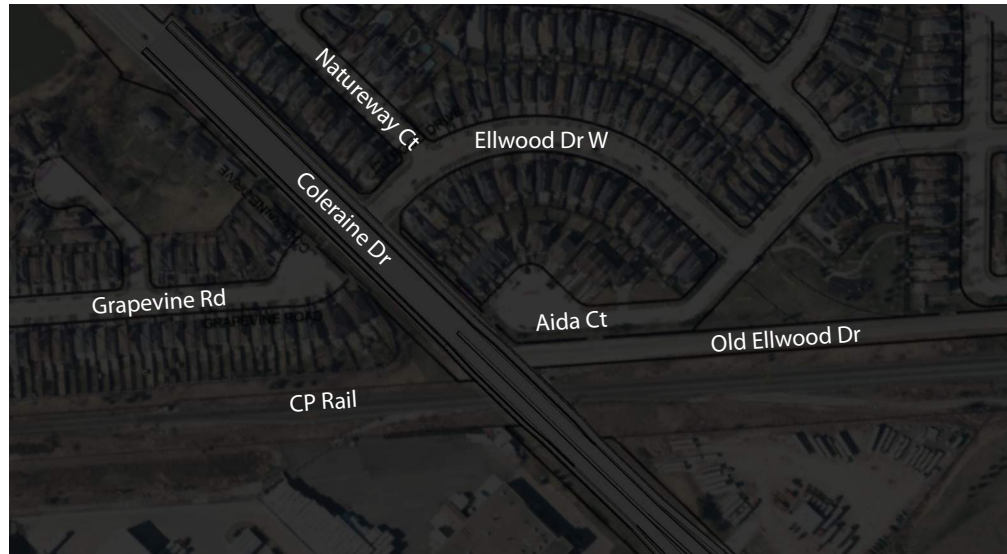
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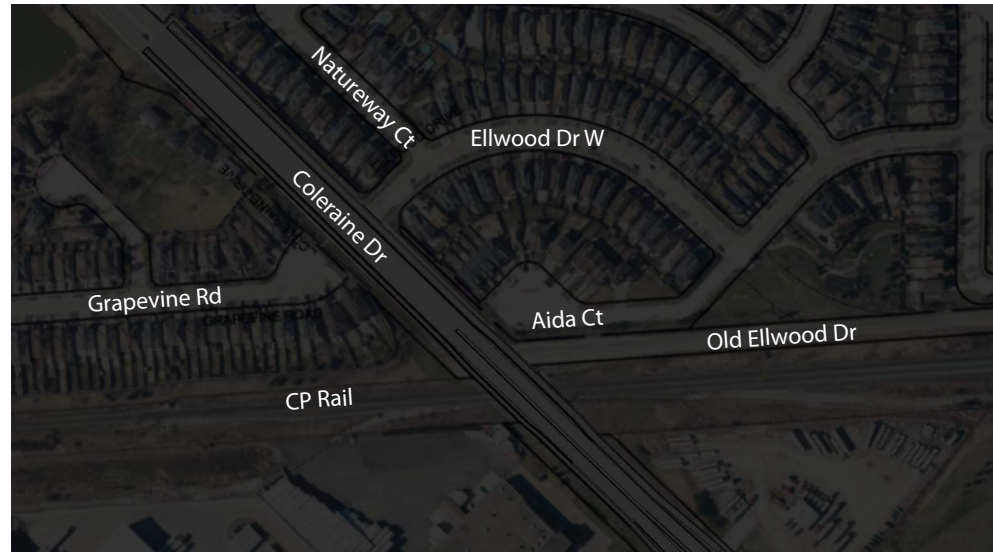
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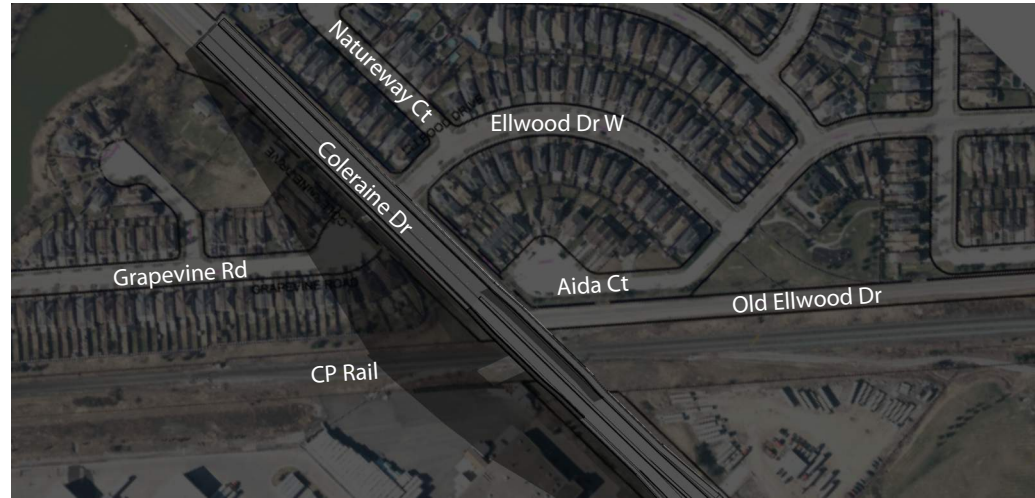
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19:33 (Set)



COLERAINE DRIVE



5:37 (RISE)



7:00



8:00



9:00



10:00



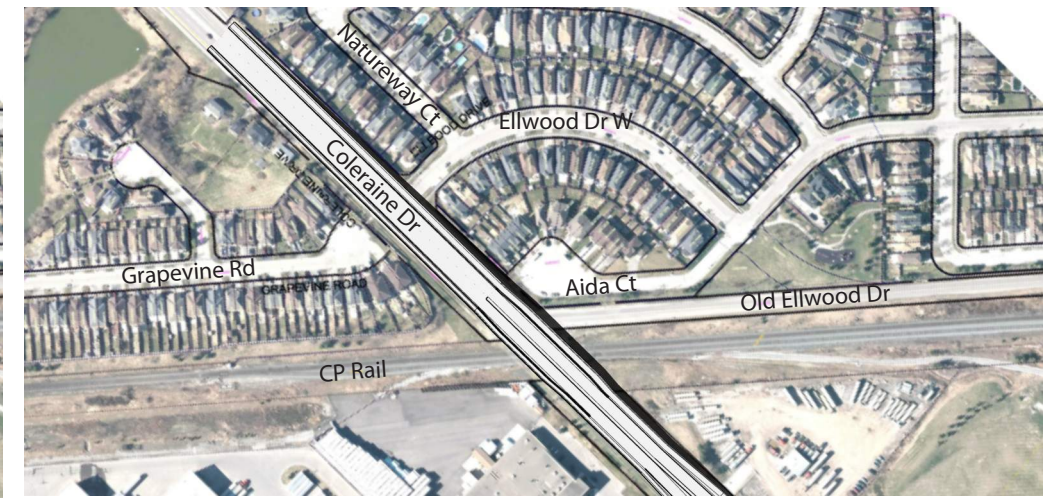
11:00



12:00



13:00



14:00



COLERAINE DRIVE



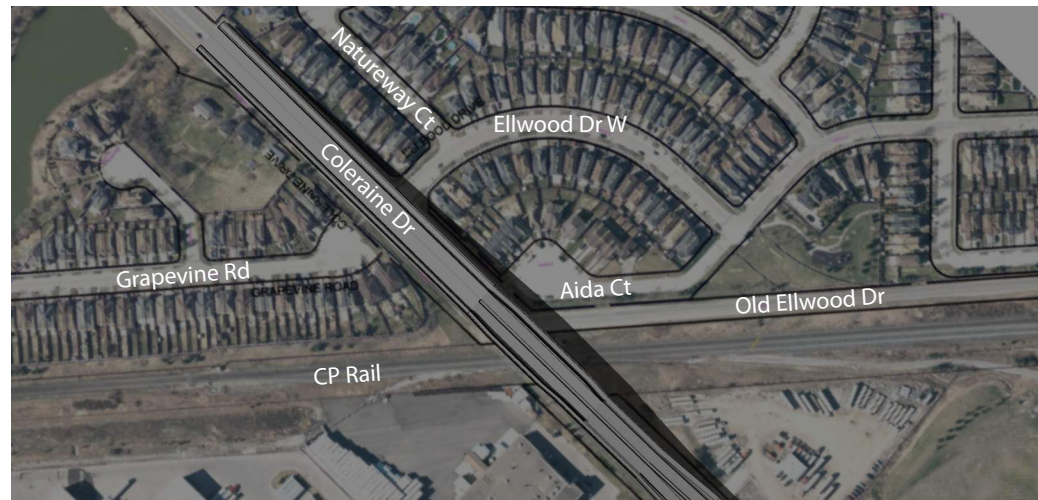
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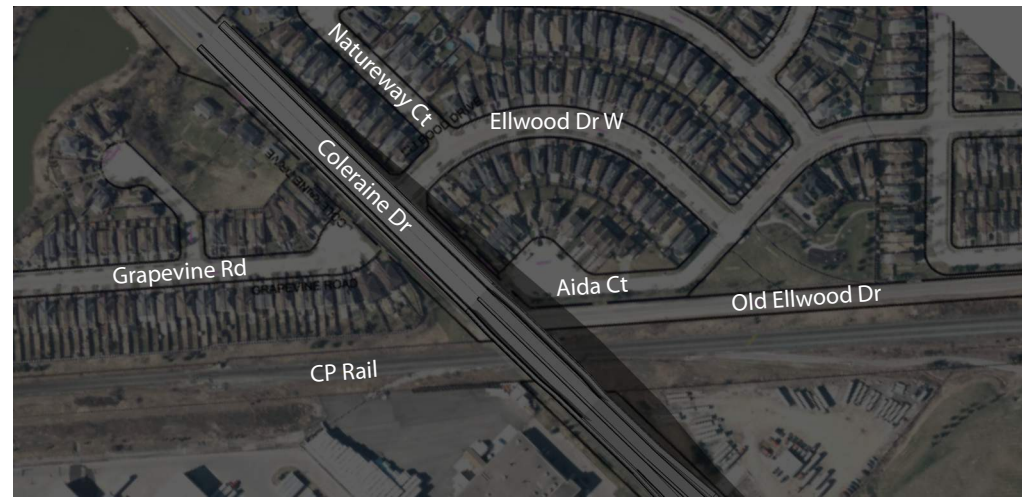
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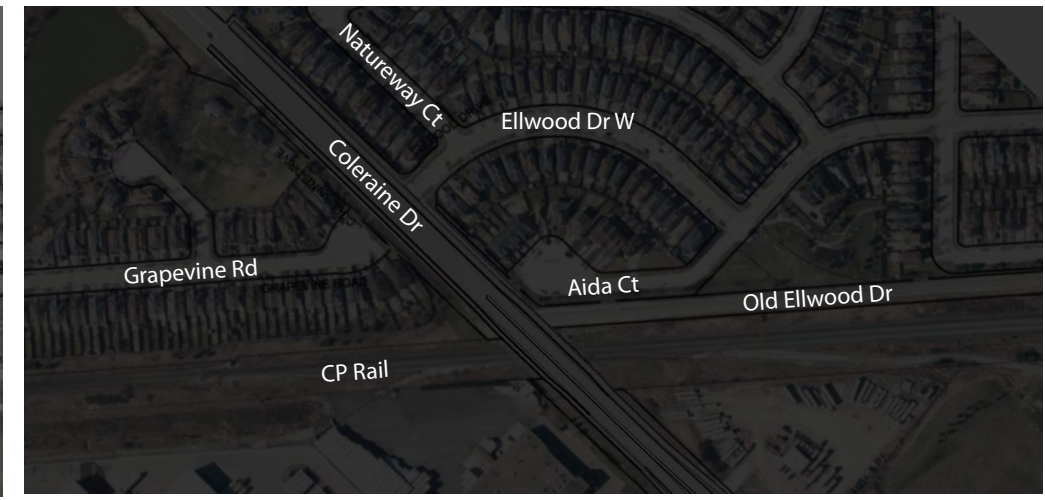
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18:00



19:00



21:05 (Set)



COLERAINE DRIVE



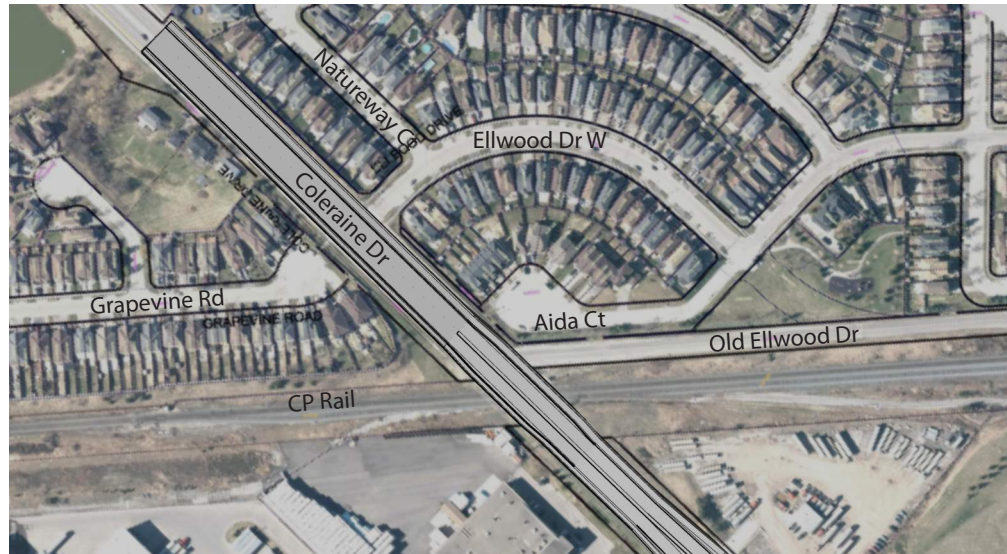
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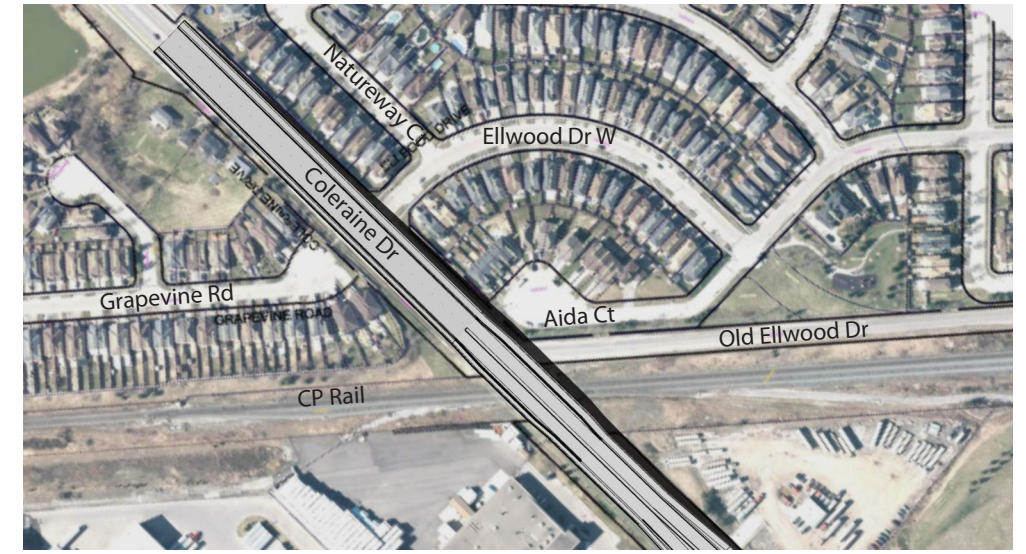
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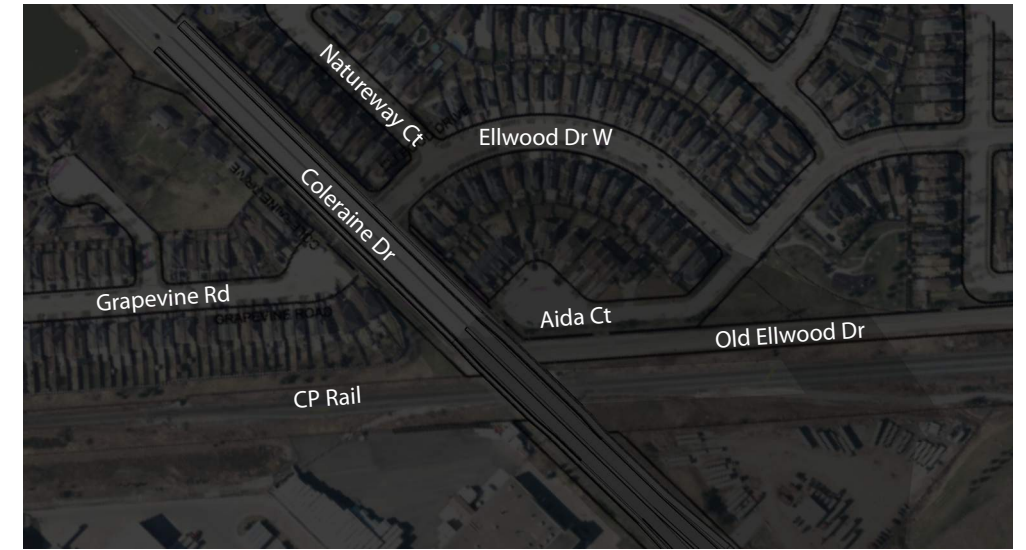
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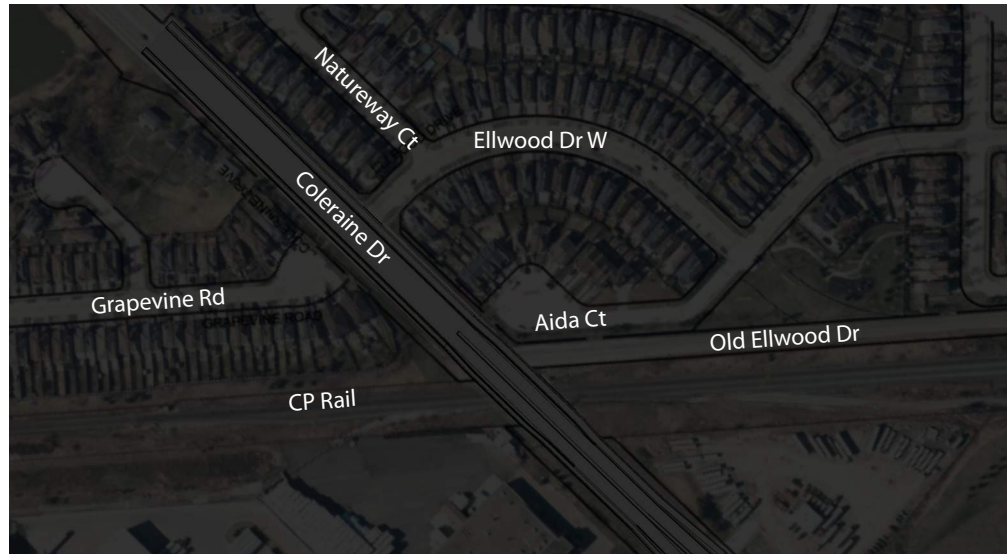
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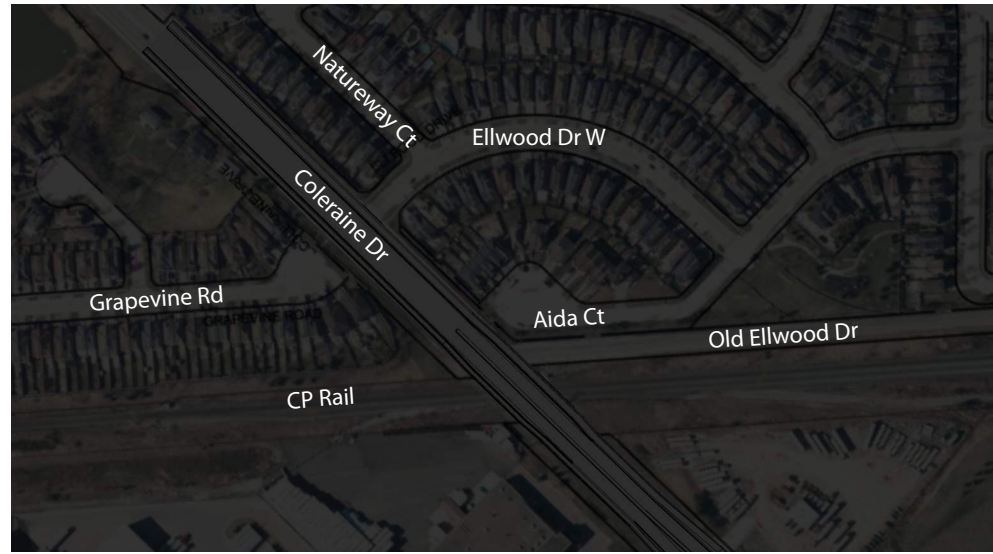
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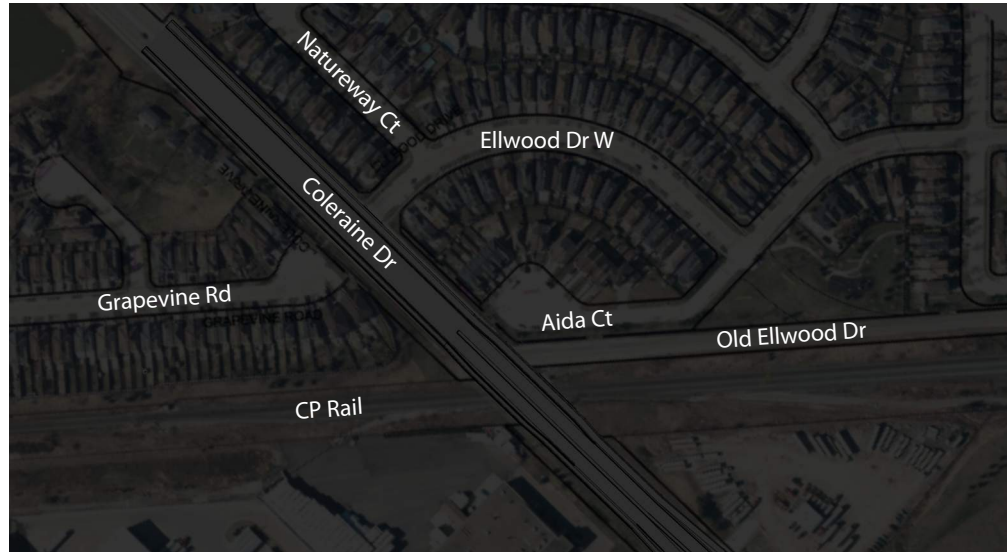
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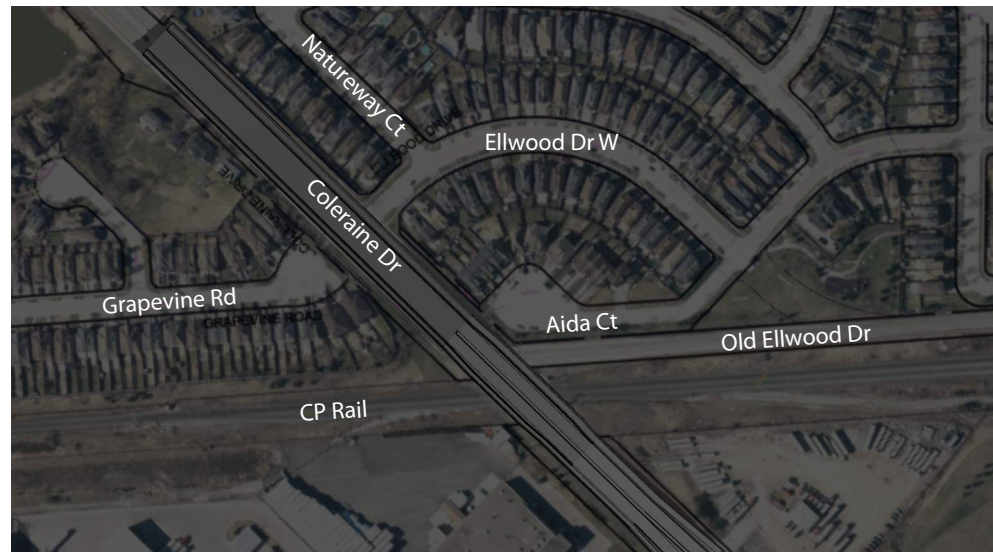
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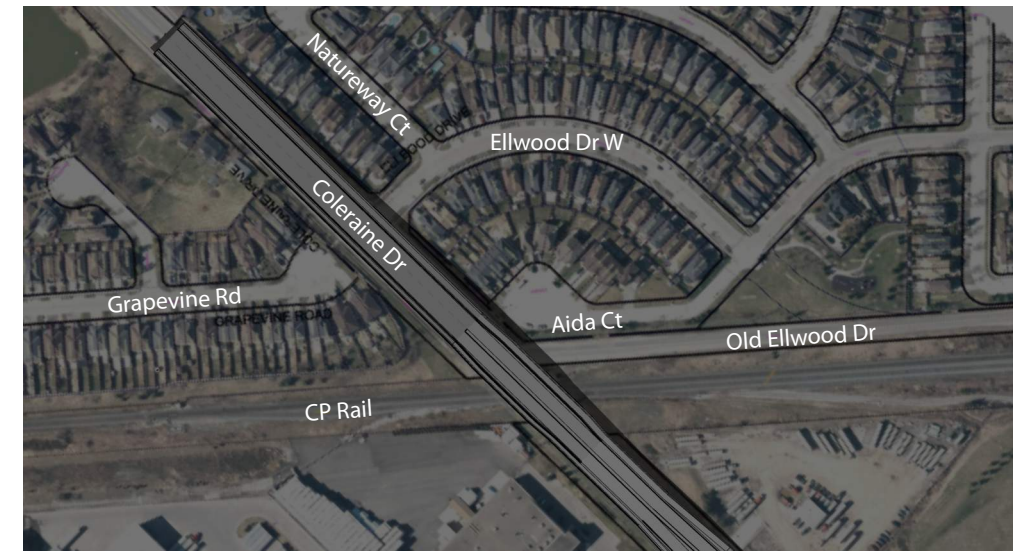
COLERAINE DRIVE



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10:00



11:00



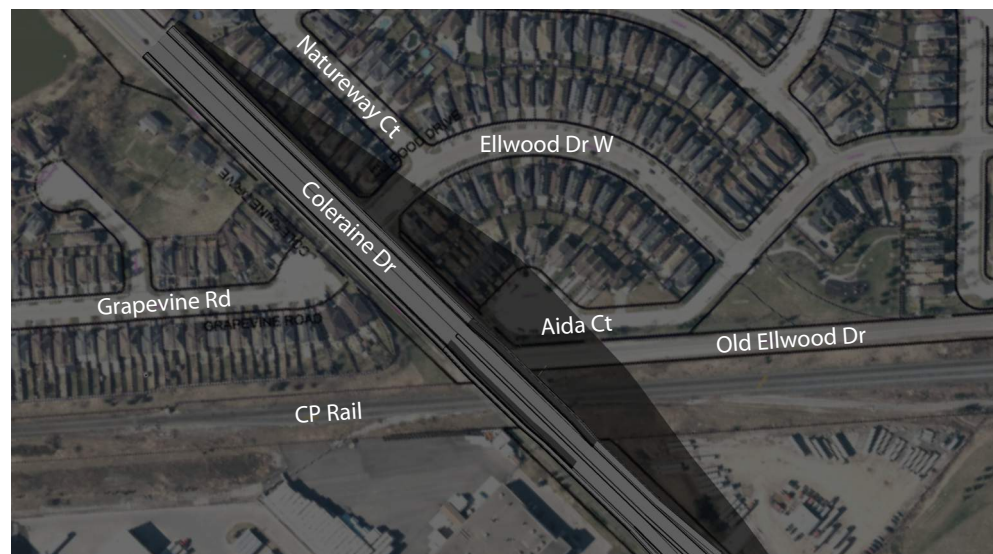
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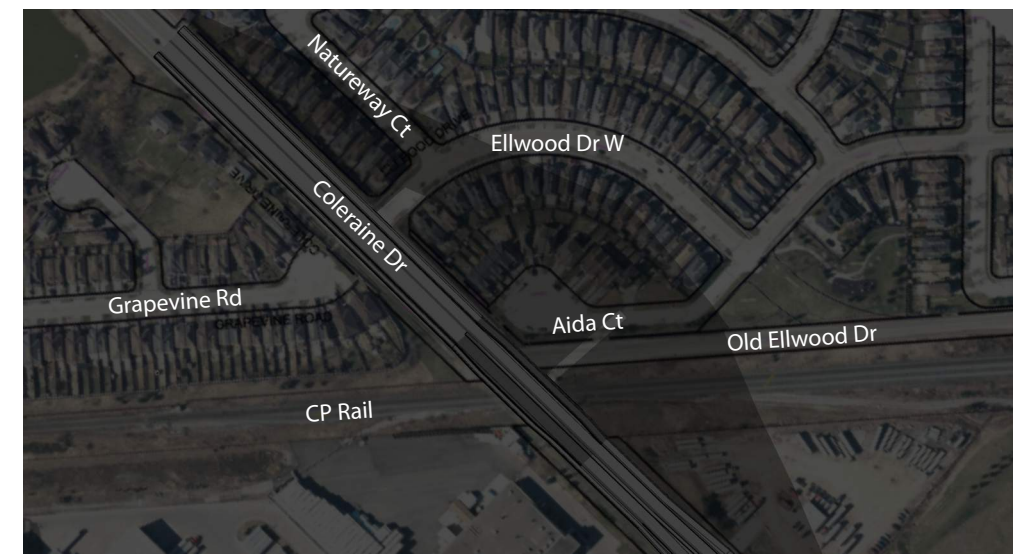
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