DNV·GL

ROMNEY WIND ENERGY CENTRE

Property Setback Assessment

Romney Energy Centre Limited Partnership

Document No.: 10021083-CAMO-R-10
Issue: B, Status: Final
Date: 27 July 2017

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Abbreviation	Meaning
DNV GL	GL Garrad Hassan Canada Inc.
O. Reg	Ontario Regulation
PSA	Property Setback Assessment
REA	Renewable Energy Approval

1 INTRODUCTION

1.1 Purpose

DNV GL was retained by Romney Energy Centre Limited Partnership to prepare a Property Setback Assessment (PSA) report for the Romney Wind Energy Centre ("Project") based on the Ontario Ministry of the Environment and Climate Change's (MOECC) REA guidelines.

This report presents the 17 of the 18 turbines that are less than the prescribed distance from a parcel boundary, as defined in the Renewable Energy Approval (REA) (*O. Reg. 359/09*). As per Section 53 (3), a PSA must be performed for each turbine in order to:

1. Demonstrate that the proposed location of the wind turbine will not result in adverse impacts on nearby business, infrastructure, properties or land use activities, and
2. Describe any preventive measures that are required to be implemented to address the possibility of any adverse impacts mentioned in sub clause (i). *O. Reg. 359/09*, s. 53 (3); *O. Reg. 521/10*, s. 30 (3); *O. Reg. 231/11*, s. 4.

1.2 Project Description

The Romney Wind Energy Centre is located in southwestern Ontario, within the Town of Lakeshore and the Municipality of Chatham Kent, Ontario. More specifically, the Project is located south of Highway 401, extending along Richardson Side Road and Wheatley Road near the community of Wheatley. It has a total Project study area of approximately 5,093 ha.

Project components will be mostly installed on privately-owned agricultural lots within this area. It is anticipated that the electrical collector lines will be partially located within public road allowances. The Project will connect to the existing 230 kV transmission line located within the Town of Lakeshore and close to Richardson Side Road. There is a short section of transmission line (less than 1 km) proposed for the Project to be built by Hydro One Networks Inc. (Hydro One) from the Point of Common Coupling (PCC) to the Point of Interconnect (POI).

At the time of this report, the final wind turbine technologies have not been selected; however, it is likely that more than one turbine variant rated up to 3.6 MW will be installed. For the purposes of reference, the Vestas V136-3.6 MW turbines will be considered, some of which may need to be de-rated to lower noise modes. Alternatively, another turbine model that is acoustically equivalent and would have the same or lower octave band sound power levels, tonal audibility values, and predicted noise impact levels at receptors may be chosen. The total installed capacity for the Project will be up to 60 MW.

The proposed turbine will be a 3-bladed horizontal-axis turbine with a hub height of 132 m, rotor diameter of 136 m and a blade length of 68 m.

Figure 1-1 presents the location of the Project study area.

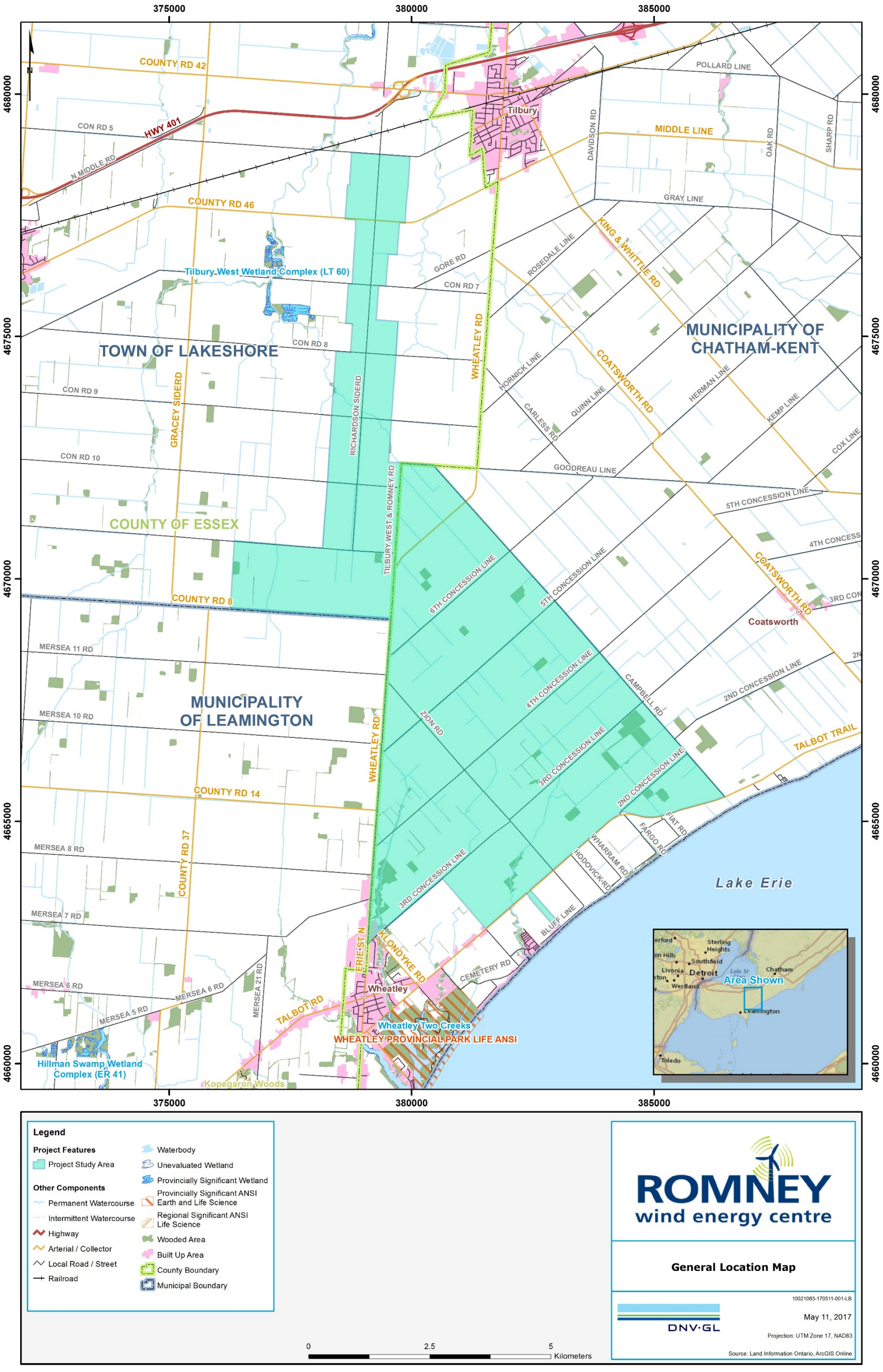

Figure 1-1: Project location map

Figure 1-2: Intersection of Lakeshore Road and Richardson Side Road

Figure 1-3: Zion Road North of Concession 5

Figure 1-4: Concession 3 west of Campbell Road

Figure 1-5: Zion Road south of Concession 4

2 ANALYSIS

The property setback analysis will first identify setback thresholds prescribed by *O. Reg. 359/09* to determine which turbines need to be assessed (Section 2.1). Next, the relationships between the identified turbines and their neighbouring parcels will be summarized (Section 2.2) to facilitate the assessment of potential impacts and identify necessary mitigation measures (Section 2.3).

2.1 Legislation

The prescribed setbacks from parcel boundaries as defined in *O. Reg. 359/09* Section 53 are summarized in Table 2-1.

Table 2-1: Summary of *O. Reg. 359/09* prescribed setbacks from parcel boundaries.

Section	Status of adjacent lot(s)	Setback
53 (2)(a)	Lot owner has proposed to engage in the renewable energy project in respect of the wind turbine	0 m
53 (2)(b)	Owner has entered an agreement with the person mentioned in clause (2)(a) to permit the wind turbine to be located closer than the distance specified in clause (1)(b) (i.e. hub height)	
53 (1)(b)	Owner has **not** entered an agreement with the person mentioned in clause (2)(a) to permit the wind turbine to be located closer than the distance specified in clause (1)(b) (i.e. hub height), **and** no property setback assessment has been conducted for the lot	Hub height (i.e. the height of the wind turbine, excluding the length of any blades)
53 (3)(b)	Owner has **not** entered an agreement with the person mentioned in clause (2)(a) to permit the wind turbine to be located closer than the distance specified in clause (1)(b) (i.e. hub height), **but** a property setback assessment has been conducted for the lot; (i) Demonstrating that the proposed location of the wind turbine will not result in adverse impacts on nearby business, infrastructure, properties or land use activities; and (ii) Describing any preventative measures that are required to be implemented to address the possibility of any adverse impacts	Blade length + 10 m

The present analysis focuses solely on potential impacts related to property setbacks. As presented in Table 2-1, in absence of an agreement with the adjacent landowner, the setback from parcel boundary is 132 m (hub height). Turbines may be as close as 78 m (blade length + 10 m) if a Property Setback Assessment shows that such a placement will not result in adverse impacts to nearby business, infrastructures, properties and land use.

The following evaluation of impacts therefore considers built structures and land use in all lots adjacent to turbines positioned less than hub height distance from a lot line. Applicable mitigation measures are then presented and considered in the evaluation of any residual impacts.

2.2 Assessed Turbines

Based on the *O. Reg 359/09*, DNV GL identified 17 turbines requiring a property setback assessment (Table 2-2). The technical specifications of the V136 relevant to this PSA are the hub height of 132 m, the rotor diameter of 136 m, and the blade length of 68 m (i.e. rotor diameter divided by 2). This PSA will use 132 m (i.e. the hub height of the V136) for the setback prescribed by *O. Reg. 359/09* clause 53 (1)(b). The minimum blade + 10 m setback requirement identified by clause 53 (3)(b) is 78 m (i.e. 68 m + 10 m).

Table 2-2 Turbines included in the property setback assessment and their neighboring parcels

Turbine ID	Figure (Appendix A)	Turbine Coordinates (UTM17 NAD83)		Host Parcel PIN	Abutting Parcel PIN	Abutting Parcel Land use and notable features		Closest Point Coordinates (UTM17 NAD83)		Distance (m)
		Easting (m)	Northing (m)					Easting (m)	Northing (m)	
T1	Figure A-1	380450	4670257	008300018	008300045	Land use: agriculture		380522	4670175	109.0
T2	Figure A-2	380172	4667904	008310003	008310073	Land use: agriculture		380119	4667965	81.8
					008310072	Land use: agriculture	-Dwelling at 770 m from T2.	380168	4668008	104.6
T3	Figure A-3	380880	4668771	008310007	008310006	Land use: agriculture		380792	4668693	118.0
					008310009	Land use: agriculture		380947	4668693	103.3
T4	Figure A-4	381401	4668982	008310012	008310010	Land use: agriculture	-Dwelling at 776 m from T4.	381345	4669046	85.5
T5	Figure A-5	380033	4666186	008330088	008330082	Land use: agriculture	-Dwelling at 660 m from T5; -Suspended disposal well at approximately 230 m from T5.	380108	4666250	98.2
					008330072	Land use: agriculture	-Solar panels at approximately 690 m from T5; -Watercourse within 132 m from T5.	380099	4666111	99.5
T6	Figure A-6	381193	4666947	008310023	008310021	Land use: agriculture		381139	4667011	83.0
T7	Figure A-7	382074	4667940	008310058	008310064	Land use: agriculture	-Farm building 700 m from T7.	381977	4667856	128.5
					008310066	Land use: agriculture		382130	4667876	84.7
T8	Figure A-8	382601	4668405	008310058	008310066	Land use: agriculture	-Farm building 850 m from T8; -Wooded area within 132 m from T8.	382656	4668342	83.9

					008310031	Land use: agriculture		382664	4668460	84.3
					008310056	Land use: agriculture	-Solar Panels at 709 m from T8.	382719	4668397	118.3
					008330038	Land use: agriculture		379890	4664102	82.6
T9	Figure A-9	379836	4664164	008330039	008330040	Land use: agriculture	-Wooded area within 132m from T9.	379898	4664108	83.3
					008330046	Land use: agriculture		380348	4664498	82.2
					008330044	Land use: agriculture		380227	4664499	90.9
T10	Figure A-10	380294	4664560	008330045	008330048	Land use: agriculture		380409	4664550	114.7
					008340012	Land use: agriculture		382865	4666830	84.8
					008340016	Land use: agriculture	-Oil and gas infrastructure 815 m from T11.	382996	4666810	102.8
T11	Figure A-11	382928	4666887	008340014	008340091	Land use: agriculture		382941	4666762	125.8
					008470037	Land use: agriculture	-Dwelling within 736 m from T12.	381250	4663448	84.9
					008470161	Land use: agriculture		381371	4663439	85.3
T12	Figure A-12	381306	4663384	008470038	008470041	Land use: agriculture	-Dwelling at 776 m from T12.	381315	4663504	120.6
T13	Figure A-13	381882	4664077	008470050	008470055	Land use: agriculture	- Dwelling at 709.5 m from T13; - Wooded area within 132 m from T13.	381965	4664149	109.6
					008340062	Land use: agriculture		382967	4664946	81.8
T14	Figure A-14	382914	4665008	008340028	008340060	Land use: agriculture	-Farm building at approximately 703 m from T14.	382934	4664917	93.0
T15	Figure A-15	383866	4665878	008340042	008340087	Land use: agriculture		383781	4665804	113.1

					008340043	Land use: agriculture	-Oil and gas infrastructure 730 m from T15; -Watercourse within 132 m from T15.	383938	4665797	108.5
T17	Figure A-17	376473	4669991	750810055	750810056	Land use: agriculture	-Dwelling 611 m from T17.	376601	4669984	127.8
A1	Figure A-18	379958	4671291	008300002	008300003	Land use: agriculture	-Farm building 590 m from A1.	380022	4671349	86.4

2.3 Potential Impacts and Mitigation Measures

Table 2-3 summarizes potential impacts and proposed mitigation measures for the Project.

Table 2-3: Description of potential impacts and mitigation measures

Incident	Description	Impact	Applicable parcels and turbines	Mitigation Measures	Residual Impact
Spill of hazardous material	Spills may occur due to an accident or malfunction during construction activities, operation, and decommissioning. Contamination of soil would mostly be limited to the immediate area surrounding of the spill. However, it is possible that hazardous materials could be carried into adjacent lots by surface or ground water, or by wind blown dust.	Contamination of soil or water	All adjacent parcels listed in Table 2-2.	Spill incidents will be minimized by ensuring that industry regulations are properly followed. Refuelling of construction equipment will only take place at crane pads or designated areas, well away from running water. Hazardous materials will be stored off site. Emergency spill kits will be maintained on the Project site, to be used if any spills of hazardous material should occur. Operational control procedure for storage and handling of hazardous materials will be implemented and all construction staff will be trained on proper implementation of this procedure. An Emergency Response and Communication Plan will be prepared and implemented. A Sediment and Erosion Control Plan will be prepared and implemented. Routine inspections will be carried out throughout the	**Non-significant**. The mitigation measures minimize the likelihood of hazardous materials being spilled. In the event of a spill, the Emergency Response and Communication Plan will allow onsite workers to minimize the impact of the spill.
		Transportation of hazardous material to adjacent lots via surface water, ground water, or wind-blown dust.	All adjacent parcels listed in Table 2-2.		

Incident	Description	Impact	Applicable parcels and turbines	Mitigation Measures	Residual Impact
				Project to verify for run-off and erosion.	
Ice throw	The formation of ice on turbine blades can increase downtime and produce ice clusters that could fall or be projected from the blades. Ice throw is however a low-probability event that requires specific meteorological conditions. Formation of ice is however a low-probability event that requires specific meteorological conditions. In the event of ice formation, assuming the proper ice event procedure is implemented and maintained throughout the life of the wind farm, the control system (turbine or SCADA) will detect ice formation on the rotor and stop the affected turbine. In this case, ice falls would be	Damage to farmland (loss of crops, soil compaction) or farm equipment	All adjacent parcels listed in Table 2-2.	An Emergency Response and Communication Plan will be prepared and implemented. In the event of ice formation, the control system (turbine or SCADA) will detect ice formation on the rotor and stop the affected turbine. In this case, ice falls would be limited to the area directly underneath the turbine and the immediate vicinity. Communication and information will be ensured through the operator's website where periodic updates, newsletters and contact phone numbers will be posted.	**Non-significant**. Given the low probability of ice throws occurring at the distance of the surrounding structures, the probability of a safety incident or damage is considered negligible. Furthermore, the implementation of Emergency Response and Communication Plan will mitigate safety issues and/or damage should an ice throw event occurs.
		Damage to surrounding structures	Distance to the closest structures: • Suspended well at approximately 220 m on PIN 008330082 (T5); • Other oil and gas infrastructure at approximately 530 m on PIN 008330084 (T5); • Farm building / shed at approximately 550 m on PIN 750810056 (T117); • Trailer (mobile home) at approximately 611 m on PIN 750810056 (T117); • Dwelling at approximately 651 m on PIN 008330082 (T5).		

Incident	Description	Impact	Applicable parcels and turbines	Mitigation Measures	Residual Impact
	limited to the area directly underneath the turbine and in the immediate vicinity. Nevertheless, ice throws are known to happen. In the present case, no damages to crops or farm equipment are expected as icing events occur in winter, when fields are not in use. Additionally, there is no dwelling or other structure located in the immediate vicinity of a turbine. Roads are not subject to damages due to ice throws.	Safety incident on roads	No turbines		
Turbine failure	Events such as blade fall and tower collapse could potentially cause safety issues and cause damage to farmland, (loss of crops and soil compaction), farming equipment, surrounding structures, etc. Such events have occurred on extremely rare occasions. Turbines are designed and installed following strict specifications to allow for safe and long-term operation in a specific physical environment.	Damage to farmland (loss of crops, soil compaction) or farm equipment	All adjacent parcels listed in Table 2-2.	The potential adverse impact will be mitigated by best management practices, including wind turbine certification, proper maintenance and shutdown protocols during extreme weather. An Emergency Response and Communication Plan will be prepared and implemented. Communication and information will be ensured through the operator's website where periodic updates, newsletters and contact phone numbers will be posted.	**Non-significant**. Given that the likelihood of turbine failure is extremely rare, the probability of a safety incident or damage is considered negligible. Furthermore, the implementation of the Emergency Response and Communication Plan will mitigate safety issues and/or damage should a turbine failure occur.
		Damage to surrounding structures	See distance to the closest structures above.		
		Damage to roads	No turbines		
		Safety incident on roads	No turbines		

Incident	Description	Impact	Applicable parcels and turbines	Mitigation Measures	Residual Impact
	There is no dwelling or other structure located in the immediate vicinity of a turbine. Damages to farmland (loss of crops or soil compaction), roads would be easily remediated. Given that the likelihood of turbine failure is extremely rare, the probability of damage is considered negligible.				

3 CONCLUSIONS

As per *O. Reg. 359/09*, DNV GL has undertaken a PSA for each turbine within the Project layout that falls within the prescribed distance from a parcel boundary (i.e. positioned less than the hub height and greater than the blade length + 10 m). A total of 17 of the 18 turbines were identified as being located within this prescribed distance and thus, subject to a PSA.

The assessment has determined that the potential adverse impacts to business, infrastructure, properties or land use of adjacent lots are highly unlikely with the implementation of the safety procedures and other mitigation measures proposed in this document., no adverse impacts are expected.

Furthermore, it should be noted that the REA setback of 550 m from non-participating dwellings and other Points of Reception (550 m) has been applied to all turbines, which further reduces the already low likelihood that any potentially impacted land uses will be subject to adverse impacts by the proposed turbine locations.

4 REFERENCES

[1] Ontario Regulation 359/09, made under the Environmental Protection Act, Renewable Energy Approvals under Part 1.0 of the Act.

[2] Technical Guide to Renewable Energy Approvals, Ontario Ministry of the Environment, 2017.

APPENDIX A – TURBINE MAPS

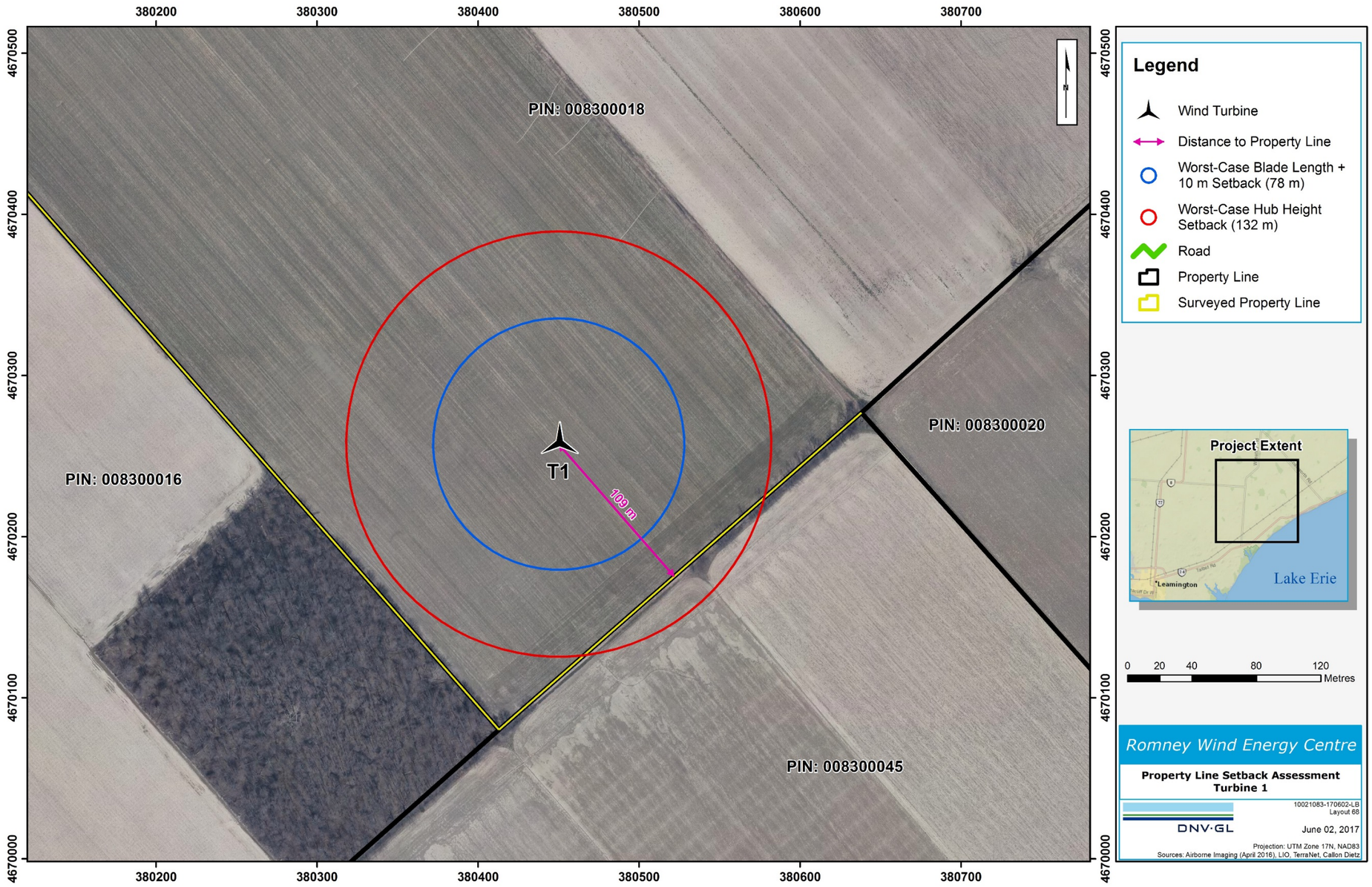

Figure A-1: Property Line Setback Assessment Map – Turbine T1

Figure A-2: Property Line Setback Assessment Map – Turbine T2

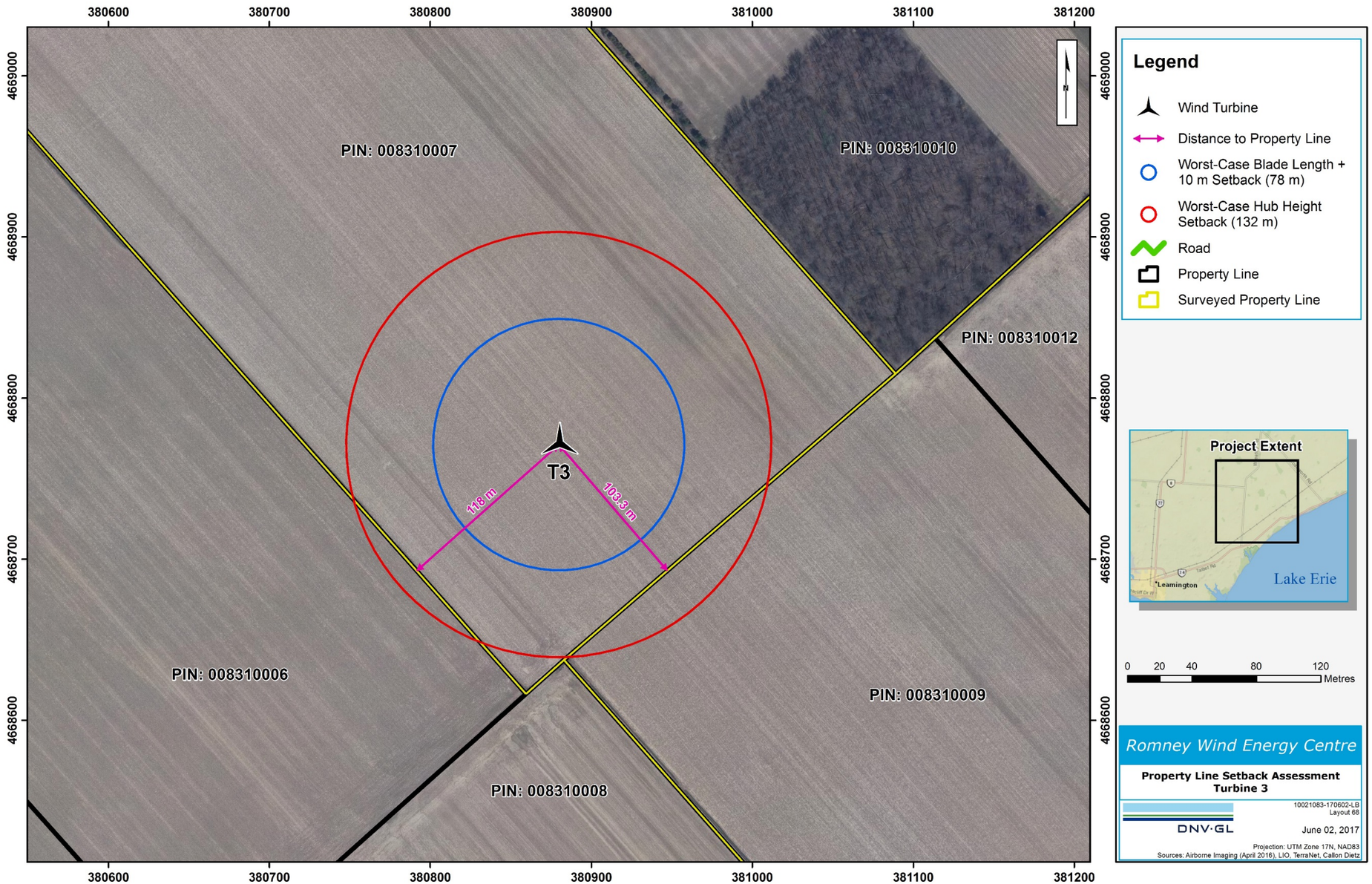

Figure A-3: Property Line Setback Assessment Map – Turbine T3

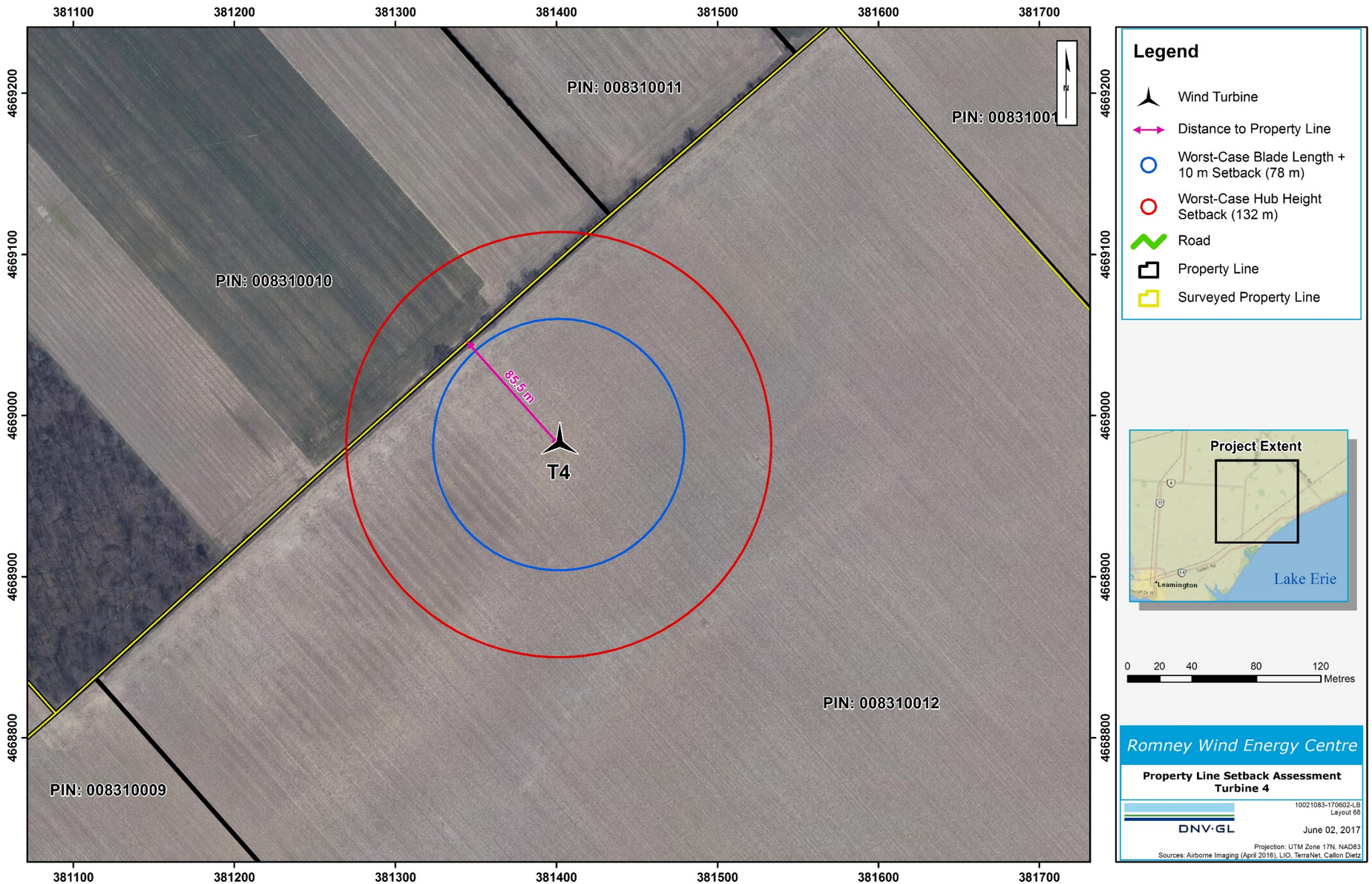

Figure A-4: Property Line Setback Assessment Map – Turbine T4

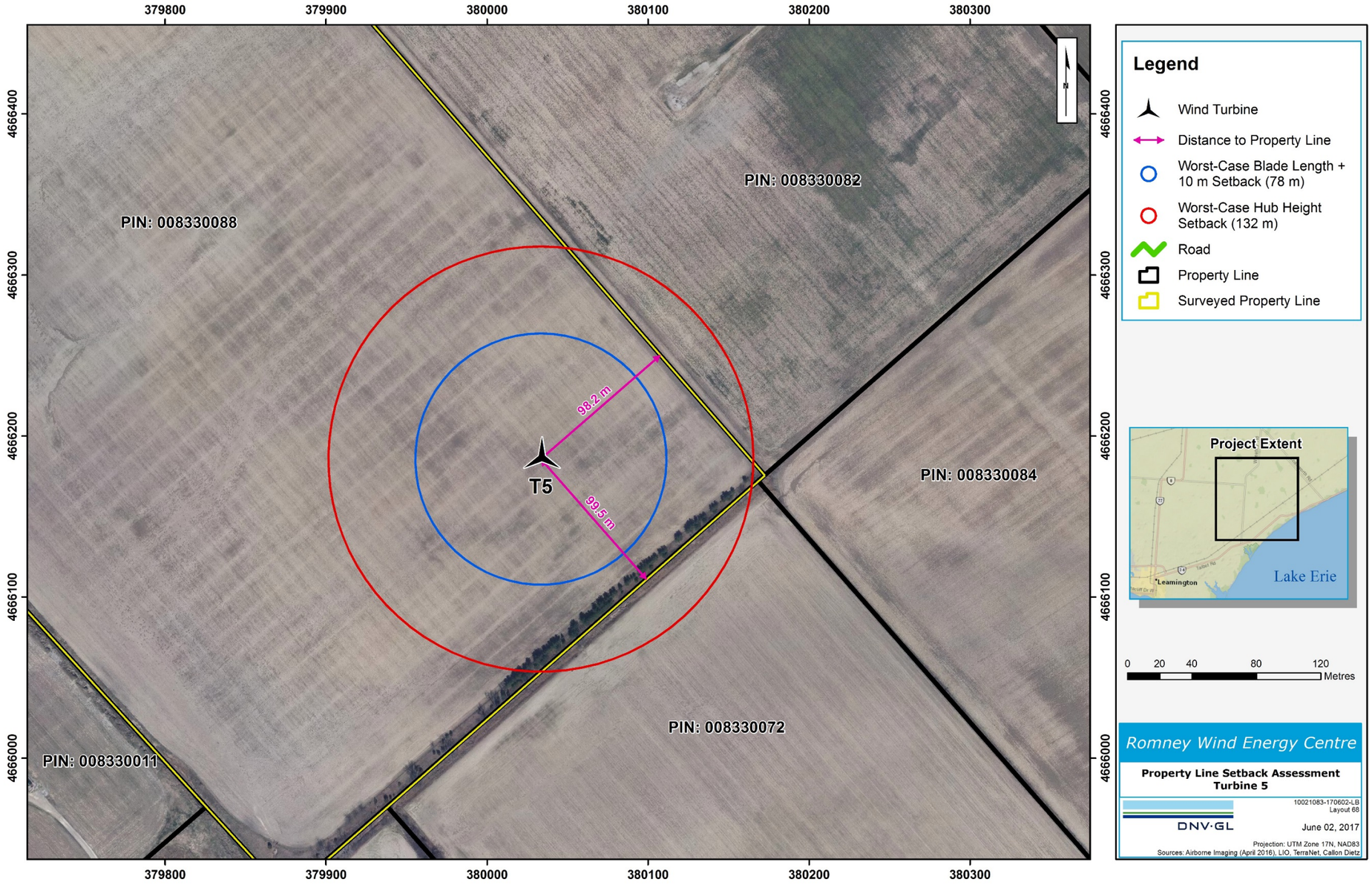

Figure A-5: Property Line Setback Assessment Map – Turbine T5

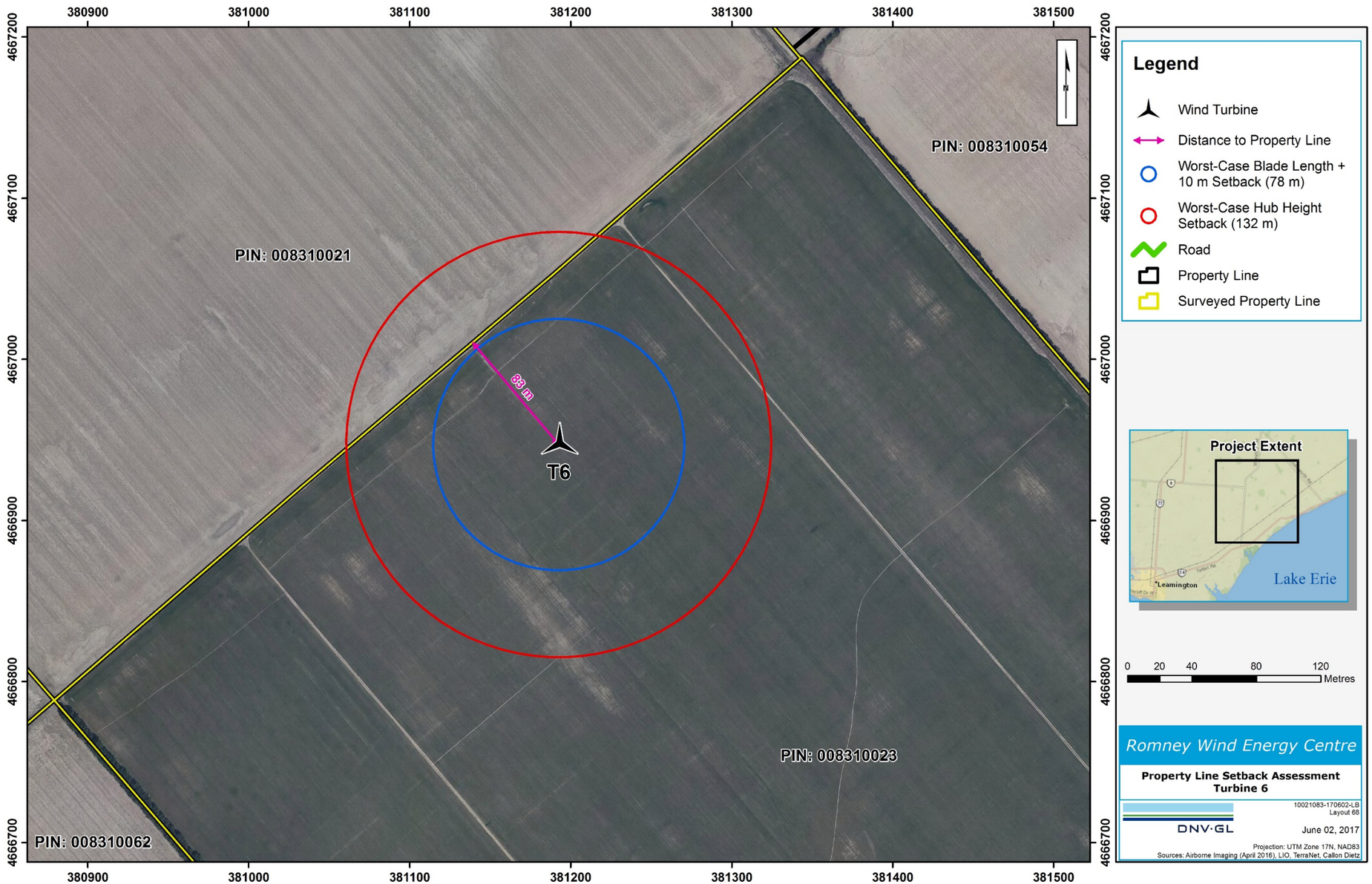

Figure A-6: Property Line Setback Assessment Map – Turbine T6

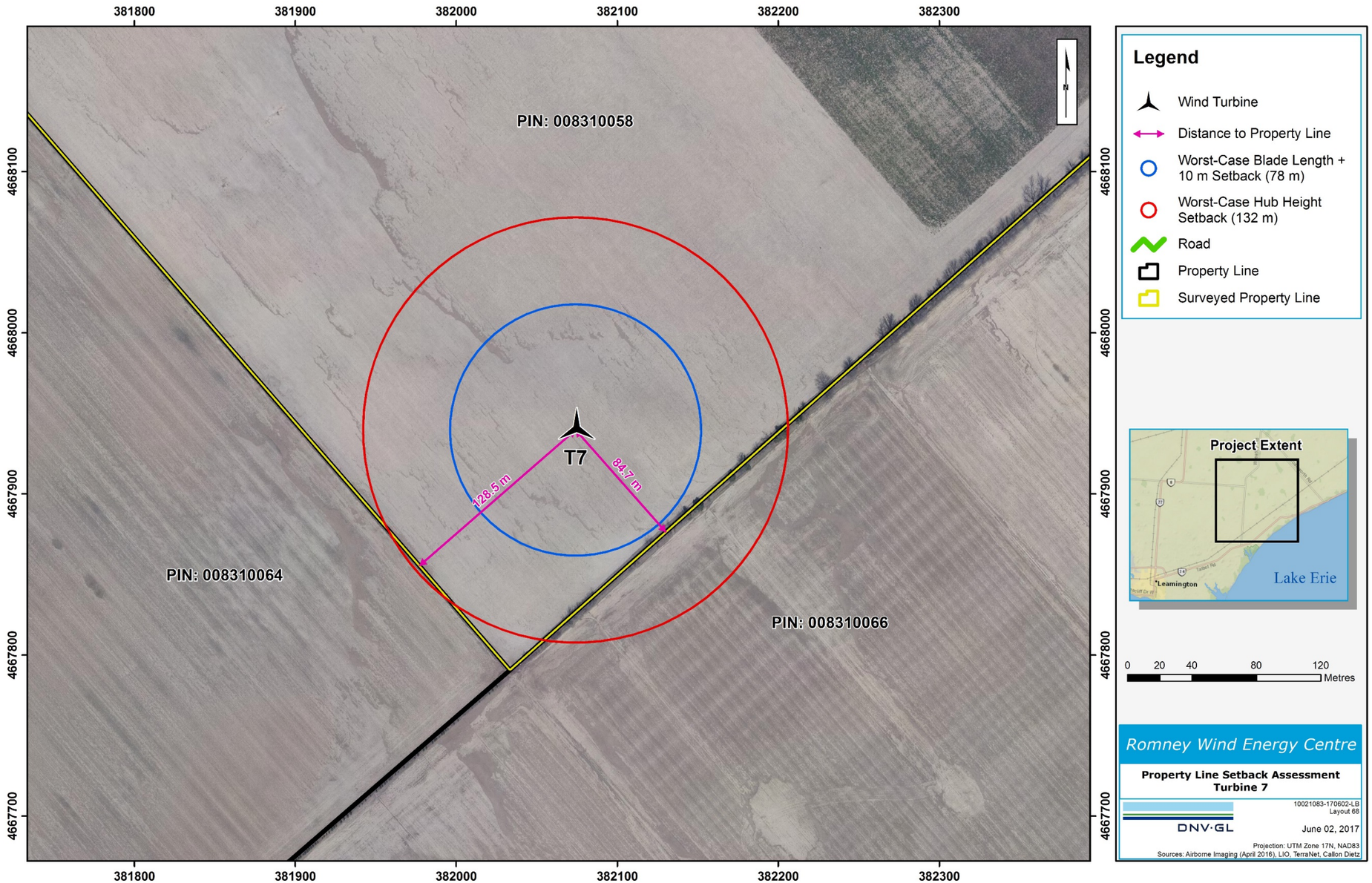

Figure A-7: Property Line Setback Assessment Map – Turbine T7

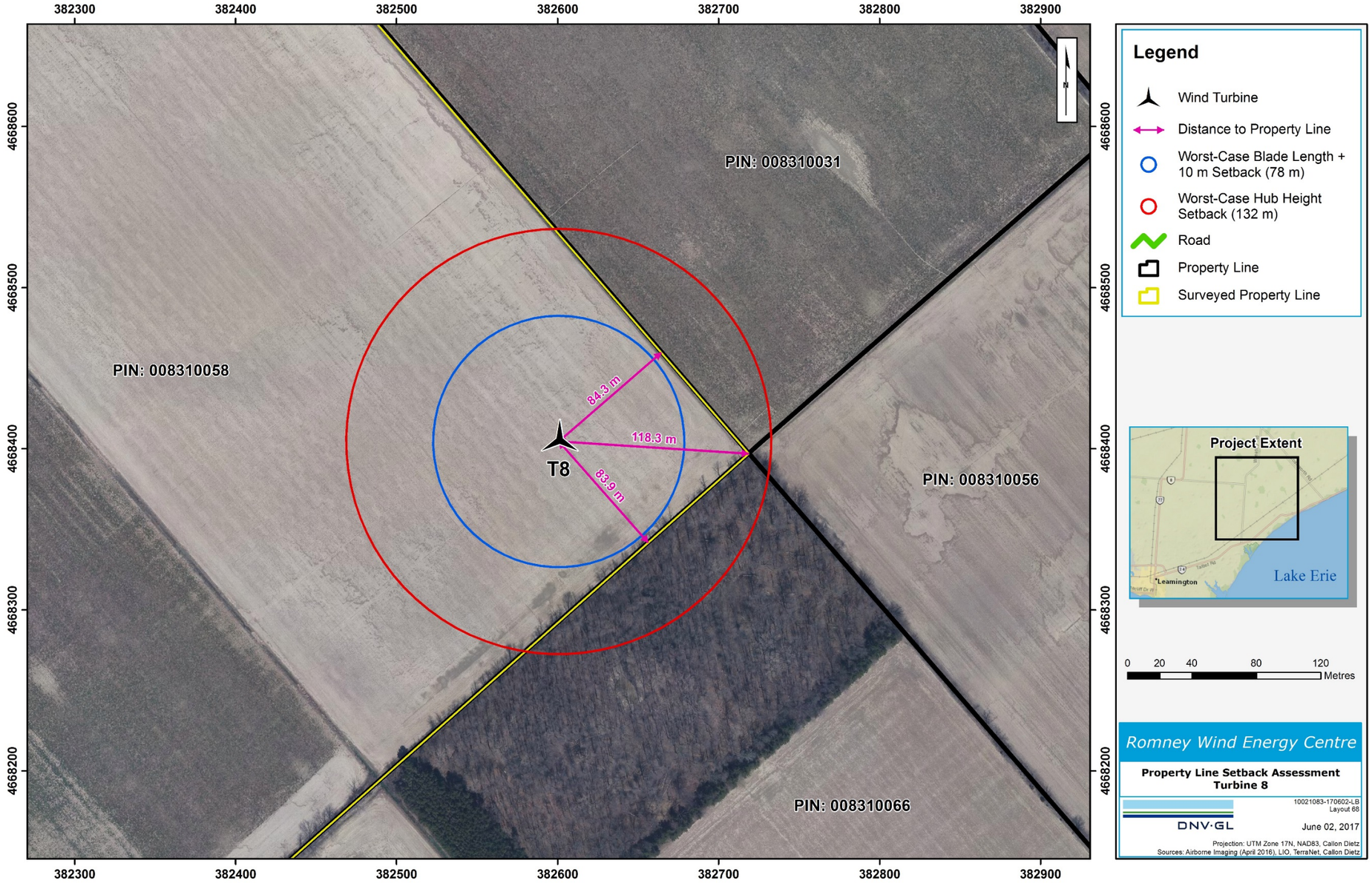

Figure A-8: Property Line Setback Assessment Map – Turbine T8

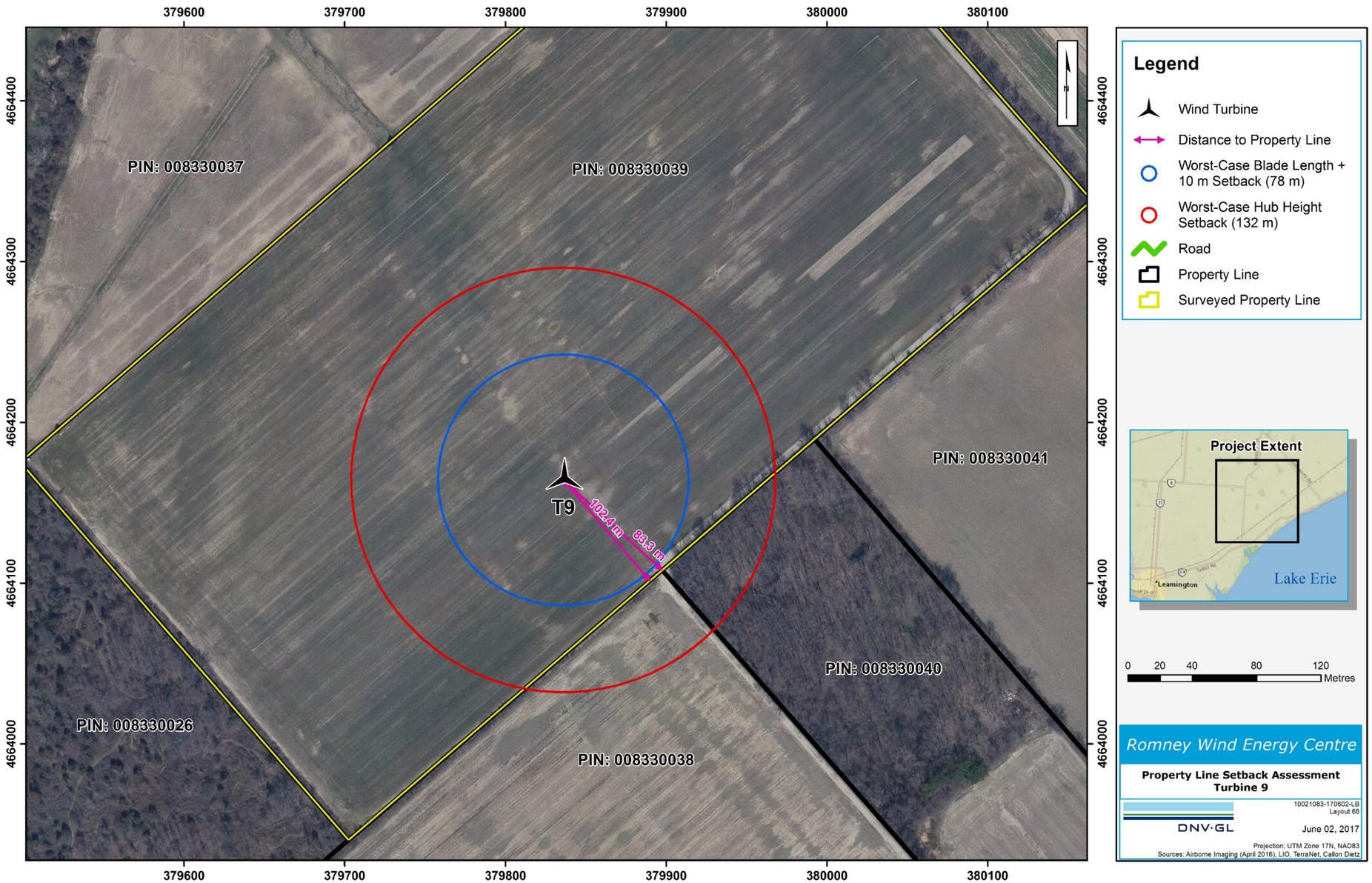

Figure A-9: Property Line Setback Assessment Map – Turbine T9

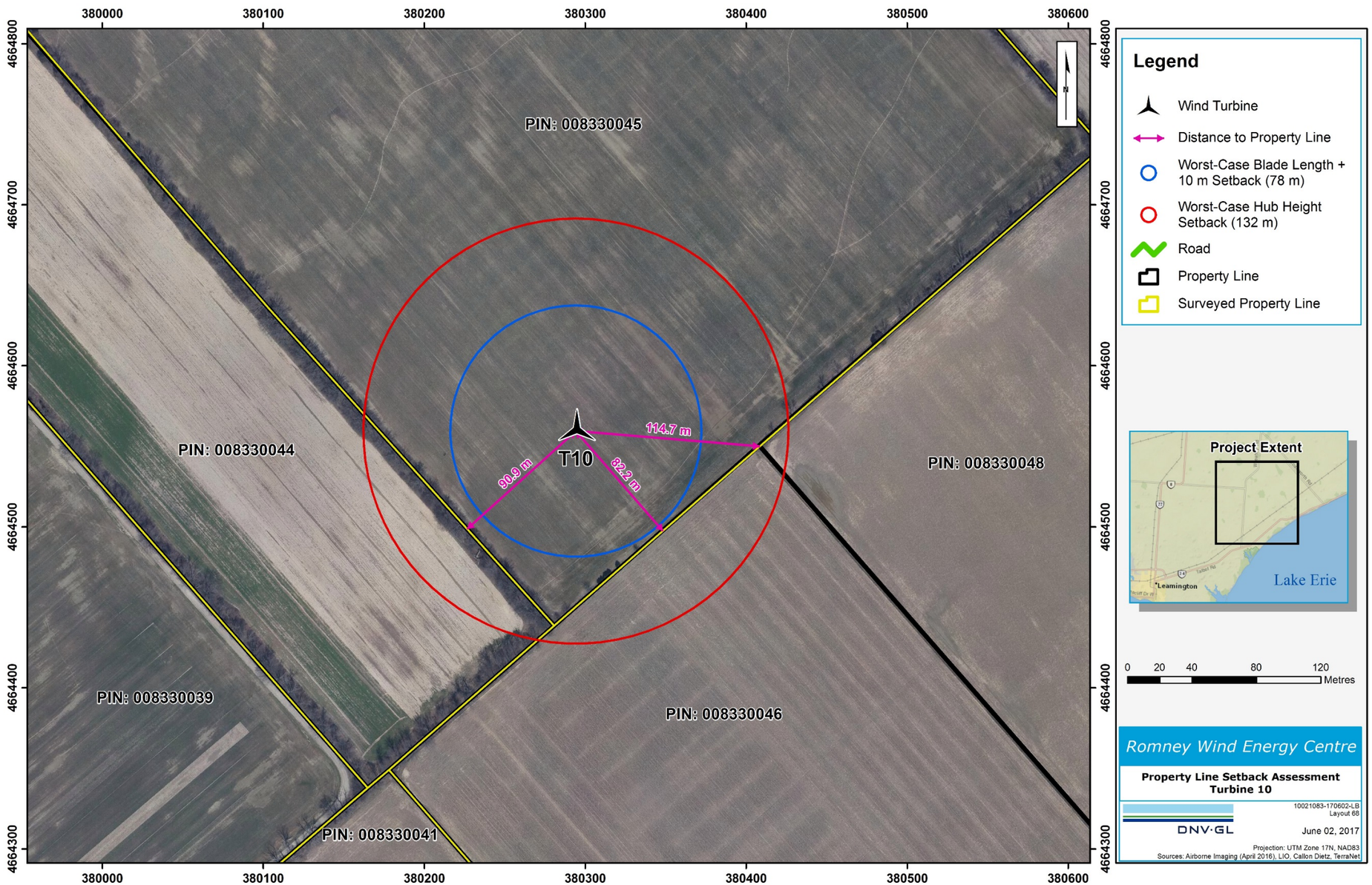

Figure A-10: Property Line Setback Assessment Map – Turbine T10

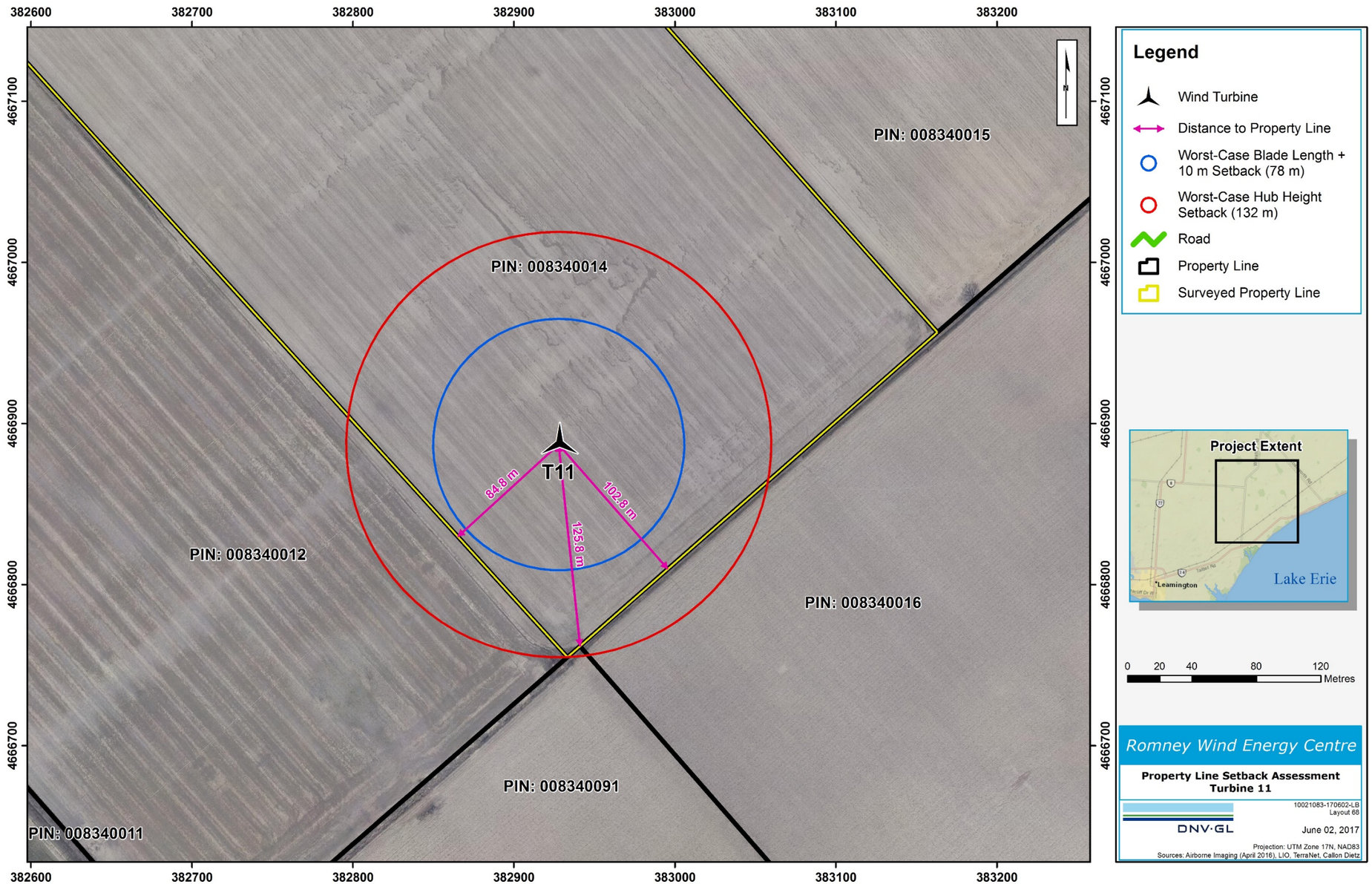

Figure A-11: Property Line Setback Assessment Map – Turbine T11

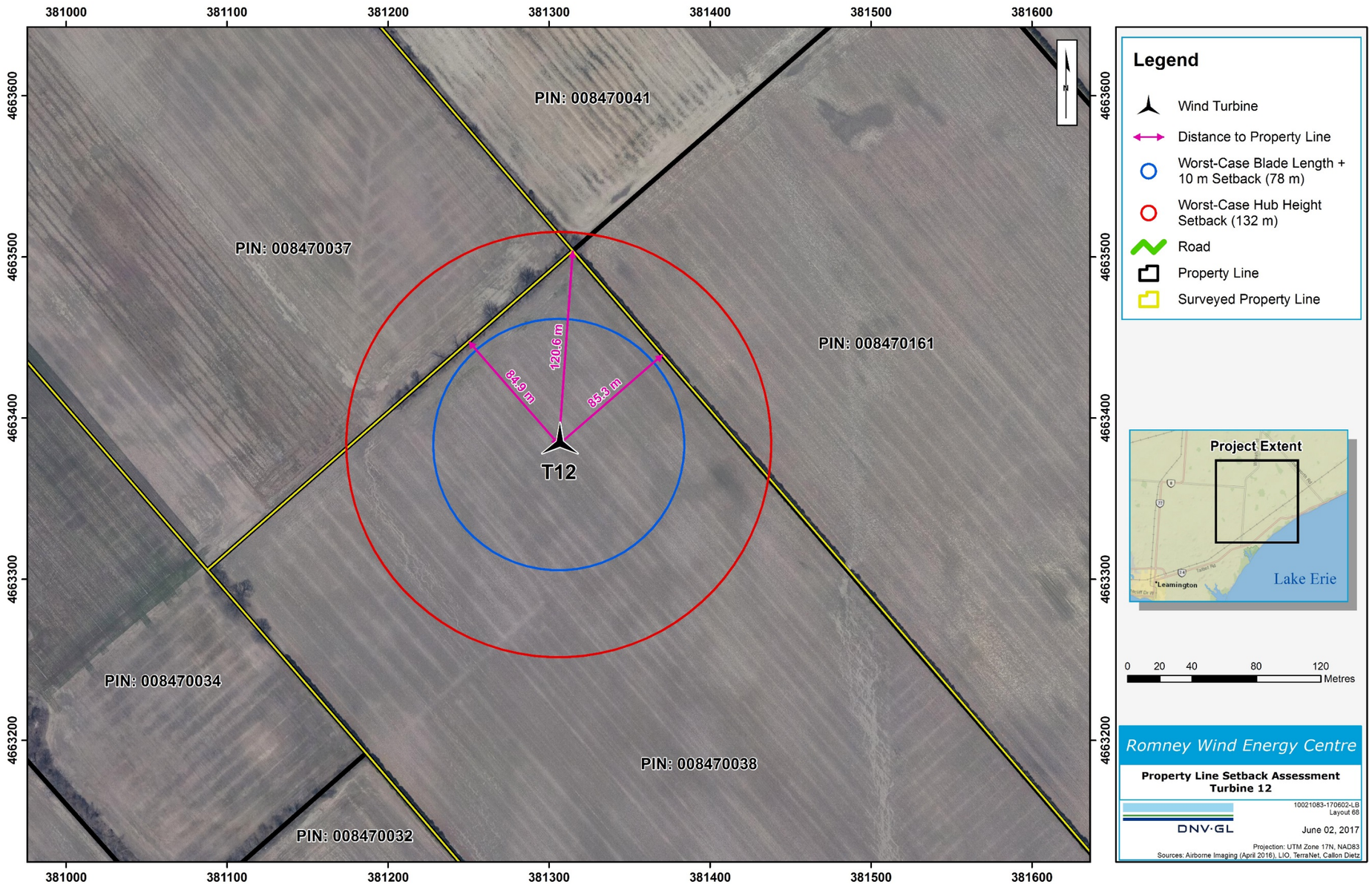

Figure A-12: Property Line Setback Assessment Map – Turbine T12

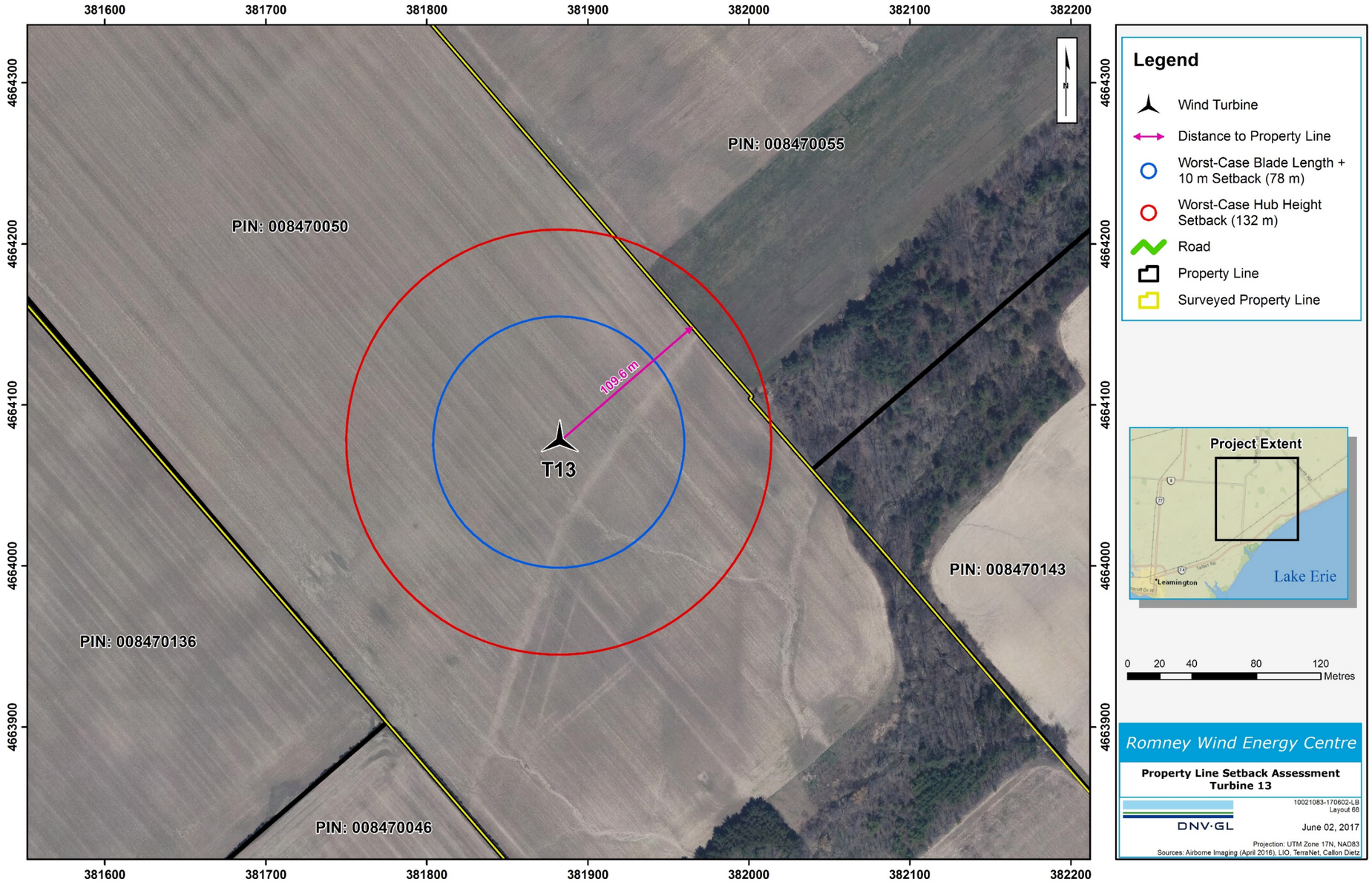

Figure A-13: Property Line Setback Assessment Map – Turbine T13

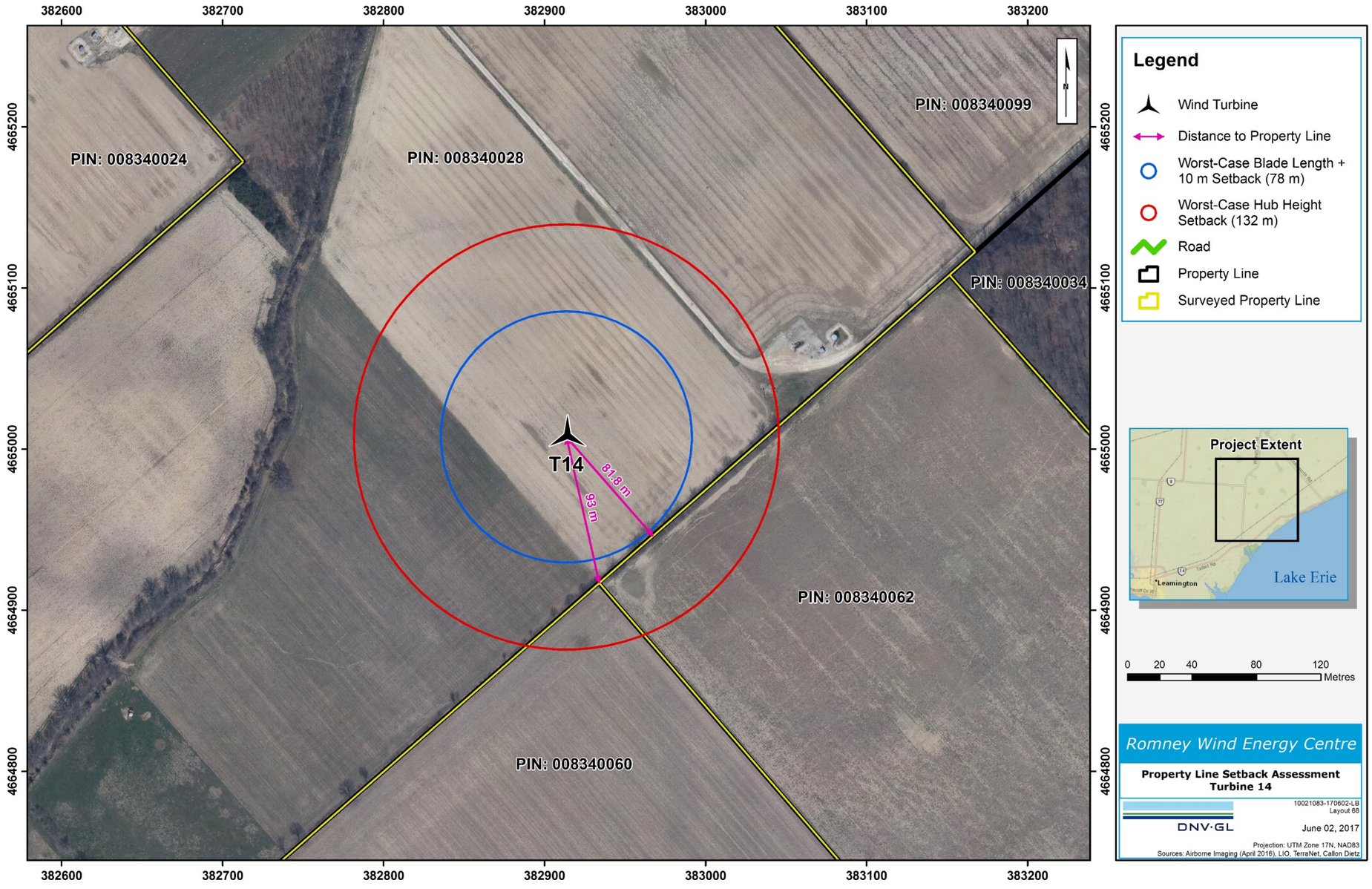

Figure A-14: Property Line Setback Assessment Map – Turbine T14

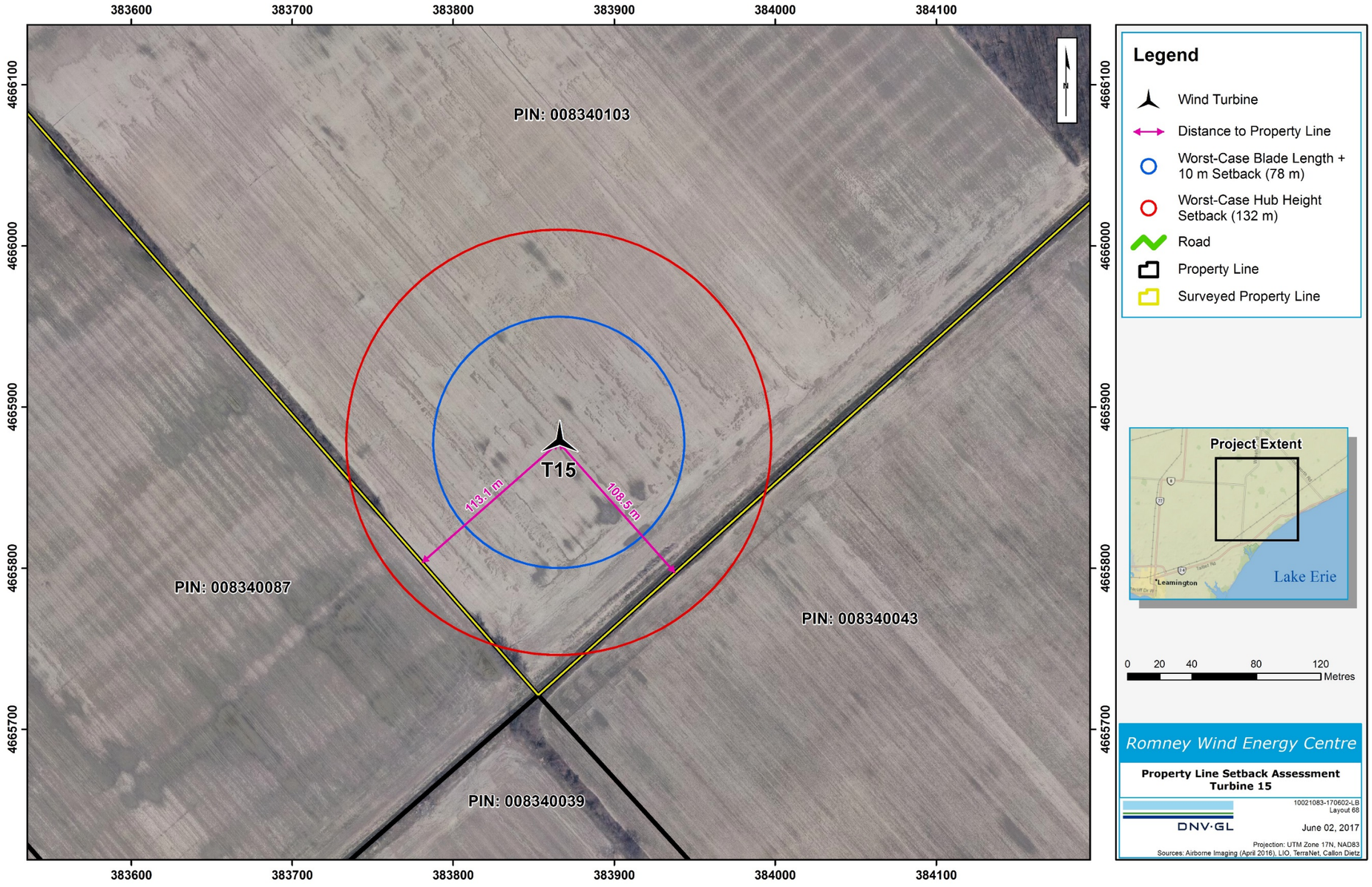

Figure A-15: Property Line Setback Assessment Map – Turbine T15

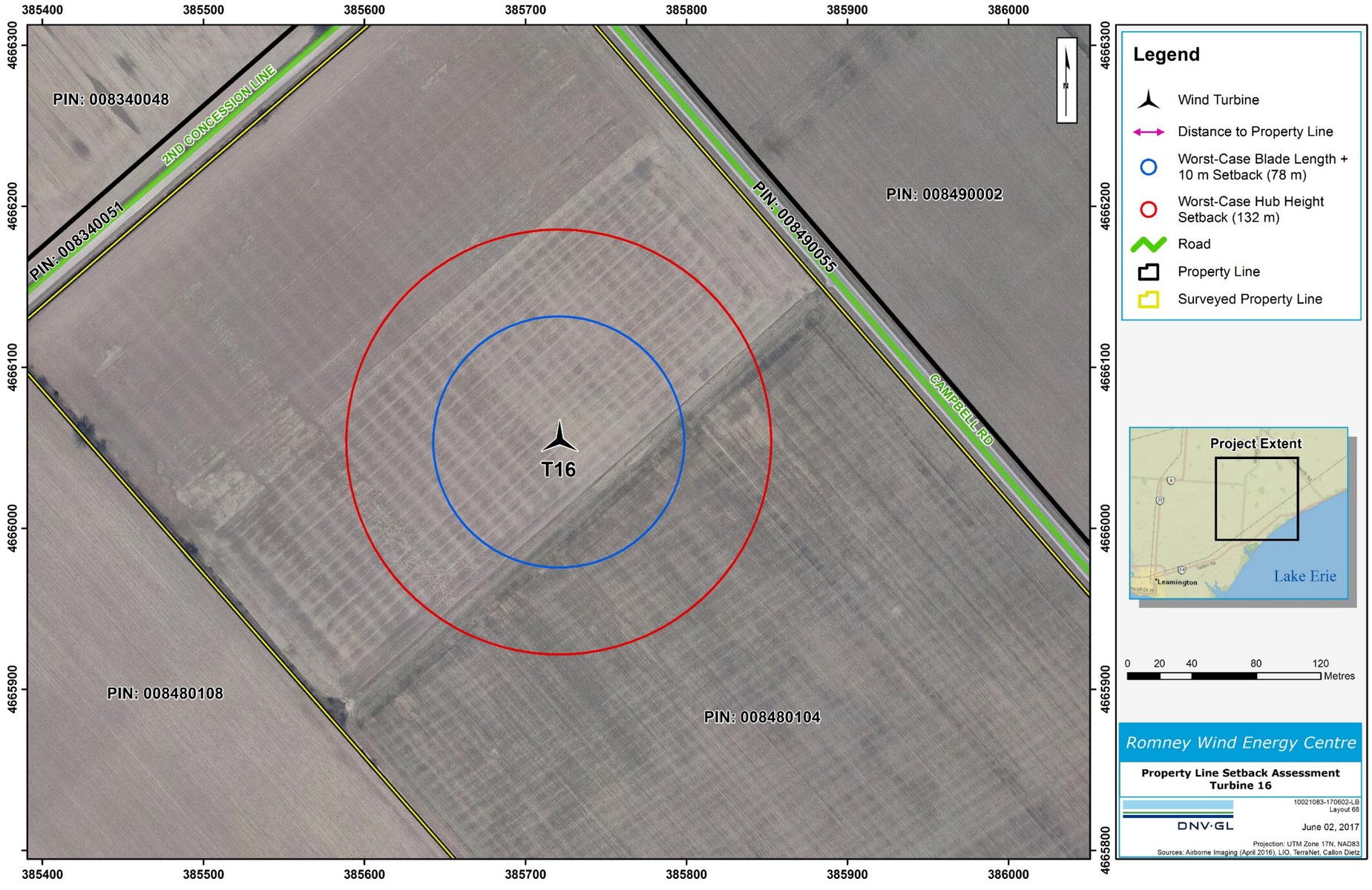

Figure A-16: Property Line Setback Assessment Map – Turbine T16

Figure A-17: Property Line Setback Assessment Map – Turbine T17

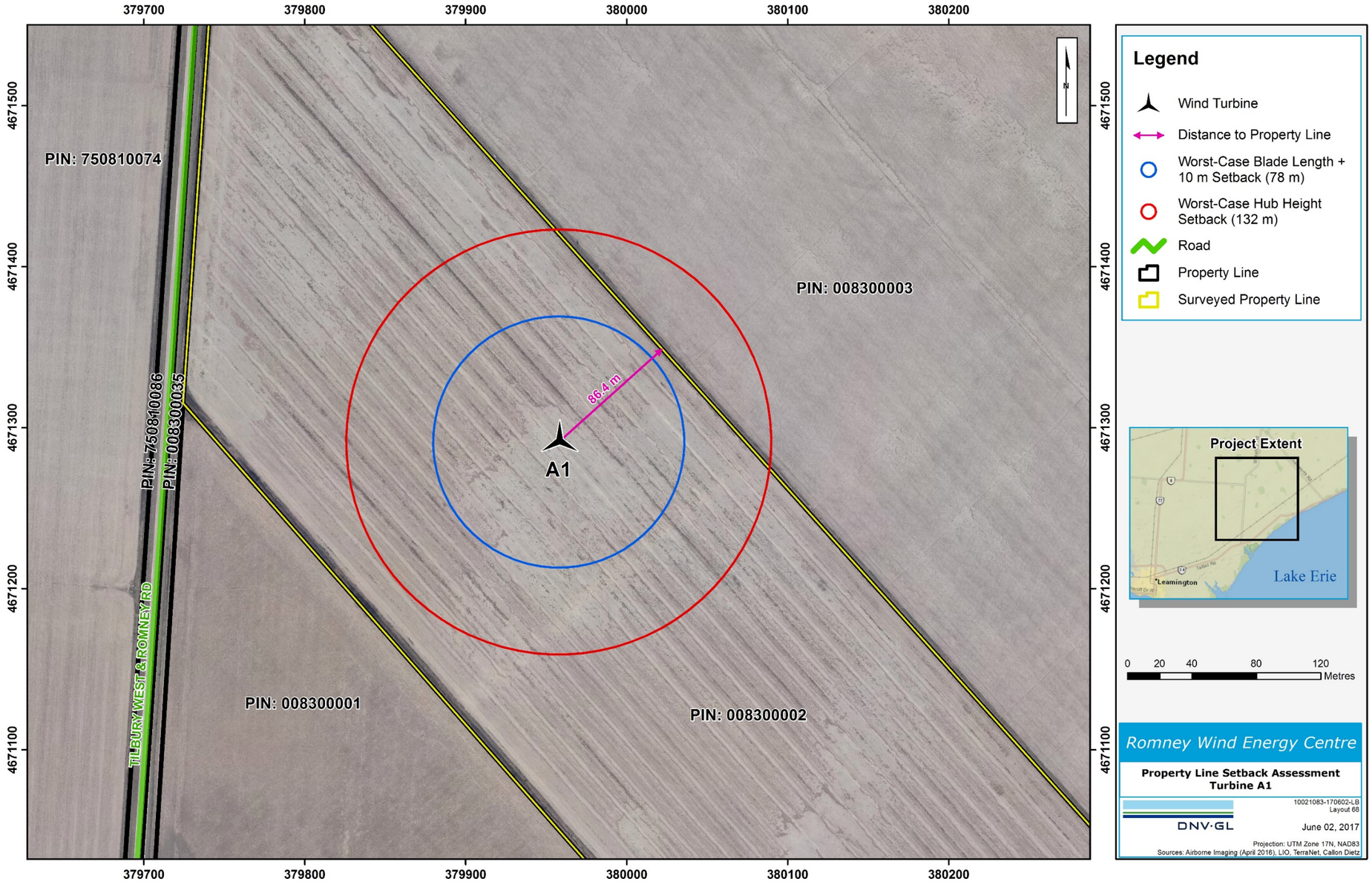

Figure A-18: Property Line Setback Assessment Map – Turbine A1

About DNV GL

Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. We provide classification, technical assurance, software and independent expert advisory services to the maritime, oil & gas and energy industries. We also provide certification services to customers across a wide range of industries. Combining leading technical and operational expertise, risk methodology and in-depth industry knowledge, we empower our customers' decisions and actions with trust and confidence. We continuously invest in research and collaborative innovation to provide customers and society with operational and technological foresight. Operating in more than 100 countries, our professionals are dedicated to helping customers make the world safer, smarter and greener.