

Toronto Pearson Air Quality Assessment

## **Phases 1-3 Summary**





## Phase 1 & Phase 2 – Emissions

Contaminant	Airport Emissions (tonnes/year)			Off-Site Emissions (tonnes/year)	
	2011 Actual	2022 Forecast	2032 Forecast	Current Actual	2022/2032 Forecast
CO	2,611	2,525	2,987	98,457	98,457
NO <sub>x</sub>	1,554	2,026	2,455	16,945	15,528
SO <sub>x</sub>	113	169	206	2,049	2,049
VOC	207	274	330	21,303	18,797
PM <sub>10</sub>	24	30	36	10,959	8,351
PM <sub>2.5</sub>	23	28	34	4,296	3,321

Notes:

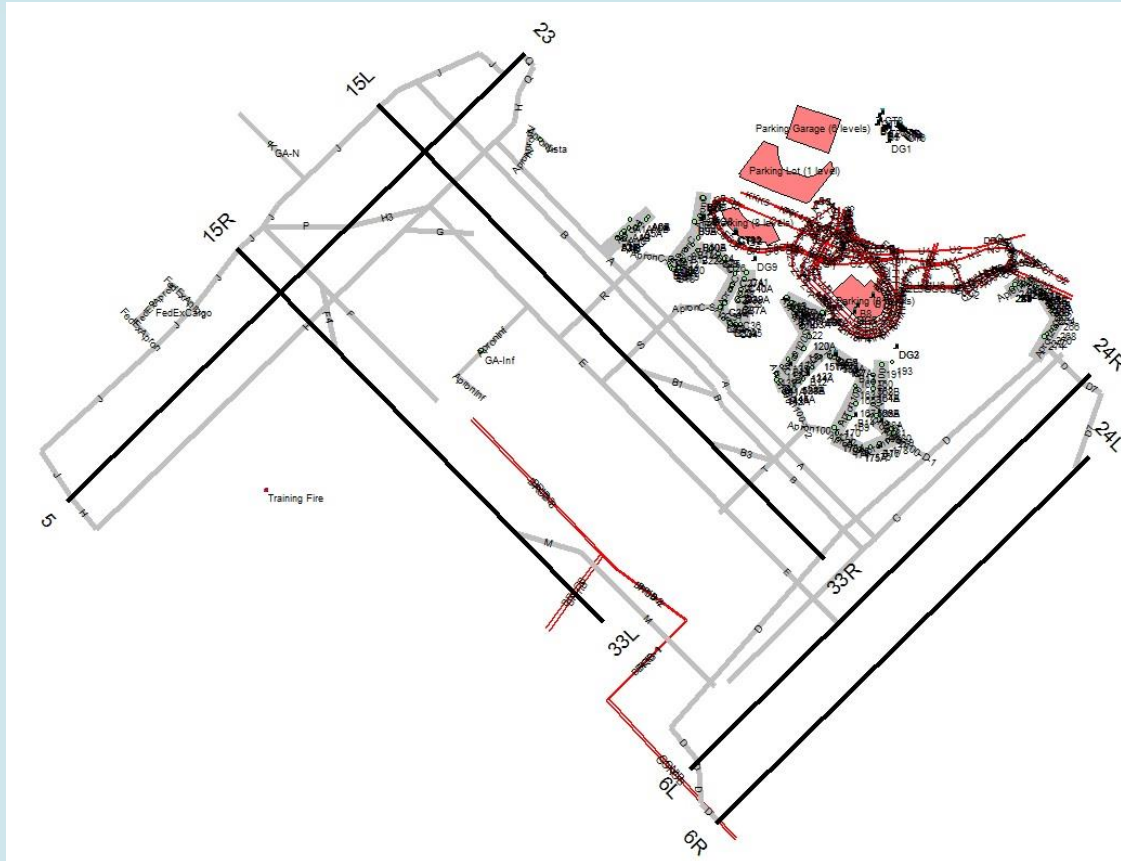
2011 Actual – emissions calculated based on actual 2011 activity levels at TPA

2022 and 2032 Predicted– emissions calculated based on predicted 2022 & 2032 project fleet and traffic data

2011 baseline emissions based on SMOKE emissions inventory from Environment Canada for 2006 (most recent available at time of project)

2022 and 2032 estimated based on national trends published for 1990 to 2012 and local trends between previous study and current study

# Phase 1 – Airport Sources



Baseline - Lester B Pearson Intl

Scale:  
 1 km

- |                     |               |                  |
|---------------------|---------------|------------------|
| Training Fire       | Receptor      | Runway           |
| Stationary (point)  | Gate (volume) | Taxiway/Queue    |
| Stationary (volume) | Gate (area)   | Roadway          |
| Stationary (area)   | Building      | Parking Facility |



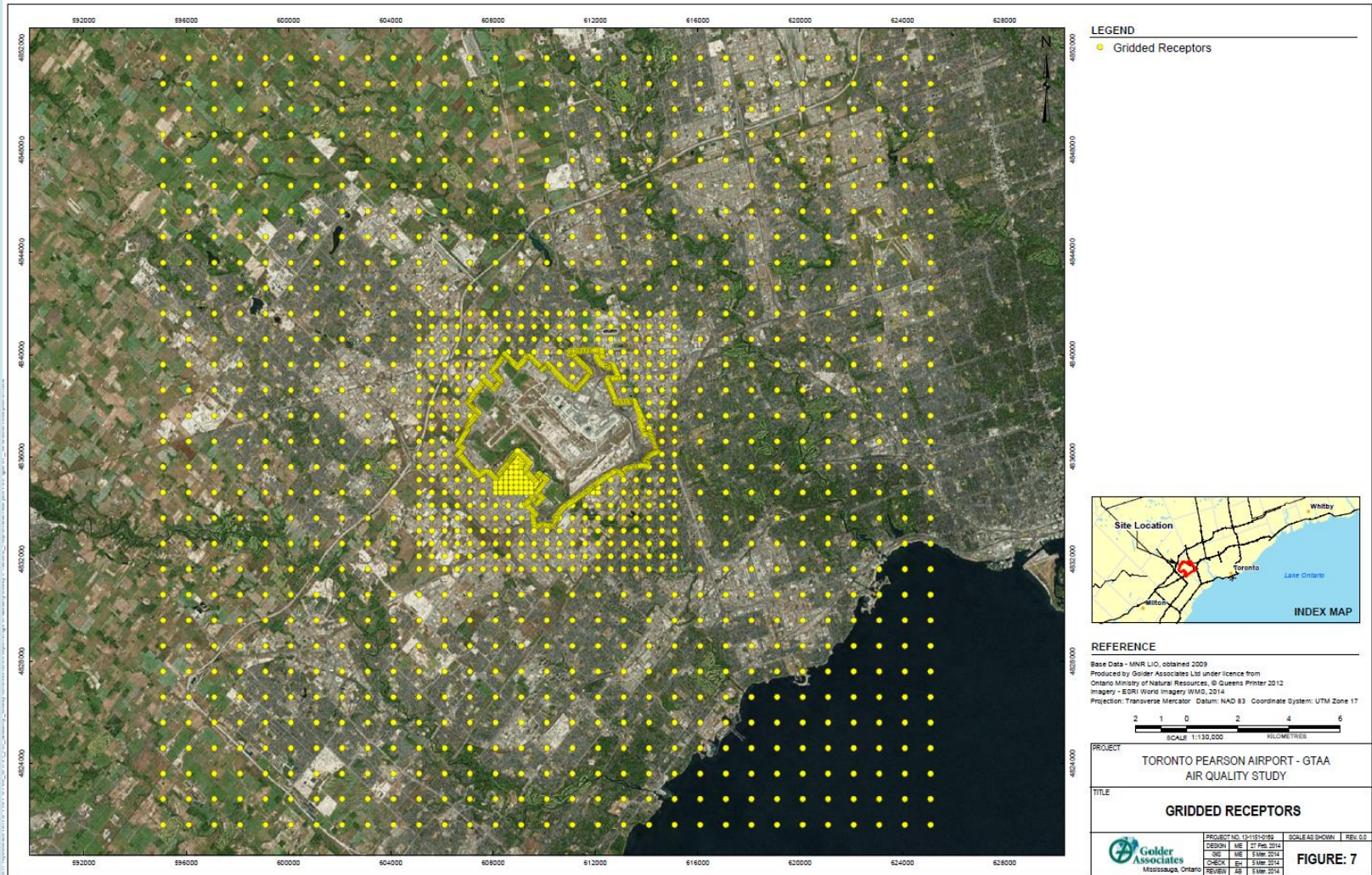


## Phase 3 – Dispersion Modelling

- Three types of scenarios considered:
  - Airport Alone
  - Background Alone
  - Airport + Background
- Modelling used 2011 meteorological data for 2011 scenario and 5 years of meteorological data (2008 to 2012) for future scenarios
- Hourly ozone data used to apply Ozone Limiting Method for NO<sub>2</sub>
- Results compared to ambient monitoring for 2011, relative contributions of airport and regional emissions to long-term concentrations also considered




# Gridded Receptors







# Individual Receptors



 Toronto  
Pearson

 Receptor  
Location

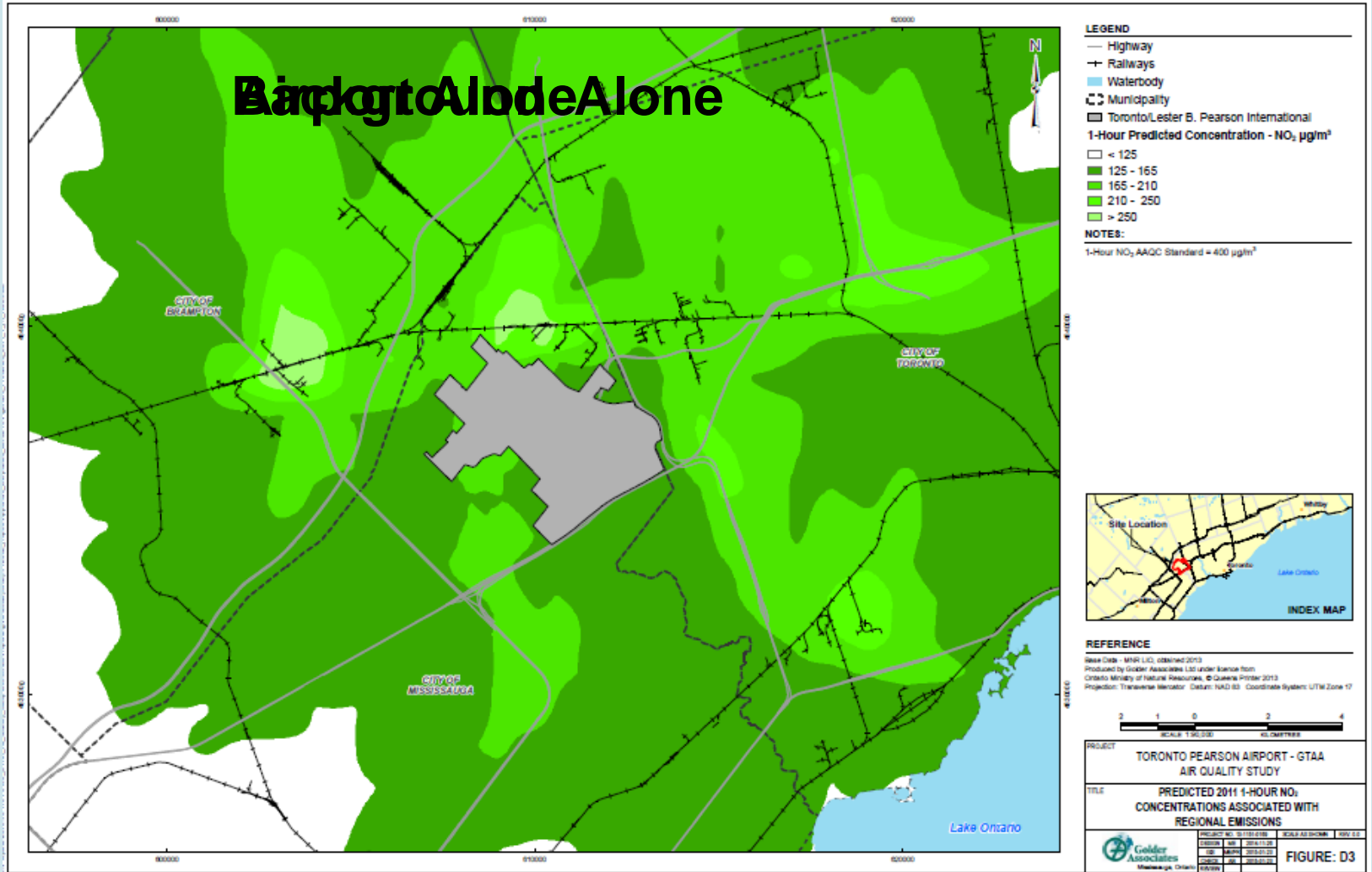
 New  
Receptor  
Location



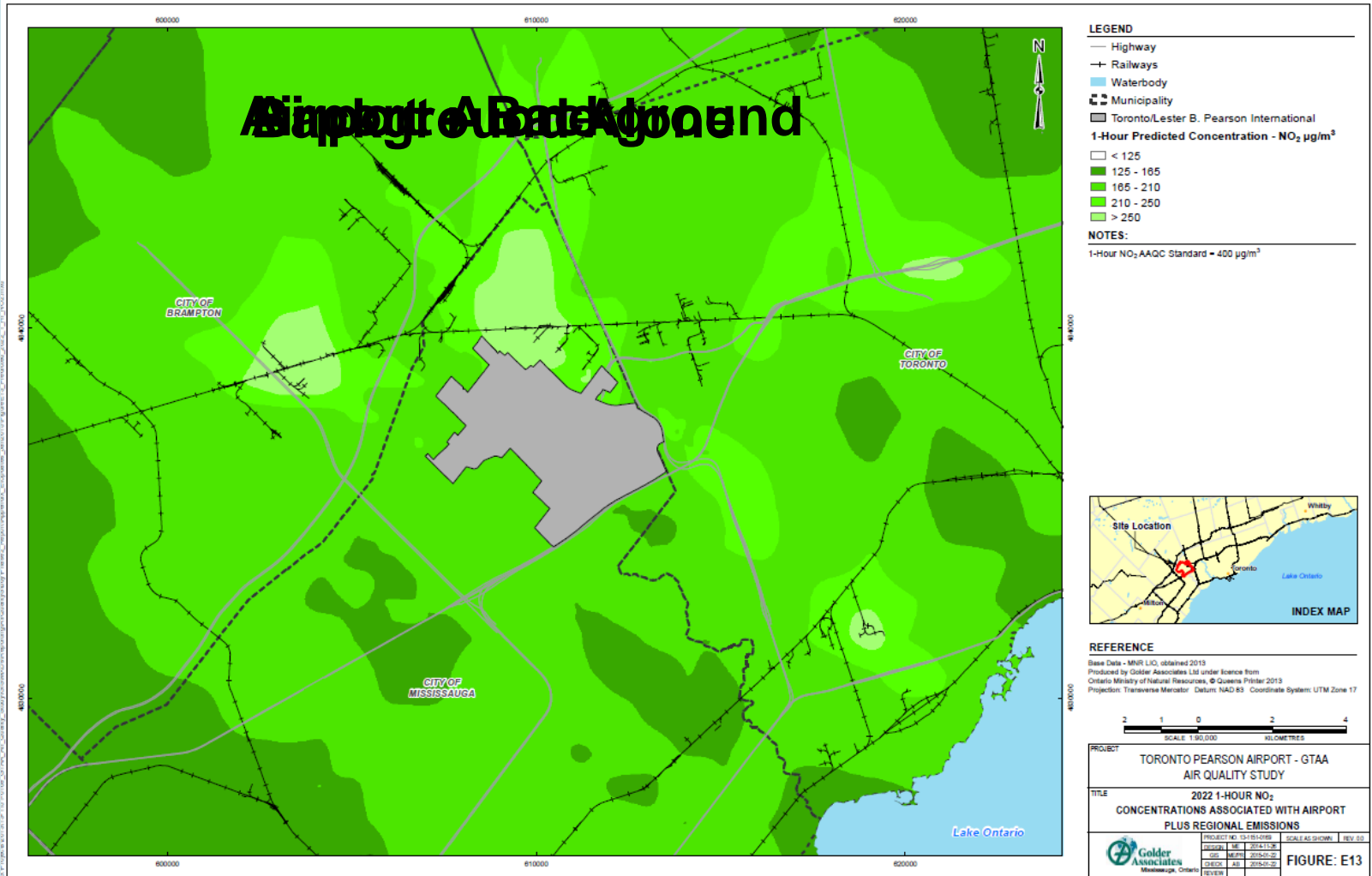
# Results Figures



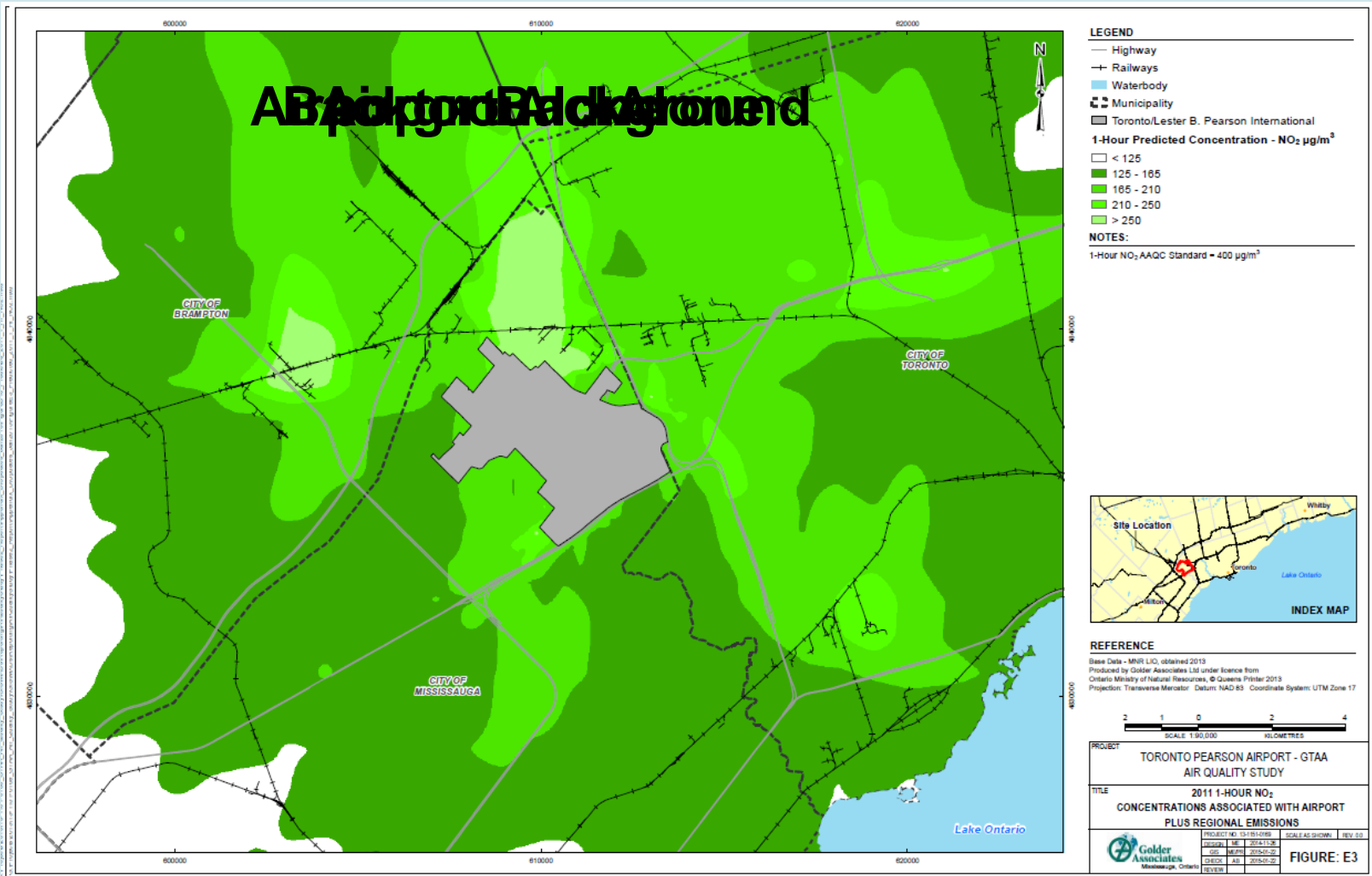
# Modelling Results (2011 NO<sub>2</sub>)



# Modelling Results (2022 NO<sub>2</sub>)



# Modelling Results (2032 NO<sub>2</sub>)

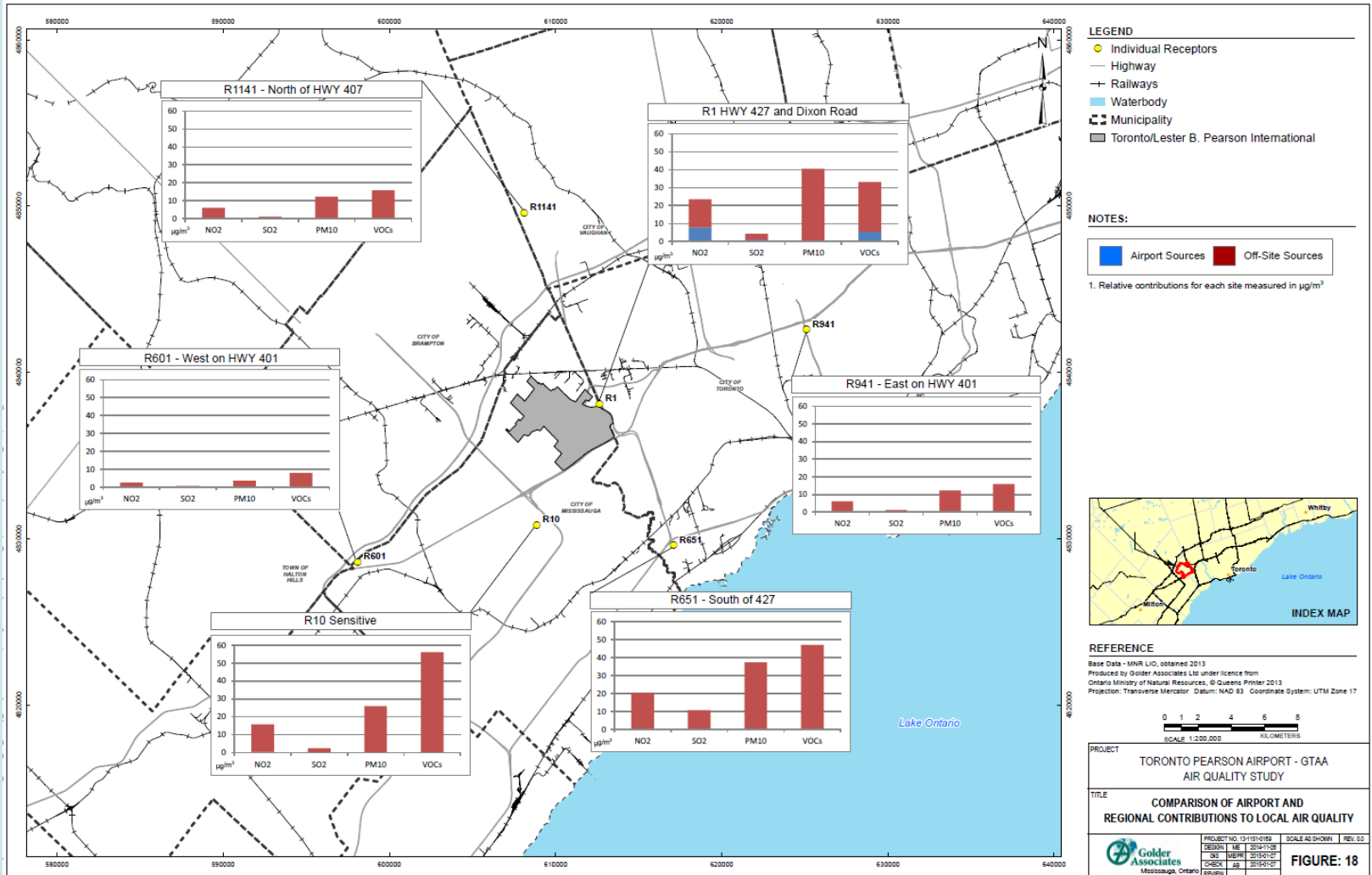




## Phase 3 – Comparison to Local Monitoring

- Comparison to 5 local stations, 3 inside modelling domain, 2 outside domain
- Agreement was good for 4 of the 5 locations (exception was “Toronto North”, outside modelling domain and to the north and east)
- Generally model was found to over-predict short-term concentrations (1-hour, 8-hour, many 24-hour) and be near or slightly under-predict long-term concentrations (some 24-hour, most annual)
- Least accuracy was found for CO, best was generally NO<sub>2</sub>

# Phase 3 – Relative Contributions





## Conclusions Phases 1 to 3

- Majority of emissions inside the modelling domain are from off-airport sources
- Estimated emissions for the airport are anticipated to increase
- Predicted concentrations are below current guidelines for airport alone (all scenarios)
- Predicted concentrations over most of the modelling domain are dominated by contributions from regional emissions
- Use of Ozone Limiting Method for NO<sub>2</sub> gives values comparable to local monitoring



## Any Questions?

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