# CITIZEN SCIENCE @ ROCKFORD MANOR SECONDARY SCHOOL

## Air Quality Monitoring Campaign

**By: Lily Kohout & Caitlyn Kelly**

MET éireann
The Irish Meteorological Service

PRM
Rockford Manor School
Adorate Dominum In Atrio Sancto Eius - AD 1777

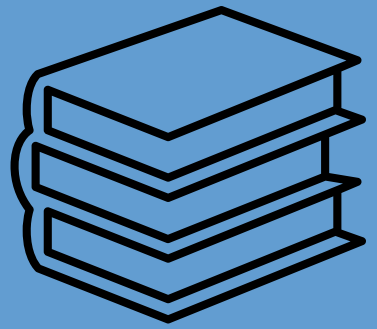
The GLOBE Program

epa
Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

An Taisce
The National Trust for Ireland

# OUR SCHOOL

Rockford Manor is a secondary school located in Blackrock, County Dublin. Our school is a Green-School and is located in an urban setting next to a busy road and roundabout.

Green-Schools

# INTRODUCTION

Today, we would like to tell you about the Air Quality Project that our TY students have carried out over the past 4 academic years.

During this project we measured the concentration of Nitrogen Dioxide, $NO_2$ gas in the air around our school.

$NO_2$ is red-brown gas that is produced by vehicles. High levels of this pollutant can cause respiratory health issues and damage to our atmosphere.

# OUR AIM - RESEARCH QUESTIONS

1. **How much $NO_2$ is there in different parts of our outdoor school environment?**

2. **Is our school air quality within the WHO recommended level (less than 10 $\mu g/m^3$) of healthy $NO_2$ exposure?**

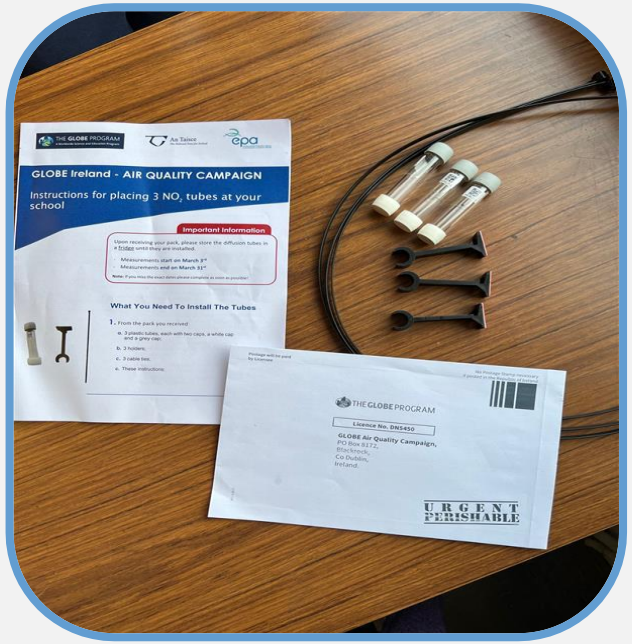
3. **Do weather conditions such as wind speed and direction affect our air quality?**

4. **How do our current results compare with our previous results?**

5. **Can we improve air quality for our students and staff around our school?**

# METHOD

- $NO_2$ Diffusion Tubes placed at three locations around our school for 4 weeks during each monitoring period
- Mix of monitoring locations – roadside, sheltered from traffic and elevated
- TY students completed traffic surveys
- Daily weather (wind speed & direction) recorded

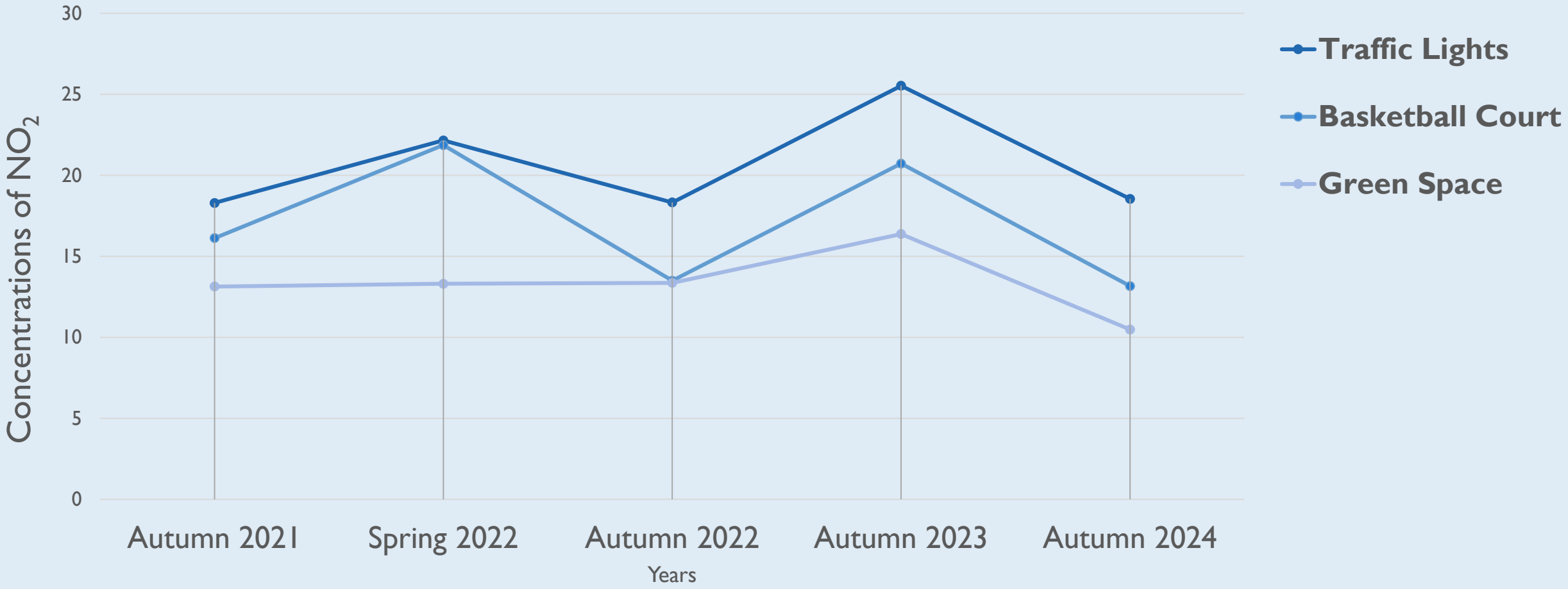



# RESULTS: CONCENTRATIONS OF $NO_2$ ($\mu g/m^3$)

| Location | Autumn 2021 | Spring 2022 | Autumn 2022 | Autumn 2023 | Autumn 2024 | Average per location |
|---|---|---|---|---|---|---|
| Tube 1- traffic lights | 18.29 | 22.15 | 18.32 | 25.52 | 18.54 | 20.56 |
| Tube 2- basketball court (elevated) | 16.12 | 21.86 | 13.49 | 20.72 | 13.16 | 17.07 |
| Tube 3- sheltered | 13.13 | 13.30 | 13.36 | 16.37 | 10.48 | 13.33 |
| Average per season | 15.85 | 19.10 | 15.06 | 20.87 | 14.06 | |

1. Traffic lights – highest concentrations of $NO_2$ Average = 20.56
2. Sheltered location - lowest concentrations of $NO_2$ Average = 13.33
3. Highest overall average concentrations of $NO_2$ measured Autumn 2023
4. Lowest overall average concentrations of $NO_2$ measured Autumn 2024

# RESULTS: CONCENTRATIONS OF $NO_2$ ($\mu g/m^3$)



# TRAFFIC SURVEY ROCKFORD MANOR
## 11.20 TO 11.40 AM

**Motor Vehicle Total 195 = 585 per hour**

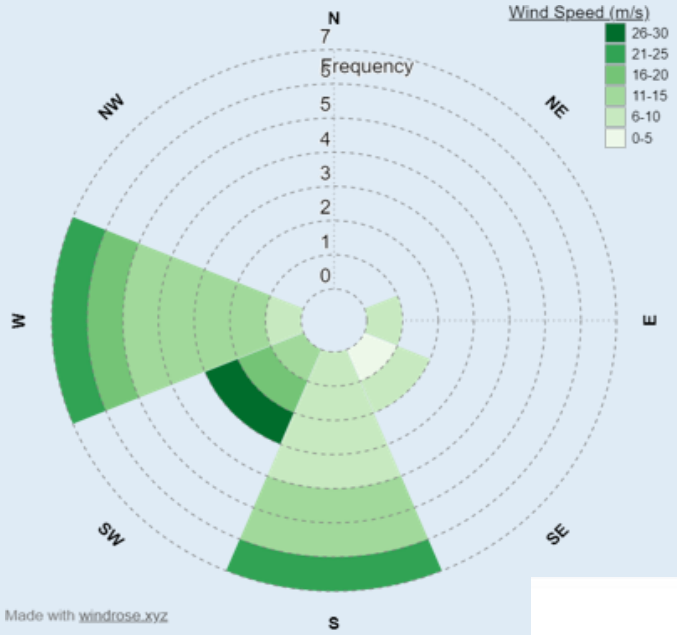
| | |
|---|---|
| Cars | 165 |
| Jeep/SUV | 5 |
| HGV | 6 |
| Van | 19 |
| Bus | 0 |
| Pedestrian | 12 |
| Cyclists | 10 |
| Motorcyclists | 3 |
| Dog | 3 |

**Note – we did not specify Electric vehicles – less emissions – however there**
**from Particulate matter (PM) (tyre and brake wear)**

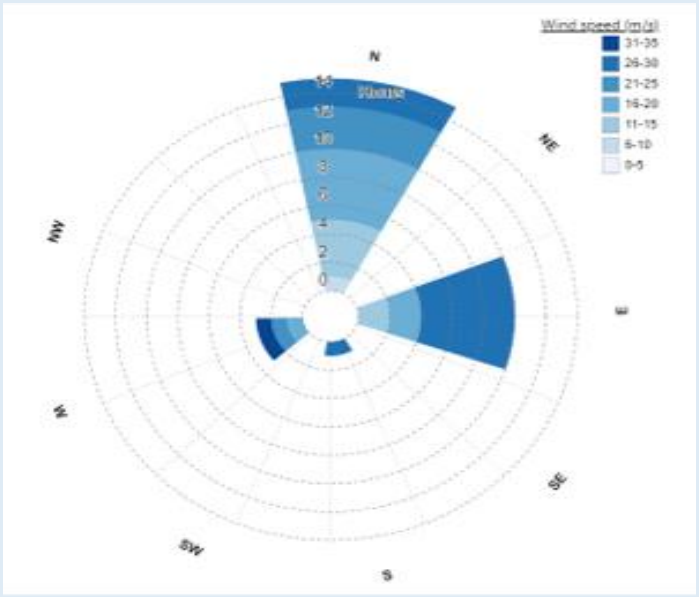
**Particulate Matter Pollution is not to be underestimated.**

# WIND DIRECTION AND SPEED

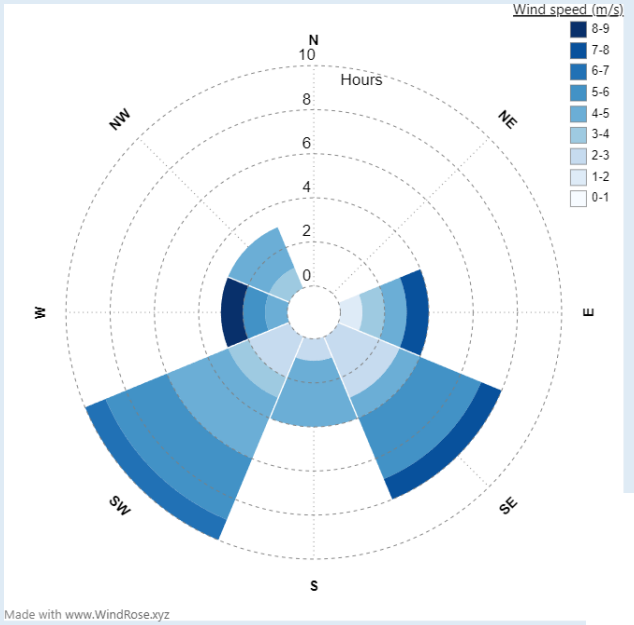
## Autumn 2021



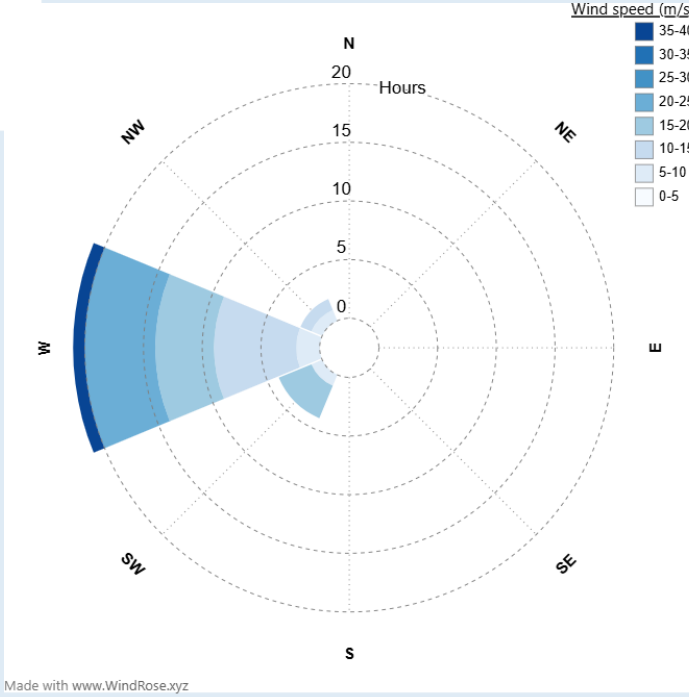

## Autumn 2022




## Autumn 2023




## Autumn 2024



# Conclusion – Analysis of our Results

**Short-term exposure limit**

Constant exposure to anything above this for **over a day** is deemed unsafe by WHO

**Long-term exposure limit**

Constant exposure to anything above this for **over a year** is deemed unsafe by WHO

| µg/m³ | Colour Code | $NO_2$ Level Description |
|---|---|---|
| >40 | | High |
| 30-40 | | Medium to High |
| 25 µg/m³ → 20-30 | | Medium |
| 10-20 | | Low to Medium |
| 10 µg/m³ → 0-10 | | Low |


**Our data indicate that the air quality around Rockford Manor is in the Low-Medium and Medium categories. These values exceed the limit set by the World Health Organisation. This means that the $NO_2$ levels may be too high and action is required. If they keep increasing in the area due to exhaust fumes and human activity around the school, it could have a serious long-term effect on our respiratory health.**

# OUR CLEAN AIR PLAN: #LOCAL ACTIONS FOR GLOBAL CHANGE

1. Our school has laid a Pathway around the school grounds and installed picnic tables in our green space
2. WOW – Walk On Wednesdays
3. Green-Schools - #AndSheCycles
4. Planting trees

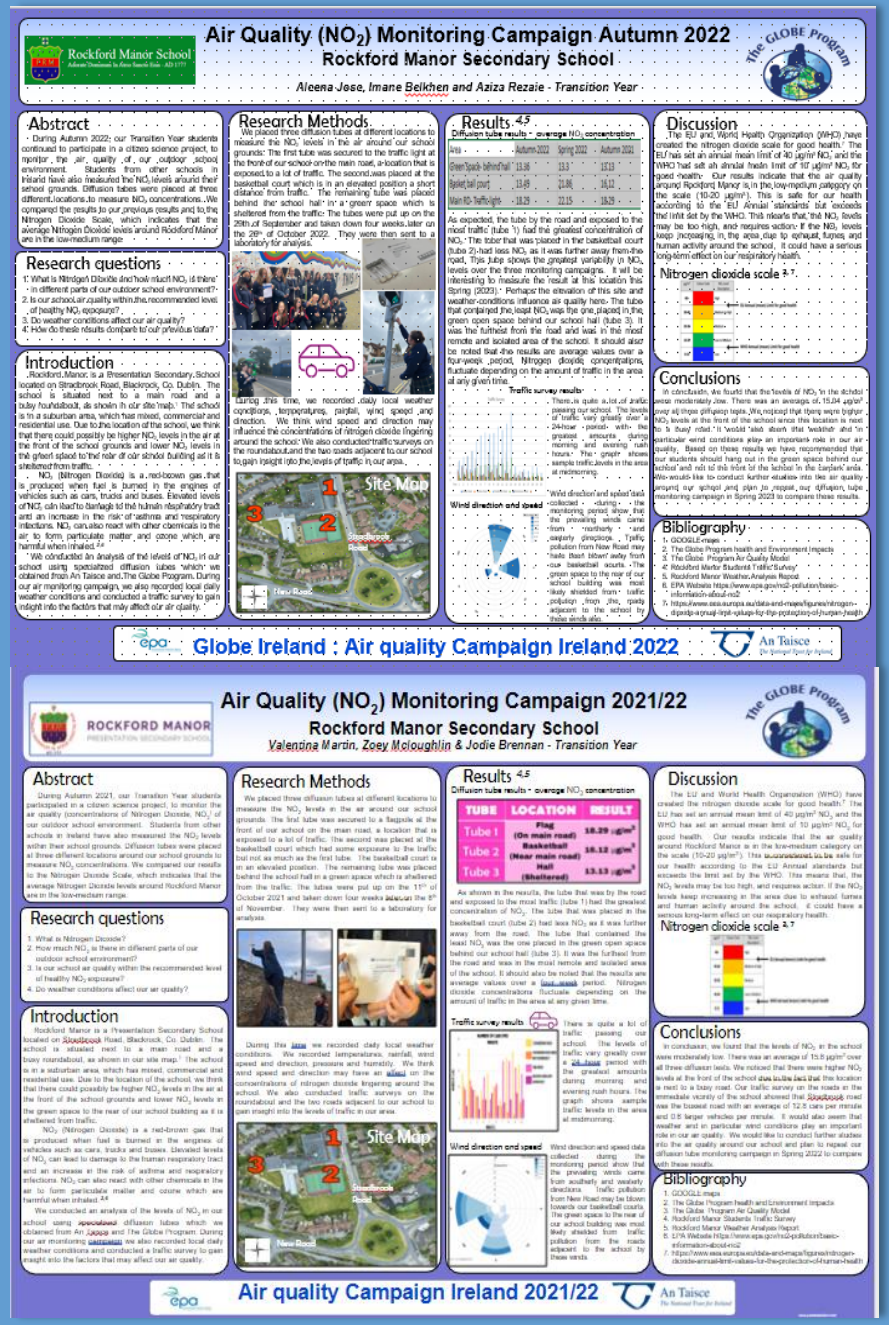


**To Do:**

1. Anti-idling campaign
2. Talk to politicians/councilors – reducing traffic and/or traffic speeds around our school

# HOW DID WE ENGAGE OUR SCHOOL & COMMUNITY?

"Science isn't finished until it's communicated"



# THANK YOU

**We would like to say thank you and acknowledge those who have organized this project and have assisted us with our research. Many thanks to The Globe Program, An Taisce, Globe Ireland and Green-Schools for this opportunity. We have enjoyed learning about air quality and have had lots of fun being Citizen Scientists.**



# REFERENCES


- The Globe Program health and Environment Impacts
- The Globe  Program Air Quality Model
- Rockford Manor Students Traffic Survey
- EPA Website https://www.epa.gov/no2-pollution/basic-information-about-no2
- https://www.eea.europa.eu/data-and-maps/figures/nitrogen-dioxide-annual-limit-values-for-the-protection-of-human-health
- www.met.ie