Globe Project: NO2 levels around our school

By Leanora O'Connor and Ellen O'Dononghue

St.Mary's Macroom

Introductions:

School Name	St.Marys Secondary School Macroom
School Location	Chapel Hill Macroom P12 RH67 Co.Cork
Situated	The school is situated next to a narrow road, which has another school on the other side.The school is connected to a church and school of art on one side and a lane on the other. Along the back of the school is residential housing and a construction site that was in use during the project.
Area	The area surrounding the school is a town and as such there are many amenities surrounding the school such as a church, five grocery shops, a theatre, a hotel, four chemists and countless restaurants and clothes shops all within a short five minute walk of the school.

What was our Aim?

The aim of this experiment is to get a reading of the NO_2 levels around our school so that we can see if the air around the school is safe to breathe and within the regulation guidelines set by the EU and World Health Organisation. This was done with the purpose of making sure that the students and teachers of our school would not have to breathe poor air and risk the health concerns that come with being exposed to bad air quality for a long amount of time.

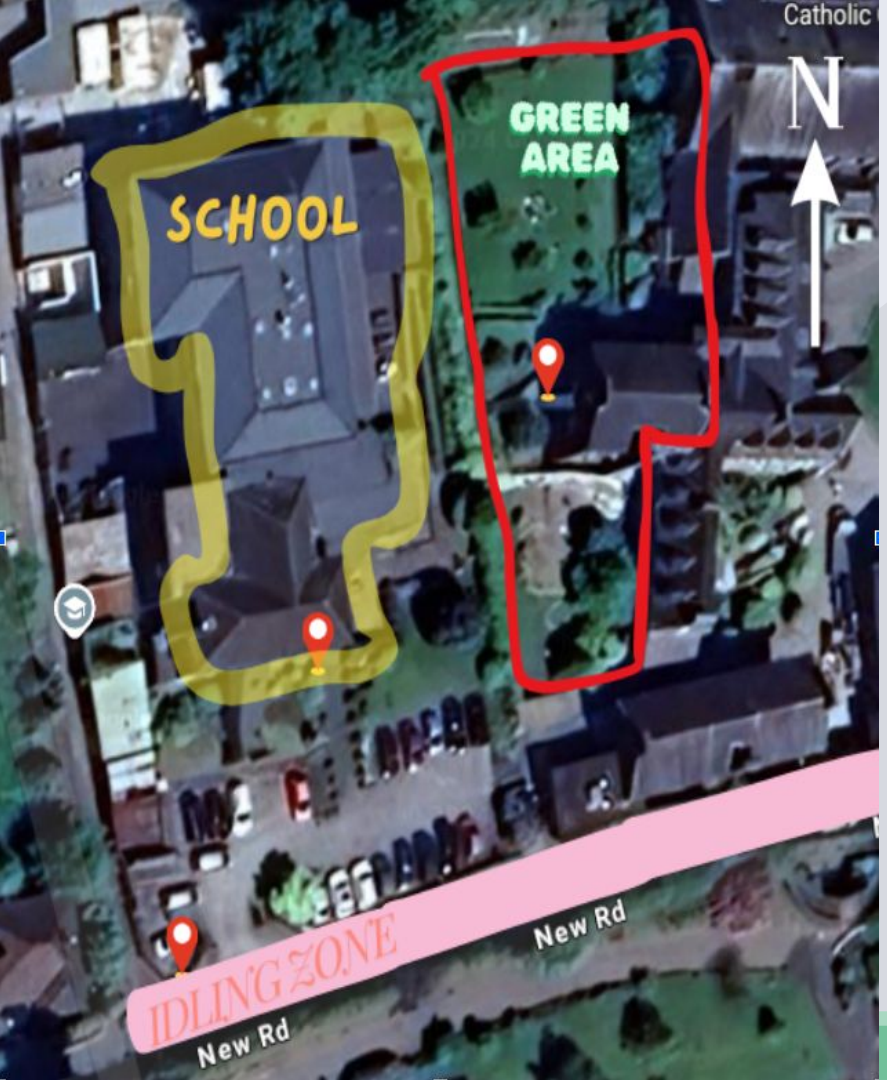
Where the tubes were placed

During this experiment three tubes were set up around the school. One was placed directly next to the only road leading to the gate of the school, to get a good reading on NO_2 levels in an area with heavy traffic, we predicted that this reading would be higher than the others. The next tube was placed just inside the carpark of the school, while this tube was farther away from the road and traffic, it still would get a good read of the NO_2 levels from students and teachers coming and going into the school as well as the cars entering and exiting the car park. We predicted that this tube would be higher than that in the remote area but still lower than the one next to the road. The last tube was placed in one of the most remote areas of the school, however with construction being done just below the school, it meant that NO_2 levels may not be correct for the standard in this area, without interference.

Heavy traffic

Moderate traffic

Remote area



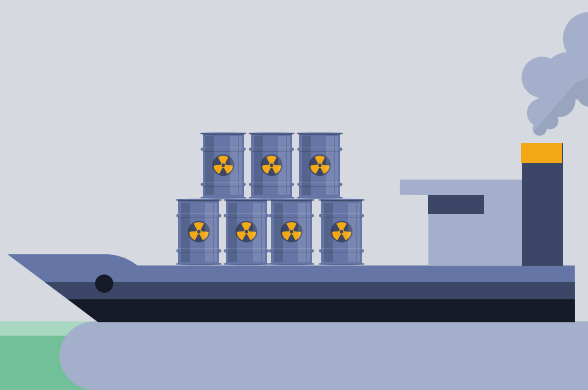
Aerial photograph of our school

This Image here is an aerial photograph of our school. We have marked all the areas were we placed tubes to find out what the air quality was.

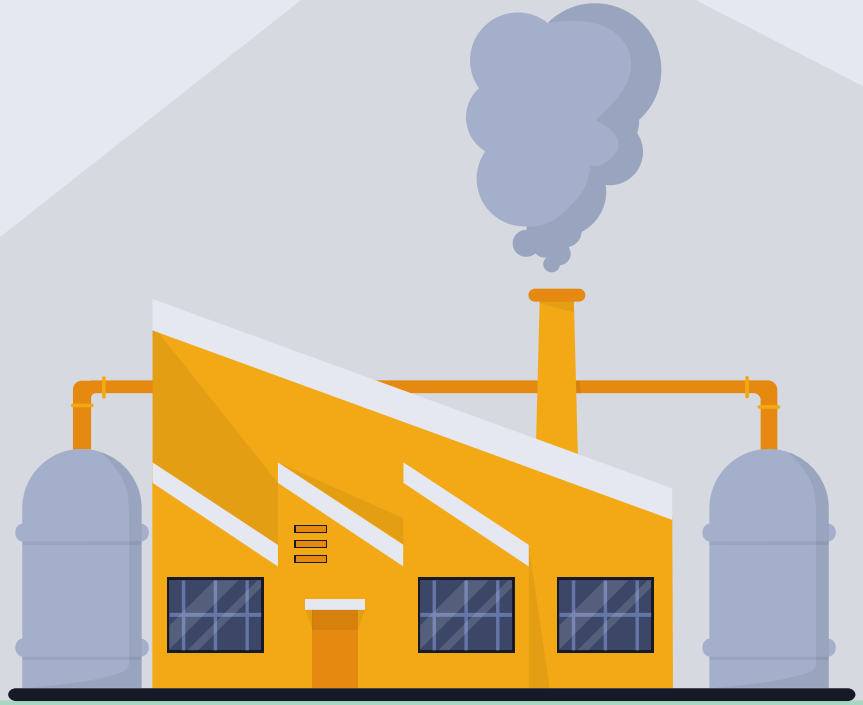
The yellow outline is the outline of the main part of our school. This is where our moderate traffic tube was placed. In the red outline we outline our green area. This is where we placed our rural area tube. Finally the pink outline is the main road outside our school where we placed our heavy traffic tube.

Why do we think its important people know about NO2 levels in the areas around them?

We think it is important to know about NO2 levels so that people can make educated decisions when it comes to visiting areas with bad air quality or how to make air quality better in their areas. If people know about bad air quality and how to avoid it it can help them fight lung cancer and other diseases that come with heavy exposure to high NO2 levels.



What we wanted to find out:



- What is NO2?
- Why are high levels of NO2 bad for you?
- What are the NO2 levels around our school?
- Is our school above or below the recommended NO2 levels?
- Are the NO2 levels in our school better than schools in a densely populated area.

What is NO2?

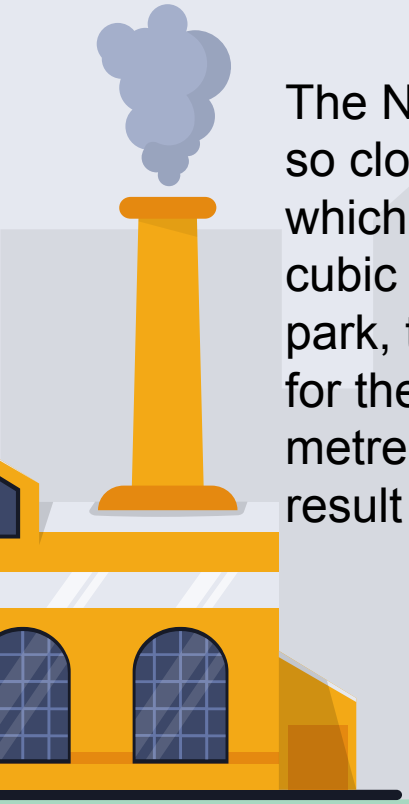
NO2, is a gaseous air pollutant composed of nitrogen and oxygen. It is formed when natural gases such as coal, oil or methane gas are burned at high temperatures .

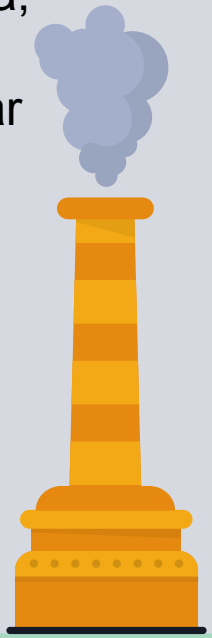
Why are high levels of NO2 bad for you?

High No2 levels are bad as it can affect human health and the environment around us. After long exposure to the gas it can lead to asthma or increase the chance of respiratory infections. High levels of NO2 are also harmful to vegetation and livestock as when it mixes with rainwater it can form acid rain which removes nutrients and minerals from the soil that plants need to grow and increases the acidity in the water that livestock drink form.

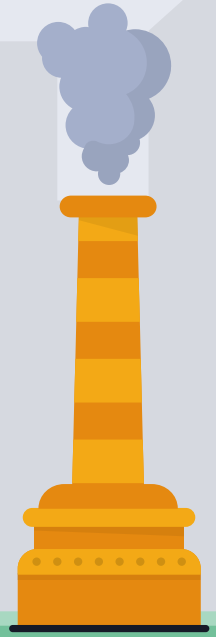
What are the NO2 levels around our school?

The NO2 levels around our school are relatively low even tho it is so close to the central town. The results for the heavy traffic area, which is the road outside our school were 5.54 micrograms per cubic metre. For the moderate traffic area which is our school car park, the results were 4.64 micrograms per cubic metre. Lastly for the Remote area the results were 4.58 micrograms per cubic metre. As you can tell the less traffic in an area the lower the result will be.





Is our school above or below the recommended NO2 levels?



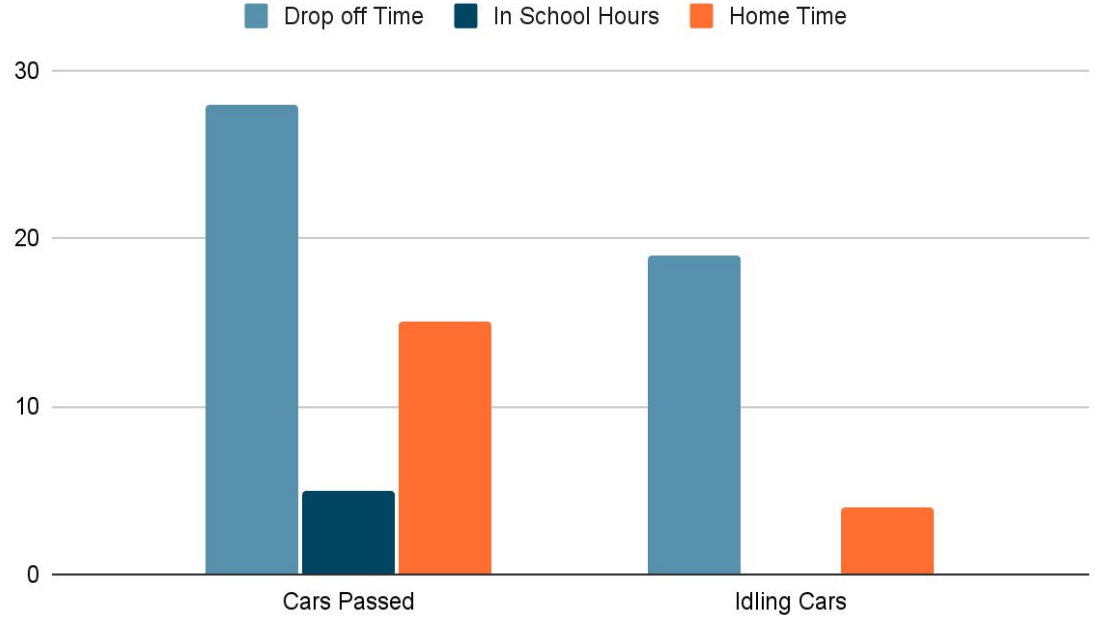
The NO2 values that were collected from around our school are considered safe by the WHO and the EU. We think this is because of traffic flow being usually very quiet outside of school opening and closing times. If these results are representative of the average AQ in a year it means that our community is mostly safe from toxic area pollutants but much work can be done to further improve the air quality.

Are the NO2 levels in our school better or worse than those from a school in a densely populated area?

We compared our school's air quality to a school in Dublin City Centre and found ours was much better. Macroom’s smaller population and less dense traffic contribute to cleaner air compared to the busy streets of Dublin, where people are constantly passing through.

The fact that Macroom has only one main road reduces traffic congestion, especially near our school. In contrast, Dublin’s many roads lead to constant traffic, resulting in higher NO2 levels and more CO2 emissions from cars.

Survey Results:



Due to the results in the area by the road being so similar to those in the green area we decided to take a survey to see why the results were presented as such.

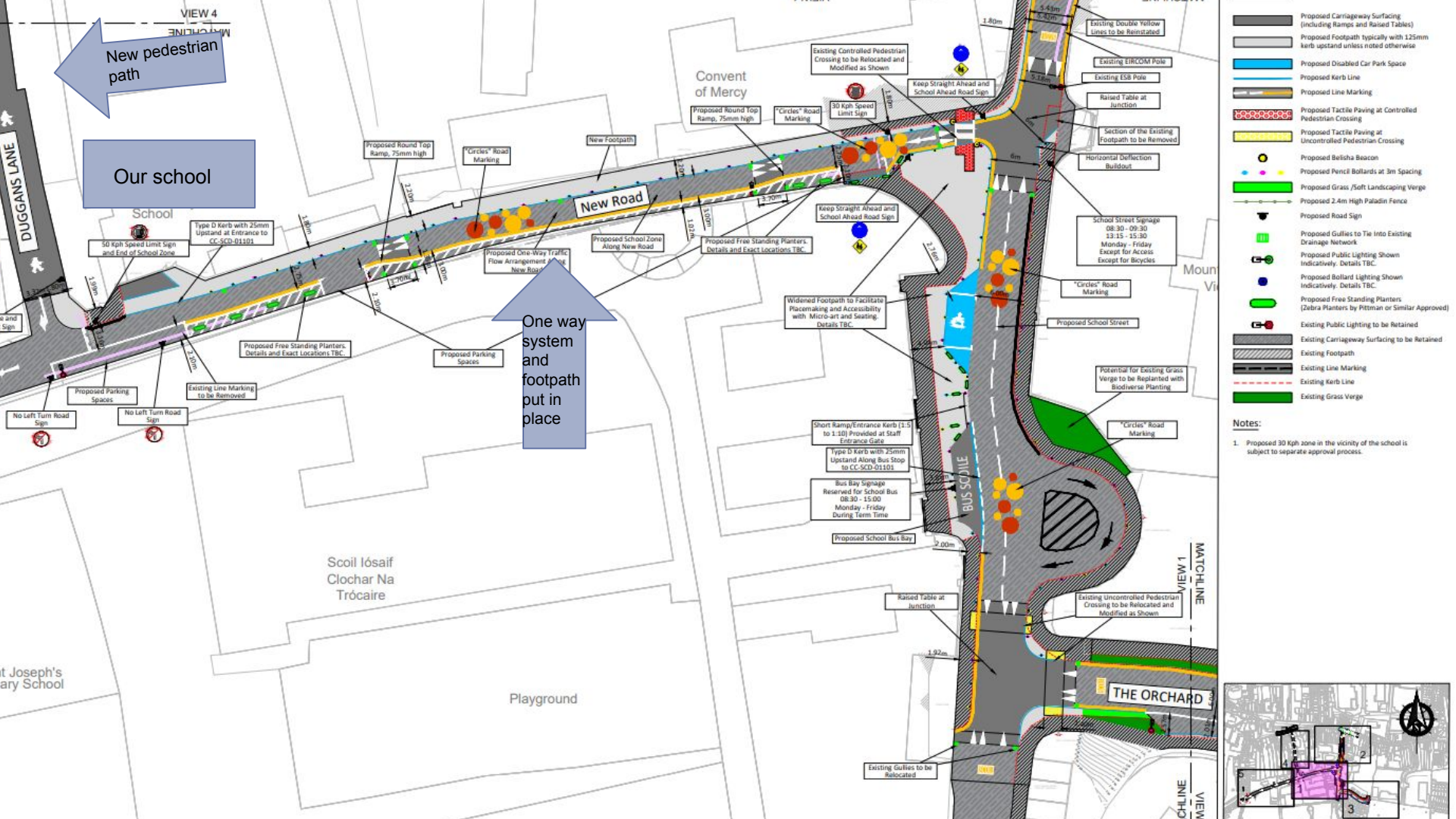
From this survey we found that the majority of cars passed during school opening and closing times causing our results to be skewed slightly.

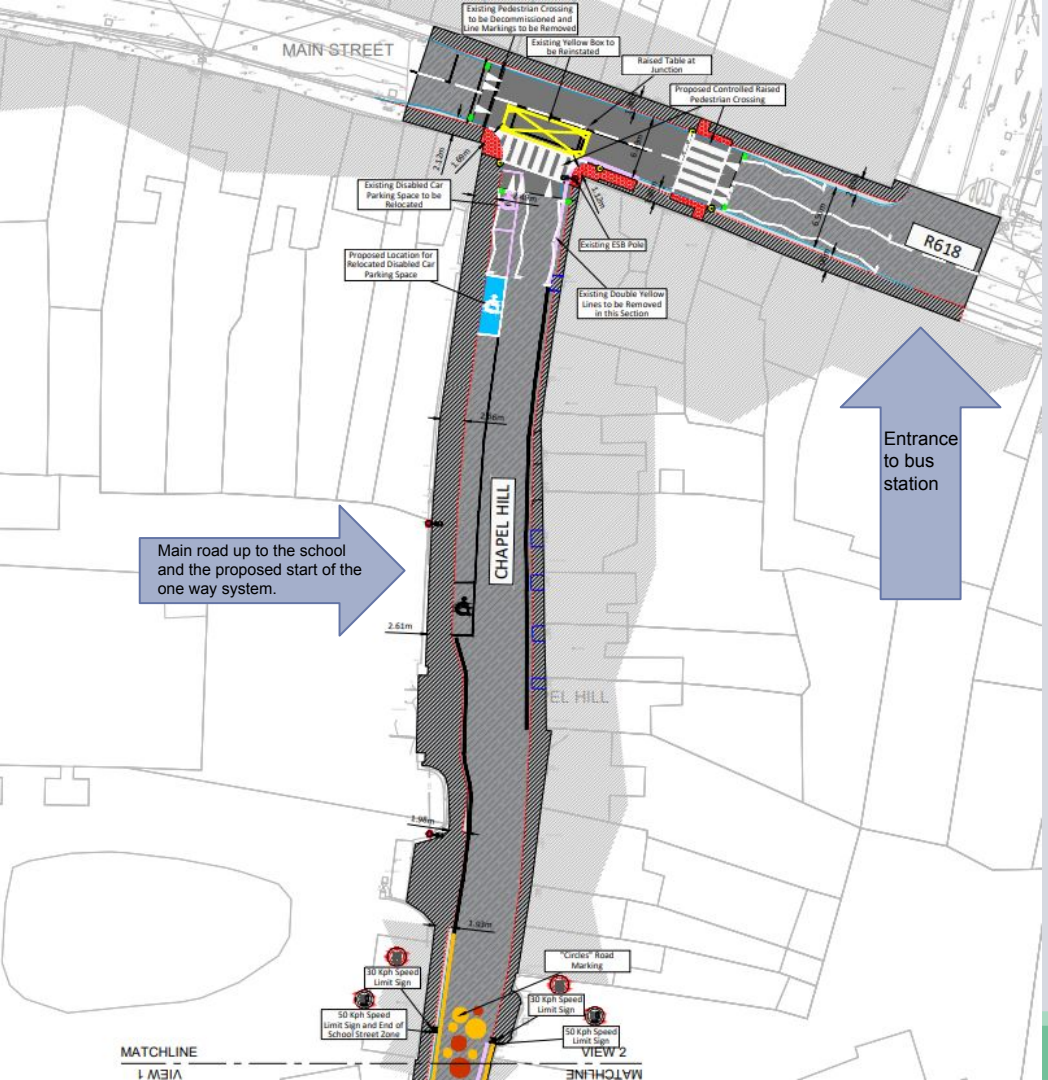
We also found that idling cars were most common during these times, which could have also caused a change in the results.

What can we do to better air quality in our school?

Most cars passing our school are from parents, students, and teachers going to and from school. To reduce traffic and make travel more sustainable, we've encouraged students to walk or take the bus instead of driving.

Currently, there is no footpath leading to the school, and the narrow road can be dangerous, especially when cars pass by. To improve safety, our Green Schools and Environmental Committees campaigned for a footpath and a one-way system to reduce congestion. After two years of effort, the council has agreed to build the footpath along the road outside the school and to improve the entire walk from the bus station. The project is set to be completed by the start of the 2025/2026 school year, and we're excited to see how it will improve both safety and traffic flow around the school.


New pedestrian path
Our school
One way system and footpath put in place
New Road
Convent of Mercy
Scoil Iósaif Clochar Na Trócaire
Playground
DUGGANS LANE
THE ORCHARD
BUS SCOILE
Proposed Carriageway Surfacing (including Ramps and Raised Tables)
Proposed Footpath typically with 125mm kerb upstand unless noted otherwise
Proposed Disabled Car Park Space
Proposed Kerb Line
Proposed Line Marking
Proposed Tactile Paving at Controlled Pedestrian Crossing
Proposed Tactile Paving at Uncontrolled Pedestrian Crossing
Proposed Bellisha Beacon
Proposed Pencil Bollards at 3m Spacing
Proposed Grass /Soft Landscaping Verge
Proposed 2.4m High Paladin Fence
Proposed Road Sign
Proposed Gullies to Tie Into Existing Drainage Network
Proposed Public Lighting Shown Indicatively. Details TBC.
Proposed Bollard Lighting Shown Indicatively. Details TBC.
Proposed Free Standing Planters (Zebra Planters by Pittman or Similar Approved)
Existing Public Lighting to be Retained
Existing Carriageway Surfacing to be Retained
Existing Footpath
Existing Line Marking
Existing Kerb Line
Existing Grass Verge
Notes:
1. Proposed 30 Kph zone in the vicinity of the school is subject to separate approval process.



Following the plan to add a footpath and a new pedestrian walkway up to the school, the council also decided to redesign the road down to the bus station.

This would include redoing the zebra crossing on the main road in Macroom. What was once, one crossing straight across the road will now be two raised zebra crossings, making it much safer to cross the bottom of Chapel Hill and make your way to the bus station.

Thank You for listening!