

Air Quality Action Planning Consultation – Proposed Measures for Reducing the Exposure of Twynnyrodyn Road Residents to Nitrogen Dioxide

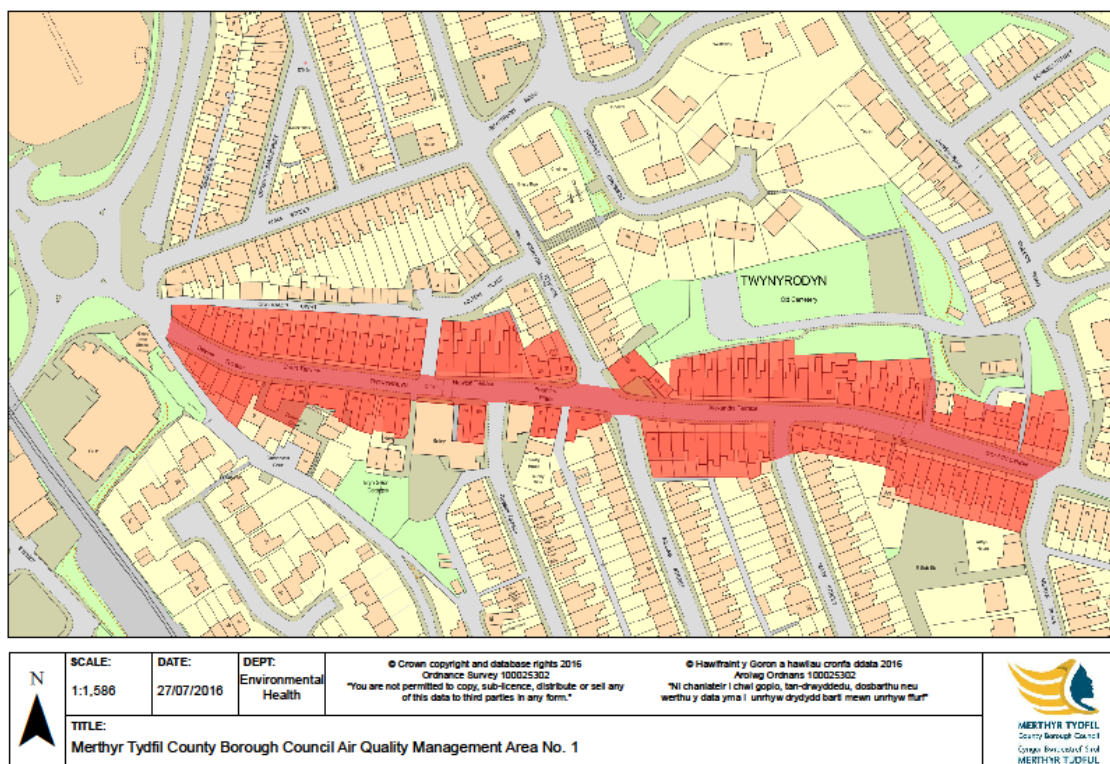
Introduction

Merthyr Tydfil County Borough Council has monitored air pollution at a number of locations across the whole Borough for over seventeen years.

During this period only one pollutant, nitrogen dioxide, has been found to be present at levels in excess of the Government's objective levels. These objective levels are set for the protection of the health of the public and for nitrogen dioxide there are two; one to protect from exposure to high levels for short periods and one to protect from exposure to low levels year on year. We have so far found no locations where the levels so high that people exposed for the shorter, one hour, period. However, we have found one location half-way up Twynnyrodyn Road where the levels exceed the annual mean objective of 40 microgrammes per cubic metre.

When it was found, a study was carried out and action taken to deal with it. This improved the air quality there but subsequent increases in road traffic on the road caused the concentrations of nitrogen dioxide to rise again. Nitrogen dioxide is produced when fuel is burned and in most cases road vehicles are the main source.

The Council declared an Air Quality Management Area (AQMA) on 30th January 2017. This covered the area of exceedance and also the section of Twynnyrodyn Road down to the roundabout outside Tesco as shown on this plan;



After declaring the AQMA the Council is allowed up to eighteen months to study the problem and produce an Action Plan designed to lower the pollution to below the objective levels.

The Council has studied a very large number of alternatives (the full study is available at the Civic Centre on request) and has found a small number capable of dealing with the problem.

Since the problem is caused by road traffic, and changing the types of vehicles using the road would have little effect, the aim has been to reduce the numbers of vehicles using the affected section of Twynyrodyn Road.

For some of the proposals considered, their likelihood of success depends on the destinations drivers are trying to reach and the routes they are taking to reach them. A further traffic study is being carried out at the moment to determine whether they could be successful or not and if so, they will expand the range of viable options. However, as they are more limited in effect and currently of questionable value they are not included in this consultation.

The options given here are all capable of protecting the health of the residents in Twynyrodyn Road. They are arranged in order of the benefits and disadvantages they might cause to the residents, traders, drivers and other people affected by the measures.

Since our aim is firstly to protect the health of all members of the public we favour options which, as far as possible, do not increase traffic in other areas where people would be exposed. Since drivers are also exposed to high levels of air pollution in their vehicles their exposure is reduced by keeping journeys short and avoiding congestion.

Only one solution meets all of these aims and this is given first with the rest following. Your views on all of the options are welcomed and will be taken into account before the Action Plan is finalised and submitted to the Welsh Government.

Summary of Available Measures

Option		Link to	
		Map	Text
1a	Reversal of one-way traffic on both Pontmorlais High Street and Church Street.	Appendix 1	Details
1b	Reversal of one-way traffic on Pontmorlais High Street and Church Street opened to two-way traffic*	Appendix 2	Details
2	Provision of a chicane on Twynyrodyn Road between Windsor Terrace and Queens Road	Appendix 3	Details
3	All west-bound traffic on Twynyrodyn Road diverted at Queens Road with no left turn onto Queens Road for east-bound traffic	Appendix 4	Details

*The Automatic Number Plate Recognition currently in progress will determine how effective this is likely to be.

The Options in More Detail

Option 1a and b – Reversal of one-way traffic on Pontmorlais High Street with Church Street one-way system either reversed or removed.

By reversing the one-way systems on Pontmorlais High Street and Church Street or allowing two-way traffic on Church Street it becomes possible to travel directly north to Penydarren Road and Pontmorlais Road West from Tramroadside.

Traffic currently using the roundabout outside Tesco is no longer required to travel up Twynyrodyn Road or Courtland Street and then turn north through Queens Road, Goatmill Road etc. This lowers traffic on both. Traffic on the roundabout itself is further eased if vehicles travelling north from Tesco take the secondary exit directly onto Tramroadside.

The traffic travelling north is similar to the traffic already travelling south through Pontmorlais High Street and no excessively large increase or decrease is likely to occur on the High Street. Air quality on the High Street is currently good and should not suffer as a result of this change.

If Church Street is reverted to permitting two-way traffic it will continue to be possible to access Tramroadside from Glebeland Street.

This arrangement would permit travel directly from Castle Street to Glebeland Street and on to Pontmorlais High Street. This will assist the provision of services such as deliveries and refuse collection which will no longer have to travel through Court Street and Tramroadside.

Southbound traffic from Penydarren Road may continue on to the Gyratory system and access Tesco via Court Street.

If the Church Street one-way system is simply reversed and not reverted to two-way a larger reduction in traffic will occur on Courtland Street and Tramroadside but east-bound traffic will no longer be able to travel through Church Street.

Maps showing the effects of both proposals on the traffic in the area are available here – [Option 1a](#) and [Option 1b](#).

Both options permit further measures to be taken if traffic rises on Twynyrodyn Road in future. Further details of this are given in [Appendix 5](#).

Option 2 – Provision of a Chicane on Twynyrodyn Road between Windsor Terrace and Queens Road

A map showing the effects of this proposal on the traffic in the area is shown in [Appendix 3](#).

This option extends the traffic calming and road centre-line re-alignment already completed outside no. 55 Twynyrodyn Road.

It involves providing a chicane on the east-bound side of Twynyrodyn Road to move uphill traffic to the right-hand side of the road. This moves the exhaust pipes of the vehicles away from the houses opening directly onto the pavement and towards the centre of the road.

This lowers the levels of nitrogen dioxide outside these houses much faster than it increases the levels at the houses on the other side of the road.

A temporary chicane would be installed and then moved and extended until the air quality monitoring showed it to be providing the greatest overall benefit to the residents.

It would also be designed to take account of parking, the provision of services including refuse collection, road safety and noise and will probably require the

provision of traffic lights. These would be arranged to minimise adverse effects and improve road safety for drivers and pedestrians.

This measure will have effects on Twynyrodyn Road and elsewhere as to avoid the calmed area drivers may take alternative routes. This has the potential to increase traffic on Queens Road, Luther Street, St. Tydfils Avenue and Windsor Terrace. These changes depend on driver behaviour the size of the effect is not predictable.

The following maps show the predicted effects of increasing the length of the chicane as it causes more traffic to divert to nearby routes.

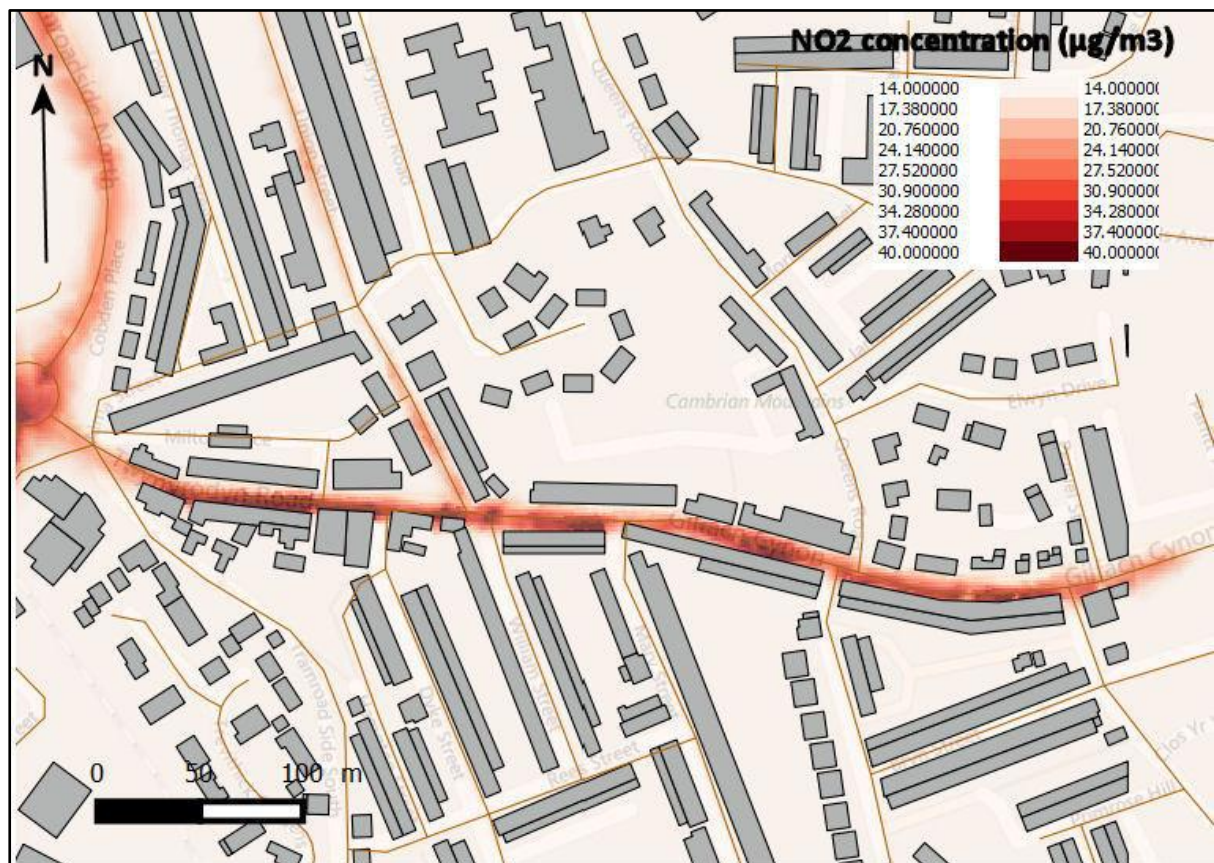


Figure 2 Short Chicane - NO2 concentration on Twynyrodyn road, 40 $\mu\text{g}/\text{m}^3$ threshold

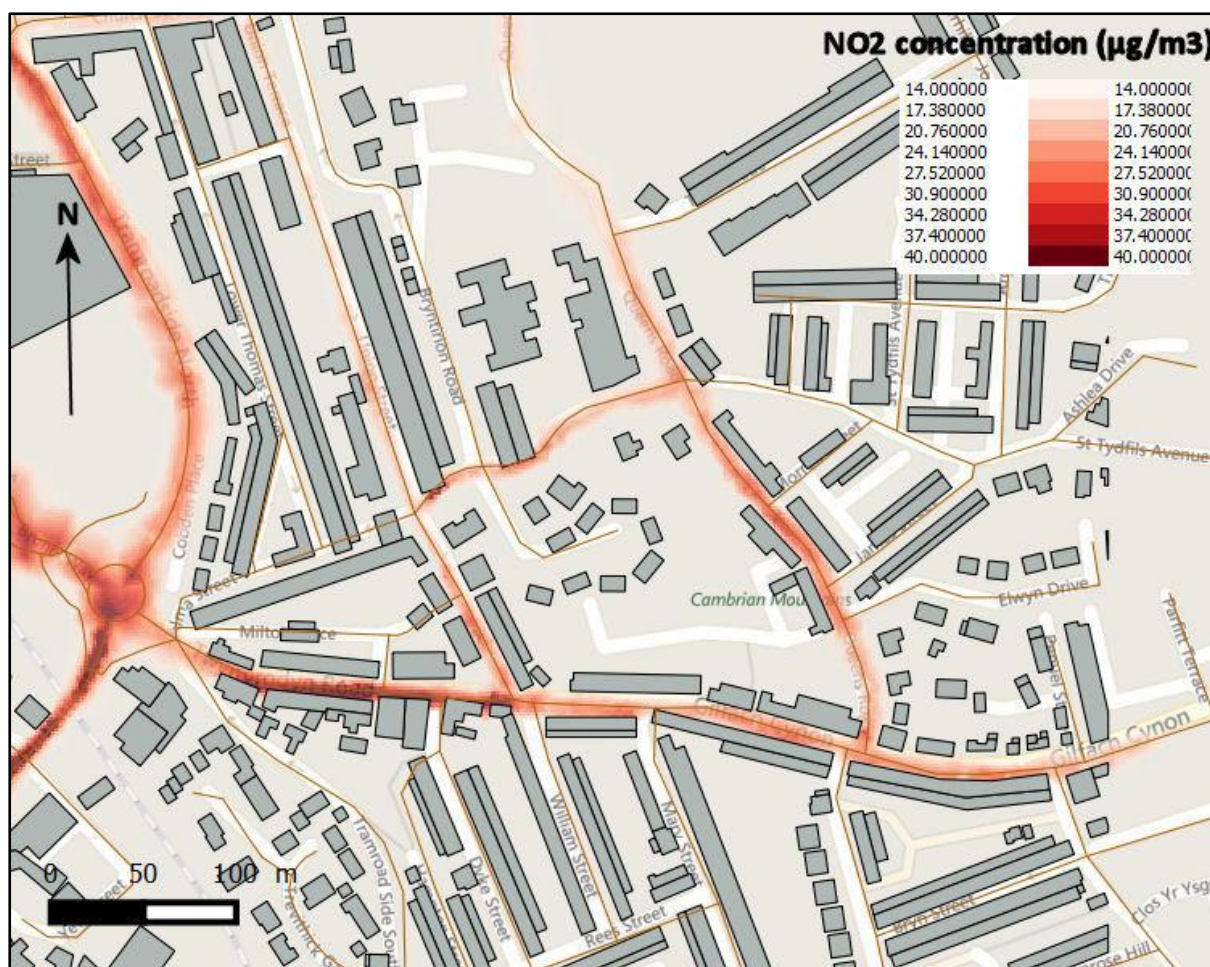


Figure 3 Long Chicane - NO2 concentration on Twynyrodyn road, 40 $\mu\text{g}/\text{m}^3$ threshold

Option 3 - Twynyrodyn Road west-bound diversion with no left turn onto Queens Road

A map showing the effects of this proposal on the traffic in the area is shown in [Appendix 4](#).

This approach results in the complete removal of the downhill traffic from Twynyrodyn Road by diverting it onto Queens Road, St. Tydfil's Avenue and Windsor Road.

The effect on air quality has been modelled and, provided traffic is unable turn left off Twynyrodyn Road into Queens Road, the improvement in nitrogen dioxide concentrations on Twynyrodyn Road is predicted to be substantial.

However, by displacing the traffic to Queens Road, St. Tydfil's Avenue and Windsor Terrace these streets would receive an increase in traffic. For Windsor Terrace and St. Tydfil's Avenue this is additional to their current traffic levels of around 1,000

vehicles per day. Existing Queens Road traffic is negligible and would cease as a result of reversing the one-way system.

None of the final traffic flows on these streets will approach those currently on Twynyrodyn Road and nitrogen dioxide levels will not exceed the air quality objective. Nitrogen dioxide levels would be highest on Windsor Terrace where it connects with Twynyrodyn Road due to the presence of standing traffic waiting to re-join Twynyrodyn Road.

Since diverting west-bound traffic in this way requires it to cross the path of east-bound traffic there are safety concerns. Traffic lights provided to address this would impede east-bound traffic and some reduction in east-bound vehicle numbers might result. Being sent along the diversionary route is also liable to reduce west-bound traffic. This traffic is likely to use Queens Road, Pontmorlais West and Glasier Road instead.

The following map shows the predicted effect of this diversion on air quality.

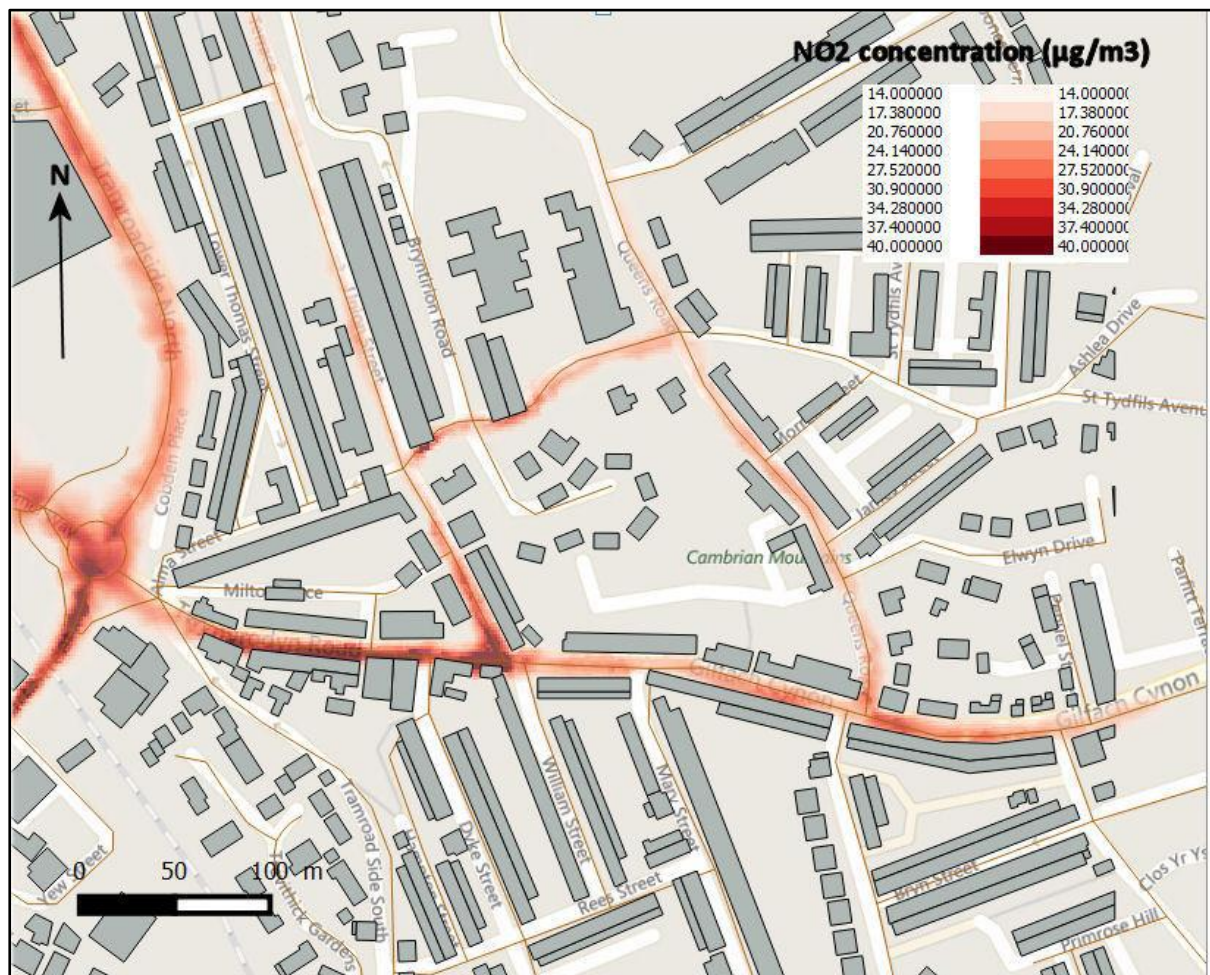
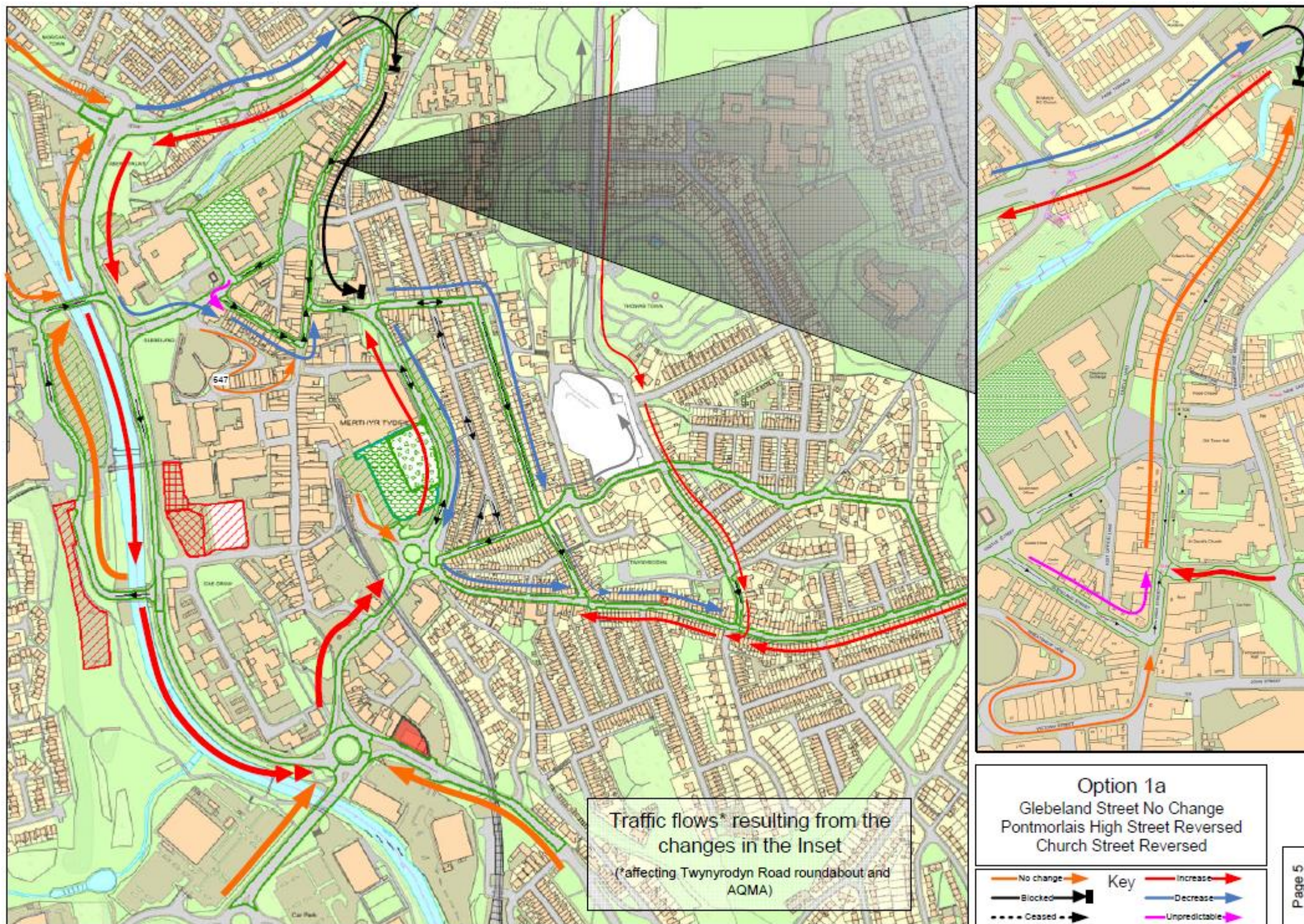


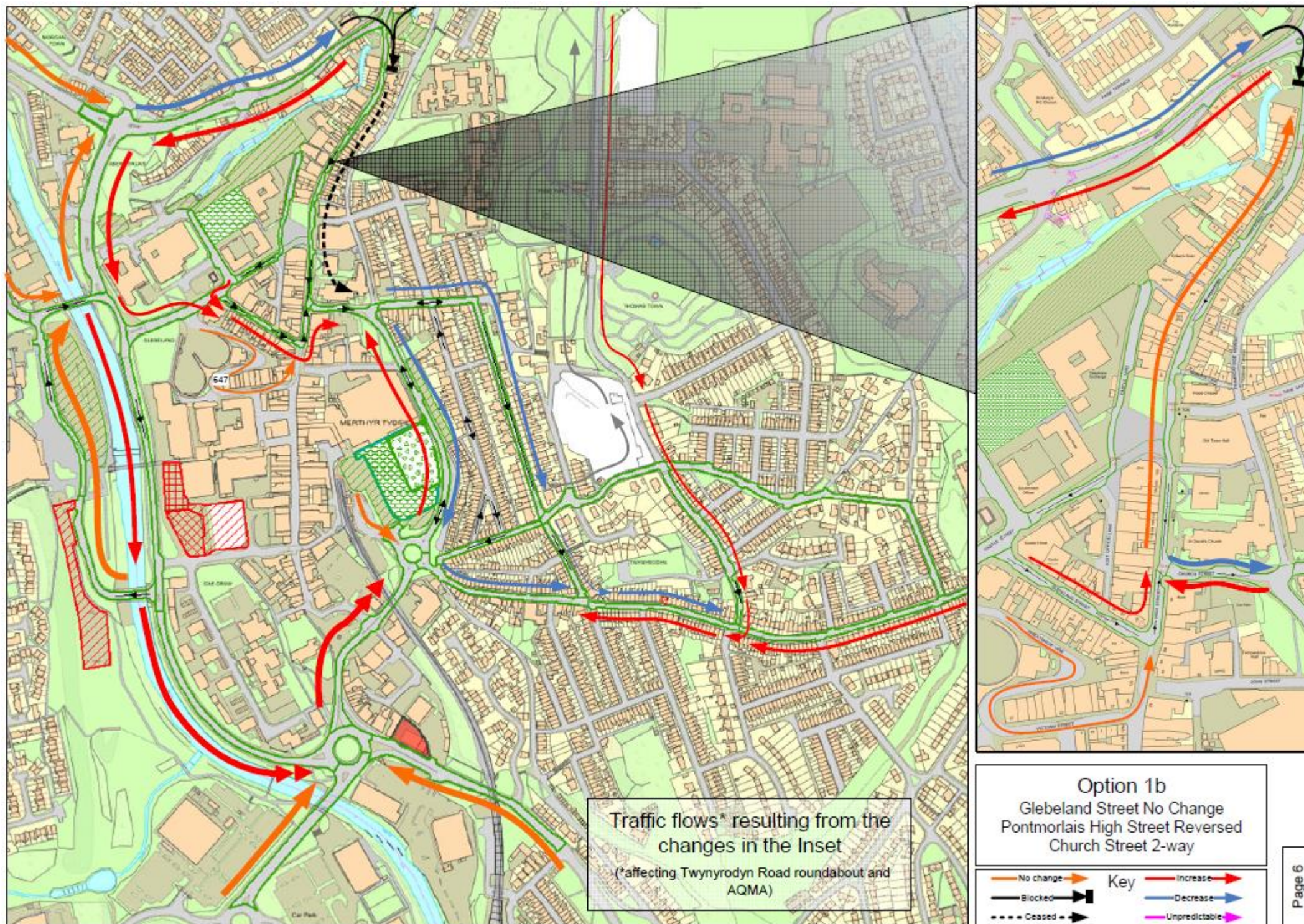
Figure 4. West-bound traffic diverted - NO2 concentration on Twynyrodyn road, 40 $\mu\text{g}/\text{m}^3$ threshold

Appendix 1 – Map showing traffic related to Option 1a – Reversal of one-way traffic on Pontmorlais High Street with Church Street one-way system reversed.



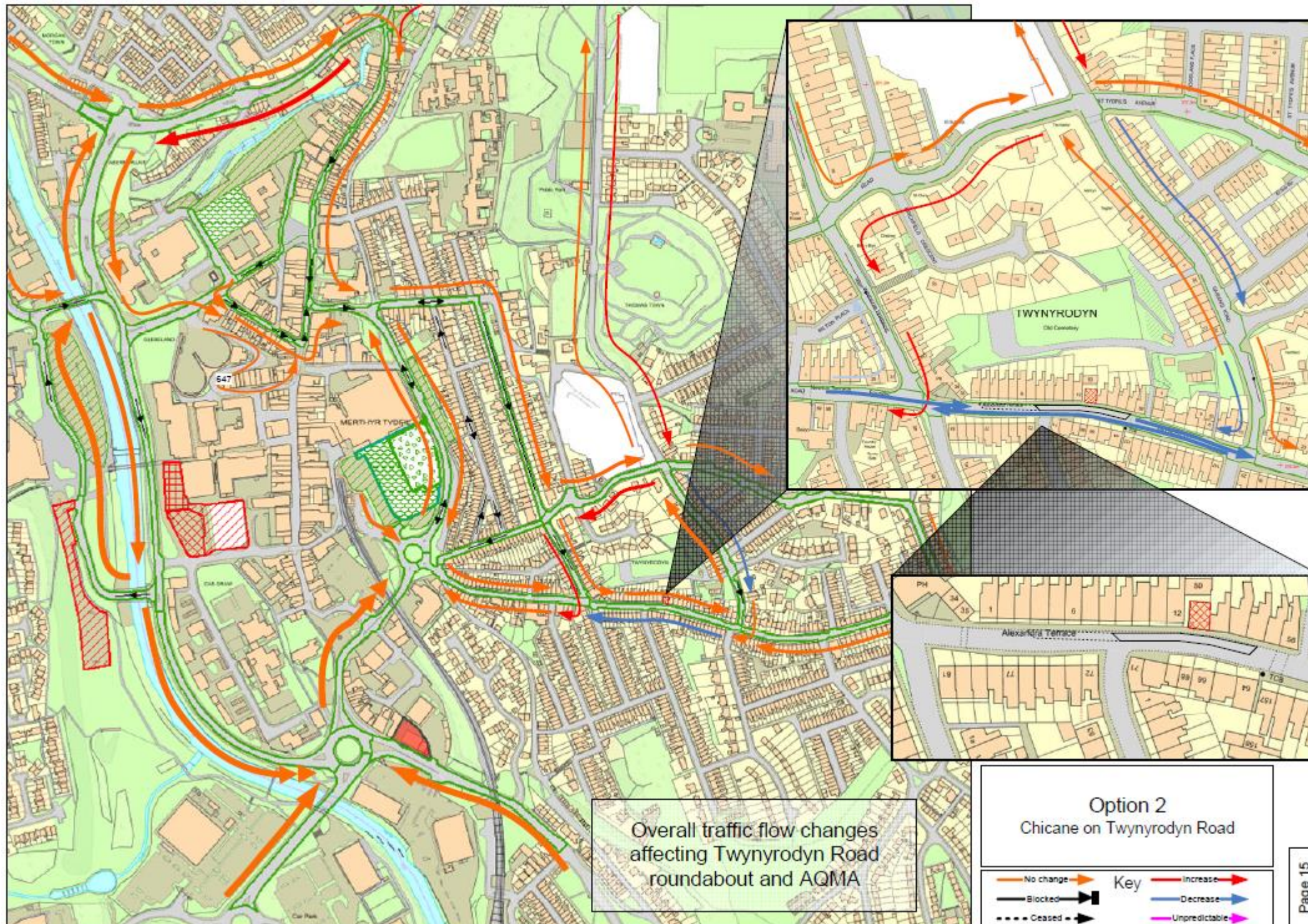
'Visio-Solutions - G0H1C1 Consultation 1a'

Appendix 2 – Map showing traffic related to Option 1b – Reversal of one-way traffic on Pontmorlais High Street with Church Street one-way system removed.



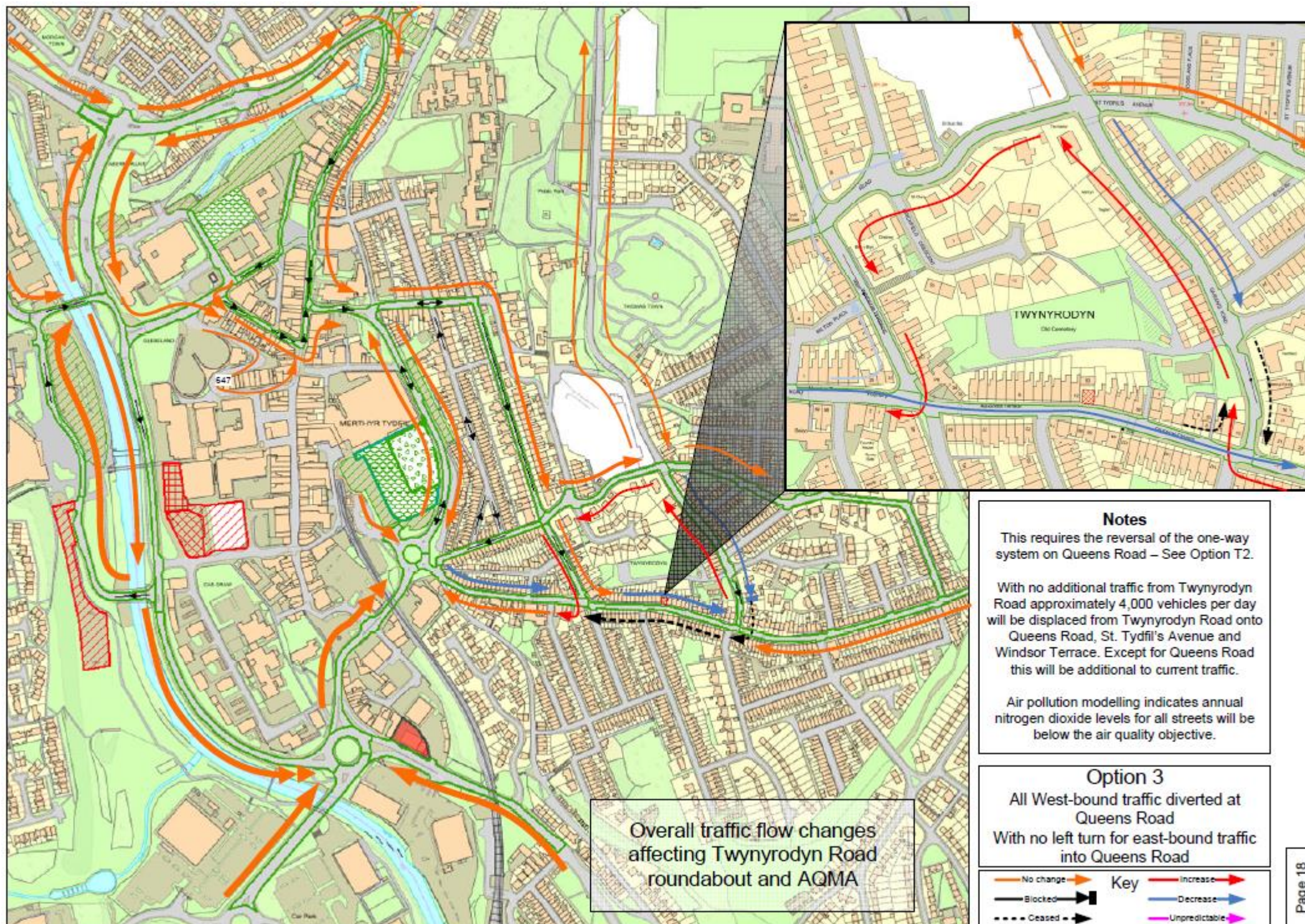
'Visio-Solutions - G0H1C1 Consultation 1b'

Appendix 3 – Map showing traffic related to the provision of a Chicane on Twynyrodyn Road between Windsor Terrace and Queens Road.



'Visio-Solutions - T1 Twynyrodyn Road area Chicane - Consultation 2'

Appendix 4 – Map showing traffic related to diverting all west-bound traffic on Twynyrodyn Road at Queens Road with no left turn onto Queens Road for east-bound traffic.



Appendix 5 - Twynyrodyn Road east-bound diversion

This is not included in the consultation as an option in itself as it is not a stand-alone solution to the current air quality problem on Twynyrodyn Road.

It is not a stand-alone solution as it is likely to cause a substantial volume of traffic to join the existing traffic travelling to Darren View via Queens Road unless an easier northern route already exists. This would probable cause an air quality problem in Darren View. Details of this are provided in the full study.

This part of the document is therefore linked to Options 1a and 1b. It is not likely to be successful if any of the other options are used.

It is included here as it is a potential solution to any future air quality problems that might be caused on Twynyrodyn Road by further increases in traffic. These might result from developments such as the Heads of the Valleys dualling project or other matters causing larger numbers of drivers to pass through the town centre.

The diversionary route, and the likely effects of its use on the area, are shown below.

The air quality effects of this diversion were modelled on the basis that all of the current 3,400 vehicle east-bound traffic would leave Twynyrodyn Road at Windsor Terrace, travel up St. Tydfil's Avenue and re-join at Queens Road. The model showed that even with all the traffic re-joining through Queens Road the nitrogen dioxide levels would not exceed the objective level. We expect the re-joining traffic would actually be split between Queens Road and Luther Street and this would substantially lower the air quality impact on both.

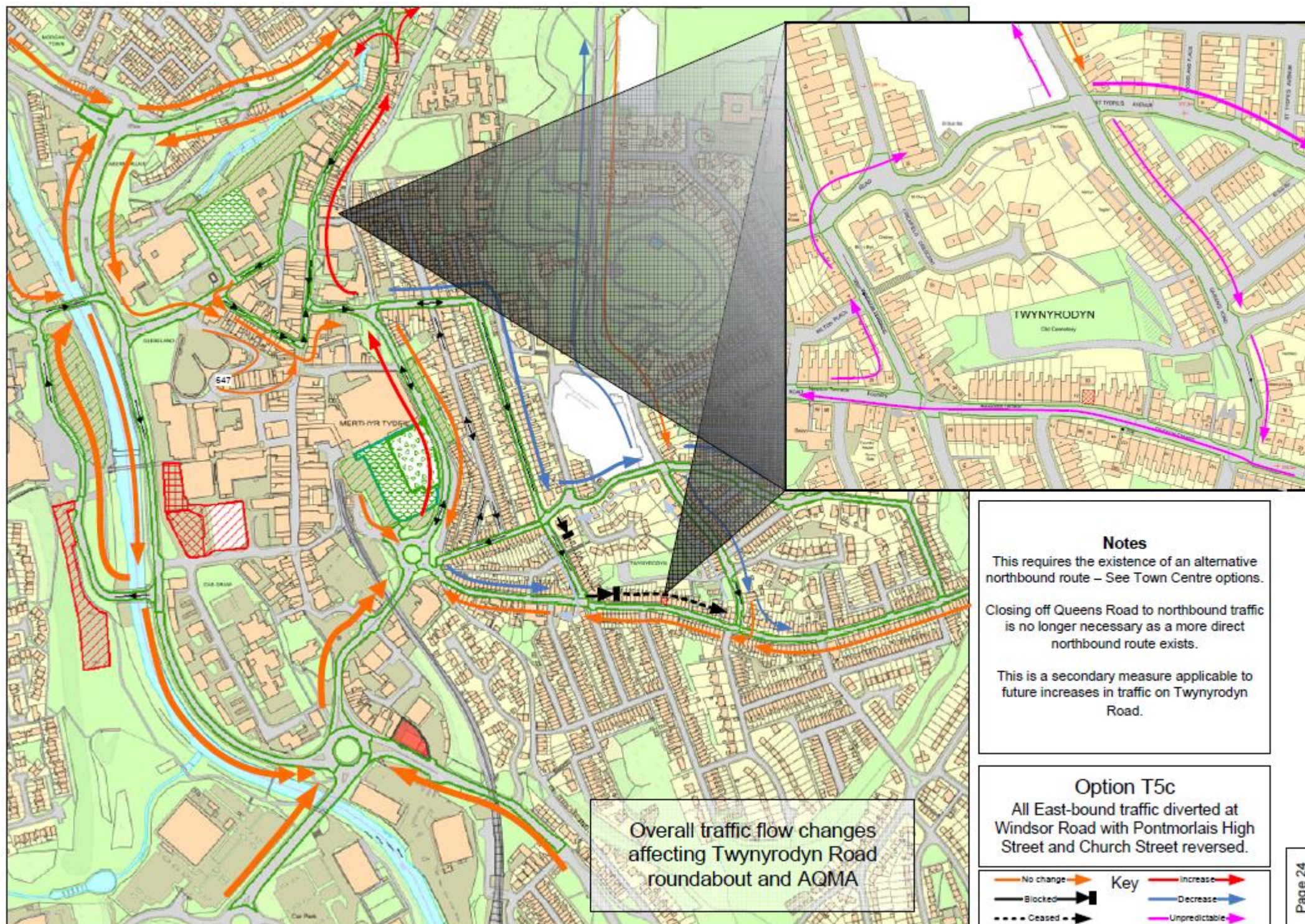
The model showed a more substantial rise on Windsor Terrace where vehicles would be accelerating away from Twynyrodyn Road but this was also not so high as to cause an air quality failure on Windsor Terrace.

The following map shows the modelling prediction. It can be seen that the level of nitrogen dioxide on Windsor Terrace was predicted to be equivalent to that on lower Twynyrodyn Road. Diffusion tube monitoring on lower Twynyrodyn Road has shown there is no air quality problem there.



Figure # East-bound traffic diverted - NO₂ concentration on Twynnyrodyn road, 40 $\mu\text{g}/\text{m}^3$ threshold

Map showing diversion of east-bound Twynyrodyn Road traffic as a second phase



'Visio-Solutions - T5c Twynyrodyn Road area east-bound diversion with alternative northbound route to Queens Road'