ARUP

South Dublin County Council

# Old Bawn Road Active Travel Scheme

## Options Assessment Report

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# 1. Introduction

This report documents an assessment of potential options assessed for the Firhouse Road West, Kiltipper Road and Killinniny Road junctions which were completed as part of the Old Bawn to Ballyboden Active Travel Scheme. Refer to Figure 1 for the location of each junction. The purpose of this assessment is to determine the most suitable option at each junction that aligns with the project's objectives, of providing safe and convenient crossing for pedestrians and cyclists and providing a more attractive environment for residents through traffic calming and neighbourhood enhancement. While also ensuring that any proposed design does not significantly increase the traffic delays through the junction.

A screening of potential options for each junction was undertaken and then these options were sifted to determine if a Multi-Criteria Analysis (MCA) was required for each individual junction. An MCA was carried out for Killinniny Junction which included the recommended assessment criteria provided in the Common Appraisal Framework for Transport Projects and Programmes. The MCA method is further detailed along with conclusions of the analysis in Section 4 of this report.

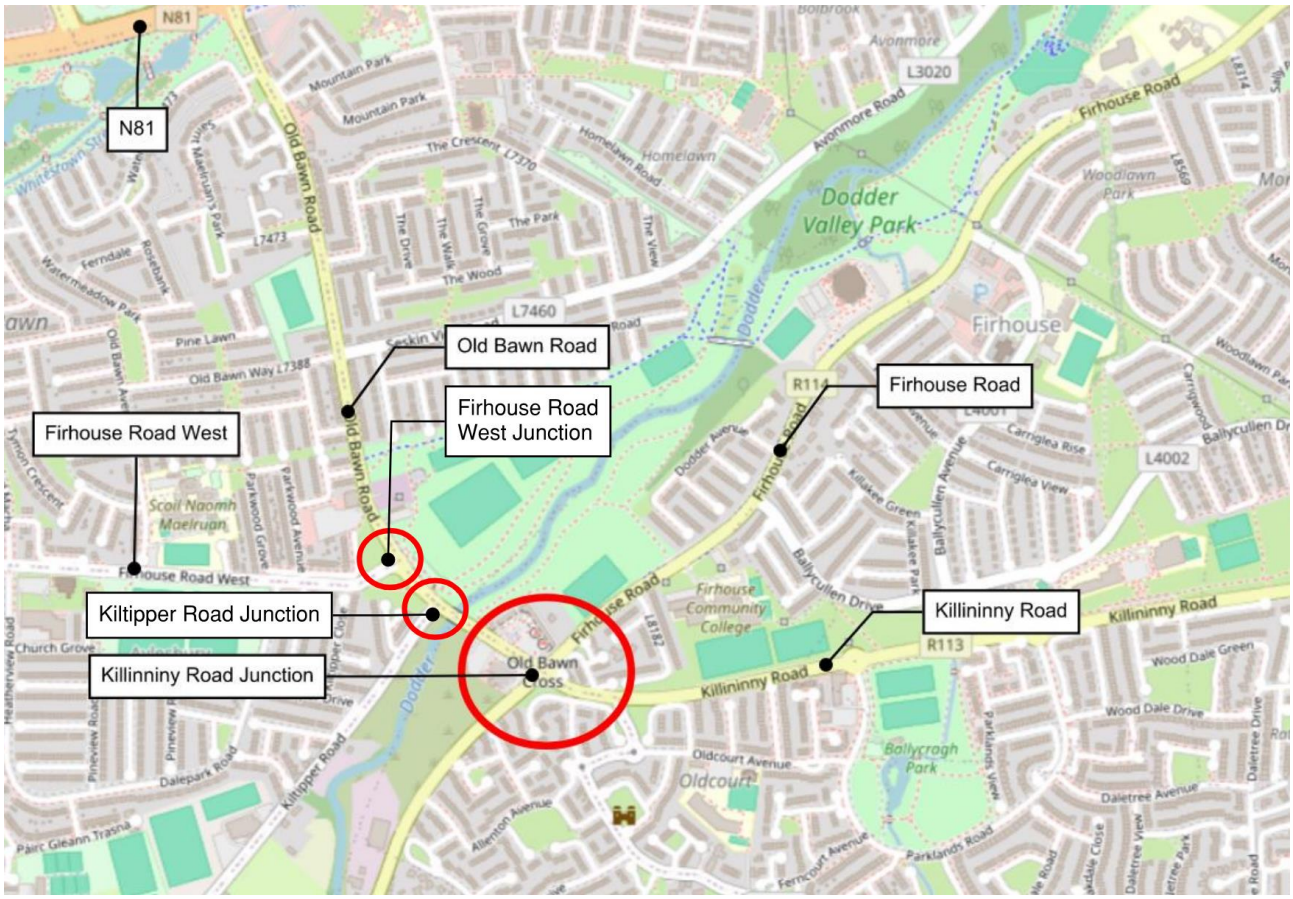



**Figure 1: Location of Firhouse Road West, Kiltipper Road and Killinniny Road Junction**

# 2. Description of the Scheme

The Old Bawn to Ballyboden Active Travel Scheme begins at the N81 junction and continues south along Old Bawn Road, ending at the Killinniny Road junction. The scheme aims to enhance the local environment along a 1.4 km stretch of Old Bawn Road by improving walking and cycling infrastructure. Key features of the project include:

- Raised and kerb-protected cycle tracks
- Upgrading existing bus stops to include bus stop islands
- Upgrading existing signal-controlled junctions to provide protected and segregated crossings for pedestrians and cyclists
- Raising priority junctions at side roads with continued footpath and cycle track pavements, giving pedestrians and cyclists priority through the junctions
- Repaving and widening existing footpaths
- In addition to improving walking and cycling infrastructure, the project also seeks to enhance the area through landscape interventions, including new planting and placemaking efforts aimed at improving biodiversity and creating a more pleasant environment.

The project serves as an important active travel link in the area, connecting with other local active travel routes. To the north, it will connect with the Avonbeg Active Scheme. The scheme will also link to the Dodder Greenway and the recently constructed two-way cycle track on Firhouse Road West. Furthermore, the Firhouse Road Active Travel Improvement Scheme and the D24 Neighbourhood Cycle Network Scheme will connect at the Killinniny Road junction.

This junction forms a critical link in establishing a comprehensive and continuous walking and cycling network across Firhouse, Old Bawn, and Tallaght.

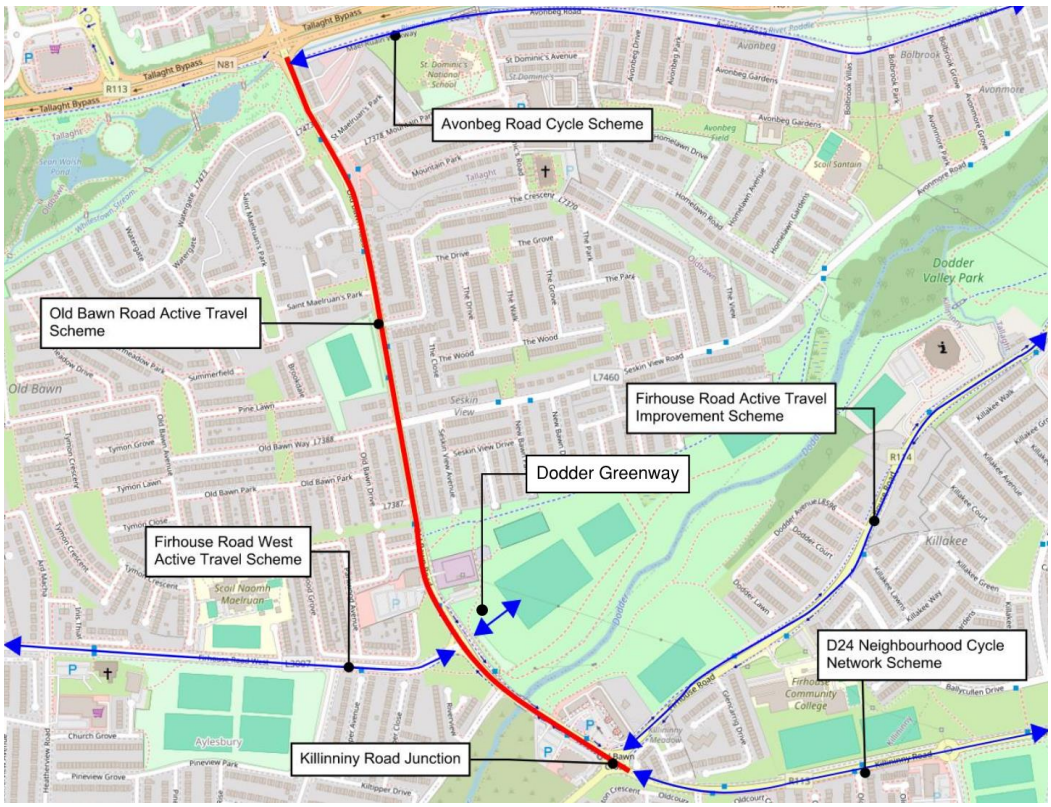



**Figure 2: Scheme Location Map**

## 2.1 Existing Conditions at the Firhouse Road West Junction

The Firhouse Road West junction is located at the intersection of Firhouse Road West and Old Bawn Road, as show in Figure 1 of this report. The current layout of the junction prioritises vehicle movement over that of pedestrians and cyclists. The left turn vehicular movement from Old Bawn Road to Firhouse Road West and from Firhouse Road West to Old Bawn Road is facilitated by dedicated left-turn slips. The geometry of these slip lanes enables and encourages fast vehicle movements due to large widths and corner radii, further compromising safety.

The layout of the junction requires pedestrians to cross Firhouse Road West in three stages – two crossing over the left-turn slips and one over the main road. Crossing of Old Bawn Road can only occur on the northern arm through a two-stage crossing, there is no pedestrian crossing facilities on the southern arm. The existing islands are large; however, multiple stage crossings provide challenges for vulnerable road users, particularly for vulnerable road users such as children and individuals with mobility impairments. This results in poor and unsafe crossing facilities, failing to align with the principles of the Design Manual for Urban Roads and Streets (DMURS) and the Cycle Design Manual.

The existing signalised crossings do not adequately cater to cyclists and are insufficiently wide. The crossing width ranges from 4.0m wide onto the island and 2.0m between the island and across Old Bawn Road, which is below the recommended 2.4m for pedestrian use only and 4.0m for shared pedestrian and cyclist use. Additionally, the cycle tracks feeding into the junction terminate near the crossings into a shared space environment, and there are no dedicated facilities for cyclists to cross safely.

The junction is strategically located to provide a link between the Dodder Greenway and Firhouse Road West Active Travel Scheme. The recently constructed active travel scheme on Frihouse Road West consists of a two-way cycle track on the southern section of the road and terminated at the Firhouse Road West Junction with Old Bawn Road. Additionally, it is an important link along the Old Bawn to Ballyboden Active Travel Scheme. This makes the junction a key element in creating a comprehensive and continuous active travel network in Tallaght, Old Bawn, Firhouse, and the surrounding areas.


**Figure 3: Arial view of Firhouse Road West Junction**

## 2.2 Existing Conditions at the Kiltipper Road Junction

The junction currently operates as a signal-controlled junction, featuring a one-lane approach from Kiltipper Road on the northbound approach, while the eastbound approach of Old Bawn Road consists of two lanes, straight ahead and right turning. The eastbound approach of Old Bawn Road consists of a combined straight ahead and right turn lane. There are no designated pedestrian or cycle crossings at this junction, forcing people to backtrack to either the Killinniny Road or Firhouse Road West junctions to find a safe crossing. This lack of pedestrian and cycle facilities inevitably leads to unsafe crossings at uncontrolled points. Additionally, a stone wall and hedge located at the south-eastern corner of the junction obstruct visibility of Kiltipper Road for vehicles turning left from Old Bawn Road. This poses a significant risk as pedestrians or cyclists crossing at this point remain unseen by drivers until the vehicle is already in the process of turning. The wide corner radii at this junction also enable vehicles to make the turn at higher speeds, further exacerbating the safety hazard.


**Figure 4: View of Kiltipper Road from northbound approaching vehicle**

A bridge over the River Dodder is located just south-east of the junction creating a constraint location where pedestrians and cyclists are expected to share a footpath that is 1.5m at the narrowest point. At the same location, a 3.0m wide ghost island is located to facilitate a right turn pocket into The Old Mill car park. The ghost island provides an opportunity to shift eastwards or remove the right turning pocket and utilise the reclaimed space to provide an appropriately wide segregated footpath and cycle track.

The layout of the junction and feeding roads provide poor and unsafe facilities for pedestrians and cyclists failing to align with the principles of the Design Manual for Urban Roads and Streets (DMURS) and the Cycle Design Manual

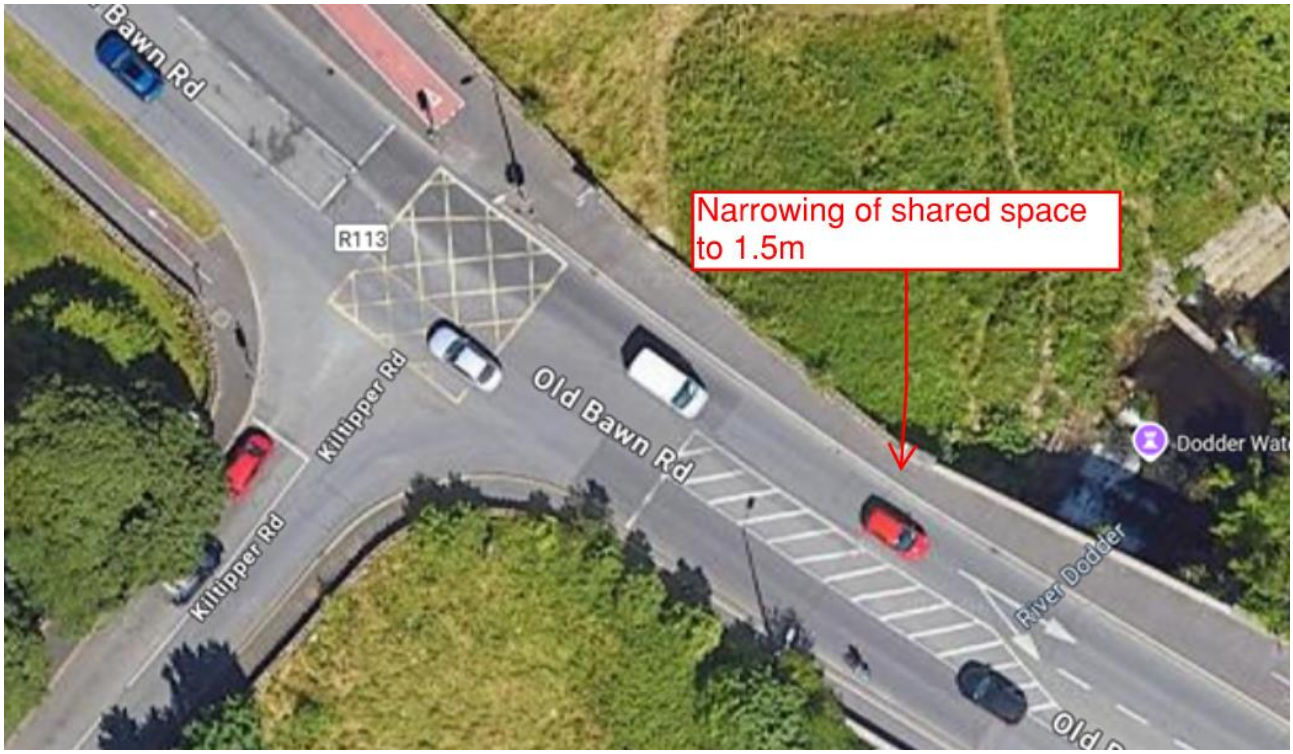



**Figure 5: Aerial view of Kiltipper Road Junction and bridge**

## 2.3 Existing Conditions at the Killinniny Road Junction

The Killinniny Road junction is located at the intersection of Old Bawn Road, Firhouse Road, Killinniny Road, and Bohernabreena Road, as shown in Figure 1 of this report. The current layout of the junction prioritises vehicle movement over that of pedestrians and cyclists. Each arm of the junction features three vehicle lanes, with left-turn movements facilitated by dedicated left-turn slips. The geometry of these slip lanes enables and encourages fast vehicle movements due to large widths and corner radii, further compromising safety.

Additionally, the layout requires pedestrians to navigate the junction in three stages—two crossings over the left-turn slips and one over the main road. The islands at the junction are too narrow to provide a safe and comfortable waiting area, particularly for vulnerable road users such as children and individuals with mobility impairments. This results in poor and unsafe crossing facilities, failing to align with the principles of the Design Manual for Urban Roads and Streets (DMURS) and the Cycle Design Manual.

The existing signalised crossings do not adequately cater to cyclists and are insufficiently wide. The crossing widths range from 2.0m to 2.35m, which is below the recommended 2.4m for pedestrian use only and 4.0m for shared pedestrian and cyclist use. Additionally, the cycle tracks feeding into the junction terminate near the crossings into a shared space environment, and there are no dedicated facilities for cyclists to cross safely.

As part of the D24 Neighbourhood Cycle Network a two-way cycle track is planned on the southern side of Killinniny Road and terminating at the Killinniny Road Junction. The strategic location of the junction makes it a critical connection point between the D24 Neighbourhood Cycle Network, the Firhouse Road Active Travel Improvement Scheme, and the Old Bawn Road Active Travel Scheme. This makes the junction a key element

in creating a comprehensive and continuous active travel network in Tallaght, Old Bawn, Firhouse, and the surrounding areas.

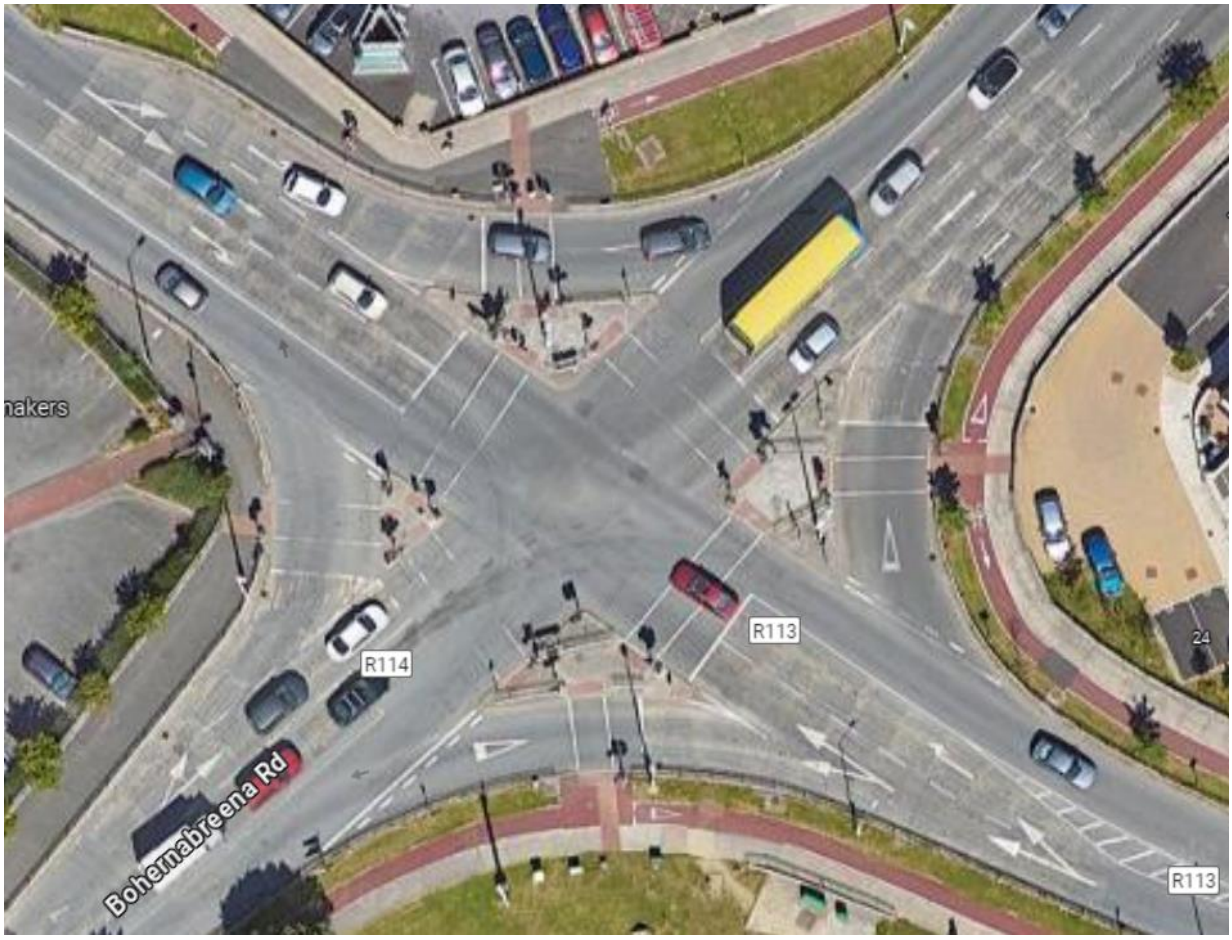



**Figure 6: Arial view of Killinniny Road Junction**

# 3. Scheme Benefits and Objectives

The purpose of the proposed scheme residential communities in Tallaght, Ballycullen, Firhouse, Knocklyon and Ballyboden to trip generators such as schools and educational centres, recreation zones, employment and business hubs, and "third spaces". There will also be links to the wider active travel network in the county by enhancing walking and cycling facilities. Upgrades will be made to existing junctions along the main route and secondary links, providing segregated cycling facilities through the junctions in addition to enhanced pedestrian crossings. When the project is delivered, it will enhance the streetscape of the area, provide continuous walking and cycling infrastructure, and improve safety for all road users. The provision of safe, continuous, legible, active travel infrastructure will be a catalyst for an increased number of journeys being made by walking, cycling, and public transport by:

- Encouraging modal shift to walking and cycling as a safe and convenient means of making local trips (work, school, college, recreation trips etc.) and to create a network of high-quality walking and cycling facilities.
- Developing secondary links in the vicinity of the main scheme that will look to increase the usability of the main route through increasing access and destination options.
- Improving the landscape along the route to improve biodiversity and create a more pleasant environment to walk and cycle.
- Installing safe school treatments outside schools which will create safe and welcoming environments that will encourage walking and cycling to school and promote positive social interaction at the school gate
- Ensuring the delivery of high-quality linkages between residential areas and key trip attractors (e.g. schools, colleges, sports clubs, shopping centres) as well as other planned and existing cycle and walking routes.
- Reprioritising crossings of sides roads, by tightening corner radii and providing raised entry treatments that allow for pedestrian and cycle priority though the junctions and encourage slower vehicle speeds.
- Developing signalised junctions that cater for all pedestrian and cyclist movements, providing segregated and kerb protected cycle facilities along with single-movement pedestrian crossings on each junction arm.
- Upgrading bus stops to remove conflict between pedestrian and cyclists and between cyclists and stopping buses by deflecting cyclists around the bus stop and by providing permeability between bus stops and destinations

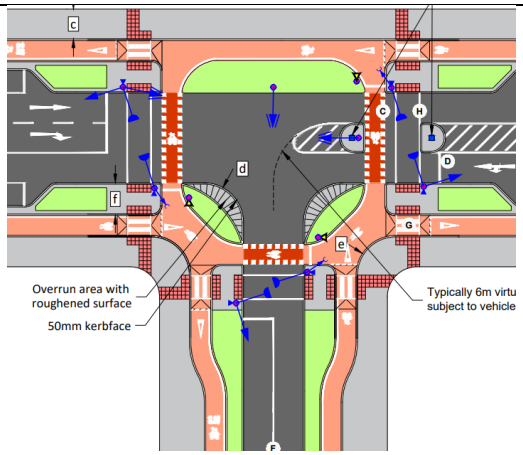
Significantly improving safety for pedestrians and cyclists in accordance with the Cycle Design Manual (CDM) and the Design Manual for Urban Roads and Streets (DMURS).

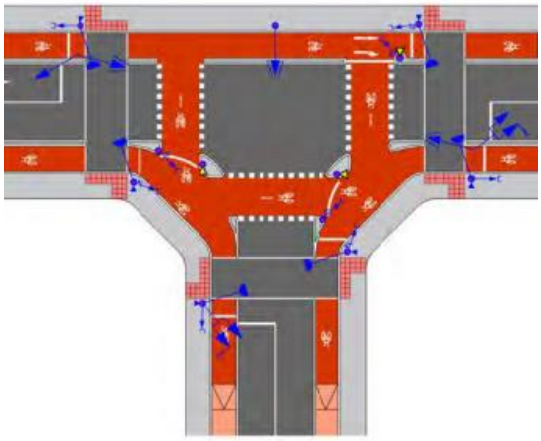
# 4. List of Options

Two options have been identified for the Firhouse Road West junction, three for the Kiltipper Road junction, and 13 for the Killinniny Road junction. Due to the strategic importance of the Killinniny Road junction, number of existing traffic lanes and the high volume of traffic, a broader range of options were considered. These options span a spectrum, from providing high-quality walking and cycling infrastructure with significant impacts on traffic capacity, to less disruptive alternatives and potential alternative walking and cycling routes. This wider selection reflects the need to balance improved pedestrian and cyclist safety with maintaining traffic flow efficiency.

## 4.1 Firhouse Road West Junction

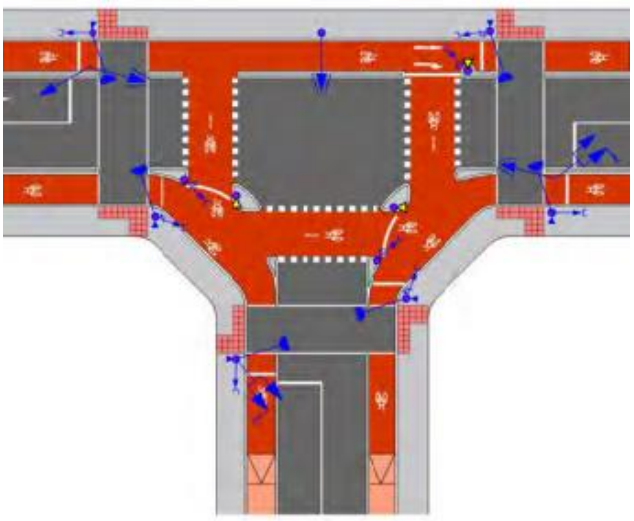
**Table 1: Options Identified: Firhouse Road West Junction**

| Design Option: | Description | Image |
|---|---|---|
| **Option 1:**<br><br>Do nothing | *'Do-nothing' option. The existing junction layout is retained with no improvements made to the walking and cycling facilities.* |  |
| **Option 2:**<br><br>Protected T-Junction – Full signal control with Detail TL504 | *Junction upgraded to a full signal controlled protected junction, as detailed in the Cycle Design Manual, Detail TL504. Separate crossing facilities will be provided for pedestrians and cyclists. The cycle tracks are set back a minimum of 2.0m from the road and pedestrians cross the cycle track with priority on raised zebra crossings and proceed to pedestrian landing area.*<br><br>*Pedestrians and cyclists will typically run in the same stage with all red to traffic.*<br><br>*In this option all slip lanes will be removed however the number of traffic approach lanes will remain the same.*<br><br>*Firhouse Road West two-way cycle track is incorporated into this option.* |  |

| Design Option: | Description | Image |
|---|---|---|
| **Option 3:**<br><br>Protected T-Junction – Full Signal Control with Detail TL505 | *Junction upgraded to a full signal controlled protected junction, as detailed in the Cycle Design Manual, Detail TL505. Separate crossing facilities will be provided for pedestrians and cyclists. Pedestrians and cyclists may cross in the same stage, with all red to traffic, however cyclists will need to give way to pedestrians.*<br><br>*In this option all slip lanes will be removed however the number of traffic approach lanes will remain the same.*<br><br>*Firhouse Road West two-way cycle track is incorporated into this option.* |  |

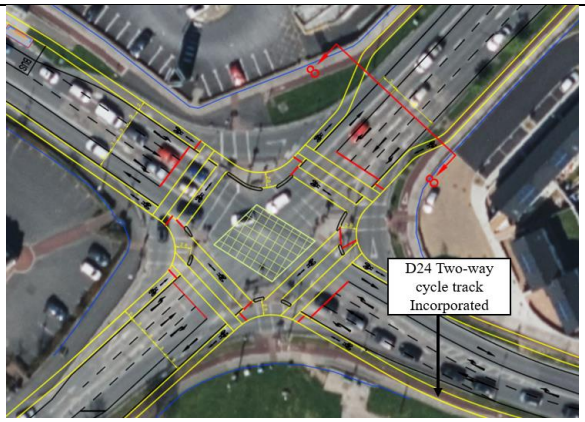
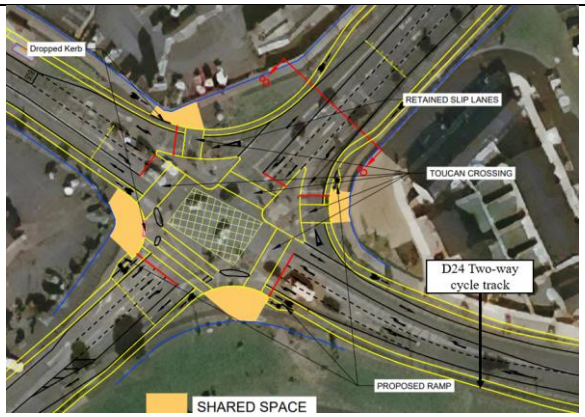
## 4.2 Kiltipper Road Junction

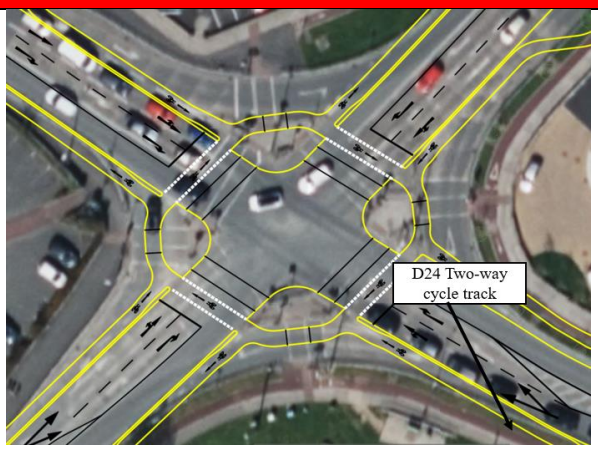
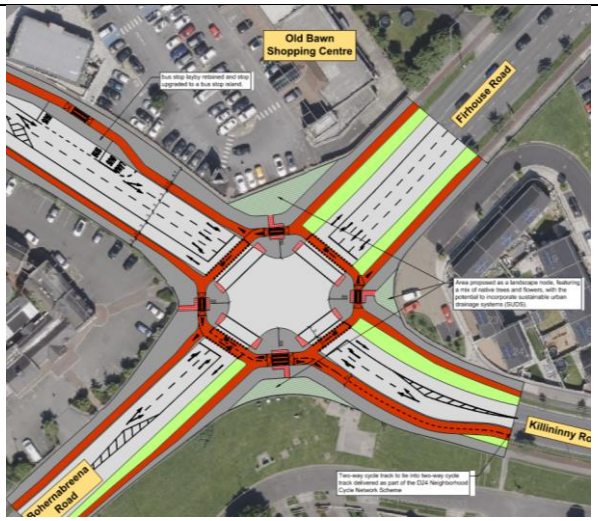
**Table 2: Options Identified: Killtipper Road Junction**

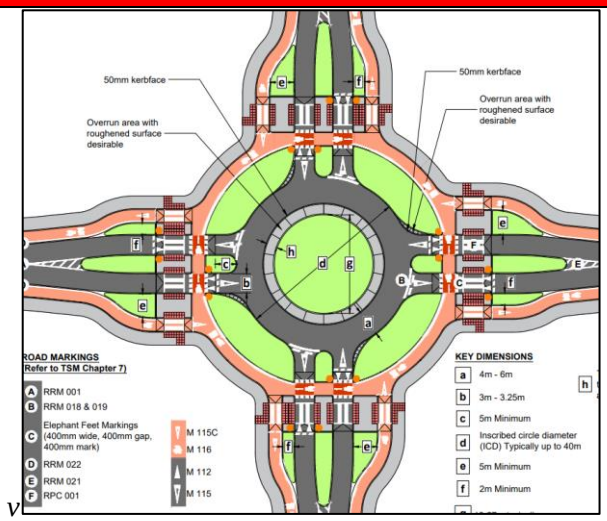
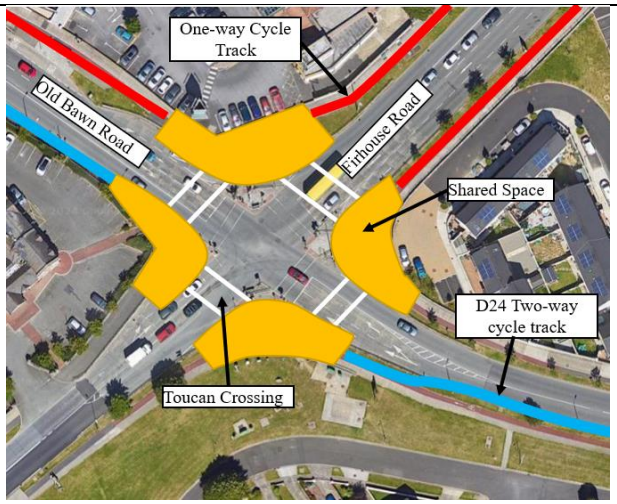
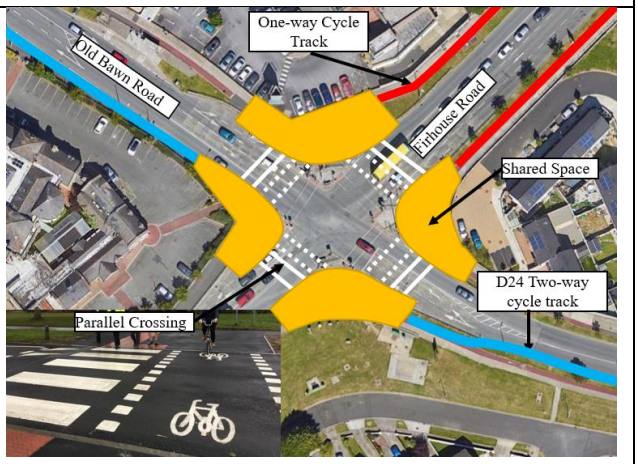
| Design Option: | Description | Image |
|---|---|---|
| **Option 1:**<br>Do nothing | *'Do-nothing' option. The existing junction layout is retained with no improvements made to the walking and cycling facilities.* |  |
| **Option 2:**<br>Do minimum | *'Do-minimum' option. The existing junction layout is retained with the only improvement to active travel is a new pedestrian and cycle crossing across Kiltipper Road.* |  |
| **Option 3:**<br>Protected T-Junction – Full Signal Control with Detail TL505 | *Junction upgraded to a full signal controlled protected junction, as detailed in the Cycle Design Manual, Detail TL505. Separate crossing facilities will be provided for pedestrians and cyclists. Pedestrians and cyclists may cross in the same stage, with all red to traffic, however cyclists will need to give way to pedestrians.* |  |

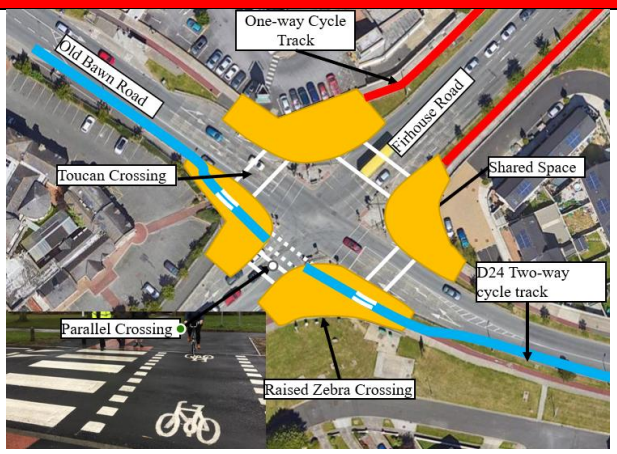
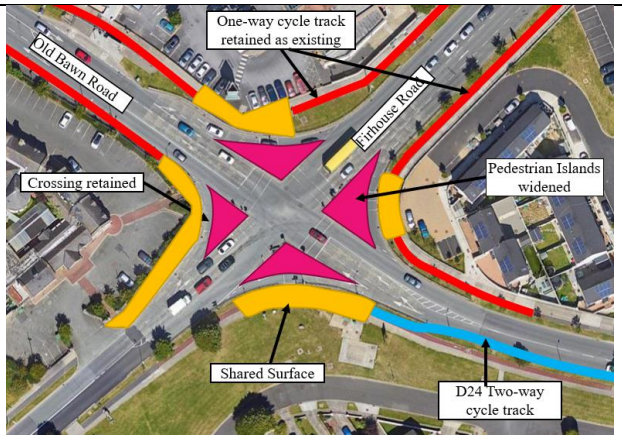
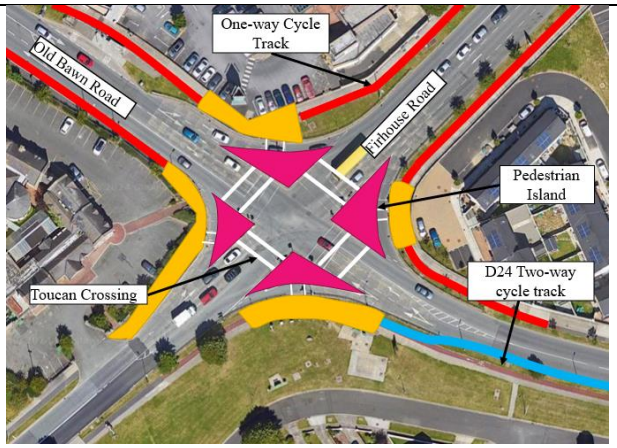
## 4.3 Killinniny Road Junction

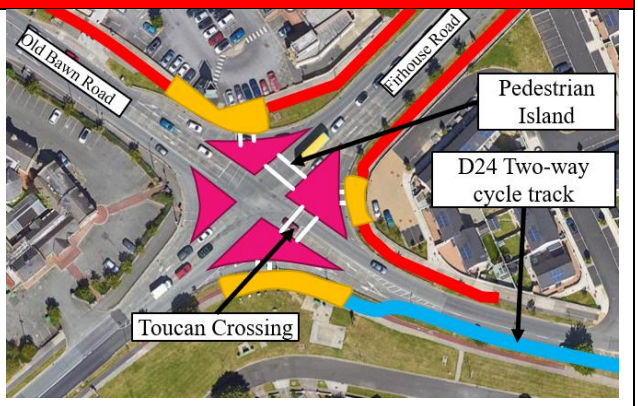
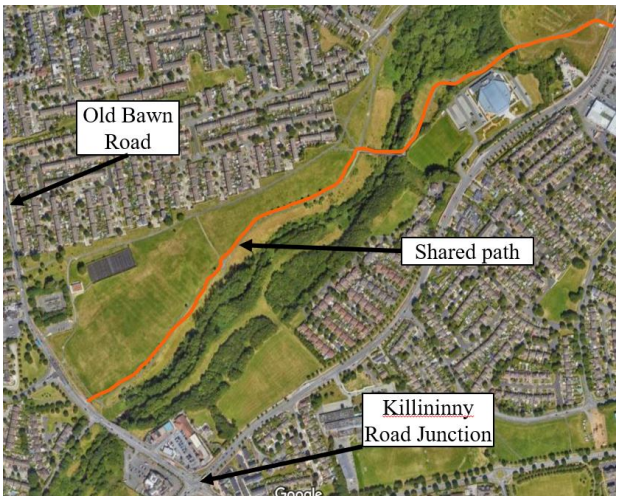
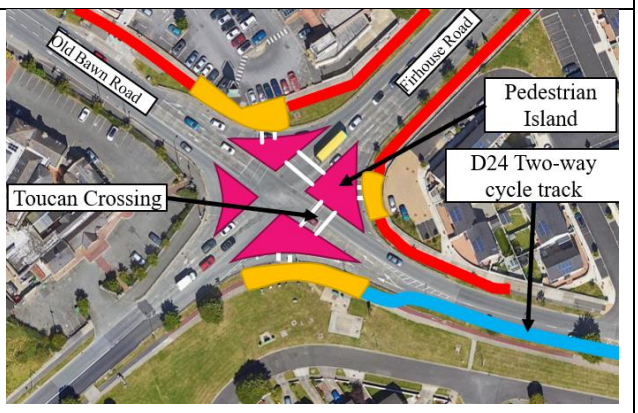
**Table 3: Options Identified: Killinniny Road Junction**

| Design Option: | Description | Image |
|---|---|---|
| **Option 1:**<br>Do nothing | *'Do-nothing' option. The existing junction layout is retained with no improvements made to the walking and cycling facilities.* |  |
| **Option 2:**<br>Full Signal Controlled Protected Junction | *Junction upgraded to a full signal controlled protected junction, as detailed in the Cycle Design Manual, Detail TL503. Separate crossing facilities will be provided for pedestrians and cyclists. Pedestrians and cyclists may cross in the same stage, with all red to traffic, however cyclists will need to give way to pedestrians.*<br><br>*In this option all slip lanes will be removed however the number of traffic approach lanes will remain the same.*<br><br>*D24 two-way cycle track is incorporated into this option.* |  |
| **Option 3:**<br>Full Signal Controlled Hybrid Junction | *In this option the junction would be upgraded to a hybrid signal controlled protected junction. This layout would retain the slip lanes from Old Bawn Road into Firhouse Road and from Firhouse Road to Killinniny Road, highest traffic flows have been observed for these two movements when observing the existing traffic flow data. Where the slip lanes are retained, the crossings will be upgraded to 4.0m wide toucan and pedestrians and cyclists will be required to cross at the same location. This layout would retain the existing three stage crossing over Firhouse Road.*<br><br>*Where the slip lanes are removed, the pedestrian and cyclist crossings will be separated.*<br><br>*The number of traffic approach lanes will remain the same.*<br><br>*D24 two-way cycle track is incorporated into this option.* |  |

| Design Option: | Description | Image |
|---|---|---|
| **Option 4:**<br><br>CYCLOPS with two traffic lane approach | *In this option the junction would be upgraded to a protected junction, CYCLOPS layout, as detailed in the Cycle Design Manual, Detail TL502. Separate crossing facilities will be provided for pedestrians and cyclists. Pedestrians and cyclists will cross in the same stage, with all red to traffic. Under this layout the position of the pedestrians and cyclists is switched, with cyclists circulating in an external orbital cycle track. Pedestrians will cross the cycle track on a raised zebra crossing.*<br><br>*In this option all slip lanes will be removed and the number of traffic lanes is reduced to two on each approach - A combined straight and left turn and dedicated right turn lane.*<br><br>*D24 two-way cycle track is incorporated into this option.* |  |
| **Option 5:**<br><br>CYCLOPS with three traffic lane approach on Old Bawn and Firhouse Road | *In this option the junction would be upgraded to a protected junction, CYCLOPS layout, as detailed in the Cycle Design Manual, Detail TL502. Separate crossing facilities will be provided for pedestrians and cyclists. Pedestrians and cyclists will cross in the same stage, with all red to traffic. Under this layout the position of the pedestrians and cyclists is switched, with cyclists circulating in an external orbital cycle track. Pedestrians will cross the cycle track on a raised zebra crossing.*<br><br>*In this option all slip lanes will be removed and the number of traffic lanes will be retained on Old Bawn Road and Firhouse Road where the largest traffic movements were observed and reduced to two lanes on Killinniny Road and Bohernabreena - A combined straight and left turn and dedicated right turn lane.*<br><br>*D24 two-way cycle track is incorporated into this option.* |  |

| Design Option: | Description | Image |
|---|---|---|
| **Option 6:**<br><br>Protected Roundabout | *In this option the junction would be upgraded to protected roundabout, as detailed in the Cycle Design Manual, Detail TL701. This layout includes a circulatory cycle track around the roundabout, cyclists and pedestrians cross the road on a raised crossing and drivers are required to give way.*<br><br>*This layout requires that the number of approach traffic lanes is reduced to one lane and one circulatory lane is provided.*<br><br>*D24 two-way cycle track is incorporated into this option.* |  |
| **Option 7:**<br><br>Left turn slip lanes removed and crossings upgraded to toucan | *In this option the slip lanes are removed however the number of approach traffic lanes are retained. The existing crossings will be upgraded to 4.0m wide toucan crossings and the space before the crossings converted to a shared space.*<br><br>*D24 two-way cycle track is incorporated into this option.* |  |
| **Option 8:**<br><br>Left turn slip lanes removed and crossings upgraded to parallel crossings | *In this option the slip lanes are removed however the number of approach traffic lanes are retained. The existing crossings will be upgraded to a signalised parallel crossing, as detailed in the Cycle Design Manual, Detail TL606. The space before the crossings will be converted to a shared space.*<br><br>*D24 two-way cycle track is incorporated into this option.* |  |

| Design Option: | Description | Image |
|---|---|---|
| **Option 9:**<br><br>Left turn slip lanes removed, D24 two-way cycle track continued across Bohernabreena and remaining crossing upgraded to toucan | *In this option the slip lanes are removed however the number of approach traffic lanes are retained. The two-way cycle track proposed as part of the D24 Cycle Network will continue across Bohernabreena Road and continue on the southern side of Old Bawn Road, crossing of Bohernabreena Road will be facilitated by a signalised parallel crossing, as detailed in the Cycle Design Manual, ab TL606. The continuous two-way cycle track will be crossed by pedestrians on raised zebra crossings.*<br><br>*Across Old Bawn, Firhouse and Killinniny Road the existing crossings will be upgraded to 4.0m wide toucan crossings and the space before the crossings will be converted to a shared space.*<br><br>*D24 two-way cycle track is incorporated into this option.* |  |
| **Option 10:**<br><br>Do-minimum with slip lanes narrowed | *This is the 'do-minimum' option. In this option the number of traffic lanes will be retained including the slip lanes. This layout would include increasing the size of the junction islands by reducing the width of the left turn slips to 3.5m allowing more space for pedestrians on the islands. The existing traffic signals will be modified to reflect the new layout but will retain the current width and will not be upgraded to 4.0m toucan crossings.*<br><br>*D24 two-way cycle track is incorporated into this option.* |  |
| **Option 11:**<br><br>Do-minimum with slip lanes narrowed and crossings upgraded to toucan | *This is the 'do-minimum' option. In this option the number of traffic lanes will be retained including the slip lanes. This layout would include increasing the size of the junction islands by reducing the width of the left turn slips to 3.5m allowing more space for pedestrians on the islands. The existing traffic signals will be modified to reflect the new layout and will be upgraded to 4.0m wide toucan crossings.*<br><br>*D24 two-way cycle track is incorporated into this option.* |  |

| Design Option: | Description | Image |
|---|---|---|
| **Option 12**:<br><br>Alternative offline route option | *Alternative route via. existing shared path in Dodder Valley Park. A new link will be provided between the active travel network on Old Bawn Road, at bus stop No. 2539, and the existing shared path in the Dodder Valley Park. This alternative route will provide a walking and cycling link between Old Bawn Road and Firhouse Road. Pedestrians and cyclists will be able to access Firhouse Road at the opening next to Ballycullen Road Avenue.*<br><br>*This option would also see the slip lanes narrow to 3.5m and the reclaimed space used to widen the junction islands. The existing crossings would be upgraded to 4.0m wide toucan crossing.*<br><br>*D24 two-way cycle track is incorporated into this option.* |  <br>  |
| **Option 13:**<br><br>Alternative offline route option with new bridge over River Dodder | *Alternative route via. existing shared path in Dodder Valley Park. A new link will be provided between the active travel network on Old Bawn Road, at bus stop No. 2539, and the existing shared path in the Dodder Valley Park. This alternative route will provide a walking and cycling link between Old Bawn Road and Firhouse Road. Pedestrians and cyclists will be able to access Firhouse Road via a new bridge across the River Dodder and shared path at the side of the Tallaght Rugby Club pitch. This option would also see the slip lanes at Killininny Road junction narrow to 3.5m and the reclaimed space used to widen the junction islands. The existing crossings would be upgraded to 4.0m wide toucan crossing.*<br><br>*D24 two-way cycle track is incorporated into this option.* |  <br>  |

# 5. Multi-Criteria Analysis

The options outlined in Table 3 were reviewed through the Multi-Criteria Analysis (MCA). The MCA was carried out to assess and better understand the benefits, challenges and implications of each option compared to other options.

The MCA included the recommended assessment criteria in the Common Appraisal Framework for Transport Projects and Programmes, namely: Economy, Safety, Integration, Environment, Accessibility and Social Inclusion and Physical Activity. An additional criterion of Quality-of-Service Level and Traffic Impact has been added to the assessment, as the delivery of a safe, high-quality, and attractive route for both cyclists and pedestrians is an objective of the scheme. However, given the strategic nature of the junction within the road network, it is also important that traffic delays through the junction are not significantly increased.

| | |
|---|---|
| Economy | The impacts of a transport investment on economic growth and competitiveness are assessed under the economic impact and economic efficiency criteria. |
| Safety | Safety is concerned with the impact of the investment on the number of transport related accidents. |
| Integration | Integration considers the extent to which the project being evaluated promotes integration of transport networks and is compatible with Government policies, including national spatial and planning policy. |
| Environment | Environment embraces a range of impacts, such as emissions to air, noise, and ecological and architectural impacts. |
| Accessibility and Social Inclusion | Accessibility and social inclusion embraces the notion that some priority should be given to benefits that accrue to those suffering from social deprivation, geographic isolation and mobility and sensory deprivation. |
| Physical Activity (where applicable) | This relates to the health benefits derived from using different transport modes |

**Figure 7: Extract from the Common Appraisal Framework for Transport Projects and Programmes outlining project appraisal criteria**

For each assessment criteria considered options were relatively compared against each other based on a five-point scale, ranging from having significant advantages to significant disadvantages over other options. For illustrative purposes, this five-point scale was colour coded as presented in Table 3 below, with advantageous options graded to ‘dark green’ and disadvantageous options graded to ‘dark red’.

The following assessment scale has been developed to compare the options:

**Table 4: Summary of MCA Assessment**

| | |
|---|---|
| ***Highly Positive*** ***(significant advantages over other options)*** | |
| ***Moderately Positive*** ***(some advantages over other options)*** | |
| ***Neutral*** ***(compared to other options)*** | |
| ***Moderately Negative*** ***(some disadvantages compared to other options)*** | |
| ***Highly Negative*** ***(significant disadvantages compared to other options)*** | |

## 5.1 Firhouse Road West Junction

A feasibility screening and sifting exercise was conducted for the options at the Firhouse Road West junction to eliminate those that have fundamental differences from the objectives outlined in Section Three of this report. The screening process determined that Options 1 and 3 do not align with the project objectives or fail to adhere to the design principles established in the Cycle Design Manual.

Option 3 – a Protected T-Junction with full signal control (TL505) – is generally recommended only for constrained locations, with the Protected T-Junction (TL504) described in Option 2 being the preferred arrangement. The screening exercise concluded that sufficient space is available within the existing boundaries to accommodate a Protected T-Junction (TL504).

As a result of the feasibility and sifting process, it was determined that no further assessment is needed, and Option 2 – Protected T-Junction is the preferred option. Option 2 will provide safe and segregated crossing facilities for pedestrians and cyclists. The TL504 layout, proposed under Option 2, deflects the cycle track away from the road at the junction creating a more pleasant and safe cycling experience. The layout is also suitable to incorporate the recently constructed two-way cycle track on Frihouse Road West. Overall TL504 provides safer and more free flowing facilities for pedestrians and cyclists.

## 5.2 Kiltipper Road Junction

A feasibility screening and sifting exercise was conducted for the options at the Kiltipper Road junction to eliminate those that fundamentally conflict with the objectives outlined in Section Three of this report. The screening concluded that Options 1 and 2 do not align with the project's objectives or adhere to the design principles in the Cycle Design Manual.

One of the key objectives of the project is to provide continuous and segregated walking and cycling infrastructure throughout the entire scheme. The feasibility assessment determined that Options 1 and 2 fail to meet this critical requirement.

As a result, no further assessment was deemed necessary, and Option 3 – a Protected T-Junction with full signal control (TL505) was selected as the preferred option.

It is important to note that the Protected T-Junction (TL504) was not considered feasible at this location due to insufficient space to accommodate such an arrangement.

## 5.3 Killinniny Road Junction

A summary of the results from the Multi-Criteria Analysis (MCA) is provided in Table 5 below. 13 options were assessed for the Killinniny Road Junction. Refer to Appendix A for a full breakdown summary of the MCA assessment.

**Table 5: Summary of MCA Assessment**

| Design Options / Assessment Criterion | Option 1 | Option 2 | Option 3 | Option 4 | Option 5 | Option 6 | Option 7 | Option 8 | Option 9 | Option 10 | Option 11 | Option 12 | Option 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Economy | | | | | | | | | | | | | |
| Safety | | | | | | | | | | | | | |
| Integration | | | | | | | | | | | | | |
| Accessibility and Social Inclusion | | | | | | | | | | | | | |
| Environment | | | | | | | | | | | | | |
| Physical Activity | | | | | | | | | | | | | |
| Quality-of-Service Level | | | | | | | | | | | | | |
| Traffic Delays | | | | | | | | | | | | | |

Reviewing the comparative MCA assessment of the long list of options, it is evident that Options 2, 4, 5, and 6 scored the highest in terms of pedestrian and cyclist safety, integration with the surrounding cycle network, accessibility and social inclusion, physical activity, and quality of cycle service provided. Options 2, 4, 5, and 6 all offer protected and segregated cycle and pedestrian crossing facilities, operating in a separate phase from traffic movements. While these options score the highest on criteria related to safety, accessibility, and quality of service for active travel, they incur higher costs than other options.

Options 7, 8, and 9 feature shared spaces on each junction corner, incorporating toucan or parallel crossings across each arm of the junction. However, shared spaces create conflicts between pedestrians and cyclists, compromising safety and reducing the overall quality of the facility, particularly for users with mobility impairments. Additionally, they lead to more frequent stopping and starting for cyclists, with potential dismounting required during busy periods. This not only diminishes the quality of the cycling infrastructure but also poses challenges for less able cyclists. Due to these issues, the shared nature of these options results in lower scores for safety, accessibility and social inclusion, and overall quality-of-service compared to Options 2, 4, 5, and 6. As a result, Options 7, 8, and 9 are not suitable for this location

Option 1, 10, 11, 12 and 13 do not provide safe and segregated crossing facilities on each arm of the junction scoring it low in terms of safety, accessibility and social inclusion and quality-of-service. These options will not adequately cater for users of all abilities and will not contribute towards creating a safe, continuous and comprehensive active travel network, it is therefore predicted that these options will not contribute towards modal shift to more active modes of transport in the area. They will also not reduce the footprint of the junction, therefore providing little opportunity for placemaking interventions and enhancement of biodiversity. As a result, the options score low in terms of environment compared to other options considered

in this assessment. Option 1, 10, 11, 12 and 13 do not meet project objectives and therefore are not suitable for this location.

Option 3 only partially provides for safe and segregated cycling and walking facilities with the left-turn slip lanes from Old Bawn Road and Killininny Road retained. Although the option scored higher in terms of traffic delays than options 2, 4, 5 and 6, the combination on segregated and shared crossing facilities along with retention of two of the four slip lanes scored Option 3 low in safety, accessibility and social inclusion, and quality-of-service level. Option 3 does not meet project objectives and therefore are not suitable for this location.

Option 2 – A fully signal-controlled protected junction scores slightly lower than the CYCLOPS option in terms of Quality-of-Service Level. The layout has limited stacking space for right-turning cyclists, which may lead to blockages on the cycle track. Additionally, the design increases crossing distances for pedestrians, as they must cross both the cycle track and the carriageway. This requires a longer pedestrian green phase, contributing to further traffic delays. Combining the pedestrian and cyclist signal phases in this layout could create conflicts on the cycle track, especially without a pedestrian refuge, significantly reducing the quality of the crossing—particularly for vulnerable road users. To avoid these issues, pedestrian and cyclist signal phases would likely need to be separated. However, this would introduce additional signal stages, further increasing delays. For these reasons Option 2 is considered unsuitable for this location.

Option 4 – CYCLOPS with two lane approach, this option provides the same benefits as Option 5, however it consists of a combined straight and left turning lane on all approaches scoring it worse than Option 5 in terms of traffic delays. For that reason, Option 5 is considered unsuitable for this location.

Option 6 – Protected Roundabout requires reducing the number of traffic lanes to one approach lane and one circulatory lane, significantly lowering the current capacity of the junction. Therefore, this option is considered unsuitable for this location.

Option 5 – CYCLOPS, with a three-lane approach on Old Bawn and Firhouse Road, provides a high-quality level of service for active travel and accessibility by reducing conflicts between pedestrians and cyclists. This is achieved by switching the position of pedestrians and cyclists, with cyclists circulating on an external orbital cycle track. The layout proposed in Option 5 also reduces the existing footprint of the junction, creating opportunities for new planting, sustainable urban drainage features, and placemaking features. Additionally, this layout performs well in terms of traffic capacity due to the following factors:

- The three-lane approach is retained on Old Bawn and Firhouse Road, generally maintaining the existing capacity, aside from the removal of left-turn slip lanes.
- CYCLOPS operates effectively on a shared pedestrian and cyclist signal phase, reducing the number of signal stages required.

The MCA assessment has concluded that Option 5, consisting of a CYCLOPS arrangement incorporating the two-way cycle track on Killinniny Road planned as part of the D24 Neighbourhood Cycle Network is the Preferred Option for the Killinniny Road Junction.

# 6. Conclusion

Following the completion of the sifting and MCA assessment it was concluded that the following options best achieved the project objectives and aligned with the principles outlined in the Cycle Design Manual for the Old Bawn Active Travel Scheme:

- Firhouse Road West: *Option 2: Protected T-Junction with full signal control (TL504*)
- Kiltipper Road: *Option 3: Protected T-Junction with full signal control (TL505)*
- Killinniny Road: *Option 5 CYCLOPS with three traffic lane approach on Old Bawn and Firhouse Road and two lane approach on Killininny and Bohernabreena Road.*

## APPENDIX A: MCA ASSESSMENT FOR KILLININNY ROAD JUNCTION

| Carriageway Design Options | | Option 1: Do nothing | Option 2: Full Signal Controlled Protected Junction | Option 3: Full Signal Controlled Hybrid Junction | Option 4: CYCLOPS with two traffic lane approach | Option 5: CYCLOPS with three traffic lane approach on Old Bawn and Firhouse Road | Option 6: Protected Roundabout | Option 7: Left turn slip lanes removed and crossings upgraded to toucan | Option 8: Left turn slip lanes removed and crossings upgraded to parallel crossings |
|---|---|---|---|---|---|---|---|---|---|
| **Assessment Criterion** | **Sub-Criterion** | | | | | | | | |
| **Economy** | *Capital Cost* | | | | | | | | |
| **Safety** | *Pedestrian and cyclists' safety* | | | | | | | | |
| **Integration** | *Public transport integration* | | | | | | | | |
| | *Cycle network integration* | | | | | | | | |
| **Accessibility and Social Inclusion** | *Enhance network access* | | | | | | | | |
| | *Universal Accessibility* | | | | | | | | |
| **Environment** | *Air quality* | | | | | | | | |
| | *Noise and Vibration* | | | | | | | | |
| | *Landscape and Visual Quality* | | | | | | | | |
| | *Biodiversity & Land use* | | | | | | | | |
| **Physical Activity** | *Promotion of Active Travel* | | | | | | | | |
| **Quality-of-Service Level** | *Level of Service NCM* | | | | | | | | |
| | *Number of conflicts* | | | | | | | | |
| **Traffic Impact** | *Traffic delays* | | | | | | | | |

| Carriageway Design Options | | Option 9: Left turn slip lanes removed, D24 two-way cycle track continued across Bohernabreena and remaining crossing upgraded to toucan | Option 10: Do-minimum with slip lanes narrowed | Option 11: Do-minimum with slip lanes narrowed and crossings upgraded to toucan | Option 12: Alternative offline route option | Option 13: Alternative offline route option with new bridge over River Dodder |
|---|---|---|---|---|---|---|
| **Assessment Criterion** | **Sub-Criterion** | | | | | |
| **Economy** | *Capital Cost* | | | | | |
| **Safety** | *Pedestrian and cyclists' safety* | | | | | |
| **Integration** | *Public transport integration* | | | | | |
| | *Cycle network integration* | | | | | |
| **Accessibility and Social Inclusion** | *Enhance network access* | | | | | |
| | *Universal Accessibility* | | | | | |
| **Environment** | *Air quality* | | | | | |
| | *Noise and Vibration* | | | | | |
| | *Landscape and Visual Quality* | | | | | |
| | *Biodiversity & Land Use* | | | | | |
| **Physical Activity** | *Promotion of Active Travel* | | | | | |
| **Quality-of-Service Level** | *Level of Service NCM* | | | | | |
| | *Number of conflicts* | | | | | |
| **Traffic Impact** | *Traffic delays* | | | | | |