

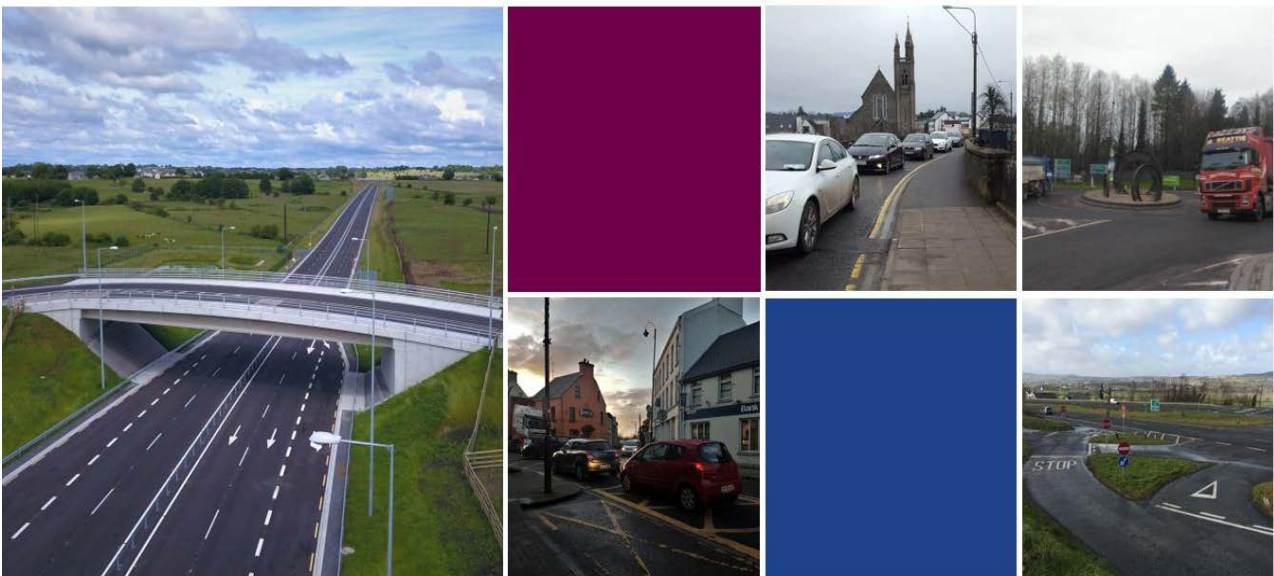
Appendix C5.02

Key Alternatives for Road Layout

Appendix C5.02

Key Alternatives for Road Layouts

TEN-T Priority Route Improvement Project, Donegal



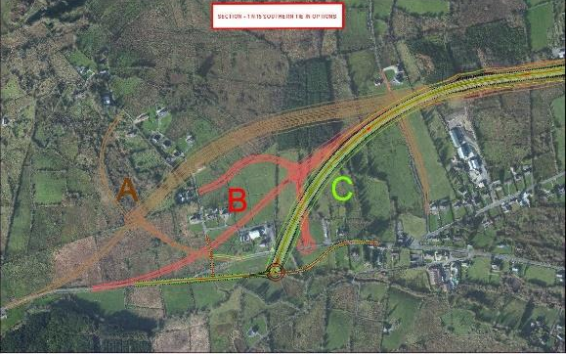
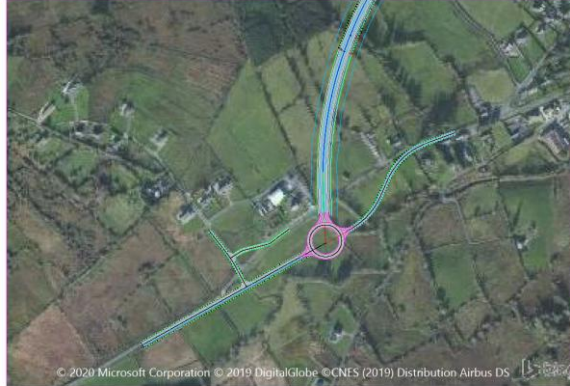
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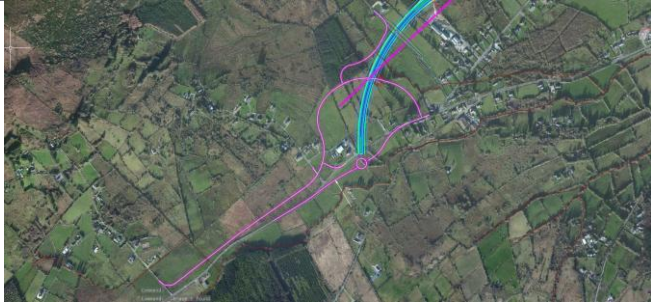

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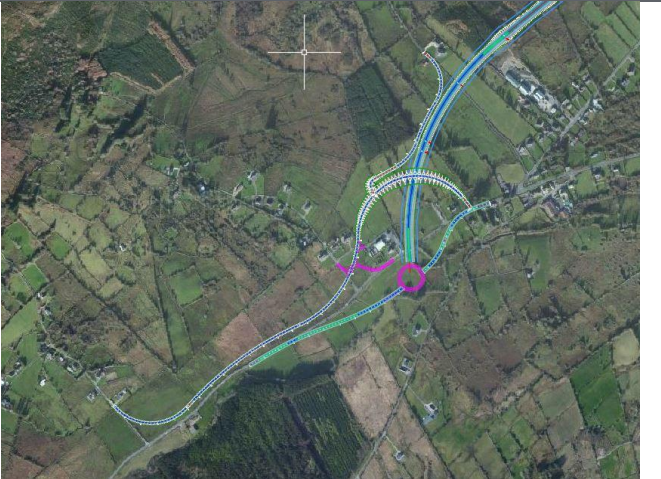
March 2026





Appendix C5.02 Table 1: Section 1 Key Alternatives for Road Layout

Location	Alternatives Considered (sketches)	Comments
Dooish Junction	<p>Alternative arrangements for the southern tie-in to the existing N15 were examined to:</p> <ul style="list-style-type: none"> ▪ Improve local connectivity and reduce community severance between Dooish and Cappry ▪ Improve road safety by reducing the number of direct accesses onto the National Primary Road Network ▪ Improve safety by increasing segregation between local traffic (including vulnerable road users) and strategic traffic 	
		<p>Three alternative mainline approaches were considered to the proposed Tie in: Options A, B and C. Option C was selected because it caused the least severance of the Dooish community and had the least environmental impact on nearby dwellings.</p> <p>A further eight junction configuration options were considered, Options A to H presented below.</p>
		<p>Option A - Option rejected because local road junction is retained on National Primary Road network.</p>

Location	Alternatives Considered (sketches)	Comments
		<p>Option B - Option not preferred for operational and safety reasons, and due to the environmental impact on the Burn Daurnett.</p>
		<p>Option C - Option rejected due to high impact on land owners, local road network (long diversions), high length of new local roads to be constructed on green field land.</p>
		<p>Option D - Option not preferred due to the environmental impact and cost associated with the introduction of the additional bridge structure.</p>

Location	Alternatives Considered (sketches)	Comments
		<p>Option E - Option rejected due to the need to introduce geometric departures – unacceptable for reasons of road safety.</p>
		<p>Option F - Option not preferred - Achieves closure of two junctions, moderate impact to existing road network, no additional structures and low impact to Burn Daurnett; however, has higher impact to landowners, higher land take, higher severance and higher impact on properties adjacent to proposed diverted local roads.</p>

Location	Alternatives Considered (sketches)	Comments
		<p>Option G - Option not preferred due to the need to concentrate traffic at Roadhouse pub junction and introduces long diversions for some residents.</p>
		<p>Option H – Preferred Option – Safely accommodates local road network, while limiting land severance and land take, and avoiding excessive diversions for local residents.</p>

Location	Alternatives Considered (sketches)	Comments
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Mainline 1.2 at Drumboe



Two alternative alignments for the mainline at Drumboe to avoid potential archaeological features at the Drumboe Abbey site. Both alternatives were located to the north of the proposed mainline to avoid the Drumboe Abbey Site and had significant impacts on Holywell Woods.



Archaeological site investigations were completed and concluded that there were no archaeological remains impacted by the proposed mainline alignment, and the alternatives were therefore not taken forward.

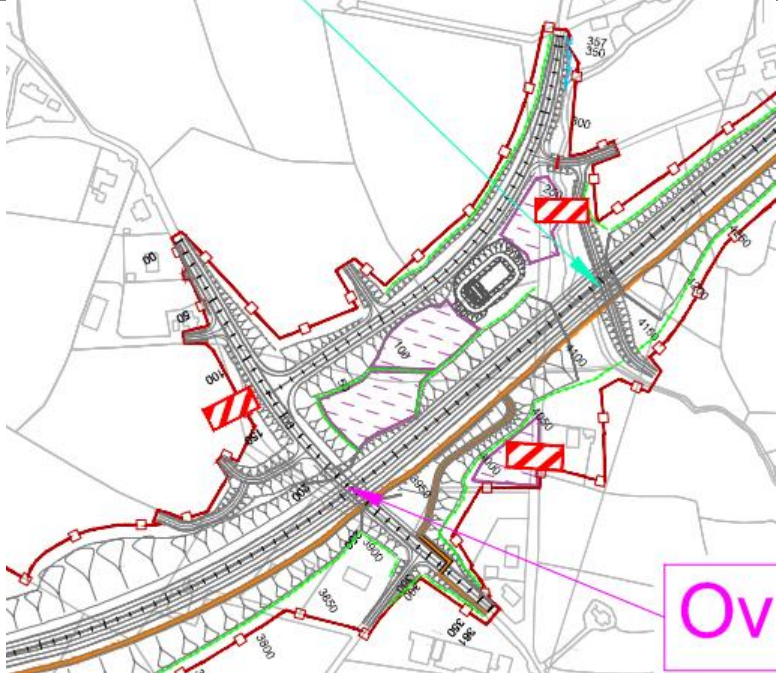
L-2784 Connector and L-2734 Connector at Dunwiley

Alternative arrangements for the L-2784 and L-2734 connector sides road crossing of the mainline examined to optimise the number of road bridges while maintaining satisfactory connectivity of the local road network to reduce impact and costs.



Option A – Provision of two bridges, to retain local road network without any changes. Results in long sections of realigned local road and two road structures resulting in significant impact.

Location	Alternatives Considered (sketches)	Comments
		<p>Option B – Variation of Option A, shortening of the L-2734 realignment, and offline alignment investigated for L-2784 realignment. Results in significant land severance.</p>
		<p>Option C – Provision of one road structure on the heavier used L-2784 and diversion of the L-2734 to use the new road structure. Significant reduction in impact compared to Options A and B, due to the provision of one structure and the avoidance of long sections of realignment of local road.</p>

Location	Alternatives Considered (sketches)	Comments
		<p>Option D – Refinement and development of Option C. Introduction of structure to provide for accommodation underpass and retention of the existing river to the east of the road structure, refinement of alignment to allow access to local land holdings and to Holywell woods.</p>

Location	Alternatives Considered (sketches)	Comments
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L-2724 connector at Dunwiley Alternative arrangements for the L-2724 side road crossing of the mainline examined to:



- Achieve feasible access to dwelling to the east of the side road, while minimising land take
- Reduce visual impact of side road structure and impact on adjacent private land and properties

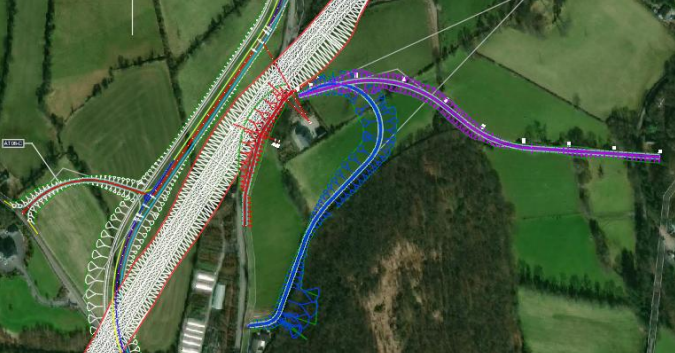
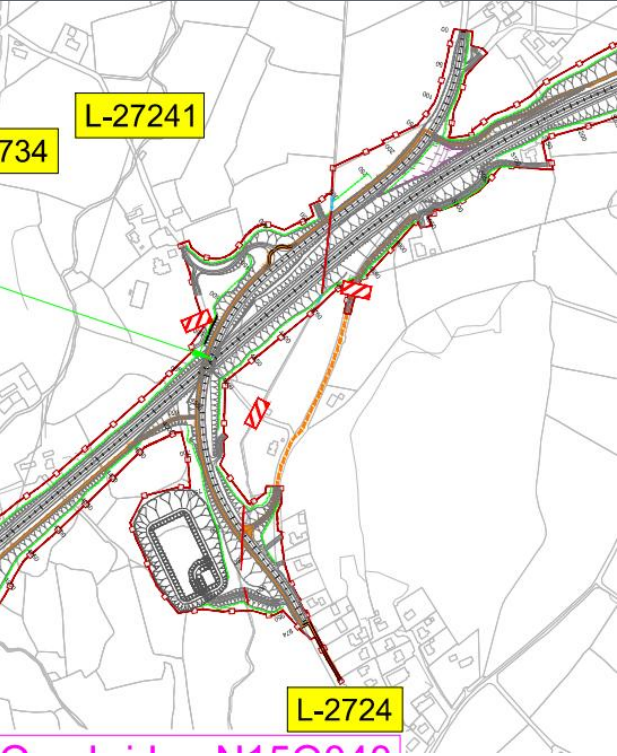



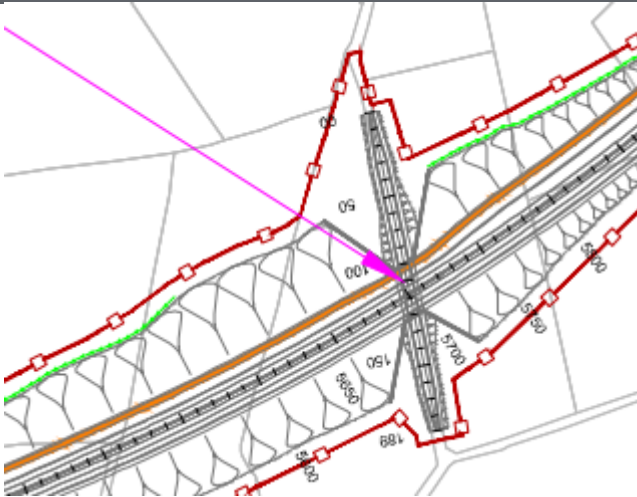
Option A – Proposed accommodation road has high impact on land holding. High visual impact of proposed side road overbridge,



Option B – Alternative route for proposed accommodation road but still has high impact on land holding. High visual impact of proposed side road overbridge,

Location	Alternatives Considered (sketches)	Comments
		<p>Option C – Similar alternative route to Option B for proposed accommodation road but still has very high impact on land holding. High visual impact of proposed side road overbridge,</p>
		<p>Option D – Side Road crossing moved further south and changed from an overbridge to an underbridge, results in significant reduction in visual impact. Alternative route for proposed accommodation road but still has very high impact on land holding.</p>

Location	Alternatives Considered (sketches)	Comments
		<p>Option 5 – Side Road crossing arrangements same as Option 4. Three options shown for access to property. Red option is preferred and provides direct access to property from existing road, although steep gradients will be required. Blue option still has very high impact on land holding and property frontage. Purple option takes access from different road, and is considered unacceptable for reasons of severance from existing neighbours.</p>
		<p>Option 6 – Preferred Option. Refined version of Option 5 using the Red option for access to the property. Direct access from existing side road (that will be closed as a public road). Side road utilises underbridge to reduce visual impact. Access arrangements to other properties refined to reduce impact.</p>

Location	Alternatives Considered (sketches)	Comments
L-7094 Connector	Initial proposals included the provision of an overbridge on the existing side road (unnamed) at Ch 5+700 to retain local road connectivity and access. The existing road is narrow with very little traffic, and alternatives were examined to explore opportunities for cost reduction.	
		<p>Option A - An alternative to the initial proposals included the provision of an overbridge on the provide a shared accommodation road to provide landowners with access instead. (Shown to the west of the proposed side road).</p> <p>This arrangement did not provide the access required and did not result in significant cost savings since the accommodation road bridge was almost as wide as the proposed public road bridge.</p> <p>This option was rejected.</p>
		<p>Option B – the proposals reverted to the initial solution to provide an overbridge for the existing side road, thereby retaining the status-quo in relation to land access.</p> <p>This is the Preferred Option taken forward.</p>

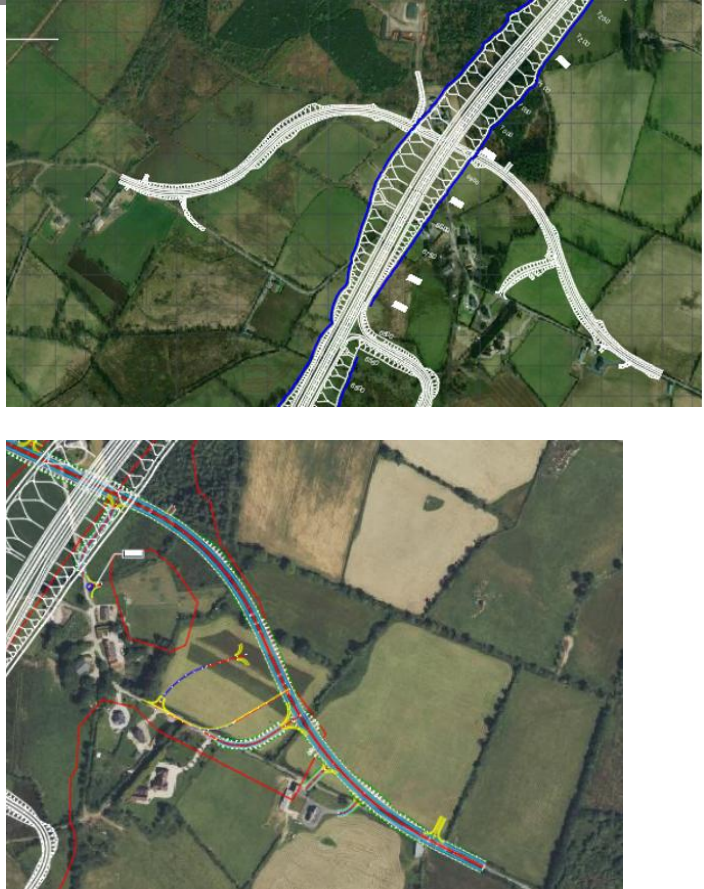
Location	Alternatives Considered (sketches)	Comments
L-7084 Connector Alternative alignment for the L7084 side road to: at Teevickmoy	<ul style="list-style-type: none"> Provide satisfactory alignment to maintain road safety and maintain access to land holdings, at location where existing road has very poor alignment <p>Minimise direct impacts on adjacent properties and land holdings.</p>	

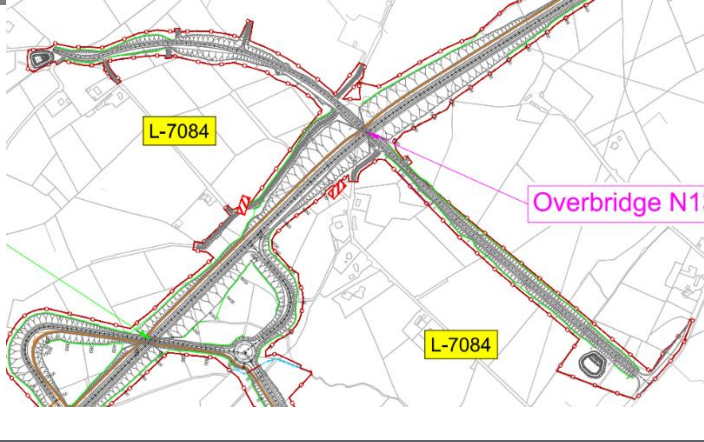





Option A – Side Road overbridge follows the alignment of the existing road, which results in poor geometrical solution, and incorrect prioritisation north of the mainline. Side road south of the mainline passes in between existing farm buildings and properties, on poor alignment. This option is not taken forward as it is sub-standard for a public road.



Option B – Side Road overbridge follows the alignment of the existing road. Improved geometry and correct prioritisation north of the mainline. Side road south of the mainline still passes in between existing farm buildings and properties, on poor alignment. This option is not taken forward as it is sub-standard for a public road.


Location	Alternatives Considered (sketches)	Comments
		<p>Option C – Longer side road alignment with geometry that meets required standards, and side road south of the mainline avoids passing in between existing farm buildings and properties. This solution is considered acceptable, however, there revised tie-in south of the mainline brings the proposed road closer to existing properties that had previously not been impacted.</p> <p>Further sub-options were examined to identify optimum tie in arrangement for the side road to minimise impact to properties.</p> <p>While this option was considered acceptable, it was not taken forward.</p>



Location	Alternatives Considered (sketches)	Comments
		<p>Option D4 – Similar to Option 3 north of the mainline but is realigned to the edge of the land plot to reduce land severance. South of the mainline there is an entirely new side road alignment that terminates at a new junction with the existing N13 (downgraded). This solution meets required standards, avoids impacting existing properties, reduces environmental impact to existing dwellings.</p> <p>The existing L7084 south of the mainline will remain unchanged and will have a connection to the new side road immediately south of the mainline to facilitate access.</p> <p>This option is preferred.</p>
<p>Teevickmoy Junction</p>	<p>The proposed junction of the N15 Primary Road Connector with mainline at Teevickmoy is located on a steep hillside. The variable topography of this location significantly influences the visual impact of the junction, the extent of earthworks required to construct it, and the impact on land holdings. Options were examined to explore ways to reduce earthworks, visual impact and impact on landholdings.</p>	
		<p>Option A – Standards compact grade separated junction configuration. High visual impact on landscape in elevated position. Priority junction provided to allow turning movement to southbound carriageway. Not taken forward for reasons of impact on landscape, impact on landholdings and safety of junction to southbound carriageway on gradient.</p>



Location	Alternatives Considered (sketches)	Comments
		<p>Option B – Standards compact grade separated junction configuration. High visual impact on landscape in elevated position. Roundabout provided to allow turning movement to links. Realigned link to northbound carriageway to improve alignment, however option still has high visual impact due to earthworks. Not taken forward for reasons of impact on landscape and impact on landholdings.</p>
		<p>Option C – Reconfigured compact grade separated junction configuration. Reduced visual impact on landscape than Options 1 and 2. Roundabout provided to allow turning movement to links. Realigned link to northbound carriageway to follow land boundary and reduce visual impact.</p> <p>Preferred option.</p>

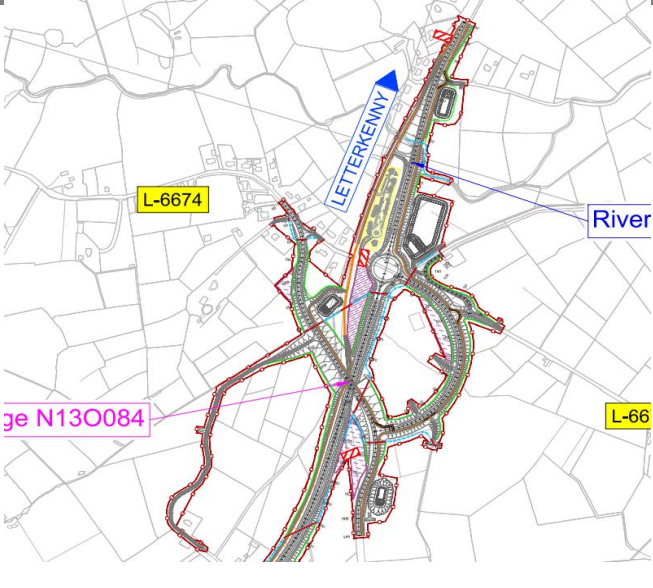
Location	Alternatives Considered (sketches)	Comments
Tircallan Junction	<p>Alternative arrangements for arrangement at N15 Primary Road Connector junction with existing N13 (to be downgraded) at Tircallan to:</p> <ul style="list-style-type: none"> ▪ Reduce direct impact on nearby properties <p>Improve traffic flow on proposed new N15 Primary Road Connector.</p>	<p>Option A – Roundabout provided at junction. Due to the gradient of the proposed N15 Primary Road Connector, the proposed roundabout would be elevated from the existing road and would necessitate elevated approach to the roundabout causing direct physical and environmental impacts on the adjacent properties.</p> <p>Additionally, there will be no segregation between local traffic and strategic traffic which reduces road safety, and interrupts to the traffic flow on the proposed N15 Primary Road Connector.</p> <p>Not taken forward.</p>



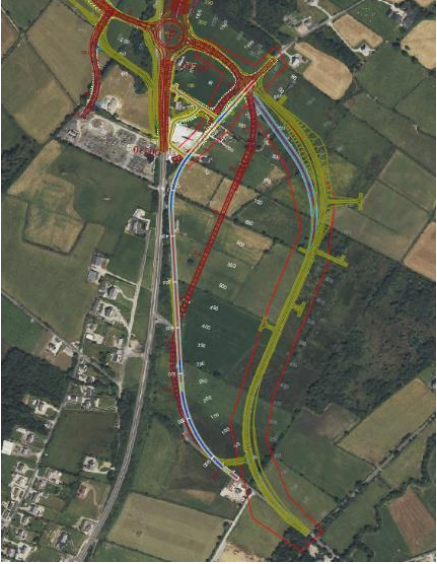

Location	Alternatives Considered (sketches)	Comments
		<p>Option B – compact grade separated junction provided to enable retention of the existing N13 (downgraded) road along its current alignment without incurring direct physical impacts on adjacent properties. Proposed N15 Primary Road Connector is elevated over the existing N13 on an overbridge and retains uninterrupted traffic flow through the junction. Access to the proposed junction is provided via links that are located to minimise impact on adjacent properties and landholdings and exploit the existing natural topography to gain access to the mainline, thus minimising earthworks.</p> <p>This arrangement provides a safer solution by segregating local traffic from strategic through traffic, while enabling access between the two road networks.</p> <p>Preferred option.</p>

Location	Alternatives Considered (sketches)	Comments
Meenavoy Junction	<p>Alternative arrangements for the northern tie-in to the existing N13 were examined to:</p> <ul style="list-style-type: none"> ▪ Improve local connectivity and reduce community severance between Meenavoy, Stranorlar and Raphoe ▪ Improve road safety by reducing the number of direct accesses onto the National Primary Road Network ▪ Improve safety by increasing segregation between local traffic (including vulnerable road users) and strategic traffic 	
		<p>Option A – Direct tie into N13 via proposed roundabout. No separation between local and strategic traffic. Not taken forward for reasons of road safety.</p>
		<p>Option B – Direct tie into N13 via proposed roundabout. Separation provided between local and strategic traffic, although priority movement is provided to minor local road, instead of downgraded N13. Not taken forward for reasons of road safety due to incorrect prioritisation.</p>

Location	Alternatives Considered (sketches)	Comments
		<p>Option C – Similar to Option B, direct tie into N13 via proposed roundabout. Separation provided between local and strategic traffic, although priority movement is provided to minor local road, instead of downgraded N13. Not taken forward for reasons of road safety due to incorrect prioritisation.</p>
		<p>Option D – Direct tie into N13 via proposed roundabout. Provides separation between local and strategic traffic.</p> <p>Preferred option - later revised to provide a through movement between the Meenavoy Road west of the junction and the existing (downgraded) N13. Final arrangement shown below.</p>

Location	Alternatives Considered (sketches)	Comments
	 <p>The map sketch illustrates a road network with several key features: <ul style="list-style-type: none"> A yellow box labeled 'L-6674' is positioned in the upper left quadrant. A blue arrow labeled 'LETTERKENNY' points upwards in the center. A blue box labeled 'River' is on the right side. A yellow box labeled 'L-66' is in the lower right quadrant. A pink box labeled 'ge N130084' is on the left side, pointing to a specific road segment. The sketch shows various road alignments in red, green, and blue, with a central roundabout area. </p>	<p>Final arrangement: Connectivity provided between the Meenavoy Road (L-6674) and the downgraded N13 to facilitate local traffic, with connection to the L-6674 to Raphoe.</p> <p>Local traffic is able to access the proposed mainline via the roundabout but is segregated from the strategic through traffic.</p>

Appendix C5.02 Table 2: Section 2 Key Alternatives for Road Layout

Location	Alternatives considered (sketches)	Comments
L-1064 Connector		<p>Four alternative arrangements for the L-1064 connector considered to provide connection between the existing L-1064 and Proposed N13 national road.</p> <p>These alternatives were examined to improve road safety by removing the number of accesses (two local roads connections and one direct access) onto the National Primary Road Network.</p> <p>Several options were assessed working with landowners to improve access to the N13 and using less favourable land.</p> <p>Option E was selected in the final phase of the design. The decision was based on the geometrics for corresponding design speed and overall least impact on land take.</p>
		<p>Option A – This option was rejected because the geometrics are not suitable for the proposed design speed of the local road and the existing properties are impacted by the alignment. The departures from standards are identified on the geometric design for this option.</p>



Option B – Similar to option A, but smaller ICD roundabout was introduced between L-1064 connector and link road which is connected to proposed mainline roundabout to eliminate sharp curve. This Option was rejected because geometrics are not suitable for the proposed design speed of the local road and the existing properties are impacted by the alignment. The departures from standards are identified on the geometric design for this option.



Option C – This option is similar to option B with slight re-alignment of L-1064 connector. Extended L-1064 connector alignment with geometry that meets required standards without major impact on properties. This solution is considered acceptable however, option is rejected due to alignment severing the agriculture plots. After receiving landowners' feedback - to reduce the land severance, this option was thus rejected. This alignment further shifted to edge of the properties to reduce the land severance in the below alternative option D.



Option D – The Option D alignment further shifted west to the edge of the properties to reduce land severance. This solution meets required standards, avoids impacting existing properties, reduces environmental impact to existing dwellings. This option was the preferred; however, geometrics are further updated to standards considering value engineering in the final option E.

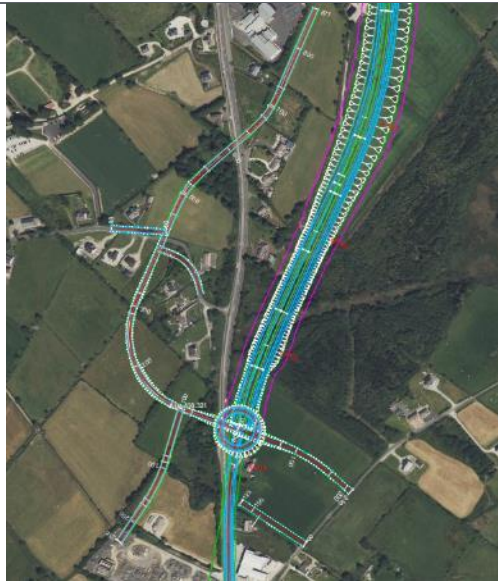


Option E – Preferred option - This is the final design option selected considering the geometrics for proposed design speed, landowners' feedback on the alignment and value engineering.

Connections at Listellian junction Seven alternative arrangements for the L-1094 connector considered to provide connection between the existing L-1094, new proposed roundabout on N13, Lurgybrack school and surrounding property accesses.

Alternative arrangements for the southern junction and L-1094 connector to the existing N13 were examined to:

- Improve local connectivity and reduce community severance between Local Road, school access and property access roads.
- Improve road safety by removing the number of direct accesses onto the National Primary Road Network.



Option A – The proposed road to the school (access to back side of school) was connected directly to the proposed Listellian junction to give priority to the school traffic. The local road L-1094 connected to proposed school road with a priority junction.

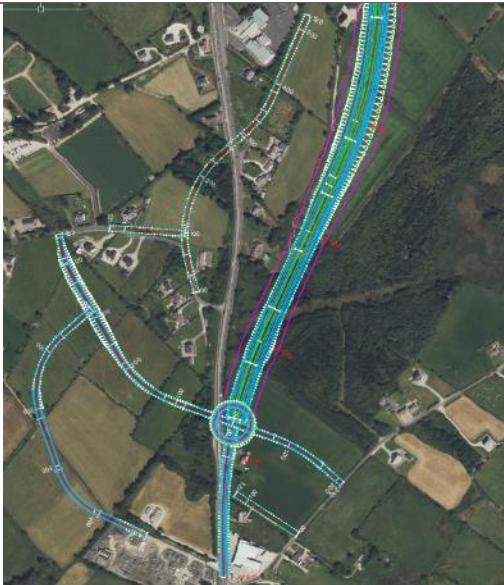
This option had least impact on to the properties however, this option was rejected due to obstruction of priority movement for local road L-1094. The local road traffic has to travel long distances and pass through the priority junction; hence the school traffic was obstructing the local road L-1094 traffic. The staggered junctions was formed on new school road - which is a departure from standard. Several geometric departures are identified in this option.

The other below alternative options were considered to improve the connectivity.



Option B – The proposed road to the school was connected to the proposed Listellian junction to give priority to the school traffic and tie-in to existing N13 (to be downgraded) in front of the school. The local road L-1094 connected to proposed school road with a smaller ICD roundabout. This option was rejected due to:

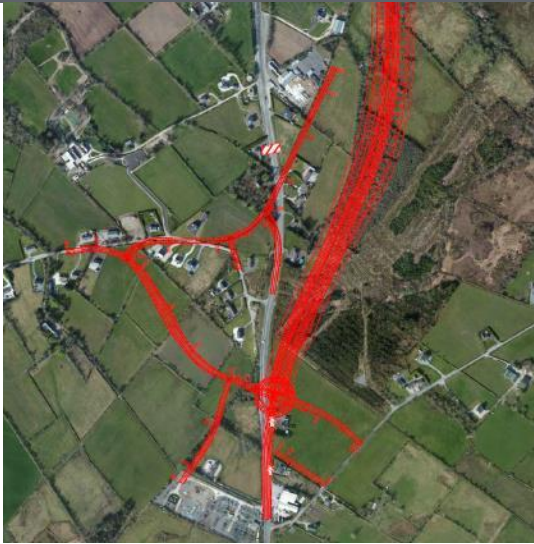
- No priority movement for local road L-1094 traffic, the local road traffic has to pass through the roundabout with a longer distance.
- The proposed smaller ICD roundabout on the new local road was impacting the existing properties. The property accesses are very close to the roundabout and considered as departure from standard.
- For access to properties between proposed N13 and new school road required to travel long distance from the smaller ICD roundabout.



Option C – L-1094 connector proposed to provide connection between the existing L-1094, new proposed roundabout on N13. A priority junction formed between existing local road L-1094 and new L-1094 link road. The existing local road L-1094 connected to new school access road (access to back side of school) with another priority junction.

This option was less impact on to the properties however, this option was not preferred due to:

- No priority movement for local road L-1094 traffic, the local road traffic has to pass through the priority junction. Hence, through movement for local road obstructed by the priority junction.
- There are two priority junctions introduced in this option which leads to long diversions for some of the properties and school traffic.



Option D – L-1094 link road proposed to provide connection between the existing L-1094, new proposed roundabout on N13. The L-1094 link road aligned to existing local road L-1094 by allowing through movement for local road traffic. The priority junction provided between new L-1094 link and new realigned school road (access to back side of school).

Although priority movement is provided to local road L-1094 traffic, this option was rejected due to:

- school traffic has to travel long distance to access from mainline.
- Priority junction arrangement and diverted school road has greater impact on the existing properties.



Option E – L-1094 link road proposed to provide connection between the existing L-1094, new proposed roundabout on N13. A priority junction formed between existing local road L-1094 and new L-1094 link road. The existing local road L-1094 connected to downgraded N13 (access to back side of school) with another priority junction.

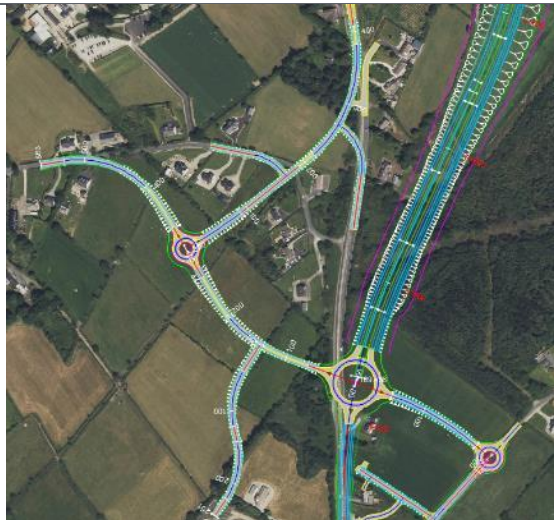
This option was less impact on to the properties however, this option was not preferred due to:

- No priority traffic movement for local road L-1094 traffic, the local road traffic has to pass through the priority junction. Hence, through movement for local road obstructed by the priority junction.
- There are two priority junctions introduced in this option which leads to long diversions for some of the properties and school traffic.

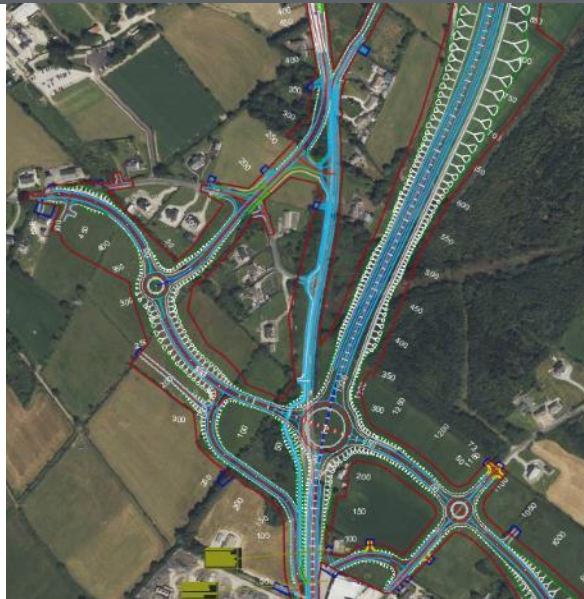


Option F: L-1094 link road proposed to provide connection between the existing L-1094, new proposed roundabout on N13. The L-1094 link road aligned to existing local road L-1094 by allowing through movement for local road traffic. The priority junction provided between new L-1094 link and new realigned school road (access to back side of school).

This solution is considered acceptable design by providing priority movement for local road L-1094 traffic with shorter distance to school traffic. However, due to the proposed priority junction the travel time for school greater compared to preferred option-H at peak hour as shown below. Hence, not considered as preferred option.

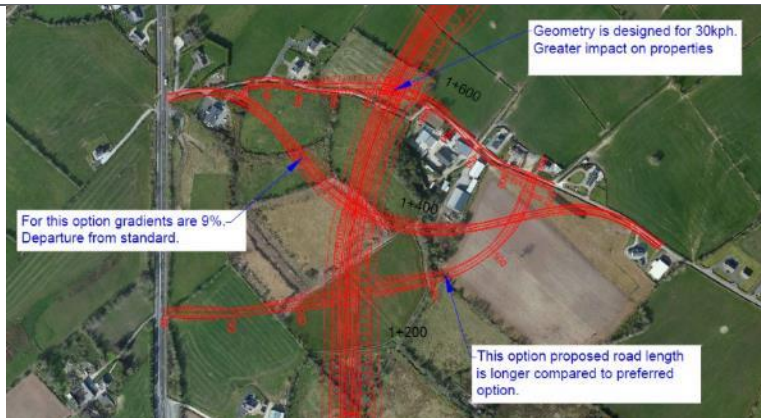


Option G: The option-F further developed with providing smaller ICD roundabout for free traffic flow for local road, access road to school and surrounding properties.



Option H: Preferred option - Same as option-H with improved geometry and residents access connections. This is the final design option selected considering the local road through movement, school access road connectivity, travel distance, property accesses, geometrics and impact on the properties.

L- 5784
Realignment
and
South of Dromore



Five alternative arrangements for the L-5784 Realignment Road considered to provide connection between the existing L-5784 and downgraded existing N13 to retain the local road connectivity and accesses. These alternatives were examined to improve road safety and existing local road poor alignment.

The option F was selected in the final phase of the design. The decision based on the geometrics for corresponding design speed and overall least impact on existing properties.



Option A: North alignment – The local road overbridge follows the alignment of existing road with slight re-alignment which results in poor geometrical solution. The local on either side of the proposed mainline passes in between existing farm buildings and properties, on poor alignment. This option is not taken forward as it is sub-standard for a public road and greater impact on existing properties.

Option B: South alignment – L-5784 Re-alignment Road proposed to provide connection between the existing L-5784 and downgraded N13. A priority junction formed between existing local road L-5784 and new re-alignment road.

This option was less impact on to the properties however, this option was not preferred due to no priority movement for local road traffic and the junction formed opposite to the existing property accesses which leads to safety issue.



Option C and D: These two options were rejected due to the gradient are not with in the acceptable limits.



Option E – Eliminated the Overbridge crossing, and the local road diverted parallel to mainline. This option not preferred due to travel lengths and steep gradient. The local traffic needs to travel long distance to cross mainline and to access the town.

This option was less impact on to the existing properties however, this option was not preferred due to:

- Longer the length of the re-aligned road and steep gradients.
- Increased traffic load on L1114 local road which leads to traffic congestion on proposed bridge on L1114.
- Sharp horizontal curve at tie-in which required more land to provide full visibility to avoid departure.



Option F – Preferred option – This option was selected as the preferred design to minimise the impact on the existing properties, provide local road connectivity with standard geometrics considering activate travel connections.

South of Dromore Five alternative arrangements for the access road considered to maintain the local connectivity and property accesses.

The option F was selected in the final phase of the design. The decision based on the geometrics for corresponding design speed and overall least impact on existing properties.



Option A - Initial proposals included the provision of an overbridge on the existing side road at Ch 2+050 to retain local road connectivity and access. The existing road is narrow with very little traffic. This option was rejected due to:

- Gradient is not within the acceptable limit (9% gradient).
- Required visibility not achieved for accesses.
- Impact on existing properties.

The alternatives were examined to explore opportunities for cost reduction to provide connectivity without bridge requirement.



Option B - An alternative to the initial proposals included the provision of an overbridge with modified tie-ins to check the possibility of alternative design. This option was rejected due to sub-standards geometrics on alignment curvature, gradient and visibility.

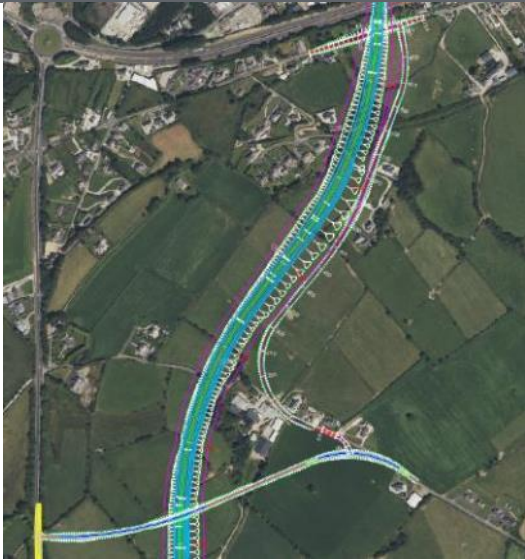
The other alternatives were examined to explore opportunities for cost reduction to provide connectivity without bridge requirement in the below options.



Option C - An alternative to the initial proposals without the provision of an overbridge considered in this option. To provide local connectivity between either side of the properties of proposed mainline the below alternative options were examined.

The connectivity provided for the properties on east of mainline by proposed access road which is aligned to existing local road (L-5784) and extended up to L-1114 local road on north side. This alignment was not preferred due to

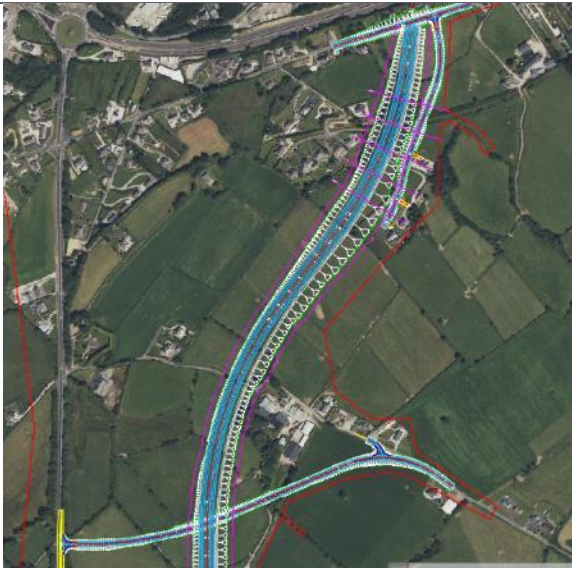
- The sharp curve which is impacting the properties at tie-in (to local road L-5784) and high impact on land holding.
- Travel length and time significantly long to access the properties on other side of the mainline.
- Steeper gradient on proposed access road.



Option D - An alternative to the initial proposals without the provision of an overbridge considered in this option. To provide local connectivity between either side of the properties of proposed mainline the below alternative options were examined.

The connectivity provided for the properties on east of mainline by proposed access road which is aligned to existing local road (L-5784). This alignment was not preferred due to

- The length of the new access road significantly more which leads to increase in cost.
- The sharp curve which is impacting the properties at tie-in (to local road L-5784) and high impact on land holding.
- Steeper gradient on proposed access road.



Option E – This is an initial preferred option which is selected based on the impact on the properties, travel length, connectivity and geometrics. However, this option further developed with improved geometrics, access gradients and landowner feedback which is shown below.



Option F – Preferred option – Same as option E with the minor modifications which includes:

- Priority junction moved away from proposed bridge on L-1114.
- Alignment modified to provide acceptable gradients to the access road and dwelling accesses.

Trimrugh Junction Alternative arrangements for the Trimrugh junction connecting the mainline examined based on existing topography, geometric standards, impact on properties, local road connections and dwelling accesses.

The initial alternatives developed with two different scenarios.

- Trimrugh link road with Underbridge
- Trimrugh link road with Overbridge



Option A - Proposed Underbridge – This option was developed with underbridge for proposed Trimrugh link road. This option was rejected due to:

- Steep link road gradient, difficult to achieve flatter roundabout approach gradient
- Significant impact on south and west of existing properties due to high cutting.
- Difficult to provide accesses to existing properties near southern roundabout.
- Shifting of Trimrugh link road and connector roads towards east will leads to high cuttings on all connected roads.



Option B – Proposed Underbridge – This option was developed to reduce the impact on property on west by changing the southern connector road towards east and arranged the local road connections with proposed roundabout. A separate access road provided for existing properties on south. This option was rejected due to:

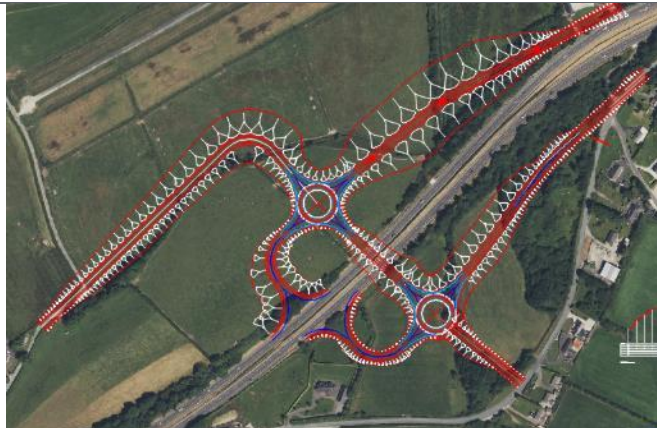
- Steep link road gradient of 7%, difficult to achieve flatter roundabout approach gradients to roundabouts on either side of the link road.
- This option was reduced the earthwork cutting and impact on to existing properties on southern roundabout compared to option A. However, additional access road required to provide access to properties which will significantly impact on existing properties.
- Southern connector road formed a junction with mainline after the sharp curve on existing N13, which leads to visibility issues. The sight

distance cannot be achieved without acquiring additional land on N13 sharp curve location to provide full junction visibility. However, this area is constrained by Archaeological features.



Option C - Proposed Underbridge – This option was developed to reduce the impact on properties on south by changing the roundabout location. This option was rejected due to:

- Steep link road gradient, difficult to achieve flatter roundabout approach gradient
- Significant impact on west of existing property.
- There is no direct connection for local road L- 1154 to southern roundabout. Local road traffic needs to travel long distance through the exiting road to access Trimrugh junction.
- The southern proposed roundabout very near to existing properties.



Option D – Proposed Overbridge – As the Trimrugh link road under bridge option was not considered as workable design solution, the alternative overbridge options were examined. This option was developed to avoid high cuttings on south of mainline near the properties and to provide acceptable geometrics. The gradients for proposed overbridge options are within the acceptable limits, the roundabouts slightly adjusted and moved closer to mainline to avoid impact on existing properties.

This option was less impact on to the properties however, this option was not preferred due to no priority movement for local road traffic on south and the priority junction formed opposite to the existing property accesses which leads to safety issue. The south connector road alignment significantly impacted the property on west.



Option E – Proposed Overbridge – This option same as option D with slight modification to local road L-1154 connection which was connected to another local road using existing local road route.

This option was less impact on to the properties however, this option was not preferred due to no priority movement for local road traffic and substandard geometry of existing alignment. Local road L-1154 traffic needs to travel long distance through the existing road to access Trimrugh junction. The south connector road alignment significantly impacted the property on west.



Option F - Proposed Overbridge – This option same as option D with slight modification to local road L-1154 connection which was aligned and connected directly to southern roundabout.

This option was preferred as compared to option D and option E as the local road connection provided directly to southern roundabout. However, this option was not preferred due to:

- Geometry of the local road is on sharp curve which leads to visibility issue
- Property on south significantly impacted by the alignment
- The south connector road alignment significantly impacted the property on west.



Option G – Proposed Overbridge – Considering all the disadvantages from the above options, a standard preferred option was developed considering geometric standards, impact on existing properties and connectivity.

This option was modification of option F considering below:

- Trimrugh link road and all corresponding connection roads slightly shifted towards east to avoid any major impact on west of the property.
- Improved geometry of the local road L-1154 and connected directly to the proposed roundabout.
- Accesses to dwellings on south maintained from existing road.

This option further modified as final design option as shown below.



Option H – Preferred Option – This option same as option G with the minor changes which includes:

- Provision of active travel facility on local road north of mainline
- Further reduced the southern connector road impact on the property on west.
- Considering all the standard geometrics

Bonagee Eight alternative arrangements for Bonagee surrounding side roads were developed to provide connection between proposed mainline and junctions, link and properties/developments within the Bonagee parcels.
connector roads

These alternatives were examined to improve connectivity, road safety and existing local road poor alignment considering impact on properties, SAC constrains, active travel facility and surface water drainage.

The option I was selected in the final phase of the design. The decision based on the local connectivity, geometrics for corresponding design speed, drainage considerations, SAC constrains, overall least impact on existing properties and land take.



Option A- At grade junctions on mainline - This option was developed to provide local connection from mainline to surrounding commercial developments. New side roads were developed on both sides of proposed Bonagee link and connected to mainline with Left-in/Left-out junctions.

The side road on west connected to existing local road L-11142 with a priority junction and the side road on east connected to L-11141 with a priority junction. A new underbridge was proposed at the crossing point of mainline NX-2000 Link and L-11141 to retain the local road connection and aligned to Trimrugh junction. The local road L-11142 was realigned with new underbridge at the location of mainline River Swilly link crossing. This option was rejected due to:

- weaving issues identified between left-in/left-out junctions with either side of roundabouts.
- The re-aligned local road L-11142 significantly impacted on to the existing development.
- To provide underbridge for local road L-11141, the proposed alignment required significant cutting to provide vertical clearance hence, the proposed road development significantly impacted the surrounding existing properties.



Option B: At grade junctions on mainline – This option is the same as the option A with small modifications as stated below:

The side road on east connected to L11141 with a smaller roundabout to provide priority to local traffic. The local road L-11142 alignment modified by reducing the impact on the existing development. This option was also rejected due to:

- weaving issues identified between left-in/left-out junctions with either side of roundabouts.
- The re-aligned local road L-11142 identified visibility issues on sharp curves.
- Proposed small roundabout slightly impacted the properties.
- To provide underbridge for local road L-11141, the proposed alignment required significant cutting to provide vertical clearance hence, the proposed road development significantly impacted the surrounding existing properties.



Option C- At grade junctions on mainline – This option is the same as the option B with small modifications as stated below:

The local road L-11142 alignment modified by reducing the impact on the existing development on north of mainline and provided with required visibility. This option was also rejected due to:

- Same as mentioned in Option B.
- Required longer underbridge structure for local road L-11142.
- Additional existing property impacted on south of mainline due to re-aligned local road L-11142.



Option D- At grade junctions on mainline – This option is the same as the option C with small modifications as stated below:

The local road L-11142 re-alignment from back of existing properties and reduced the impact on the existing developments on south of mainline. The re-aligned local road L-11142 connected with proposed roundabout. This option not considered as preferred option due to:

- Same as mentioned in Option B.
- Required longer re-alignment of local road L-11142 which resulting in higher land take.
- Surrounding SAC constrains.



Option E – Proposed underbridge – To eliminate weaving issues in Bonagee link road underbridge was proposed to connect the commercial developments, local road L-11141 and further to Trimrugh junction for mainline access. This option was not considered as preferred option due to:

- No direct connectivity to surrounding mainlines from proposed side roads. The local traffic needs to travel long distance to access mainline from Trimrugh junction.
- To provide underbridge for local road L-11141, the proposed alignment required significant cutting to provide vertical clearance hence, the proposed road development significantly impacted the surrounding existing properties.



Option F – Proposed underbridge – This option same as option E with addition of new connector road between proposed Bonagee roundabout and local road L-11141 to provide acceptable connectivity between mainline and side roads which are proposed for commercial developments.

This option was not considered as preferred option due to:

- No direct connectivity to surrounding mainlines from proposed side roads. The local traffic needs to travel long distance to access mainline from proposed connector road.
- To provide underbridge for local road L-11141, the proposed alignment required significant cutting to provide vertical clearance hence, the proposed road development significantly impacted the surrounding existing properties.



Option G – Proposed underbridges – With considering the option F as base this option was further developed to provide connectivity between commercial developments and mainline without travelling long distance to access mainline. The proposed bridge shown in above options at local road L-11141 was removed to reduce the impact on existing properties by closing the access on both sides.

The side road was proposed between new connector road and local road L-11142 with two new underbridges running below mainlines. There are two smaller ICD roundabouts formed in which one is at connector road and other is at local road L-11142.

This option is the initial preferred option however, alignments further modified in the below options to reduce the impact on properties and land take.



Option H – This option is the same as option G with minor modifications to reduce the impact on properties and land take.

The alignment of the proposed side road between connector road and local road L-11142 shifted north to reduce the impact on properties and land take. This re-aligned side road connected to local road L-11142 with a priority junction to reduce the impact on properties and land take.



Option I - Preferred option – Same as option H with minor changes to connector road between proposed Bonagee roundabout and local road L-11141. This connector road further shifted towards north to avoid property severance with greater embankments to avoid flooding.

The side road on the east of Bonagee link road slightly shifted towards west to achieve drainage gradients.

This is the final design option is selected based on the local connectivity, geometrics for corresponding design speed, drainage considerations, SAC constrains, overall least impact on existing properties and land take.

Ballyraine Roundabout Three alternative arrangements for Ballyraine roundabout and approach roads were examined to improve road safety, local connectivity, property access provisions and geometrics

The option D was selected in the final phase of the design.



Option A- This option was the initial design option developed without major impacting on the adjacent existing properties. However, this option not considered as preferred due to:

- The access arrangements for properties/developments on all the approaches are very close to roundabout which leads to safety issue (it includes access for Ballyraine estate on south and fuel station on north).
- Equal impact on all surrounding properties to roundabout
- Departures are identified on the geometrics
- Design of NMU facility not considered.



Option B - Roundabout was further shifted to west side to reduce the impact on the north- east and south-east properties. Realigned the roundabout subjected to acquisition of north-west property.

The access to properties were closed which are near to roundabout on approaches. Access to Ballyraine estate given from the south of Ramelton road. This option was rejected due to following reasons:

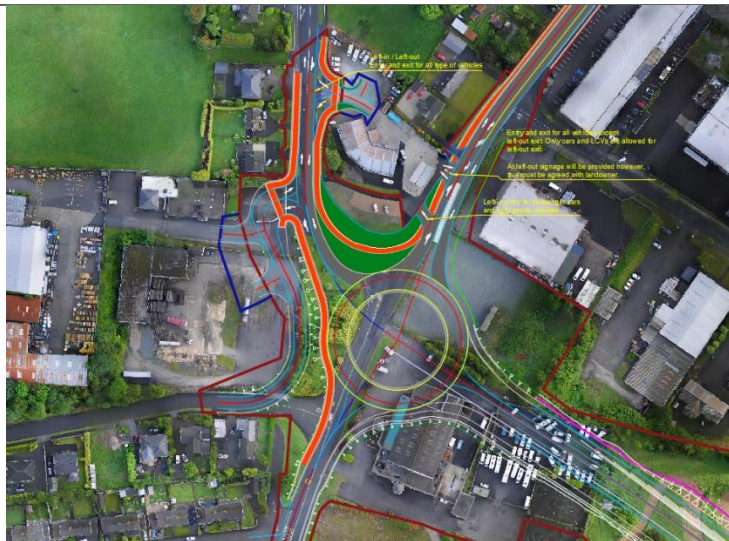
- Access road gradients to Ballyraine estate not within acceptable limits. To provide access to Ballyraine estate it is required to acquire other landowners' property which is not feasible.
- Fuel station at north-west largely impacted and not possible to operate the business.



Option C - Roundabout was shifted towards south to avoid any impact on fuel station on north-west property.

The access to properties were closed which are near to roundabout on approaches. Access to Ballyraire estate given from the south of Ramelton road. This option was rejected due to following reasons:

- Access road gradients to Ballyraire estate not within acceptable limits. To provide access to Ballyraire estate it is required to acquire other landowners' property which is not feasible.
- Access entry and exits are not considered for fuel station which leads to safety issue.



Option D – Preferred Option - Roundabout design is the same as option C with small design modifications which include the approaches and access road arrangements are modified considering road safety, traffic circulation and connectivity.

The Ballyraire estate access road provided from the north arm of the roundabout with left-in/left-out and fuel station entry and exit arrangement provided considering safety.

South of Dry Arch
near School

(Existing N13)



Option A – The through movement for downgraded N13 was closed by providing cul-de-sacs near the school. The access to school maintained from both the sides with U-turn facility. This option was not preferred due to:

- NMU provision not considered
- Impacting existing parking's on north of school
- Drop-off facility not considered
- No parking facilities on south of school



Option B – The through movement for downgraded N13 was closed by providing cul-de-sacs near the school. The access to school maintained from both the sides with U-turn facility. The parking arrangement on north of school retained and Vehicle drop-off and NMU facility provided on other direction on north of school. This option was not preferred due to:

- Additional land take on other landholding
- Entry and exit arrangement for existing parking not safe
- Drop-off facility considered however, this facility away from school
- No parking facilities on south of school

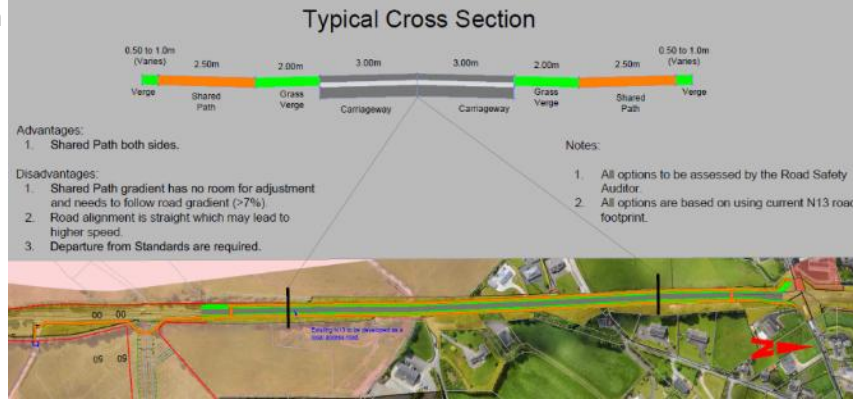


Option C – The through movement for downgraded N13 was closed by providing cul-de-sacs near the school. The access to school maintained from both the sides with U-turn facility. The drop-off facility and NMU facility provided on north of school however, this option was rejected due to the existing parking's significantly impacted.



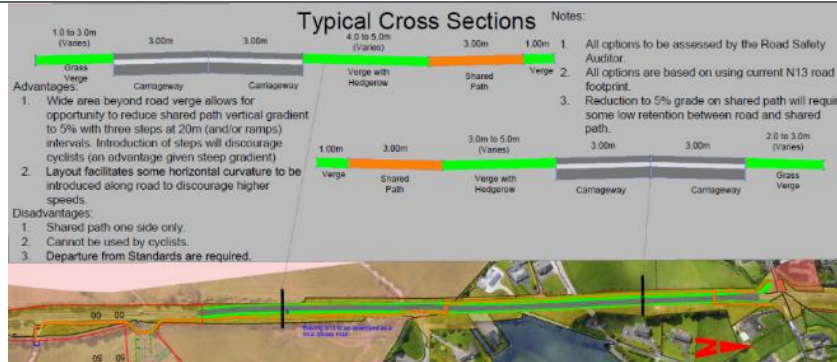
Option D – Preferred Option - The through movement for downgraded N13 was closed by providing cul-de-sacs near the school. The access to school maintained from both the sides with U-turn facility. This is the preferred option developed by considering existing parking arrangement, drop-off facility, access arrangements and NMU facility on both sides of school.

South of Dry Arch
(Downgraded
N13)




Option A – The width of the existing road reduced to local road standards and provided with NMU facility. In this option NMU provision provided on both sides of the road with a minimum separation distance.

This option was not preferred due to the existing gradients not with in the acceptable limits. The large separation distance required in order to provide slopes and steps.

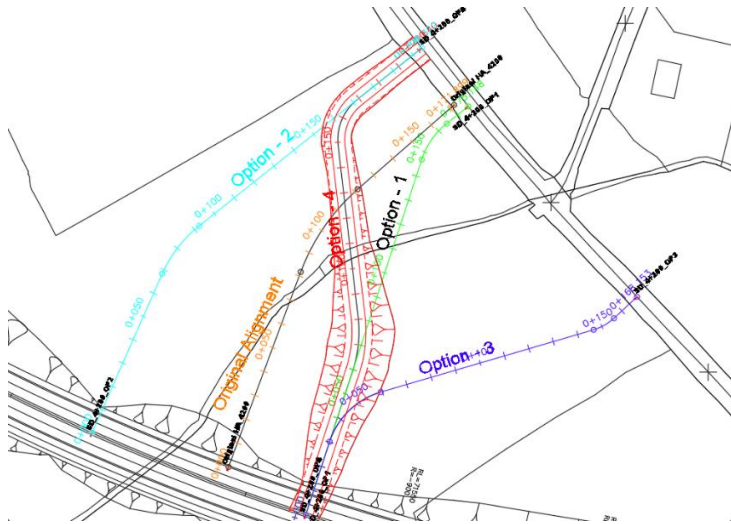


Option B – Preferred Option - The width of the existing road reduced to local road standards and provided with NMU facility. In this option NMU provision is provided on one side of carriageway with adequate separation distance.

Appendix C5.02 Table 3: Section 3 Key Alternatives for Road Layout

Location	Number of Alternatives considered (sketches)	Comments
<p>3+600</p> 	<p>Original</p>	<p>The alignment satisfying the horizontal and longitudinal geometric standards, there will be no need for further cut and fill as it is designed flat</p>
	<p>Options 1-3</p>	<p>The proposed Option 2 alignment have the high longitudinal gradient is about 6.5%. The proposed Option 3 alignment have the high longitudinal gradient is about 7.0%. Proposed Alignments option 1 to option 3 side road should be in cutting to get the clearance from the main road.</p>
	<p>Option 4</p>	<p>The proposed 6.5% longitudinal gradient is high on this section. To get the clearance from the main road, the proposed side road should be cutting.</p>
	<p><u>Option 5</u></p>	<p>Shorter than the Original proposed alignment by approximately 85m. The proposed alignment reduces the construction cost. There is no impact on the existing properties. The land acquisitions on west side will be minimised. The proposed 5.0% longitudinal grade is satisfying the standards and quite less compared to the other options.</p>

4+200



Original The distance between the link road and main line is very less it results the steeper longitudinal gradient (steeper gradient is a departure from standard). The earth work filling is more approximate 3.7m.

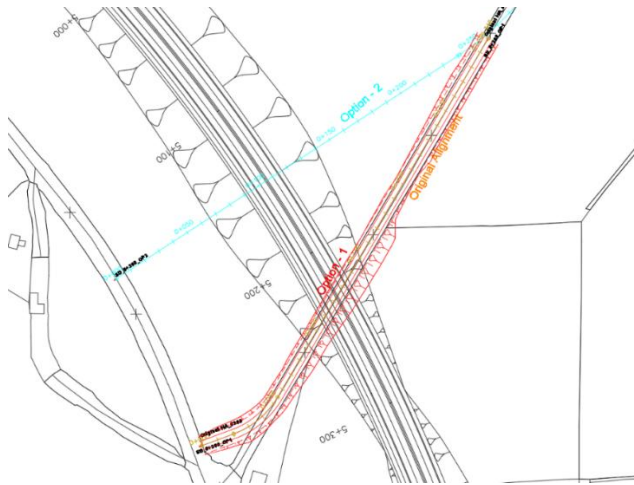
Option 1 Steeper Gradient but it's in the limit.

Option 2 The earth work cutting, and filling is more.

Option 3 Steeper Gradient but it's satisfying the standards. Left / Right Staggered junction is a departure from standard.

Option 4 To get more reliable longitudinal gradient in between the shorter distances the length of alignment should be large.
Less cutting & filling as compared with the original proposal.
Right / Left staggered junction is preferable.

5+300

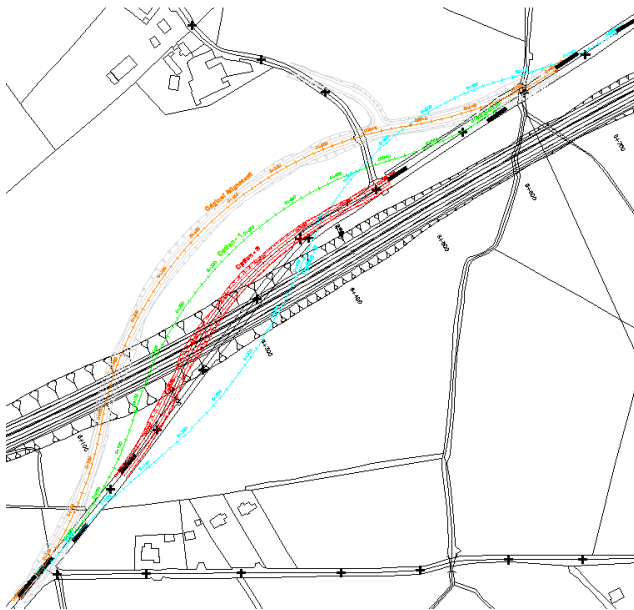


Original Huge vertical difference between the existing road and the proposed road.
Construction cost will be more.

Option 1 Satisfying the design standards.
Shorter in length.
Construction cost is economical.
Cutting and filling of the earth work will be balanced.
Avoiding the existing properties.

Option 2 Deep in cutting.
Long in length leads to high the construction cost.
Proposed alignment meets at the bend in the existing road.

6+400



Original Land acquisitions problem
Larger radius leads to designed away from the existing alignment.
Larger in length and construction cost will be high.
Disturbing the existing junction combination.

Option 1 Larger radius leads to designed away from the existing alignment.
Required more land.
Disturbing the existing junction combination.

Option 2 Disturbing the existing junction combination.
Required land on either side of the main road.
Larger in length and construction cost will be high.

Option 3 Shorter in length (Approx.396m).
Construction cost is economical.
Avoiding the junction re-design.
Near and following the existing road.
Minimising the land acquisitions.

10+300

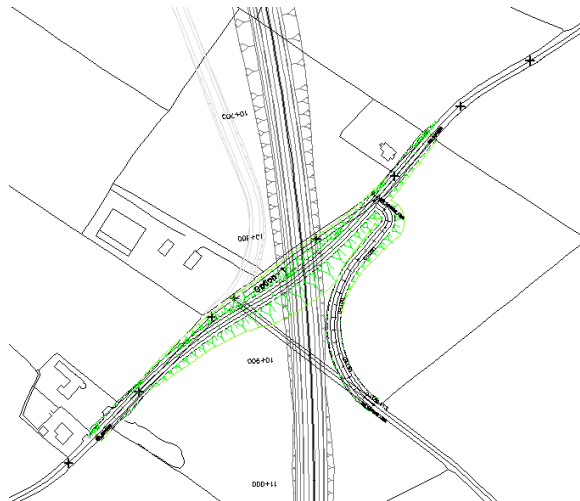


Original Conflicting with the existing features.
Land acquisition problem.
Larger in Length and its directly related with cost.

Options 1-3 Filling is more.
Conflicting with the existing features.

Option 4 Minimising the conflicts with the existing features.
Shorter than the original proposed alignment.
More reliable than the original alignment in compared with land acquisition and construction cost.
Minimising the cut & fill balance.

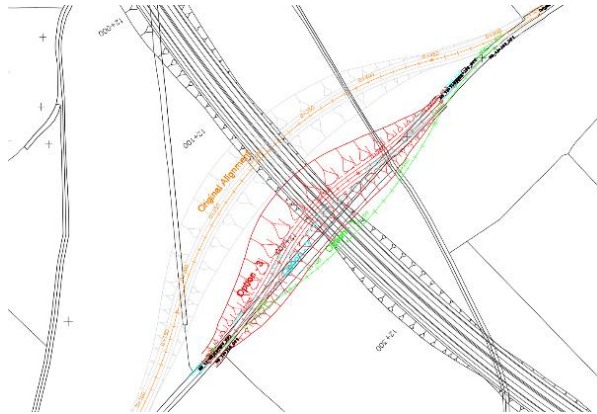
10+800



Option 1 Geometric parameters are designed as per standards.
Minimising the conflicts with the existing properties.

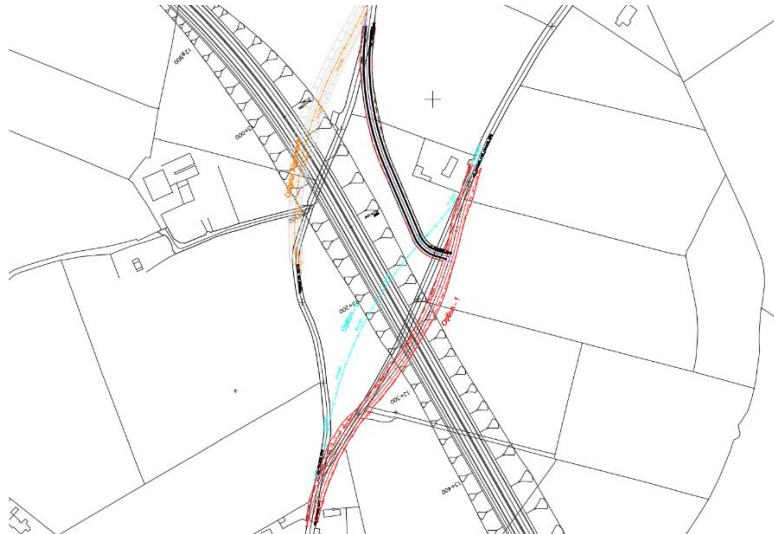
Link Road Access to the farm.

12+300



Original	Conflicting with the existing properties. Land acquisition problem. Alignment is impacting the more land.
Option 1	Designed alignment is away from the existing road. Required more land.
Option 2	Alignment is parallel to existing and it creates difficulties at the construction time.
<u>Option 3</u>	Shorter in length No conflicts with the existing features. Construction cost is economical. Parallel to the existing road. Minimised the alignment footprint.

13+300



Original	Difficult to tie-in with the existing property entry.
<u>Option 1</u>	Balancing the cut & fill. Parallel to the existing road. Avoiding the existing properties. Easy to link with the other parallel road.
Option 2	Conflicting with the existing building. Cut & fill will be more as compared with the option 1.
Link Road	No conflicts with the existing properties.