

N52 TULLAMORE TO KILBEGGAN LINK - OPTION SELECTION REPORT - VOLUME F APPENDIX F9A

Option Selection Report

**Volume F – Environmental Appendices
Appendix F9A – Water (Hydrology)**

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1 INTRODUCTION

This report outlines the comparative assessment of options in relation to hydrology for the seven options for the N52 Tullamore to Kilbeggan Link Scheme. The options include a management option which consists of maintaining the current N52 route with relatively minor upgrade works. This assessment will form part of a Phase 2 – Option Selection Report, which is a deliverable under Phase 2 – Options Selection of the TII PMG 2019. The purpose of the Option Selection Report is to present the project constraints and the assessments that were undertaken in order to identify the Preferred Option for the project.

This report assesses the impact of each option shortlisted for Stage 2 from a hydrology perspective. Specifically, the report evaluates the potential impacts on any of the following with the operation of each of the options:

- Water Framework Directive status;
- Risk to that status;
- Nutrient sensitivity;
- Protected areas; and
- Flooding potential.

The impacts for each of the options are identified so that those with unacceptably high levels of impact can be avoided to the extent feasible as part of the overall option assessment process.

A comparative assessment of each route was carried out to assess potential impacts in relation to hydrology. This assessment has been undertaken in accordance with “Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes” (NRA, 2008¹) and has had regard to the TII MCA Guidelines (TII, 2016²). A route corridor with an overall width of 500m was applied to each route option, as recommended in the TII Guidelines for Assessment of Hydrology for National Road Schemes. The criteria for determining the importance for each hydrological attribute is detailed in **Table 1-1**, sourced from the TII Guidelines.

Table 1-1: Rating Criteria for Hydrology Attributes (NRA, 2008)

Importance	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international scale	River, wetland or surface water body ecosystem protected by EU legislation e.g. SAC, SPA, salmonid waterbody
Very High	Attribute has a high quality or value on a regional scale	Regionally important potable water source supplying >2500 homes Flood plain protecting more than 50 residential or commercial properties from flooding
High	Attribute has a high quality or value on a local scale	Locally important potable water source supplying >1000 homes Flood plain protecting between 5 and 50 residential or commercial properties from flooding
Medium	Attribute has a medium quality or value on a local scale	Local potable water source supplying >50 homes Flood plain protecting between 1 and 5 residential or commercial properties from flooding
Low	Attribute has a low quality or value on a local scale	Local potable water source supplying <50 homes Flood plain protecting 1 residential or commercial property from flooding

¹ NRA, 2008. Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Projects. National Roads Association.

² TII, 2016. Multi-Criteria Analysis (MCA). Transport Infrastructure Ireland (TII) Publications.

The significance of an impact is defined by first considering the importance of the attribute impacted upon and secondly the magnitude of the impact. The importance of hydrological attributes (rating criteria) are defined in accordance with the NRA Guidelines.

1.1 Guidance

This analysis was undertaken by means of a desktop assessment based on the following guidance and information sources:

- GeoHive – <https://www.map.geohive.ie>;
- Geological Survey of Ireland (GSI) - <https://www.gsi.ie/>;
- Catchment mapping (<https://www.Catchment.ie>);
- Environmental Protection Agency (EPA) - <http://gis.epa.ie/Envision>;
- Office of Public Works (OPW); www.opw.ie and www.floodinfo.ie for flooding information;
- Met Éireann (www.met.ie) for historic rainfall and evapotranspiration data;
- National Parks and Wildlife Services (NPWS) <http://webgis.npws.ie/npwsviewer/> for designated sites;
- Transport Infrastructure Ireland (TII) “*Project Appraisal Guidelines for National Roads Unit 7.0 - Multi Criteria Analysis*” (2016);
- National Roads Authority (NRA)/TII “*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Projects*” (2008); and
- UK Highways Agency “*Design Manual for Roads and Bridges, Volume 11, Section 3, Road Drainage and the Water Environment*” (2007) and the updated LA113 (2020³).

An assessment of the impact on the hydrological constraints was undertaken for the options in accordance with the NRA guidelines (NRA, 2008) and the TII MCA Guidelines (TII, 2016). The documents provide guidance on the assessment procedures utilised for hydrology in the option selection process and provide guidance on the assessment of hydrological impacts during the planning and design of national road schemes in Ireland.

1.2 Project Appraisal Guidelines Requirements

The TII “*Project Appraisal Guidelines for National Roads Unit 7.0 - Multi Criteria Analysis*” (PAG) states the following should be considered in the route corridor selection for a Stage 2 appraisal of hydrology:

“The TII Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes is also the basis for measuring hydrology impact in the MCA. It expands on references to soil and water contained in the NRPMG’s and specifically outlines the approach to be adopted in the consideration and treatment of geology, hydrology and hydrogeology at the Constraints Study, Route Corridor Selection and Preliminary Design / Environmental Impact Assessment phases. Road schemes have the potential to significantly affect surface water bodies such as rivers, lakes/ponds, estuaries and reservoirs. In particular construction of a road scheme may affect the flood response of a catchment or alter the established drainage pattern. The impact assessment criteria in the MCA are the same as stated in the TII Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.”

Therefore, the following elements are considered as part of the hydrology assessment:

- Water Framework Directive status;
- Risk to that status;
- Nutrient sensitivity;

³ UK Highway Agency, 2020. Design Manual for Roads and Bridges – A113 Road Drainage and the Water Environment ((formerly HD 45/09)). Department for Infrastructure.

- Protected areas; and
- Flooding potential.

1.3 Assessment Criteria

The Stage 2 Appraisal Process was carried out using the full range of sub criteria recommended in PAG unit 7.0 and with regard to the objectives of the scheme. This was done to take account of all the predicted impacts of each option or alternative. In many cases there is a strong overlap between the objectives of the scheme and one or more of the PAG sub criteria.

All appraisal criteria use a standard scale. Each impact is scored on a scale of 1 (major or highly negative impact) to 7 (major or highly positive impact). A score of 4 represents a neutral or not significant impact. Each impact is scored as per the system presented in **Table 1-2**.

Table 1-2: Project Appraisal Guidelines Scoring

Score	PAG Score
7	Major or highly positive
6	Moderately positive
5	Minor or slightly positive
4	Not significant or neutral
3	Minor or slightly negative
2	Moderately negative
1	Major or highly negative

All scores refer to impacts measured relative to the Do-Minimum. The Do-Minimum consists of doing nothing further to improve the N52 route. The Do- Minimum would therefore by definition be scored as Neutral (relative to itself) under all sub criteria.

PAG 7.0 notes that simply adding up the scores of the different sub-criteria gives an indication of the overall performance of each option under a given criterion, but this is not to be used in a mechanistic way as a decision process. The performance of each option in meeting the scheme objectives was then considered to be one of the criteria presented in **Table 1-3**.

Table 1-3: Qualitative Scoring

Score	PAG Score
Preferred	The choice which most fully meets the project objectives.
Good	Where project objectives are met notably better than with the intermediate choices but notably not as well as with the best choice.
Intermediate	Where project objectives are met considerably less well than with the best choice but considerably better than with the worst choice.
Poor	Where project objectives are met notably less well than with the intermediate choices but notably not as well as with the best option.
Least Preferred	The choice which does least to achieve the project objectives.

Having regard to the full range of impacts assessed in each case. This is a high level of ranking of the options or alternatives. The scoring process allows for options or alternatives to be identified as being “Good”, falling between “Intermediate” and “Preferred”, or as “Poor”, falling between “Least Preferred” and “Intermediate”.

For some options there will be very little between their impact scores and some may even have the same impact scores. In such circumstances, the author has applied judgement and evaluated each option comparatively against the other options based on the quantitative and qualitative assessments. This has allowed the author to determine a preference for each option. In some instances, similar options may have the same preference.

2 EXISTING ENVIRONMENT

2.1 Hydrology

The EU Water Framework Directive (2000/60/EC) (WFD) establishes a framework for the protection, improvement and management of surface water and groundwater. A catchment area is a hydrological unit made up of sub-catchments divided by watersheds. Surface water within a catchment area will end up in the same river. In this assessment's case, surface water will end up in the Lower Shannon (if it doesn't evaporate).

The study area is situated within the Lower Shannon catchment (Hydrometric Area 25A) and crosses, from south to north, the Tullamore_SC_10, the Silver[Tullamore]_SC010, and the Brosna_SC_020 sub-catchments (**Figure 2-1**).

Each Option traverses the Tonaphort Stream (IE_SH_25T450930) (unassigned status and risk, subject to industry pressures) in the north and the Silver [Tullamore] River (IE_SH_25S030100) (Good 2013-2018 WFD Status, not at risk) in the south (**Figure 2-2**). The Tonaphort Stream discharges to the nearby Brosna River (IE_SH_25B090450) (Good 2013-2018 WFD Status, not at risk) which has a Q-Value of 5 (High) upstream and 4 (Good) downstream of the confluence. The Brosna River is an important site for Salmonids and Crayfish.

The section of the Silver River upstream of all route options (to the east) is classified as a river within a Special Area of Conservation (SAC). The SAC is located 10km upstream of the route options therefore there is no impact anticipated from the study area on the SAC.

None of the routes lie within a fluvial or pluvial flood zone as mapped by the Office of Public Works (OPW). Each of the routes cross the benefitted land from the Brosna Arterial Drainage Scheme (1947) in the vicinities of the Silver River and Tonaphort Stream. All routes intersect the C22(1) land drain between the Tonaphort and Balleek Beg Streams which discharges to the Brosna River.

2.2 Study Area and Options

A route corridor with an overall width of 500m was applied to each route option, as recommended in the TII Guidelines for Assessment of Hydrology for National Road Schemes, also considering junctions and ring roads.

Each of the seven route options brought forward for Stage 2 assessment are described below:

- **Proposed Management Option** consist of maintaining the existing N52 route in terms of vertical and horizontal alignment. The proposed cross section remains a single carriageway as per the existing N52 route and does not involve significant land take. Access along the N52 is proposed to be facilitated with roundabouts at key junctions.
- **Proposed Option 1** (8.54km) follows existing N52 closely in horizontal and vertical alignment. The proposed cross section is wider than the existing carriageway in sections and will involve land take along the edges of the road. Multiple existing field accesses along N52 will be joined by parallel collector roads or diverted to the local roads minimizing field access points to the new carriageway.
- **Proposed Option 2** (8.17km) follows the existing N52 closely in horizontal and vertical alignment from the Tullamore Bypass roundabout until chainage 2050. At chainage 2050 it diverges east from the existing N52 and joins back to the existing alignment at chainage 6400. The 4350m new offline road allows for elimination of substandard junctions at Four Roads and Durrow Village. The Option 2 will cross Derrygolan Esker at chainage 5050 to 5200. Option 2 contains the shortest offline section, trying to utilise as much as possible of the existing road. Option 2 skirts to the left of the national monument of Meeneglish avoiding direct impact on the monument at chainage 5700. Four crossings of waterbodies will be required on Option 2 at chainages: 2150, 3850, 5900 and 7000.
- **Proposed Option 3** (7.90km) diverges east from the existing N52 at chainage 600. It crosses Molloy's Quarry at chainage 1250-1600 and the source protection area at chainage 1000-2100. Three road crossings are proposed along the Option 3: at chainage 2240 with L2003, at chainage 3120 with L2005 and at chainage 4790 with L2006. Three crossing of waterbodies will be required on the Option 3 at chainages: 2150, 5780 and 6800. Option 3 joins the existing N52 alignment at chainage 7000 following to the M6 junction.

- **Proposed Option 4** (8.09km) is an eastern option and diverges east from existing N52 at chainage 250. It crosses Molloy's Quarry at chainage 1750-1950 and the source water protection area at chainage 1000-2400. Two road crossings are proposed along Option 4: at chainage 3200 with L2005 and at chainage 4900 with L2006. Option 4 avoids crossing Derrygolan Esker passing it on the east at chainage 4900. It then goes north west passing west of Pallas forest at chainage 6000. Two crossings of waterbodies will be required on Option 4 at chainages: 2730 and 7050. Option 4 joins the existing N52 alignment at chainage 7850 and follows to the M6 interchange.
- **Proposed Option 5** (8.05km) diverges east from the existing N52 at chainage 2300 making use of an already upgraded alignment of N52 up to this point. The proposed alignment east of the existing N52 replaces two substandard junctions at Four Roads and Durrow Village and substandard horizontal and vertical alignment of N52 at the middle section. Two road crossings are proposed at Option 5: at chainage 3480 with L2005 and at chainage 4990 with L2006. Option 5 crosses Derrygolan Esker at chainage 4900-5000. Two crossings of waterbodies will be required on Option 5 at chainages: 2150 and 7050. Option 5 joins the existing N52 alignment at chainage 7850 and follows to the M6 interchange.
- **Proposed Option 2-3** (8.10km) was developed during the course of the scheme development and appraisal as a combination of Options 2 and 3 above. This option combines the southern part of Option 2 with the northern part of Option 3 and has been developed as a means of further minimising impact on the Ballybought Castle site identified for Option 2.

Figure 2-1: Catchments and Subcatchments (Source: EPA, 2021)

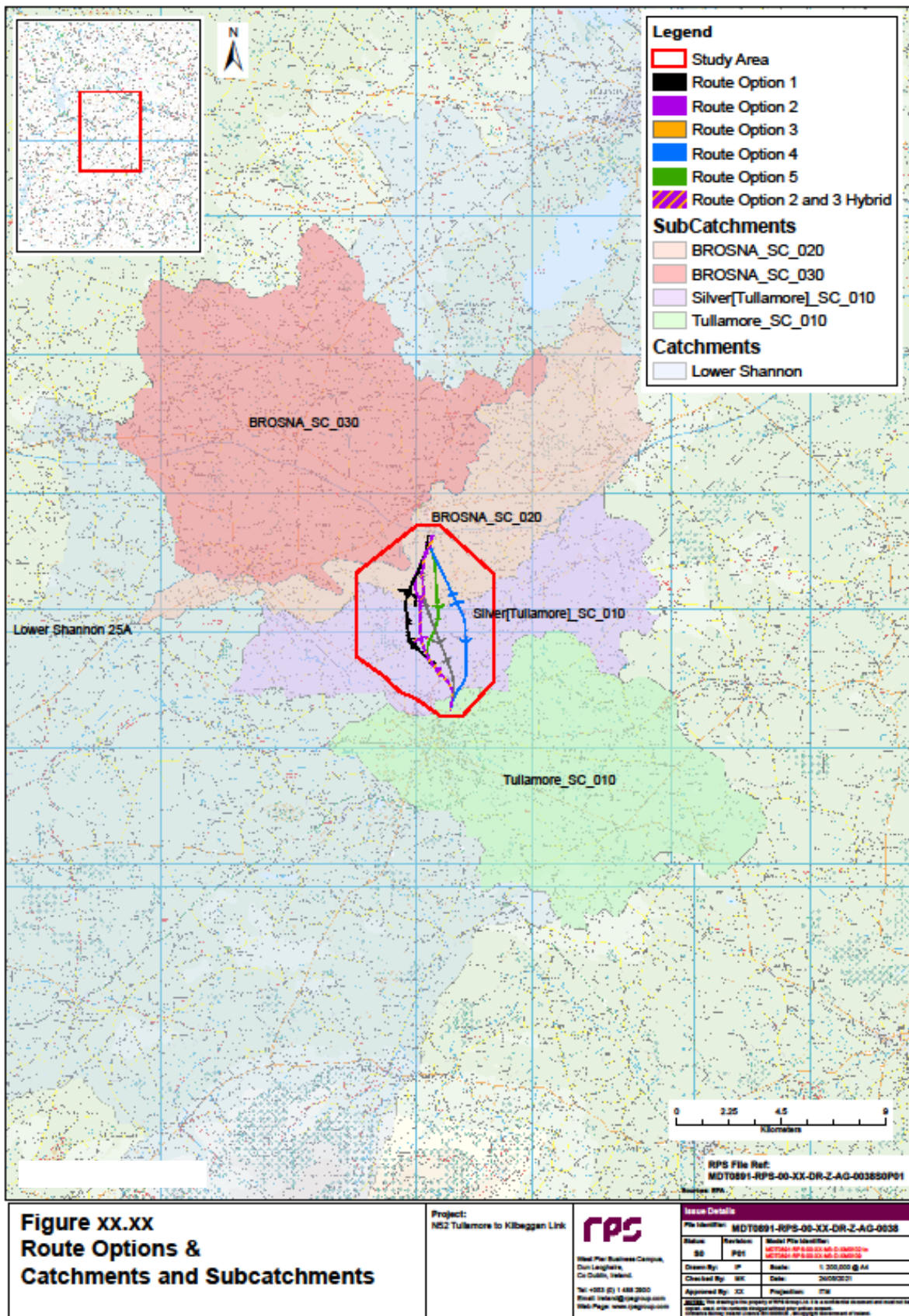
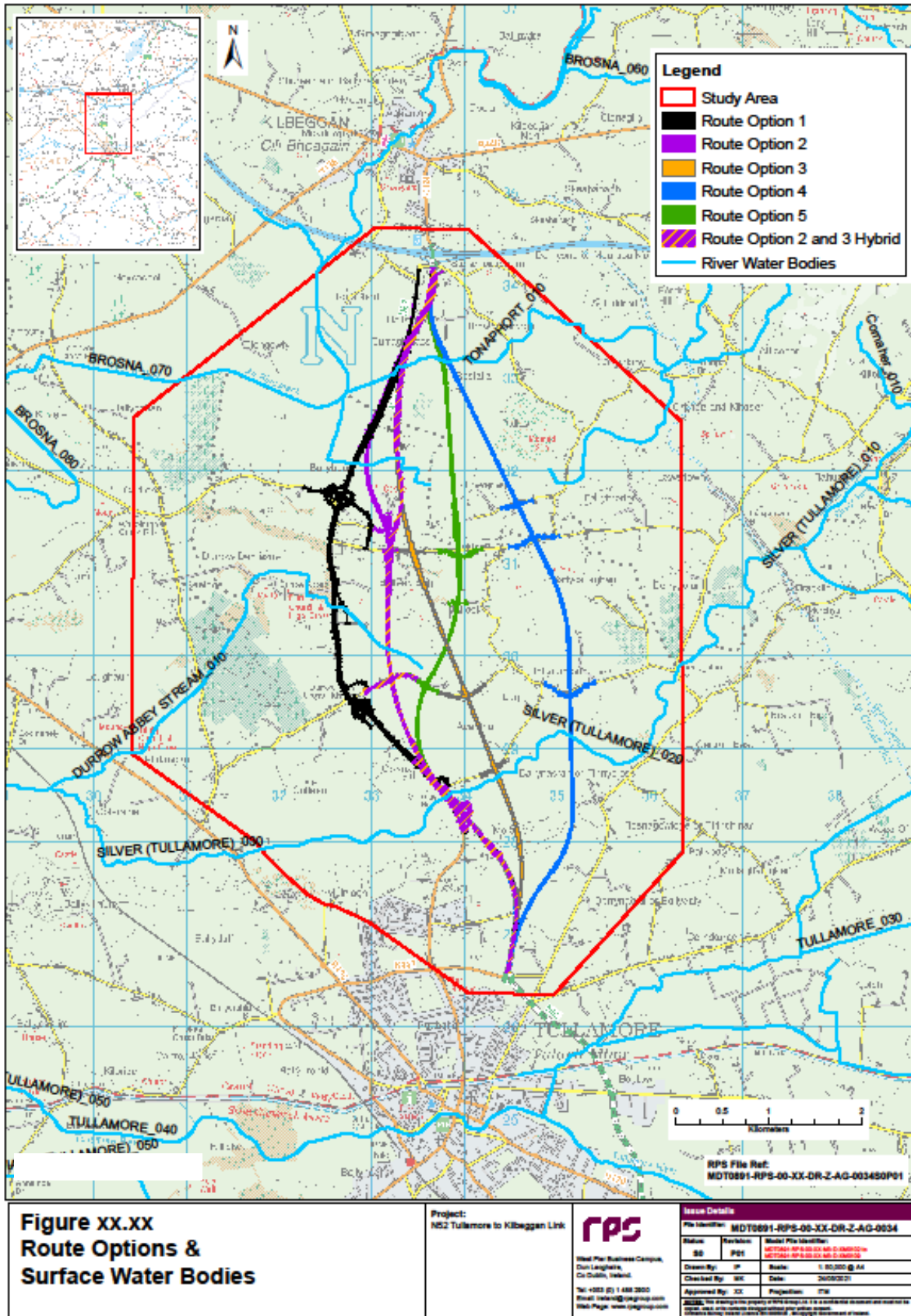


Figure 2-2: Surface Waterbodies (Source: EPA, 2021)



3 OPTION SELECTION

Online sources such as Geological Survey Ireland Spatial Resources, Catchment.ie maps and EPA maps have been used to perform geographic information system (GIS) analysis of hydrological data. 250 metre buffer zones have been generated around each of the seven no. Stage 2 options' centrelines. The options were assessed with respect to their likely impact on hydrology attributes.

The potential hydrological impacts on the surface waterbodies and catchments, as well as other particular attributes, falling within the individual route corridors are set out in **Table 3-1**, with an impact level assigned between 1 (major or highly negative) to 7 (major or highly positive).

Option 1 (Brown) and the Management Option intersects the Balleek_Beg Stream (IE_SH_25B090450) (Good 2013-2018 WFD Status, not at risk) which is in a nutrient sensitive area, and the Durrow Abbey Stream (IE_SH_25D120200) (Moderate 2013-2018 WFD Status, at risk). The Balleek_Beg Stream discharges to the Brosna River. The Durrow Abbey Stream is at risk of not achieving WFD objectives and is subject to agricultural and forestry pressures.

The Q-value of the Silver River at the proposed crossing point is 4 (Good) and the values upstream and downstream are both 3-4 (Moderate). The Balleek_Beg Stream discharges to the nearby Brosna River which has a Q-Value of 5 (High) upstream and 4 (Good) downstream of the confluence.

Option 2 (purple) intersects the Balleek_Beg Stream which is in a nutrient sensitive area and the Durrow Abbey Stream which is subject to agricultural and forestry pressures. The Balleek_Beg Stream discharges to the Brosna River.

The Q-value of the Silver River at the proposed crossing point is 4 (Good) and the values upstream and downstream are both 3-4 (Moderate). The Balleek_Beg Stream discharges to the nearby Brosna River which has a Q-Value of 5 (High) upstream and 4 (Good) downstream of the confluence.

Option 3 (Orange) intersects the Balleek_Beg Stream which is in a nutrient sensitive area. The route overlies the C9(7), C9(11) and M20(A) land drains which discharge to the Silver River. The Balleek_Beg Stream discharges to the Brosna River.

The Q-value of the Silver River upstream of the proposed crossing point is 3-4 (Moderate) and 4 (Good) downstream. The Balleek_Beg Stream discharges to the nearby Brosna River which has a Q-Value of 5 (High) upstream and 4 (Good) downstream of the confluence.

The Q-value of the Silver River upstream of the proposed crossing point is 3-4 (Moderate) and 4 (Good) downstream. The route overlies the C9(11) and C9(12) land drains which discharge to the Silver River.

Option 4 (blue) route intersects the L2005 road at a location with a record of recurring flood events according to meeting minutes taken from an interview with the area engineer (available on floodinfo.ie, ref P4D403A – F310 – 027 – 004-004). The road is liable to flood after very heavy rainfall which may indicate poor road drainage at the location.

Option 5 (green) the Durrow Abbey Stream which is subject to agricultural and forestry pressures.

The Q-value of the Silver River at the proposed crossing point is 4 (Good) and the values upstream and downstream are both 3-4 (Moderate).

Option 2-3 intersects the Balleek_Beg Stream which is in a nutrient sensitive area and the Durrow Abbey Stream which is subject to agricultural and forestry pressures. The Balleek_Beg Stream discharges to the Brosna River.

The Q-value of the Silver River at the proposed crossing point is 4 (Good) and the values upstream and downstream are both 3-4 (Moderate). The Balleek_Beg Stream discharges to the nearby Brosna River which has a Q-Value of 5 (High) upstream and 4 (Good) downstream of the confluence.

Table 3-1: Hydrological Impacts of Options

Route Option	Attribute	Importance	Impact	Level of Impact
Management Option	Flood Zone A and B	Low	This option does not consist of offline sections so the potential impact on flooding is negligible. The route corridor transverses OPW Benefitted Lands which indicate improvement works were carried out for these watercourses. This option does not provide potential for increased run-off to receiving watercourse hence it does not increase the likelihood of flooding. The route corridor traverses a site of localised historical surface water flooding on the northern bank of the Silver River which is located within OPW Benefitted Lands.	Neutral
	Water Quality	Medium	The Balleek Beg Stream is nutrient sensitive and the Durrow Abbey Stream is at risk of not achieving WFD status. The nature of the impact is not expected to change from existing N52 alignment.	Neutral
		Low	The route corridor crosses the Silver River and associated land drains. Potential for pollution from runoff from route corridor.	Neutral
Option 1 (Brown)	Flood Zone A and B	Low	This option does not consist of offline sections so the potential impact on flooding is negligible. The route corridor transverses OPW Benefitted Lands which indicate improvement works were carried out for these watercourses. Increased run-off from the proposed route corridor to receiving watercourses may increase the likelihood of flooding. The route corridor traverses a site of localised historical surface water flooding on the northern bank of the Silver River which is located within OPW Benefitted Lands.	Neutral
	Water Quality	Medium	The Balleek Beg Stream is nutrient sensitive and the Durrow Abbey Stream is at risk of not achieving WFD status. The nature of the impact is not expected to change from existing N52 alignment.	Neutral
		Low	The route corridor crosses the Silver River and associated land drains. Potential for pollution from runoff from route corridor.	Neutral
Option 2 (Purple)	Flood Zone A and B	Low	The route corridor transverse the Balleek Beg Stream, Durrow Abbey Stream and the Silver River. No out of bank flooding (Flood Zone A or B) is indicated for these watercourses in the vicinity of the route corridor. The route corridor transverses OPW Benefitted Lands which indicate improvement works were carried out for these watercourses. Increased run-off from the proposed route corridor to receiving watercourses may increase the likelihood of flooding. The route corridor traverses a site of localised historical surface water flooding on the northern bank of the Silver River which is located within OPW Benefitted Lands.	Neutral
	Water Quality	Medium	The Balleek Beg Stream is nutrient sensitive and the Durrow Abbey Stream is at risk of not achieving WFD status. Potential for pollution from run-off from route corridor.	Minor Negative
		Low	The route corridor crosses the Silver River and associated land drains. Potential for pollution from runoff from route corridor.	Neutral

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Route Option	Attribute	Importance	Impact	Level of Impact
Option 3 (Orange)	Flood Zone A and B	Low	<p>The route corridor transverse the Balleek Beg Stream, Durrow Abbey Stream, the Silver River and associated land drains. No out of bank flooding (Flood Zone A or B) is indicated for these watercourses in the vicinity of the route corridor.</p> <p>The route corridor transverses OPW Benefitted Lands which indicate improvement works were carried out for these watercourses. Increased run-off from the proposed route corridor to receiving watercourses may increase the likelihood of flooding.</p> <p>The route corridor traverses a site of localised historical surface water flooding on the northern bank of the Silver River which is located within OPW Benefitted Lands.</p>	Neutral
	Water Quality	Medium	The Balleek Beg Stream is classed as nutrient sensitive. Potential for pollution from runoff from route corridor.	Minor Negative
		Low	The route corridor crosses the Silver River and associated land drains. Potential for pollution from runoff from route corridor.	Neutral
Option 4 (Blue)	Flood Zone A and B	Low	<p>The route corridor transverse the Silver River and associated land drains. No out of bank flooding (Flood Zone A or B) is indicated for these watercourses in the vicinity of the route corridor.</p> <p>The route corridor transverses OPW Benefitted Lands which indicates improvement works were carried out for these watercourses. Increased run-off from the proposed route corridor to receiving watercourses may increase the likelihood of flooding.</p> <p>Recurring flooding noted at a low point within L2005 road approximately 200m to the west of the route corridor. Flooding indicated to be a road drainage issue and does affect the route corridor.</p>	Neutral
	Water Quality	Low	The route corridor crosses the Silver River and associated land drains. Potential for pollution from runoff from route corridor.	Neutral
Option 5 (Green)	Flood Zone A and B	Low	<p>The route corridor transverse the Durrow Abbey Stream, the Silver River and associated land drains. No out of bank flooding (Flood Zone A or B) is indicated for these watercourses in the vicinity of the route corridor.</p> <p>The route corridor transverses OPW Benefitted Lands which indicates improvement works were carried out for these watercourses. Increased run-off from the proposed route corridor to receiving watercourses may increase the likelihood of flooding.</p> <p>The route corridor traverses a site of localised historical surface water flooding on the northern bank of the Silver River which is located within OPW Benefitted Lands.</p>	Neutral
	Water Quality	Medium	The route corridor crosses the Durrow Abbey Stream is at risk of not achieving WFD status. Potential for pollution from runoff from route corridor.	Minor Negative
		Low	The route corridor crosses the Silver River and associated land drains. Potential for pollution from runoff from route corridor.	Neutral
Option 2-3	Flood Zone A and B	Low	The route corridor transverse the Balleek Beg Stream, Durrow Abbey Stream, and the Silver River. No out of bank flooding (Flood Zone A or B) is indicated for these watercourses in the vicinity of the route corridor.	Neutral

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Route Option	Attribute	Importance	Impact	Level of Impact
			<p>The route corridor transverses OPW Benefitted Lands which indicate improvement works were carried out for these watercourses. Increased run-off from the proposed route corridor to receiving watercourses may increase the likelihood of flooding.</p> <p>The route corridor traverses a site of localised historical surface water flooding on the northern bank of the Silver River which is located within OPW Benefitted Lands.</p>	
	Water Quality	Medium	The Balleek Beg Stream is nutrient sensitive and the Durrow Abbey Stream is at risk of not achieving WFD status. Potential for pollution from run-off from route corridor.	Minor Negative
		Low	The route corridor crosses the Silver River and associated land drains. Potential for pollution from runoff from route corridor.	Neutral

4 OPTION SUMMARY

A summary of the preference ranking for each option with respect to hydrology is shown in **Table 4-1**. The preference rating is determined based on a comparative assessment of the impacts between options.

All options are predicted to pose an adverse water quality impact and all are categorised as posing a minor negative impact, with the exception of the Management Option and Option 1. These both are predicted to have a neutral impact. The Management Option in comparison to Option 1 has a reduced land take and does not increase the likelihood of flooding due to increased runoff. Therefore it is considered to have a lower negative impact. Therefore the Management Option and Option 1 are both is classed as the “preferred” options.

Option 4 is also classed as a “good” as this option has a minor or slightly negative impact on the hydrological environment including potential impacts on flood zone A and B and water quality and this option only crosses a single watercourse - the Silver River.

Option 2, Option 3, Option 5 and Option 2-3 are all classed as an “intermediate” preference. All of the mentioned options are likely to have a minor or slightly negative impact on water quality of the surface water bodies that the routes intersect. These routes all traverse across at least one surface water body of “medium” importance (The Balleek Beg Stream is nutrient sensitive and the Durrow Abbey Stream is at risk of not achieving WFD status).

All routes intersect the Silver River and associated land drains and have the potential for pollution from run-off from the route corridors. The Silver River is of “low” importance, therefore, all impacts on this waterbody are considered neutral or not significant.

Table 4-1: Hydrology Preference Rating

Option	Potential for Impact	Impact Level	Impact Score	Preference
Management Option	Neutral impact on Flood Zone A and B and water quality in the Balleek Beg Stream, Durrow Abbey Stream and Silver River. The nature of the impact is not expected to change from the existing N52 alignment.	4	Not significant or neutral	Preferred
Option 1 (Brown)	Neutral impact on Flood Zone A and B and water quality in the Balleek Beg Stream, Durrow Abbey Stream and Silver River. The nature of the impact is not expected to change from the existing N52 alignment.	4	Not significant or neutral	Preferred
Option 2 (Purple)	<ul style="list-style-type: none"> Neutral impact on Flood Zone A and B and water quality in the Silver River. Minor impact on the Balleek Beg Stream and Durrow Abbey Stream from the potential for pollution from run-off from the route corridor. The Balleek Beg Stream is nutrient sensitive and the Durrow Abbey Stream is at risk of not achieving WFD status. 	3	Minor or slightly negative	Intermediate
Option 3 (Orange)	<ul style="list-style-type: none"> Neutral impact on Flood Zone A and B and water quality in the Silver River. Minor impact on the Balleek Beg Stream from the potential for pollution from run-off from the route corridor. The Balleek Beg Stream is classed as nutrient sensitive. 	3	Minor or slightly negative	Intermediate
Option 4 (Blue)	Neutral impact on Flood Zone A and B and water quality in the Silver River.	3	Minor or slightly negative	Good
Option 5 (Green)	<ul style="list-style-type: none"> Neutral impact on Flood Zone A and B and water quality in the Silver River. Minor impact on the Durrow Abbey Stream from the potential for pollution from run-off from the route corridor. The route corridor crosses the Durrow Abbey Stream is at risk of not achieving WFD status. 	3	Minor or slightly negative	Intermediate
Option 2-3 (Purple-Orange)	Neutral impact on Flood Zone A and B and water quality in the Silver River.	3	Minor or slightly negative	Intermediate

Option	Potential for Impact	Impact Level	Impact Score	Preference
	<ul style="list-style-type: none"> Minor impact on the Balleek Beg Stream and Durrow Abbey Stream from the potential for pollution from run-off from the route corridor. The Balleek Beg Stream is nutrient sensitive and the Durrow Abbey Stream is at risk of not achieving WFD status. 			