BOLIDEN
Tara Mines

Environmental Impact Assessment Report (EIAR)

Tailings Facility Embankment Buttress

Appendix 5.A

Traffic and Transport Impact Assessment

Appeal Reference Number: ABP-315173-22

Submitted: February 2024

Coyle Environmental

Proposed Construction of a Rockfill Reinforcement Buttress to the Extant Embankment Walls of the Tailings Storage Facility, Co. Meath

Traffic and Transport Assessment

P·M·C·E

February 2024

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3.0	AP	AOR/TAG	AOR	13th Feb 2024	Final
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1.0	AP	AOR/TAG	AOR	22nd Jan 2024	Draft Report

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Non- Technical Summary

PMCE Ltd was commissioned by Coyle Environmental to undertake an assessment of the traffic impacts associated with the proposed construction of a rockfill reinforcement buttress to the extant embankment wall of the Tailings Storage Facility in Co. Meath

The Tailings Storage Facility is located on the L74141 Local Road approximately 6km north of Navan, 4km northwest of the N51 National Road, and 50km northwest of Dublin City.

Three options have been considered for the proposed construction phase of the proposed buttress at the Tailings Storage Facility in Co. Meath. Each option is predicted to vary in duration due to the annual volume of material being imported to the site varying in each option. Option A proposes the shortest construction period of 1.5 years (823,296 tonnes per annum), Option B proposes a construction period of 2 years (617,472 tonnes per annum) and Option C proposes the longest construction period of 3 years (411,648 tonnes per annum).

A Traffic and Transport Assessment was undertaken, including link capacity analysis to determine if the proposed development would lead to congestion on the surrounding road network. The results of the Link Capacity Analysis indicate that the surrounding roads will continue to operate within capacity for each of the assessment years for all proposed construction phase options under consideration.

Junction Capacity Analysis was undertaken at four junctions in the vicinity of the Site, and along the routes between the site and the source of materials/M3 Motorway. The results of the Junction Capacity Analysis indicated that the site access, the L74141/R162 junction and the R162/R163 junction currently operate within capacity and will continue to operate within capacity for each of the assessment years for all construction phase options under consideration both with, and without, the construction of the proposed rockfill reinforcement buttress.

The R162 arm of the R162/N51 roundabout, however, currently operates at capacity and will exceed capacity in all future assessment years for all construction phase options under consideration. This would however occur both with, and without, traffic generated by the construction of the proposed rockfill reinforcement buttress. The impact of the additional construction related traffic on vehicle queues and delay at the roundabout is considered imperceptible with regards to the operation of the junction during the proposed construction period for all options under consideration.

Sightlines at the site access have been assessed in accordance with Section 5.6.3 of TII Publication's document DN-GEO-03060, which requires 160m of unobstructed visibility of 160m (where the design speed is 85kph) at a point 3m back from the edge of the carriageway, and relaxed to 2m on lightly trafficked Regional and Local Roads. Pillars located at the site access may partially impede visibility to drivers of private cars at a setback of 3m, however, the full required visibility is achievable at the access in both directions, for all drivers, from a distance of 2.0m back from the edge of the L74141 carriageway where low traffic volumes were recorded.

Following traffic analysis, which included a link, and junction, capacity analysis, it was determined that the proposed development would have an imperceptible impact on the local road network.

Glossary of Terms

Road Network:	The existing and proposed public and private roads within the study area.
Traffic Growth:	The normal expected growth in traffic over time.
Trip:	One movement, in or out of the study area by foot, cycle or vehicle.
Thresholds:	Minimum intervention levels at which Transport and Traffic Assessments are to be conducted.
Generated Trips:	Additional trips made as a result of the presence of a development.
Peak Time:	Time of day at which the transport demands from a development are greatest.
Capacity Calculations:	Standardised methods of estimating traffic capacity on links and at junctions.
Trip Distribution:	The estimated directional distribution of the estimated traffic at each junction in the study area.
Trip Assignment:	The final estimated flows of traffic for each direction of travel at each junction and along each link within the study area.
TRICS:	A database containing empirically obtained trip generation data for a wide range of different types of developments.
AADT:	Annual Average Daily Traffic – The mean daily traffic volume over the course of a year on a particular route.
Level of Service:	Level of Service (LOS) is a measure of the capacity of a road related to the average vehicular speed and level of congestion on the road. It is ranges from LOS A to LOS F, with A representing free flow and F representing stop/start traffic. LOS C represents stable flow conditions

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1 Introduction

1.1 General

PMCE Ltd was commissioned by Coyle Environmental to undertake an assessment of the traffic impacts associated with the proposed construction of a rockfill reinforcement buttress to the extant embankment wall of the Tailings Storage Facility in Co. Meath.

Three options have been considered for the proposed construction phase of the proposed buttress at the Tailings Storage Facility in Co. Meath. Each option is predicted to vary in duration due to the annual volume of material being imported to the site varying in each option. Option A proposes the shortest construction period of 1.5 years (823,296 tonnes per annum), Option B proposes a construction period of 2 years (617,472 tonnes per annum) and Option C proposes the longest construction period of 3 years (411,648 tonnes per annum).

1.2 Information Reviewed

In preparing this report reference has been made to the following documents:-

- "Traffic and Transport Assessment Guidelines" (May 2014) published by Transport Infrastructure Ireland (TII).
- "Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections" (October 2021) published by Transport Infrastructure Ireland.
- Traffic Count Data, collected by Traffinomics on the 9th of November 2021.
- Topographical Survey Data/Mapping provided by Coyle Environmental.
- "Project Appraisal Guidelines for National Roads Unit 16.1 - Expansion Factors for Short Period Traffic Counts" (October 2016) published by Transport Infrastructure Ireland.
- TII Publications document DN-GEO-03031, "Rural Road Link Design" (June 2017, May 2023) published by Transport Infrastructure Ireland (TII).
- TII Publications document DN-GEO-03060, "Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade-separated and compact grade-separated junctions)" (May 2023) published by Transport Infrastructure Ireland (TII).

1.3 Scope

The objective of this assessment is to examine the traffic implications associated with the proposed construction in terms of its integration with existing traffic in the area. This chapter determines and quantifies the extent of additional trips generated by construction, and the impact on operational performance of such trips on the local road network.

1.4 Methodology

The methodology adopted for this appraisal and report involved, in brief:-

- A site visit on the 13th December 2021; the weather was dry and the ground surface was dry
- Trip Generation and Trip Assignment – This is used to derive trip rates for both the AM and PM Peaks and to provide information as to which direction of travel vehicles will travel to/from the proposed development
- Link Capacity Assessment - To obtain an AADT value for the roads linking the development to the surrounding network
- Existing Traffic Assessment – The traffic count data was used to develop models for junctions affected by the proposed development
- Construction Year Assessments – The estimated construction year traffic volumes on the study area network, as a result of the increase in background traffic and any site related traffic, was used to assess the operational performance of the junctions and surrounding road network for three construction phase options including

- **Option A (1.5-year duration):** 2023 & 2024
- **Option B (2-year duration):** 2023 & 2024
- **Option C (3-year duration):** 2023, 2024, & 2025

1.5 Location Plan

Figure 1.1 shows the location of the proposed construction of the Rockfill Reinforcement Buttress at the Tailings Storage Facility, Co. Meath and surrounding area.

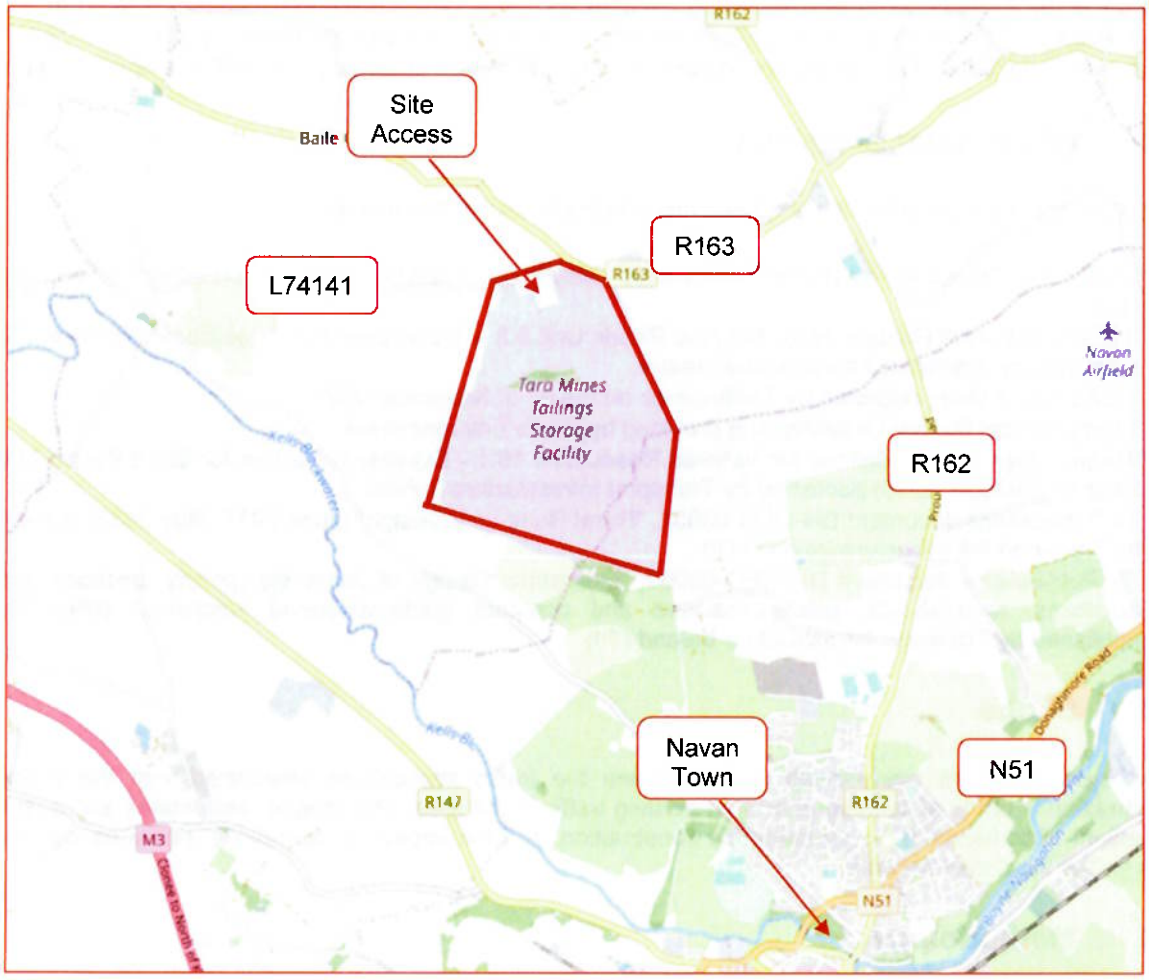

FIGURE 1.1: LOCATION PLAN (SOURCE: WWW.OPENSTREETMAP.ORG)

2 Existing Conditions

2.1 The Site

The proposed application is in relation to the proposed construction of a rockfill reinforcement buttress to the extant embankment wall of the Tailings Storage Facility, Co. Meath. The Tailings Storage Facility is located on the L74141 Local Road approximately 6km north of Navan, 4km northwest of the N51 National Road, and 50km northwest of Dublin City.

The construction of the buttress will require the movement of materials between the Tailings Storage Facility and a number of existing source locations, including the Main Mine site in Navan, and between the Tailings Storage Facility and the M3 Motorway. The route between the Tailings Storage Facility and some of these source locations will require drivers to turn right when exiting the site towards the R163 Regional Road, then right onto the R163 before continuing on the R163 Regional Road at the R162/R163 staggered junction. The route between the Tailings Storage Facility and the M3 Motorway will require drivers leaving the site to turn right onto the L74141 towards the R163 Regional Road, right onto the R163, right onto the R162 at the R163/R162 staggered junction towards Navan and then travel via the N3 link at the N51/N3 Link/R162 roundabout junction in Navan. Both routes are illustrated in Figure 2.1.

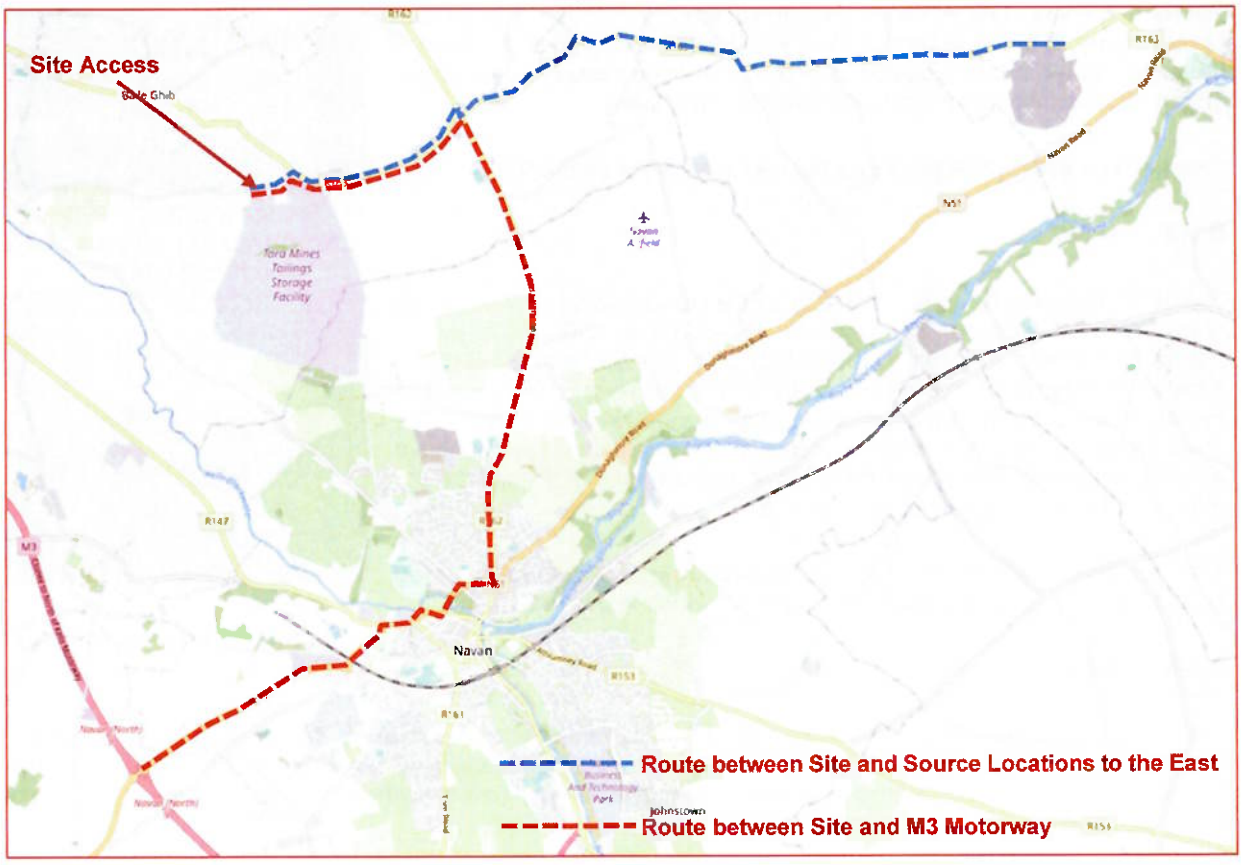

FIGURE 2.1: ROUTE FROM THE SITE TO SOURCE LOCATIONS TO THE EAST AND THE M3 MOTORWAY

The lands surrounding the subject site can be characterised as rural, with land uses in the area comprising agriculture, and single house residential. The construction traffic will utilise an existing access from the L74141 Local Road approximately 0.3km west of its junction with the R163 Regional Road. Trucks entering the site must approach from the R163 and therefore turn left when entering the site. Similarly, trucks exiting the site are permitted to turn right only. Signage is provided at the site access advising drivers of the permitted movements. The proposed buttress will be constructed over two phases; Phase 1 works are expected to take approximately 30 weeks to complete and Phase 2 works are estimated to take a further 80 weeks to complete. Three possible options, of varying duration, for the construction programme have been proposed and the impacts of all three options on the surrounding road network will be assessed as part of this Traffic and Transport Assessment.

2.2 Existing Road Network

2.2.1 L74141

The existing site is located on the L74141 Local Road (Donaghpatrick Road) which is approximately 5.5m wide with no hard shoulder or hard strip at the edge of the carriageway. The existing site is bounded to the north by the L74141 which runs in an east to west direction with a posted speed limit of 80kph. The access to the site is gated. There are no designated pedestrian or cyclist facilities on the L74141. The cross-section of the L74141 to the east of the site access is wide but narrows gradually towards the west of the access. The L74141 terminates at its junction with the R163 Regional Road.

FIGURE 2.2: L74141 IN THE VICINITY OF THE SITE ACCESS

2.2.2 R163

The R163 Regional Road is a two-way single carriageway which, within the vicinity of the site, runs in a north-west to south-east direction. The R163 is approximately 6.5m wide with no hard shoulder or hard strip at the edge of the carriageway. It has a posted speed limit of 80kph which transitions to 60kph approaching its junction with the R162 in Kilberry.

There are no designated pedestrian or cyclist facilities on the R163.

FIGURE 2.3: R163 TO THE NORTHWEST OF ITS JUNCTION WITH THE L74141

2.2.3 R162

The R162 Regional Road is a two-way single carriageway which runs in a north to south direction. The R162 is approximately 7.0m wide with a posted speed limit of 50kph, in the vicinity of its junction with the R163 in Kilberry. Further south the posted speed limit transitions to 60kph before transitioning to 80kph as it continues southwards towards Navan. The cross-section of the R162 varies along its length, but largely does not have a hard shoulder or hard strip at the edge of the carriageway throughout the area included in the scope of this scheme.

The junction of the R163/R162 is a priority-controlled staggered crossroad junction which provides ghost island right turn lanes in both directions.

FIGURE 2.4: R162 AT ITS JUNCTION WITH THE R163

2.2.4 N51

The N51 National Road's cross-section varies within the extent of the scheme. To the west of the R162 and N51 Roundabout it is a two-way single carriageway road approximately 13.0m in width with a hatched central median dividing the opposing traffic lanes throughout its length. To the northeast of this roundabout it is a two-way single carriageway approximately 9.5m in width.

2.3 Traffic Volumes

Classified traffic counts were carried out on Tuesday 9th November 2021 at four junctions, including the existing site access, the L74141/R162 T-Junction, the R162/R163 Staggered Crossroads, and the R162/N51 Roundabout. The count was carried out between 7:00am and 7:00pm, this time-period encompassing the main operating hours of the proposed construction. The time-period also includes the peak hours on the adjacent National, Regional and Local Roads. Surveyed vehicles were broken down into five categories as follows:

1. Cars
2. LGV's (Light Goods Vehicles)
3. OGV1 (Two and three axle goods vehicles)
4. OGV2 (Four and five axle goods vehicles)
5. Buses

The detailed results of the traffic survey are summarised in Appendix B. The morning and evening peak hours have been established as follows:

- **Junction 1** – L74141/Site Access - 08:15 – 09:15 (AM Peak), 17:15 – 18:15 (PM Peak)
- **Junction 2** – L74141/R163 T-Junction - 08:15 – 09:15 (AM Peak), 16:45 – 17:45 (PM Peak)
- **Junction 3** – R162/R163 Staggered Crossroads - 07:45 – 08:45 (AM Peak), 16:30 – 17:30 (PM Peak)
- **Junction 4** – R162/N51 Roundabout - 08:00 – 09:00 (AM Peak), 17:00 – 18:00 (PM Peak)

The traffic count data for each site has been converted to Annual Average Daily Traffic (AADT) values using the methodology described in "Expansion Factors for Short Period Traffic Counts" (Unit 16.1 NRA Project Appraisal Guidelines, October 2016). Annexes A to C of the above document were used in the expansion of traffic counts to AADTs. The AADTs at each junction, both existing and future, was calculated to determine the percentage increase in traffic volumes on the road network as a result of the trips generated during the proposed construction period.

A combined factor of 0.775 was arrived at by combining the individual hourly factors for the count duration. This factor was then used to determine the 24-hour traffic flow. This was then converted to a Weekly Average Daily Traffic (WADT) using an index of 0.97 for the Tuesday traffic count. Finally, this was converted to AADT using an index of 0.99 for the month of November. These factors were used to calculate the AADT for the roads at each of the four junctions.

TABLE 2-1: AADT AT JUNCTION 1 – SITE ACCESS

Hour Ending	L74141 (E)	Site Access	L74141 (W)
08:00	28	15	17
09:00	37	5	32
10:00	20	4	16
11:00	19	7	14
12:00	16	2	16
13:00	15	6	13
14:00	13	4	11
15:00	19	3	18
16:00	19	4	17
17:00	35	1	34
18:00	106	12	100
19:00	89	0	89
Period Total	416	63	377
Period Total HGVs	27	19	8
% HGVs	6.5%	30.2%	2.1%
Total AADT	515	78	467

TABLE 2-2: AADT AT JUNCTION 2 – L74141/R163 T-JUNCTION

Hour Ending	R163 (S)	L74141 (W)	R163 (N)
08:00	95	30	79
09:00	179	42	147
10:00	95	21	76
11:00	134	23	117
12:00	83	17	72
13:00	106	19	93
14:00	84	16	74
15:00	121	23	104
16:00	117	22	99
17:00	187	49	166
18:00	217	126	197
19:00	157	94	163
Period Total	1,575	482	1,387
Period Total HGVs	125	46	89
% HGVs	7.9%	9.5%	6.4%
Total AADT	1,952	597	1,719

TABLE 2-3: AADT AT JUNCTION 3 – R162/R163 STAGGERED CROSSROADS

Hour Ending	R162 (N)	R163 (E)	R162 (S)	R163 (W)
08:00	441	177	475	125
09:00	456	254	452	200
10:00	382	182	428	114
11:00	291	116	323	110
12:00	288	142	306	106
13:00	308	157	338	117
14:00	329	147	385	107
15:00	323	178	384	135
16:00	388	181	407	154
17:00	459	259	544	224
18:00	573	250	597	230
19:00	436	191	500	179
Period Total	4,674	2,234	5,139	1,801
Period Total HGVs	547	166	501	162
% HGVs	11.7%	7.4%	9.7%	9%
Total AADT	5,792	2,768	6,368	2,232

TABLE 2-4: AADT AT JUNCTION 4 – R162/N51 ROUNDABOUT

Hour Ending	N51 (W)	R162 (N)	N51 (E)	Flower Hill
08:00	1183	727	773	381
09:00	1533	1022	790	411
10:00	1120	793	633	390
11:00	967	703	559	361
12:00	954	740	584	432
13:00	964	719	565	422
14:00	985	803	616	492
15:00	1166	860	712	530
16:00	1144	834	758	514
17:00	1245	892	871	604
18:00	1320	944	961	657
19:00	1134	874	811	595
Period Total	13,715	9,911	8,633	5,789
Period Total HGVs	994	752	733	487
% HGVs	7.2%	7.6%	8.5%	8.4%
Total AADT	16,994	12,281	10,697	7,173

3 Proposed Development

The proposed application is in relation to the construction of a rockfill reinforcement buttress to the extant embankment walls of the Tailings Storage Facility, Co. Meath. A total of 1,234,944 tonnes of construction material will be imported to the existing facility over two construction phases.

Three options have been considered for the proposed construction phase of the proposed buttress at the Tailings Storage Facility in Co. Meath. Each option is predicted to vary in duration due to the annual volume of material being imported to the site varying in each option. Option A proposes the shortest construction period of 1.5 years (823,296 tonnes per annum), Option B proposes a construction period of 2 years (617,472 tonnes per annum) and Option C proposes the longest construction period of 3 years (411,648 tonnes per annum).

3.1 Trip Generation

3.1.1 General

An assessment of the traffic generated by the proposed construction operation, for each proposed option, has been undertaken based on the proposed length of each option.

A total of 1,234,944 tonnes of material will be imported to the site during the construction period. The trips per day for each option will be dependent on the length of the construction period. In determining the daily traffic volumes associated with the construction, for each option, an average of between 65 and 129 loads per day arriving at the site has been calculated based on the following assumptions: -

- Construction will take place for 48 weeks per year
- On average, material will be transported to/from the site in 26.5 tonne loads
- Construction at the facility will take place for five days per week
- Construction will take place for 10 hours a day

Daily operations at the site will continue during the construction period. Trips associated with the daily operations are considered to be recorded in the traffic survey data and therefore contained within the background traffic. As a result, the additional development traffic distributed throughout the surrounding road network is related to traffic related to the construction operation only.

3.1.2 Derived Trip Rate

Table 3-1 contains a summary of the HGV trips associated with each construction option for the proposed development. These figures have been calculated based on the assumptions outlined above.

TABLE 3-1: SUMMARY OF PREDICTED DAILY HGV TRIPS

	Construction Quantities to be Imported		
	Option A	Option B	Option C
Duration Years	1.5	2	3
Tonnes per year	823,296	617,472	411,648
Tonnes per week (48 weeks)	17,152	12,864	8,576
Tonnes per day (5 days per week)	3,430	2,573	1,715
Number of HGVs per day (26.5 tonne trucks)	129	97	65
Number of HGVs per hour (10 hours per day)	13 (12.9)	10 (9.7)	7 (6.5)

In addition to the importation of material during the construction period, a total of six construction workers will also travel to/from the site daily. For the purpose of a conservative assessment, it is assumed that these workers will arrive at the site during the morning peak hour and depart during the evening peak hour, with these time periods including the maximum volume of traffic on the surrounding road network. Table 3-2 indicates the total trips, arrivals and departures, associated with each option during the construction period.

TABLE 3-2: TOTAL DAILY TRIPS GENERATED DURING THE PROPOSED CONSTRUCTION PERIOD

	Total Daily Trips associated with the Construction					
	Option A		Option B		Option C	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Imported Material (HGVs)	129	129	97	97	65	65
Staff	6	6	6	6	6	6
Total	135	135	103	103	71	71
Total Trips	**270**		**206**		**142**	

The Trip Rate Information Computer System (TRICS) database was used to determine the forecast arrival/departure distribution for quarry sites. This was considered to be the most suitable category in the TRICS database for this development. By inspection it can be seen that the pattern of arrivals/departures is consistent with a short turnaround within the site, e.g. that vehicles generally arrive and depart within a short time period, likely to be less than an hour.

These trips have been distributed throughout the day according to trip rates estimated from the TRICS database which is based on surveyed traffic for similar types of developments in similar locations and of a similar scale.

3.1.3 Adjacent Developments

A search of planned future developments which may have an impact on future traffic flows in the vicinity of the proposed site during the construction period was undertaken.

A list of third party projects, which may have an impact on the traffic related to the proposed development, which have received planning permission or intend to submit for planning permission, is shown in Table 3.3.

TABLE 3.3: SUMMARY OF ADJACENT DEVELOPMENTS

Reference	Description	Traffic Impact on Proposed Development	Reasons
NA170485	This is a proposed residential development comprising of 26 apartments and 21 two storey houses located to the north of the N51 on the western arm of the N51/R162 roundabout with access provided from the R162 Regional Road.	Yes	See below
PL17.247707	The lateral extension to the existing tailings storage facility and construction of an Integrated Constructed Wetlands.	No	Internal works
NA171232	The resumption of underground mining in the Nevinstown orebody	No	Permission has expired (12.2.2024)
317390	Construction of water treatment plant within mine site complex located c. 2.8km southeast of the proposed development.	No	Internal works
22924	The construction of 138 no. residential units, public open spaces and all associated site works located c. 1km southeast of the proposed development. (intended to be submitted for planning)	No	Application not submitted (12.2.2024)
211046	Demolition of existing agricultural structures (c. 530sqm) and the construction of 98 no. residential units located c. 2.5km southeast of the proposed development.	No	Location relative to the proposed routes
NA181543	The demolition of an existing vacant single storey dwelling and associated shed (total c.165.7sqm) and the construction of 74 no. apartment units located c. 2.7km southeast of the proposed development.	No	Location relative to the junctions within the scope of this assessment, as detailed in Section 3.3
221008	The demolition of an existing single storey dwelling (110 sqm) and associated outbuildings and the construction of 93	No	Location relative to the proposed routes

Reference	Description	Traffic Impact on Proposed Development	Reasons
	no. residential units located c. 3.5km southeast of the proposed development.		
NA201296	The construction of 73 no. two-storey dwellings located c. 3.7km southeast of the proposed development.	No	Location relative to the proposed routes
2360342	The demolition of 2 no. single storey dwelling houses and detached domestic garage and the construction of a residential development of 53 no. units located c. 4.2km southeast of the proposed development.	No	Location relative to the proposed routes
ABP-306021-19	The construction of a residential development of 544 no. dwellings, 2 no. creches, landscaping located c. 4.2km southeast of the proposed development.	No	Distance from the site and the proposed routes
23625	The construction of 97 no. dwellings located c. 4.3km south of the proposed development.	No	Distance from the site and the proposed routes
2121	The construction of 95 no. residential units located c.4.5km southeast of the proposed development.	No	Distance from the site and the proposed routes
2360198	The development will consist of the construction of approximately 3.9km of below ground potable water mains (450mm diameter) between Liscarton Water Treatment Plant and Proudstown Reservoir.	No	The proposed pipeline works are generally off road with the exception of short sections of public roads which do not affect the site and the proposed routes
22653	The construction of a pedestrian/cycle bridge crossing the River Blackwater extending to c. 93.6 metres in length providing for a shared pedestrian and cycle access.	No	Pedestrian/cycle bridge crossings is not expected to affect motorised vehicle movements
221031	The construction of approximately 2.7km of below-ground treated water pipeline (180mm, 500mm and 630mm diameters), with associated valves, two below-ground shaft structures and 1200m diameter concrete sleeve (60m length) underneath the Navan to Drogheda.	No	The route of the proposed pipeline works interacts with the R153, L34001, L3400 and the N51, and does not affect

Reference	Description	Traffic Impact on Proposed Development	Reasons
			the site and the proposed routes

The review of these adjacent projects determined that these, with the exception of application reference NA170485, would not have an impact on the proposed development in relation to traffic and, therefore, the cumulative impacts of these projects on the proposed facility would be imperceptible. Therefore, projects listed above were not included in this assessment.

One adjacent development in the vicinity of the route between the Tailings Storage Facility and the source locations/M3 Motorway, however, was identified that is considered to be of a sufficient scale such that traffic generated by it may impact on the future performance of the road network. This is a proposed residential development comprising of 26 apartments and 21 two storey houses located to the north of the N51 on the western arm of the N51/R162 roundabout with access provided from the R162 Regional Road (Meath County Council application ref. NA170485).

A Traffic Impact Assessment, carried out by the developers during the Planning Application process, was reviewed to estimate the volume of traffic that this development would create during the construction period. 16 trips in the AM Peak (08:00 – 09:00) and 17 trips in the PM Peak (17:30 – 18:30) were estimated to be generated by this proposed development. It was assumed that 60% of traffic would travel south towards the N51 roundabout and the remaining 40% would travel north. The trips generated by this adjacent development, for which permission has been granted, but had not yet been constructed at the time of the traffic survey, have been added to the background traffic for this traffic assessment for each year in the proposed construction period, 2024 (All Options), 2025 (All Options) and 2026 (Option C).

This is considered a conservative approach as the traffic growth factors used in the analysis are based on the forecast of future developments such as these adjacent developments.

3.2 Trip Assignment

All traffic arriving at, and departing from, the site must turn left in from, and right out onto, the L74141. Similarly, all traffic will travel southwards on the R163 when leaving the site and approach the junction with the L74141 from the south, such that they will turn right when leaving the site and left when travelling to the site.

At Junction 3, the staggered crossroads between the R163 and R162, when travelling to/from the site, it is anticipated that construction traffic will be split 50:50 to the east and south. Construction traffic at this point either travels east along the R163 towards source locations to the east, or south along the R162 towards the M3 Motorway. The traffic assignment for traffic generated by the proposed construction related traffic are illustrated in Figure 3.1 to Figure 3.4.

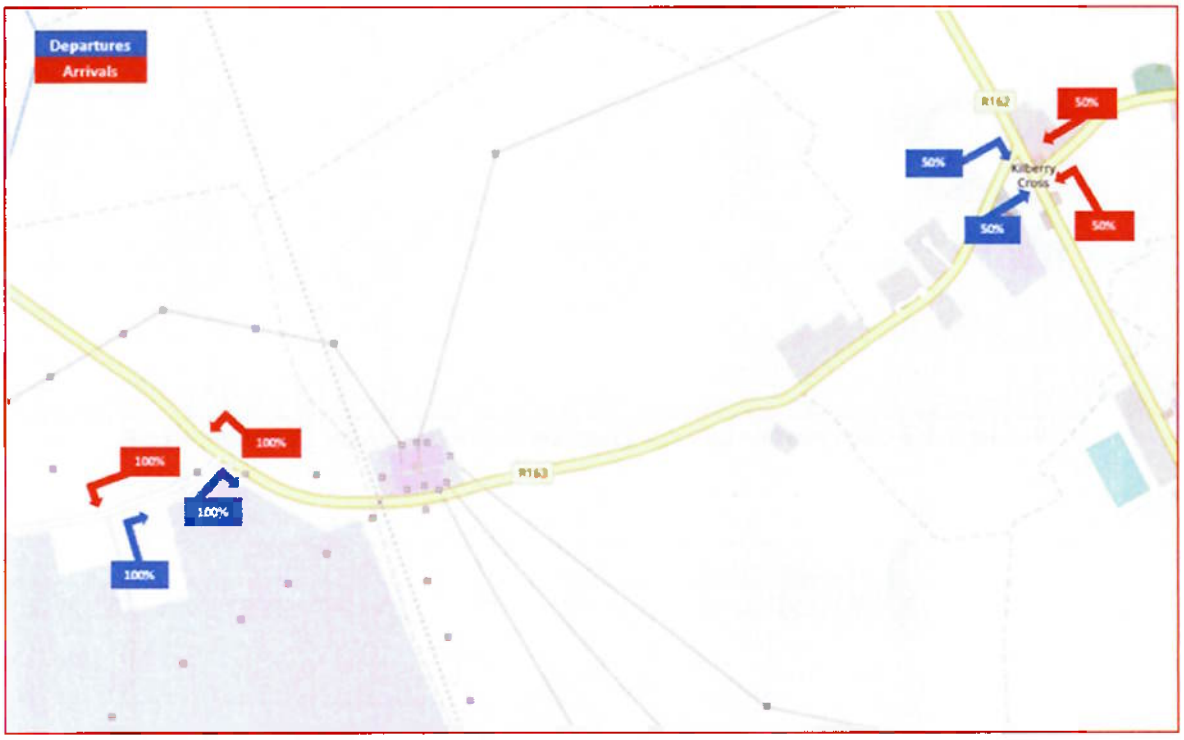

FIGURE 3.1: ASSIGNMENT OF HGV CONSTRUCTION TRAFFIC THROUGH JUNCTIONS 1 TO 3

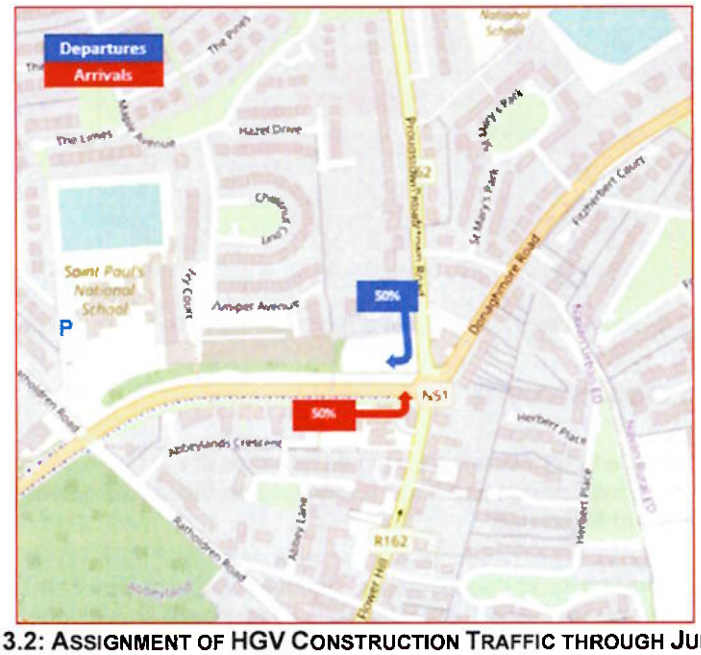

FIGURE 3.2: ASSIGNMENT OF HGV CONSTRUCTION TRAFFIC THROUGH JUNCTION 4

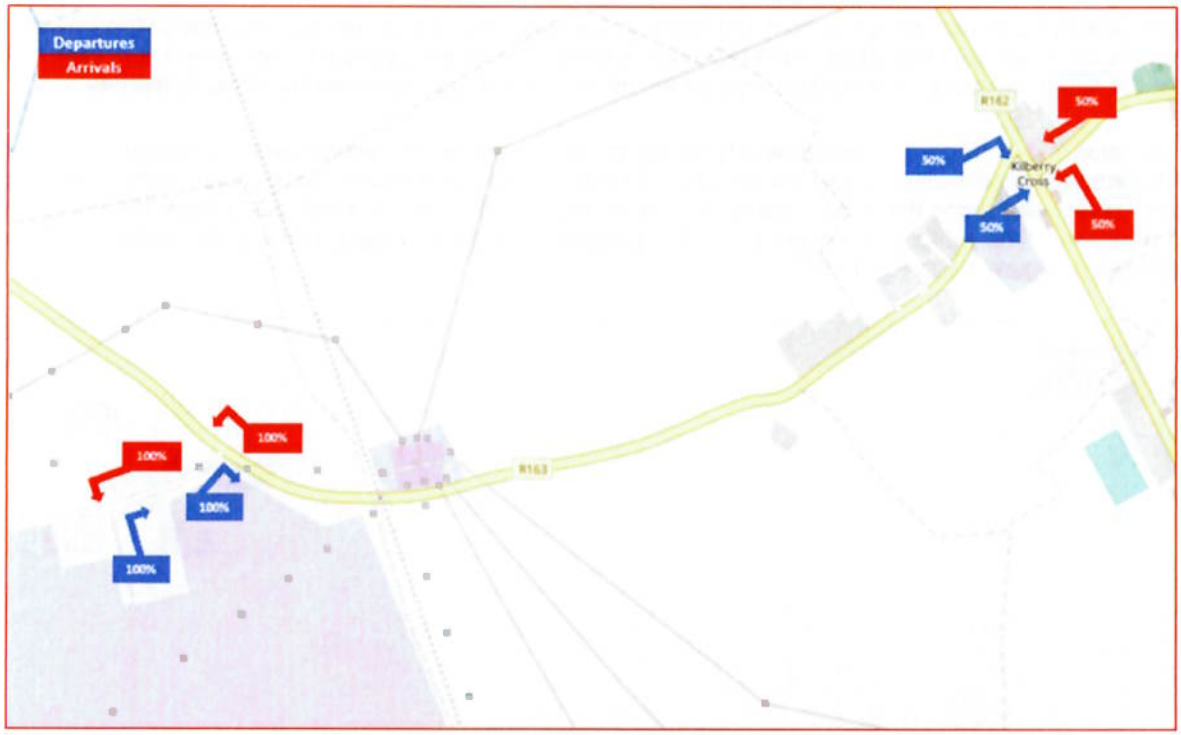

FIGURE 3.3: ASSIGNMENT OF LV CONSTRUCTION TRAFFIC THROUGH JUNCTIONS 1 TO 3

FIGURE 3.4: ASSIGNMENT OF LV CONSTRUCTION TRAFFIC THROUGH JUNCTION 4

3.3 Scope of Assessment

The construction of the proposed buttress will result in an increase in the traffic volumes at junctions within the road network in the vicinity of the Tailings Storage Facility, and on the routes between the site and the source of materials to the east and M3 Motorway.

Section 2.1 of the "Traffic and Transport Assessment Guidelines" published by Transport Infrastructure Ireland recommends that in an urban or congested setting a traffic assessment should include all roads and junctions where the development traffic exceeds 5% of the existing or background traffic.

Figure 3.5, Figure 3.6, and Figure 3.7 outline the distributed development traffic as a percentage of the background traffic on the surrounding road network for each construction option. The construction traffic is indicated as exceeding 5% of the background traffic on the local road network on the L74141 Local Road and R162 Regional Road for all options. The junctions which include the L74141 and R162 will therefore require a full capacity analysis (i.e. Junction 1, Junction 2 and Junction 3).

While the construction traffic does not exceed the 5% threshold at Junction 4, the N51/R162 Roundabout, it is considered prudent to also undertake a full capacity assessment at this junction, as it is located on a National Road.

As a result, this Traffic and Transport Assessment shall undertake a full capacity assessment of the following junctions, and the links between these junctions: -

- **Junction 1:** L74141/Site Access
- **Junction 2:** L74141/R163 T-Junction
- **Junction 3:** R162/R163 Staggered Crossroads
- **Junction 4:** R162/N51 Roundabout

FIGURE 3.5: PROPOSED CONSTRUCTION TRAFFIC AS A PERCENTAGE OF BACKGROUND TRAFFIC (OPTION A)

FIGURE 3.6: PROPOSED CONSTRUCTION TRAFFIC AS A PERCENTAGE OF BACKGROUND TRAFFIC (OPTION B)

FIGURE 3.7: PROPOSED CONSTRUCTION TRAFFIC AS A PERCENTAGE OF BACKGROUND TRAFFIC (OPTION C)

4 Road Impacts

4.1 Assessment Years

Three options have been considered for the proposed construction phase of the proposed buttress at the Tailings Storage Facility in Co. Meath. Each option is predicted to vary in duration due to the annual volume of material being imported to the site varying in each option. Option A proposes the shortest construction period of 1.5 years (823,296 tonnes per annum), Option B proposes a construction period of 2 years (617,472 tonnes per annum) and Option C proposes the longest construction period of 3 years (411,648 tonnes per annum).

The 'Opening Year' for the construction period is 2024. All options have therefore been assessed for this year and 2025 while Option C has been assessed for 2026 also. The assessment years for each option are summarised in Table 4-1 below.

TABLE 4-1: SUMMARY OF ASSESSMENT YEARS FOR EACH CONSTRUCTION PHASE OPTION

Option	Assessment Years			
	2021 (Base Year)	2024	2025	2026
A	✓	✓	✓	-
B	✓	✓	✓	-
C	✓	✓	✓	✓

4.2 Traffic Growth

Growth Factors outlined in the "Project Appraisal Guidelines - Unit 5.3 – Travel Demand Projections (PE-PAG-02017)," updated by TII in October 2021, have been used to determine future year traffic flows on the network from the estimated 2021 traffic count data.

Table 4-2 contains a summary of the traffic Growth Factors published in the "Project Appraisal Guidelines". For this assessment, a central growth scenario has been adopted (a 'central' growth scenario was assumed given the site location and scale).

TABLE 4-2: FUTURE YEAR TRAFFIC GROWTH FIGURES

Year	Low Growth		Central Growth		High Growth	
	LV	HV	LV	HV	LV	HV
2016-2030	1.0156	1.0349	**1.0173**	**1.0365**	1.0205	1.0400

5 Capacity Analysis - Option A (1.5 Years)

5.1 Link Capacity Assessment

When assessing the link capacity of a road a Level of Service D has been chosen as, according to the TII Publications document DN-GEO-03031, "Rural Road Link Design," it is at this level that, "*speeds begin to decline slightly with slight increase of flows and density begins to increase somewhat more quickly. Freedom to manoeuvre within the traffic stream is more noticeably limited, and the driver experiences reduced comfort levels.*"

The capacity of the local and national roads within the surrounding road network has therefore been assessed with reference to the TII Publications document DN-GEO-03031, "Rural Road Link Design," for a level of Service D.

5.1.1 L74141 Local Road

The TII Publications document reference DN-GEO-03031 (June 2017) provides guidance on recommended rural road layouts in its Table 6/1. It advises that the capacity of a Type 3 Single Carriageway Road with 6.0m cross-section is 5,000 AADT for a Level of Service D. The L74141 Local Road, adjacent to the site, has an average cross-section width of approximately 5.5m with no hard shoulders present. Therefore, the L74141 is considered to be most similar to the Type 3 Single Carriageway cross-section in this document with a capacity of 5,000 AADT for Level of Service D.

The combined background and construction traffic volumes, outlined in Table 5-1, in each of the assessment years is less than the LOS D capacity of 5,000 AADT for a Type 3 Single Carriageway. It is therefore considered that the L74141 will operate within capacity for each of the assessment years.

Table 5-1 indicates that the traffic associated with the construction of the proposed buttress represents between 33.62% and 33.21% of the total traffic on the L74141 during the construction years 2024 and 2025.

TABLE 5-1: COMBINED AADT FOR EACH ASSESSMENT YEAR (L74141)

	Assessment Year		
	Base Year	2024	2025
Background Traffic	515	545	555
Construction Traffic	-	276	276
Combined Traffic (Background + Construction Traffic)	515	821	831
Construction Traffic as % of Combined Traffic	-	33.62%	33.21%

5.1.2 R163 Regional Road

The TII Publications document reference DN-GEO-03031 (June 2017) provides guidance on recommended rural road layouts in its Table 6/1. It advises that the capacity of a Type 3 Single Carriageway Road with 6.0m cross-section is 5,000 AADT for a Level of Service D. The R163 Regional Road has an average cross-section width of approximately 6.5m with no hard shoulders present. Therefore, the R163 is considered to be most similar to the Type 3 Single Carriageway cross-section in this document with a capacity of 5,000 AADT for Level of Service D.

The combined background and construction traffic volumes, outlined in indicates that the traffic associated with the construction of the proposed buttress represents between 11.79% and 11.6% of the total traffic on the R163 during the construction years 2024 and 2025., in each of the assessment years is less than the LOS D capacity of 5,000 AADT for a Type 3 Single Carriageway. It is therefore considered that the R163 will operate within capacity for each of the assessment years.

indicates that the traffic associated with the construction of the proposed buttress represents between 11.79% and 11.6% of the total traffic on the R163 during the construction years 2024 and 2025. indicates that the traffic

associated with the construction of the proposed buttress represents between 11.79% and 11.6% of the total traffic on the R163 during the construction years 2024 and 2025.

	Assessment Year		
	Base Year	2024	2025
Background Traffic	1,952	2,064	2,103
Construction Traffic	-	276	276
Combined Traffic (Background + Construction Traffic)	1,952	2,340	2,379
Construction Traffic as % of Combined Traffic	-	11.79%	11.6%

5.1.3 R162 Regional Road

The TII Publications document reference DN-GEO-03031 (June 2017) provides guidance on recommended rural road layouts in its Table 6/1. It advises that the capacity of a Type 2 Single Carriageway Road with 7.0m cross-section is 8,600 AADT for a Level of Service D. The R162 Regional Road has a varying cross-section however, in the vicinity of its staggered crossroad junction with the R163, it has a width of approximately 7.0m with no hard shoulders present and ghost islands at its junction with the R163. Therefore, the R162 is considered to be most similar to the Type 2 Single Carriageway cross-section in this document with a capacity of 8,600 AADT for Level of Service D.

The combined background and construction traffic volumes, outlined in in indicates that the traffic associated with the construction of the proposed buttress represents between 2.09% and 2.05% of the total traffic on the R162 during the construction years 2024 and 2025.

Table 5-2, in each of the assessment years is less than the LOS D capacity of 8,600 AADT for a Type 2 Single Carriageway. It is therefore considered that the R162 will operate within capacity for each of the assessment years.

indicates that the traffic associated with the construction of the proposed buttress represents between 2.09% and 2.05% of the total traffic on the R162 during the construction years 2024 and 2025.

Table 5-2 indicates that the traffic associated with the construction of the proposed buttress represents between 2.09% and 2.05% of the total traffic on the R162 during the construction years 2024 and 2025.

Table 5-2: Combined AADT for each Assessment Year (R162)

	Assessment Year		
	Base Year	2024	2025
Background Traffic	6,368	6,742	6,872
Construction Traffic	-	144	144
Combined Traffic (Background + Construction Traffic)	6,368	6,886	7,016
Construction Traffic as % of Combined Traffic	-	2.09%	2.05%

5.1.4 N51 National Road

The TII Publications document reference DN-GEO-03031 (June 2017) provides guidance on recommended rural road layouts in its Table 6/1. It advises that the capacity of a Type 3 Dual Carriageway Road with 7.0m + 3.5m cross-section is 14,000 AADT for a Level of Service D. The N51 National Road has a varying cross-section however, in the vicinity of its roundabout junction with the R162, it has two westbound traffic lanes of approximately 3.0m wide each and one eastbound traffic lane of 3.0m wide approximately and a hatched central median. Therefore, the N51 is considered to be most similar to the Type 3 Dual Carriageway cross-section in this document with a capacity of 14,000 AADT for Level of Service D.

The combined background and construction traffic volumes, outlined in Table 5-3, in each of the assessment years is greater than the LOS D capacity of 14,000 AADT for a Type 3 Dual Carriageway, however this currently exceeds capacity during the base year and will continue to exceed capacity without the traffic generated by the construction of the proposed buttress.

Table 5-3 indicates that the traffic associated with the construction of the proposed buttress represents between 0.79% and 0.78% of the total traffic on the N51 during the construction years 2024 and 2025.

This indicates that the impact of the traffic generated during the proposed construction period on the existing traffic on the N51 National Road, despite exceeding capacity, is negligible.

TABLE 5-3: COMBINED AADT FOR EACH ASSESSMENT YEAR (N51)

	Assessment Year		
	Base Year	**2024**	**2025**
Background Traffic	16,994	17,966	18,304
Construction Traffic	-	144	144
Combined Traffic (Background + Construction Traffic)	16,994	18,110	18,448
Construction Traffic as % of Combined Traffic	-	0.79%	0.78%

5.2 Junction Capacity Analysis

The capacity of the surveyed junctions was assessed using the Transport Research Laboratory's (TRL) Junctions 9 computer programme.

Junction performance is measured as a ratio between the flow and capacity (RFC). The capacity analysis has been carried out for a period of 12-hours, which corresponds to the operational hours of the proposed construction period, for each of the assessment years. A rural junction with an RFC below 0.85 is considered to be operating within capacity, and an RFC of 0.85 indicates a junction operating at capacity.

The detailed junction capacity analysis outputs for the analysed junctions, for each of the assessment years, are contained within Appendix D of this report.

5.2.1 Location 1: Junction of L74141 & Site Access

A summary of the junction capacity analysis results for the Site Access junction are shown in Table 5-4. The results indicate that the junction will continue to operate within capacity for each of the construction years, 2024 and 2025.

TABLE 5-4: SUMMARY OF TRAFFIC ANALYSIS AT JUNCTION 1

	12 Hours (07:00 – 19:00)			
	Queue (Veh.)	Delay (s)	RFC	LOS
Stream	**2021 (Base Year)**			
Site Access – L74141 (West)	0.0	5.88	0.02	A
Site Access – L74141 (East)	0.1	15.20	0.07	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.71	0.01	A
Stream	**2024 (Construction Year 1) Without Development**			
Site Access – L74141 (West)	0.0	5.90	0.02	A
Site Access – L74141 (East)	0.1	15.24	0.07	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.71	0.01	A
Stream	**2024 (Construction Year 1) With Development**			
Site Access – L74141 (West)	0.0	6.01	0.02	A
Site Access – L74141 (East)	0.1	16.13	0.13	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.79	0.01	A
Stream	**2025 (Construction Year 2) Without Development**			
Site Access – L74141 (West)	0.0	5.91	0.02	A
Site Access – L74141 (East)	0.1	15.25	0.07	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.71	0.01	A
Stream	**2025 (Construction Year 2) With Development**			
Site Access – L74141 (West)	0.0	6.02	0.02	A
Site Access – L74141 (East)	0.1	16.16	0.13	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.79	0.01	A

5.2.2 Location 2: Junction of the L74141 & R163

A summary of the junction capacity analysis results for the L74141/R163 T-Junction are shown in Table 5-5. The results indicate that the junction will continue to operate within capacity for each of the construction years, 2024 and 2025.

TABLE 5-5: SUMMARY OF THE TRAFFIC ANALYSIS AT JUNCTION 2

	12 Hours (07:00 – 19:00)			
	Queue (Veh.)	Delay (s)	RFC	LOS
Stream	**Base Year (2021)**			
L74141 (West) – R163 (North)	0.2	11.29	0.14	B
L74141 (West) – R163 (South)	0.2	12.61	0.17	B
R163 (North) – R163 (South)/L74141 (West)	0.0	8.09	0.04	A
Stream	**2024 (Construction Year 1) Without Development**			
L74141 (West) – R163 (North)	0.2	11.31	0.14	B
L74141 (West) – R163 (South)	0.2	12.74	0.18	B
R163 (North) – R163 (South)/L74141 (West)	0.1	8.16	0.04	A
Stream	**2024 (Construction Year 1) With Development**			
L74141 (West) – R163 (North)	0.2	12.02	0.15	B
L74141 (West) – R163 (South)	0.2	15.11	0.23	C
R163 (North) – R163 (South)/L74141 (West)	0.1	8.20	0.04	A
Stream	**2025 (Construction Year 2) Without Development**			
L74141 (West) – R163 (North)	0.2	11.32	0.15	B
L74141 (West) – R163 (South)	0.2	12.79	0.18	B
R163 (North) – R163 (South)/L74141 (West)	0.1	8.19	0.04	A
Stream	**2025 (Construction Year 2) With Development**			
L74141 (West) – R163 (North)	0.2	12.02	0.15	B
L74141 (West) – R163 (South)	0.2	15.16	0.23	C
R163 (North) – R163 (South)/L74141 (West)	0.1	8.23	0.04	A

5.2.3 Location 3: Junction of the R162 & R163

A summary of the junction capacity analysis results for the R162/R163 Staggered Crossroads are shown in Table 5-6. The results indicate that the junction will continue to operate within capacity for each of the construction years, 2024 and 2025.

TABLE 5-6: SUMMARY OF TRAFFIC ANALYSIS AT JUNCTION 3

	12 Hours (07:00 – 19:00)			
	Queue (Veh.)	Delay (s)	RFC	LOS
Stream	**2021 (Base Year)**			
R163 (West) – R162 (South)	0.1	8.19	0.12	A
R163 (West) – R162 (North)/R163 (West)	0.4	12.26	0.28	B
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.45	0.08	B
R163 (West) – R162 (North)	0.1	11.59	0.13	B
R163 (West) – R163 (West)/R162 (South)	0.5	13.51	0.35	B
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	8.60	0.14	A
	2024 (Construction Year 1) Without Development			
R163 (West) – R162 (South)	0.1	8.34	0.13	A
R163 (West) – R162 (North)/R163 (West)	0.4	12.97	0.30	B
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.59	0.09	B
R163 (West) – R162 (North)	0.1	11.80	0.14	B
R163 (West) – R163 (West)/R162 (South)	0.6	14.45	0.38	B
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	8.82	0.15	A
Stream	**2024 (Construction Year 1) With Development**			
R163 (West) – R162 (South)	0.2	8.59	0.13	A
R163 (West) – R162 (North)/R163 (West)	0.5	15.22	0.32	C
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.76	0.09	B
R163 (West) – R162 (North)	0.2	12.24	0.15	B
R163 (West) – R163 (West)/R162 (South)	0.7	17.75	0.45	C
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	8.92	0.15	A
Stream	**2025 (Construction Year 2) Without Development**			
R163 (West) – R162 (South)	0.2	8.39	0.13	A
R163 (West) – R162 (North)/R163 (West)	0.4	13.24	0.31	B
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.64	0.09	B
R163 (West) – R162 (North)	0.2	11.88	0.14	B
R163 (West) – R163 (West)/R162 (South)	0.6	14.81	0.39	B
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	8.90	0.15	A
Stream	**2025 (Construction Year 2) With Development**			
R163 (West) – R162 (South)	0.2	8.67	0.14	A
R163 (West) – R162 (North)/R163 (West)	0.5	15.49	0.33	C
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.81	0.09	B
R163 (West) – R162 (North)	0.2	12.32	0.15	B
R163 (West) – R163 (West)/R162 (South)	0.8	18.22	0.46	C
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	9.00	0.16	A

5.2.4 Location 4: Junction of the R162 and N51 Roundabout

A summary of the junction capacity analysis results for the R162/N51 Roundabout are shown in Table 5-7. The results indicate that the R162 arm at the junction currently operates at capacity and will operate above capacity during the two future construction years (2024 & 2025) however this would be the case both with and without the additional construction traffic.

The proposed construction traffic has a negligible impact on the capacity of the junction. It will result in a maximum increase in vehicle queues of 1 vehicle and a maximum increase in delay of 4.49 seconds on the R162 in 2024 and a maximum increase in vehicle queues of 1.2 vehicles and a maximum increase in delay of 5.63 seconds on the R162 in 2025. This increase in vehicle queues and delay is however considered to be negligible with regards to the operation of the junction and the traffic generated by the construction period is therefore considered to have a negligible impact on the operation of the roundabout during the proposed construction period.

TABLE 5-7: SUMMARY OF TRAFFIC ANALYSIS AT JUNCTION 4

	12 Hours (07:00 – 19:00)			
	Queue (Veh.)	Delay (s)	RFC	LOS
Stream	**2021 (Base Year)**			
Arm 1 – N51 (West)	1.7	13.39	0.64	B
Arm 2 – R162 (East)	5.0	26.68	0.85	D
Arm 3 – N51 (East)	2.1	15.89	0.69	C
Arm 4 – Flower Hill	1.5	9.97	0.59	A
	2024 (Construction Year 1) Without Development			
Arm 1 – N51 (West)	2.1	16.04	0.69	C
Arm 2 – R162 (East)	8.0	40.61	0.92	E
Arm 3 – N51 (East)	2.8	19.82	0.75	C
Arm 4 – Flower Hill	1.9	12.35	0.64	B
Stream	**2024 (Construction Year 1) With Development**			
Arm 1 – N51 (West)	2.1	12.28	0.70	C
Arm 2 – R162 (East)	9.0	45.10	0.94	E
Arm 3 – N51 (East)	2.9	20.63	0.76	C
Arm 4 – Flower Hill	1.9	12.73	0.65	B
Stream	**2025 (Construction Year 2) Without Development**			
Arm 1 – N51 (West)	2.3	17.21	0.71	C
Arm 2 – R162 (East)	9.8	48.12	0.94	E
Arm 3 – N51 (East)	3.1	21.51	0.77	C
Arm 4 – Flower Hill	2.0	13.39	0.66	B
Stream	**2025 (Construction Year 2) With Development**			
Arm 1 – N51 (West)	2.3	17.48	0.72	C
Arm 2 – R162 (East)	11.0	53.75	0.96	F
Arm 3 – N51 (East)	3.2	22.37	0.78	C
Arm 4 – Flower Hill	2.1	13.80	0.67	B

6 Capacity Analysis - Option B (2 Years)

6.1 Link Capacity Assessment

When assessing the link capacity of a road a Level of Service D has been chosen as, according to the TII Publications document DN-GEO-03031, "Rural Road Link Design," it is at this level that, "*speeds begin to decline slightly with slight increase of flows and density begins to increase somewhat more quickly. Freedom to manoeuvre within the traffic stream is more noticeably limited, and the driver experiences reduced comfort levels.*"

The capacity of the local and national roads within the surrounding road network has therefore been assessed with reference to the TII Publications document DN-GEO-03031, "Rural Road Link Design," for a level of Service D.

6.1.1 L74141 Local Road

The TII Publications document reference DN-GEO-03031 (June 2017) provides guidance on recommended rural road layouts in its Table 6/1. It advises that the capacity of a Type 3 Single Carriageway Road with 6.0m cross-section is 5,000 AADT for a Level of Service D. The L74141 Local Road, adjacent to the site, has an average cross-section width of approximately 5.5m with no hard shoulders present. Therefore, the L74141 is considered to be most similar to the Type 3 Single Carriageway cross-section in this document with a capacity of 5,000 AADT for Level of Service D.

The combined background and construction traffic volumes, outlined in Table 6-1, in each of the assessment years is less than the LOS D capacity of 5,000 AADT for a Type 3 Single Carriageway. It is therefore considered that the L74141 will operate within capacity for each of the assessment years.

Table 6-1 indicates that the traffic associated with the construction of the proposed buttress represents between 27.81% and 27.45% of the total traffic on the L74141 during the construction years 2024 and 2025.

TABLE 6-1: COMBINED AADT FOR EACH ASSESSMENT YEAR (L74141)

	Assessment Year		
	Base Year	**2024**	**2025**
Background Traffic	515	545	555
Construction Traffic	-	210	210
Combined Traffic (Background + Construction Traffic)	515	755	765
Construction Traffic as % of Combined Traffic	-	27.81%	27.45%

6.1.2 R163 Regional Road

The TII Publications document reference DN-GEO-03031 (June 2017) provides guidance on recommended rural road layouts in its Table 6/1. It advises that the capacity of a Type 3 Single Carriageway Road with 6.0m cross-section is 5,000 AADT for a Level of Service D. The R163 Regional Road has an average cross-section width of approximately 6.5m with no hard shoulders present. Therefore, the R163 is considered to be most similar to the Type 3 Single Carriageway cross-section in this document with a capacity of 5,000 AADT for Level of Service D.

The combined background and construction traffic volumes, outlined in Table 6-2, in each of the assessment years is less than the LOS D capacity of 5,000 AADT for a Type 3 Single Carriageway. It is therefore considered that the R163 will operate within capacity for each of the assessment years.

Table 6-2 indicates that the traffic associated with the construction of the proposed buttress represents between 9.23% and 9.08% of the total traffic on the R163 during the construction years 2024 and 2025.

TABLE 6-2: COMBINED AADT FOR EACH ASSESSMENT YEAR (R163)

	Assessment Year		
	Base Year	2024	2025
Background Traffic	1,952	2,064	2,103
Construction Traffic	-	210	210
Combined Traffic (Background + Construction Traffic)	1,952	2,274	2,313
Construction Traffic as % of Combined Traffic	-	9.23%	9.08%

6.1.3 R162 Regional Road

The TII Publications document reference DN-GEO-03031 (June 2017) provides guidance on recommended rural road layouts in its Table 6/1. It advises that the capacity of a Type 2 Single Carriageway Road with 7.0m cross-section is 8,600 AADT for a Level of Service D. The R162 Regional Road has a varying cross-section however, in the vicinity of its staggered crossroad junction with the R163, it has a width of approximately 7.0m with no hard shoulders present and ghost islands at its junction with the R163. Therefore, the R162 is considered to be most similar to the Type 2 Single Carriageway cross-section in this document with a capacity of 8,600 AADT for Level of Service D.

The combined background and construction traffic volumes, outlined in Table 6-3, in each of the assessment years is less than the LOS D capacity of 8,600 AADT for a Type 2 Single Carriageway. It is therefore considered that the R162 will operate within capacity for each of the assessment years.

Table 6-3 indicates that the traffic associated with the construction of the proposed buttress represents between 1.62% and 1.59% of the total traffic on the R162 during the construction years 2024 and 2025.

TABLE 6-3: COMBINED AADT FOR EACH ASSESSMENT YEAR (R162)

	Assessment Year		
	Base Year	2024	2025
Background Traffic	6,368	6,742	6,872
Construction Traffic	-	111	111
Combined Traffic (Background + Construction Traffic)	6,368	6,853	6,983
Construction Traffic as % of Combined Traffic	-	1.62%	1.59%

6.1.4 N51 National Road

The TII Publications document reference DN-GEO-03031 (June 2017) provides guidance on recommended rural road layouts in its Table 6/1. It advises that the capacity of a Type 3 Dual Carriageway Road with 7.0m + 3.5m cross-section is 14,000 AADT for a Level of Service D. The N51 National Road has a varying cross-section however, in the vicinity of its roundabout junction with the R162, it has two westbound traffic lanes of approximately 3.0m wide each and one eastbound traffic lane of 3.0m wide approximately and a hatched central median. Therefore, the N51 is considered to be most similar to the Type 3 Dual Carriageway cross-section in this document with a capacity of 14,000 AADT for Level of Service D.

The combined background and construction traffic volumes, outlined in Table 6-4, in each of the assessment years is greater than the LOS D capacity of 14,000 AADT for a Type 3 Dual Carriageway, however this currently exceeds capacity during the base year and will continue to exceed capacity without the traffic generated by the construction of the proposed buttress.

Table 6-4 indicates that the traffic associated with the construction of the proposed buttress represents between 0.61% and 0.60% of the total traffic on the N51 during the construction years 2024 and 2025. This

indicates that the impact of the traffic generated during the proposed construction period on the existing traffic on the N51 National Road, despite exceeding capacity, is negligible.

TABLE 6-4: COMBINED AADT FOR EACH ASSESSMENT YEAR (N51)

	Assessment Year		
	Base Year	2024	2025
Background Traffic	16,994	17,966	18,304
Construction Traffic	-	111	111
Combined Traffic (Background + Construction Traffic)	16,994	18,077	18,415
Construction Traffic as % of Combined Traffic	-	0.61%	0.60%

6.2 Junction Capacity Analysis

The capacity of the surveyed junctions was assessed using the Transport Research Laboratory's (TRL) Junctions 9 computer programme.

Junction performance is measured as a ratio between the flow and capacity (RFC). The capacity analysis has been carried out for a period of 12-hours, which corresponds to the operational hours of the proposed construction period, for each of the assessment years. A rural junction with an RFC below 0.85 is considered to be operating within capacity, and an RFC of 0.85 indicates a junction operating at capacity.

The detailed junction capacity analysis outputs for the analysed junctions, for each of the assessment years, are contained within Appendix D of this report.

6.2.1 Location 1: Junction of L74141 & Site Access

A summary of the junction capacity analysis results for the Site Access junction are shown in Table 6-5. The results indicate that the junction will continue to operate within capacity for each of the construction years, 2024 and 2025.

TABLE 6-5: SUMMARY OF TRAFFIC ANALYSIS AT JUNCTION 1

	12 Hours (07:00 – 19:00)			
	Queue (Veh.)	Delay (s)	RFC	LOS
Stream	**2021 (Base Year)**			
Site Access – L74141 (West)	0.0	5.88	0.02	A
Site Access – L74141 (East)	0.1	15.20	0.07	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.71	0.01	A
Stream	**2024 (Construction Year 1) Without Development**			
Site Access – L74141 (West)	0.0	5.90	0.02	A
Site Access – L74141 (East)	0.1	15.24	0.07	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.71	0.01	A
Stream	**2024 (Construction Year 1) With Development**			
Site Access – L74141 (West)	0.0	5.99	0.02	A
Site Access – L74141 (East)	0.1	15.90	0.12	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.77	0.01	A
Stream	**2025 (Construction Year 2) Without Development**			
Site Access – L74141 (West)	0.0	5.91	0.02	A
Site Access – L74141 (East)	0.1	15.25	0.07	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.71	0.01	A
Stream	**2025 (Construction Year 2) With Development**			
Site Access – L74141 (West)	0.0	5.99	0.02	A
Site Access – L74141 (East)	0.1	15.92	0.12	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.77	0.01	A

6.2.2 Location 2: Junction of the L74141 & R163

A summary of the junction capacity analysis results for the L74141/R163 T-Junction are shown in Table 6-6. The results indicate that the junction will continue to operate within capacity for each of the construction years, 2024 and 2025.

TABLE 6-6: SUMMARY OF THE TRAFFIC ANALYSIS AT JUNCTION 2

	12 Hours (07:00 – 19:00)			
	Queue (Veh.)	Delay (s)	RFC	LOS
Stream	**2021 (Base Year)**			
L74141 (West) – R163 (North)	0.2	11.29	0.14	B
L74141 (West) – R163 (South)	0.2	12.61	0.17	B
R163 (North) – R163 (South)/L74141 (West)	0.0	8.09	0.04	A
	2024 (Construction Year 1) Without Development			
L74141 (West) – R163 (North)	0.2	11.31	0.14	B
L74141 (West) – R163 (South)	0.2	12.74	0.18	B
R163 (North) – R163 (South)/L74141 (West)	0.1	8.16	0.04	A
Stream	**2024 (Construction Year 1) With Development**			
L74141 (West) – R163 (North)	0.2	11.89	0.15	B
L74141 (West) – R163 (South)	0.2	14.96	0.22	B
R163 (North) – R163 (South)/L74141 (West)	0.1	8.19	0.04	A
Stream	**2025 (Construction Year 2) Without Development**			
L74141 (West) – R163 (North)	0.2	11.32	0.15	B
L74141 (West) – R163 (South)	0.2	12.79	0.18	B
R163 (North) – R163 (South)/L74141 (West)	0.1	8.19	0.04	A
Stream	**2025 (Construction Year 2) With Development**			
L74141 (West) – R163 (North)	0.2	11.89	0.15	B
L74141 (West) – R163 (South)	0.2	15.00	0.22	C
R163 (North) – R163 (South)/L74141 (West)	0.1	8.22	0.04	A

6.2.3 Location 3: Junction of the R162 & R163

A summary of the junction capacity analysis results for the R162/R163 Staggered Crossroads are shown in Table 6-7. The results indicate that the junction will continue to operate within capacity for each of the construction years, 2024 and 2025.

TABLE 6-7: SUMMARY OF THE TRAFFIC ANALYSIS AT JUNCTION 3

	12 Hours (07:00 – 19:00)			
	Queue (Veh.)	Delay (s)	RFC	LOS
Stream	**2021 (Base Year)**			
R163 (West) – R162 (South)	0.1	8.19	0.12	A
R163 (West) – R162 (North)/R163 (West)	0.4	12.26	0.28	B
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.45	0.08	B
R163 (West) – R162 (North)	0.1	11.59	0.13	B
R163 (West) – R163 (West)/R162 (South)	0.5	13.51	0.35	B
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	8.60	0.14	A
Stream	**2024 (Construction Year 1) Without Development**			
R163 (West) – R162 (South)	0.1	8.34	0.13	A
R163 (West) – R162 (North)/R163 (West)	0.4	12.97	0.30	B
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.59	0.09	B
R163 (West) – R162 (North)	0.1	11.80	0.14	B
R163 (West) – R163 (West)/R162 (South)	0.6	14.45	0.38	B
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	8.82	0.15	A
Stream	**2024 (Construction Year 1) With Development**			
R163 (West) – R162 (South)	0.2	8.53	0.13	A
R163 (West) – R162 (North)/R163 (West)	0.4	14.61	0.32	B
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.72	0.09	B
R163 (West) – R162 (North)	0.2	12.13	0.15	B
R163 (West) – R163 (West)/R162 (South)	0.7	16.97	0.43	C
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	8.90	0.15	A
Stream	**2025 (Construction Year 2) Without Development**			
R163 (West) – R162 (South)	0.2	8.39	0.13	A
R163 (West) – R162 (North)/R163 (West)	0.4	13.24	0.31	B
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.64	0.09	B
R163 (West) – R162 (North)	0.2	11.88	0.14	B
R163 (West) – R163 (West)/R162 (South)	0.6	14.81	0.39	B
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	8.90	0.15	A
Stream	**2025 (Construction Year 2) With Development**			
R163 (West) – R162 (South)	0.2	8.58	0.14	A
R163 (West) – R162 (North)/R163 (West)	0.5	14.86	0.33	B
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.77	0.09	B
R163 (West) – R162 (North)	0.2	12.21	0.15	B
R163 (West) – R163 (West)/R162 (South)	0.7	17.42	0.44	C
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	8.97	0.16	A

6.2.4 Location 4: Junction of the R162 and N51 Roundabout

A summary of the junction capacity analysis results for the R162/N51 Roundabout are shown in Table 6-8.

The results indicate that the R162 arm at the junction currently operates at capacity and will operate above capacity during the two future construction years (2024 & 2025) however this would be the case both with and without the additional construction traffic.

The proposed construction traffic has a negligible impact on the capacity of the junction. It will result in a maximum increase in vehicle queues of 0.7 vehicles and a maximum increase in delay of 3.32 seconds on the R162 in 2024 and a maximum increase in vehicle queues of 0.9 vehicles and a maximum increase in delay of 4.17 seconds on the R162 in 2025. This increase in vehicle queues and delay is however considered to be negligible with regards to the operation of the junction and the traffic generated by the construction period is therefore considered to have a negligible impact on the operation of the roundabout during the proposed construction period.

TABLE 6-8: SUMMARY OF TRAFFIC ANALYSIS AT JUNCTION 4

	12 Hours (07:00 – 19:00)			
	Queue (Veh.)	Delay (s)	RFC	LOS
Stream	**2021 (Base Year)**			
Arm 1 – N51 (West)	1.7	13.39	0.64	B
Arm 2 – R162 (East)	5.0	26.68	0.85	D
Arm 3 – N51 (East)	2.1	15.89	0.69	C
Arm 4 – Flower Hill	1.5	9.97	0.59	A
Stream	**2024 (Construction Year 1) Without Development**			
Arm 1 – N51 (West)	2.1	16.04	0.69	C
Arm 2 – R162 (East)	8.0	40.61	0.92	E
Arm 3 – N51 (East)	2.8	19.82	0.75	C
Arm 4 – Flower Hill	1.9	12.35	0.64	B
Stream	**2024 (Construction Year 1) With Development**			
Arm 1 – N51 (West)	2.1	16.22	0.69	C
Arm 2 – R162 (East)	8.7	43.93	0.93	E
Arm 3 – N51 (East)	2.9	20.52	0.76	C
Arm 4 – Flower Hill	1.9	12.68	0.65	B
Stream	**2025 (Construction Year 2) Without Development**			
Arm 1 – N51 (West)	2.3	17.21	0.71	C
Arm 2 – R162 (East)	9.8	48.12	0.94	E
Arm 3 – N51 (East)	3.1	21.51	0.77	C
Arm 4 – Flower Hill	2.0	13.39	0.66	B
Stream	**2025 (Construction Year 2) With Development**			
Arm 1 – N51 (West)	2.3	17.41	0.71	C
Arm 2 – R162 (East)	10.7	52.29	0.95	F
Arm 3 – N51 (East)	3.2	22.26	0.78	C
Arm 4 – Flower Hill	2.1	13.74	0.67	B

7 Capacity Analysis - Option C (3 Years)

7.1 Link Capacity Assessment

When assessing the link capacity of a road a Level of Service D has been chosen as, according to the TII Publications document DN-GEO-03031, "Rural Road Link Design," it is at this level that, "*speeds begin to decline slightly with slight increase of flows and density begins to increase somewhat more quickly. Freedom to manoeuvre within the traffic stream is more noticeably limited, and the driver experiences reduced comfort levels.*"

The capacity of the local and national roads within the surrounding road network has therefore been assessed with reference to the TII Publications document DN-GEO-03031, "Rural Road Link Design," for a level of Service D.

7.1.1 L74141 Local Road

The TII Publications document reference DN-GEO-03031 (June 2017) provides guidance on recommended rural road layouts in its Table 6/1. It advises that the capacity of a Type 3 Single Carriageway Road with 6.0m cross-section is 5,000 AADT for a Level of Service D. The L74141 Local Road, adjacent to the site, has an average cross-section width of approximately 5.5m with no hard shoulders present. Therefore, the L74141 is considered to be most similar to the Type 3 Single Carriageway cross-section in this document with a capacity of 5,000 AADT for Level of Service D.

The combined background and construction traffic volumes, outlined in Table 7-1, in each of the assessment years is less than the LOS D capacity of 5,000 AADT for a Type 3 Single Carriageway. It is therefore considered that the L74141 will operate within capacity for each of the assessment years.

Table 7-1 indicates that the traffic associated with the construction of the proposed buttress represents between 21.01% and 20.42% of the total traffic on the L74141 during the construction years 2024, 2025 & 2026.

TABLE 7-1: COMBINED AADT FOR EACH ASSESSMENT YEAR (L74141)

	Assessment Year			
	Base Year	2024	2025	2026
Background Traffic	515	545	555	565
Construction Traffic	-	145	145	145
Combined Traffic (Background + Construction Traffic)	515	690	700	710
Construction Traffic as % of Combined Traffic	-	21.01%	20.71%	20.42%

7.1.2 R163 Regional Road

The TII Publications document reference DN-GEO-03031 (June 2017) provides guidance on recommended rural road layouts in its Table 6/1. It advises that the capacity of a Type 3 Single Carriageway Road with 6.0m cross-section is 5,000 AADT for a Level of Service D. The R163 Regional Road has an average cross-section width of approximately 6.5m with no hard shoulders present. Therefore, the R163 is considered to be most similar to the Type 3 Single Carriageway cross-section in this document with a capacity of 5,000 AADT for Level of Service D.

The combined background and construction traffic volumes, outlined in Table 7-2, in each of the assessment years is less than the LOS D capacity of 5,000 AADT for a Type 3 Single Carriageway. It is therefore considered that the R163 will operate within capacity for each of the assessment years.

Table 7-2 indicates that the traffic associated with the construction of the proposed buttress represents between 6.56% and 6.34% of the total traffic on the R163 during the construction years 2024, 2025 & 2026.

TABLE 7-2: COMBINED AADT FOR EACH ASSESSMENT YEAR (R163)

	Assessment Year			
	Base Year	2024	2025	2026
Background Traffic	1,952	2,064	2,103	2,143
Construction Traffic	-	145	145	145
Combined Traffic (Background + Construction Traffic)	1,952	2,209	2,248	2,288
Construction Traffic as % of Combined Traffic	-	6.56%	6.45%	6.34%

7.1.3 R162 Regional Road

The TII Publications document reference DN-GEO-03031 (June 2017) provides guidance on recommended rural road layouts in its Table 6/1. It advises that the capacity of a Type 2 Single Carriageway Road with 7.0m cross-section is 8,600 AADT for a Level of Service D. The R162 Regional Road has a varying cross-section however, in the vicinity of its staggered crossroad junction with the R163, it has a width of approximately 7.0m with no hard shoulders present and ghost islands at its junction with the R163. Therefore, the R162 is considered to be most similar to the Type 2 Single Carriageway cross-section in this document with a capacity of 8,600 AADT for Level of Service D.

The combined background and construction traffic volumes, outlined in Table 7-3, in each of the assessment years is less than the LOS D capacity of 8,600 AADT for a Type 2 Single Carriageway. It is therefore considered that the R162 will operate within capacity for each of the assessment years.

Table 7-3 indicates that the traffic associated with the construction of the proposed buttress represents between 1.14% and 1.10% of the total traffic on the R162 during the construction years 2024, 2025 & 2026.

TABLE 7-3: COMBINED AADT FOR EACH ASSESSMENT YEAR (R162)

	Assessment Year			
	Base Year	2024	2025	2026
Background Traffic	6,368	6,742	6,872	7,004
Construction Traffic	-	78	78	78
Combined Traffic (Background + Construction Traffic)	6,368	6,820	6,950	7,082
Construction Traffic as % of Combined Traffic	-	1.14%	1.12%	1.10%

7.1.4 N51 National Road

The TII Publications document reference DN-GEO-03031 (June 2017) provides guidance on recommended rural road layouts in its Table 6/1. It advises that the capacity of a Type 3 Dual Carriageway Road with 7.0m + 3.5m cross-section is 14,000 AADT for a Level of Service D. The N51 National Road has a varying cross-section however, in the vicinity of its roundabout junction with the R162, it has two westbound traffic lanes of approximately 3.0m wide each and one eastbound traffic lane of 3.0m wide approximately and a hatched central median. Therefore, the N51 is considered to be most similar to the Type 3 Dual Carriageway cross-section in this document with a capacity of 14,000 AADT for Level of Service D.

The combined background and construction traffic volumes, outlined in Table 7-4, in each of the assessment years is greater than the LOS D capacity of 14,000 AADT for a Type 3 Dual Carriageway, however this currently exceeds capacity during the base year and will continue to exceed capacity without the traffic generated by the construction of the proposed buttress.

Table 7-4 indicates that the traffic associated with the construction of the proposed buttress represents between 0.43% and 0.42% of the total traffic on the N51 during the construction years 2024, 2025 & 2026.

TABLE 7-4: COMBINED AADT FOR EACH ASSESSMENT YEAR (N51)

	Assessment Year			
	Base Year	2024	2025	2026
Background Traffic	16,994	17,966	18,304	18,647
Construction Traffic	-	78	78	78
Combined Traffic (Background + Construction Traffic)	16,994	18,044	18,382	18,725
Construction Traffic as % of Combined Traffic	-	0.43%	0.42%	0.42%

7.2 Junction Capacity Analysis

The capacity of the surveyed junctions was assessed using the Transport Research Laboratory's (TRL) Junctions 9 computer programme.

Junction performance is measured as a ratio between the flow and capacity (RFC). The capacity analysis has been carried out for a period of 12-hours, which corresponds to the operational hours of the proposed construction period, for each of the assessment years. A rural junction with an RFC below 0.85 is considered to be operating within capacity, and an RFC of 0.85 indicates a junction operating at capacity.

The detailed junction capacity analysis outputs for the analysed junctions, for each of the assessment years, are contained within Appendix D of this report.

7.2.1 Location 1: Junction of L74141 & Site Access

A summary of the junction capacity analysis results for the Site Access junction are shown in Table 7-5. The results indicate that the junction will continue to operate within capacity for each of the construction years, 2024, 2025, and 2026.

TABLE 7-5: SUMMARY OF TRAFFIC ANALYSIS AT JUNCTION 1

	12 Hours (07:00 – 19:00)			
	Queue (Veh.)	Delay (s)	RFC	LOS
Stream	**2021 (Base Year)**			
Site Access – L74141 (West)	0.0	5.88	0.02	A
Site Access – L74141 (East)	0.1	15.20	0.07	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.71	0.01	A
Stream	**2024 (Construction Year 1) Without Development**			
Site Access – L74141 (West)	0.0	5.90	0.02	A
Site Access – L74141 (East)	0.1	15.24	0.07	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.71	0.01	A
Stream	**2024 (Construction Year 1) With Development**			
Site Access – L74141 (West)	0.0	5.96	0.02	A
Site Access – L74141 (East)	0.1	15.73	0.11	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.75	0.01	A
Stream	**2025 (Construction Year 2) Without Development**			
Site Access – L74141 (West)	0.0	5.91	0.02	A
Site Access – L74141 (East)	0.1	15.25	0.07	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.71	0.01	A
Stream	**2025 (Construction Year 2) With Development**			
Site Access – L74141 (West)	0.0	5.97	0.02	A
Site Access – L74141 (East)	0.1	15.75	0.11	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.75	0.01	A
Stream	**2026 (Construction Year 3) Without Development**			
Site Access – L74141 (West)	0.0	5.91	0.02	A
Site Access – L74141 (East)	0.1	15.27	0.08	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.71	0.01	A
Stream	**2026 (Construction Year 3) With Development**			
Site Access – L74141 (West)	0.0	5.98	0.02	A
Site Access – L74141 (East)	0.1	15.77	0.11	C
L74141 (West) – L74141 (East)/Site Access	0.0	5.75	0.01	A

7.2.2 Location 2: Junction of the L74141 & R163

A summary of the junction capacity analysis results for the L74141/R163 T-Junction are shown in Table 7-6. The results indicate that the junction will continue to operate within capacity for each of the construction years 2024, 2025, and 2026.

TABLE 7-6: SUMMARY OF THE TRAFFIC ANALYSIS AT JUNCTION 2

	12 Hours (07:00 – 19:00)			
	Queue (Veh.)	Delay (s)	RFC	LOS
Stream	**2021 (Base Year)**			
L74141 (West) – R163 (North)	0.2	11.29	0.14	B
L74141 (West) – R163 (South)	0.2	12.61	0.17	B
R163 (North) – R163 (South)/L74141 (West)	0.0	8.09	0.04	A
	2024 (Construction Year 1) Without Development			
L74141 (West) – R163 (North)	0.2	11.31	0.14	B
L74141 (West) – R163 (South)	0.2	12.74	0.18	B
R163 (North) – R163 (South)/L74141 (West)	0.1	8.16	0.04	A
Stream	**2024 (Construction Year 1) With Development**			
L74141 (West) – R163 (North)	0.2	11.73	0.15	B
L74141 (West) – R163 (South)	0.2	14.81	0.21	B
R163 (North) – R163 (South)/L74141 (West)	0.1	8.18	0.04	A
Stream	**2025 (Construction Year 2) Without Development**			
L74141 (West) – R163 (North)	0.2	11.32	0.15	B
L74141 (West) – R163 (South)	0.2	12.79	0.18	B
R163 (North) – R163 (South)/L74141 (West)	0.1	8.19	0.04	A
Stream	**2025 (Construction Year 2) With Development**			
L74141 (West) – R163 (North)	0.2	11.74	0.15	B
L74141 (West) – R163 (South)	0.2	14.85	0.21	B
R163 (North) – R163 (South)/L74141 (West)	0.1	8.21	0.04	A
Stream	**2026 (Construction Year 3) Without Development**			
L74141 (West) – R163 (North)	0.2	11.33	0.15	B
L74141 (West) – R163 (South)	0.2	12.84	0.18	B
R163 (North) – R163 (South)/L74141 (West)	0.1	8.21	0.04	A
Stream	**2026 (Construction Year 3) With Development**			
L74141 (West) – R163 (North)	0.2	11.74	0.15	B
L74141 (West) – R163 (South)	0.2	14.90	0.22	B
R163 (North) – R163 (South)/L74141 (West)	0.1	8.23	0.04	A

7.2.3 Location 3: Junction of the R162 & R163

A summary of the junction capacity analysis results for the R162/R163 Staggered Crossroads are shown in Table 7-7. The results indicate that the junction will continue to operate within capacity for each of the construction years 2024, 2025, and 2026.

TABLE 7-7: SUMMARY OF THE TRAFFIC ANALYSIS AT JUNCTION 3

	12 Hours (07:00 – 19:00)			
	Queue (Veh.)	Delay (s)	RFC	LOS
Stream	**2021 (Base Year)**			
R163 (West) – R162 (South)	0.1	8.19	0.12	A
R163 (West) – R162 (North)/R163 (West)	0.4	12.26	0.28	B
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.45	0.08	B
R163 (West) – R162 (North)	0.1	11.59	0.13	B
R163 (West) – R163 (West)/R162 (South)	0.5	13.51	0.35	B
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	8.60	0.14	A
Stream	**2024 (Construction Year 1) Without Development**			
R163 (West) – R162 (South)	0.1	8.34	0.13	A
R163 (West) – R162 (North)/R163 (West)	0.4	12.97	0.30	B
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.59	0.09	B
R163 (West) – R162 (North)	0.1	11.80	0.14	B
R163 (West) – R163 (West)/R162 (South)	0.6	14.45	0.38	B
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	8.82	0.15	A
Stream	**2024 (Construction Year 1) With Development**			
R163 (West) – R162 (South)	0.2	8.47	0.13	A
R163 (West) – R162 (North)/R163 (West)	0.4	13.99	0.31	B
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.67	0.09	B
R163 (West) – R162 (North)	0.2	12.03	0.15	B
R163 (West) – R163 (West)/R162 (South)	0.7	16.22	0.42	C
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	8.87	0.15	A
Stream	**2025 (Construction Year 2) Without Development**			
R163 (West) – R162 (South)	0.2	8.39	0.13	A
R163 (West) – R162 (North)/R163 (West)	0.4	13.24	0.31	B
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.64	0.09	B
R163 (West) – R162 (North)	0.2	11.88	0.14	B
R163 (West) – R163 (West)/R162 (South)	0.6	14.81	0.39	B
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	8.90	0.15	A
Stream	**2025 (Construction Year 2) With Development**			
R163 (West) – R162 (South)	0.2	8.52	0.14	A
R163 (West) – R162 (North)/R163 (West)	0.5	14.24	0.32	B
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.72	0.09	B
R163 (West) – R162 (North)	0.2	12.10	0.15	B
R163 (West) – R163 (West)/R162 (South)	0.7	16.64	0.43	C
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	8.95	0.16	A
Stream	**2026 (Construction Year 3) Without Development**			
R163 (West) – R162 (South)	0.2	8.44	0.14	A
R163 (West) – R162 (North)/R163 (West)	0.4	13.52	0.31	B
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.69	0.10	B
R163 (West) – R162 (North)	0.2	11.96	0.15	B

	12 Hours (07:00 – 19:00)			
	Queue (Veh.)	Delay (s)	RFC	LOS
R163 (West) – R163 (West)/R162 (South)	0.6	15.19	0.40	C
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	8.98	0.16	A
Stream	**2026 (Construction Year 3) With Development**			
R163 (West) – R162 (South)	0.2	8.57	0.14	A
R163 (West) – R162 (North)/R163 (West)	0.5	14.50	0.33	B
R162 (North) – R163 (West)/R162 (South)/R163 (West)	0.1	12.78	0.10	B
R163 (West) – R162 (North)	0.2	12.18	0.15	B
R163 (West) – R163 (West)/R162 (South)	0.7	17.09	0.44	C
R162 (South) – R162 (North)/R163 (West)/R163 (West)	0.2	9.03	0.16	A

7.2.4 Location 4: Junction of the R162 and N51 Roundabout

A summary of the junction capacity analysis results for the R162/N51 Roundabout are shown in The proposed construction traffic has a negligible impact on the capacity of the junction. It will result in a maximum increase in vehicle queues of 0.5 vehicles and a maximum increase in delay of 2.19 seconds on the R162 in 2024, a maximum increase in vehicle queues of 0.6 vehicles and a maximum increase in delay of 2.76 seconds on the R162 in 2025 and a maximum increase in vehicle queues of 0.9 vehicles and a maximum increase in delay of 3.47 seconds on the R162 in 2026. This increase in vehicle queues and delay is however considered to be negligible with regards to the operation of the junction and the traffic generated by the construction period is therefore considered to have a negligible impact on the operation of the roundabout during the proposed construction period.

Table 7-8. The results indicate that the R162 arm at the junction currently operates at capacity and will operate above capacity during the three future construction years (2024, 2025, and 2026) however this would be the case both with and without the additional construction traffic.

The proposed construction traffic has a negligible impact on the capacity of the junction. It will result in a maximum increase in vehicle queues of 0.5 vehicles and a maximum increase in delay of 2.19 seconds on the R162 in 2024, a maximum increase in vehicle queues of 0.6 vehicles and a maximum increase in delay of 2.76 seconds on the R162 in 2025 and a maximum increase in vehicle queues of 0.9 vehicles and a maximum increase in delay of 3.47 seconds on the R162 in 2026. This increase in vehicle queues and delay is however considered to be negligible with regards to the operation of the junction and the traffic generated by the construction period is therefore considered to have a negligible impact on the operation of the roundabout during the proposed construction period.

TABLE 7-8: SUMMARY OF TRAFFIC ANALYSIS AT JUNCTION 4

	12 Hours (07:00 – 19:00)			
	Queue (Veh.)	Delay (s)	RFC	LOS
Stream	**2021 (Base Year)**			
Arm 1 – N51 (West)	1.7	13.39	0.64	B
Arm 2 – R162 (East)	5.0	26.68	0.85	D
Arm 3 – N51 (East)	2.1	15.89	0.69	C
Arm 4 – Flower Hill	1.5	9.97	0.59	A
Stream	**2024 (Construction Year 1) Without Development**			
Arm 1 – N51 (West)	2.1	16.04	0.69	C
Arm 2 – R162 (East)	8.0	40.61	0.92	E
Arm 3 – N51 (East)	2.8	19.82	0.75	C
Arm 4 – Flower Hill	1.9	12.35	0.64	B
Stream	**2024 (Construction Year 1) With Development**			

	12 Hours (07:00 – 19:00)			
	Queue (Veh.)	Delay (s)	RFC	LOS
Arm 1 – N51 (West)	2.1	16.16	0.69	C
Arm 2 – R162 (East)	8.5	42.80	0.93	E
Arm 3 – N51 (East)	2.9	20.41	0.76	C
Arm 4 – Flower Hill	1.9	12.63	0.65	B
Stream	**2025 (Construction Year 2) Without Development**			
Arm 1 – N51 (West)	2.3	17.21	0.71	C
Arm 2 – R162 (East)	9.8	48.12	0.94	E
Arm 3 – N51 (East)	3.1	21.51	0.77	C
Arm 4 – Flower Hill	2.0	13.39	0.66	B
Stream	**2025 (Construction Year 2) With Development**			
Arm 1 – N51 (West)	2.3	17.34	0.71	C
Arm 2 – R162 (East)	10.4	50.88	0.95	F
Arm 3 – N51 (East)	3.2	22.14	0.78	C
Arm 4 – Flower Hill	2.1	13.69	0.67	B
Stream	**2026 (Construction Year 3) Without Development**			
Arm 1 – N51 (West)	2.5	18.56	0.73	C
Arm 2 – R162 (East)	12.1	57.79	0.96	F
Arm 3 – N51 (East)	3.5	23.43	0.80	C
Arm 4 – Flower Hill	2.2	14.59	0.69	B
Stream	**2026 (Construction Year 3) With Development**			
Arm 1 – N51 (West)	2.6	18.71	0.73	C
Arm 2 – R162 (East)	13.0	61.26	0.97	F
Arm 3 – N51 (East)	3.6	24.09	0.80	C
Arm 4 – Flower Hill	2.3	14.90	0.69	B

8 Road Safety

8.1 Collision History

The Road Safety Authority website (www.rsa.ie) was consulted to identify historical collisions on the L74141 in the vicinity of the Site access. The website includes summary information on collision occurrence for the period 2005 to 2016.

The historical collision data indicates that there were no collisions recorded in the vicinity of the site access between 2005 and 2016 (see Figure 8.1).

FIGURE 8.1: HISTORICAL COLLISIONS RECORDED ON THE L74141 IN THE VICINITY OF THE SITE ACCESS (SOURCE WWW.RSA.IE)

8.2 Sightlines

The entrance to the Site is provided via an existing access on the L74141 Local Road. The L74141 continues to the east of the Site access in one direction and to the west of the Site access in the other direction. The posted speed limit on the L74141 at, and on the approaches to the Site access, is 80kph. Trucks exiting the site are required to turn right onto the L74141.

Visibility in both directions from the site access has been assessed in accordance with Section 5.6.3 of TII Publication's document DN-GEO-03060, "*Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated, and compact grade separated junctions).*" For a Design Speed of 85kph, unobstructed visibility of 160m to the high object height (1.05m) is required in both directions from a distance of 3m back from the edge of the major road. Pillars located at the site access may partially encroach on the visibility splay of drivers of private cars however, for truck drivers, who are positioned higher in their vehicle, the full 160m visibility is achievable in both directions from the site access.

The traffic volumes recorded on the L74141 are low with an AADT in the base year of 515 and an estimated AADT in 2026 of 565. Table 5.4 in TII Publication's document DN-GEO-03060 allows the setback distance, from which visibility is measured, to be relaxed from 3m to 2m at accesses on lightly trafficked Regional and Local Roads. The full required visibility splay of 160m is achievable at the access in both directions, for all drivers, from a distance of 2.0m back from the major road.

Figure 8.2 show the visibility to the east and west of the site access. Appendix C includes a drawing indicating the available visibility splay.

FIGURE 8.2: VISIBILITY TO THE WEST (LEFT) AND EAST (RIGHT) FROM THE SITE ACCESS ON THE L74141

8.3 Parking

The existing parking provision within the site is sufficient to accommodate the staff employed at the site and the additional construction staff that will be on site during the construction period.

8.4 Public Transport

There are no public transport provisions in the vicinity of the site due to its rural location. The absence of these facilities at this location however is not connected with the operation of the Site.

8.5 Pedestrians & Cyclists

There are no footpaths or cycle provisions in the vicinity of the site. The absence of these facilities at this location is not connected with the operation of the site.

9 Interactions with other Environmental Attributes

The vehicular traffic flows that shall be generated by the proposed development may result in corresponding changes to noise levels and air quality in the vicinity of the surrounding road network. The nature, extent and consequences of these changes are examined in the relevant chapters of the EIAR.

9.1 Noise

The operations at the site will result in 270, 206 and 142 additional daily vehicle trips on the surrounding road network, 258, 194 and 130, respectively, of which will be related to HGVs under the three options assessed. It is therefore considered that the traffic generated by the proposed construction methodology will have an imperceptible impact on noise levels within the surrounding area.

9.2 Air Quality & Climate

The operations at the site will result in 270, 206 and 142 additional daily vehicle trips on the surrounding road network, 258, 194 and 130, respectively, of which will be related to HGVs under the three options assessed. Therefore, the impact on existing air quality in the vicinity of the site is expected to be imperceptible.

9.3 Future Road Schemes

A future road scheme, the 'Local Distributor Road 4 (LDR4) Abbeyland Navan,' is currently being constructed through greenfield sites adjacent to Blackwater Park, in Navan, Co. Meath, which is being led by Meath County Council. The proposed road scheme comprises a local distributor road, approximately 1.15km in length, incorporating pedestrian and cycle facilities, connecting the R147/N51 junction with the Ratholdren Road.

At the time of this Traffic and Transport Assessment, the scheme had only commenced construction and construction is likely to continue throughout the lifecycle of the construction of the rockfill reinforcement

buttress, particularly should Option A or B be progressed. As such, it has not been possible to undertake a forensic assessment of any impacts that may be generated by the scheme in relation to the proposed construction of the rockfill reinforcement buttress at the Tailings Storage Facility in Co. Meath, the subject of this application.

The southern tie-in of the scheme at the R147/N51 junction is located on the route between the subject site and the M3 motorway. It is likely that, during construction of the junction at this tie-in, temporary traffic management arrangements will be in place at this junction which may impact on the route between the subject site and the M3 motorway. However, at this early stage in construction, the layout, and extent, of such traffic management, and when this part of the scheme will be constructed, is unclear and it is, therefore, not possible to determine the level of impact such works will have on the movement of development traffic between the subject site and the M3 motorway. Temporary traffic management measures may lead to traffic congestion on this route resulting in delay to travel times between the subject site and the M3 motorway. Greater impacts than this, however, are not currently foreseen with the information currently available to us.

If Option C is progressed, however, and this scheme is opened to the public while the construction of the rockfill reinforcement buttress is still ongoing, it is likely that the distributor road will have a positive impact on traffic related to the subject site as this distributor road would present motorists with an alternative route to the N51 national road, potentially reducing traffic volumes on the route to the subject site, and decreasing travel times between the subject site and the M3 motorway.

9.4 Monitoring

During the Construction Phase, monitoring of construction operations will be undertaken by the Contractor, as part of the Construction Environmental Management Plan (CEMP).

9.5 Mitigation Measures

No significant effects were identified with the proposed development, and therefore no mitigation measures are proposed.

9.6 Summary of Mitigation & Monitoring

Table 9-1 below summarises the mitigation and monitoring measures associated with the subject development.

TABLE 9-1: SUMMARY OF MITIGATION AND MONITORING DURING CONSTRUCTION

Likely Significant Effect	Mitigation	Monitoring
No significant effects were identified with the proposed development.		CEMP to monitor traffic during construction.

10 Residual Impact Assessment

The impacts associated with the proposed development will have an imperceptible effect on the local road network. This has been demonstrated through link capacity assessment and junction capacity analysis detailed in

Table 10-1 below summarises the identified likely significant effects of the proposed development post implementation of the proposed mitigation measures

TABLE 10-1: SUMMARY OF LIKELY SIGNIFICANT EFFECTS POST MITIGATION

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
No significant effects were identified with the proposed development.						

No residual impacts are expected following the implementation of any necessary mitigation measures.

11 Conclusions

The Traffic and Transport Assessment makes the following conclusions:

1. Link capacity analysis was carried out on the L74141, R163, R162 and N51 within the vicinity of the Site, and along the routes between the site and the source of materials/M3 Motorway, with reference to TII Publication's document DN-GEO-03031, "Rural Road Link Design." It was determined that the L74141, R162 and R163 will continue to operate within capacity for each of the assessment years for all construction phase options.

   The N51 however currently exceeds capacity during the base year and will continue to exceed capacity both with, and without, the traffic generated by the construction of the proposed buttress in all future assessment years for all construction phase options. The traffic associated with the construction of the proposed buttress however represents a small percentage of total traffic on the N51 during the proposed construction period including between:

   a. 0.79% and 0.78% during construction years 2024 and 2025 (Option A).
   b. 0.61% and 0.60% during construction years 2024 and 2025 (Option B).
   c. 0.43% and 0.42% during construction years 2024, 2025 & 2026 (Option C).

   The traffic associated with the construction of the proposed rockfill reinforced buttress during the assessment years for all construction phase options therefore has a negligible impact on the capacity of the N51 during this period. It is also noted that construction traffic will be temporary.

2. Junction Capacity Analysis was undertaken at four junctions in the vicinity of the Site, and along the routes between the site and the source of materials/M3 Motorway. The results of the Junction Capacity Analysis indicate that the site access junction, the L74141/R162 junction and the R162/R163 junction currently operates within capacity and will continue to operate within capacity for each of the assessment years for all construction phase options both with, and without, the construction of the proposed rockfill reinforcement buttress.

   The R162 arm of the R162/N51 roundabout however currently operates at capacity and will exceed capacity in all future assessment years for all construction phase options. This would however occur both with and without traffic generated by the construction of the proposed rockfill reinforcement buttress. The impact of the additional construction related traffic on vehicle queues and delay at the roundabout is considered negligible with regards to the operation of the junction during the proposed construction period for all options assessed and can be summarised as follows: -

   Option A

   There will be a maximum increase in vehicle queues of 1 vehicle and a maximum increase in delay of 4.49 seconds on the R162 in 2024 and a maximum increase in vehicle queues of 1.2 vehicles and a maximum increase in delay of 5.63 seconds on the R162 in 2025. It also should be noted that construction traffic will be temporary.

   Option B

   There will be a maximum increase in vehicle queues of 0.7 vehicles and a maximum increase in delay of 3.32 seconds on the R162 in 2024 and a maximum increase in vehicle queues of 0.9 vehicles and a maximum increase in delay of 4.17 seconds on the R162 in 2025. It also should be noted that construction traffic will be temporary.

   Option C

   There will be a maximum increase in vehicle queues of 0.5 vehicles and a maximum increase in delay of 2.19 seconds on the R162 in 2024, a maximum increase in vehicle queues of 0.6 vehicles and a maximum increase in delay of 2.76 seconds on the R162 in 2025 and a maximum increase in vehicle queues of 0.9 vehicles and a maximum increase in delay of 3.47 seconds on the R162 in 2026. It also should be noted that construction traffic will be temporary.

3. Visibility in both directions from the site access has been assessed in accordance with Section 5.6.3 of TII Publication's document DN-GEO-03060. The posted speed on the L74141 is 80kph. For a Design Speed of 85kph, unobstructed visibility of 160m to the high object height (1.05m) is required in both directions from a distance of 3m back from the edge of the major road. Pillars located at the site access may partially encroach on the visibility splay of drivers of private cars however, for truck drivers, who are positioned higher in their vehicle, the full 160m visibility is achievable in both directions from the site access. The traffic volumes recorded on the L74141 are low with an AADT in the base year of 515 and an estimated AADT in 2026 of 565. Table 5.4 in TII Publication's document DN-GEO-03060 allows the setback distance, from which visibility is measured, to be relaxed from 3m to 2m at accesses on lightly trafficked Regional and Local Roads. The full required visibility splay of 160m is achievable at the access in both directions, for all drivers, from a distance of 2.0m back from the major road.