

9.1 Introduction

This section of the Environmental Impact Statement has been prepared by Colin Buchanan and Partners and examines the impact of the traffic generated by the proposed facility on the road network and road based access to the facility.

9.2 Study Methodology

The following approach has been adopted in the study:

The receiving environment is examined in Section 9.3 involving an assessment of the local and regional road network and recorded traffic flows. Details of roads currently planned and under construction in the region and potential resulting traffic reassignments are also considered.

In Section 9.4 an estimate of the traffic generated by the proposed facility is undertaken based on specified tonnages of material, vehicle capacities and assignment to the road network. The access intersection with the public highway is also proposed in this Section.

Section 9.5 identifies potential routes from the facility to the strategic road network.

Section 9.6 proposes the intersection layout for the facility access onto the public highway

Section 9.7 considers the impact of the facility generated traffic on the immediate road network.

In Section 9.8 an evaluation of candidate routes is undertaken with a recommendation of the preferred option. Where mitigation measures are required these are identified in Section 9.9

Section 9.10 presents the Consultant's recommendations.

9.3 Receiving Environment

9.3.1 Regional Road Network

As shown in Figure 9.1 the area is served by the N4 and N6, both classified as NRA National Primary Routes. The N4 links Dublin and Sligo plus other destinations to the north and west. The N6 branches from the N4 to the east of Kinnegad and links Dublin and Galway plus other destinations to the west. Between Monganstown and the Pass of Kilbride two local realignments have been implemented in the Rattin area to remove alignment discontinuities.

Both routes are single carriageway, of a high geometric standard with separate turning lanes and tapered approaches/ departures to the more significant intersecting side roads. Site photographs are provided in Appendix 9.1.

9.3.2 Improvements to the Regional Road Network

New M4 Motorway

As shown in Figure 9.2 the Kinnegad - Enfield - Kilcock section of the new M4 motorway, currently under construction, passes through the study area. The motorway which will operate as a toll facility is scheduled for completion in 2006. Once completed the motorway offers a high standard alternative to the existing N4 between Dublin and Sligo. Benefits of the scheme within the study area are a reduction in traffic on the N4 and the bypassing of Kinnegad.

Access to the motorway from the N4 will be available at two locations immediately to the south of the Correlstown intersection and to the west of Kinnegad for the N6.

New N6 Kinnegad and Athlone Dual Carriageway

The scheme is part of the Dublin to Galway National Primary Route and covers the section between the existing Athlone Relief Road and the M4 / N4 to south of Kinnegad and shown in Figure 9.2.

The alignment of the new route is parallel to the existing N6 within the study area and access between the two roads is possible via two interchanges between the Pass Of Kilbride and Kinnegad.

According to the 2003 EIS (Environmental Impact Statement) for the project the new route will result in an 87% reduction in traffic on the existing N6 between Rochfordbridge and Kinnegad. This equates to a reduction in average 24 hour flows from 11,200 to 1,500 vehicles in 2005 and from 16,000 to 2,100 vehicles in 2025.

9.3.3 Linkages Between the Proposed Facility and the N4 / N6

As shown in Figure 9.1 the access to the proposed facility is located on a country road connecting the N4 at the Correlstown crossroads and the N6 at the Pass of Kilbride intersection. The access is approximately 1.75km from the Pass of Kilbride intersection.

For reference in this study, components of the local road network representing potential routes between the proposed facility and the N4/ N6 have been labelled as links as detailed in Figure 9.3 and Table 9.1.

Table 9.1 Road Links in the Area of the Proposed Facility

Link	From	To	Length
A1	N4 intersection at Correlstown	Intersection with Link C	3.2 km
A2	Intersection with Link C	N6 at Pass of Kilbride	2.4 km
B1	N6 from Pass of Kilbride	Link C	2.5 km
B2	N6 from Link C intersection	Kinnegad southern bypass	5.7 km
C	intersection with A1/A2	Intersection with the N6	1.5 km
D	N4 from Correlstown intersection	Kinnegad	5.5 km

Link A1

Link A1 commences at the Correlstown / N4 intersection which operates as a staggered priority junction with the minor arms serving Correlstown and Link A1. Dedicated central turning lanes are provided for northbound N4 traffic to Correlstown and southbound to Link A2. Both minor arms have a tapered approach and departure flares to the intersection. Sight lines from the Link A1 approach to the intersection in both directions on the N4 are above the NRA standard for a 60 mph post speed limit. Some improvement in the delineation of road edge on the Link A1 approach would be beneficial.

Approximately 1.3 km from the N4 intersection, a cross roads provides access for Lowtown to the south and Hightown to the north. Due to high hedges at this location visibility is substandard. The Link A2 northern approach to the cross roads is via a sub standard S bend which is signed in advance. An improvement to the alignment is not possible without the expropriation of private lands.

The carriageway varies in width between 5.2 to 5.5 metre and verges between 1.5 and 3 metres. Sections of the link appear to have been recently resurfaced. Generally the running surface is reasonable although there is evidence of localised rutting. At the section to the south of the cross roads serving Lowtown / Hightown (i.e. excluding the S bend noted above), the horizontal and vertical alignment of the link is reasonable.

Link A2

Link A2 which includes the proposed facility access has a typical carriageway width of 5.4 to 5.5 metres with 2 metre verges either side. The carriageway condition appears to be in reasonable condition although there are some localised areas which would benefit from reinstatement and in one instance local re-profiling to remove a pronounced vertical hump.

Generally the road is at a similar level to the adjacent lands, with no significant ditch regimes and with verge widths that could accommodate carriageway widening.

Link A2 intersects the N6 via a priority junction at the Pass of Kilbride. Although this is an existing intersection a field inspection of available sight lines and comparison with NRA requirements was undertaken. According to NRA standards, a 60 mph road requires an unobstructed sight line of 215 metres in either direction based on (ideally) a set back of 9 metres. A relaxation in the set back to 4.5 metres in particular circumstances is permitted. It is worthwhile noting that the sight line requirement is based on a driver observation height of 1.05 metres, whereas the observation height of vehicles is significantly higher allowing a sight line above vegetation which might be an impediment at a 1.05 metre height.

Figure 9.4 indicates that the required sight line is possible in both directions at a set back of 4.5 metres while in the direction of Kinnegad the required sight line is possible in the direction of Kinnegad with a 9 metre set back.

Links B1 and B2

Links B1/B2 are located on the N6 between the Pass of Kilbride and Kinnegad bypass. Including the Link C intersection, only four minor country roads intersect with this section of the N6. Access to the parallel new N6 facility is available approximately 4.5 km east of the Link C intersection.

Link C

Link C is a narrow country road with a carriageway measuring 3.3 to 3.5 metres in width. Grass verges vary from 2 metres to 5 metres at the southern end. At some locations there is a 1 to 1.5 metre height difference with adjacent land with ditches where the road is in cutting. The link has an almost straight alignment for its entire length. Visual inspection of the carriageway pavement indicates localised rutting in some areas.

Link C intersects with the N6 as a simple priority junction. Figure 9.5 shows the available sight lines at this intersection. While the required sightline is possible in the direction of the Pass of Kilbride at a set back of 4.5 metres, a set back of only 2 metres is possible in the direction of Kinnegad.

The intersection between Link C and Links A1 / A2 is a simple priority junction with Link C being the minor arm. Visibility from Link C in both directions on Links A1 / A2 is obstructed by overgrown hedges. Widening of the Link C approach at the expense of verge widths would be required to accommodate large vehicle swept paths

Link D

Link D is the section of N6 from the Correlstown intersection and its continuation through Kinnegad. Roadside development on both sides of the N6 is evident for 2 km out of the town centre. Access to the M4 is possible via two access points along the N6 between the Correlstown intersection and Kinnegad.

9.3.4 Existing Traffic

ATC's (Automatic Traffic Counts) are available at three locations in the study area as shown in Figure 9.6, on the N4 2km west of Clonard, on the N4 at Griffinstown and on the N6 3km west of Rochford Bridge.

Classified 24 hour weekday outputs from the ATC's are provided in Appendix B and graphically in Figures 9.7, 9.8 and 9.9. Comparison of the ATC eastbound and westbound flows indicates the predominance of through traffic with only minor traffic contributions from the local road network.

The Griffinstown ATC provides the most relevant indication of N4 traffic flows in the area of the proposed facility. Although located outside the study area the Rochford Bridge ATC provides a reasonable indication of traffic flows expected on the N6 in the area of the proposed facility given the predominance of through traffic. All three ATC's have similar weekday profiles with identical am (08:00 - 09:00 hours) and pm (17:00 - 18:00) peak hour traffic.

The ATC averaged 2004 flows, expressed in pcu's (Passenger Car Units) for weekday peak hours are:

Table 9.2 Existing ATC Flows

Road	AM	PM
N4 at Griffinstown		
Eastbound	458	509
Westbound	439	653
N4 at Clonard		
Eastbound	828	839
Westbound	720	1040
N6 at Rochfordbridge		
Eastbound	384	477
Westbound	409	493

No specific information is available of the anticipated re-assignment of traffic from individual sections of the N4 onto the M4 (currently under construction) and the corresponding reduction of traffic on the N4. However according to the Explanatory Statement issued by the NRA, an estimated 2,400 AADT (Annual Average daily traffic) with a 15% HGV (Heavy Goods Vehicle) content is anticipated at the year of opening of the scheme rising to 5,600 AADT by 2025 with a 13% HGV content.

Classified traffic surveys were undertaken by Colin Buchanan and Partners on Link A2, close to the proposed facility access location on Thursday 26 February 2004. The surveys in the am and pm peaks showed a total of 32 pcu's northbound / 46 pcu's southbound between 0800 - 0900 hours and 36 pcu's northbound / 51 pcu's southbound between 1500 - 1600 hours northbound.

9.3.5 Adjacent Properties on Links

The following residential dwellings are located adjacent to local routes (Links A1 / A2/ C) from the facility to the N4 and N6:

Table 9.3 Residential Properties Located on Links A1, A2 and C

Link (refer to Figure 9.1)	No of residential properties
A1	15
A2	3
C	2

9.4 Facility Generated Traffic

9.4.1 Estimate of Facility Generated Traffic

The estimate of generated traffic is based on the facility operation which is detailed elsewhere in this document. The operational features dictating vehicular demand are:

Table 9.4 Facility Operational Details Influencing Vehicular Demand

Material inbound:	90,000 tonnes per annum
Material outbound:	50,000 tonnes per annum
Vehicle carrying capacity	20 tonnes
Waste acceptance	0800 -1800 hours Monday to Friday
	0800 - 1800 hours on Saturday
Office hours:	0730 - 1800 hours Monday to Friday
	0730 -1600 hours on Saturday
Workforce	20

It has been assumed that vehicles delivering material to the facility will return empty. Similarly it is assumed that vehicles transporting processed material from the facility will arrive empty.

For the purpose of assessment it is assumed that inbound material + outbound empty and inbound empty + outbound material vehicle movements will be distributed equally over the operating day.

Inbound HGV's will commence at 0800 hours and since the first hour of operation (0800 - 0900) coincides with the background traffic am peak hour this combination will be assessed accordingly. Similarly the last hour of HGV movements 1700 - 1800 hours coincides with the background traffic pm peak and this combination will be assessed.

The averaged inbound rate for delivery of material to the facility = $90,000t / (50 \text{ weeks} \times 58 \text{ hours} \times 20t) = 1.552 \text{ HGV's per hour}$, rounded upwards to 2 HGV's per hour

The averaged outbound rate of processed material from the facility = $50,000t / (50 \text{ weeks} \times 58 \text{ hours} \times 20t) = 0.862 \text{ HGV's per hour}$, rounded upwards to 1 HGV per hour

It is anticipated that a maximum labour force of 20 personnel will work at the facility. Assuming an average work car occupancy rate of 1.5 this equates to 14 car movements, arriving 0630 - 0730 hours and departing 1800 - 1900 hours. These timeframes occur before and after the peak hours for background traffic on the road network and will have minimal impact.

An allowance of one visitor vehicle and one delivery vehicle has been assumed to coincide with the assessed peak hours, although given the nature of the operation this is considered to be excessive.

The arrivals and departures of materials occurring during the am / pm peak hours and used in the later traffic impact assessment are summarised in Table 9.5:

Table 9.5 Summary of Facility Generated Vehicle Movements

Peak Hours	Facility Operation Generated Vehicles	Office - Visitors Vehicles	Total Vehicles	
			In	Out
0800-0900	Raw Material laden in = 2	Since office hours start at 0730 all office workers will already be at facility prior to 0800 - 0900 peak hour. Therefore no traffic contribution due to facility workers. Assume 1 car each for visitors and deliveries during the hour	3HGV	3HGV
	Raw Material Empty out =2 Processed empty in = 1 Processed laden out = 1		2 cars	2 cars
1700-1800	Raw Material laden in = 2	Since office hours end at 1800 will be leaving after the peak hour 1700 - 1800. Therefore no traffic contribution due to facility workers. Assume 1 car each for visitors and deliveries during the hour	3HGV	3HGV
	Raw Material Empty out = 2 Processed empty in = 1 Processed laden out = 1		2 cars	2 cars

Using an equivalence of 1 HGV = 3 pcu's (Passenger Car Units) and rounding upwards this equates to the following pcu totals:

AM (peak hour) inbound = 10 pcu's

AM (peak hour) outbound = 10 pcu's

PM (peak hour) inbound = 10 pcu's

PM (peak hour) outbound = 10 pcu's

9.5 Access Routes to the Proposed Facility

Given the sub-standard S bend and visibility constraints at the Lowtown / Hightown cross road which are not resolvable without land appropriation and also the number of residential dwellings on Link A1, the northbound route formed by a section of Link A2 and all of Link A1 to the N4 is discounted as a means of facility access.

The remaining routes available to access the facility are therefore:

- **OPTION A**

Link A2 southwards to access the N6 at the Pass of Kilbride intersection.

- **OPTION B**

Northwards for a short section of Link A2 and then Link C to access the N6.

9.6 Facility Access Junction

Figure 9.10 shows the layout of the proposed facility access junction superimposed on topographic mapping of existing Link A2. The continuation of the access road to the facility is addressed in Chapter 4 of the EIS.

A priority tee-intersection is proposed with 1:10 tapers on the access approach and 15 metre curve radii is in Figure 9.10. The opening shown opposite the facility access is a lightly used agricultural access to a field and as such will conflict with facility traffic.

As shown in Figure 9.10 the junction layout accommodates the swept path of a 16.5 metre articulated vehicle as a worst case scenario. Given the low volume of traffic involved, a central turning lane on Link A2 is not warranted. However it is recommended that no overtaking road marking and advanced warning signs are provided. It is recommended that 'works access' signs are installed in advance of the access in both directions.

Assuming a Link A2 posted speed of 100kph a 215 metre sight line in either direction based on a 9 metre set back is required. Given the low volumes of traffic involved a relaxation in NRA standards from 9 metres to 4.5 metre set back is assumed reasonable. As shown in Figure 9.10, the above sight line requirement is satisfied although this will involve a trimming back of verge side vegetation in the ownership of the Applicant.

9.7 Potential Impacts

Both Options A and B use the N6 to access other destinations on the road network and only represents a 1% increase in existing traffic on the N6 during the am / pm peak hours. As noted previously an 87 % reduction in traffic is anticipated on the N4 due to the reassignment of traffic onto the planned parallel N6 dual carriageway. Given the extremely low volumes involved delays are not considered relevant and as such no traffic assessment is considered warranted at the intersections of Link A2 / Link C with the N6.

The assessment of performance of the facility access junction (Figure 9.10) is based on the following:

- Year of opening, assumed as 2005
- Year of opening + 15 years (where NRA growth rates for non-national routes are applied to background traffic on Link A2)

The traffic flows (expressed in pcu's) used in the assessment are summarised in Table 9.6. These flows are based on the use of Link A2 which as discussed later in this study represents the preferred access option.

Table 9.6 Table 9.6 Facility Access Turning Movements:

OPTION A	Traffic	Access Left Out	Access Right Out	AM		PM		Link A2 s-bound	Link A2 n-bound
				Link A2 s-bound	Link A2 n-bound	Access Left Out	Access Right Out		
2005	Facility	0	10	0	2	0	20	0	10
	Background	0	0	46	32	0	0	58	41
2020	Facility	0	10	0	10	0	10	0	10
	Background	0	0	57	40	0	0	71	50

OPTION A	Traffic	Access Left Out	Access Right Out	Link A2 s-bound	Link A2 n-bound	Access Left Out	Access Right Out	Link A2 s-bound	Link A2 n-bound
Background	0	0	46	32	0	0	58	41	
2020	Facility	10	0	10	0	10	0	10	0
	Background	0	0	57	40	0	0	71	50

The industry standard program PICADY will be used to assess the operational performance of the proposed facility access junction. This program predicts the capacities, queue lengths and the geometric and queuing delays at non-signalised major / minor priority junctions.

The outputs of the PICADY program based on the above flows and junction geometry are summarised in terms of RFC's (Ratio of Flow to Capacity) and maximum queues are given in Table 9.7 (Complete outputs provided in Appendix C):

Table 9.7 Summary of RFC & Queue Length Outputs from PICADY:

OPTION B	Traffic	AM		PM	
		Access Left Out	Access Right Out	Access Left Out	Access Right Out
2005	RFC	0	0.015	0	0.015
	Max Q	0	0	0	0
2020	RFC	0	0.015	0	0.015
	Max Q	0	0	0	0

OPTION B	Traffic	AM	
		Access Left Out	Access Right Out
2005	RFC	0.012	0
	Max Q	0	0
2020	RFC	0.012	0
	Max Q	0	0

Due to the extremely low traffic flows even for the opening year + 15 years, no queues are predicted on any of the three arms of the junction. This also confirms that separate turning lanes are unwarranted.

9.8 Evaluation of Access Route Options:

This evaluation compares the suitability of the two potential routes (Options A and B) in terms of the following criteria:

- Traffic Impact
- Access to Long Distance Destinations
- Horizontal Alignment
- Vertical Alignment
- Intersections
- Carriageway Width (refer to 9.8.3)
- Adjacent Residential Dwellings
- Travel Distance from Facility to N6 (refer to 9.8.2)
- Ability to Implement Mitigation Measures

Travel distance is measured from the access to the intersection with the N6. For Option A eastbound traffic this will be measured up to the Link C / N6 intersection and for Option westbound traffic up to the Link A2 / N6 intersection.

Allowing for wing mirrors an overall delivery vehicle width is 2.6 metres. Given the possibility of two such vehicles passing in opposite directions and an allowance for clearance between vehicles, a minimum carriageway width of 6.5 metres is deemed necessary.

Table 9.8 presents the comparison of Option A and B based on the above criterion:

Table 9.8 Option Evaluation

Evaluation	Preferred
Traffic Impact: Due to the low volumes of facility generated traffic and background traffic no appreciable traffic impact due to the facility access or at the intersection with the N6.	No difference
Access to Long Distance Destinations: For destinations to the west (eg Galway) Option A is preferable. For destinations to the east (eg Dublin) and north west (eg Sligo) Option B is preferable. It is understood that the facility is expected to serve a wide geographic area and as such there is little difference between either option.	No difference
Horizontal Alignment: Both options have relatively straight alignments. Option A is more direct and only requires one turning manoeuvre at the N6 whereas Option B requires two turning manoeuvres at the intersection with Link C and also at the intersection with the N6.	Option A
Vertical Alignment: Both options have reasonable vertical alignments and satisfy NRA stopping sight distance requirements. Refer also to Mitigation Measures.	No difference
Intersections: Both option intersections with the N6 exist and are used by traffic. For the sake of robustness both intersections were examined for compliance with NRA sight line requirements, although this is normally applied to new intersections. It is also noted that vehicles generated by the facility will have a significantly higher driver observation height than the required 1.05 metres which will enable a sight line over most of the roadside vegetation. Option A achieves the NRA sight line requirements based on a 9 metre set back and a relaxation of 4.5 metres. Option B satisfies the relaxation 4.5 metre set back in one direction and only 2 metres in the other direction. Option A has a wide intersection with the N6 and accommodates the swept path of facility generated vehicles. Some widening of the Option B intersection with the N6 will be required to accommodate facility generated vehicles. The intersections would also benefit from enhanced delineation as discussed under Mitigation Measures.	Option A
Carriageway Width: As discussed later a minimum carriageway width of 6.5 metres is considered necessary to allow the passage of two facility generated vehicles to pass in opposite directions with reasonable separation. The existing carriageway widths of both options are less than the desired width. Option A requires a smaller widening to achieve the desired width. Both options require increases in width as discussed under Mitigation Measures.	Option A
Adjacent Residential Dwellings: Little residential development occurs on either option. Two adjacent dwellings are located on Option B and three on Option A, however one of the latter properties is also located close to the N6.	No difference
Travel Distance from Facility to N6: For westbound destinations Option A travel has a travel distance of 1.75km and 6.7km for Option B. For eastbound destinations Option A has a travel distance of 4.25 km and 2.1 for Option B. Total travel for east and west bound traffic for option A is 6 km and 6.7km for Option B.	Option A
Ability to Implement Mitigation Measures: Given the existing carriageway width of Option A only a slight widening will be required. There are no significant impediments to widening due to available verge widths or differences in level with adjacent land in Option A. It should also be possible to maintain vehicular access during construction. Due to the narrow width of Option B a significant widening is required which will require modifications to the adjacent ditches, special slope treatment to accommodate the level differences with adjacent land. In addition a closure of the road will be required in order to implement the widening.	Option A

Based on the above evaluation Option A is considered to represent the preferred route.

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9.9 Mitigation Measures

Based on the selection of Option A as the preferred route, the following mitigation measures are suggested:

Typically the carriageway width measures 5.2 to 5.5 metres. To achieve the minimum width of 6.5 metres, a widening of 1 to 1.3 metres is required at the expense of the (typical) 2 metre wide verges. This would apply over the entire length of 1.75km (1925 sq m). For ease of construction the widening should occur on one side only.

Local reprofiling of the existing carriageway approximately 600 metres south of the proposed intersection is required to remove a local hump in the road. This would be included in the widening works.

Although the existing Link A2 intersection with the N6 at the Pass of Kilbride has sufficient area to accommodate the largest of the facility generated vehicles it is suggested that the intersection would benefit from improved delineation. This would include a more defined asphalt edge, edge marking, a ghosted island and advanced signing.

9.10 Recommendations

The proposed route from the facility will use the direct connection to N6 via the existing intersection at the Pass of Kilbride. Visibility is acceptable at this intersection although some minor junction enhancements are suggested to improve delineation.

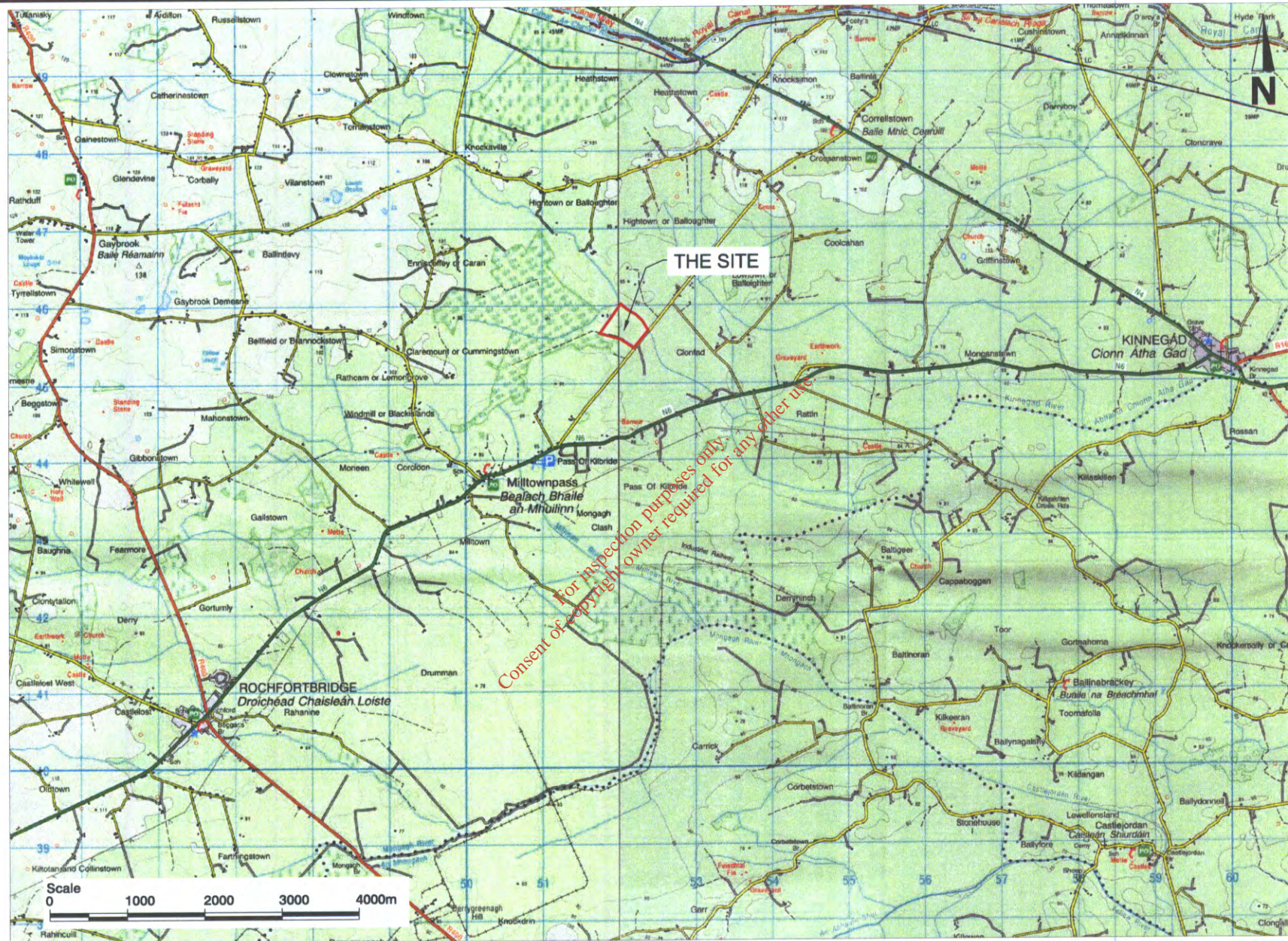
The facility is accessed by a priority tee intersection located on Link A2 as presented in this report. The layout accommodates the largest facility generated vehicles and satisfies the required NRA sight line requirements.

Given the low volumes of facility generated traffic and low background traffic no capacity enhancement mitigation measures are necessary. It is noted that the estimate of facility generated traffic used in the assessment may be considered as an over estimate given the rounding upwards during the conversion to pcu's and to whole vehicle numbers. The value of visitor and delivery vehicles assumed during the peak hours is also unlikely to be achieved.

Widening of Link A2 is recommended to provide a 6.5 metre wide carriageway.

The use of the existing N6 and the new separate dual carriageway route provides access to destinations without passing through built up areas such as Kinnegad. The existing N6 is anticipated to have an 87% reduction in traffic due to the implementation of the dual carriageway.

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Thorntons recycling
FIGURE 9.1
 REGIONAL ROAD NETWORK
 (Colin Buchanan and Partners)

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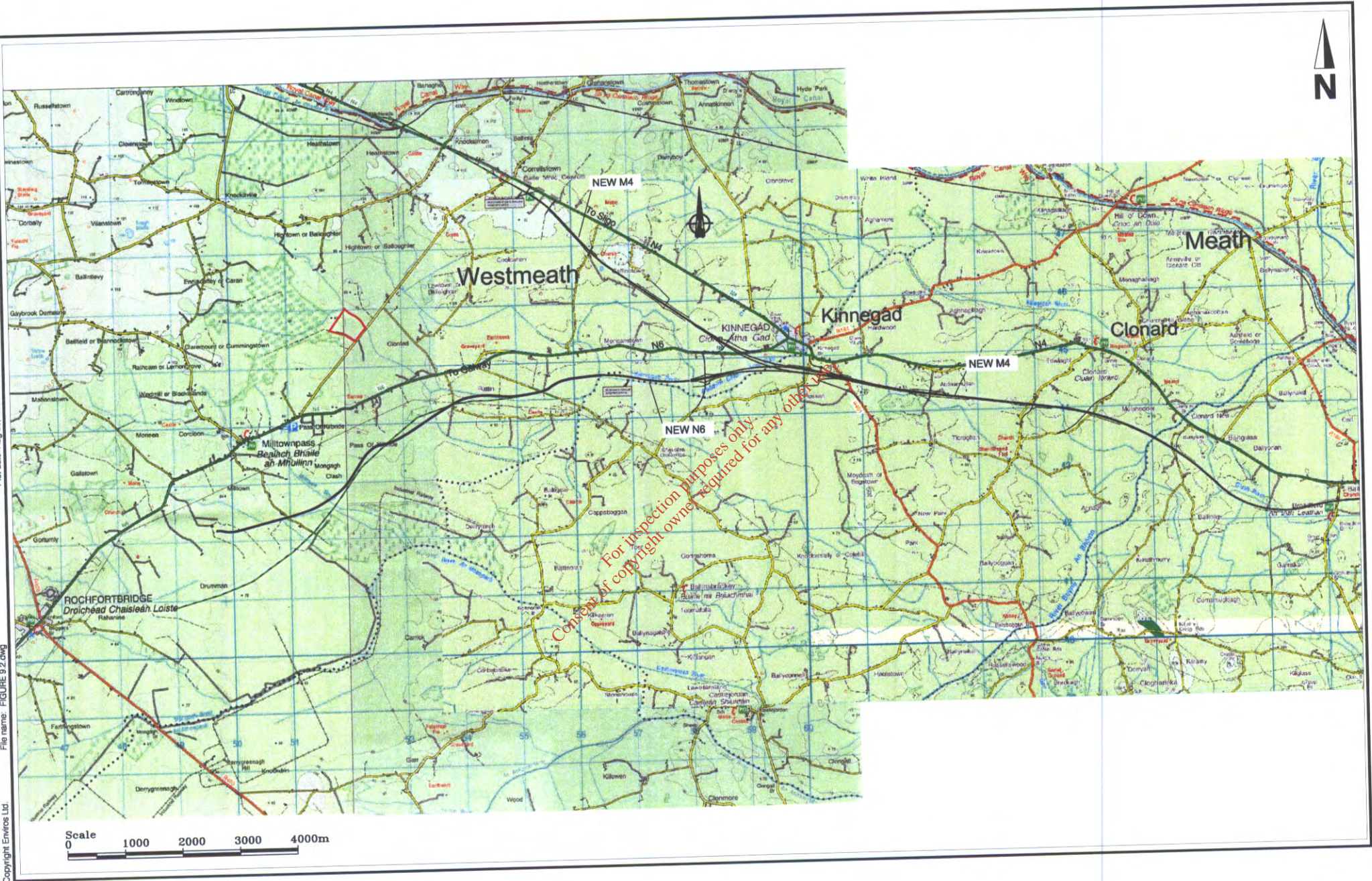
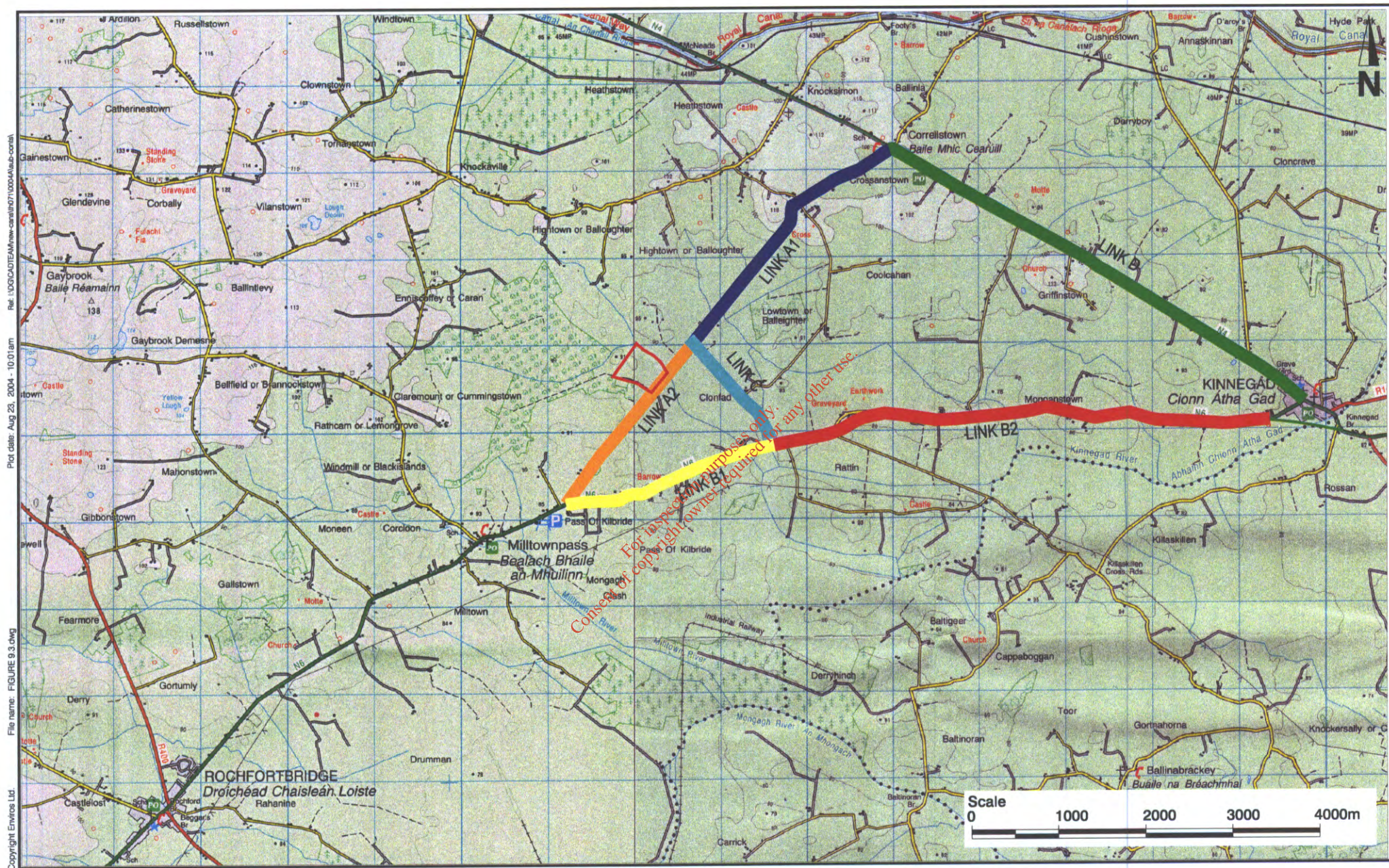


FIGURE 9.2
PLANNED ROADS IN THE STUDY AREA
 (Colin Buchanan and Partners)



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Thorntons recycling
FIGURE 9.3
LOCAL ROAD LINKS
 (Colin Buchanan and Partners)

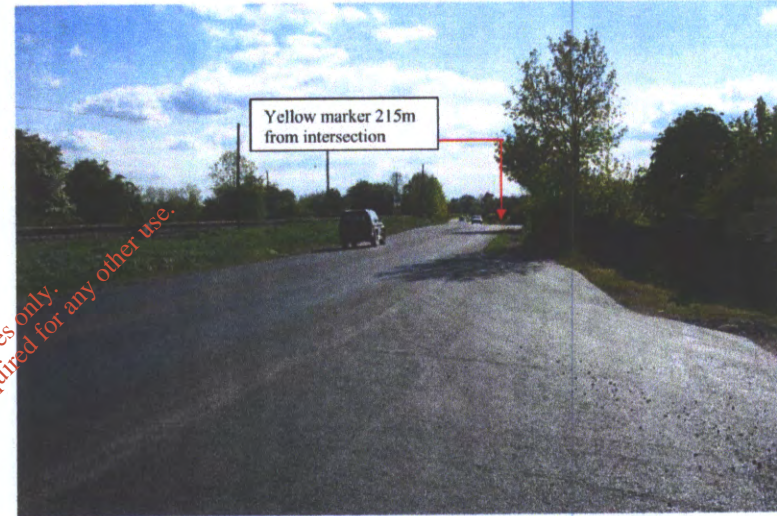
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Link A2/B1 Intersection with the N6 at Pass of Kilbride.
Sight line at 4.5 metre set back towards Kinnegad along Link B1.



Link A2/B1 Intersection with the N6 at Pass of Kilbride.
Sight line at 9 metre set back towards Kinnegad along Link B1.



Link A2/B1 Intersection with the N6 at Pass of Kilbride.
Sight line at 4.5 metre set back towards Milltownpass from Link A2.

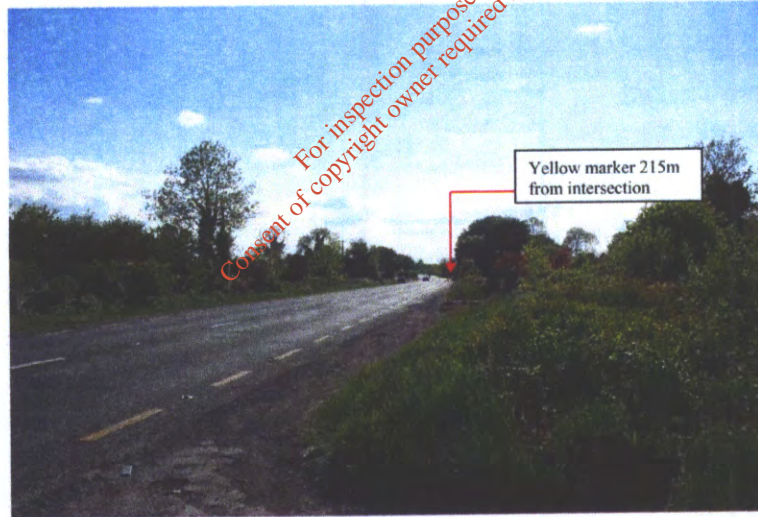
Figure 9.4



FIGURE 9.4
PHOTOGRAPHS
(Colin Buchanan and Partners)



Link C/B1-B2 Intersection.
Sight line at 2 metre set back towards Kinnegad from Link C.

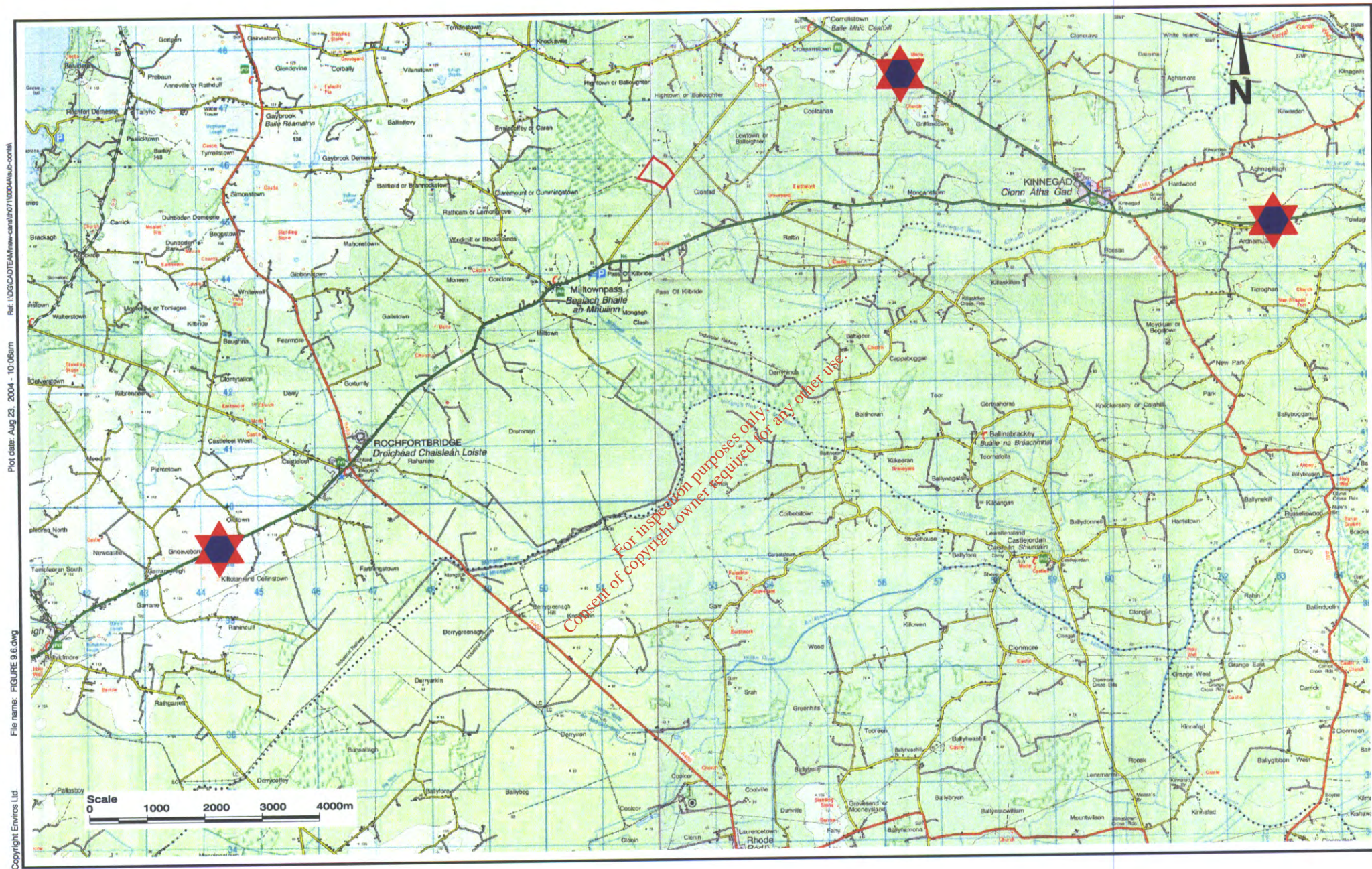


Link C1/B1-B2 Intersection.
Sight line at 4.5 metre set back on Link C1 towards Pass of Kilbride.


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FIGURE 9.5
PHOTOGRAPHS
(Colin Buchanan and Partners)

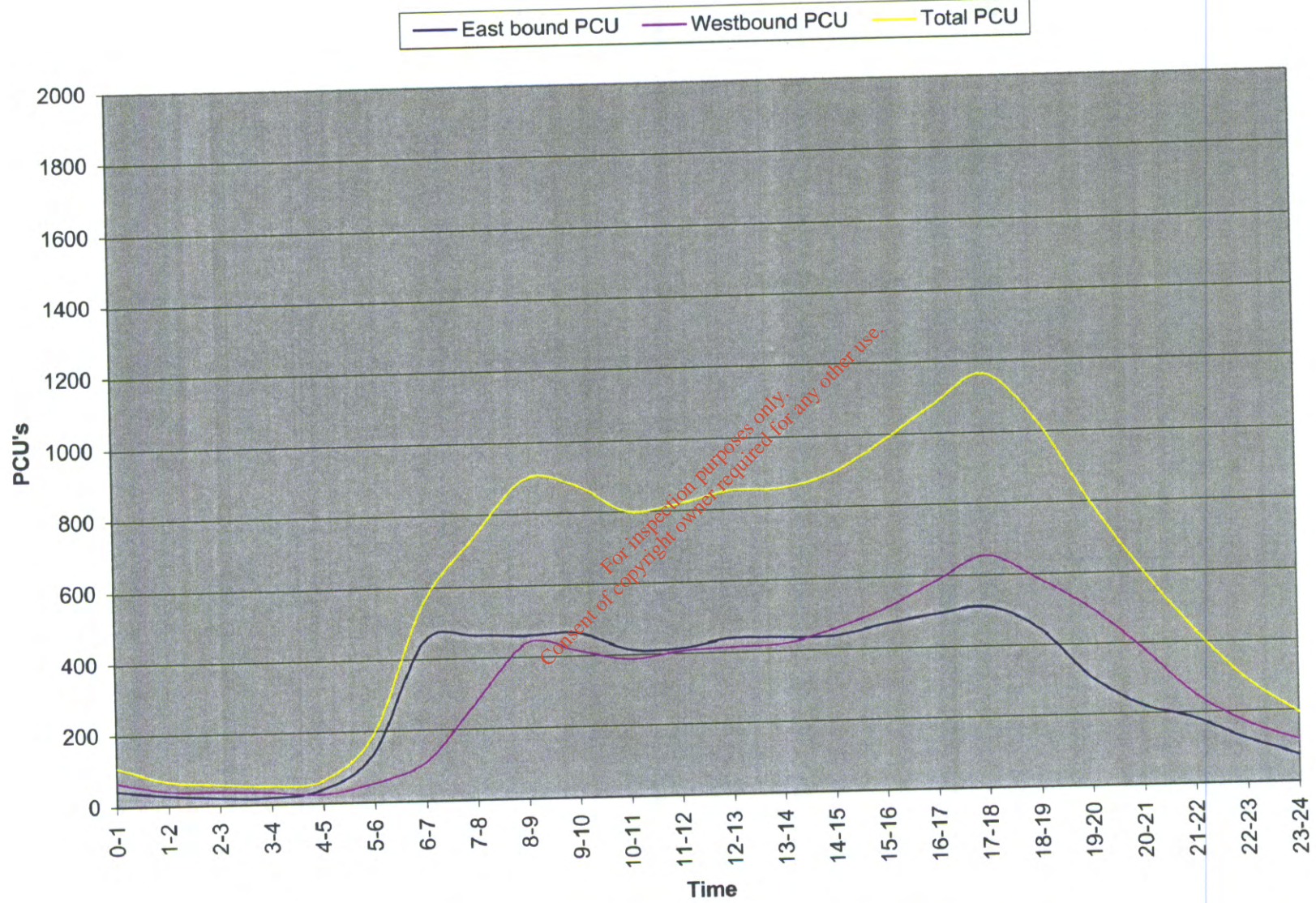


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FIGURE 9.6
AUTOMATIC TRAFFIC COUNT LOCATIONS
 (Colin Buchanan and Partners)

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N4 Griffinstown ATC



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FIGURE 9.7
TRAFFIC FLOW GRAPH
(Colin Buchanan and Partners)

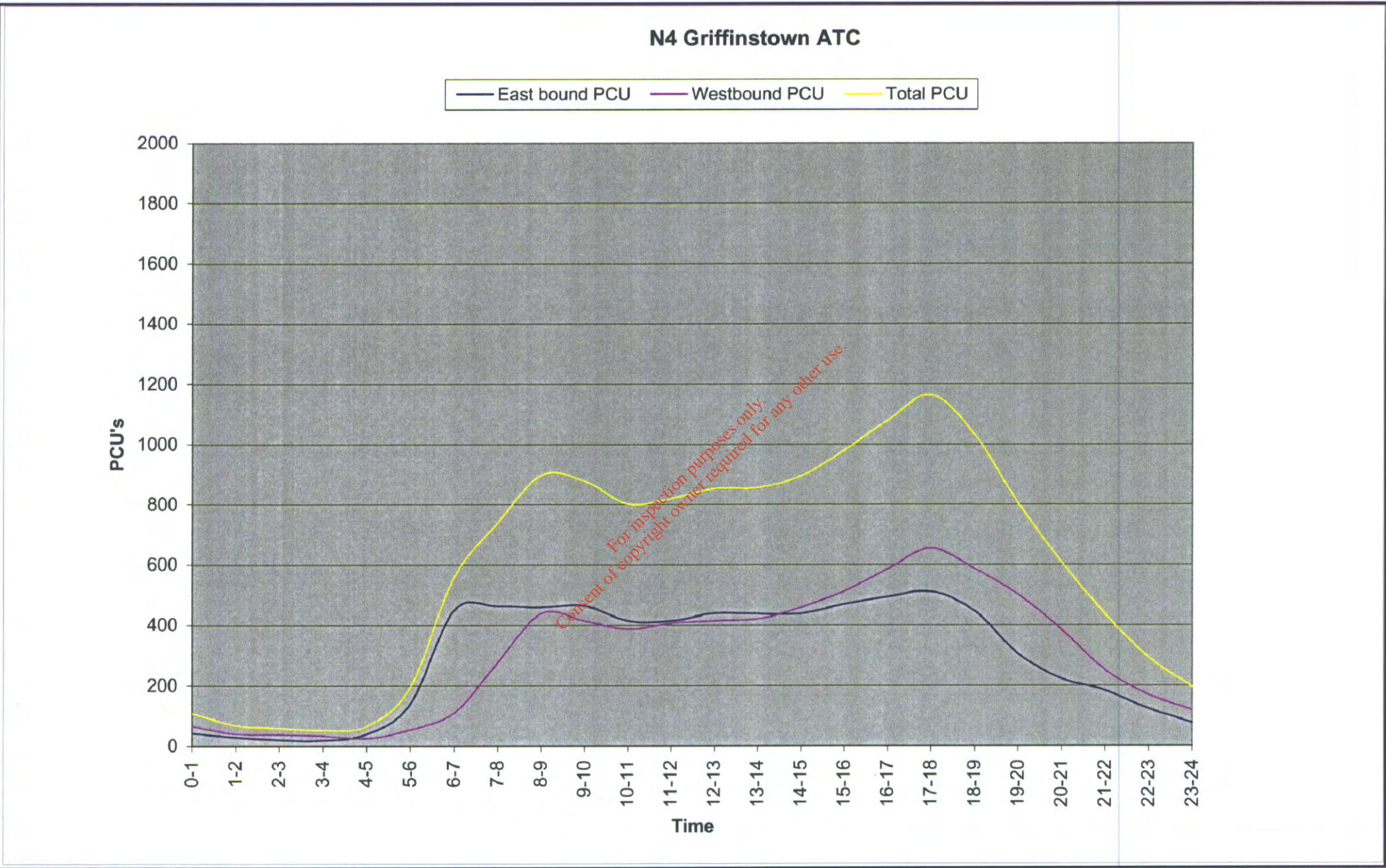


FIGURE 9.8
TRAFFIC FLOW GRAPH
(Colin Buchanan and Partners)

N6 Rochfordbridge ATC

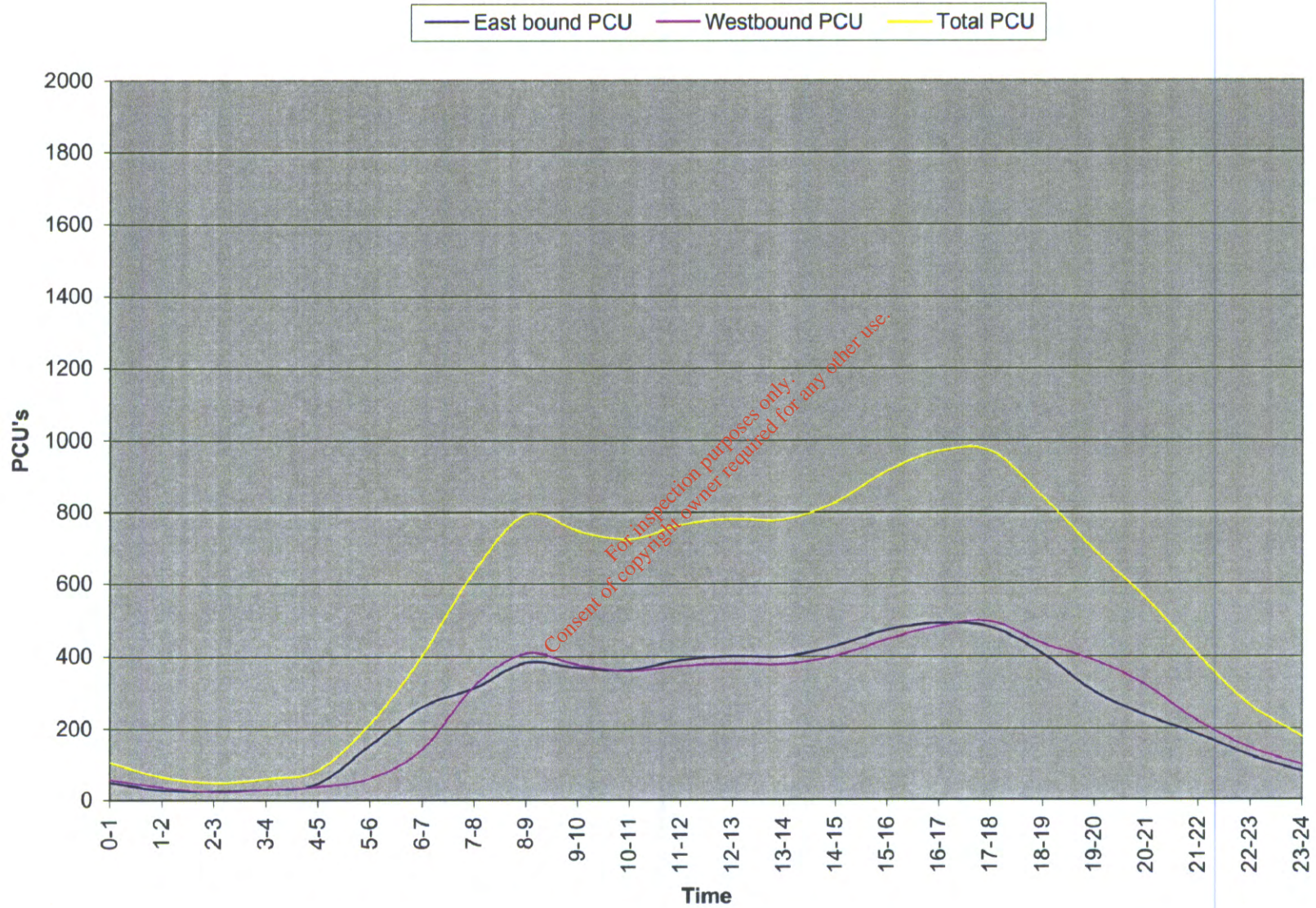
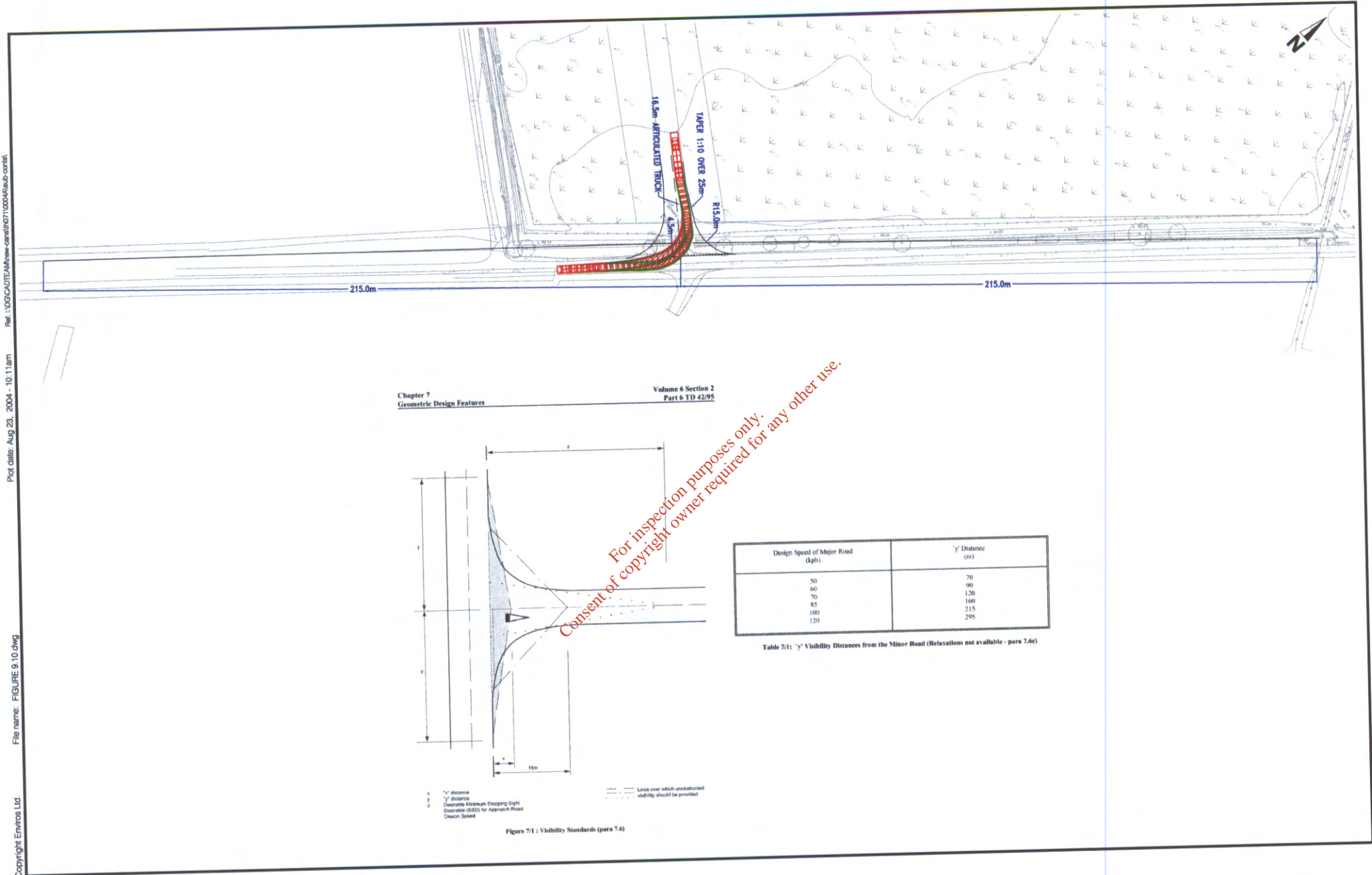


FIGURE 9.9
TRAFFIC FLOW GRAPH
(Colin Buchanan and Partners)



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FIGURE 9.10
PROPOSED ACCESS
(Colin Buchanan and Partners)