

## 6. ROADS AND TRAFFIC

In this chapter the effect of traffic through the local road network due to the proposed development is assessed to establish what impact the construction and operational generated traffic may have on the surrounding road network.

A Traffic Impact Assessment on the surrounding road network of the proposed development was prepared by Atkins in January 2005 and the main findings of the report are summarised in the following sections. A full copy of the Traffic Impact Assessment text is included in Appendix C. (*Note: The full Traffic Impact Assessment Report including all model calculation output has been provided as a separate document in support of the Planning Application.*)

### 6.1 General

#### 6.1.1 Methodology

The Traffic Impact Assessment was prepared in accordance with the recommendations of The Institution of Highways and Transportation (IHT) Guidelines for Traffic Impact Assessment and the Traffic Management Guidelines.

- Employment numbers, shift hours and deliveries for both the construction and operational phases of the proposed development were used to determine traffic generation estimates.
- Existing and predicted Annual Average Daily Traffic (AADT) volumes on the proposed development local road network were estimated using the following National Roads Authority (NRA) documents; RT201 Expansion Factors for Short Period Traffic Counts, and RT620 National Roads and Traffic Flow 2003 and the N28 Traffic Model.

The N28 Model developed for the Cork City to Ringaskiddy road project is based on the Cork Strategic Transport Model (CSTM) developed for the Cork Area Strategic Plan 2001-2020 (CASP).

The N28 Traffic Model provides detailed predicted peak hour traffic flows and AADT volumes for the future modelled years 2008 and 2023<sup>3</sup>, with and without the various N28 route options. The predicted traffic flows are based on the expected employment and population projections for the N28 Study Area.

- Future background traffic flows on the local road network were predicted using the NRA Future Traffic Forecasts 2002-2040 and the N28 Traffic Model.
- The NRA Design Manual for Roads and Bridges (DMRB) and the N28 Traffic Model were used to determine the link capacity of the proposed development local road network.
- The proposed development entrances and the existing and proposed local road network junctions were analysed using the computer software programmes ARCADY and PICADY. These programmes estimated the capacities of junctions, queue lengths and average delay per vehicle on each approach per roundabout and junction respectively.

<sup>3</sup> For the purpose of the Traffic Assessment, it was conservatively assumed that the proposed development plan year 2017 traffic volumes would be equivalent to the N28 Traffic Model predicted 2023 peak hour traffic volumes.

- Morning peak period classified traffic counts were carried out by Atkins on Wednesday the 12<sup>th</sup> January 2005 on the existing N28, adjacent to the proposed development site, and at the N28/Pfizer Ireland Pharmaceutical entrance roundabout junction.

## 6.2 Existing Road Network

The surrounding road network of the proposed development is shown in Figure 6.1. Adjacent to the proposed development site is the N28 National Primary Route which is part of the main Cork City to Ringaskiddy Road. The N28 extends from the N25 South Ring road at the Bloomfield Interchange in the north to Ringaskiddy in the south.

The N28 is a single carriageway distributor road with a typical carriageway width of 7.5 m and dedicated central ghost islands and right turns at existing development entrances and a variable width hardshoulder on its southside.

Adjacent to the site, the N28 forms an at-grade roundabout junction at the main entrance to Pfizer Ireland Pharmaceuticals, while immediately west of the north western entrance to the site, the N28 forms a roundabout junction with the existing county road at Shanbally Village.

Access to the site on the north western boundary is via the existing N28 entrance, located approximately 150 m east of the N28 Shanbally Roundabout junction at Shanbally Village. This entrance is priority controlled with a dedicated central ghost island and right turn lane, and partial left turn lane.

To the southeast of the proposed development site, the N28 forms a stop controlled priority junction with the R613 Regional Road, which includes dedicated turning lanes for both right and left turning traffic from the N28 and R613. Dedicated climbing lanes are located on the N28 from its junction with the R613 in the westbound direction and on the R613 from its junction with the N28 in the southwest direction.

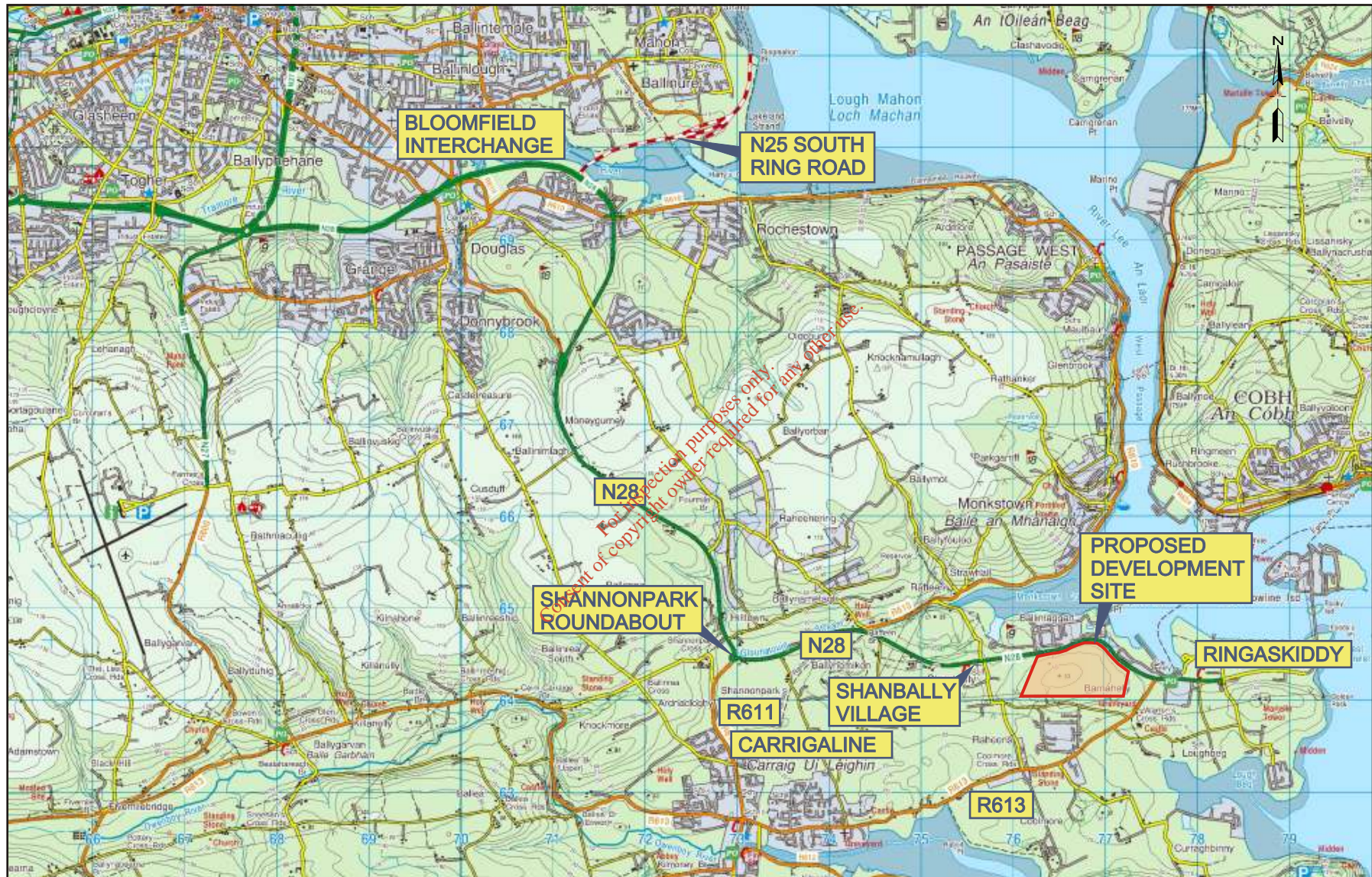
Access to the site on the eastern boundary is via the existing entrance from the R613 Regional Road, located approximately 350 m southwest of the N28/R613 junction.

The R613 is a single carriageway rural road with a typical carriageway width of approximately 7.5 m.

A continuous internal service road between the two entrances from the N28 and the R613 is currently being constructed and is shown in Figure 6.2.

Northwest of Shanbally village, the N28 and R611 form the at-grade Shannonpark Roundabout junction. The R611 Regional Road is part of the main Cork City to Carrigaline Road.

At Shanbally Village, the N28 is located within the 50 km/h urban speed limit zone, which extends to the immediate eastside of the existing north western entrance. The 60 km/h speed limit zone extends along the N28, adjacent to the proposed development site, from east of the north western entrance to immediately west of the R613 junction. The N28/R613 junction is located within the 50 km/h Ringaskiddy urban speed limit zone. The eastern entrance on the R613 is located in the 80 km/h rural speed limit zone. The Shannonpark Roundabout junction is located in the 100 km/h rural speed limit zone.



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Figure 6.1 - Site Location In Relation To Local Road Network

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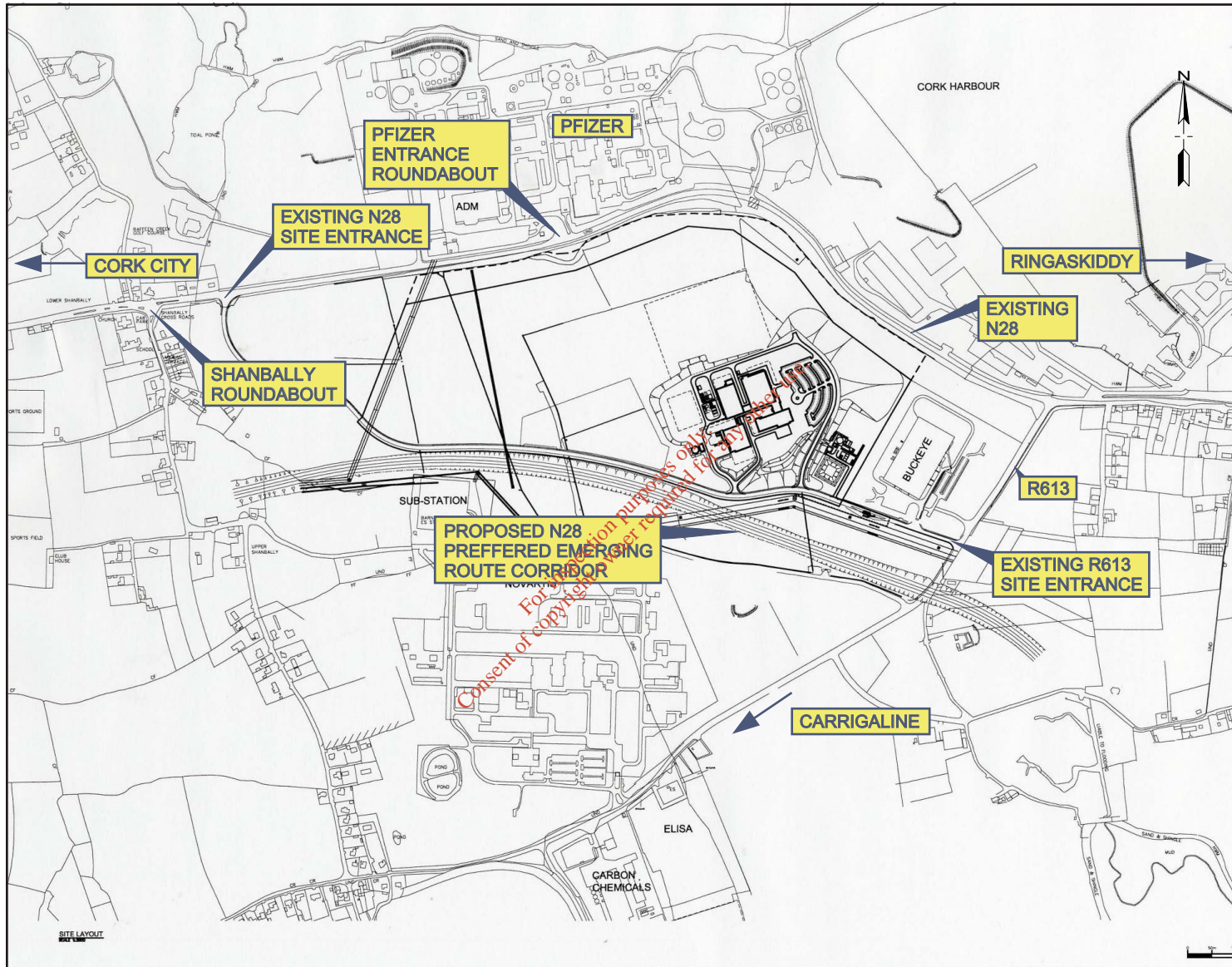


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Figure 6.2 - Proposed Development Layout Plan

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The N28 from Shanbally Village to Ringaskiddy includes continuous street lighting and a continuous footpath along its northside from the entrance to the proposed site to Ringaskiddy Village and a footpath along its southside from the entrance to the proposed site to Shanbally Village. The R613 from its junction with the N28, to southwest of the R613 entrance to the proposed development site, also includes street lighting and a continuous footpath with grass verge.

The N28 is located on the No. 223 Bus Eireann route, from Cork City to Ringaskiddy, for which there are 8 services per day inbound to Ringaskiddy.

### 6.2.1 Existing Traffic Flows (2005)

The recorded peak traffic hour at the N28/Pfizer entrance roundabout junction occurred between 7.30 and 8.30. The overall existing daily peak hour on the existing N28 route, from the Shannonpark Roundabout junction to the R613 junction, occurred between 8.00 to 9.00 a.m. The existing peak hour traffic flows (expressed in total vehicles) on the local road network are shown on Figure 6.4.

The recorded proportion of heavy commercial vehicles (HCVs) on the N28 adjacent to the proposed development site was approximately 4.2% during the peak hour period.

The N28 adjacent to the proposed development is currently operating with a link volume/capacity ratio of approximately 64%. West of Shanbally Village, the equivalent current link volume/capacity ratio is approximately 80%.

The estimated existing AADT traffic volumes and proportion of HCVs on the local roads are as follows:

Estimated Existing Volume (2005)		
	AADT (vehicles)	% HCVs
N28, north of Shannonpark Roundabout	29,500	7.5
N28, west of Shanbally Roundabout	16,100	8.1
N28, east of Pfizer's Entrance Roundabout	10,900	12.0
R611, south of Shannonpark Roundabout	22,800	4.0
R613, south of N28	3,650	4.0

The existing R613, south of its junction with the N28, is currently operating at approximately 42% of its AADT capacity at Level of Service D.

### 6.3 Proposed Road and Public Transport Improvements

Cork County Council are currently progressing the existing N28 resurfacing project at Shanbally, this includes upgrading the existing N28 road carriageway and the Shanbally Roundabout junction.

Cork County Council, in association with the NRA, propose to provide a new and upgraded N28 route from the N25 South Ring Road, at the Bloomfield Interchange to Ringaskiddy. The proposed new N28 route is currently at the preferred route selection stage, the alignment extends south of Shanbally Village and immediately south of the proposed development site as shown in Figure 6.3.

Cork County Council's National Roads Office have indicated that it is currently envisaged that the proposed new N28 route would include a grade separated interchange with the R613, including a southeast bound off-ramp and northwest bound on-ramp, with roundabout junctions on either side of the interchange bridge. It is envisaged that the existing eastern entrance road on the R613 would be realigned locally to tie in with the interchange roundabout on the northeast side.

A partial grade separated interchange is also currently proposed on the preferred N28 route at the internal service road, currently under construction, together with the realignment locally of the existing site entrance on the existing N28 route, with an associated at-grade roundabout junction.

Cork County Council's National Roads Office currently envisage that the proposed new N28 route would be fully completed and opened during 2009 or 2010.

The CASP recommends the provision of a high quality frequent bus service, from Cork City to Ringaskiddy, as part of the integrated transport system for Cork. In the longer term, CASP also recommends the provision of a Park and Ride facility at Carrigaline with a high quality frequent bus service route to Cork City.

### 6.3.1 Future Years Background Traffic Flows

The NRA envisage that passenger car traffic and light goods vehicle traffic on national primary routes would increase by a factor of 1.08 during the period 2005 to 2007, and by a factor of 1.19 during the period 2005 to 2010. Heavy vehicle traffic is expected to increase by a factor of 1.07 and 1.19, during the same periods.

The N28 Traffic Model predicts that peak hour traffic volumes on the proposed development local road network would increase by similar factors for the modelled year 2008, with the exception of northwest bound volumes from Ringaskiddy.

The N28 Traffic Model predicts that northwest bound 2008 peak hour traffic volumes on the N28 adjacent to the proposed development would increase by a factor of 1.49.

Without the development in place, the predicted opening/base year 2007 and worst case operational year 2010 (prior to the opening of the new N28), peak hour background traffic volumes are shown on Figure 6.5(a+b).

The predicted background traffic volumes are considered conservative as the N28 Traffic Model assumes the proposed development site would include an industry with 150 jobs during 2005.

The predicted 2017 plan year<sup>4</sup>, peak hour background traffic volumes with the proposed new N28 route in place and without the proposed development are shown on Figure 6.5(c).

The predicted background traffic volumes for 2017 are considered conservative as the Traffic Model assumes the proposed development site would include an industry with 1,500 jobs during 2010.

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<sup>4</sup> The plan year is referred to in guidelines as 10 years after the development



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Figure 6.3 - N28 Emerging Preferred Route Corridor

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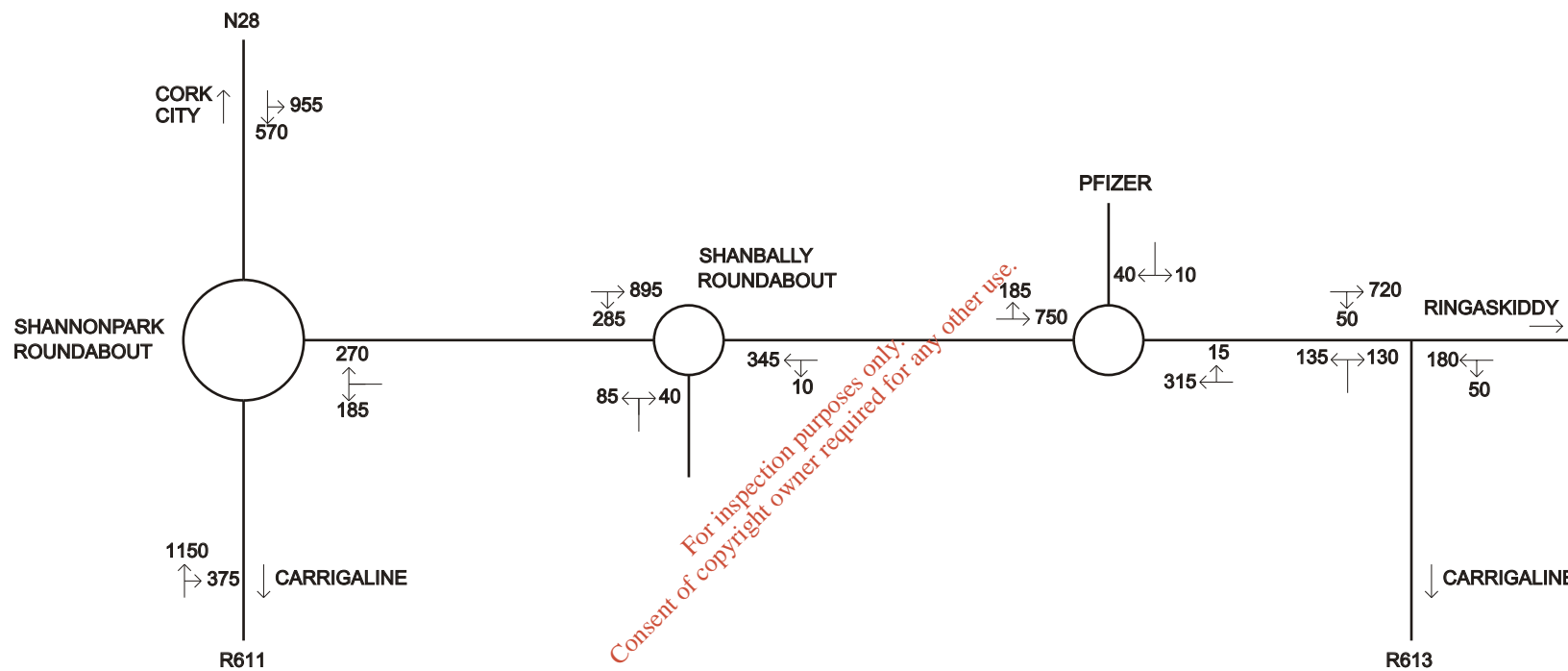


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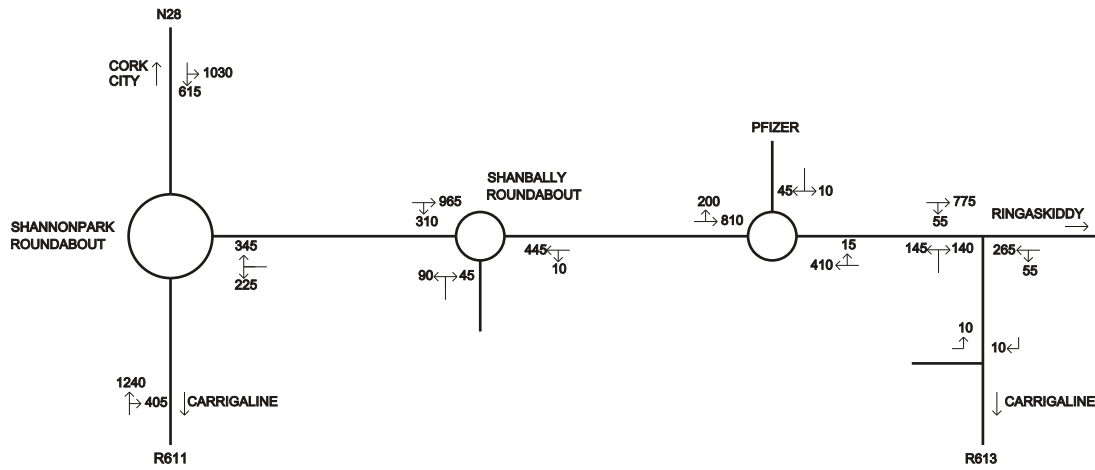
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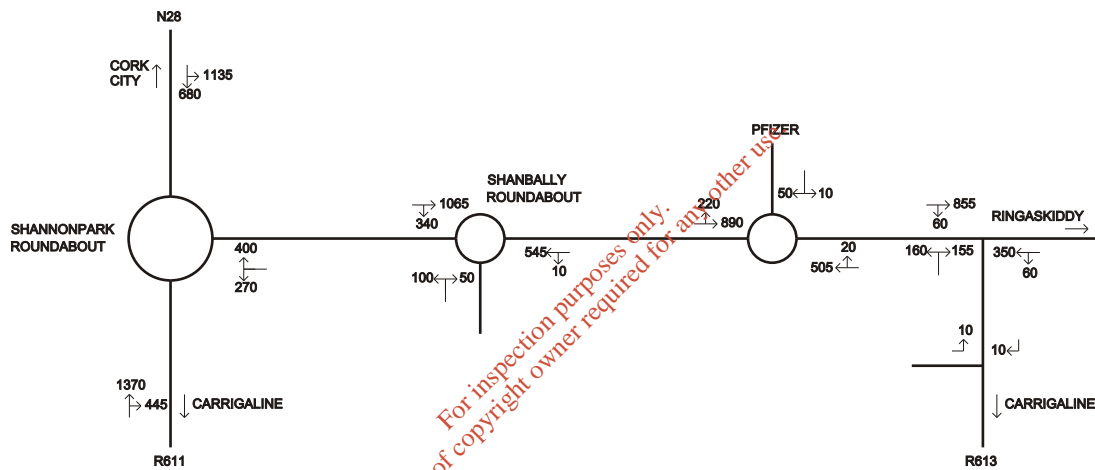


EXISTING 2005 PEAK HOUR TRAFFIC FLOWS (VEHICLES)

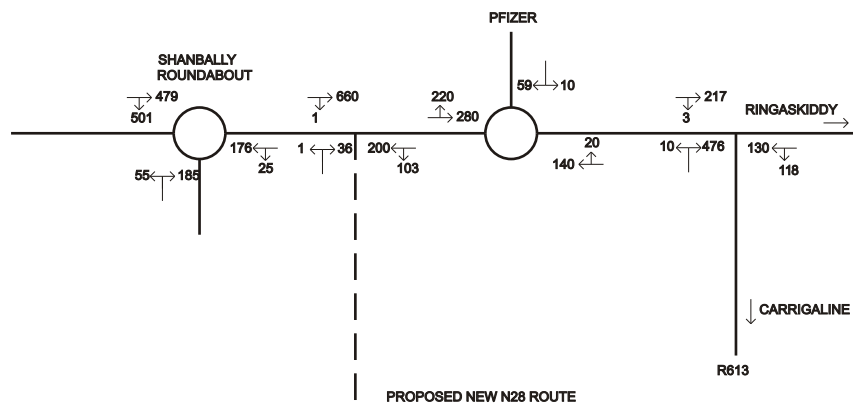




PREDICTED 2007 PEAK HOUR BACKGROUND TRAFFIC FLOWS (VEHICLES)



PREDICTED 2010 PEAK HOUR BACKGROUND TRAFFIC FLOWS (VEHICLES)



PREDICTED 2017 PEAK HOUR BACKGROUND TRAFFIC FLOWS (VEHICLES) WITH THE PROPOSED NEW N28 ROUTE

## 6.4 Traffic Generation and Impacts – Initial Site Development Phase

### 6.4.1 Do Nothing Impact - Initial Site Development Year (2005)

Without the development in place, on the basis of the link capacity<sup>5</sup> the N28 adjacent to the proposed development would operate with a link volume/capacity ratio of approximately 64% during the 2005 peak hour. West of Shanbally Village, the equivalent link volume/capacity ratio would be approximately 80%.

On the basis of the AADT capacity<sup>6</sup>, the R613 south of its junction with the N28 would operate at approximately 42% of its AADT capacity.

A ratio of flow to capacity of 0.90 for a roundabout junction and a priority controlled junction is considered to represent typical practical capacity. Analysis indicates that the N28 Shanbally Roundabout is operating in excess of capacity during the 2005 peak hour period (1.00), with queuing and delays on the N28 eastbound approach junction. The N28/R611 Shannonpark Roundabout junction is operating approximately at practical capacity (0.91) with highest delays of approximately 20 seconds per vehicle. Both the N28/Pfizer's Entrance Roundabout and the N28/R613 junctions are operating well within practical capacity, without significant queuing or delays.

### 6.4.2 Site Access to the Proposed Development

For seven weeks of the 13 week site development phase, all trucks removing excavated material off-site would exit the site, via a left turn only, from the existing entrance on the N28, and enter the site from the existing entrance on the R613. During the site development phase, all other construction traffic would exit and enter the site via the R613 entrance.

On completion of site development works, access to the proposed development is proposed via the existing eastern entrance on the R613 only. It is proposed to upgrade the existing priority junction during the site development phase to include a central ghost island and dedicated right turn lane only. It is envisaged that during the operational phase the existing north western entrance on the N28 will be an emergency access only.

During the main facility construction phase, it is envisaged that all construction traffic would enter and exit the site via the proposed development entrance on the R613. During certain periods, the N28 entrance may be used for outbound left turn development construction traffic.

It is envisaged that access to the proposed development when operational would be via the R613 entrance.

### 6.4.3 Construction Impact – Initial Site Development

During the 13 week site development phase (July to November 2005), on-site shift working hours would be from 7.00 a.m. to 7.00 p.m., Monday to Fridays, and from 7.00 a.m. to 4.00 p.m. on Saturdays. Peak on-site employment is expected to be up to 50 persons. It is envisaged that all employees would travel to and from site by car or light commercial vehicle, at an average vehicle occupancy of 1.3 persons per vehicle.

<sup>5</sup> Link capacity of an urban all-purpose road is of the order of 1,470 vehicles/hour in each direction based on a road carriageway width of 7.3 metres and a 60 km/h speed limit zone (NRA).

<sup>6</sup> AADT link capacity of the R613 is of the order of 8,600 vehicles (NRA)

Accordingly, during the weekday period, peak on-site employment would generate a total of approximately 38 vehicles inbound up to 7.30 a.m., and approximately 38 vehicles outbound after 7.00 p.m. All peak traffic generated by on-site employment would occur before the local morning peak period and overall daily peak hour period, and after the evening peak hour.

During 7 of the 13 week site development phase, it is envisaged that up to approximately 25,000m<sup>3</sup> of unsuitable overburden and excavated rock may be removed off-site and disposed of at a licensed facility. The removal of excavated material would generate a total of approximately 75 trucks outbound and 75 trucks inbound during the weekday 12 hour working shift, which equates to approximately 7 trucks per hour outbound and 7 trucks per hour inbound.

Licensed landfills that may be used include Riverstick, Co. Cork; Meathstown, Carrigaline; Ovens, Ballincollig; Watergrasshill; and Ballygarvan.

Depending on the timing of other development and infrastructural projects in the region there may be an opportunity to reuse part or all of the excess excavated material as beneficial fill on these projects. An example would be in the construction of the new N8 route, from Watergrasshill to Fermoy, Co. Cork. Such opportunities will be fully explored by Centocor at the time of tendering of the initial site development works.

Delivery vehicles to the site are expected to be of the order of 12 vehicles per day two way.

A summary of the total daily and local road network peak hour period two-way traffic generated by the initial site development phase is as follows:

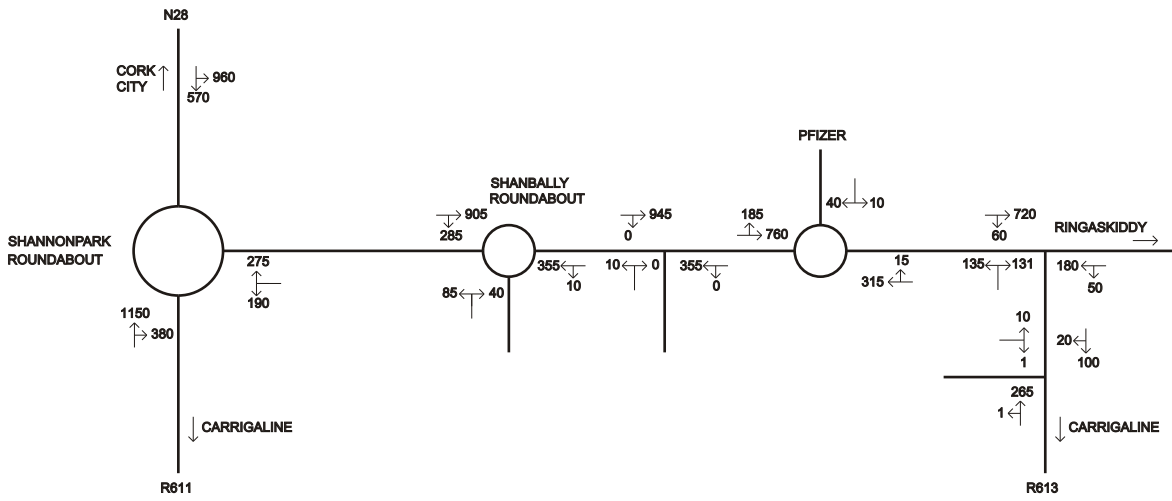
<b>Predicted Initial Site Development Phase Two-Way Traffic Generation</b>		
	<b>Daily</b>	<b>Peak Hour</b>
Trucks	150	14
Cars and Vans	86	2
<b>Total:</b>	<b>236</b>	<b>16</b>

The predicted 2005 peak hour traffic volumes on the local road network, with the proposed initial site development phase are shown on Figure 6.6(a).

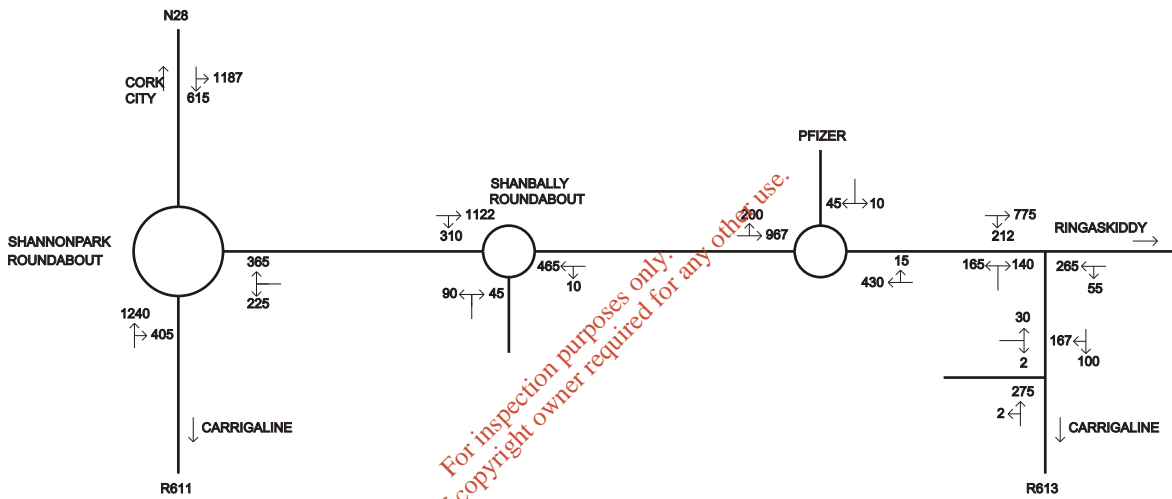
With the proposed initial site development phase, two-way peak hour traffic volumes would increase by up to 1.2% on the N28, and by up to 3.0% and 0.4% on the R613 and R611, respectively. AADT volumes would increase by up to 1.5% on the N28 and by 4.4 and 0.4% on the R613 and R611, respectively.

On the basis of link capacity, the N28 adjacent to the proposed development site would operate with a link volume/capacity ratio of approximately 67% during the 2005 peak hour. This compares to a ratio of approximately 64% without the proposed development. West of Shanbally Village, the equivalent volume/flow capacity ratio would be approximately 81%, compared to 80% without the proposed development.

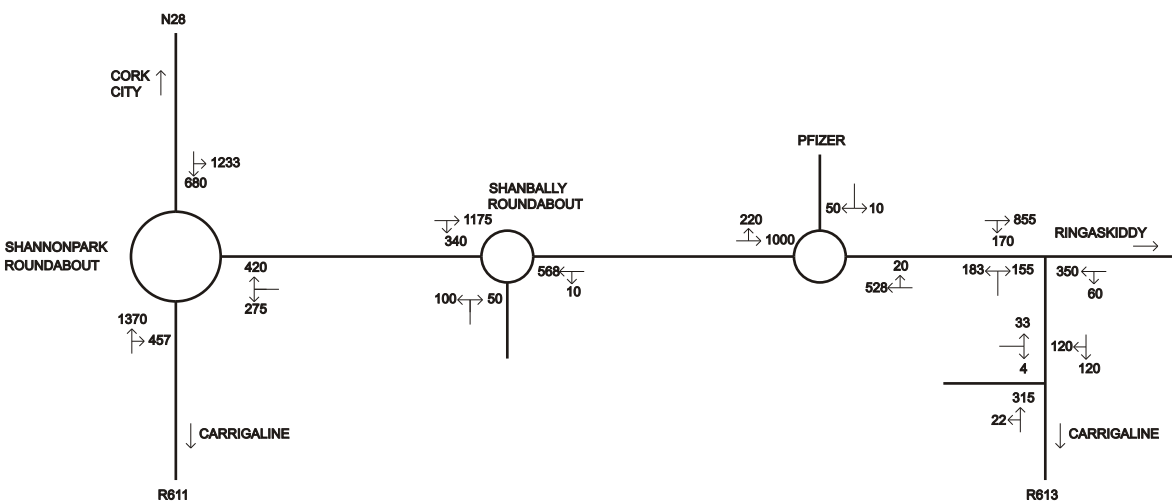
On the basis of the AADT capacity, the R613 south of its junction with the N28, would operate at approximately 44% of its AADT capacity, compared to approximately 42% without the proposed development.



PREDICTED 2005 PEAK HOUR TRAFFIC FLOWS (VEHICLES) WITH THE PROPOSED DEVELOPMENT INITIAL SITE DEVELOPMENT PHASE



PREDICTED 2007 PEAK HOUR TRAFFIC FLOWS (VEHICLES) WITH THE PROPOSED DEVELOPMENT MAIN FACILITY CONSTRUCTION PHASE



PREDICTED 2010 PEAK HOUR TRAFFIC FLOWS (VEHICLES) WITH PROPOSED DEVELOPMENT AT FULL PRODUCTION

Figure 6.6 - Future Year Traffic Flows (Vehicles) with the Proposed Development in Place

Analysis indicates that the ratio of flow to capacity of the proposed development local road network junctions would increase slightly with the initial site development phase from 0.91 to 0.92 at the N28/R611 Shannonpark Roundabout, 1.00 to 1.01 at the Shanbally Roundabout and 0.65 to 0.66 at Pfizer's Entrance Roundabout. The highest ratio of flow to capacity at the N28/R613 junction would remain unchanged at 0.47.

At the N28/R611 Shannonpark Roundabout, queuing and delays would be highest on the R611 approach and the N28 southbound approach from the Cork City direction. There would be no significant queuing and delays on the N28 westbound approach from the Ringaskiddy/Shanbally direction. At the N28 Shanbally Roundabout, queuing and delays would be highest on the N28 eastbound approach from the Cork City direction. There would be no significant queuing and delays on the N28 westbound approach from the Ringaskiddy direction, or on the local county road approach from the southern direction.

On the basis of the above findings, it is considered that the traffic impact of the proposed initial site development phase would be slight and temporary in nature for a period of approximately 13 weeks.

## 6.5 Traffic Generation and Impacts – Main Facility Construction Phase

### 6.5.1 Do Nothing Impact - Main Facility Peak Construction Year (2007) and Operational Opening Year (2007)

Without the proposed development, on the basis of link capacity<sup>7</sup>, the N28 adjacent to the proposed development site would operate with a link volume/capacity ratio of approximately 69% during the 2007 peak hour. West of Shanbally Village, the equivalent link volume/capacity ratio would be approximately 87%.

On the basis of the AADT capacity<sup>8</sup>, the R613 south of its junction with the N28 would operate at approximately 46% of its AADT capacity.

A ratio of flow to capacity of 0.90 for a roundabout junction and a priority controlled junction is considered to represent typical practical capacity. Analysis indicates that the N28 Shanbally Roundabout would operate in excess of capacity during the 2007 peak hour period (1.08), with queue lengths in excess of 100 vehicles on the N28 eastbound approach to the junction. The N28/R611 Shannonpark Roundabout junction would also operate in excess of capacity (1.01), with queue lengths of up to almost 50 vehicles on the R611 approach to the junction.

Both the N28/Pfizer's Entrance Roundabout and the N28/R613 junctions would operate within practical capacity, without significant queuing or delays.

### 6.5.2 Construction Impact - Main Facility Peak Construction (2007)

During the main facility construction phase, on-site shift working hours would be from 7.00 a.m. to 8.00 p.m, Monday to Friday, 7.00 a.m. to 4.00 p.m. on Saturdays and as required on Sundays. During the 24 month main construction

<sup>7</sup> Link capacity of an urban all-purpose road is of the order of 1,470 vehicles/hour in each direction based on a road carriageway width of 7.3 metres and a 60 km/h speed limit zone (NRA).

<sup>8</sup> AADT link capacity of the R613 is of the order of 8,600 vehicles (NRA)

phase, average on-site employment is expected to be of the order of 370 persons, with a peak of up to approximately 700 persons. Peak construction employment is expected to be for a period of 6 months. Outside of this 6 months peak construction employment, average on-site employment would be of the order of 260 persons during the remaining 18 months of the construction programme.

It is envisaged that a minimum of 75% of all construction employees would arrive on-site before 7.30 a.m. each morning, with the remaining 25% before 8 a.m. It is also envisaged that 75% of all construction employees would depart off-site before or at 4.30 p.m. each weekday afternoon, while the remaining 25% would depart after 4.30 p.m. and up to 8.00 p.m.

Assuming that all construction employees travel to and from the site by car or light commercial vehicles and on the basis of an average vehicle occupancy<sup>9</sup> of 1.75 persons/vehicle peak construction employment would generate a total of up to approximately 300 vehicles inbound up to 7.30 a.m. and up to 100 vehicles inbound between 7.30 and 8.00 a.m. On this basis, peak construction employment would generate a total of up to approximately 300 vehicles outbound before or at 4.30 p.m., and up to approximately 100 vehicles outbound between 4.30 p.m. and 8.00 p.m. during weekdays.

During the main facility construction it is proposed that a total of up to 80 Centocor employees will be based at the former Buckeye facility, which will be leased for this purpose. All 80 employees would work on a flexitime basis with a start time of 7.30 to 9.30 a.m. and a finish time of 4.30 to 6.30 p.m. It is assumed that 20% of Centocor employees would arrive for 7.30 a.m., 60% between 7.30 and 9.00 a.m. and 20% between 9.00 and 9.30 a.m.

During the main facility construction phase, it is envisaged that all construction traffic would enter and exit the site via the R613 entrance to the site. During certain periods the N28 entrance may be used for outbound left turn construction traffic.

Peak daily construction deliveries are expected to be of the order of up to 40 trucks two-way, while daily visitors are expected to be of the order of 50 vehicles two-way.

Any item considered an abnormal load such as boilers, cooling towers etc. would be subject to a specific study to ensure the logistics of transportation are fully examined. All relevant authorities would be consulted and all abnormal loads would be transported by a specialist company during off-peak periods.

During the daily peak traffic hour, it is envisaged that peak deliveries and visitors would generate 20 trucks two-way and 20 cars and vans two-way.

A summary of the total daily and local road network peak hour period two-way traffic generated by the main facility construction phase is as follows:

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<sup>9</sup> John Sisk & Son Ltd. propose to operate a continuous incentive scheme to encourage car pooling by all construction workers, with eligibility for the incentive scheme likely to be based on a minimum vehicle occupancy rate of three per vehicle.

<b>Predicted Main Facility Construction Phase Two-Way Traffic Generation</b>				
	<b>Daily Two Way</b>	<b>Local Road Network Peak Hour Period</b>		
		<b><u>In</u></b>	<b><u>Out</u></b>	<b><u>Total</u></b>
Trucks and Other	80	10	10	20
Heavy Vehicles				
Cars and Vans	974	147	10	157
<b>Total:</b>	<b>1,054</b>	<b>157</b>	<b>20</b>	<b>177</b>

The predicted 2007 peak hour traffic volumes on the proposed development local road network, with the proposed main facility construction phase are shown in Figure 6.6(b). It is assumed that all construction traffic generated would travel to and from the site via the N28 and that peak construction would occur during 2007.

Analysis shows that with the proposed main facility construction phase, two-way peak hour traffic volumes would increase by up to 14.2% or 177 vehicles on the N28. Two-way peak hour traffic volumes on the R613 would increase by 44.8 % to 572 vehicles.

AADT volumes on the N28 east of Pfizer's Entrance Roundabout would increase by 8.5% to 13,504 vehicles and by 5.8% to 19,154 vehicles west of Shanbally Roundabout.

Analysis shows that on the basis of link capacity, the N28 adjacent to the proposed development site would operate with a link volume/capacity ratio of approximately 79% during the 2007 peak hour. This compares to a ratio of approximately 69% without the proposed development. West of Shanbally Village, the equivalent link volume/capacity ratio would be approximately 97% compared to 87% without the proposed development.

On the basis of AADT capacity, the R613 south of its junction with the N28 would operate at approximately 58% of its AADT capacity, compared to approximately 46% without the proposed development.

Analysis indicates that the peak hour highest ratio of flow/capacity of the local road network junctions would increase slightly or moderately with the main facility construction phase. During the six month period of peak construction employment, the ratio of flow/capacity would increase from 1.01 to 1.02 at the Shannonpark Roundabout, 1.08 to 1.18 at the Shanbally Roundabout, 0.70 to 0.80 at Pfizer's Entrance Roundabout and 0.53 to 0.61 at the N28/R613 junction.

At the N28/R611 Shannonpark Roundabout, queuing and delays would be highest on the R611 approach and the N28 southbound approach from the Cork City direction. There would be no significant queuing and delays on the N28 westbound approach from the Ringaskiddy/Shanbally direction. At the N28 Shanbally Roundabout, queuing and delays would be highest on the N28 eastbound approach from the Cork City direction. There would be no significant queuing and delays on the N28 westbound approach from the Ringaskiddy direction, or on the local county road approach from the southern direction.

Outside the six months peak construction employment period, the peak hour highest RFC's at the proposed development local road network junctions, with the main facility construction phase, would be lower than those during the six months peak construction employment period.

On the basis of the above findings, it is considered that the traffic impact of the proposed main facility construction phase would be moderate to significant and short-term over a period of 24 months.

## 6.6 Traffic Generation and Impacts – Operational Phase

### 6.6.1 Do Nothing Impact

#### ***Operational First Full Production Year 2010***

On the basis of link capacity, the N28 adjacent to the proposed development site would operate with a link volume/capacity ratio of approximately 76% during the 2010 peak hour, without the proposed development and proposed new N28 route in place. West of Shanbally Village, the equivalent link volume/capacity ratio would be approximately 96%.

On the basis of the AADT capacity, the R613, south of its junction with the N28 would operate at approximately 51% of its AADT capacity.

A ratio of flow to capacity of 0.90 for a roundabout junction and a priority controlled junction is considered to represent typical practical capacity. Analysis indicates that the N28 Shanbally Roundabout would operate in excess of capacity during 2010 peak hour period (1.19), with delays of up to almost six minutes per vehicle on the N28 eastbound approach to the junction. The N28/R611 Shannonpark Roundabout junction would also operate in excess of capacity (1.14), with delays of over four minutes per vehicle on the R611 approach to the junction.

Both the N28/Pfizer's Entrance Roundabout and the N28/R613 junctions would operate within practical capacity, without significant queuing or delays.

#### ***Operational Plan Year (2017)***

On the basis of link capacity, without the proposed development but with the proposed new N28 in place, the old N28 adjacent to the proposed development site would operate with a link volume/capacity ratio of approximately 45% during the 2017 peak hour. West of Shanbally Village, the equivalent link volume/capacity ratio would be approximately 67%.

On the basis of the AADT capacity, the R613, south of its junction with the N28 would operate at approximately 69% of its AADT capacity.

Without the proposed development but with the new N28 in place, analysis indicates that all of the junctions on the proposed development old N28 local road network would operate within practical capacity during the peak hour period. The Shanbally Roundabout would operate within a highest ratio of 0.87, while the R613 junction at Ringaskiddy would operate with a highest ratio of 0.84.



## 6.6.2 Operational Impact

### **First Full Production Year (2010)**

At full production it is envisaged that the proposed development would operate 24 hours a day and seven days a week. It is expected that a total of 330 staff, including contractors, would be employed at the proposed development, with 128 of these working on a four cycle shift basis. There would be two 12-hour shifts each day, with changeovers at 7.30 a.m. and 7.30 p.m. A total of 32 employees would be working during each shift. The flexitime working hours for the remaining 192 permanent staff would be from 7.30 to 9.30 a.m and 4.30 to 6.30 p.m. It is envisaged that approximately 60% of flexitime staff would arrive during the local road network daily peak morning traffic hour.

It is proposed that access to the proposed development will be available via the existing eastern entrance to the site on the R613.

Up to 20 short-term contractors, 10 students and 10 visitors would also be working at various periods during the daytime working hours. It is envisaged that 50% of contractors, students and visitors would arrive during the local road network daily morning peak traffic hour.

Traffic generated by shift workers travelling to and from the proposed development would occur before the morning peak traffic period and after the evening peak traffic period.

Traffic generated by deliveries is expected to be of the order of 10 light commercial vehicles two-way per day.

A summary of the total daily and local road network peak hour two-way traffic<sup>10</sup> generated by the operational phase of the proposed development is as follows:

<b>Predicted Operational Phase (Full Production) Two-Way Traffic Generation (Vehicles)</b>				
	<b>Daily Two Way</b>	<b>Local Road Network Peak Hour Period</b>		
		<b><u>In</u></b>	<b><u>Out</u></b>	<b><u>Total</u></b>
Permanent Employees	492	113	25	138
Contractors, Students & Visitors	62	15	0	15
Deliveries	10	2	2	4
<b>Total:</b>	<b>562</b>	<b>130</b>	<b>27</b>	<b>157</b>

The predicted 2010 peak hour traffic volumes on the proposed development local road network, with the proposed development at full production are shown on Figure 6.6(c).

Analysis of the two-way peak hour traffic volumes shows that volumes would increase by up to 6.5% on the N28 west of Shanbally Roundabout by 3.3% on the N28 north of Shannonpark and by 9.3% on the N28 east of Pfizer Entrance

<sup>10</sup> Based on an average vehicle occupancy of 1.3 persons /vehicle

Roundabout. Peak hour volumes would increase by 0.7% on the R611 south of Shannonpark, and by 6.0% to 461 vehicles on the R613, southwest of the proposed development site entrance.

AADT volumes would increase by up to 3.4% on the N28, and by 0.2% on the R611. AADT volumes on the R613, southeast of the site entrance would increase by 11.0%.

On the basis of the link capacity, the N28 adjacent to the proposed development site would operate with a link volume/capacity ratio of approximately 83% during the 2010 peak hour, compared to a ratio of approximately 76% without the proposed development. West of Shanbally Village, the equivalent link volume/capacity ratio would be approximately 103% compared to approximately 96% without the proposed development.

On the basis on AADT capacity, the R613 southwest of its junction with the site entrance, would operate at approximately 56.2% of its AADT capacity, compared to approximately 50.6% without the proposed development.

Analysis indicates that the peak hour highest ratio of flow/capacity at the N28/R611 Shannonpark Roundabout would increase slightly from 1.14 to 1.15. The highest ratio of flow/capacity at the N28 Shanbally Roundabout would increase from 1.19 to 1.28, with increased highest delays per vehicle of up to 8.68 minutes, compared to 5.93 minutes without the development.

With the proposed development at full production, the entrance to the site on the R613 would operate well within practical capacity. The N28/Pfizers entrance roundabout and the N28/R613 junction would also operate within practical capacity.

At the N28/R611 Shannonpark Roundabout, queuing and delays would be highest on the R611 approach and the N28 southbound approach from the Cork City direction. There would be no significant queuing and delays on the N28 westbound approach from the Ringaskiddy/Shanbally direction. At the N28 Shanbally Roundabout, queuing and delays would be highest on the N28 eastbound approach from the Cork City direction. There would be no significant queuing and delays on the N28 westbound approach from the Ringaskiddy direction, or on the local county road approach from the southern direction.

On the basis of the above findings, it is considered that the traffic impact of the proposed development on the N28 Shanbally Roundabout would be moderate to significant and temporary to short-term under the assumption that the proposed new N28 will be fully complete by 2010 or shortly after. The traffic impact of the proposed development on the remainder of the local road network would be imperceptible to slight, and temporary to short-term.

### **Plan Year (2017)**

For the purpose of the Traffic Assessment, it was conservatively assumed that the proposed development plan year 2017 traffic volumes would be equivalent to the N28 Traffic Model predicted 2023 peak hour traffic volumes.

It is envisaged that the proposed new N28 route would be in place by the proposed development plan year 2017. The new route includes provision for direct access to and from the proposed development site. The N28 Traffic Model assumes that the proposed development site would include the development of an industry with 150 jobs during 2005 and a major industry with 1,500 jobs during 2010. Accordingly, the traffic impact of the proposed development at full production has been more than anticipated in the design of the new N28 route.

It is envisaged that the proposed development would not result in any increase in the predicted 2017 peak hour background traffic flows, with the new N28 route in place, (see Figure 6.7) and that the vast majority of the plan year (2017) proposed development generated traffic would travel via the new N28 route. An analysis of the proposed development local road network, with the proposed development in place (2017) would be equivalent to the analysis detailed in Section 6.6.1 for 2017. It is considered that the traffic impact of the proposed development during the plan year (2017) would be imperceptible to slight and long term to permanent in duration.

## 6.7 Mitigation

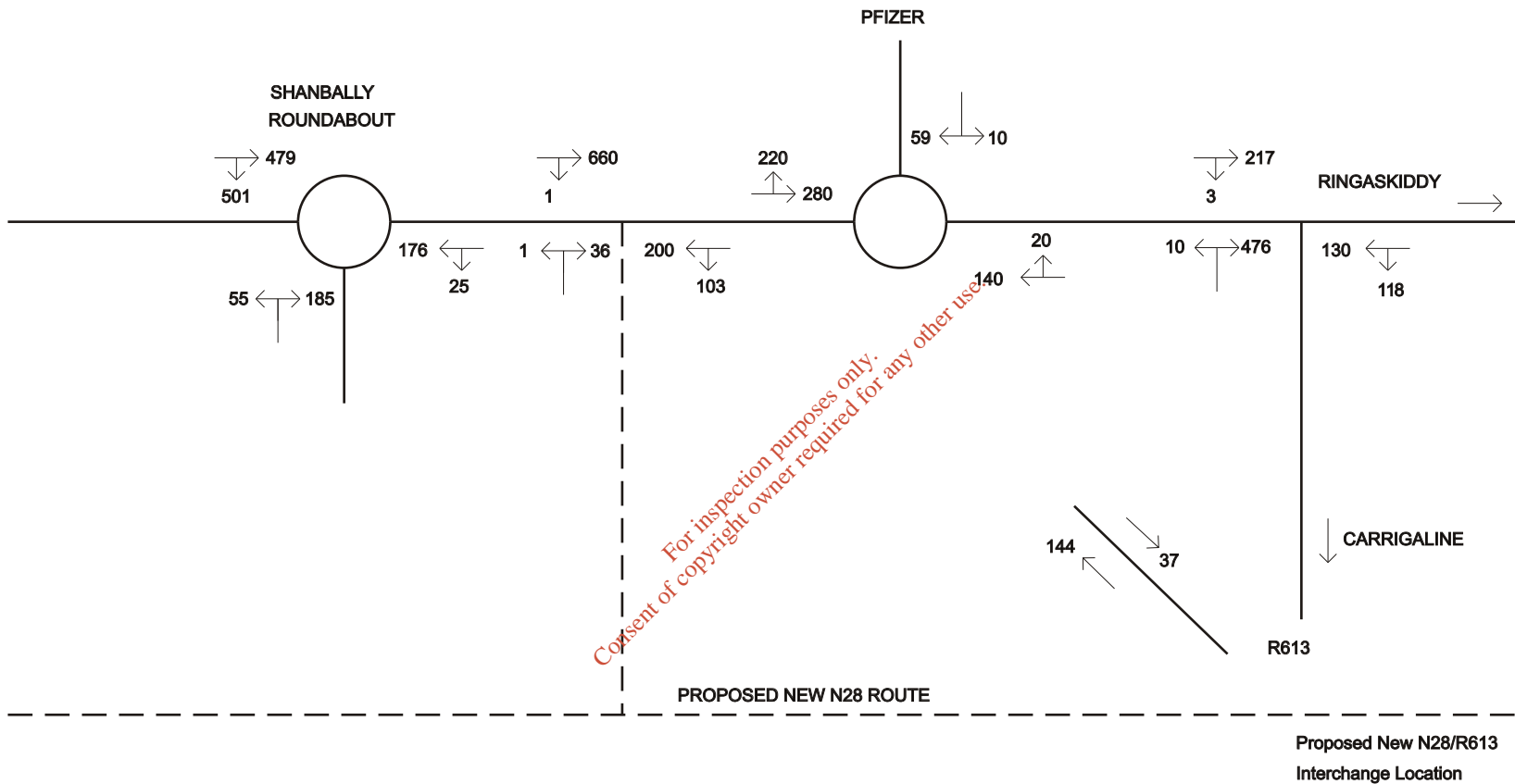
- The proposed on-site construction working hours have been designed to ensure that peak traffic generated by construction employees occurs before the morning peak traffic period on the local road network, and outside of the evening peak period.
- The selected contractor for the construction phase, propose to operate a continuous incentive scheme to encourage car pooling by all construction workers based on a minimum vehicle occupancy of three.
- Hardstand parking areas would be provided within the proposed development site for all construction parking. All construction site offices and compounds would be located within the site confines. Construction wheelwash facilities would also be provided within the site. All necessary construction warning signs and other measures required by Cork County Council would be provided at the commencement of construction.
- During the main facility construction, canteen facilities will be provided on-site for all construction employees.
- A Traffic Management Plan will be implemented during the construction phase. It is proposed that all trucks removing excavated material off-site during the initial site development phase would exit the site via a left turn only from the existing entrance on the N28 and proceed along the N28 to the N28/R611 Shannonpark Roundabout.
- From Shannonpark Roundabout, trucks would then travel, either via the R611 to Carrigaline, to access the licensed landfills at Riverstick, Meathstown and Ballygarvan, or via the N28 Bloomfield Interchange on the South Ring Road, to access the licensed landfills at Ovens and Watergrasshill.
- All trucks returning to the site would travel along the same routes, via the N28/R611 Shannonpark Roundabout, and enter the site from the existing site entrance on the R613, via the N28/R613 junction at Ringaskiddy.
- The predicted traffic volumes generated by construction employees and operational employees assume that all employees would travel to and from work by car or other vehicle. In reality, a minority proportion of employees would walk, cycle or travel by Bus Eireann public transport to and from work. The provision of the CASP recommended high quality frequent bus service, from Cork City to Ringaskiddy, as part of the proposed integrated transport system for Cork, is likely to result in the modal shift of some operational employees to public transport.
- Centocor propose to operate flexitime working hours for all daytime employees during the operational phase, with a start time of 7.30 to 9.30

a.m. and a finish time of 4.30 to 6.30 p.m. This also includes Centocor staff working in the former Buckeye building during the main facility construction phase. Centocor also propose to provide canteen facilities for all staff during the operational phase.

- ❑ The proposed development operational shift hours have also been designed to avoid the morning and evening peak periods.
- ❑ Centocor propose to provide facilities for employees to increase the use of alternative transport modes and reduce dependency on private car use. Showers, changing and locker facilities for cyclists would be provided, together with secure bicycle parking. A staff car pooling link on the company web site would be provided. Centocor will also engage fully in any coordinated Mobility Management Plan process for the major employers in the Ringaskiddy area.
- ❑ The ARCADY junction analysis of Shanbally Roundabout for the predicted 2005, 2007 and 2010 peak hours, both with and without the proposed development, indicates that significant queuing and delays would occur on the N28 eastbound approach from the Cork City direction, while no significant queuing or delays would occur on the N28 westbound approach from the Ringaskiddy direction or on the local county road approach from the southern direction. This disproportionate queuing and delays is a function of the junction type, the demand volume on each approach and the turning movement distribution at the existing roundabout junction. The installation of a traffic signal controlled junction at this urban area junction would reduce queuing and delays on the N28 eastbound approach and proportion the available green time in accordance with demand. This would reduce the highest ratio of flow to capacity at the junction during the peak hour.
- ❑ On completion of the site development phase, access to the proposed development is proposed via the R613 entrance only. Centocor, in consultation with Cork County Council, propose to upgrade the existing priority junction to include a central ghost island and dedicated right turn lane. Centocor propose to carry out these upgrading works during the initial site development phase. It is proposed that the existing N28 entrance would be an emergency access only.

## 6.8 Conclusion

- ❑ The predicted background traffic volumes and associated analysis, without the proposed development, for the existing year (2005) and the future years 2007 and 2010, confirm Cork County Council's current proposal, in association with the NRA, for a new N28 route.
- ❑ Without the proposed development, the N28/R611 Shannonpark Roundabout and the N28 Shanbally Roundabout are operating in excess of practical capacity during the 2005, 2007 and 2010 peak hours. The peak hour analysis indicates significant queuing and delays on the N28 eastbound approach to the Shanbally Roundabout. In this regard, the proposed development construction and operational shift working hours have been designed to avoid the morning and evening peak traffic periods.
- ❑ The traffic impact of the proposed development initial site development phase (2005) would be slight and temporary for a period of approximately 13 weeks. During the peak hour period, the critical N28 Shannonpark Roundabout and Shanbally Roundabout junctions would operate with highest



Predicted 2017 Peak Hour Traffic Flows (Vehicles) with the Proposed Development in Place

ratios of flow to capacity of 1.02 and 1.18, respectively, compared to 0.91 and 1.00, respectively, without the development.

- ❑ During the main facility peak construction year (2007), the traffic impact of the proposed main facility construction phase would be moderate to significant and short-term. The critical N28 Shannonpark roundabout and Shanbally Roundabout junctions would operate with highest peak hour ratios of flow to capacity of 1.02 and 1.18, respectively, compared to 1.01 and 1.08, respectively, without the development.
- ❑ The traffic impact of the proposed development at full production in 2010 on the N28 Shanbally Roundabout would be moderate to significant, and temporary to short-term. The traffic impact of the proposed development on the remainder of the local road network would be imperceptible to slight, and temporary to short-term.
- ❑ Cork County Council's National Roads Office currently envisage that the proposed new N28 route would be fully completed and opened during 2009 or 2010. Accordingly, it is likely that the foregoing traffic impact of the proposed development at full production in 2010 would not arise, or would only be temporary in nature.
- ❑ It is envisaged that the proposed new N28 route would be in place by the proposed development plan year (2017) and that the proposed development would not result in any increase in the predicted 2017 peak hour background traffic flows.

The design of the proposed new N28 route includes provision for direct access to and from the proposed development site and remaining IDA lands. The N28 Traffic Model assumes that the proposed development site and remaining IDA lands would include the development of an industry with 150 jobs during 2005, and a major industry with 1,500 jobs during 2010. At full production, the proposed development would include a total of 320 employees. It is considered that the traffic impact of the proposed development during the plan year (2017) would be imperceptible to slight and long term to permanent.