11 TRANSPORTATION

INTRODUCTION

This chapter of the Environmental Statement has been prepared by FMW Consultancy and examines the environmental impact of the additional traffic resulting from the proposed development on the site. The scope of the wider traffic and transport assessments that feed into this chapter were agreed with the Gloucestershire County Council (GCC) highway officer in advance. This chapter deals with the following key elements:

- the methodology employed to assess the impact of the proposed development on the local transport network;
- the baseline conditions in terms of existing traffic volumes;
- an assessment of the impact of the additional traffic on the local highway network;
- an assessment of the impact of the additional traffic on the prevalence of accidents; and
- identification of appropriate mitigation measures to offset potential negative impacts and any residual effects.

METHODOLOGY

Baseline Traffic Flows

In order to determine the net increase in traffic volumes as a result of the proposed development, traffic surveys were undertaken at the following junctions on Tuesday 24th November 2009:

- A433 London Road / Quercus Road roundabout;
- A433 London Road / B4014 Hampton Street / A4135 New Church Street / A433 Long Street priority junctions;
- A433 Long Street / Chipping Street / B4014 Market Place / A433 Church Street mini roundabout; and
- The crossroads junction between the A433 Tetbury Road, Tarlton Road and Kemble Road;

The A433 / A429 junction near Cirencester was also included in the traffic assessments but previous March 2006 survey data for this junction was obtained from GCC.

Future Year Assessment

It was further agreed with GCC that the operation of the various junctions should be assessed for the 2015 design year both with and without the proposed development.

In order to increase the surveyed traffic flows (2006 and 2009) to the future year scenario (2015), Tempro adjusted NRTF (National Road Traffic Forecasts) central growth factosr were applied. The factors used were 1.110 for 2006 to 2015 and 1.071 for 2009 to 2015.

Development Trip Generation

The methodology to calculate the development trip generation was agreed with GCC in advance. In summary the methodology used is given below:

- Peak hour person trip rates derived from the TRICS trip rate database using the mixed private/non-private residential category;
- Modal split of the above person trip rates derived through reference to 2001 Census Data for the Tetbury Ward using the 'Method of Travel to Work – Resident Population' data set;
- Vehicular trip rates for the residential element then calculated by applying the car driver modal share to the person trip rates; and
- Peak hour vehicle trip rates for the Nursing Home element derived directly from the TRICS trip rate database.

Development Trip Distribution

Trip distribution was again calculated using 2001 Census data for the Tetbury Ward. Tetbury was set as the Ward of residence, i.e. the origin of a work related trip, with the destination of work related trips then being identified at the Ward level within the Cotswold District and the Local Authority level beyond.

The most appropriate vehicular route to the various destinations was then identified 'by eye' to allow a percentage of trips value to be assigned to each of the main roads leading out of the town.

Committed Development

GCC identified that the only committed development site that needed to be taken into account was the consented, but yet to be implemented, extension to the Tesco store on London Road, Tetbury.

Predicted traffic flows associated with this site were obtained from inspection of the Cotswold District Council planning files and applied to the base traffic survey results accordingly.

Capacity Assessments

It was agreed with GCC that AM and PM peak hour capacity assessments be undertaken at the five junctions where traffic surveys were undertaken, namely:

- A433 London Road / Quercus Road roundabout;
- A433 London Road / B4014 Hampton Street / A4135 New Church Street / A433 Long Street priority junctions;
- A433 Long Street / Chipping Street / B4014 Market Place / A433 Church Street mini roundabout;
- The crossroads junction between the A433 Tetbury Road, Tarlton Road and Kemble Road; and
- The A433 / A429 priority junction near Cirencester

Two of the junctions are roundabouts and were assessed using the ARCADY computer programme with the remainder being priority junctions and assessed using the PICADY computer programme.

Accidents

In order to determine the existing accident record in the local area, Personal Injury Accident (PIA) data was acquired from GCC for a 5 year period. The data was then analysed to identify any particular accident clusters and the likelihood of any existing highway safety problems being exacerbated by development traffic.

BASELINE CONDITIONS

Traffic Flows

As identified above, traffic surveys were undertaken at various junctions within Tetbury and on the A433 towards Cirencester. The indentified two-way flows on each road in 2009 are shown in the table below.

	AM Peak	**PM Peak**
A433 London Road north of Quercus Road	855	876
A433 London Road south of Quercus Road	888	905
A433 Long Street through the town centre	988	848
B4014 Hampton Street	592	525
A4135 New Church Street	712	643
B4014 Market Place	640	546
A433 Church Street	689	556
A433 south of A429 junction	800	721
A433 north of A429 junction	1,334	1,245

The surveyed flows set out above represent the existing conditions against which the impact of additional traffic associated with the proposed development has been assessed.

Accident Data

Details of the number of PIAs recorded on the roads surrounding the site were obtained from GCC with full details being given in an Appendix to the Transport Assessment.

The severity of PIAs are recorded as fatal, serious or slight which are classified as follows:

- A fatal accident is an accident in which at least one person is fatally injured;
- A serious accident is one in which at least one person is seriously injured, but no-one suffers a fatal injury, and which is in one (or more) of the following categories:
  - an injury for which a person is detained in hospital as an in-patient; or
  - a person sustains any of the following injuries (whether or not the person is detained in hospital): fractures, concussion, internal injuries, crushings, severe cuts and lacerations, severe general shock requiring treatment;

- A slight accident is one in which at least one person suffers "slight" injuries (for example, a sprain, bruise or cut which is not judged to be severe, or slight shock requiring roadside attention), but no-one is seriously injured, or fatally injured.

The accident records identify a total of 36 accidents within Tetbury over the 5 year period with 31 being classified as slight and 5 classified as serious. There were no fatal accidents recorded. In total there were 50 recorded casualties split as 6 serious and 44 slight.

Of the 36 accidents, 9 involved pedestrians (1 serious) and 2 involved cyclists (both slight). Children were involved in 3 of the pedestrian accidents (all slight) and 1 of the cyclist accidents (again slight).

The accident locations are relatively evenly spread with only small clusters at the junctions either end of Long Street but these are not considered to be excessive in number given the quantity of turning traffic and the general town centre environment. Beyond the town centre area there is a small cluster of accidents at the A433 London Road/Cirencester Road junction and again at the A433 London Road/Conygar Road junction.

Accident information has also been obtained for the A433 junction with the link to Kemble where only a single slight injury accident has been recorded over the last 5 year period. Accident data for the A433/A429 junction near Cirencester identifies a total of 6 accidents (all slight) and 11 casualties. Given the amount of traffic using the junction, this number of accidents is not considered to identify any major safety concerns.

It is therefore concluded that there are no types or locations of accidents that would be exacerbated by development traffic from the proposed Highfield Farm development site.

ASSESSMENT OF IMPACT

The Institute of Environmental Assessment (IEMA) has prepared guidelines for the environmental assessment of road traffic (Guidance Note No: 1). Column 3 of Table 2.1 of those guidelines sets out the recommended list of environmental impacts which could be considered potentially significant whenever a new development is likely to give rise to changes in traffic flows. This chapter deals with the following subjects listed in the guidelines:

- Severance;
- Driver delay;
- Pedestrian delay and amenity;
- Accidents and safety; and
- Hazardous loads.

Other subjects that are included in the IEMA guidelines but not listed above are Noise, Vibration, Visual Impact, Air Pollution, Dust and Dirt, Heritage and Conservation Areas, and Ecological Impact. These subjects are dealt with elsewhere in this Environmental Statement.

Severance

Severance is the perceived division that can occur within any community when it becomes separated by a major traffic route. The assessment of severance considers specific local conditions, in particular, the location of pedestrian routes to key local facilities and whether or not crossing facilities are provided.

Driver Delay

Values for delays to vehicular traffic can be determined by the use of the Department of Transport's (DfT's) computerised junction assessment packages (ARCADY for roundabouts and PICADY for priority junctions).

Pedestrian Delay and Amenity

As a general rule, it is considered that an increase in vehicular traffic reduces the time and quantum of acceptable traffic gaps. Accordingly, this will affect the delay incurred by pedestrians seeking to cross roads in the surrounding area, assuming that gap acceptance does not change.

The IEMA guidelines recommend that rather than rely on thresholds of pedestrian delay, any assessment should be based on professional judgement to determine whether pedestrian delay is a significant impact.

Accidents and Safety

PIA reports have been obtained from GCC for a defined area within Tetbury. An assessment of the type and severity of accidents has been conducted in a qualitative manner.

Hazardous Loads

The IEMA guidelines acknowledge that most developments will not result in an increase in the quantum of hazardous/dangerous loads. The publication "The Carriage of Dangerous Goods in the UK" lists materials which can represent a hazard when in transit, and provides guidance in relation to the safe carriage of these goods. The proposed development is evaluated against that list.

Vehicular Access

The proposed access strategy to the Highfield Farm site is shown on the plans included within the Transport Assessment.

Trip Generation

The predicted vehicular trip generation of the proposed development is calculated within the Transport Assessment. However, the following table provides a summary of the predicted number of trips to and from the site in the AM and PM peak periods and across a 12 hour day (07.00 to 19.00).

	AM Peak		PM Peak		Daily
	Arrivals	**Departures**	**Arrivals**	**Departures**	**Two-way**
Vehicle Trips	62	163	110	89	2,035

Traffic Impact

The effects of the operational traffic on the wider network in 2015 have been considered to produce a thorough investigation of the potential effects of the peak hour traffic generated/attracted by the proposed development. The Table below illustrates the predicted proportional increases in traffic on each of the assessed road links.

Link	AM Peak	PM Peak
A433 Church Street	7.6%	9.1%
B4014 Market Place	4.0%	3.9%
A433 Long Street	7.8%	7.7%
A4135 New Church Street	6.4%	6.0%
B4014 Hampton Street	2.8%	2.7%
A433 London Road (south of roundabout)	15.6%	13.1%
A433 London Road (north of roundabout)	7.8%	6.5%

The IEMA guidelines state that 'highway links should be assessed when traffic flows have increased by more than 30% or other sensitive areas affected by traffic increases of at least 10%'.

None of the roads experience a traffic flow increase greater than 30% with only the A433 London Road (south of the roundabout) experiencing a flow increase of greater than 10%. London Road is not considered a sensitive link in environmental terms given that direct frontage access is very limited and the 'with development' flow levels remain within the theoretical link capacity derived through reference to the Department for Transport guidance TA79/99: Traffic Capacity of Urban Roads. More detailed assessment is therefore considered unnecessary.

All the other road links assessed experience increases ranging from 2.7% to 9.1% which is considered insignificant based on IEMA's Guidelines.

In terms of vehicular movements during the construction of the proposed development, as these would be lower than the predicted number of trips following full occupation of the development, no specific separate analysis of construction traffic has been undertaken. The assessments undertaken for the impacts of development traffic effectively already provide a robust approach.

Severance

Paragraph 4.31 of IEMA's Guidelines advises 'a range of indicators determining the significance of the relief of severance. Changes in traffic flow of 30%, 60% and 90% are regarded as producing "slight", "moderate" and "substantial" changes in severance respectively'.

As stated above, none of the existing roads will experience increases in traffic volumes in excess of 30% which is the minimum value necessary to create even a "slight" impact. Notwithstanding, the majority of pedestrian movements to and from the development site will be towards the south and the town centre and can therefore utilise the existing controlled crossings of the A433 London Road. The severance effects of the additional traffic flows will therefore be minimal.

Driver Delay

Peak hour operational performance assessments of the local highway network have been undertaken using the DfT approved operational performance models ARCADY and PICADY. The detailed modelling results are discussed within the Transport Assessment. The following junctions were assessed for a 2015 base scenario (including committed development trips) and 2015 base plus proposed Highfield Farm trips:

- A433 London Road / Quercus Road roundabout;
- A433 London Road / B4014 Hampton Street / A4135 New Church Street / A433 Long Street priority junctions;
- A433 Long Street / Chipping Street / B4014 Market Place / A433 Church Street mini roundabout; and
- The crossroads junction between the A433 Tetbury Road, Tarlton Road and Kemble Road.

The junction assessments demonstrate that all of the existing junctions operate with spare capacity in the peak hours in 2015 both with and without the proposed Highfield Farm development.

The inclusion of Highfield Farm traffic to the highway network would result in additional delays to non-development traffic at 3 junctions as follows:

- A433 London Road / B4014 Hampton Street / A4135 New Church Street / A433 Long Street priority junctions. Maximum driver delay increases from 1.08 minutes to 1.87 minutes in the AM peak and from 0.24 minutes to 0.28 minutes in the PM peak;
- A433 Long Street / Chipping Street / B4014 Market Place / A433 Church Street mini roundabout. Maximum driver delay increases from 0.29 minutes to 0.33 minutes in the AM peak and from 0.61 minutes to 0.79 minutes in the PM peak; and
- The crossroads junction between the A433 Tetbury Road, Tarlton Road and Kemble Road. Maximum driver delay increases from 0.20 minutes to 0.21 minutes in the AM peak and is unchanged in the PM peak

Accordingly, it is concluded that the junction capacity assessment results summarised above demonstrate that traffic associated with the proposed development will have only a slight impact upon the operation of the local highway network.

Pedestrian Delay and Amenity

As a general rule, an increase in vehicular traffic reduces the time and quantum of acceptable traffic gaps. Accordingly, this will affect the delay incurred by pedestrians seeking to cross roads in the surrounding area, assuming that gap acceptance does not change. The IEMA guidelines recommend that rather than rely on thresholds of pedestrian delay, any assessment should be based on professional judgement to determine whether pedestrian delay is a significant impact.

As previously mentioned the majority of pedestrian movements are likely to be to and from the south as the Primary School, Tesco Supermarket and Town Centre are located in this direction. A pedestrian / cycle link will be provided to connect to the existing residential streets to the south which are generally lightly trafficked and are likely to form the desire line to local services and facilities. These connect through to existing signal controlled crossings of the A433 London Road which provide safe locations at which to cross.

In light of the above it is considered that there will be no increase in pedestrian delay or reduction in pedestrian amenity as the signal controlled crossings stop the traffic irrespective of any increase in flow associated with the proposed Highfield Farm development.

Accidents and Safety

The recorded Personal Injury Accidents are discussed within the baseline conditions section of this chapter. It is difficult to predict with any accuracy the effect of increased traffic on the number of accidents and safety of the highway network. Notwithstanding, as traffic increases are predicted to be generally less than 10%, the potential for increased accidents is considered 'slight'.

There have only been 36 recorded accidents within the Tetbury study area over the last 5 years with none of these being fatal and only 5 recorded as serious. Given the volume of traffic on the highway network, it is considered unlikely that the projected increases in traffic flows will materially impact on the prevalence of accidents.

Hazardous Loads

No movement of materials listed in "The Carriage of Dangerous Goods in the UK" are anticipated during the operational or construction phase of the proposed development

MITIGATION MEASURES

Of significant importance to the mitigation of the proposed development is the Residential Travel Plan. The aim of the Residential Travel Plan is to reduce the reliance on the private motor vehicle and increase the use of more sustainable modes of travel. The Residential Travel Plan will comprise a package of measures to promote use of sustainable transport including:

- Dissemination of sustainable travel information to new residents in the form of a Travel Information Pack;
- Provision of vouchers towards cycle and public transport season ticket purchase together with the negotiation of discounts on other cycle equipment and bus tickets;
- Promotion of a site wide car sharing scheme and links to the other existing schemes; and,
- Availability of an individual travel planning visit by the Travel Plan Coordinator for new residents.

The proposed development will also bring enhancements to the local transport infrastructure including:

- Provision of pedestrian and cycle links within the site to provide a permeable network;
- Provision of pedestrian and cycle links between the site and the existing adjacent residential streets; and
- Potential extension of public transport services to serve the site.

The above measures are considered appropriate to mitigate against the projected increases in traffic volumes on the local highway network.

Residual Effects

The distribution of the development-generated traffic results in a slight to moderate adverse impact on the operation of the local off-site junctions, with slight increases in queue lengths and vehicle delays. However, these increases are not anticipated to detrimentally affect the operation of the local highway network or have any long term effects.

Similarly, the increase in traffic flows may lead to a slight increase in the number of accidents recorded. However, the severity of previous accidents is generally low and there are no particular accident 'black spots' where improvements are required.

OVERALL ASSESSMENT OF IMPACTS

The Table below provides a summary of the impact of development traffic on the five key criteria discussed above.

	Geographical	Duration	Nature	Significance	Mitigation	Residual
Severance	Local	Short Term	Neutral	None	New pedestrian/cycle links to existing residential areas. Travel Plan to reduce additional flows.	None
Driver Delay	Local	Short Term	Neutral	Slight	Travel Plan to reduce additional flows.	Slight increases in queue lengths and driver delay.
Pedestrian / Cyclist Delay	Local	Short Term	Neutral	None	New pedestrian/cycle links to existing residential areas. Travel Plan to reduce additional flows.	None
Accidents & Safety	Local	Short Term	Neutral	Slight	Travel Plan to reduce additional flows.	Potential for slight increases in accident numbers.
Hazardous Loads	Local	N/A	Neutral	N/A	None necessary.	None