



# Shenfield Station Parking and Access Study

Assessing the impact of Crossrail

Report





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# 1 Introduction

## Specification

- 1.1 JMP Consultants Ltd (JMP) were appointed by Brentwood Borough Council ('the Council') to undertake a study of parking demand at Shenfield Station.
- 1.2 The study required a detailed assessment of current and future car parking demand and capacity utilisation at Shenfield Station, alongside a similar review of the kiss n' ride demand within the station drop-off area. This analysis has been undertaken within the context of the additional rail passenger demand that will be generated by future Crossrail services, along with the potential disruption caused during the construction phase.
- 1.3 The outputs of the study are an evaluation of a series of potential scheme option enhancements to improve parking and drop-off facilities, to be implemented both during the construction phase and subsequently when full Crossrail services are in operation.

## Report Structure

- 1.4 The report presents a summary of all the data and information collected during the study and uses this to highlight the key issues and opportunities for parking and drop-off provision at the station. A series of options are then considered and appraised.
- 1.5 Sections 2 and 3 present the findings of the site audit work and the review of existing documentation relating to the Shenfield Station and surrounding development.
- 1.6 Sections 4 and 5 presents the results of the demand surveys and rail user surveys conducted at the station.
- 1.7 Section 6 summarises the key stakeholder engagement process and feedback.
- 1.8 Section 7 presents an evaluation of future station demand with Crossrail services.
- 1.9 Section 8 brings together all of the data analysis into an evaluation of issues and opportunities.
- 1.10 Section 9 and 10 then develop and appraise a series of potential scheme options.

## 2 Site Audit

### Introduction

- 2.1 This section of the report provides a summary of information relating to the current station car parks and the public areas surrounding the station, including facilities for pedestrians, cyclists, public transport users and motorists.

### Car Park Audit

- 2.2 An audit of the existing car parks has been carried out on the basis of site visits undertaken in November and December 2013, with additional desktop research where appropriate.

#### Hunter Avenue (NCP)

- 2.3 Hunter Avenue NCP is one of the two official station car parks which are run by NCP on behalf of Greater Anglia, the train operating company. The car park is accessed via Hunter Avenue and has a maximum of 217 parking bays and is segregated into two sections (identified by signage and markings in front of the bays):

- Premium parking, located closer to the station and with a higher tariff rate (111 spaces);
- Standard parking, ticketed by pay and display (106 spaces).

- 2.4 Station access from this car park is obtained via a pathway along Hunter Avenue that cuts through to the Hutton Road. This can take up to 6 minutes by foot depending on which parking bay is used (the furthest parking bay is approximately 450m from the station entrance). The walkway is quite dark in the early morning and evening, especially around the Hutton Road bridge, and users have to negotiate traffic when crossing the busy Hutton Road.

**Figure 2-1: Premium parking and standard P&D parking zones at Hunter Avenue NCP**



#### Mount Avenue (NCP)

- 2.5 Mount Avenue NCP is the other official station car park run by NCP on behalf of Greater Anglia, the train operating company. It is accessed via a long approach road off of Mount Avenue at the back of the station. Some car parking is provided along the approach road and is classified as being within the station car park. The car park has 251 spaces and parking is provided in two distinct areas:

- 'end on' bays within the main body of the car park (along the railway tracks);
- 'parallel' bays on the eastern side of the approach road leading to the main car park.

- 2.6 The parallel bays tend to be occupied first in the morning as they are closest to the station entrance.
- 2.7 Station access from this car park is obtained via a pathway from the South side of the station, along Mount Avenue and under the bridge crossing at Hutton Road towards the station entrance. This can take up to 8 minutes by foot depending on which parking bay is used (the furthest parking bay is approximately 550m from the station entrance). The walkway is quite dark in the early morning and evening, especially around the Hutton Road bridge crossing.

**Figure 2-2: Parallel and end on bays at Mount Avenue NCP**



**Hunter Avenue (Council)**

- 2.8 The smaller Hunter Avenue car park is operated by Brentwood Borough Council and is located directly alongside the NCP station car park with access from Hunter Avenue. The car park has 61 spaces with no segregated areas (except 2 disabled parking bays) and it is used by both shoppers and commuters. Ticketing is primarily by pay and display, although the Council does sell a limited number of season tickets.
- 2.9 Station access from this car park is obtained via a pathway that cuts through to the Hutton Road. This can take up to 2 minutes by foot depending on which parking bay is used (the furthest parking bay is approximately 130m from the station entrance). The walkway is quite dark in the early morning and evening, especially around the bridge crossing, and users have to negotiate traffic at peak times when crossing the Hutton Road.

**Figure 2-3: Hunter Avenue council car park**



### Friar Avenue (Council)

- 2.10 Friar Avenue car park is operated by Brentwood Borough Council and is accessed via a narrow single track lane off of Friars Avenue. The car park has 50 spaces with no segregated areas (except 2 disabled bays). Ticketing is primarily by pay and display, although the Council does sell a limited number of season tickets.
- 2.11 Station access from this car park is obtained via a pathway alongside the single-track car park entrance onto Friars Avenue towards the Hutton Road and towards the station entrance. This can take up to 4 minutes by foot depending on which parking bay is used (the furthest parking bay is approximately 300m from the station entrance). The car park is quite dimly lit and vehicles entering and exiting the car park pose a hazard to pedestrians.

**Figure 2-4: Friars Avenue council car park**



## Station Forecourt and Surrounding Area

### Drop-off Area

- 2.12 The station forecourt provides a limited space for both the ranking of taxis and the dropping off and picking up of rail passengers.

**Figure 2-5: Shenfield Station Forecourt Area from southwest perspective**



- 2.13 Two separate circulation areas are provided: one segregated for taxis and the other for general traffic. The facility for general drop-off/pick-up is a single lane with sufficient space for around three vehicles, although additional vehicles often stop at the back of the queue of the main carriageway. The drop-off lane is bounded by kerbs, in close proximity on either side, meaning it is not possible for one vehicle to overtake another. As such, vehicles are not permitted to wait and should move on as quickly as possible.

**Figure 2-6: Access to Taxi Rank (with illegally parked car) and access to drop-off area**



### Area Surrounding Station

- 2.14 The station forecourt fronts on to the A129 Hutton Road. The area of Hutton Road immediately to the east and west of the station is primarily retail-led development, with a variety of shops including national chains and independent retailers. The mix of shops and services draws custom from both the Shenfield and Hutton areas, and also from wider parts of Brentwood Borough, leading to strong demand for car parking from shoppers during the day and also at weekends. The upper floors of these buildings are used both for employment (primarily small offices, or services such as hair and beauty treatments) and for residential accommodation.
- 2.15 Angled and parallel car parking bays are provided on Hutton Road in front of the shopping parades; these provide short-stay parking and are enforced through parking warden patrols.
- 2.16 Bus stops are located immediately to the east and west of the Station forecourt on Hutton Road; there is a pelican crossing directly opposite the station and there are further non-signalled crossing points provided in various locations along Hutton Road.
- 2.17 Beyond the immediate station environment, development is almost entirely residential in nature. “Old” Shenfield is located to the north and west of Hutton Road and is characterised by long, straight residential roads with a mixture of bungalows and houses. To the south west, the Mount Avenue area consists of primarily large, detached properties; the road network here is largely private (i.e. the roads are not part of the adopted public highway). To the west (north of the A129 Rayleigh Road), Hutton represents post-war development with smaller properties, denser development and a wide mix of houses and flats.
- 2.18 The only significant area of employment within Shenfield and Hutton (excluding the Hutton Road area) is the Wash Road industrial estate. There are a number of primary schools within Shenfield and Hutton, and two major state secondary schools (Shenfield High and St. Martins) which have playing fields as part of their grounds, and there are public parks at Alexander Lane and Wash Road.
- 2.19 The Strategic Road Network (SRN) can be accessed at the A12 via the A129 Hutton Road and A1023 Chelmsford Road; beyond the existing built edge, the land in this area is designated as Green Belt.

## 3 Documentation Review

### Overview

- 3.1 As part of the background data collation for the study, a series of local documentation has been reviewed, as follows:
- **Brentwood Borough Council Retail and Commercial Leisure Study, 2011**  
This study assesses future retail and commercial leisure growth from 2011 to 2031 across the Borough including a comprehensive 'health check' assessment of Shenfield's centre.
  - **Brentwood Borough Local Development Plan: Preferred Options for Consultation, 2013**  
Once adopted, the Local Development Plan will set out the long term vision for how the Borough should develop by 2030 and the Council's strategy and policies to deliver that vision. The Preferred Options document was prepared as part of the Local Development Plan consultation process and sets out draft policies for comment.
  - **Crossrail Update Presentation to Brentwood Borough Council, 2013**  
This presentation was delivered by Terry Morgan to Brentwood Borough Council in 2013 and provides an overview of the Crossrail development and progress to date.
  - **Interim Memo from SDG, 'Shenfield Park and Walk', 2010**  
This memo was provided by the council an overview and update on the key findings of the Shenfield Parking Study undertaken by Steer Davies Gleave in December 2009
  - **Shenfield Urban Integration Study, 2012**  
This study develops an urban realm design for Shenfield Station in order to maximise the positive impact of Crossrail and reflect the aspirations of the local authority.
- 3.2 The key insights in relation to transport, Crossrail and development found from a full review of these documents have been summarised in the sections below.

### Transport insights

- 3.3 The review of transport documentation has provided the following key insights.
- 3.4 Shenfield is known to be the busiest station in the Borough and traffic congestion is repeatedly cited as a major issue in the town (Shenfield Urban Integration Study, 2012). As such, the council has an overarching strategic development objective to increase sustainable transport links in the area through a commitment to park and walk schemes and improved cycling. This has become a particular objective in light of the future Crossrail development (Brentwood Borough Council Retail and Commercial Leisure Study, 2011).
- 3.5 Current transport concerns regarding station access are well known by the local community who have called for interventions to accommodate their transport needs including additional bus services, park and walk facilities (Alexander Lane) and better cycling facilities in light of the Crossrail development. The Shenfield Urban Integration Study even goes so far as to call for the relocation of the taxi rank, drop-off facility and disabled parking activities to the South side of the station, but this would require considerable funding. Current concerns are outlined below:



### Walking

- 3.6 Shenfield experiences higher than average levels of car ownership and low levels of cycling, however walking levels are above the national average (Brentwood Borough Local Development Plan, Preferred Options 2013). This existing disposition towards walking bodes well for any potential 'park and stride' facility to serve the station.
- 3.7 However, this would need to be countered by a provision of safer pedestrian access to the station with previous studies citing the quantity and speed of traffic, poor footpaths and lighting as major hazards on the station approach.

### Public Transport

- 3.8 Public transport servicing Shenfield Station has been constrained by various logistical issues such as the limited space for buses to turn and terminate on the forecourt and the amount of traffic and vehicles that encroach in bus stop zones (Shenfield Urban Integration Study, 2012). These factors should be taken into account when considering the feasibility of any potential 'park and ride' scheme.
- 3.9 Existing bus services to the station are restrictive in terms of hours of service and their geographical coverage and are limited to:
- The Ensign 81 is only frequent bus service that serves Shenfield station. This service runs a circular route between Brentwood and Hutton between the hours of 06:00am to 19:00pm, up to every 20 minutes during peak hours.
  - A recent addition has been made to the bus service by the introduction of the First in Essex 9a service that runs between Brentwood and Shenfield every 30 minutes between the hours of 16:00pm and 19:00pm.
  - Finally, the X81 (Lakeside to Hutton) and 82 (Brentwood to Shenfield) routes also service the station operating between the hours of 10:00am and 16:00pm. However at the date of writing the 82 service was due be discontinued with the 81 to replace this service on a route taking it clockwise around Hutton, every 30 minutes during off peak times on Mondays to Fridays.
- 3.10 In addition there are a number of school and community buses which serve the station and other routes which pass nearby, namely the 41, 80A, 80C, 251, 502, 808 and 849 services. Collectively these services allow travel to and from Southend on Sea in the east and Lakeside in the south; however, most of these services are infrequent.

### Cycling

- 3.11 The Urban Integration Study states that there are a large number of cycling facilities at the station but that these tend to operate over full capacity as demand exceeds supply. Facilities are somewhat scattered and the lack of cycle lanes on routes to the station are considered to prevent many from cycling as they feel that it is an unsafe option.

### Taxis

- 3.12 Congestion around the station area has been noted in previous studies which cite large queues of taxis from the station along Hutton Road backing up to the Hutton Public House. At any one point there can be up to 14 taxis in the rank at the Station Forecourt plus additional taxis in the rank along the Hutton Road eastwards. Demand for taxi parking can be even more intense in the PM peak period.

### Private 'drop-off' vehicles

- 3.13 There is currently limited space for kiss 'n' ride activity to occur on the station forecourt and as such vehicles frequently block the main approach roads to the station, the taxi rank and bus stops in order for passengers to alight. Consequently safety concerns have been raised as to whether it is this activity which is leading to an occurrence of slight accidents on Hutton Road. These accidents are considered largely due to 'failure to pay attention'.

### Mode Split

- 3.14 Previous survey work at Shenfield Station, undertaken for the Urban Integration Study, has identified mode split for passengers accessing Shenfield Station, as follows:

- Walk (including walk from car parks) 65%
- Kiss and Ride (drop-off) 15%
- Taxi 9%
- Bus 7%
- Cycle 4%

- 3.15 By utilising the levels of car park demand captured from the demand surveys (Section 4) and the overall level of peak period passenger demand, it is feasible to split the walk figure into those walking from a station car park, and those walking from elsewhere. This breakdown is estimated as:

- Walk (from station car park) 24%
- Walk (other) 41%

### Crossrail

- 3.16 The review of Crossrail documentation has provided the following key insights.
- 3.17 Crossrail, the major new cross-London rail link, will see the current peak hour train service from Shenfield to London increase from 6 to up to 12 trains per hour in what is already one of the busiest stations in the Borough. Data from the Office of Rail Regulation shows a total of 2,990,942 entries and exits for the year 2011/12.
- 3.18 In 2001 AM peak entries and exits at Shenfield Station were observed to total 2,200 and 350 respectively. This data has been used to forecast future rail patronage up to the year 2016 in previous studies, most notably the Shenfield Urban Integration Study, 2012, which forecasts the following figures for AM peak activity in 2016:
- 2500 entries and 400 exits (without Crossrail)
  - 2600 entries and 400 exits (with Crossrail)
- 3.19 However, given the recent unprecedented growth in rail patronage over the last few years, these estimates are thought to be on the conservative side.
- 3.20 Official forecast patronage figure provided by Crossrail present a slightly conflicting picture, with a 2026 forecast of 2,400 entries and 730 exits. Within their modelling work, however, Crossrail have applied a 28% uplift to test the impact of higher levels of demand, which might reflect future demand more accurately.

- 3.21 Crossrail state that they consider passengers will judge the success of the railway development by their experience of using the spaces outside of the stations as they enter and exit. As such, they intend to set high standards for the immediate surroundings of the stations in terms of the design and functionality of the transport interchange, in line with the draft policies emerging as part of the Council's Local Development Plan.
- 3.22 In terms of physical works, the Crossrail development will require the widening of the embankment, a platform extension and the construction of a new line to serve the newly created Platform 6 at Shenfield Station. Lorry numbers are expected to reach up to 7 per day during the peak construction period and once per day during off-peak construction. Friars Avenue car park will be used for the storage of materials and equipment but the car park will remain open with at least 20 spaces available.
- 3.23 It has been suggested that as a response to the Crossrail development there will be an intensification of competition for retail space in and around Shenfield Station as that end of Hutton Road becomes more desirable to retailers (Brentwood Borough Council Retail and Commercial Leisure Study, 2011). According to specific research undertaken by Chase and Partners as part of the retail study, Simply Eat and Aldi have already been reported to have sought representation within Shenfield (paragraph 5.93 of the retail study report).

## Development insights

- 3.24 The review of development documentation has provided the following key insights.
- 3.25 As has been noted briefly in Section 2, the majority of development in the Shenfield area is residential; this is a pattern which originally commenced with the opening of Shenfield station itself in the late 19<sup>th</sup> century. Employment and retail activities have remained largely confined to the Hutton Road and Rayleigh Road areas.
- 3.26 Shenfield is projected to undergo significant household growth with many people expected to move into the area over the coming years. The strategic plan is to create an “inclusive, balanced and sustainable community” (Brentwood Borough Local Development Plan Preferred Options, 2013).
- 3.27 Employment is also set to grow over the Local Development Plan period (2015-2030). Consequently, 1,800 new dwellings are planned for the Brentwood and Shenfield urban areas. This makes up 51% of planned residential development in the Borough. Shenfield's Hutton Road is a specific target area for development with a desire to achieve a better balance of use in the town centre for all that work, live and spend time there.
- 3.28 Across the Brentwood urban area, there is a lack of existing “brownfield” or previously developed sites of significant size, and this is a particular issue within Shenfield and Hutton, as historically most development has been residential-led and therefore is still in use for this purpose today. Therefore, the current draft local plan primarily identifies small to medium size “infill” sites that will contribute toward the overall housing need within Shenfield and Hutton. The “major” sites (providing 10 or more dwellings) identified in the draft Local Plan Preferred Options document are as follows:
- Essex County Fire Brigade HQ, Rayleigh Road – up to 101 dwellings
  - Land at Brookfield Close, Hutton – up to 13 dwellings
  - Land adjacent to Adult Education Centre, Rayleigh Road – up to 11 dwellings
  - Land between Tendring Court and Tillingham Bold, Woodland Avenue – up to 10 dwellings

- 3.29 It is noted that land outside of the built areas of Shenfield and Hutton (such as that adjacent to the A12 and A1023 Chelmsford Road) is within the green belt. Within the built-up areas, the remaining open space is accounted for by public parks, playing pitches and school fields, all of which are necessary to provide amenity for the local community.
- 3.30 Railway stations and their surrounding forecourts are to be prioritised as ‘key gateways’ within development proposals in order to encourage people to use sustainable transport connections in their town centres. The long-term plan is to continue to encourage alternative modes of transport including public transport, cycling and walking in the local area.
- 3.31 In terms of specific development that might have implications for parking provision for Shenfield Station, representations have been made to the Local Plan Preferred Options consultation regarding a site located to the south-west of the A12 Mountnessing roundabout. The submitted indicative scheme layout would provide parking for up to 782 cars with 3 acres of “employment / hospitality” land adjacent to the park and ride facility.
- 3.32 Another two potential sites for park & ride have previously been identified to the east and north of Shenfield station. The first is located to the east at 661 Rayleigh Road (A129); the site was previously occupied by a car dealership and, as such, has hard standing available for over 100 cars. The second is located to the north at Alexander Lane, proposing car access from the A1023 Chelmsford Road.

## 4 Demand Surveys

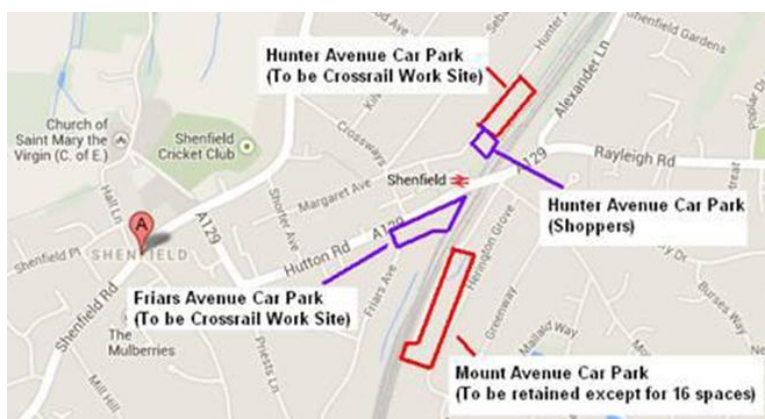
### Overview

- 4.1 In order to determine precise levels of activity at the car parks surrounding Shenfield Station, as well as the drop off area around the station forecourt, a series of demand surveys were commissioned. The physical survey was subcontracted to a specialist survey company (Sky High), with the work overseen, collated and analysed by JMP.

### Specification

- 4.2 The car parking demand surveys were undertaken on the station forecourt, the main carriageway (Figure 4-2) and in the following four car parks (Figure 4-1):
- Mount Avenue NCP
  - Friars Avenue Council Car Park
  - Hunter Avenue Council Car Park
  - Hunter Avenue NCP
- 4.3 The car park survey consisted of a half hourly beat survey between the hours of 06:00am and 12:00pm and took place on a typical weekday, Tuesday 19th November 2013. Car vehicle registration plates were recorded so that the analysis could determine the turnover of vehicles.

**Figure 4-1 Station car park survey locations**



**Figure 4-2: Positioning of cameras used for drop-off area survey**



4.4 The drop-off area demand survey took place on the same day but in two shifts between the hours of 07:00am and 10:00am and 16:00pm and 20:00pm using 2 cameras in order to capture vehicle activity in both the station forecourt area (Camera 2) and the main carriageway (Camera 1) on the approach to Shenfield Station (Figure 4-2).

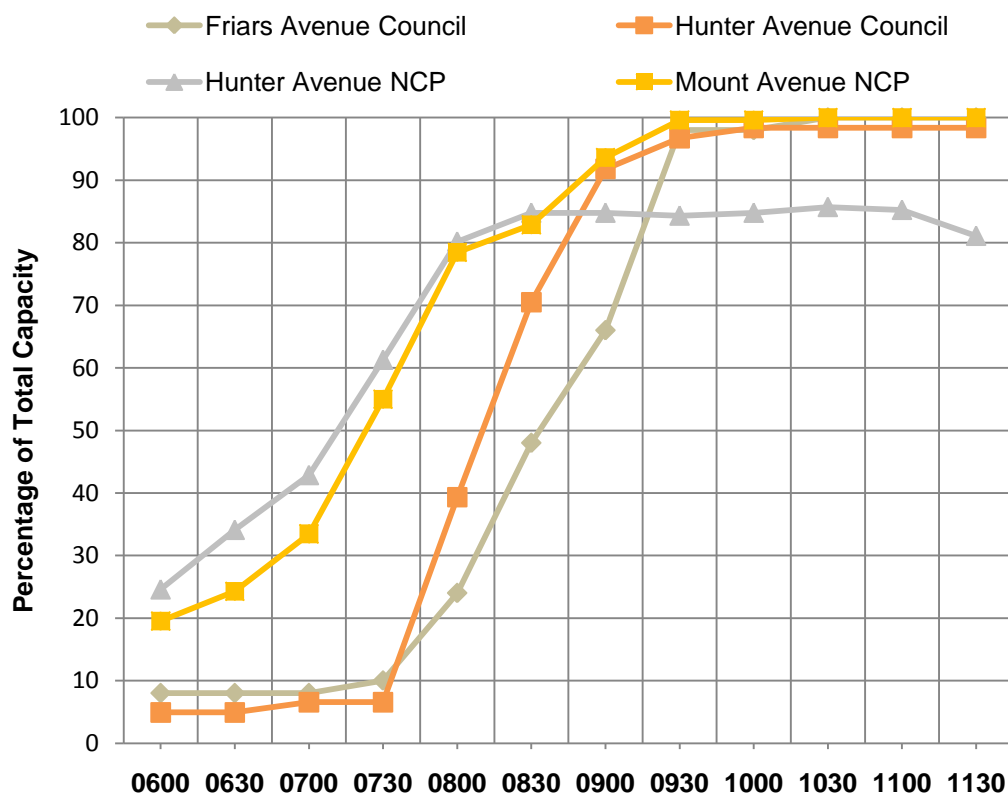
## Results

### Car Parks

4.5 The car park demand survey recorded the activity of 603 vehicle registrations that utilised nearly all of the 579 parking bays within the 4 station car parks. Only 4 vehicle registrations reoccur in the data so it can be assumed that there were a total of 599 different vehicles that utilised the car parks during the morning of the survey.

4.6 The results indicate that the car parks around Shenfield Station are operating at near capacity, with three out of the four car parks reaching full or near-full capacity by 10:30am in the morning (Figure 4-3).

**Figure 4-3: Car park utilisation shown by the hour and as a % of total capacity**



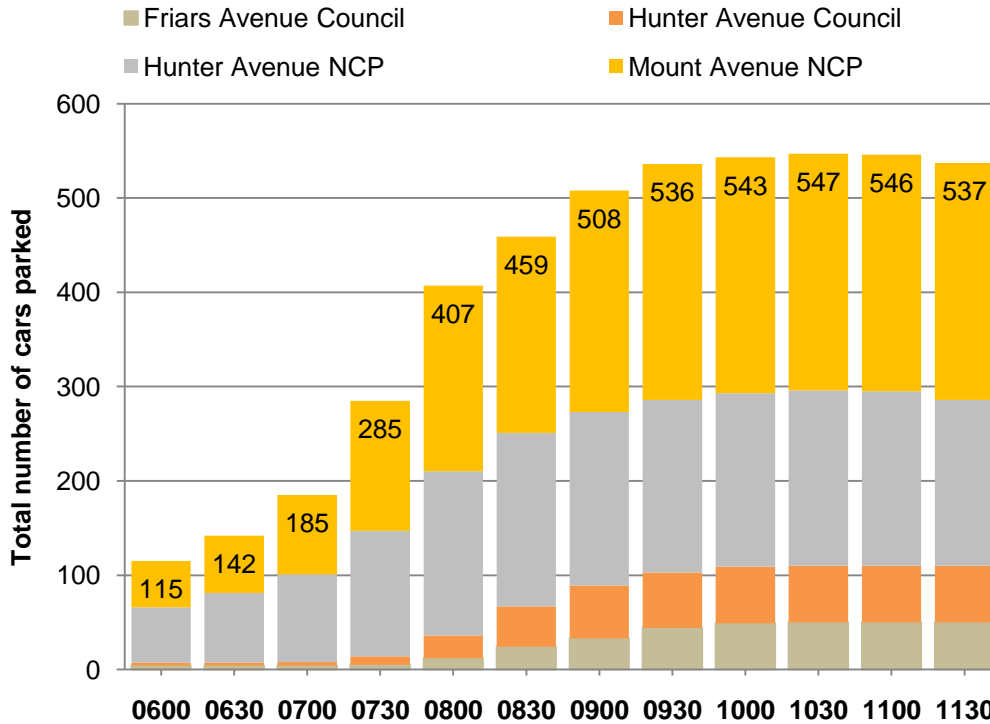
4.7 As expected, the main activity occurred between the hours of 07:00am and 09:00am. Mount Avenue NCP was the most heavily utilised car park with all 22 parallel bays on Approach Road full from 06:00am onwards. Full capacity was reached at this car park by 09:30am and it remained full for the rest of the morning.

4.8 Hunter Avenue Council car park had filled up by 10:30am and Friars Avenue car park reached near full capacity, peaking at 98% utilisation (just 1 vacant space). Only the Hunter Avenue NCP had spare capacity with 35 spaces remaining vacant upon reaching its peak of 86% utilisation by

10:30am. The majority of these vacant spaces (28), however, were premium parking spaces that are allocated to individual season ticket holders and are unavailable for other drivers to use.

4.9 Overall the data indicates that from 09:00am in the morning there is an average of well over 500 vehicles parked at any one time within the four car parks in the vicinity of the station (Figure 4-4). Whilst not all of this demand is associated with Shenfield Station, with some local parking activity, it is anticipated that up to 450 vehicles park in order to access the station.

**Figure 4-4: Total number of cars parked shown by car park and the hour**



**Station Drop-off**

4.10 The drop-off and pick-up survey reports activity from 882 vehicles on the station forecourt area with slightly higher proportion of activity (from 477 vehicles) occurring across the AM period.

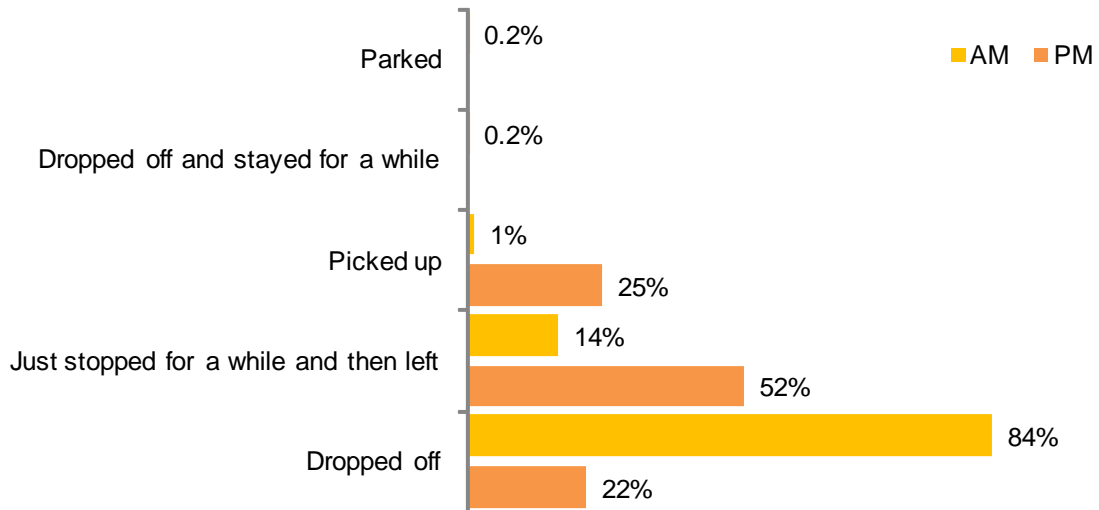
4.11 For all activity the vehicle type was recorded as well as type of activity:

- drop-off;
- drop-off and stay for a while;
- just stop for a while and left;
- parked;
- pick up.

4.12 In the morning data from the station forecourt shows that 84% of activity (401 vehicles) is from passenger drop-off and a further 14% of vehicles (69) are recorded as just stopping for a while and leaving (Figure 4-5). This activity can be assumed to be people using the station forecourt to turn around after dropping rail passengers off further down the road when sat in traffic on the approach to the station and out of sight of the survey area.

4.13 This is collaborated by the Rail User Survey responses (Section 5) that indicate a large number of passenger drop-offs occurred away from the station forecourt.

**Figure 4-5: Station forecourt AM and PM activity**



- 4.14 The evening survey period intuitively shows slightly more pick-up than drop off activity (25% versus 22%) and a much higher level of vehicles just stopping for a while and then leaving (52%) which we can attribute to passengers being picked up outside of the main forecourt and carriageway survey areas.

## Conclusions

- 4.15 The demand surveys provide conclusive evidence that the car parks around Shenfield Station are operating close to, or at, capacity.
- 4.16 In addition, there is, as evidenced elsewhere, substantial vehicular activity on the station forecourt, although not all of it directly relates to forecourt drop-offs, with many vehicles using the area to turn around having dropped their passenger off further along Hutton Road, due to the levels of congestion.



## 5 Rail User Surveys

### Overview

- 5.1 A rail user survey was designed to evaluate the process of decision-making behind existing travel behaviour of rail users entering Shenfield Station, as well as to help determine the level of any suppressed demand for car parking.
- 5.2 The survey also served as a useful opportunity to gauge initial responses to the proposed 'park and ride' or 'park and stride' solutions for future car parking demand shortfalls in the light of the Crossrail development at Shenfield Station.

### Specification

- 5.3 The information obtained through the project inception meeting, data collation and site audit phase of the project informed the design of three rail user specific surveys for:
- existing car park users (both 'pay and display' and season ticket holders);
  - existing drop-off area rail users (including both kiss 'n' ride and users of the taxi rank);
  - all other access mode rail users (people who walk/cycle or take public transport to the station).
- 5.4 The survey questions were carefully designed so as to be both unbiased and unambiguous in order to provide a concise data set for analysis. Copies of the three user surveys can be found in **Appendix A**, whilst a full summary and analysis has been included below.
- 5.5 The surveys asked for journey origin data in order to build a profile of where users were travelling from in order to access the station. This data is needed to help assess the catchment area of the station including the volume of railheading that takes place and the potential for rail users to switch modes for their journeys to Shenfield Station.
- 5.6 The survey also captured other basic journey data such as the departure time and final destination of their train as well as the journey purpose and frequency.
- 5.7 Existing car park users were asked specifically about potential solutions to the shortfall in car parking supply at the station, such as 'park and ride' or 'park and stride', as well as increased provision for cyclists.
- 5.8 For users of the station drop-off area the survey sought to establish why rail passengers use this facility and if they would, under other circumstances, change their travel behaviour to the station. In this way it was sought to detect levels of suppressed parking demand.
- 5.9 Rails users who access the station by all other modes were asked what influenced their choice of transport to the station and what may influence their travel behaviour in the future.
- 5.10 All survey respondents were given the opportunity to make further comments about getting to and from Shenfield Station.
- 5.11 Given that all of the targeted survey respondents were on their way to board a morning train it was considered infeasible to try and conduct face-to-face interviews as a large proportion of respondents were likely to decline. The more appropriate approach was deemed to be a self completion survey format which could be returned by freepost within a week. Respondents were

incentivised to return the survey by the option of entering a prize draw for the chance to win one of five £30 Love2Shop vouchers.

## Distribution

5.12 Permission was granted from Greater Anglia, the station operator, for surveys to be handed out on the station forecourt and from NCP to hand out surveys at the car park exits. As such, on December 3rd 2013, between the hours of 0600am and 1100am an estimated total of 950 surveys were distributed amongst a predicted 2,400 rail users entering Shenfield Station (Office of Rail Regulation Statistics, 2012). The distribution by survey type (Figure 5-1) was as follows:

- **Car park users: 60% distribution**

This survey was the easiest to distribute as they were handed out to pedestrians exiting the car parks. These rail users appeared to have more time on their hands and were happy to take the form. Some 300 forms were handed out amongst an estimated 500 car park users.

- **Drop-off area rail users: 22% distribution**

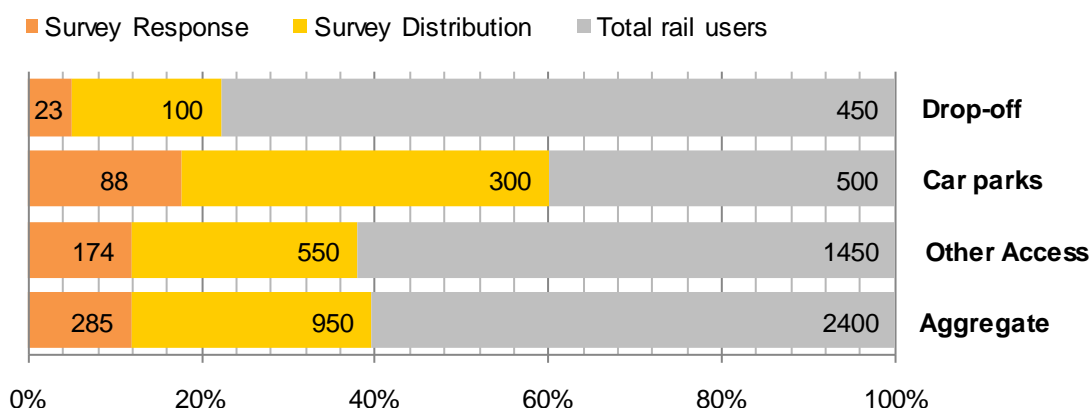
This was the hardest survey to distribute as they were handed to people as they got out of their car and headed towards the station entrance. Passengers seemed to be in the greatest rush and many were simply not interested in taking a survey form. Out of an estimated 450 drop-off area rail users, only around 100 people accepted a survey form.

- **Other access modes: 38% distribution**

Logistically, this was the most difficult survey to distribute as many rail users had already been given survey forms. Despite some reticence towards accepting the form, again in part due to rush upon reaching the entrance to Shenfield Station, around 550 surveys were distributed amongst an estimated 1450 passengers arriving by 'other' transport modes.

**Figure 5-1: Rail user survey distribution levels and response rates**

\*Shown by station access type where n is number of rail users



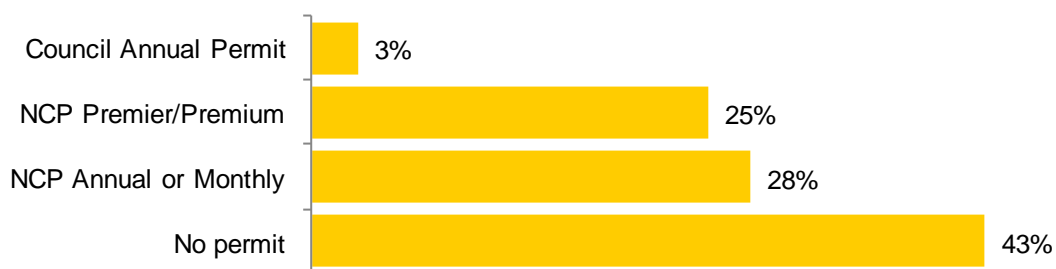
### Car Park

5.13 The four car parks in and around Shenfield Station at Hunter Avenue, Mount Avenue and Friar Avenue have a combined total of 579 parking bays, although 11 spaces in the Council-run car

parks are not thought to be predominantly used by station passengers. The car-park survey was distributed to 60% of the 500 estimated car park users during the morning peak and elicited a response from 88 people which gives the survey a self-completion rate of 29%, and a total sample size of 18% of all car park rail users (**Error! Reference source not found.**).

- 5.14 The survey was distributed on a per vehicle basis but took into account how many passengers a private vehicle could be carrying to the station. The majority, 83% of people, travel to the station alone whilst 14% share with one passenger and just 3% with more than one passenger. The survey also profiled parking ticket holders, the results of which are that the majority, 43%, have no parking permit, whilst 28% have an NCP annual or monthly permit, 25% have a premium permit and 3% have a council annual parking permit (see Figure 5-2).

**Figure 5-2: Profile of parking season ticket holders**



- 5.15 Around 97% of station car park users are travelling onwards to a destination within Greater London and an overwhelming majority stated that their train trip made up part of their commute (83%) or was business related (11%). Some 68% of respondents make the journey daily and 22% make the journey with a frequency of at least 1-4 times per week.

#### Drop-off

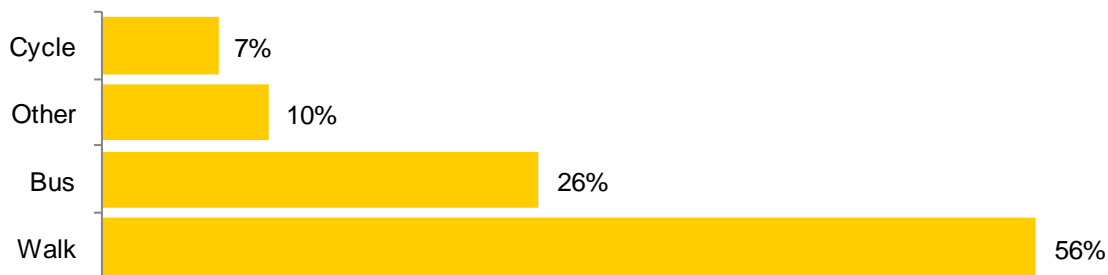
- 5.16 Drop-off rail users were particularly hard to engage. This survey was distributed to just 22% of the estimated 450 drop-off area users during the morning peak and elicited a response from 23, whilst this gives a reasonable self-completion rate of 23%, the low distribution meant that the sample size was just 5% of the estimated 450 drop-off rail users (see Figure 5-1).
- 5.17 Around 78% of drop-off area rail users are travelling onwards to a destination within Greater London, lower than for car park users. Some 57% stated that their train trip made up part of their commute whilst 26% related their travel to business reasons; the remaining 18% were split equally between leisure and 'other'. Drop-off area users tend to use the train slightly less frequently with just 57% making their journey daily and a further 26% with a frequency of 1-4 times per week.

#### Other Access Rail Users

- 5.18 This survey was distributed to 38% of 'other access' rail users who arrived by walking, cycling or public transport during the morning peak. A response was elicited from 174 people which gives the survey a self-completion rate of 32% and a total sample size of 12% of the 1,450 estimated rail users arriving to the station by other modes (See Figure 5-1).
- 5.19 Other access mode rail users have a very similar profile to car park rail users as 96% are travelling onwards to a destination within Greater London and the majority state that their train trip makes up part of their commute (83%) or is business related (11%). Other access mode rail users use the train with a similar frequency to car park users with 70% making their journey daily and a further 22% 1-4 times per week.

5.20 In addition, this survey recorded the modal split of other access rail users' journey to the station (see Figure 5-3) which indicated that 56% walked, 26% arrived by bus and 7% cycled to the station. The remaining 10% elected 'other', arriving by moped or motorcycle, parking further away and walking or were dropped off further away from the station.

**Figure 5-3: Modal split of other access rail users' journey to the station**



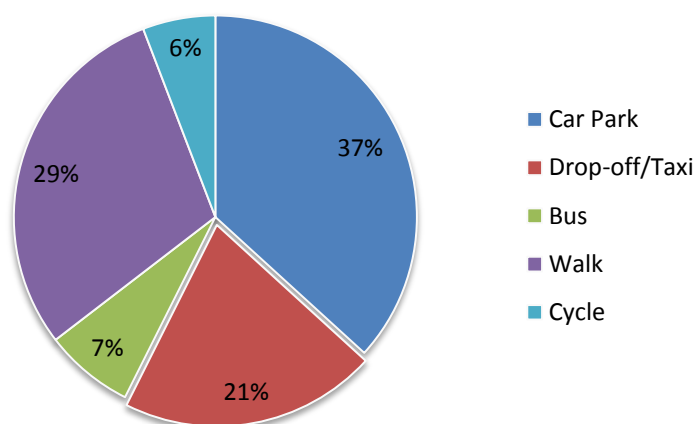
5.21 Where respondents provided details of their home postcode or their street name, the mode choices of the station users have been plotted using Geographical Information System (GIS) software. Maps ST14273-GIS-01 to -03 show all modes of travel at different scales (local and wider areas); maps ST14273-GIS-04 to -07 show the distribution of trips by individual modes. Copies of the resulting maps are included at **Appendix B** and are discussed in more detail later in the chapter in the 'spatial distribution' section.

## Mode Split

5.22 Figure 5-4 presents a breakdown of the mode split of overall respondents to the Rail User Survey. This indicates that the largest proportions were car park users, followed by those who walk at least part of the way to the station.

5.23 The drop-offs/taxis, include those who used the station forecourt directly (who received an official drop-off questionnaire) as well as those who were dropped-off further along Hutton Road and so who subsequently received an 'other access' questionnaire.

**Figure 5-4: Modal split of Rail User Respondents**



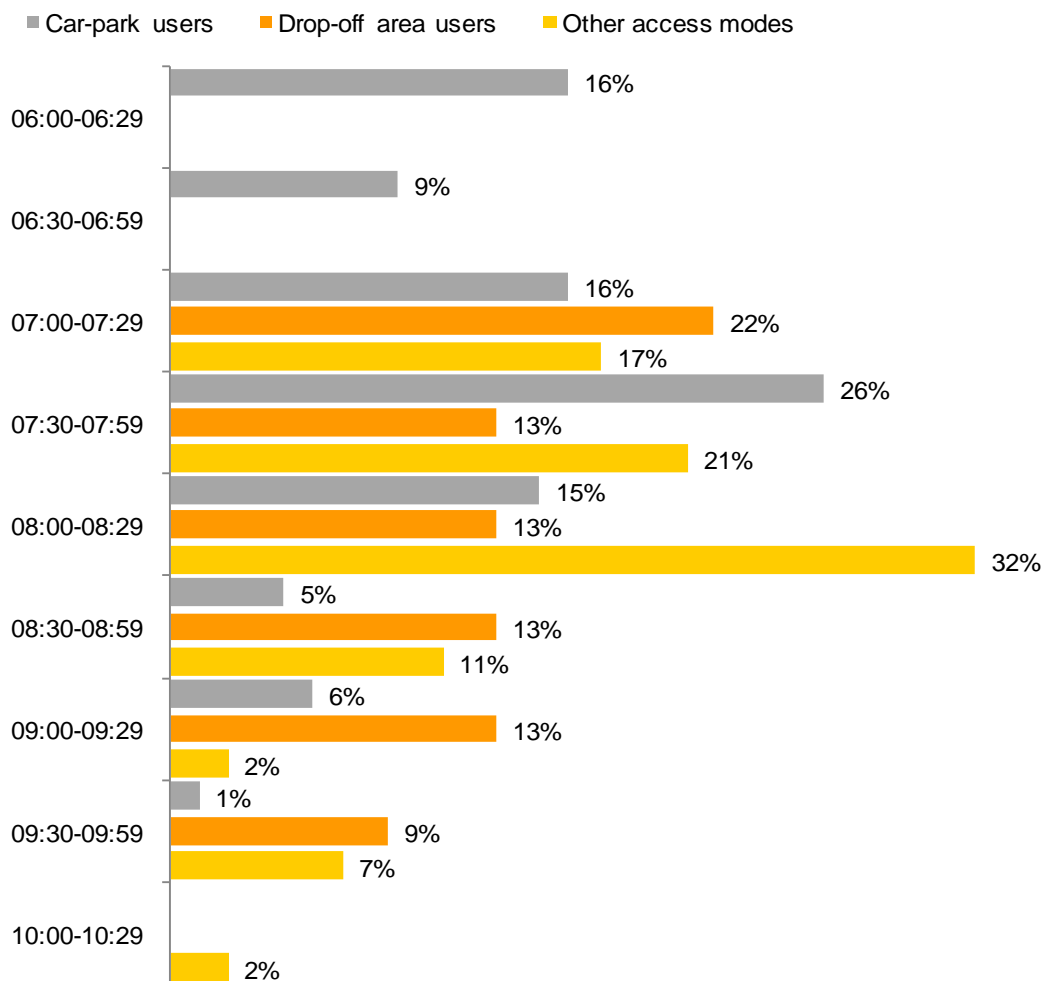
5.24 When compared against the actual mode split data for station access presented in Section 3, the results indicate that a higher proportion of car park users engaged with the survey than those arriving by other modes.

## Train Departure Profiles

5.25 All three of the surveys asked rail users to note down the departure time of their onward train from Shenfield Station. By filtering this information we are able to make a comparative analysis of the trends in activity for each of the three types of rail users. The results are summarised below and are shown in full in Figure 5-5:

- the majority of activity occurs between the hours of 0700 and 0900am;
- drop-off activity peaks first between 0700 and 0729am;
- car parking activity peaks between 0730 and 0759am;
- as such, all private vehicle activity (car parking, drop-off and taxi) has peaked by 0800am;
- pedestrian activity continues to climb until peaking between 0830 and 0859am.

**Figure 5-5: Train departure times for rail users entering the station**



5.26 This data, in particular the car park, correlates with the profiles from the demand surveys.

## Spatial distribution

- 5.27 The choice of mode used to access Shenfield Station is driven in part by the geographical spread of station users' home addresses. Home address information and mode data has been extracted from the survey data and combined to create a series of maps which are reproduced at **Appendix B**. Each mode is also considered separately below.

### Walking and Cycling

- 5.28 Walking and cycling trips are concentrated primarily in the area which lies within 2km of the station. The trips are distributed across this area, with there being more trips arising in the "old" Shenfield and Hutton areas than from Hutton Mount. The on-street contours show that the route from much of Hutton Mount is circuitous in comparison to other areas, and this may explain why there appear to be fewer walking and cycling trips generated from this part of the surrounding area.
- 5.29 The mapping shows that a number of respondents walk for considerably more than 1km (12 minutes) to reach the station; this is potentially due to perceived, or actual, lack of car parking spaces and/or the cost of paying for parking.
- 5.30 There are very few cyclists in the survey sample who cycle from outside of the main urban areas, despite there being a number of villages within a 5km distance of the station. It is considered likely that concerns over traffic and a lack of cycle parking space may contribute toward this finding.

### Car Drivers

- 5.31 As would be expected, car drivers are the most widely distributed sub-group of respondents. Typically, car drivers live more than 2km from the station (although there are a few exceptions evident within the survey data). There are concentrations of drivers at Warley, the eastern edges of Hutton, and in the Doddinghurst / Kelvedon Hatch / Stondon Massey / Blackmore area to the north-west of the main Brentwood urban area. There are also more scattered numbers of drivers whose journeys originate from the rural areas between Brentwood and Chelmsford.
- 5.32 It is notable that there are very few car driver trips which start in the area to the south of Brentwood, or the rural areas between Brentwood, Basildon and Billericay. It is likely that train users in these areas who drive will park at other stations, either Billericay for the Liverpool Street line or Basildon for the C2C / Fenchurch Street line. These drivers could also potentially be travelling to Upminster to connect with the District Line.

### Drop-offs (Car Passengers & taxis)

- 5.33 Passengers being dropped off at the station by car typically travel between 1 and 3km between their home and the station. This differs from car drivers, who typically travel between 2km and 5km on their journeys. It is likely that the people who are driving passengers to the station are either returning home afterward or are going on to another destination of their own, therefore there is an incentive to keep the "drop off" journey sufficiently short such that these other purposes, of the person driving the car, are not compromised.
- 5.34 There are notable concentrations of "drop off" journeys starting in the eastern areas of Hutton and in the residential areas to the immediate south-west of the station.
- 5.35 Overall, the survey results continue to suggest there is little evidence that many individuals who are currently dropped off would begin driving and parking at the station in their own right if more (or cheaper) car parking were to be provided.

### Public Transport (Buses)

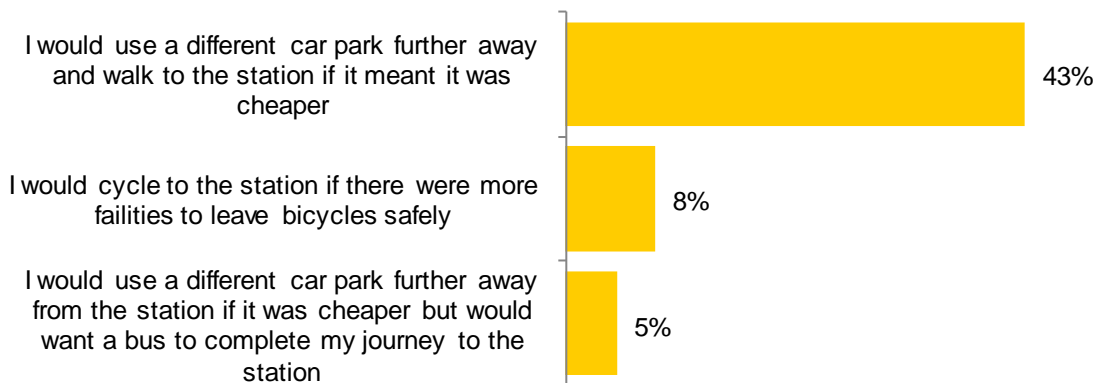
- 5.36 By necessity, bus trips to and from the station are constrained to those areas which are connected by a bus service. It is noted that a number of survey respondents specifically raised the point that bus services either did not serve their area, or were too infrequent to be useful at the key times of day (weekday mornings and evenings).
- 5.37 Bus users are primarily located in the areas to the east of the station, where the estates benefit from a semi-regular bus service. There are no bus users in the survey sample living in “old” Shenfield or the areas to the west of the station.

## Attitudinal Analysis

### Car Park Rail Users

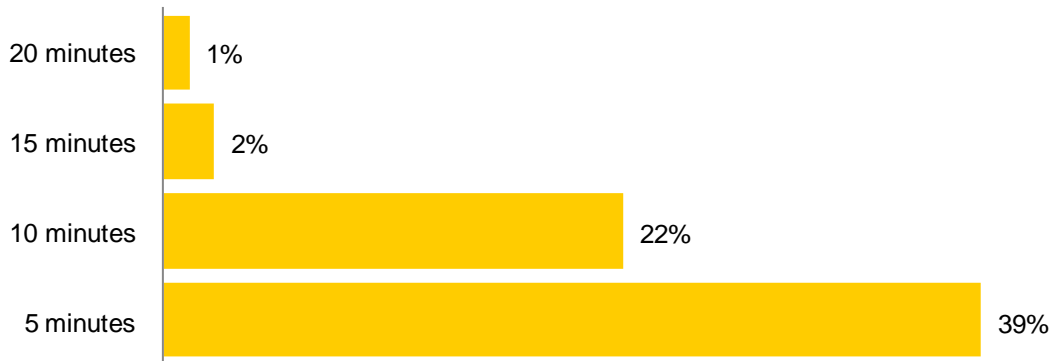
- 5.38 Over half (59%) of car park rail users agreed with the statement that it is difficult to find parking near the station. The survey then tested attitudes to the proposed solutions to future car parking demand shortfalls (park and stride, park and ride and increased provision for cyclists). The results showed some meaningful insights (Figure 5-6) :

**Figure 5-6: Attitudinal survey for proposed solutions to future parking demand**



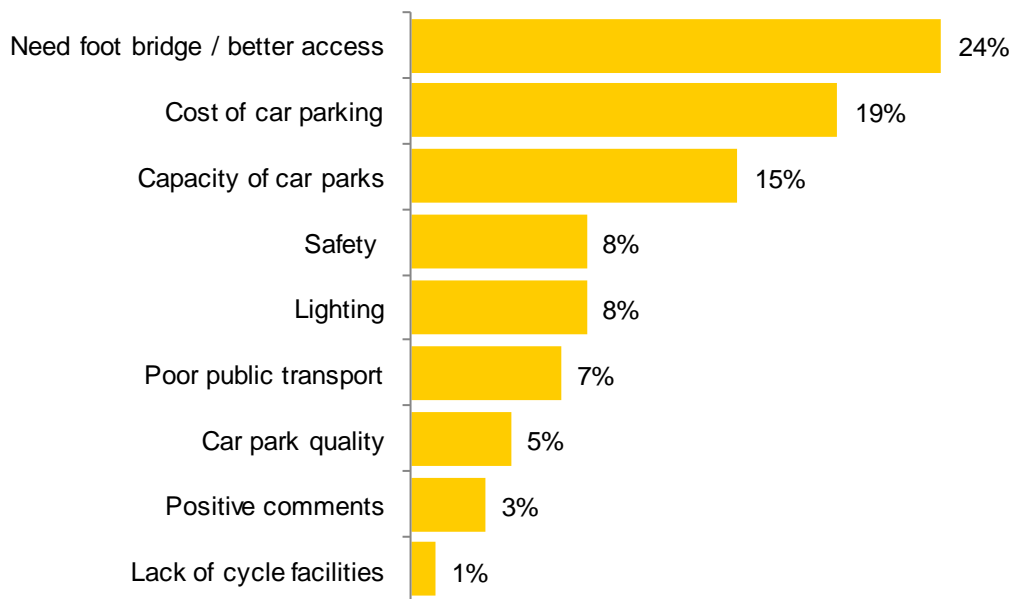
- 5.39 Many car park users (43%) agreed that they would use a car park further away and walk to the station if it meant that it was *cheaper* and it is not surprising that it was the cost of car parking that was the most common general complaint amongst survey respondents when making further comments. Interestingly, the provision of safe cycle parking would appear to have a higher potential to reduce car parking demand than a park and ride scheme. Around 8% of respondents state that they would cycle to the station if there were more cycle facilities compared to just 5% who would consider using a park and ride scheme.
- 5.40 When asked to quantify the distance that they would be prepared to walk, most current car park users would not be prepared to walk more than 10 minutes to the station from any park and stride location (Figure 5-7), with some stating that they already walk 5 minutes to the station from the current car park locations. This result indicates a potentially limited demand for a park and stride scheme which is located more than a 10 minute walk away from Shenfield Station.

**Figure 5-7: Acceptable walking times for any park and stride scheme - car park rail users**



5.41 Finally, survey respondents were given the opportunity to make any further comments about station parking facilities and getting to and from the station. These results have been codified and are shown in (Figure 5-8), the most common of which were the need for additional station access from the South side (24%), the cost of car parking (19%) and the capacity of the car parks (15%).

**Figure 5-8: Additional comments made by car park rail users about station parking and journeys to and from Shenfield Station**

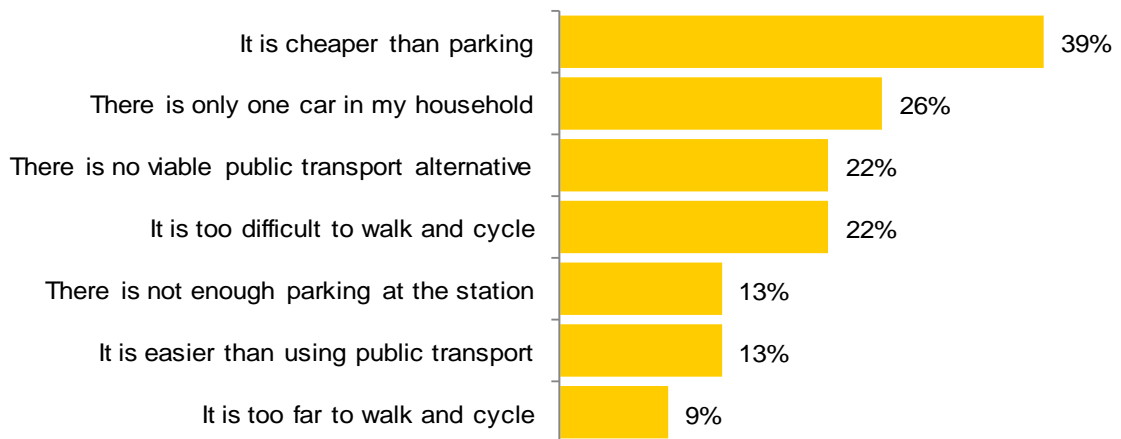


### Drop-Off Rail Users

5.42 Drop-off rail users were asked why they use the drop-off facility at the station. The cost of car parking was a key concern of the respondents with 39% stating it as the reason that they do not use the car parks at Shenfield Station. Other key factors were that respondents came from one car households (26%), there is no viable public transport alternative available to them (22%) or active transport is too difficult (22%). Many users stated the impact of the weather or carrying luggage. The full list of results is shown in Figure 5-9.



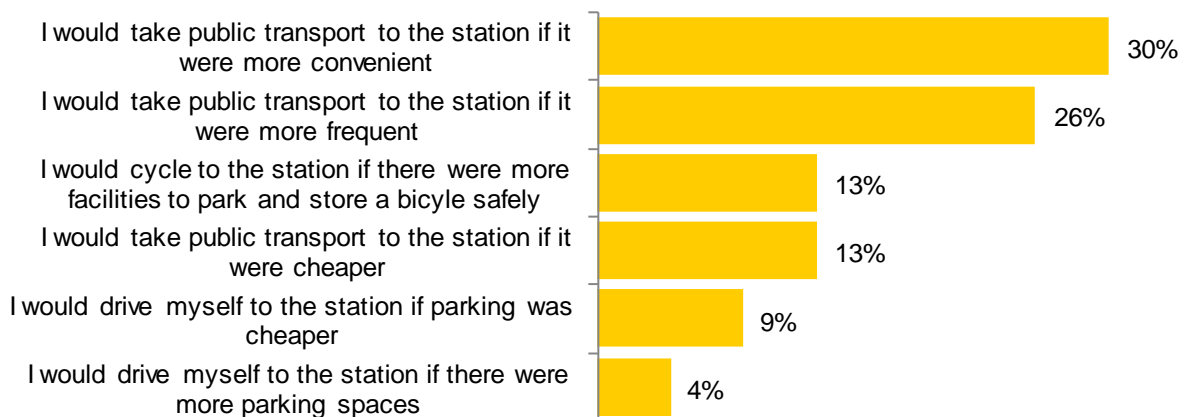
**Figure 5-9: Attitudinal survey to determine why rail users use the drop-off facility over other station access modes**



5.43 Drop-off area users were next asked what may change their travel behaviour in order to judge any suppressed parking demand at Shenfield Station. Surprisingly availability and cost of parking was not a major concern (see Figure 5-10). Drop-off area users instead appear to have a suppressed demand for public transport many respondents stating that they would take public transport to the station if only it were more convenient (30%), frequent (26%) or cheaper (13%).

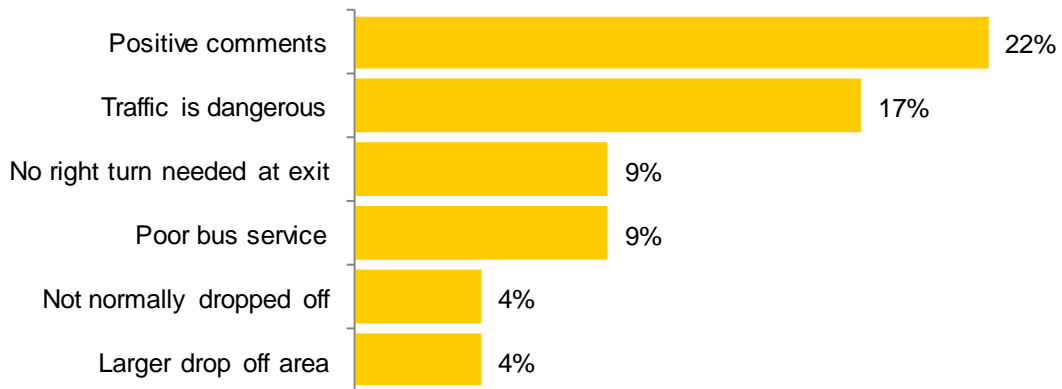
5.44 Better public transport service is a recurring theme throughout the three surveys. Many respondents state that the short operating hours and low frequency of the bus service that prevent them from fully utilising public transport for their journeys to and from the station.

**Figure 5-10: Drop-off area rail user responses when questioned what may change their travel behaviour to the station**



5.45 Finally, drop-off area respondents were asked if they wanted to make any further comments regarding the drop-off facility at Shenfield Station. The comments have been codified and are shown in Figure 5-11, 22% of respondents made positive comments about the drop off facility, but 17% commented on the congestion and traffic which makes it a dangerous area.

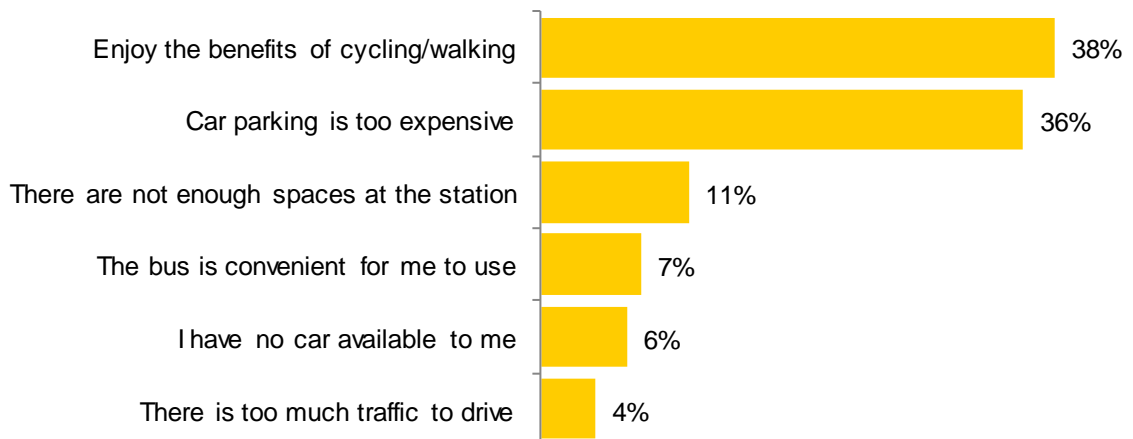
**Figure 5-11: Additional comments made by drop-off rail users about the drop-off facility and journeys to and from Shenfield Station**



**Other Access Mode Rail Users**

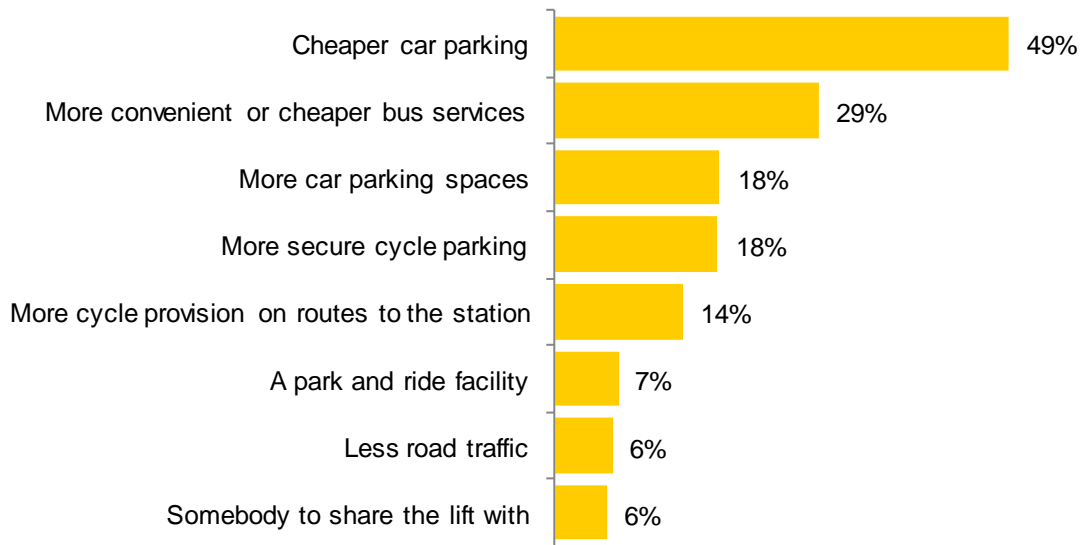
5.46 Rail users arriving by all other access modes were asked what influenced their choice of transport to the station that morning (see Figure 5-12). The most common reasons stated (aside from living close by to the station) was that respondents enjoyed the benefits of walking / cycling (38%) and that car parking is too expensive (36%). A relatively small percentage (11%) stated that the lack of parking spaces at the station influenced their decision and just 4% stated traffic as a main factor.

**Figure 5-12: What influenced the travel behaviour of rail users arriving by other access modes to the station?**



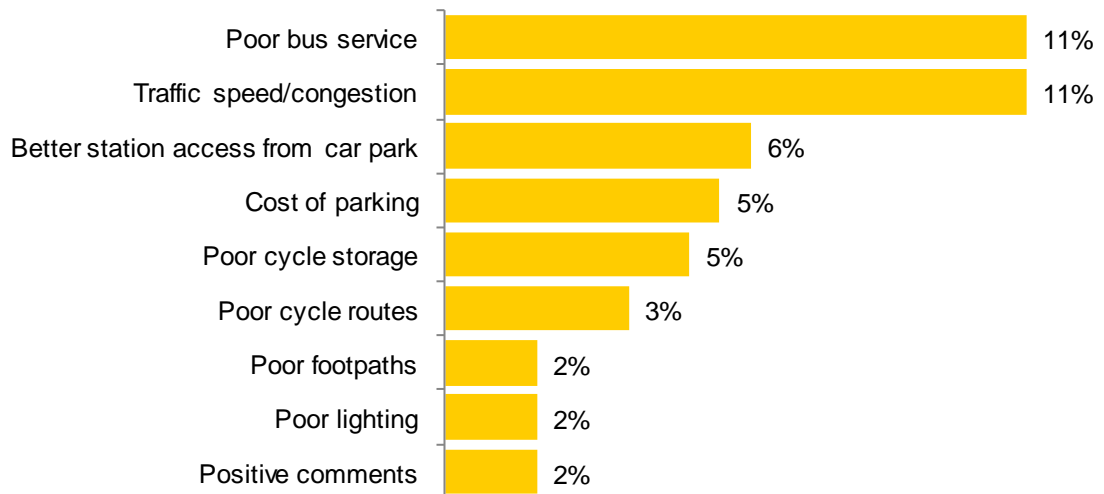
5.47 Rail users arriving by other access modes were asked if they had ever considered driving to the station. Around 57% stated no they had not, whilst 39% stated that they had. With this in mind the survey determined what may encourage these rail users to change their travel behaviour to detect suppressed parking demand. Cheaper car parking was the main factor (49%) followed by a more convenient or cheaper bus service to the station (29%). Other factors included more car parking spaces (18%), more secure cycle parking (18%) and more cycling provision on routes leading to the station (14%). Comparatively there was not much interest in a park and ride facility (7%) or lift sharing (6%). A full summary of results are shown in Figure 5-13 below.

**Figure 5-13: What may change travel behaviour of rail users arriving at the station by other access modes?**



5.48 Finally, other access mode rail users were asked if they had any further comments to make about getting to and from Shenfield Station. The comments were codified and are displayed in Figure 5-14, the most common of which (11%) was the bus service, which neither serves enough areas nor operates long enough hours in the evening; similarly, 11% of people stated concern regarding the speed of traffic and congestion around the station entrance.

**Figure 5-14: Additional comments made by other access mode rail users about journeys to and from Shenfield Station**



## Conclusions

5.49 The key findings for this study from the Rail User Survey responses are considered to be as follows:

- Existing car drivers generally live between 2km and 5km from the station;
- Existing car / taxi drop-offs live between 1km and 3km from the station;
- Pedestrians & cyclists nearly all live within 2km of the station;
- 43% of car drivers would park further away from the station if it was cheaper but very few would walk further than 10 minutes (3%) or take a bus (5%);
- Cost of car parking was a major reason why 'drop-off' or 'other access' passengers don't use the station car parks. Availability of car parking spaces appeared to be of less concern - 'drop-off' (13%); 'other access' (11%);
- Drop-off passengers were more interested in switching to bus or cycling, than to driving; and
- Cheaper parking would encourage nearly half of 'other access' passengers to drive to the station, in comparison only 18% indicated more car parking spaces would be an incentive.

## 6 Stakeholder Engagement

### Introduction

6.1 This section provides a summary of the stakeholder engagement process that was undertaken and the responses received.

### Crossrail

6.2 Crossrail were advised about the study and asked to contribute by providing specific information regarding:

- forecasting for future rail patronage as a result of the Crossrail project;
- any parking demand forecasts at the station as a result of this increased rail patronage;
- site plans for the construction phase of the project and the impact this will have on car parks.

6.3 Crossrail were able to contribute figures on projected demand at Shenfield and other stations on the Crossrail route modelled for the year 2026. The figures provided, along with sensitivity test incorporating an additional 28% demand, have been used by Crossrail to establish whether stations require remodelling to meet future demand. Local Authorities have been in possession of these figures since 2011.

6.4 Crossrail have no specific parking demand forecasts but did provide their policy paper outlining their approach to rail passenger car parking provision during the construction phase.

6.5 Crossrail were unable to provide us with any site plans for the construction phase of the project.

### Greater Anglia

6.6 Greater Anglia (GA) are the Train Operating Company who run the current franchise for Shenfield Station. They were approached about the study, in the first instance, to seek permission to undertake survey work on the station forecourt and station car parks but also to contribute any data or views they had about the station and its future development.

6.7 GA granted full support for all of the survey work and provided data about footfall at the station and provided general background information about Crossrail proposals and how they would impact upon the station.

### NCP

6.8 NCP operate both of the station car parks at Shenfield on behalf of Greater Anglia. NCP were approached to provide their views on the current operation of the station car parks and future development.

6.9 A meeting was held with NCP representatives to discuss the car parks, which provided the following key information:

- Both station car parks are considered by NCP to operate at capacity
- The Hunter Avenue car park operates a premium parking scheme for which customers can purchase a dedicated car parking space for their sole use. Premium spaces make up nearly half the total car park capacity.

- Shenfield Station acts as a rail head due to the fast train service
- It also acts as an alternative option for many passengers when there are disruptions on other lines
- NCP consider there to be suppressed demand for parking at the station
- The GA franchise requires them to expand car parking across their route during the lifetime of the franchise. Shenfield is a prime candidate to expand car parking.
- Outline plans have been drawn up to partially-deck the Mount Avenue car. This would provide an additional 154 car parking spaces (revised plans have subsequently been submitted to the Council as part of a planning application on 5<sup>th</sup> December 2013).
- It would utilise a simple construction method and so could be completed within a 6 week timeframe.
- Initial plans considered decking the whole of the car park and providing a footbridge directly onto the station platform. However, it is understood that Crossrail construction traffic will need access through the car park as part of the construction process, therefore only a partial deck is feasible until Crossrail has been completed.
- A full decking of the car park would provide an estimated additional 254 spaces, which would still be feasible post-Crossrail construction.
- A consultation process was proposed with local residents who will be affected by the decking.
- An outline programme for the scheme would see construction begin in July 2014.

6.10 Further to the meeting with NCP, an application for a single deck expansion (under permitted development rights) to the Mount Avenue car park was submitted to the Council on 5<sup>th</sup> December 2013. The submitted plans will increase total car parking at Mount Avenue from 213 to 338 spaces, an increase of 125 spaces. The application was approved on 27<sup>th</sup> January 2014 and the decision notice was issued on 6<sup>th</sup> February 2014. This is reflected in the following sections of the report.

## Other Stakeholders

### Councillors

- 6.11 All of the Councillors in the Shenfield and three Hutton Wards around Shenfield Station were contacted and asked to contribute any views that they had in relation to the study. This included the offer to meet to discuss specific issues in detail.
- 6.12 Councillors from all of the wards expressed interest in meeting to discuss matters relating to the station and a variety of potential dates were offered; however, to-date, no meetings have taken place.

### Taxi Licensing

- 6.13 The taxi licensing department were contacted to determine whether or not there are any existing issues with taxi ranking at the station that they would like to input into the study. Whilst the official taxi rank is on the station forecourt, which is controlled by Greater Anglia, there is also a feeder rank on the main highway under the railway bridge that is on public highway.
- 6.14 The taxi licensing group responded with the following comments:

- They confirmed there is a small 6-car Council rank on the public highway that has adapted to become a 'feeder' rank to the main Station rank. Whilst technically there is no such thing as a 'feeder' rank, drivers appear to have used it as such and unofficially respect the fact that it is not an independent rank.
- They highlighted concerns that have been raised over whether there will be a Station-owned rank under the Crossrail proposals and, if so, to what extent this will be made available to the Hackney Carriage Trade. (Hackney Carriages, and not Private Hire, may pick up from a rank without a booking). Whilst the Council will have no input/say into any Station-owned rank, the principle of Hackney Carriage vehicles being the only ones that may use a rank and pick up non-booked passengers is enshrined in law and will apply regardless of ownership of land.
- They would welcome the opportunity of working with the relevant parties to secure the most appropriate and effective means of clearing passengers from the Station area as quickly, easily and safely as possible.
- They also highlighted other issue relating to permits as drivers are constantly request that plates are issued that have permits attached to them. At the moment permits are issued to the vehicle, it would greatly assist the licensing authority if they could be issued to the person instead and made non transferable.

# 7 Demand Forecasting

## Overview

- 7.1 A key aspect of the study is to forecast potential growth in demand for car parking at Shenfield Station in order to be able to accurately determine the level of parking supply that will be required in future years.
- 7.2 There are four elements that need to be considered for future demand;
- Existing levels of parking
  - Current suppressed demand for parking
  - Future underlying growth in rail patronage
  - Additional rail patronage associated with the introduction of Crossrail services

## Existing Parking

- 7.3 The car parking demand surveys presented in Section 3 provide an assessment of existing level of parking associated with Shenfield Station. Surveys were carried out at four car parks in the vicinity of the station; however, two of these are Council operated car parks, which also serve local parking requirements and not just the station.
- 7.4 The distribution process and results from the Rail User Surveys provided an opportunity to assess the level of demand in the Council car parks that could be attributed to the station and this concluded that only around 10% were station users.
- 7.5 Assuming only 10% of the council car park demand was attributable to the station, then the estimated level of AM peak station car parking demand is around 450. The Rail User Survey results indicated that the average car occupancy level was 1.28, so the car parking demand translates into around 575 AM peak rail passenger trips.

## Suppressed Demand

- 7.6 One of the key aims of the Rail User Survey was to ascertain the level of suppressed demand for car parking at Shenfield Station. This was done through a series of targeted questions to rail passengers who were dropped-off by car or taxi at the station, or who arrived by a non-car mode.
- 7.7 These passengers were asked to indicate whether, amongst other potential reasons, a lack of car parking spaces influenced their choice of mode when accessing the station. They were subsequently asked whether they would change their behaviour if, among other options, there was an increase in the availability of car parking space.
- 7.8 The results of the analysis indicated that around 17% of 'drop-off' respondents stated that a lack of car parking was a reason why they did not drive themselves to the station. However, all of these respondents also stated that the expense of car parking was also a reason.
- 7.9 When asked if they would switch mode if more car parking was available, only 4% of 'drop-off' respondents indicated that they would.



- 7.10 Amongst 'non-car' users, 11% of respondents indicated that a lack of car parking was a reason why they did not drive to the station. A higher number of respondents, 18%, indicated they would consider changing mode to drive if there was more car parking available. However, the majority of these respondents also stated that parking would need to be cheaper for them to consider switching mode. Only 1% of respondents indicated that the availability of car parking spaces would be the sole reasons why they would change mode.
- 7.11 The results indicate that whilst there are a large number of current rail passengers at Shenfield who would like to use the station car parks if there was more space, it is also the case that the expense of parking represents a significant constraint. Furthermore, the results of the Rail User Survey generally indicate that the cost of car parking is more of an issue to passengers than the availability of parking spaces. This is partly reflected in the results of the Car Parking Demand Surveys, which indicates that the Mount Avenue NCP car park was not fully utilised until after 9.30am, suggesting that it is price that is deterring some peak period travellers from parking and not the availability of space.
- 7.12 This is not necessarily a surprising finding as it is likely that NCP and First Capital Connect, the car park operator and train operating company, will have conducted market analysis in order to set their price structures such that they utilise their car parking provision, whilst maximising revenue.
- 7.13 The results therefore suggest that the level of suppressed demand for parking at the current price structures is relatively limited. A conservative interpretation of the data would suggest that it may be as little as 25 vehicles during the AM peak, although a more liberal assessment, that assumes some passengers, if offered a direct choice, would in fact be prepared to pay the current price, suggests a figure of closer to 125 vehicles. This range of forecasts will be taken forward as a maximum and minimum assumption for suppressed demand with the analysis.

## Underlying Rail Growth and Crossrail Demand

- 7.14 The study team has been in regular contact with Crossrail in order to try and obtain and understand their forecasts of potential future rail demand under an operating Crossrail service. Whilst headline figures have been provided, these give limited detail, with no explanation for the basis of the forecasts.
- 7.15 It had been hoped that Crossrail forecasts, which will have been generated from a modelling process, would have provided estimates of mode access to rail; however, this data is either not available or has not been forthcoming.
- 7.16 The forecasts provided indicate a future year 2026 forecast AM peak station entry demand of 2,400 passengers, with operational Crossrail services. This forecast has been compared to current estimated rail demand from the station, from the Office of the Rail Regulator Website, that indicates current AM peak demand from the station is already at around 2,450 passenger trips.
- 7.17 It is not clear when exactly the Crossrail forecasts were produced, although it is known to be pre-2011, and perhaps as early as 2008. This would partially explain why they appear to demonstrate, at best, no overall growth over and above current demand, as it is known that rail demand has significantly increased across the UK over the last few years. Even taking this into account, the Crossrail forecasts for 2026 appear an underestimate. This might, in part, explain why Crossrail have applied an additional 28% of demand as part of their analytical work as a sensitivity test, to allow for higher growth rates than anticipated.

- 7.18 Further sources of future rail demand are provided within the Shenfield Urban Integration Study Stage C Masterplan. These project a 2016 AM peak entry demand of 2,500 passengers without Crossrail and an additional 100 passenger trips with Crossrail (+ 4%). These would appear to be more in line with current patronage levels and forecast rail growth rates but again would indicate a limited impact of Crossrail upon patronage levels.
- 7.19 An assessment of current forecast rail growth rates in London and the South East<sup>1</sup> indicates that commuter routes are predicted to grow by around 1.3% pa. Applying this factor to the current assessment of AM peak station entries would forecast around 2,580 by 2016 and 2,940 by 2026. If we were to apply the same 4% uplift as an allowance for new Crossrail services, these would translate to 2,685 in 2016 and 3,055 in 2026. This latter figure is very similar to the Crossrail sensitivity test forecasts when applying the 28% uplift in demand.
- 7.20 With the data available it is not easy to draw any strong conclusions of the impact of underlying rail growth and Crossrail on future passenger numbers at Shenfield. There would be reasonable justification, however, to conclude that the forecasts provided by Crossrail would seem to considerably under-represented future demand and that a figure of around 3,050 AM peak station entries is potentially feasible give the current London & South East rail market and the proposed housing growth around the Shenfield area.
- 7.21 Given the lack of certainty surrounding the forecasts the remaining analysis will utilise a range of rail passenger demand forecasts in order to assess the associated demand for car parking and other modes of station access. A minimum forecast growth to 2026 of 2,600 will be utilised, along with a maximum of 3,050.

## Implication for Station Access Demand

- 7.22 The forecast uplifts in passenger entries at Shenfield station will obviously have a direct impact upon the station access demand by individual modes.
- 7.23 From the data provided, the Crossrail forecasting work does not appear to consider any potential change in the profile of station access. So for the purposes of the analysis we have assumed that the same mode shift profile remains, as presented in Section 2.
- 7.24 On this basis, Table 7.1 presents the forecast future year levels of station access demand by mode.

**Table 7.1 Future Year Station Access Demand Forecasts (AM Peak)**

Mode	Mode Share	Passenger Forecast		
		Existing	2026 Low	2026 High
Car parking	24%	576	611	718
Walk	41%	1,018	1,079	1,268
Drop-off	15%	368	390	458
Taxi	9%	221	234	275
Bus	7%	172	182	214
Cycle	4%	98	104	122
<b>Total</b>	<b>100%</b>	<b>2,452</b>	<b>2,600</b>	<b>3,055</b>

<sup>1</sup> Network Rail London and South East Market Study

### Car Park Demand

- 7.25 In terms of car park demand, the above passenger demand forecasts are based upon the current constrained supply of car park spaces. If this constraint was to be released, then the previous analysis has indicated that there is potentially some suppressed demand for car parking, albeit still constrained by the pricing structure, which is assumed to be maintained in line with inflation.
- 7.26 Table 7.2 presents a range of forecasts based upon both a high and low level of suppressed demand and on high and low growth rates.
- 7.27 The results are presented as vehicular demand, through the application of a car occupancy factor. The survey results indicated a figure of around 1.28. This allows an assessment of the potential required number of car parking spaces around Shenfield Station in future years.

**Table 7.2 Future Year Unconstrained Car Park Demand Forecasts (Am Peak - vehicles)**

Mode	Existing	Existing (Low SD)	Existing (High SD)	2026 Low Growth, Low SD	2026 High Growth, High SD
Car parking	450	475	575	504	716
Mode Share	24%	25%	30%	25%	30%
<i>Increase from existing</i>		25	125	54	266

SD = Suppressed demand for car parking

- 7.28 These forecasts demonstrate quite a range in the increase in car parking demand, reflecting the uncertainty in some of the Crossrail forecasts. The growth in demand ranges from 12% up to 59%. These numbers will be used to assess potential options for new car park provision and whether such options can accommodate the potential high and low growth predictions.
- 7.29 The high and low growth rates without any released suppressed demand, as presented in Table 7.1, will be utilised to estimate the impact of future demand for station drop-off facilities.

## 8 Issues and Opportunities

### Introduction

- 8.1 This section seeks to bring together all of the previous analysis of data in order to identify the key issues and opportunities relating to car parking, drop-off and general station access at Shenfield Station.
- 8.2 This will provide the basis upon which to develop potential options and to subsequently appraise who each of those options would perform against the identified need for improvements.

### Current Station Access

- 8.3 All access to the station is currently taken from the forecourt fronting the A129 Hutton Road. There are a number of issues which arise as a result of the current layout and, if considered appropriate, some limited physical improvements could potentially deliver benefits to all station users and also to others using Hutton Road when demand for access to the station is at its peak.
- 8.4 Although taxi and other “drop off” vehicles are segregated, as described in section 2, the available space is extremely constrained and has to operate as a one-way system. For private vehicles, any vehicle which stops to pick up or drop off a passenger prevents any other vehicles from passing through the space and therefore any halt of more than a few seconds at peak times can quickly cause traffic to tail back on to the main carriageway of the A129 Hutton Road.
- 8.5 The entry and exit to the station forecourt sit to either side of a signalised pedestrian crossing. Vehicles waiting to turn right into the forecourt do not always position themselves in the optimum location and this can make it difficult or impossible for larger vehicles to pass by, causing them to park over the pedestrian crossing and creating an obstruction. If this combines with tailing-back from the private vehicle drop-off area, the entirety of Hutton Road can become blocked in both directions until the vehicles within the drop-off lane move forward.
- 8.6 There are additional issues relating to the use and misuse of the bus lay-bys which are positioned on Hutton Road to the east and west of the station. Particularly in the evening peak, there are frequent instances of car users waiting in the bus lay-bys to collect passengers exiting the station; this often prevents buses from using the lay-bys and instead they have to wait on the road, where there is insufficient space for other vehicles to pass. This triggers a similar sequence of events to those described previously. It is also frequently observed that more than one bus is present at a lay-by at a time; since the lay-bys are not large enough accommodate more than a single bus, the second has to park at an angle and again the carriageway becomes blocked.
- 8.7 There are also issues with drivers seeking to pick up passengers from the station parking in other prohibited areas, such as the disabled and servicing lay-bys adjacent to Hutton Road at Crossways and Friars Avenue; as with the bus lay-bys, this displaces legitimate parking on to the street which reduces the efficiency of operation of the junctions involved, and leads to further delays and blocking of traffic on Hutton Road itself.
- 8.8 It is noted, for clarity, that a number of the issues cited above are a result of drivers ignoring restrictions which are already in place. The frequency and scale of this behaviour suggests that drivers have little or no fear that the restrictions will be enforced and other drivers who observe this are in turn encouraged to act the same way. Local observation indicates that the same situation does not occur with such frequency during the day and this is considered to be associated with the

regular presence of parking enforcement wardens. It is therefore suggested that a modest investment to deploy wardens at intervals in the PM peak in the vicinity of the station could produce a significant reduction in these parking behaviours and improved functioning of the road layout in the immediate station area.

- 8.9 With regard to the physical layout of the station forecourt it is acknowledged that efforts have already been made to provide extra accommodation for taxis and that the pedestrian crossing occupies the optimal location to cater for the majority of “desire lines” for people approaching and leaving the station. Nevertheless, there may be benefit in taking highway engineering advice with regard to the alignment and width of the road directly adjacent to the forecourt entrance and the bus stop layby to the east; some vehicle tracking of this area may be helpful in identifying specific point(s) where minor alterations would assist drivers to position correctly to turn right, and to have greater confidence to pass waiting drivers on the left hand side.

## Impact of Crossrail Construction

### Overview

- 8.10 The Crossrail development will require the widening of the embankment, a platform extension and the construction of a new line to serve the newly created Platform 6. Lorry numbers are expected to reach up to 7 per day during the peak construction period and once per day during off-peak construction. Figure 8-1 shows an extract from the construction plan which was included in the presentation made by Crossrail to the Council on 23<sup>rd</sup> October 2013.

**Figure 8-1: Construction of the Crossrail development**



- 8.11 As part of the construction works, part of Friars Avenue car park will be used for the storage of materials and equipment. It is the current stated intention for all of the track-side car park spaces to be suspended and given over to Crossrail, with the rest of the car park remaining open with at least 20 spaces available. This dates back to a commitment originally made in 2007.
- 8.12 In practical terms, however, it appears unlikely that it will be possible to maintain partial operation of the car park if there is a requirement for construction vehicles to deliver material and equipment. As described in the site audit, the access to the car park is constrained, with a single track entrance and narrow pedestrian footway. The car park site itself is also relatively small and so it would

appear infeasible for any large construction vehicles to be able to enter without safety concerns for both pedestrians and private vehicles.

- 8.13 The loss of car parking spaces within the Friars Avenue car park is not anticipated to significantly affect station access, as the car park is primarily used for local business activity and shoppers. At this stage, there have been no additional requests from Crossrail for car parking land in any of the other car parks, in particular the main station NCP car parks. Clearly, the loss of shopper spaces will have an impact on the local shops.
- 8.14 It is understood that Crossrail construction traffic will require access through the Mount Avenue car park; however, this is only to access the railway land at the western end and there has been no stated impact upon car parking spaces at this time. There may, however, be some potential conflicts between pedestrians accessing and egressing the car park and construction traffic as there is a section of the route that currently provides no pedestrian protection from vehicular traffic.
- 8.15 The only other impact of Crossrail construction upon station access is likely to relate to the additional construction traffic on the local highway network, although Crossrail have indicated that this will be a maximum of 7 lorries per day during the peak construction phase, with the majority of materials to be brought in by rail.

## Impact of Crossrail Operations

### Overview

- 8.16 The Crossrail development will see the current peak hour train service increase from 6 to up to 12 trains per hour to Central London.
- 8.17 The potential impact upon rail passenger demand has been discussed in Section 7, with a high level of uncertainty over absolute forecasts, although the relative impact of Crossrail services themselves have been forecast to be as low as a 4% increase.
- 8.18 If this forecast is correct then it is the underlying growth in rail demand that is likely to have the most impact upon station access demand, including the car park and drop-off facilities.
- 8.19 The demand forecasting work has predicted the potential increase in car park demand of between 54 and 266 vehicles by 2026 under a Crossrail scenario. Similarly the level of car park drop-offs has been forecast to increase by between 22 and 90 vehicles.

## 9 Option Development

### Introduction

- 9.1 The section examines the full range of options that could, in theory, be developed in order to provide additional car parking capacity or drop-off facilities for station access at Shenfield.
- 9.2 This section is simply meant to produce an exhaustive list of options (within reason) and does not consider the practicality or deliverability of the schemes, which is discussed in Section 10. In effect, this section provides a long-list of potential solutions to the identified issues and opportunities for car park and drop-off provision outline in Section 8.
- 9.3 For completeness, a range of non-car options are also discussed as an alternative approach to managing station access demand.
- 9.4 The options have been broadly segregated into the follow types:
- Expansion of existing car parks
  - Identification of new local car parks
  - Identification of new park & stride sites
  - Identification of park & ride sites
  - Improved station drop-off facilities
  - Enhanced local bus provision
  - Enhanced walking and cycling provision
- 9.5 A reference map, ST14273-GIS-08, has been prepared which shows the location of the various site options in the context of the station and on-street walking distances. This map is included at **Appendix B**.

### Expand existing car parks

- 9.6 An ideal solution to providing additional car parking capacity would obviously be to expand the capacity of existing car parks close to the station.

#### At Grade Expansion

- 9.7 All of the car parks are located within heavily developed areas of the town, with the railway line itself providing a barrier to one side and housing or retail develop located on other sides. There is, therefore, very limited opportunity for at grade expansion of the car parks.
- 9.8 The Mount Avenue NCP car park does have a limited amount of railway land located to the west; however, this is to be utilised as part of the Crossrail construction process so is not a short term solution.

#### Option 1a: At grade expansion of Mount Avenue NCP car park

#### Car Park Decking

- 9.9 The alternative option to expand existing car parks is to deck them. Modern construction methods mean that this can be done relatively quickly and without great expense. It is more practical for the

larger NCP car parks to be decked, as some low level spaces will be lost through the provision of ramps.

- 9.10 The main issue relating to car park decking is one of visual intrusion.
- 9.11 The stakeholder engagement process has revealed plans to partially deck the Mount Avenue NCP car park and subsequent to those discussions, an application has been made under permitted development rights and a Lawful Development Certificate has been granted for 125 additional car parking spaces to be provided at Mount Avenue.

**Option 2a: Partial decking of Mount Avenue NCP car park**

**Option 2b: Full decking of Mount Avenue NCP car park**

**Option 2c: Decking of Hunter Avenue NCP car park**

**Option 2d: Decking of Hunter Avenue Council car park**

**Option 2e: Decking of Friar Avenue Council car park**

### Identify new local car park sites

- 9.12 The process of identifying sites as part of the preparation of the Local Development Plan indicates that there are no available sites of suitable size within close proximity of the station that could be made available for car parking.
- 9.13 Any creation of a new local car park could only be achieved through changing the existing land use or re-developing existing sites. No suitable sites have been identified as part of this study.

**No identified options**

### Identify Park & Stride sites

- 9.14 In the absence of potential car park sites in close proximity to the station, an alternative would be to identify sites further away from the station but still within potential walking distance.
- 9.15 Previous work undertaken by Steer Davies Gleave (interim report, 27<sup>th</sup> August 2010) has identified a potential site off Alexander Lane on land owned by Brentwood Borough Council. Whilst this land remains available, the conclusions of the previous evaluation was that Alexander Lane itself would present considerable challenges in relation to the level of vehicular access that would be associated with a park & stride site.
- 9.16 A variation of this option would be to utilise land further out along Alexander Lane but which would also have access out onto Chelmsford Road. Walk access to the station would still be provided along Alexander Lane.
- 9.17 Whilst other areas of land are available within a reasonable walking distance of Shenfield Station, the development review identified that these are necessary public spaces and parks, schools, areas of greenbelt or designated housing development. As such, no other options have been identified; however, these discounted sites are shown on map ST14273-GIS-08 for reference.

**Option 3a: Alexander Lane (Brentwood Borough Council Land)**



## Identify Park & Ride sites

- 9.18 As with a range of potential park & stride sites, most areas of open or undeveloped land that might potentially be utilised for a park & ride site are not suitable due to planning regulations or development requirements.
- 9.19 Nevertheless, a number of options for park & ride have been identified for the purposes of this report, utilising information from the Local Plan development and Preferred Options consultations, and local mapping data
- 9.20 The identified options include a variation on the Alexander Lane / Chelmsford Road park & stride, with an additional shuttle bus service provided.
- 9.21 The proposed development complex at Mountnessing Roundabout could also serve as a potential park & ride site, to be delivered as part of a mixed use development scheme. It is noted for clarity that no such proposals have been put forward as part of the recent Preferred Options consultation.
- 9.22 A specific submission relating to provision of a 782-space Park and Ride site on the A1023 Chelmsford Road, to the south-west of the A12 Mountnessing Roundabout, has been made to the Preferred Options consultation. This submission is considered alongside other areas of land which front on to the A1023 which would have very similar capacities and means of access.
- 9.23 Other potential options include utilising excess parking provision around Brentwood Town Hall or a site of an old car dealership out along the A129 Rayleigh Road

### **Option 4a: Chelmsford Road / Alexander Lane**

### **Option 4b: Mountnessing Roundabout Complex**

### **Option 4c: Other Chelmsford Road sites (including site to south-west of A12 Mountnessing Roundabout)**

### **Option 4d: Brentwood Town Hall Car Parking**

### **Option 4e: Rayleigh Road Site**

## Improve drop-off facilities

- 9.24 The options for improving the drop-off facilities for passengers at the station can be described in three categories:
- Alter the existing station forecourt layout
  - Create a new drop-off facility at the rear of the station on the access road to Mount Avenue car park; or
  - Create a new formalised drop-off facility somewhere further along Hutton Road
- 9.25 The current station forecourt is significantly constrained with both taxis and passenger drop-offs utilising a relatively smaller forecourt area. There are only a limited range of options which could be considered to improve drop-off facilities, all of which are likely to require either the complete or partial removal of the station taxi rank. This is likely to be highly infeasible unless equivalent or improved ranking provision could be provided elsewhere.

- 9.26 Proposals have previously been developed to create a new drop-off facility at the rear of the station. For this to be a practical solution it would need to be accompanied by a new station access on the southeast side of the station. This would be most obviously provided via an extension of the existing foot tunnel, although could feasibly be provided by a footbridge as well.
- 9.27 The creation of a drop-off facility further along Hutton Road would require the displacement of other road-side users: the feeder taxi rank; bus stop facilities; or car parking provision. Any of these solutions would also result in an extended walk distance to the station for passengers.

**Option 5a: Alter existing drop-off facilities on the station forecourt**

**Option 5b: Create new drop-off facility at rear of station**

**Option 5c: Create new drop-off facility along Hutton Road**

## Enhance local bus provision

- 9.28 The Rail User Survey results highlighted the difficulties that some passengers have in utilising bus services to access the station due to the limited service on offer. Whilst not directly related to this commission, options to enhance bus service provision could be utilised to reduce the future demand for car parking or drop-off facilities at the station.
- 9.29 These enhancements could take the form of:
- Increased frequency of services, particularly on existing low frequency routes
  - Extended hours of bus service operation
  - Introduction of new routes
- 9.30 An assessment of any clustering of existing car drivers could identify the bus routes to enhance.

**Option 6a: Increase frequency of services**

**Option 6b: Extend hour of operation**

**Option 6c: Introduce new routes**

## Enhance walking & cycling provision

- 9.31 The Rail User Survey results also highlighted difficulties that some passengers have with cycling to the station, either relating to a lack of cycle parking or a perception of safety on the routes leading to the station. Again, whilst not directly related to this commission, options to enhance cycling provision, or indeed walking provision, could be utilised to reduce the future demand for car parking or drop-off facilities at the station.
- 9.32 These improvements could include additional, or more secure, cycle parking, dedicated cycle routes or measures to enhanced awareness of cyclists on roads leading to the station, or enhancements to the public realm on route leading to the station to improve the perception of safety when walking, particularly at night.

**Option 7a: Increase cycle parking at station**

**Option 7b: Enhance safety on cycle routes to station**

**Option 7c: Enhance public realm on walk routes to station**

# 10 Option Appraisal

## Introduction

- 10.1 This section conducts an appraisal of each of the long-list of options generated in Section 9 to determine both the feasibility of deliverability, as well as the performance against the identified needs for car park provision, drop-off and general station access at Shenfield Station.
- 10.2 The assessment of deliverability considers physical land and construction issues, but also considers any pre-requisite schemes, on-going operational requirements, as well as political and public acceptability of the scheme.
- 10.3 The performance against the identified needs for station access considers the travel patterns identified from existing behaviour as well as those revealed from the Rail User Surveys. This data is used to determine whether rail passengers would actually utilise the scheme.
- 10.4 Consideration of the potential financial cost is also presented as part of an assessment of value for money.
- 10.5 An overall summary is then presented for each potential scheme option considering whether it is likely to be deliverable and the level of benefits that it would generate.
- 10.6 A series of conclusions are then drawn at the end of the chapter.
- 10.7 Sites referred to in this section are mapped on JMP drawing ST14273-GIS-08, in **Appendix B**. It is noted that sites are identified where there is a clear means of access to the highway network; sites which do not have this are not included in the analysis.

## Appraisal

### Option 1a - At grade expansion of Mount Avenue NCP car park

- 10.8 The land which would be required to undertake the expansion of Mount Avenue car park is understood to be currently used by Network Rail to store materials and as a worksite when works are being undertaken on the tracks in the vicinity of Shenfield station. It is also understood that this land would be utilised as part of the Crossrail construction phase and so would not be available until post-construction.
- 10.9 It is not clear whether Network Rail is the landowner, although it is assumed that this is the case. Discussions would need to be undertaken with Network Rail, or any third party landowner, to establish whether some or all of the land could be released. If the land were to be available, construction of additional car parking space would be expected to be relatively straightforward. It is highly likely that access to the trackside would need to be retained as part of any scheme.
- 10.10 Once operational it is envisaged that the maintenance of the additional spaces would be managed as in the same manner for the existing Mount Avenue car park.
- 10.11 It is not anticipated that there would be any objection to the proposals in terms of visual intrusion as the site is already screened from adjacent properties at ground level. Some objections may be made with regard to the additional traffic generated by the creation of additional parking spaces; however, the number of spaces which could be accommodated on the land is considered to be modest (less than 50) and, therefore, the impacts of additional vehicle movements on the local

highway network would also be expected to be minor, and not of a magnitude which would trigger the need for formal assessment.

- 10.12 The scheme would receive benefits from any moves to create a new passenger access to the station; however, a new access would not be a pre-requisite of the scheme.
- 10.13 The analysis of current and future parking demand suggests that additional spaces would be well-used by rail travellers; however, the scheme would only be able to accommodate the 2026 low growth forecast of increased car parking demand.
- 10.14 The costs of construction and maintenance would be relatively low, however it is not possible to accurately estimate any costs associated with the purchase or lease of the land in question. The costs of the land would determine the level of “value for money” delivered by the scheme.
- 10.15 It is noted that the recently approved partial decking of the Mount Avenue car park would not prevent the future delivery of further at-grade expansion of parking, but that assuming that this development takes place, the need for at-grade expansion would be expected to decrease accordingly.
- 10.16 In summary, the scheme would deliver a medium level of benefit; the deliverability of the scheme would rest with third parties and be largely dependent on Network Rail’s view of their need and utilisation for the site. At best it would not be available until post-Crossrail but it is also considered unlikely at this stage as the site would remain a prime trackside access point.

#### **Option 2a - Partial decking of Mount Avenue NCP car park**

- 10.17 A partial decking of Mount Avenue car park will deliver additional car parking spaces within the footprint of the existing car park site. The deliverability of such a proposal would, therefore, be primarily a matter of Greater Anglia and NCP being able to develop and agree a suitable physical design, as well as to fund the scheme.
- 10.18 Consultation with NCP has indicated the preliminary design work has been undertaken for this scheme. Designs have, subsequently, been submitted to the Borough Council for a certificate of lawful development for the construction of a decked car park within the existing car park, and as previously noted, this was issued on 6<sup>th</sup> February 2014.
- 10.19 It has been confirmed as a result of the application that only a single deck is being proposed at this time; creation of multiple decks would significantly increase the associated scheme costs due to the strength required for the supporting structures. Multiple decks would also significantly increase the visual intrusion of the scheme.
- 10.20 Some car parking spaces will be lost at ground level to accommodate ramps to the upper level; The single, partial-deck is expected to provide a net increase of 125 car parking spaces at the site.
- 10.21 The creation of a partial-deck will leave part of the car park closest to the railway tracks as a ground-level only facility. This is expected to have significant benefits in terms of retaining access to the trackside via the car park, particularly if there is a need to maintain a route for large or tall track working vehicles in this location. It is understood that this is one of the key arguments for only partial decking as access will be required by Crossrail construction vehicles.
- 10.22 It is assumed that Greater Anglia and NCP have undertaken all necessary consultations with Crossrail and Network Rail to address access issues when developing the submitted scheme

design. Maintenance of the structure will need to be managed by Greater Anglia and/or NCP and will presumably be funded from parking charges.

- 10.23 It is expected that, due to its location close to the station, the new spaces provided by a partial decking scheme will be well used. Unless, however, the scheme is accompanied by complimentary schemes to enhance station access, such as extending the foot tunnel, the walk time to the station entrance will remain comparatively high given how physically close the car park is to the station platforms. None-the-less the increased number of additional spaces provided would result in a high level of benefit to passengers and the scheme is likely to provide good value for money.
- 10.24 The provision of 125 additional spaces will easily accommodated the low forecast growth in car parking demand by 2026, of 54, but would only accommodate around 50% of the high growth rate forecast.
- 10.25 A decking scheme could also include some new provision for quality cycle parking within or adjacent to the structure, although there is currently no information about whether this would be included.
- 10.26 In summary, the scheme will deliver a high level of benefit and will potentially be a good match with the predicted future and suppressed demand for parking at the station. The delivery of the scheme will rest with third parties (Greater Anglia and NCP). It is also noted that a partial decking scheme could feasibly be delivered before, or at the same time, as the Crossrail works.

#### **Option 2b - Full decking of Mount Avenue NCP car park**

- 10.27 The “Full Decking” option for Mount Avenue presents similar opportunities and challenges to the “Partial Decking” option. For clarity, it is understood that a fully decked car park would be constructed in two phases, with a partial deck delivered first and the remaining space “filled in” once the Crossrail works at Shenfield Station are complete. This is consistent with the recently approved partial-deck scheme.
- 10.28 A full deck car park would be capable of delivering significantly more spaces than a partial deck (roughly estimated as 100 spaces). This would understandably result in a larger structure, although in terms of visual intrusion this would not be expected to differ radically from a partial deck.
- 10.29 The need for this level of additional parking would need to be demonstrated as part of any application; JMP’s work indicates that such demand might exist under the high scenario but the likelihood of these occurring would ideally require further evidence from Greater Anglia (and potentially Transport for London (TfL) as future operators of Crossrail services).
- 10.30 A full deck car park would also be more likely to result in additional traffic generation of a magnitude which would result in a significant highway impact at one or more local road junctions; this should be considered by the Council in the event that a further application for Lawful Development is brought forward in relation to a full deck car park in the future.
- 10.31 A potential advantage of the “Full deck” option is that it could potentially allow for the provision of a footbridge into the station providing direct access to the platforms. Whilst this would further increase the cost of the scheme it would provide a significant benefit to passengers.
- 10.32 On balance, it is considered that a full deck scheme would still offer high benefits for rail travellers; its value for money would be dependent on the anticipated level of demand and utilisation of the additional parking spaces.

### **Option 2c - Decking of Hunter Avenue NCP car park**

- 10.33 The decking of Hunter Avenue car park would follow similar principles to those already described in connection with Mount Avenue, but potential concerns from residents are considered likely to be greater in nature. There is potential for up to around 200 additional spaces to be provided through use of a single decked structure.
- 10.34 The main difference between the Hunter Avenue and Mount Avenue sites is their proximity and visibility to residents of adjacent roads. The physical distance between the current car park edge and the frontage of properties on Hunter Avenue is relatively small and any decked structure would be very clearly visible to residents, even if screening vegetation were to be provided. (The existing hedges separating the car park from Hunter Avenue itself are of inconsistent height and typically only 6 to 8 feet tall).
- 10.35 Vehicles accessing Mount Avenue are able to do so directly from the A129 Hutton Road; access to Hunter Avenue Car Park is via residential roads. There are, therefore, likely to be more sustained (and robust) objections from these residents to any significant increase in parking provision.
- 10.36 It is considered that rail travellers would be willing to use the additional spaces as they are no further from the station than the current car park.
- 10.37 In summary, the construction of a decked car park at Hunter Avenue would be physically possible and would offer the same benefits to rail travellers as the Mount Avenue decked options. However, the option would raise greater issues of visual intrusion and traffic concern and would directly affect a larger number of residents and so is considered to be more challenging to deliver in practice.

### **Option 2d - Decking of Hunter Avenue Council car park**

- 10.38 The single decking of Hunter Avenue's council "shoppers" car park would provide only a further 50 additional spaces, which for the purposes of this study are assumed to be used as additional rail station parking.
- 10.39 The conclusions drawn in relation to this option are very similar to those for the Hunter Avenue NCP car park; additionally, it is noted that a decked structure in this location would be visible from the A129 Hutton Road and would be positioned physically close to properties fronting both Hunter Avenue and Hutton Road. It is also noted that visibility from the existing car park access is poor due to its location on a bend, and any substantial increase in the use of this access would require the exploration of options to improve the access arrangements.
- 10.40 For these reasons it is considered that achieving planning consent for decking of this car park would be difficult and, therefore, this option is discounted on the basis of it being undeliverable.

### **Option 2e - Decking of Friar Avenue Council car park**

- 10.41 As with Option 2d, it is assumed for the purposes of this report that a decked structure at Friars Avenue would serve as additional station car parking, although there is potentially also an option to transfer the Hunter Avenue shoppers' car park to station parking use, and dedicate the whole of the expanded Friars Avenue car park to shoppers' needs.
- 10.42 It is noted that any decking of Friars Avenue would only be able to take place following completion of the Crossrail works and, therefore, would not provide any additional capacity during the construction phase for Crossrail.
- 10.43 The Friars Avenue car park is largely concealed from view behind the rear of properties which front on to Friars Avenue itself, and Hutton Road. Concerns may be raised by residents of these

properties with regard to overlooking and these would need to be very carefully assessed as part of the development of any design.

- 10.44 The scale of the additional car parking which could feasibly be delivered is considered to be minimal given the access and dimensions of the existing car park. It is considered unlikely that any more than a net increase of 40 parking spaces could be achieved. This would, therefore, provide limited additional overall capacity.
- 10.45 Whilst the level of additional traffic generated is unlikely to trigger traffic impacts of a scale which would require off-site highway capacity assessment, the existing car park access is narrow with there being no obvious way of improving this, and the increase in traffic movements associated with the additional spaces would increase the potential for conflict between vehicles, and between pedestrians and vehicles. The safe operation of a car park of increased size in this location would therefore require particular scrutiny.
- 10.46 Although the ownership of the car park is not an issue, its shape and its means of access mean that the development of a workable, safe design may be challenging and costs are likely to be higher than for decked construction at either Mount Avenue or Hunter Avenue. The operation of such a car park would need to be discussed with Greater Anglia and NCP. Recent discussions between Crossrail and the Borough Council have provided strong evidence that local residents and shoppers highly value the parking space provided by Friars Avenue and therefore access for shoppers to parking of at least equivalent numbers to the existing car park would need to be maintained.
- 10.47 It is considered likely that rail passengers would use spaces made available to them in this location as it is within a 400m walk of the station. The benefits of these additional spaces would therefore be high. The issue of value for money would be determined by the terms of any agreement with regard to the leasing and operation of the additional car park space, and where maintenance liabilities for the structure would lie.
- 10.48 In summary, the decking option for Friars Avenue, whilst considered feasible in principle is subject to significant technical and commercial issues which would need to be thoroughly discussed and resolved before a robust conclusion on its deliverability could be reached. Furthermore, given the limited additional parking that it would provide, it is considered that this option would only be worth exploring further in the event that the plans for Mount Avenue become stalled by unforeseen issues.

#### **Option 3a – Park and Stride Alexander Lane (Brentwood Borough Council Land)**

- 10.49 The provision of a “Park and Stride” car park at Alexander Lane is partially supported by the results of the rail traveller surveys; 43% of respondents to the car park surveys indicated that they would walk further from an alternative car park if the parking were to be cheaper there. However, the surveys also very clearly demonstrate that a 10-minute walk is the maximum that car drivers are prepared to undertake from an alternative car park site; just 2% of respondents indicated that they would walk for up to 15 minutes. This is a critical finding which has major implications for all of the park and stride / park and ride options.
- 10.50 Map ST14273-GIS-01 shows catchments around the station of 1km (approximately a 12 minute walk) and 2km (approximately a 25 minute walk). It can be seen from this map that the Alexander Lane site lies just on the edge of the 1km area, and is therefore positioned at a location which is on the upper limit of the walking trips which car drivers would be prepared to make. As a result of this, the potential for car park users to use an alternative facility in this location may be diluted.

- 10.51 It is also noted that a facility in this location would increase traffic flows on Alexander Lane, which is narrow and has been previously identified as being unsuitable for large increases in traffic volume. The precise impacts of a facility in this location would therefore need to be discussed fully with Essex County Council and objections from local residents would be expected. Previous comments made with regard to parking numbers and the threshold for off-site highway capacity assessments also remain relevant to this option.
- 10.52 The creation of a Park and Stride facility in this location would also require the loss of part of the existing recreation ground (which is likely to be contrary to adopted and developing policy and would generate local opposition), and the re-configuration of the existing pedestrian access from Alexander Lane.
- 10.53 The construction costs associated with a facility in this location would be relatively low as it is a “Greenfield” site. There is a footpath connection from Alexander Lane; this is of average to poor quality and some improvement is therefore likely to be needed (see option 7c).
- 10.54 The available land would permit the construction of sufficient additional car park spaces to meet the 2026 high growth forecast increase in demand and could, theoretically, accommodate demand from the other Council car parks in Hunter Avenues and Friars Avenue. Again, however the current users of these car parks are unlikely to wish to park that far away from the shops and businesses along Hutton Road.
- 10.55 On balance, it is considered that the benefit to existing rail users arising from the provision of a Park and Stride facility would be low, and that there are a number of issues which cast doubt on the ultimate deliverability and financial viability of such a scheme. Further investigation would be required (particularly with regard to suppressed parking demand) to develop the planning and business case for such a facility, an activity which would only be worthwhile in the event that all of the previously discussed options were to be ruled out.

#### **Option 4a – Park and Ride Chelmsford Road / Alexander Lane**

- 10.56 The issues associated with a Park and Ride site served from the Chelmsford Road and/or Alexander Lane are, in part, similar to those discussed in relation to option 3a. There are two pieces of information from the rail user surveys which cast immediate doubt on the viability of all the Park and Ride sites; these are that all the sites lie well outside of the 10 minute walking “threshold” and would, therefore, be perceived as remote from the station, and more importantly that only 5% of respondents indicated that they would consider using a bus to get to the station from an alternative car park.
- 10.57 The Chelmsford Road site is currently used as playing field / athletics space associated with Shenfield High School; the site is physically separated from the main High School site by Alexander Lane. For this reason, it would be physically possible to use part or all of this site without directly affecting the main school site (notwithstanding the loss of the space for school use) and, therefore, it has not been ruled out in the manner of the other school field sites identified on the reference map.
- 10.58 The Chelmsford Road site is positioned toward the north-western end of Alexander Lane; this is a 15-minute walk from the station if Alexander Lane is used, and at present Alexander Lane has no footpaths between the recreation ground and its western end (except in the immediate vicinity of Shenfield School). The site would, therefore, have to be park and ride only (with those parking there physically prevented from reaching Alexander Lane), or a new footpath would need to be created from the park and ride site to link up with the existing pavement at the recreation ground.



- 10.59 It is also noted that, as this land is currently part of the green belt (as shown on the 2005 Replacement Local Plan Proposals Map), “very special” circumstances would be required to justify any type of development and to trigger the necessary review of Green Belt extents as part of the Local Plan development process. Some level of public opposition might be expected in response to any encroachment on Green Belt land.
- 10.60 It is noted that the NPPF does make reference at paragraph 90 to “local transport infrastructure which can demonstrate a requirement for a green belt location”, however, it is unclear, at present, whether the predicted future and suppressed demand (even in the high demand scenario) would support a scheme of sufficient size to be considered a “strategic” project that justifies a review of green belt extents.
- 10.61 It is noted, however, that this study focuses only on Crossrail and existing station users and, as such, has not included any assessment of wider sub-regional demand for access to Shenfield Station. In particular, there may be unidentified or suppressed demand arising from the Chelmsford area and its hinterland that would provide a strategic basis upon which a park and ride case might be developed.
- 10.62 The costs of operating any park and ride scheme are significant, even where such services operate only in peak periods. The evidence from the rail user surveys makes it clear that few, if any, existing car park users would choose to use the new service to access the station. It is not possible to say with certainty whether potential additional car park users (i.e. future or suppressed demand) would take a different view; evidence for this would need to be collected via a wider sub-regional study, as described above.
- 10.63 For time and fare costs to be attractive to existing rail passengers, it is considered highly likely that bus and parking fares would need to be so low as to become unviable as a self-supporting service. The costs which would be acceptable to new or additional rail passengers drawn from a wider area would need to be assessed in the sub-regional study, if this is undertaken.
- 10.64 Previous comments made with regard to parking numbers and the threshold for off-site highway capacity assessment remains relevant to this option.
- 10.65 On balance, it is therefore considered that the benefits to existing rail users from a park and ride site in this location would be low and that the challenges associated with securing a planning consent purely on the basis of existing demand may make this site undeliverable. The case for a park and ride that serves a wider sub-regional area may be stronger and would be best examined through a further study. Then, if appropriate, the selection of a site can be progressed through the emerging Local Plan process.

#### **Option 4b – Park and Ride Mountnessing Roundabout Complex**

- 10.66 The Mountnessing Roundabout complex currently has planning consent for a mixed use development, as described in Section 3. The provision of additional car parking spaces and facilities for a park and ride would require an amendment to this consent; however the principle of development on this site is well established. It is noted for clarity that no such proposals have as yet been put forward as part of the Local Plan consultations.
- 10.67 As the site lies close to the A12, any additional parking facility which results in more than 30 additional vehicle trips through the A12 junction in any one hour would potentially need to be assessed according to the relevant Highways Agency (HA) criteria.

- 10.68 JMP's assessment is that the long-term viability of a park and ride facility to serve existing rail users in this location would need to be carefully considered. The benefits to existing rail users are expected to be relatively low and so the site would also need to serve a much wider, strategic catchment area. It is understood that the strategic viability of the site will be subject to further assessment within a wider study.
- 10.69 If a private developer considers that they can operate a fully commercial service without subsidy, and without using the park and ride to justify further unrelated development at the site (in the absence of evidence relating to the wider sub-regional case), then it is recommended that the Council consider the evidence which is put forward to support such an application in the context of the independent analysis presented in this report. Any case which seeks to draw existing users away from the NCP car parks is likely to face opposition from both NCP and Greater Anglia.

#### **Option 4c – Park and Ride Other Chelmsford Road sites**

- 10.70 There are a number of other sites fronting on to the A1023 Chelmsford Road which could potentially accommodate a Park and Ride site. A submission relating to a site located to the south-west of the A12 Mountnessing Roundabout has been made to the recent Preferred Options consultation, which proposes a 782-space facility. A second submission has also been made with regard to the site known locally as "Officers' Meadow", which proposes a mixed use development including housing. At present no planning applications or formal pre-application discussions relating to this site are understood to have taken place.
- 10.71 These sites lie within the Green Belt and, therefore, this issue would need to be considered in the same manner as has been described for Option 4a. The same conclusions are also drawn in relation to viability, value for money, and rail user benefits as have been presented for option 4B.

#### **Option 4d - Brentwood Town Hall Car Parking**

- 10.72 The use of car parking space at Brentwood Town Hall would be significantly less expensive in terms of capital cost than for the previous Park and Ride options as it would utilise existing car parking space. There would also be likely to be few planning objections to such proposals.
- 10.73 The walk distance from this site to Shenfield Station of well over 15 minutes, means that it would only be viable if a park & ride bus service is provided. The costs of operating any shuttle bus services would fall to the Council and, as has previously been described, the location of the car park relative to the station and the expense of operating bus services are likely to mean that benefits for rail users will be low and it is expected that such a service would be difficult to operate without subsidy.
- 10.74 The only alternative option would be to divert an existing bus service to the site, such as the 81/82, however, this would add considerable journey time to this route, as well as being a relatively slow service to the station.

#### **Option 4e – Park and Ride Rayleigh Road Site**

- 10.75 As is the case for option 4D, the Rayleigh Road option would use existing car parking space and would face similar challenges with regard to rail user benefits and viability. It is also noted that most current demand for car parking at the station arises from areas to the north and west of Brentwood, with far less demand to the east – therefore customers using this car park would have to drive through Shenfield and Hutton to access the site. It is, therefore, considered that this option offers few benefits and is not likely to be worth further investigation.

#### **Option 5a - Alter existing drop-off facilities on the station forecourt**

- 10.76 Section 8 has previously discussed the benefits which could accrue from a review of the general arrangement of the highway in the vicinity of the station forecourt. It is considered that increasing the efficiency of the way in which traffic uses the existing forecourt would be expected to offer the most benefits to rail and road users; it is acknowledged that the existing taxi provision is heavily used and, therefore, it is not reasonable to take more space away from taxis in order to provide additional space for other drop-off activity. Equally, the non-taxi "lane" is used for a variety of purposes, including deliveries. It is therefore considered that the current arrangement of the forecourt itself should be maintained, unless a second facility can be created as part of a new second station access (see option 5b).

#### **Option 5b - Create new drop-off facility at rear of station**

- 10.77 The provision of a new drop-off facility within the Mount Avenue car park area would be predicated on the provision of a new station access. This would potentially require relocation of some of the Network Rail "portacabins"; access would preferably be made by way of an extension to the existing station underpass and creation of a "ticket holders only" gate. Some space within the car park could be lost to accommodate a turning and waiting facility; however, if this were to be combined with a decking option, the result would be that demand for access to the station would be split and significant pressure could be relieved on the existing forecourt.
- 10.78 It is noted that this would be a "high cost" option in relation to the other options discussed in this report and that the additional demand from Crossrail alone is not expected to result in a "step change" in passenger demand at the station. However, JMP's analysis suggests that wider growth in station patronage will have a more pronounced effect over time; it is also noted that Shenfield is classified in the 2009 DfT report "Better Rail Stations" as a Category B (National Interchange) station and is therefore given similar footing with stations such as Southampton Central, Reading and Clapham Junction in terms of its importance to the national rail network, with that importance expected to grow significantly further when Crossrail opens. It is therefore considered that the case for further improvements at Shenfield should not be dismissed, although it is recognised that finding ways to secure funding in the current financial climate is always challenging.
- 10.79 The benefits to all rail users (not just car park users) from this option would, therefore, be high, and with careful scheme design could deliver good value for money. It is recommended that dialogue with Crossrail is used where possible as a platform for exploring possible future funding bids and the potential for joint working.

#### **Option 5c - Create new drop-off facility along Hutton Road**

- 10.80 Any new drop-off facility on Hutton Road would potentially displace existing car parking or bus stop facilities, all of which are essential to the proper functioning of Hutton Road for retail and employment purposes. It is noted that informal use of these spaces frequently takes place, and it is recommended that this should continue except where activities have been shown to lead to knock-on negative effects. There may be some limited potential for creating a drop-off zone behind the end of the extended taxi rank; this would need to be assessed to ensure that sufficient space is retained for all other road users, including large vehicles.

#### **Option 6a - Increase frequency of bus services**

- 10.81 The bus stops outside of the station are currently served by the following regular services:
- Service 81 – EnsignBus - Serves Brentwood, Shenfield and Hutton via a clockwise loop. Services are half-hourly between 6am and 7pm, with a 20-minute frequency between 6.30am

and 9am. (It is noted that the 82 service will be discontinued on 18<sup>th</sup> January 2014 so is not considered here).

- Service 9A – First – Serves Shenfield Station and Knights Way via Hanging Hill Lane – weekday evenings only, 5 journeys between 5pm and 7pm
- Service 808 – BCT – Serves Brentwood, Community Hospital, Shenfield and Hutton. Weekdays hourly, 9am to 5pm
- Service AX1 – Stansted Bus – Stansted Airport to Canvey Island – Booked service, operates hourly but only when booked to call at a stop.

10.82 Other services which use the bus stops are school services or have irregular or infrequent timetables.

10.83 To be of most use to rail commuters, service frequency increases would need to be focused on the period between 6am and 9am, and 5pm to 8pm. It is noted that the main bus route serving the station offers a 20 minute frequency during the morning, but only a half hour frequency in the evening. Increasing the frequency of service in the evening peak could potentially make the service more attractive to passengers; however it is noted that the 81 route has previously struggled to operate commercially (having been previously dropped by First) and that it is unlikely that any additional subsidy would be available to increase frequencies.

#### **Option 6b - Extend hours of bus operation**

10.84 It is notable that there are no regular bus services serving the Shenfield Station stops after 7pm on weekdays. This potentially removes the bus option from consideration for a significant number of people, particularly as several train services from London arrive at or just after 7pm.

10.85 As with service frequency, it is acknowledged that funding for additional services is likely to be extremely limited. However, there may be some scope to explore the re-timing of the last services on Route 81 so as to provide a greater “window” for connection with key service arrivals at Shenfield from London; this would potentially have little or no cost to the bus operator, but may give existing and potential bus users greater confidence that they can make their evening connection at Shenfield.

#### **Option 6c - Introduce new bus routes**

10.86 Current bus route provision is concentrated around the Hutton area, with Shenfield being served only via Hutton Road, and bus services then running directly into Brentwood via the A1023. It is unlikely that there would be sufficient additional demand in Hutton to support a new route and much of Shenfield lies within a reasonable walking distance of the station, which would dilute demand for bus services here.

10.87 One area which currently has a high concentration of car drivers travelling to Shenfield Station is the Doddinghurst and Blackmore area. A “loop” service which travels around this area and then runs “fast” into Shenfield and back in the peaks could feasibly attract a market, although more research would be required to determine the actual likely market size. It is possible that one or more council-run bus services is currently bringing pupils from this area to Shenfield School, and if this is the case, it might be possible to investigate whether these buses could make one or more earlier “runs” to bring commuters to the station. The feasibility of providing a return service in the evenings would also need to be investigated.

#### **Option 7a - Increase cycle parking at station**

- 10.88 Current cycle parking facilities at and near Shenfield station are well used and are regularly maintained; there is a surfeit of cycle parking demand as evidenced by the number of cycles left chained to railings and other street fittings during weekdays. The provision of additional cycle parking space could be considered as part of several of the options previously presented and this may encourage new travellers to cycle to the station. It is noted however that it would not be expected for many current car users to switch to cycling, unless there were also to be a major “push” factor such as an increase in car parking charges.

#### **Option 7b - Enhance safety on cycle routes to station**

- 10.89 The road network around the station area is largely residential in nature and therefore suitable for use by cyclists. Hutton Road and Crossways are designated as on-road cycle routes, and there are segregated pedestrian and cycle paths alongside the A1023 between Crossways and the Mountnessing roundabout.
- 10.90 The A1023 into Brentwood town centre is a busy route and cyclists are therefore advised to follow the quieter routes through “old” Shenfield; additional marking and promotion of these routes may encourage more cyclists from the areas to the west of the station.

#### **Option 7c - Enhance public realm on walk routes to station**

- 10.91 The pedestrian paths on routes to and from the station are of varying quality. With the exception of Hutton Mount, most of the residential areas have footway provision and there are a number of cut-throughs for pedestrians and cyclists which reduce journey distances for non-motorised travellers. Signage on a lot of routes is very limited and there may be some benefit in providing simple, targeted signs where “short cuts” to the station exist so that walkers are not put off by perceived journey lengths.
- 10.92 A number of well used pavement routes connecting to Hutton Road have suffered damage over a number of sequential cold winters and pavement repairs appear to be infrequently undertaken in comparison to road potholes. A concise audit of key routes and repairs to any particularly serious or extensive damage would improve the pedestrian environment, not only for commuters but for the wider local populations.

## Summary

10.93 Table 10.1 below provides a summary of the appraisal outputs in terms of the potential benefits to rail users to be generated from each scheme and their deliverability.

**Table 10.1 Summary of Scheme Benefits and Deliverability**

Scheme Option	Rail User Benefits	Deliverability*
Option 1a Mount Avenue Extended	Medium	Low
Option 2a Mount Avenue Partial Deck	High	Medium
Option 2b Mount Avenue Full Deck	Very High	Medium
Option 2c Hunter Avenue NCP Full Deck	High	Very Low
Option 2d Hunter Avenue Council Full Deck	Medium	Very Low
Option 2e Friar Avenue Full Deck	Low	Low
Option 3a Alexander Lane P&S	Low	Medium
Option 4a Chelmsford Rd/Alexander Ln P&R	Low	Medium
Option 4b Mountnessing Roundabout P&R	Low	High
Option 4c Other Chelmsford Road P&R	Low	Medium
Option 4d Town Hall P&R	Low	Medium
Option 4e Rayleigh Road P&R	Low	Medium
Option 5a Enhance existing drop-off	Medium	Low
Option 5b Create new drop-off (station rear)	Very High	Medium
Option 5c Create new drop-off (Hutton Rd)	Low	Low
Option 6a Increased bus frequency	Medium	Medium
Option 6b Extended bus hours of operation	Medium	Medium
Option 6c New bus routes	Medium	Low
Option 7a Increased cycle parking	Medium	Medium
Option 7b Enhanced cycle safety	Medium	High
Option 7c Enhanced public realm	Medium	High

\* includes physical, operational and public acceptability but excludes cost

10.94 The results indicate that the partial and full decking of Mount Avenue NCP car park would offer the high benefits as well being reasonably deliverable. Similarly the creation of a new rear drop-off would offer undoubtedly strong benefits, albeit that it would be a high cost scheme and time-consuming to develop as an option; however, it represents a physically feasible option to improve the accessibility of the station for all users and to deliver benefits to the wider public realm around the station on Hutton Road.

10.95 Regarding deliverability, the Mountnessing Roundabout scheme is given a rating of “High” due to the fact that a park and ride “addition” to the current consented scheme would not be expected to give rise to any major planning issues, and the delivery (and risk) associated with such a scheme would sit with the site’s developer rather than the council. It should, however, be noted that at present the scheme developer is not promoting such a scheme via the Local Plan process and, as noted earlier in this report, JMP remains to be convinced that a fully commercial scheme would prove to be viable. As such any business case presented in future by the developer of the site should be reviewed carefully.

10.96 Enhancements to cycle routes and the public realm are also given a rating of “high” as it is envisaged that useful schemes could be devised to meet criteria for submission to ECC for partial or full funding, or could potentially become part of future discussions with Crossrail, Greater Anglia and TfL.





# Appendix A

## Rail User Survey Forms



## Spatial Distribution GIS Mapping

