

Rail Delivery Group

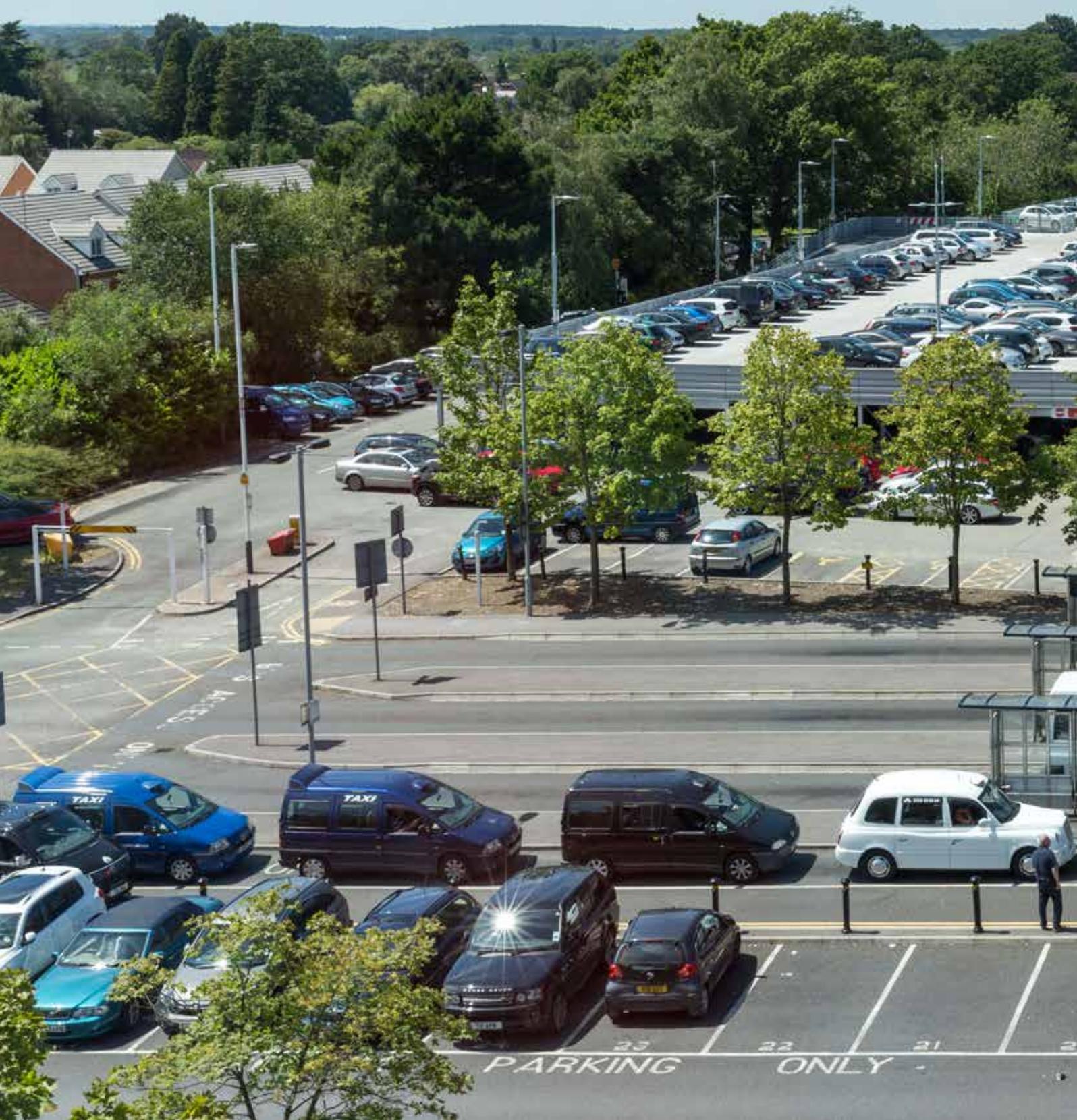


Station Car Parking Good Practice Guide

February 2018



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Foreword

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The rail industry continues to be a success story. Between 1997 and 2014, the number of planned services increased by 28%, up from 5.69 million to 7.27 million. During this time, passenger journeys per train company employee have increased 39%.

Approximately 8% of journeys to rail stations are made using a car which is then parked at the station, so it is vital to ensure that customers who access rail services via a station car park have a good quality experience.

That is why I am delighted to provide the foreword for this Station Car Parking Good Practice Guide. Train operators and Network Rail are delivering improvements across the network, and this guidance document will help ensure that infrastructure for car parking is high quality, leading to a greater number of people parking at stations and travelling by train.

Station car parks need to be attractive and available to rail customers for whom driving is the most suitable way of getting to the station.

Parking is included in a number of the Rail Delivery Group's Customer Touchpoints – important aspects of the customer journey – which show that car parking makes a substantial impression in the end to end journey by rail.

This update seeks to show best practice implementation and lessons that can be learned. It will provide train operators with the knowledge to embed quality car parking in their business objectives by explaining how to provide good quality car parking and how to maintain facilities to ensure that station car parks are attractive for rail passengers' onward journeys.



1 Introduction

1.1 Background

The rail network is an essential part of our economic and social fabric. It delivers 2.5 million people a day to and from Britain's towns, cities and villages, and over the next 30 years this figure is expected to double¹. Around 8% of rail customers park at or near the station, and another 8% are dropped off².

To meet these demands, and to ensure the rail network plays a full and positive part in a sustainable and integrated transport system, station car parks need to be attractive and available to rail customers who drive to the station. For these customers – and potential customers – station car parks are their first and last impression of the railway. And their expectations are rising all the time.

Even now, many station car parks are filled each day. As well as providing alternatives to driving, expanding availability of parking will in many locations be essential to meet the growing demands from customers. In every case, station car parks are a valuable land resource, particularly in busy towns and crowded cities, and needs to be used to best advantage.

Above all, station car parks should respond to the needs of all station and rail users, adding value to the customer journey and helping to make rail the mode of choice.

1.2 Purpose

This guide is not a standard and its advice is not mandatory, but it shows what good practice looks like. It is also a reference for those delivering enhancements and expansions to station car parks – describing key principles, what works, and what to avoid.

It is not a design guide or a parking management handbook, although it does include some key design

and management principles as an introduction to the greater detail available in other sources. It focuses on good practice at station car parks specifically, and on experience gained in the rail environment. It also highlights areas of design or management guidance that are sometimes overlooked or misinterpreted.

The guide is aimed primarily at station owners and operators, as well as organisations bidding for rail franchises. The intended audience also includes passenger transport executives (PTEs), local authorities and those involved in community rail projects.

1.3 How this guide is set out

The following chapter sets out the context for this guide, including the importance of station car parking and evidence on customers' views.

Further chapters place station car parks within an integrated transport system, and highlight some parking standards and guidance within the rail industry and beyond.

Subsequent chapters cover pricing and payment issues, some specific aspects of meeting drivers' needs, as well as accessibility, and a range of other factors that form part of the customer experience. The final chapter covers management, maintenance and monitoring.

Appendices cover:

- A** Useful sources of information, with web links
- B** Technical advice on lighting
- C** Potential partners for car park enhancements
- D** Autonomous vehicles and the future
- E** An example specification for decked or at-grade parking projects, which can also be used as a checklist of further factors to consider
- F** A glossary of abbreviations.

¹ Britain's Future, Britain's Railway (Rail Delivery Group, 2015)

² 2015 figures, supplied by Transport Focus

2 Context



2.1 Why station car parking is important

Station car parks are part of customers' end-to-end journey experience. They are the first and last contact with the railway – not just for car users but for many others. Often the station car park is also the station access for cyclists, pedestrians, and other customers and visitors.

- A station car park should reflect the quality of the station it is part of, and the train services it connects with.

It is important to prioritise and encourage use of sustainable modes to reach stations, but the railway still needs to cater for customers who use the car – especially if this avoids a longer car trip.

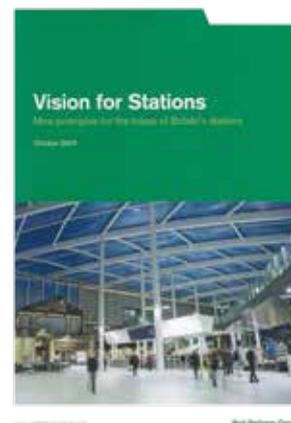
2.2 Lessons from other sectors

Shopping centres and airports often do parking very well, focusing on customers and their needs. The best of these operators combines good quality facilities with a visible staff presence providing the human touch. Their car parks tend to reflect the quality and values of the centre or airport they serve, and can offer a suite of facilities including online pre-booking, valet parking, long-stay or short-stay options, high levels of security

and ancillary services such as car washes. While not all of these will be appropriate at every station, they indicate the level of facilities and options that customers may increasingly expect in a high-quality environment. Relevant best practice from these sectors is covered in this guide.

These sectors are also exploiting technology that allows parking to become one component in an integrated and personalised trip. Prestigious shopping centres' car parks offer 'rewards' apps with account-based billing, plus offers and information based on location and activity while customers are in the centre. There's also the potential for parking fees to be reduced by incentives and purchases.

For the rail industry, the same technology is an opportunity to know and engage with customers end-to-end, rather than having anonymous and separate rail ticket and parking transactions.



2.3 Our customers and our stations

Vision for stations

As the Rail Delivery Group's (RDG's) Vision for Stations sets out, Britain's railway stations are an important element of the nation's infrastructure and transport system. The Vision aims for a station estate that optimises each station both in its local context and as part of that national transport network.

The Vision sets out nine principles for the future of Britain's stations. While station car parks are most closely associated with supporting the principle of a 'seamless journey experience', all of the principles are relevant to how station car parking is planned, designed and managed. They are listed below and are reflected throughout the guide.

The principles underpinning the Vision for Stations	
P1: Customer focused	There has been significant investment in stations but our Vision aims to build on this
P2: Intelligent use of technology	The latest information and ticketing technologies are used to support and enhance the experience at stations
P3: Seamless journey experience	Ensure stations are fully integrated with rail services and onward travel modes (including walk, cycle, bus, car, tube, transit, metro, air, ferry or ship)
P4: Reflect local needs and opportunities	Tailor stations to reflect local needs and characteristics while still being part of a recognisable national network
P5: Safe and secure environment	Ensure all stations and their localities are places where users can feel safe and secure
P6: Entrepreneurial spirit	View stations as potential catalysts for innovation and entrepreneurship, thereby enhancing the railway and local economies
P7: Flexible and long-term stewardship	Plan and operate stations for the long term, with built-in flexibility to adapt to change
P8: Shared industry know-how	Share knowledge and experience of what works best at stations in meeting passengers' diverse needs in the most efficient and effective manner
P9: Optimised network	Realise the full value of every station while minimising inefficiencies, through investment and operation based on objective and informed decision making.



Who are the customers for station car parks?

The design and operation of station car parks, as with any other aspect of a station, must reflect the differing needs and aspirations of the station's varied stakeholders and user groups. As a minimum requirement, all users

should expect a clean, efficient, accessible, reliable and safe facility, but over and above this, individual customer groups may have particular expectations and needs. Some typical needs are outlined below.

Customer priorities

Commuters

...gain familiarity with a station through daily use. Their main objective is to minimise journey time. They will often arrive with little time to spare before their train departs. They require:

- Efficient transfer
- Direct access to and from station thresholds, including access to car parking and taxi pick-up and drop-off points
- Time-efficient payment methods such as monthly permits

They may additionally value:

- Ancillary services during the daytime, such as car servicing or washing
- Ancillary facilities such as mail-order parcel lockers or grocery collection on their journey home
- Reserved parking spaces

Business travellers

...are frequent travellers, used to first-class facilities and high levels of comfort. While their periods of time spent on stations will vary, again they are keen to minimise transfer time between station threshold and car. They require:

- Efficient transfer
- Direct access to and from station thresholds, including access to car parking and taxi pick-up and drop-off points

They may additionally value:

- Premium parking or valet-parking
- Ancillary services during the daytime, such as car servicing or washing
- Pre-booking of parking spaces

Leisure users and tourists

...are typically less time-constrained and less familiar with stations than commuters and business travellers. A range of factors such as language constraints, luggage and cultural differences may drive their needs. They require:

- A welcoming, safe environment that promotes understanding and reassurance
- Accessible route provision and ease of navigation through legible design, wayfinding and clear, consistent information

They may additionally value:

- Convenient on-the-day payment methods, such as phone or mobile apps
- Pre-booking of parking spaces for special trips or simply added reassurance

Station visitors

...use the station for non-travelling purposes. This group includes people meeting and greeting family and friends, or using the station to shop or to eat. The diversity of station functions and amenities meets their needs. They require:

- Short-stay parking and car drop-off facilities

They may additionally value:

- Ancillary facilities such as parcel lockers or grocery collection

Customer priorities

Station staff, tenants and other railway operational staff

...require reliable 24-hour access, including:

- Appropriate parking facilities, which may need to be in secure areas
- Efficient servicing access (e.g. for refuse collection and catering supplies), separate from customer parking and drop-off locations.

They may also require:

- Lineside access points
- Rail replacement bus access.

This table is partly based (with thanks) on Network Rail's Guide to Station Planning and Design, with additional material to reflect specific car parking matters

Station typology

Stations also have their own characteristics, based especially on their location and their balance between user types. Typical characteristics are shown below. Even within one of these types, each station and its car park(s) will differ in shape, size and detail. Good car park planning, design and management will take account of all these individual factors. 'Horses for courses' is a key theme running through the good practice described in this guide.

Station types

City centre and town centre

Key car park users: business travellers, leisure users, station visitors, and staff

Key characteristics:

- While the scale of car use at large city centre stations is limited due to congestion and the alternatives available, for many customers it is still most convenient to drive to the station
- Heavy usage by station visitors (e.g. pick-up/drop-off) and taxis
- High-value parking locations
- Relationship with other nearby parking facilities such as shoppers' car parks
- Potential opportunities or pressure to intensify use of the car park estate – e.g. by building over parking, or consolidating parking into structures, to release land for commercial or residential development

Suburban

Key car park users: commuters, leisure users, station visitors, and staff

Key characteristics:

- Heavy commuter pressure on parking
- Relationship with nearby on-street parking opportunities and controls
- Edge-of-city stations may be used as railheads for hinterlands, especially at the boundary of Integrated Transport Authority areas, and this can create additional parking pressure
- Potential opportunities or pressure to intensify use of the car park estate – e.g. by building over parking, or consolidating parking into structures, to release land for residential development.

Station types
Rural
Key car park users: commuters, leisure users, station visitors, and occasional staff Key characteristics: <ul style="list-style-type: none"> • Usually small car parks • In holiday areas, these may be small park-and-ride stations with seasonal demand
Parkway
Key car park users: all Key characteristics: <ul style="list-style-type: none"> • Wide catchment area • Heavy demand for parking • Easy access from strategic road network is key • Often requires structured parking to keep up with demand • Often used for long or 'prestige' business or leisure trips.

2.4 How are we doing?

The National Rail Passenger Survey (NRPS) shows satisfaction with car parking is lower than with most other aspects of station facilities³. However, this is not among the top factors driving overall satisfaction or dissatisfaction at network-wide level.

RDG has carried out more in-depth research into the end-to-end customer experience, based on around 100 'touchpoints' in the customer's journey, to understand customers' priorities for improvement. Of the areas where the rail industry has most room to improve, "I can book a parking space in advance" appears in seventh place. In terms of importance to customers, however, the most important parking-related factors are "There is somewhere to leave my bike" (a topic covered separately in the Cycle-Rail Toolkit 2) and "My car/bike feels safe and secure".

Research in 2010 by Passenger Focus (now Transport Focus) looked in depth at a sample of station car parks including city centre, town and commuter-belt stations.

The research (see Appendix A) included passenger surveys and occupancy counts. It highlighted four key issues:

- A call for lower parking prices
- The need for a comprehensive investment programme to increase parking capacity – not only at the stations already at or near capacity but also those where a small increase in current demand would cause problems
- A need for better payment arrangements
- Further efforts to reassure passengers about personal security after dark.

The overall picture, therefore, is that while car parking may not always be the top issue for customers, it is still important and there are opportunities to raise standards further. This guidance aims to help the process.

³ In the NRPS Autumn 2016 report (the most recent at the time of writing), of the 15 questions related to individual aspects of station facilities, car parking had the second-lowest percentage of 'satisfied or good' responses, at just 50%, and the highest percentage of 'dissatisfied or poor' responses at 32%. <https://www.transportfocus.org.uk/research-publications/publications/national-rail-passenger-survey-nrps-autumn-2016-main-report>

2.5 Five-star provision

The following grading system could be adopted to denote the broad level of car parking facilities available at each station. Like the corresponding system for cycle parking outlined in the *Cycle-Rail Toolkit 2*, it reflects a common understanding that ‘five-star’ provision represents the best available. The grading system is a broad guide and the exact facilities can vary between stations within a grade.

A car park’s grade could be advertised alongside its total number of spaces (such as ‘4 stars, 150 spaces’), because users tend to assume larger car parks will have good availability of spaces.

Uncategorised	Unsurfaced car park with basic lighting
	Surfaced, marked-out car park with good lighting and a help point. If charged, payment might be by cash only. Security provision may be through informal surveillance or other means.
	ParkMark accredited (or equivalent standard) car park with good lighting and a help point. If charged, payment by cash, card and phone or mobile app.
	ParkMark accredited (or equivalent standard) car park with help point, plus security staff on site at key times of day. Offers premium or reserved spaces. Payment by all methods listed above, and pre-booking is available.
	As above, with security staff available at all times the car park is open, and with at least one added-value service (such as valet parking, car servicing or mail-order parcel collection).
	As above, with at least three added-value services.



3 | Integration



3.1 Station travel plans

Car parking should be seen within the context of a station travel plan (STP). This is a management tool for improving access to and from a station and mitigating local transport and parking problems, supporting sustainable growth in rail patronage and the strategic objectives of the rail industry. The STP is jointly agreed and delivered by the rail industry, local authorities, other stakeholders and the local community working in partnership.

Although STPs are aimed at improving more sustainable transport solutions, it is recognised that driving to a nearby station can avoid the need for the whole journey, or at least a trip to a more distant station, to be made by car. Therefore, appropriate management of car parking, and pick-up and drop-off, are a legitimate part of an STP, as is consideration of parking management in streets around stations.

RDG and the Rail Safety and Standards Board (RSSB) have jointly produced guidance on implementing STPs (see Appendix A).

3.2 Other car park users

Many station car parks are primarily focused on customer car parking, with other modes such as cycling, walking and taxi access provided with separate facilities. Other station car parks provide the access route and/or facilities for these modes.

This guide is focused on customer car parking. However, it is important to recognise that car parks may involve all modes of travel and additional specialist uses. They should be planned, designed and managed accordingly. At any individual station, the uses to be considered may include:

- ✓ Customers parking their cars and walking to the station
- ✓ Customer drop-off and pick-up
- ✓ Pedestrian access to the station
- ✓ Cycle and motorcycle access and parking
- ✓ Non-rail users, including those parking cars, and pedestrians or vehicular users cutting through the car park to another location
- ✓ Taxi pick-up and drop-off

- ✓ Bus stops and stands (a stand is where a bus may wait between duties)
- ✓ Rail replacement bus stops or stands, perhaps including a bus marshalling area
- ✓ Station servicing (such as deliveries to retail units, and refuse collection)
- ✓ Emergency access to the car park, other station facilities or lineside
- ✓ Lineside maintenance access points, potentially involving large plant such as road-rail vehicles
- ✓ Ancillary, added-value and community uses (see section 8.7)
- ✓ Car club spaces (see section 8.8)
- ✓ Rental car pick-up/return or storage.



Blaenau Ffestiniog is typical of many smaller stations where pedestrian, cycle, bus, taxi and pick-up/drop-off access can all take place through the car park.

Photo: Graham James

The interaction of these modes and users is an important factor in station car park planning and design. Cycle and motorcycle access are considered in depth in separate guides (see Appendix A). Other key issues include:

- ✓ Providing safe routes for pedestrians and cyclists at locations where the car park represents their access to the station
- ✓ Providing safe routes for pedestrians travelling to and from their parked cars
- ✓ Providing sufficient space for pick-up and drop-off so that it does not obstruct traffic flow.



Cambridge station car park serves a wide variety of users: car parking, pedestrian access, cycle access, overflow queuing space for taxis, and (on some weekends) marshalling of rail replacement buses. The car park also serves users of the retail facilities in the new station square.

Photo: Graham James



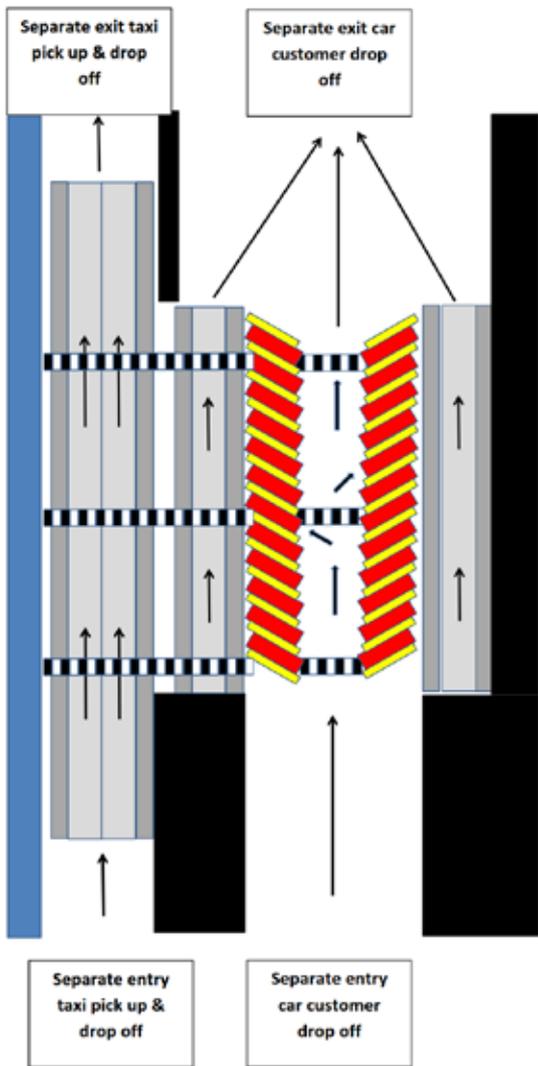
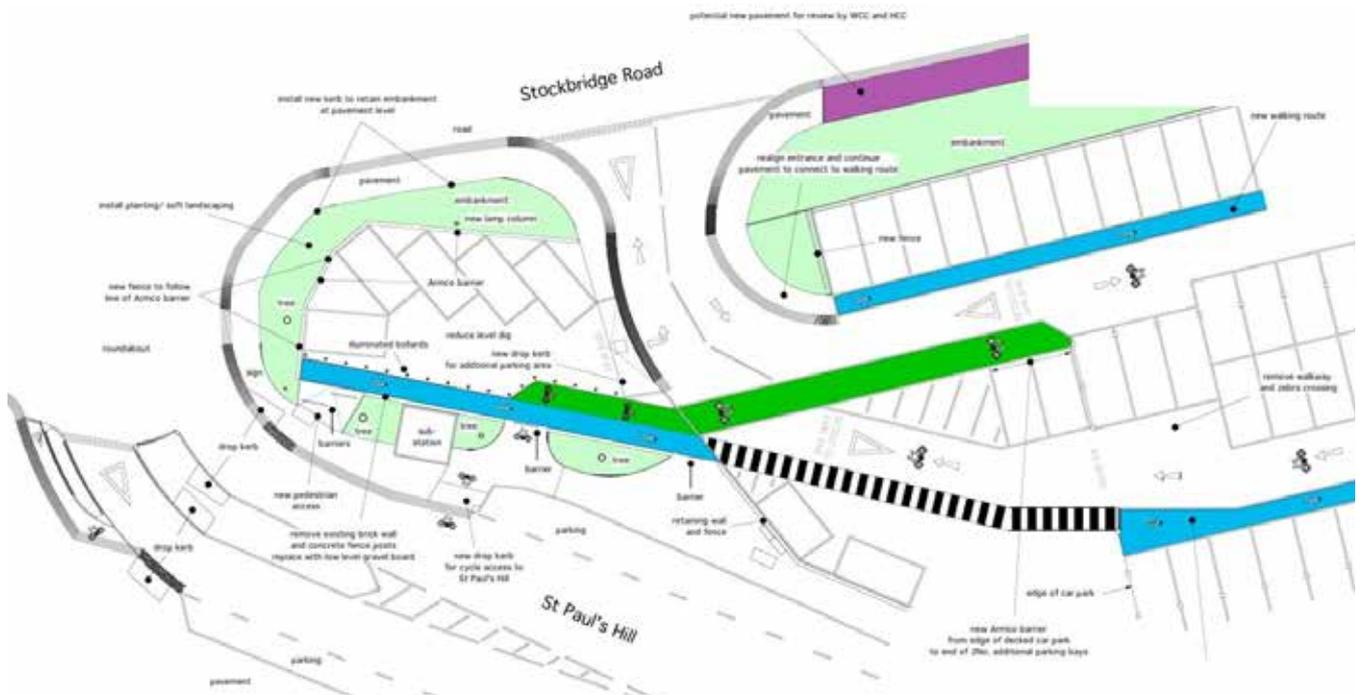
High-quality materials at Cambridge station's new taxi rank and pick-up/drop-off area, seen in the final stages of construction.

Photo: Graham James



Bournemouth station shows separation of taxis from customer pick-up/drop-off. Here the layout uses conventional kerbside parking and a single line of taxis.

Photo: South West Trains



Example of providing upgraded pedestrian and cycle routes through a station car park, for access from adjoining streets to the station – in this case, Winchester.

Drawing: South West Trains

Example layout for avoiding conflicts between taxis and customers' vehicles at pick-up/drop-off zones in the largest stations. This layout was drawn up for potential use at Cardiff Central but illustrates principles that could be used at any large station where sufficient space is available.

Taxis would pick up and drop off conventionally in two lanes on the left of the diagram, entering at the bottom and leaving at the top. Customers would pick up and drop off on the right of the diagram, again entering at the bottom and leaving at the top. The customer parking spaces (shown in red) are in a drive-through herringbone formation, which is currently little-used at stations but is seen at large airports overseas. This diagram shows two rows of spaces, each with its own exit lane (shown in grey).

Diagram: Network Rail

3.3 Access to the station

In some cases, the access road to the station car park is railway-owned. Beyond the railway boundary, local highway authorities (LHAs) are responsible for routes to and from the station.

- ✓ Consider, in partnership with the LHA, signing from nearby streets to the station, and from the station outwards to nearby destinations. Depending on the station's individual access arrangements, specific signs might be needed for pedestrians, cyclists and motor vehicles if they use different routes or station entrances. See also section 8.2.

Working in partnership with the LHA and the local transport authority (which might be a separate body such as a Passenger Transport Executive) can open up new funding opportunities for improvements on routes to the station as well as improvements to parking facilities at the station itself. These opportunities

include devolved capital funds, as well as development-generated funding through the Community Infrastructure Levy (CIL) and Section 106 agreements.

- ✓ Engaging with the Local Transport Plan (LTP) and CIL development processes could ensure that station access needs and opportunities are taken into account.

Station operators will also need to work with the LHA to understand and mitigate the traffic impacts of new and expanded car parks. New junctions to the public highway may also be required. Exit lanes ('stems') from the car park should provide sufficient reservoir space for vehicles queuing to join the highway without obstructing car park circulation. Entry stems should accommodate a reservoir of vehicles queuing at any barriers, without obstructing the highway.





Norwich station forecourt, which includes the station car park, provides a wide and attractive pedestrian route on the direct desire line most preferable route to the town centre from the landmark Grade II listed terminus.

Photo: Graham James



Signing from nearby streets, and to nearby destinations, will assist customers, particularly first-time visitors.

Photo: WSP/Graham James



The newly-reconfigured Cambridge station car park includes an improved pedestrian/cycle cut-through from an adjoining street which forms the main cycle route to the town centre. Wheel-stops on the adjacent spaces prevent encroachment.

Photo: Graham James



The unusual situation at Sheringham, while itself not widely applicable, illustrates the potential for bespoke solutions to meet each station's needs. The small station car park was built over the alignment of the line's former continuation along what is now a heritage railway, the North Norfolk Railway (NNR). A connection between the Network Rail line and NNR was reinstated in 2008 for use on a limited number of days each year. The car park has been retained but becomes unavailable on those limited days.

Photo: Graham James



4 | Other standards and guidance

This guide does not seek to duplicate or reproduce existing standards and guidance. These should of course be followed where relevant. However, some key resources are mentioned below and a summary of these is provided in Appendix A.

4.1 Rail standards and guidance

Network Rail's *Guide to Station Planning and Design* provides a design framework to help balance the varied objectives of all parties involved in the design and operation of stations. It also identifies ways for stations to successfully integrate into their local context and community; ensures sizing, cost and commercial opportunities are considered; and seeks to raise awareness of good practice in station design.

The Design of Car Parks for Railway Stations and Depots (NR/L3/CIV/160) is Network Rail's Level 3 direction and guidance on this topic. It provides comprehensive design advice as well as guidance on planning and consents. It applies to surface, demountable/modular and multi-storey parking, and changes to existing car parks.

The Design Standards for Accessible Railway Stations Code of Practice sets out mandatory or recommended standards, including the layout, numbers and locations of accessible parking spaces and the accessible routes between parking and station buildings. In the rail industry, this can be regarded as definitive and covering the same ground as *Approved Document M* of the building regulations, BS 8300 *Design of Buildings and their Approaches to Meet the Needs of Disabled People*, and other guidance such as *Inclusive Mobility*.

The guidance note, *Winter Arrangements for Stations* (ATOC / GN 027), produced by the former Association of Train Operating Companies (ATOC), includes winter maintenance for car parks.

The RDG's *Cycle-Rail Toolkit 2 and Motorcycle Parking at Rail Stations Guide* provide comprehensive guidance on provision for these two modes, which use the car park at many stations.

4.2 General parking standards and guidance

The British Parking Association produces *Parking Practice Notes* (being renamed *Parking Know-How* guides) on specific parking topics, such as the relative merits of 'pay and display' and 'pay on foot' in different situations. It also produces the *Assessment Guidelines* for the ParkMark scheme (section 8.9), which is a key resource for security good practice.

The Department of Health has produced a guidance note for hospital parking, which has many parallels with station parking and can be another useful reference for good practice. The note is *Health Technical Memorandum 07-03: NHS Car-Parking Management: Environment and Sustainability*.

The *Car Park Designers' Handbook* is a standard design guide for both at-grade and structured parking.

For structured parking, *Design Recommendations for Multi-Storey and Underground Car Parks*, produced by the Institution of Structural Engineers, is another standard guide.

The *DPA Handbook* represents good practice in accessible parking design and management, and is a useful supplement to *Design Standards for Accessible Railway Stations*. It lists the award criteria for Disabled Parking Accreditation (see section 7.4).

Transport for London's Taxi Ranks at Major Interchanges: Best Practice Guidelines does exactly what the title suggests. It can be adapted to locations outside London, by taking account of the different vehicle mix outside London and other traditionally 'black cab' cities.

5 Pricing and payment



5.1 Why have charges?

The rail industry is conscious of the need for rail travel to be affordable to all. But in appropriate situations, charging for station car parking provides a range of benefits for passengers and taxpayers. It can also encourage a more multimodal profile of access to rail.

- Car parks cost money to build, operate and maintain. The land used for parking also has a value and could be put to other uses. It is usually most appropriate for these costs to be covered by car park users, rather than being passed on through fares to all passengers (including those who do not use the car park and may already be paying, for example, a bus fare to reach the station) or ultimately, through subsidy, to taxpayers
- This is particularly true where car parks need to be expanded to meet growing demand. Each new decked space can cost £8,000 to £15,000 to build, or more on complicated sites
- At busy car parks that would overflow if they were uncharged, and where no more practical options exist to expand the car park, charging allows capacity and usage to be kept in balance so that

drivers can be sure of getting a space rather than arriving to find the car park full and having to turn away. This in turn benefits:

- Customers as a whole – because it avoids rationing by ‘first come first served’. Rather demand is managed based on relative need and availability of other options.
- Off-peak travellers, by ensuring that some spaces remain available for them after the morning peak. This in turn also helps operators, because encouraging off-peak rail travel is an important way of getting the best use out of the network.

This does not necessarily involve ‘pricing-off’ users. Differential charges can be used to encourage passengers to more lightly used car parks and to less-crowded lines. Charges can also inspire car-sharing. Similarly, charging can be used to ‘nudge’ those customers who could reach the station by alternative modes of travel, freeing up spaces for those who do

not have realistic alternatives. Ultimately, this is about making best use of the land and attracting the most people onto the railway.

Station car park charging structures and levels generally have more flexibility than fares. This provides an opportunity for operators to take a holistic and inventive approach to this aspect of the passenger experience. Section 8 sets out some ways to do this.

5.2 Whether to charge at a particular station

Stations generally have differing customer markets and differing local contexts, even along a single line of route. The decision to charge for parking, and the level of charges, needs to reflect these contexts. Factors to consider include:

- The basic parking management principle of setting the price so that the car park is well used but not full. Setting this price is not a one-off action and can be done by trial and error
- Charging levels at nearby car parks indicate the value of parking in the local context.
- Charges below the local market rate may encourage use by non-rail customers such as shoppers, which in turn may reduce the availability of spaces for rail customers
- What destinations and attractions are nearby? Is there a risk of rail users being crowded out by others?
- A charged car park surrounded by free on-street parking may struggle to attract customers and may lead to overspill issues. Residents dislike commuters parking on their streets, but may not always accept a controlled parking zone to prevent this
- How will customers respond to the charges? Switching between stations may be acceptable – and even desirable to encourage switching to less crowded routes. However, users should not be priced off rail travel altogether. There can be particular issues at the edges of Integrated Transport Authority areas with users driving to free car parks in the ITA area
- Charging can be a particular influence on customers who live close to the station and have other modes of transport available to reach the station; for these people, the decision to travel by car rather than any other mode is a marginal one. This helps to promote alternative modes of access, as well as freeing up spaces for later arrivals.

Factors pointing towards free parking	Factors pointing towards charges
<ul style="list-style-type: none"> ✓ Users are predominantly making short rail journeys with low fares – where parking charges would be significant in comparison ✓ Small rural stations where the cost of equipment and cash collection would outweigh the revenue ✓ Limited-quality car park ✓ Strong local transport planning goal of modal shift to rail ✓ Nearby streets with free parking and little or no controls ✓ Desire to encourage rail users to this station in preference to others. 	<ul style="list-style-type: none"> ✓ Users are predominantly making long-distance rail journeys, especially business trips, where parking charges would be a small proportion of the overall cost ✓ Busy car parks where there is a need to manage demand to ensure rail users can always find a space ✓ High-quality car park ✓ A need to fund car park improvements, expansion or other station enhancements ✓ Local parking pressure – risk of rail users being crowded out by non-rail users ✓ Nearby alternatives are also charged (e.g. town centre stations) ✓ Nearby streets have controlled parking (or controls can be introduced) ✓ An overall need to generate revenue.

Introducing charges where parking is currently free can be a challenge in terms of customers' and local stakeholders' responses. Often the key is to relate charges to the quality of the car park, and particularly improvements being made. Motorists are generally prepared to pay for parking provided they can see value for their money.

Consider the following criteria as the normal requirements for a charged car park:

- ✓ Good quality surface
- ✓ Marking-out of spaces and circulation
- ✓ Bright and clean
- ✓ ParkMark accredited.

One option is to consider introducing a minimal charge (perhaps refunded to rail users) where parking is currently free. This could help to discourage non-rail users while contributing to the maintenance cost.

At some locations, such as small rural stations, charging will not be appropriate due to the nature of the passenger market, or because the level of demand does not justify the cost of equipment and cash collection. However, operators should still consider a level of enforcement attention, to discourage inconsiderate parking and abuse of Blue Badge spaces (as described in section 5.4).

CASE STUDY – HARROGATE

Harrogate station previously had free parking while an adjoining multi-storey car park was charged. To stay in line with this local context, parking charges (with discounts for rail users) were introduced at the station. There has been little loss of demand, which confirms that the charging is appropriate for the context.

5.3 Pricing structure

As with the decision on whether to charge, the pricing structure should reflect each station's needs and customer base.

- ✓ Consider a reduced rate after the morning peak and/or at weekends. This is consistent with the generally cheaper pricing of rail journeys at these off-peak times, and helps the parking product to support the fare strategy. However, differential pricing within the working week (e.g. with higher prices Tuesday-Thursday than on Monday and Friday, when demand tends to be lower) may be less popular, and more confusing for customers.
- ✓ Structuring charges might encourage non-rail users at times of low rail-user demand and hence maximise use of the rail asset. For example, a reduced evening rate could be offered in car parks that can also serve shops or evening leisure attractions. At this time of day there is generally no need to discourage non-rail users and indeed the extra footfall is to be encouraged
- ✓ Think about additional products to help maximise yield from particular markets. These might include, for example, a multi-day rate for customers making overnight or longer trips, or a three-day-a-week rate for part-time commuters
- ✓ At busy car parks, consider offering free or discounted parking for rail users, to support them while discouraging non-rail users from occupying spaces needed for rail users. Depending on the payment arrangements, this could be done through paying for parking at the ticket office, receiving a discount there (see case study below) or, for payment by phone, displaying a discount code within the station
- ✓ Consider a discounted season ticket rate for environmentally-friendly vehicles (these can be defined in terms of vehicle tax rate bands)
- ✓ With payment machines that use cash, tariffs that are whole pounds rather than pounds-and-pence amounts can reduce the demands on cash collection and provision of floats.

CASE STUDY – RAIL USER DISCOUNT AT SUTTON COLDFIELD

Transport for West Midlands (TfWM) operates most station car parks in its area, and has a general policy of not charging for parking. The exceptions are mainly where station car parks are in town centres and non-rail-users would be likely to exploit free parking. Sutton Coldfield is one example of this.

There is a low flat-rate charge (at the time of writing, £1.30 each day; no charge for users of Blue Badge spaces). Charges are collected by a warden from a cabin at the car park entrance. Season ticket holders can park free of charge by showing their rail season ticket. Other rail customers are entitled to a 70p discount on their rail fare, which in effect gives them better than half-price parking. The parking ticket includes a tear-off slip which customers present at the ticket office to receive this discount.

5.4 Blue Badge holders

The rules on accessible parking (section 7) apply irrespective of whether parking is charged or not. In a charged car park, there is no legal requirement to provide free parking to Blue Badge holders. Some operators do this, and others charge. However, in line with the legal duty to provide reasonable adjustments, operators should consider allowing Blue Badge holders additional time for a given parking charge. Where there is a single ‘pay for the day’ tariff, this is not an issue. One operator, for example, allows Blue Badge holders to use charged 20-minute spaces without charge, but requires them to pay the normal daily tariff for long-stay parking.

5.5 Payment

‘Pay and display’ and ‘pay on foot’ remain the two basic options for payment systems. However, the advent of phone payment and mobile app technology, and the

availability of Automatic Number Plate Recognition (ANPR), has blurred the boundary and made the issue more than simply a choice between two basic options.

Factors pointing towards ‘pay and display’	Factors pointing towards ‘pay on foot’
<ul style="list-style-type: none"> ✓ Small car park (e.g. less than 100 spaces) – ‘pay and display’ is cheap to install and operate, and does not require space-consuming entry and exit lanes ✓ Lightly-used car park – ‘pay and display’ is cheap to install and operate ✓ Simple tariff with small steps (e.g. flat rate for the entire day) – minimises the issue of needing to pre-determine length of stay ✓ Mainly commuters – season permits are easily displayed; entry and exit barriers can be an irritation to permit-holders and can delay egress for waves of users in PM peak* ✓ Limited entry and exit lane capacity available – ‘pay and display’ avoids capacity being reduced by the need to take a ticket at entry and insert it on exit* ✓ Unstaffed locations – ‘pay and display’ has no barriers to lock people into the car park if there is a system failure*. 	<ul style="list-style-type: none"> ✓ Busy car parks – volume makes it easier to justify the more expensive ‘pay on foot’ system, which also generates fewer pedestrian movements in the car park ✓ Many trips are of uncertain duration (e.g. business travellers) – ‘pay on foot’ avoids the need to pre-determine duration of stay. However, phone and mobile app technology is overcoming this limitation of ‘pay and display’ ✓ Complex tariffs – for similar reasons ✓ Large car parks – ‘pay on foot’ requires fewer machines.
	*ANPR-based ‘pay on foot’ can get around these issues

Adapted and updated from material originally set out in the British Parking Association’s

Parking Practice Note 3: Pay on Foot or Pay & Display – a Comparison, by kind permission of the BPA.

Pay and display

This method is simple, tried and tested, and understood by customers. It is relatively easy to enforce and is the default choice. The machines acquire cash, which presents a theft risk, incurs collection costs and requires measures to prevent leakage. For users, the major drawbacks are the need to have appropriate change and to pre-determine the length of stay. However, pay-by-phone and mobile app options overcome both of these drawbacks, and many machines now accept card payments.

Pay by phone

'Pay by phone' is essentially modern technology applied to the 'pay and display' model. Users are billed against a credit or debit card account. A third-party operator provides the service for a limited fee, which may be absorbed by the car park operator or passed on to users. Users supply their car details, which are passed to the enforcement team. The user saves time as there is no need to queue at a payment machine. Text messages remind users when their paid stay is due to end, and give them the chance to buy extensions; this gets around the problem of uncertain duration-of-stay, and is particularly helpful for when customers (or trains) are running late.

Pay on foot

'Pay on foot' involves an entry ticket being validated for use as the exit ticket once the stay is paid for at a central pay-station. The major advantage for users, and why it is popular in shopping centre car parks, is that there is no need to pre-determine length of stay. 'Pay on foot' has traditionally been barrier-controlled, with tickets issued on entry and inserted on exit. However, ANPR now allows either barrier-controlled or barrier-free operation; the latter opens up 'pay on foot' to pay-by-phone and mobile app options.

Payment by mobile app

Payment by mobile app is essentially modern technology applied to the 'pay on foot' model. Users enter a parking location code into the app when they arrive, and press a 'stop' button when they leave. Users register their vehicle and payment details with the third-party provider and are billed monthly.

Continuing need for a cash option

Payment by phone or mobile app is very popular with customers, in part because it removes the need to handle small cash values, and should normally be provided at 'pay and display' locations in addition to a cash payment option. While some on-street parking has switched to card-only plus a phone option, rail customers are not yet ready to do without the cash option. It remains the most convenient one for some, particularly those without mobile phones, and attempts to withdraw the cash option have been unpopular.

For the car park operator, phone and card payments help to reduce the amount of cash in the system and its collection costs. However, as long as a cash option is still required the tariffs must remain bounded by coin denominations.

- ✓ Both cash and non-cash payment options should normally be provided.

5.6 Revenue protection

The three basic methods of revenue protection are:

- Visits by enforcement officers. This is the only practical way to enforce 'pay and display' (unless linked to ANPR), and to prevent abuse of Blue Badge spaces (see section 5.4)
- Barriers. This is the traditional way of enforcing 'pay on foot'. The system uses magnetically-coded paper tickets, RFID-encoded plastic tokens known as 'chipcoins', or barcodes
- Automatic Number Plate Recognition (ANPR), as described below.

Automatic Number Plate Recognition

ANPR is gradually spreading within and outside the rail industry. There is currently limited guidance and operators should take advantage of the maturing practical experience at stations.

ANPR can operate with or without barrier control. ANPR-based enforcement allows phone and mobile app payments to be used in a pay-on-foot system. In some situations, barriers can still be helpful, even without a ticketing function, in managing the rate of entry/exit and in controlling vehicle speeds. ANPR can also be used with barriers to restrict access to pre-booked vehicles.

The advantages of ANPR include:

- Allowing web and mobile payments in car parks where some form of access control is still required (these payment methods are normally incompatible with barrier control alone). This also applies to pre-booking as part of the rail ticket transaction
- Enabling customers to pay in advance or afterwards (up to a predetermined time such as midnight)
- A more seamless customer journey compared to barrier control
- Where there is no existing barrier control, ANPR can estimate space availability, allowing this data to be passed to customers before they arrive – particularly useful if a station has multiple car parks
- Allowing a more controlled monitoring and enforcement system
- Enabling price differentials between vehicle types, such as reduced charges for low-emission vehicles (based on linking the number plate to Driver and Vehicle Licensing Agency (DVLA) records).
- Facilitating whitelisting of vehicles, such as those belonging to Blue Badge holders or staff.

The installation cost of ANPR is only likely to be justified at the major locations. It can offer operational savings in enforcement costs but human enforcement is still needed for issues such as abuse of Blue Badge spaces (section 5.4).

- ✓ Think about installing ANPR when existing barrier technology requires replacing
- ✓ Consider what new or revised signing, both permanent and temporary, is required to inform customers about the introduction of ANPR
- ✓ With both barrier-control and ANPR, the automatically-generated occupancy data will drift over time from its true value. Occasional manual counts could recalibrate the data as part of routine human enforcement visits.

5.7 Equipment procurement considerations

Most operators will engage a specialist parking contactor who will deal with the equipment. If operating the equipment directly, here are some key tips from TOC experience:

- ✓ Modern designs of payment machines can provide live status information (e.g. faults and cash contents) to a control office. This is valuable for responsiveness and for optimising cash collection rounds
- ✓ Setting service level agreements for matters such as response times to faulty machines is easier than having to issue individual work orders on each occasion during the support period. The service level agreement should reflect the needs and busy periods at each station – for example, at city centre and leisure stations the weekends can be as important as weekdays, but at commuter stations a weekend equipment failure is less critical. Local staff input is helpful
- ✓ Barriers are more business-critical than ticket machines, and are best confined to staffed stations where local staff can be on site quickly to raise a failed barrier
- ✓ A person whose role includes equipment care may be justified through minimising the revenue loss from faulty machines.

5.8 Seamless parking

- ✓ Contactless smart cards are gradually being rolled out for rail ticketing. Once this is established, operators should consider extending the system to cover parking transactions. Many parking payment machines nowadays can also read smart cards.

Vehicle manufacturers already offer installed navigation and communication technology. In the future, we can expect to see the dashboard as the portal for parking, with navigation and parking information combined to lead drivers directly to an available parking space. This means on-street equipment such as variable message signs (VMS) could diminish in importance in the foreseeable future, which in turn may have a bearing on its deployment and life expectancy.

6 Meeting drivers' needs



6.1 Premium, reserved and bookable spaces

Terminology varies across the network, but in this guide:

- Premium parking is a designated set of spaces in the most convenient area of the car park. These could be available to any customer at a higher price, or to permit holders (generally also season-ticket holders) only, or to key markets such as first-class rail ticket holders customers. They are not reserved to specific individuals. They may or may not be physically separated from general parking
- Reserved spaces are individually allocated to specific permit-holders, who therefore have their own permanent space. Generally, reserved spaces are in premium-type locations
- Bookable spaces can be pre-booked for an individual trip to offer certainty of a space. This could be a particular space (like a reserved seat on a train) or access to a group of spaces. They are not generally used on the rail network, but could benefit customers who are willing to pay for this convenience and certainty – typically those on business trips, but potentially also those travelling with families and heavy luggage.

Paradoxically, while these types of space are most valuable to an individual customer when car parks are at their busiest, for other customers it can be frustrating at such times to see empty spaces that they cannot legitimately use.

- ✓ Consider the right balance at each station between meeting customer demands for premium and similar spaces, and the need to make best use of space to meet all customers' needs
- ✓ Look at how premium and similar spaces will be enforced – particularly if they are not in a dedicated barrier-controlled area of the car park
- ✓ In addition to premium parking normally being closer to the station entrance, consider any opportunities for premium parking to offer a quick exit from the car park for commuters returning home (to 'get out ahead of the crowd'). This could have significant value to customers at commuter stations where afternoon peak car park exit flows are heavily associated with train arrivals

- ✓ Reserved spaces could be made available for any customer to use after a designated time each day (such as the end of the morning peak) if not already occupied by the reserved user. This avoids spaces being empty but unusable when there is demand for them.



Premium parking spaces at Bracknell.

Photo: South West Trains



Reserved spaces at Biggleswade. These are marketed as 'premier parking' and the space markings are yellow rather than white.

Photo: WSP/Andrew Potter

CASE STUDY – RESERVED SPACES AT CHELMSFORD



Chelmsford station offers reserved spaces. To open up capacity for off-peak use, spaces that are not occupied by the reserved user at the end of the morning peak period become available to other customers. The yellow lines shown in this picture appear to be historic rather than being associated with this parking arrangement.

Photo: WSP/Andrew Potter

6.2 Valet parking

Valet parking is offered at larger airports and some high-end retail or leisure attractions. In the rail industry, it should be considered at locations where:

- Long or 'prestige' trips are being made. As with bookable spaces, the potential market includes not only business trips but also customers travelling with families and heavy luggage
- Parking charges at or near the station are high
- Volumes are high
- The car park is a significant distance from the station entrance, or access to it is difficult

- Space constraints mean long-stay parking can only be fully accommodated with an element of off-site provision.

Other potential value-added services are covered in section 8.7.

6.3 Target maximum occupancy

Car parks are effectively full before they reach 100% occupancy. This is because:

- At any time, a small number of spaces may be unavailable due to maintenance or other temporary uses, or due to cars encroaching into neighbouring spaces

- Daily demand fluctuations mean that to minimise the chances of a customer finding the car park full, the average peak occupancy needs to be significantly below 100%
- Drivers may ‘miss’ finding the last one or two available spaces, particularly in a complex car park where the search pattern is not straightforward.

As occupancy approaches 100%, the customer experience becomes increasingly unsatisfactory as users take time circulating for a space and they become less certain of finding one.

- ✓ Plan for a target maximum occupancy. Usual values are 95% for commuter or other long-stay parking, and 90% for short-stay parking. Above these figures, the car park should be considered as full, and intervention is required to ensure customers have a reasonable certainty of finding a space.
- ✓ A ‘trigger’ occupancy level for responding to demand growth could be the answer. This reflects the time needed to develop and deliver responses (see section 6.4 below), during which demand growth may continue. Typical triggers are 75-85% occupancy, depending on anticipated growth rates.

6.4 Responding to demand

With sustained growth in passenger numbers, many station car parks are full regularly. Operators should consider a multi-pronged strategy to address this, beginning with immediate, cost-effective steps, and moving on to more significant and longer-term investments if these are still required.

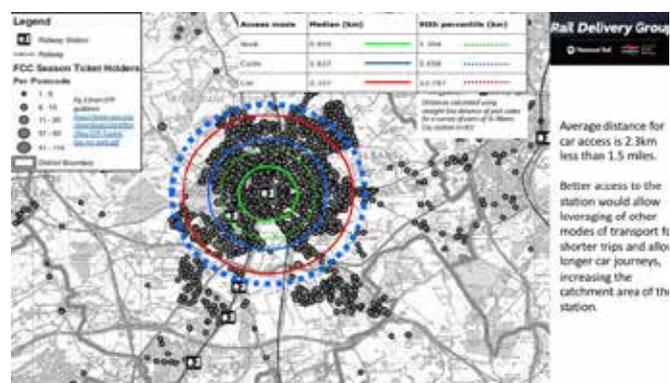
This does not necessarily mean providing additional parking areas, at least in the first instance. Managing the use of the existing supply, particularly by promoting use of alternative modes, is an important first option.

Consider promoting alternative modes of access

Alternative modes of access can help to accommodate demand growth by allowing customers to reach the station without the need to park. This includes not only new customers, but also existing customers who could switch from car travel and therefore make spaces available for new customers.

Implementing a station travel plan (STP) (section 3.1), or reviewing and enhancing an existing one, can help with alternative options for customers and encourage them to use these where feasible for their own trips.

Research carried out for STPs has shown that many customers who park have started their journey within walking, cycling or bus distance of the station. For these customers, the decision to drive rather than use alternatives may be finely balanced. Addressing the barriers to using these alternatives may help to tip the balance, and make spaces available for those new or existing customers who do not have these alternatives available. The guidance on STPs (see Appendix A) provides more detail.



The Station Travel Plan pilot at St Albans identified that customers parking at the station started their journey an average of 2.3km (1.5 miles) away.

This average is within a comfortable distance by cycle or bus. It illustrates how improving access to a station could allow alternative modes to be used for shorter car trips.

(Base map reproduced by kind permission of Hertfordshire County Council – Crown copyright reserved)

Try maximising the number of spaces available within the existing car park

- ✓ Think about reviewing the layout and space markings. Some car parks are currently laid out generously with larger-than-standard spaces and wide aisles, reflecting either historic levels of demand or a policy of accommodating larger vehicles more easily. Where demand is now high, this balance could be adjusted in favour of a new layout that creates additional spaces while retaining safe operation (see section 8.3, including the need for the new space sizes and drive aisle widths to be mutually compatible)

- ✓ There may be scope for removing landscaping areas such as ‘islands’ that are not needed to screen neighbouring properties.

One operator has identified that these techniques could create an average of 50 spaces at each car park. Generally, this ‘expansion’ can be done straightforwardly as Permitted Development, requiring only landlord’s Consent from Network Rail and any necessary approval from the relevant franchising body.

Work with local authority and Network Rail partners to expand the footprint

- ✓ Investigate adjoining or nearby Network Rail land (such as disused sidings), which could be used for expansion. Areas alongside car parks are often used for lineside maintenance access and storage;

this will need to be re-provided or moved. Financial arrangements will need to be made with Network Rail

- ✓ Consider whether adjoining local authority land could be used for expansion. This could be incorporated into the station car park, or could be a separate local authority operated car park serving rail users (such as the Falkirk example below)
- ✓ For this and subsequent steps, obtaining rail industry and other consents can be a significant process. Early informal discussions are helpful.

CASE STUDY – SCOTRAIL AND FALKIRK COUNCIL WORKING IN PARTNERSHIP

At Falkirk High, a busy commuter station, the car park and an adjoining council-owned car park are both full every day, with some customers parking on nearby residential streets.

There was no further room to expand either car park. A controlled parking zone (CPZ) could have been created to protect residential amenity, but this would not have addressed the underlying excess of demand over capacity. However, the council owned a plot of unused land on the opposite side of the station, which was suitable to be an additional car park. The council and ScotRail developed a funding package that included contributions from both parties and from the Scottish Stations Fund.

The new car park, which connects with an existing pedestrian access to the station, will provide 61 new spaces, plus cycle parking, with lighting and CCTV.

Falkirk Council, which will operate the new car park, designed it and delivered it through its own contractor. This helped to smooth discussions with the council’s planners and highway engineers.

This partnership model is now being rolled out to other stations.

Install decking within the existing footprint

Structured parking can be provided either as a conventional multi-storey car park or as a skeletal, modular structure.

Typical costs per space are £15,000 upwards for a conventional multi-storey and £8,000-9,000 or more for a skeletal structure. The costs are very site-specific and depend in particular on what is acceptable in that location. Site levelling, clearance and cladding would

add to the costs. It is often difficult for a train operator to make a business case for decking within a franchise period, and public investment may be required in this situation.

Factors to consider include:

- The visual and environmental suitability of a structure in that location. What will be acceptable to local planners and other local stakeholders?

- The net gain in spaces. Columns, ramps and staircases take up space at ground level, which partly offsets the spaces gained at the upper level(s). If existing spaces are smaller than current standards, the new layout may lose further spaces
- Whether the temporary loss of spaces during construction is acceptable, perhaps requiring ‘decanting’ of customers to a nearby car park or an alternative station (see section 9.5)
- Whether the cost can be recouped through incremental parking charges and fare-box revenue. Generally, it is difficult to make a case for decking where parking is free of charge
- Allowing for future demand growth. It is more cost-effective to build in an allowance for future growth than to come back and expand a structure within a few years. In a growing railway, and provided that alternative modes of access have been promoted as much as feasible, a deck that is full on day one is too small
- Potential impacts on other users of the car park.

Section 6.5 provides more detailed guidance on decking projects.

Provide automated parking systems

In some locations, an automated parking system could be considered. These systems have the potential to reduce the area required for each space, because there is no need to allow room for people to enter or leave parked vehicles, or for normal turning circles, and because they allow low floor-to-floor heights in parking areas. Lift-based multi-level systems tend to be used in constrained residential or long-stay parking locations in the UK and overseas. At Düsseldorf Airport a ‘robotic valet’, working on the fork-lift principle, is used instead.

A reception area is required where the driver and passengers can alight before the system takes the vehicle to the parking area. On the return journey, users can request their cars ahead of arriving at the station, and the system operates in reverse.

As well as the space saving, the user can save time from not needing to park the vehicle themselves. However, these systems come at a cost and require high levels of maintenance. They are best suited to long-stay car parks with no strong tidal flows of users. In the rail

environment, this translates broadly to the most space-constrained of the stations where valet parking (section 6.2) would be considered.

Commercially acquire additional land, where available

This may be appropriate in some locations. The cost of land acquisition should be weighed against the cost and disruption of decking an existing station car park.

Adjust parking charges

The relative parking charges between stations can be adjusted to help steer demand to where there is available space. As described in section 5.1, ultimately capacity and usage need to be kept in balance so that customers can be sure of getting a space – rather than arriving to find the car park full and having to turn away, potentially missing their train. It is a basic principle of parking management that car parks should be busy but not full.

In most locations, an incremental adjustment to charges will tend to influence those who live close to the station and for whom the decision to reach the station by car rather than any other mode is a marginal one. This helps to promote alternative modes of access as well as freeing up spaces for later arrivals.

Calculate affordability and the financial flows

In all the options described above, the financial flows for all parties need to be considered to achieve a viable business case and funding package. Factors include:

- Any payback period needs to be compatible with funders’ timelines, particularly franchise lengths
- The impact of revenue support or ‘cap and collar’ provisions in franchises
- Government or third-party funding may be available for some projects.

6.5 Planning and design issues for decking projects

Where a station has multiple car parks that are potential deck locations, the choice of location should consider both engineering feasibility and customer convenience, taking into account station entrance locations and drivers’ desire lines (most preferable route). Occasionally there is limited vehicular access between car parks (e.g.

from one side of the line to the other where there is no adjacent road bridge), and the predominant desire line may indicate the best location for customer convenience. In some cases, there may be traffic or other reasons why it is desirable to encourage parking on one or other side, or to allow motorists to flow more freely between car parks.

- ✓ An origin-destination survey of car park users could be undertaken and consideration given to how this should influence the choice of deck location and layout.

Decks are generally Permitted Development (PD) unless in a conservation area or requiring Listed Building Consent. However, experience suggests that even as PD it is important to engage local stakeholders at an early stage. This should include not only adjoining residents (where issues may include visual intrusion, light pollution and potential overlooking of their properties from the deck) but also all users of the car park. This includes informal users such as pedestrians or rambblers who use it as a cut-through.

- ✓ Carry out an early visual survey and count of who uses the space. This may reveal existing users that may not be apparent from other consultation processes. This also provides evidence on the scale of existing usage, such as by pedestrians cutting through, which can help to counteract any local concerns
- ✓ Provide good-quality replacement pedestrian and cycle routes around deck structures, in cases where there is either a public right of way or a perception of one through the existing surface car park
- ✓ Avoid unintentionally creating new public rights of way. Management measures for this include 'not intended as a right of way' notices (Highways Act 1980, section 31(3)), or closing pedestrian access for one day a year to demonstrate control.

As noted above, decanting of existing users may be required during construction.

Where there is a series of projects along a line-of-route or on neighbouring routes, there should be a master plan for delivering these in a co-ordinated way so that users have alternatives during construction. This is also an opportunity to promote alternative modes and

change travel patterns, not just during the construction period but potentially also thereafter.

- ✓ Measures to promote alternative modes during construction include additional cycle spaces. These could be permanent, or temporary with a view to becoming permanent if successful.

Skeletal modular structures are mainly used as single-level decks but depending on the design they can have multiple levels, or passive provision for additional levels. The latter requires appropriate foundation design at the outset. Beyond a certain number of levels, a lift will need to be considered, which adds to the cost, and an area should be allowed for this if making passive provision for additional levels.

- ✓ Modular systems may be designed around a particular width of space. If a different width is preferred (for example, 2.4m spaces within modules designed for 2.5m), consider what consequential layout changes might be required.

Designers should look at the deck's impact on other users. The entire site should be master-planned to identify and avoid conflicts. This may need to include any or all of the users identified in section 3.2.

- ✓ Consider incorporating a cycle hub within the structure, especially if it is a conventional multi-storey. Nottingham station is a successful example of this.

Other design factors to consider include:

- ✓ Opportunities for providing real-time information or interactive displays in decks
- ✓ Passive provision for possible additional equipment, and its electrical and ducting requirements, over the lifespan of the deck
- ✓ Making use of potentially wasted space, such as areas under ramps or in odd corners. This could be used as motorcycle parking, or as a secure compound for winter maintenance supplies. However, these need to have a suitable access route that is not blocked by parked cars
- ✓ Any requirements for lineside access, which may involve large or heavy vehicles such as road-rail vehicles. Standard clearances may not be sufficient
- ✓ Potential impacts on operational communications aeriels

Rail Delivery Group

- ✓ Requirements for dry-risers on skeletal decks and the number of escape stairs – this depends on the fire access
- ✓ In ‘pay and display’ car parks, each level should have at least one payment machine, to avoid customers having to climb stairs unnecessarily – especially as the off-peak infrequent users without permits are the ones most likely to be using the upper level(s). Machines typically serve 30-70 parking spaces each
- ✓ Ensure that vehicular swept paths, particularly for turns onto and off the ramps, do not intrude onto marked pedestrian walkways through the deck.

The ground floor layout and design should be closely examined to ensure:

- ✓ Structural items such as wind-bracing do not obstruct pedestrian routes
- ✓ Cycle parking, motorcycle parking and operational storage have proper access routes
- ✓ Stairs, rather than vehicular ramps, are on the pedestrian desire lines – otherwise pedestrians will just use the ramps.

Appendix E provides an example specification for decked or at-grade parking projects, which can also be used as a checklist of further factors to think about.



Structured parking at Penrith station. Single-level deck above existing car park, squeezed around existing buildings.

(L) Photo: Graham James. (R) Photo: Network Rail



Structured parking at Broxbourne station. Single-level deck within existing car park.

Photo: Graham James



Poor practice in design co-ordination within a decking project. This has subsequently been rectified.

Photo: RDG

CASE STUDY – DECKS AT SOUTH WEST TRAINS STATIONS

South West Trains has recently installed numerous decks in station car parks. Each location has taken different measures to mitigate the impact.

Brookwood and Andover incorporate green cladding to make them more sympathetic to their surroundings.



Green cladding at Brookwood (left) and Andover (right)

Brookwood and Farnborough include shrouds on light fittings to avoid light intrusion onto neighbouring properties. Brookwood also includes planting of conifer trees around the edge of the car park which, as they grow, will provide visual screening from neighbouring properties.

Fleet was designed at double the usual height to allow road-rail vehicle access through to an existing lineside access point.



Double height required at Fleet to allow lineside access.

Farnborough

Photos: South West Trains

CASE STUDY – MANCHESTER PICCADILLY



Photo: Network Rail

The materials of Network Rail's new customer car park at Manchester Piccadilly were chosen to support key goals of:

- ✓ Low maintenance costs
- ✓ Discouraging graffiti
- ✓ Meeting local planners' aspirations.

The metal mesh cladding panels provide a texture that is difficult to cover with graffiti.

CASE STUDY – THE QUADRANT MK



Photo: Network Rail



Photo: Network Rail

Network Rail's two car parks at The Quadrant MK in Milton Keynes demonstrate best practice in design and operation of multi-storey facilities.

Circulation was planned to allow a natural flow of vehicles, allowing customers to find available space while offering the most efficient number of spaces. Signing was designed to avoid clutter while providing the right amount in the right locations to assist passengers from vehicle to station or exit.

A cash room, car park staff accommodation and equipment storage space are provided. A customer service window offers a smart and professional service. All payment machines also have intercoms linked to the attendants, who are available 24/7.

There are 254 secure cycle parking spaces in a purpose-designed room. Electric vehicle charging points are provided.

Low-energy lighting controlled by presence detectors is used throughout the car park decks and circulation cores. The local district energy scheme provides electricity. Measures to enhance biodiversity include a variety of bird boxes mounted on the facades.

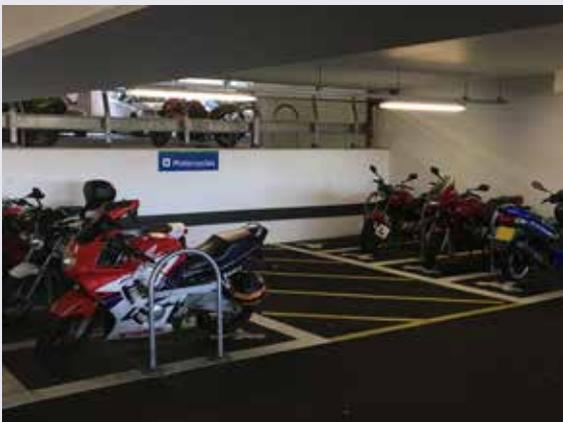
Each Network Rail asset has an Asset Steward who is responsible for its continuing life. In the development stage of the project, the Asset Steward advised on the likely maintenance costs. These costs were included in the business case, and this has allowed regular planned preventative maintenance and inspections. The life care plan for the car parks has been accepted into the Asset Steward's maintenance regime. Winter weather plans and cleaning contracts have been extended to cover the car parks.

CASE STUDY – THE QUADRANT MK

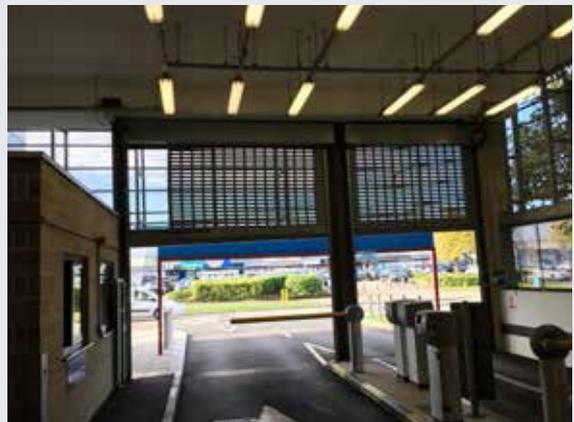
Well-marked accessible spaces



Marked pedestrian route



Dedicated motorcycle parking with easy access route and locking points



Shutter allows car park to be closed off if required

Photos: BTP

7 | Accessibility



7.1 Introduction

Accessible facilities are an important part of car park provision. This goes beyond simply providing accessible spaces for Blue Badge holders. It extends into making the end-to-end experience accessible, covering matters such as pedestrian routes and ticketing equipment. Accessible facilities can benefit all customers, including those who are frail, have luggage, or are travelling with children.

The Code of Practice *Design Standards for Accessible Railway Stations* includes detailed requirements on accessible parking, and should be the first reference point for accessible design. This section of the guide draws out some key issues arising from the Code of Practice, and also describes the Disabled Parking Accreditation scheme.

7.2 Accessible space location and layout

Accessible spaces should be located on firm and level ground, as close as feasible to the accessible station entrance. Earlier versions of the Code of Practice set a 50m maximum distance from the entrance, which

was sometimes difficult to achieve. This is no longer a requirement, but accessible routes from parking to station entrance must have resting places no more than 50m apart.

The Code of Practice also details the layout of accessible spaces, based around British Standard 8300:2009. This includes access zones (also known as transition zones) on both sides of each space, and a safety zone between the space and the vehicle aisle. These are to allow the driver and passengers to enter or leave the vehicle. The requirement is sometimes misinterpreted, with access zones provided on only one side of a space. Figure 1 shows a typical arrangement incorporating the required layout. Dimensions should be taken to the centre lines of markings.

Re-lining of existing accessible spaces that do not fully meet current standards can follow their existing layout, but there might be opportunities to move closer to the current standard if space allows. New construction must be to the current standard.

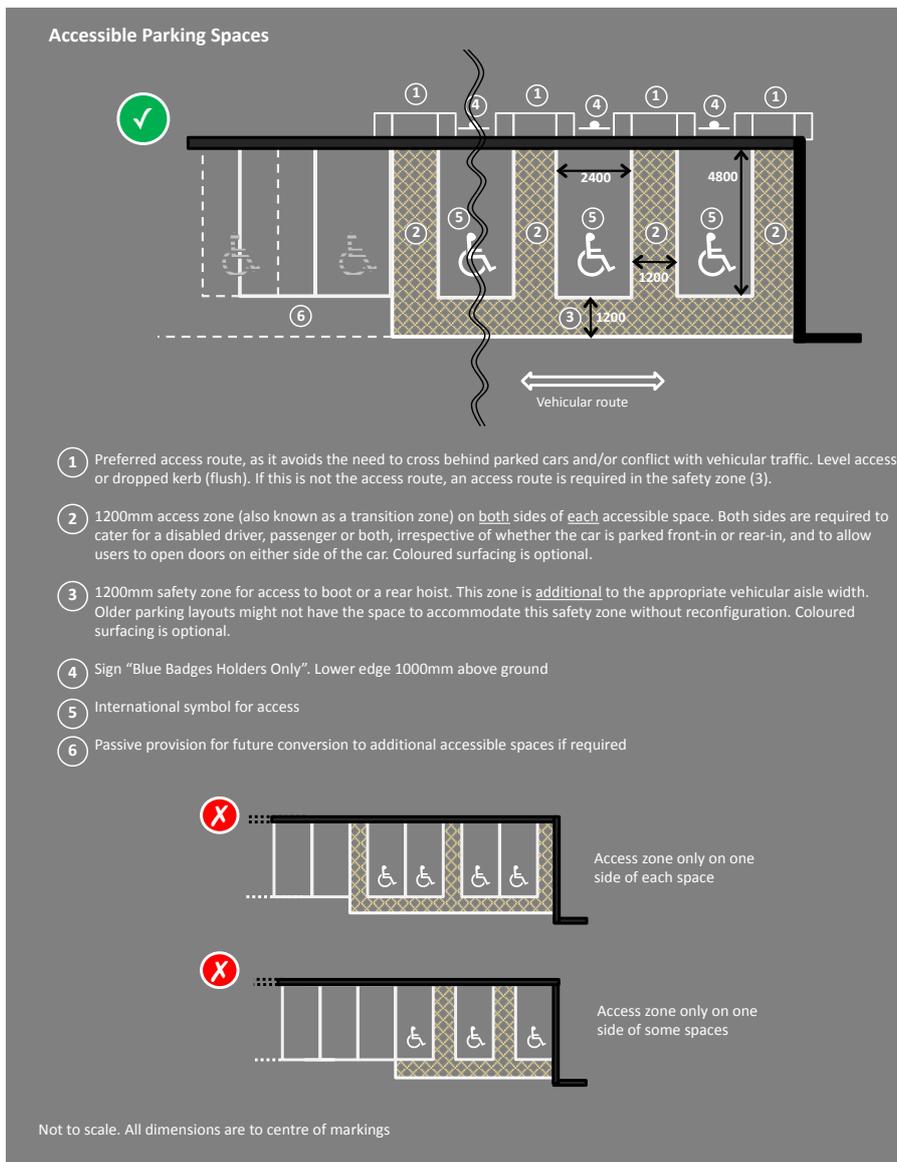


Figure 1: Layout of accessible spaces. Source: Design Standards for Accessible Railway Stations

7.3 Number of accessible spaces

The Code of Practice sets a 5% minimum provision of accessible (Blue Badge) parking spaces for customers. However, in some cases, particularly larger car parks, actual demand for Blue Badge spaces does not approach this level, even at the busiest times. In some of these instances, standard parking spaces are regularly full, which means the balance between the two types of space may not be correct. This situation can also generate potential for abuse of Blue Badge spaces by non-holders. This is recognised as an issue by Disabled Motoring UK. Its Disabled Parking Accreditation standard (section 7.5) sets a benchmark of around 3-4% in larger car parks for this reason.

It is possible to apply to DfT or Transport Scotland for derogations from the 5% standard, but these will need to be based on strong numeric evidence that a lower figure is reasonable. This might involve a daily occupancy count (at the busiest period each day) over a number of months, and potentially user surveys.

- ✓ Confirm with DfT or Transport Scotland the level of evidence they will require for a derogation in each particular case, before carrying out counts or other monitoring.
- ✓ When planning an expansion scheme, consider carrying out such a survey to confirm the required level of provision in the expanded car park.

CASE STUDY – SOUTH WEST TRAINS DECKED PARKING

In its recent decked parking projects to address capacity constraints at a number of stations, South West Trains (SWT) has secured derogations from the 5% standard on the basis that existing Blue Badge spaces were not being fully used at those particular stations. To confirm that the demand levels were correctly understood, the DfT required six months of usage data from the existing car park. This was collected by the station manager making a daily usage count of the Blue Badge spaces. SWT presented the data, along with evidence that the new layouts allowed for the full 5% to be retro-fitted if ever required. This approach was successful in securing the derogations.

7.4 Other aspects of accessible design

Other aspects of car parking, such as access control, payment machines and pedestrian routes, also require accessible design. The Code of Practice covers these, and the *DPA Handbook* (see Appendix A) provides further advice. Sometimes new facilities unintentionally become less accessible due to their placement, alignment or dimensions creating awkward access or a difficult surface.



Close attention at design stage to the accessibility of new car park facilities can minimise the need for subsequent adjustments on the ground



Although the access and safety zones around parking spaces are 1,200mm wide, accessible pedestrian routes must be 1,500mm wide.



This dropped kerb, on an accessible route from parking to station entrance, is appropriate in principle, but is not flush and will present an obstacle to some users.

Photo: WSP/Graham James

7.5 Disabled Parking Accreditation

The Disabled Parking Accreditation (DPA) scheme recognises off-street parking facilities that are accessible to disabled people. It is an initiative by Disabled Motoring UK (DMUK) and managed by the British Parking Association. Like ParkMark, it is a useful ‘kitemark’ of quality and some stations have gone through the accreditation process.

The assessment criteria include accessible spaces, clear signing, ease of access, accessible payment machines, alternative payment methods, good lighting and enforcement of Blue Badge spaces (see section 5.4 of this guide).

It may be most appropriate to focus DPA applications on fully accessible stations, as promoting DPA status at a limited-accessibility station may be misleading or produce adverse stakeholder comment.

- ✓ Seek Disabled Parking Accreditation where feasible and particularly where the station itself is fully accessible.

8 | Customer experience



8.1 Guiding drivers to vacant spaces

Being able to find a parking space is a key concern for customers who park at stations. Long-term planning (section 6.4) should respond to this need. Each day, however, there is also a need to give customers comfort that they will be able to find a space, and to help them find spaces at busy times.

- ✓ This is an opportunity to make a positive impression on customers from the very start of the journey. As a further benefit, it translates into less rushing through the station and a more positive journey experience overall. There are operational benefits from reduced congestion in car parks due to less 'cruising' for a space.

Stations with multiple car parks

While regular passengers will soon learn the times when different car parks are full, this advice is needed for infrequent and new customers who are not familiar with the typical pattern of occupancy.

- ✓ Providing 'number of spaces available' data on smartphone apps is one possibility

- ✓ Consider providing this data, or simply 'full' versus 'spaces available', within variable message signs (VMS) on routes to the station. These can be standalone but are most cost-effective as part of a wider system covering town centre parking. They are not a complete solution, however, as some drivers will attempt to find a space even when shown as full
- ✓ Static on-site signing could be provided about alternatives when the car park is full.



Advisory signing at Chippenham, showing that another car park is available when this one is full.

Photo: WSP/Graham James

Within a car park

Sensors in parking spaces, both on-street and off-street, are now a well-established technology for providing information on space availability. Casual users may benefit more than commuters.

- ✓ Experience with electromagnetic compatibility in Australia has found that passing trains up to around 10m away can affect their performance.

At stations, the best use of this technology is normally to guide customers around busy, complex car parks. Messages such as '25 spaces available in zone C', delivered to mobile devices or to variable message signs

at car park entrances and key decision-points within the car park, can save customers valuable time as well as reduce volumes of circulating traffic. Such messages may not be needed for individual rows where circulation is straightforward.

In parking structures, coloured lights above each space are sometimes used to highlight occupied or vacant spaces at a glance. Although this is a customer convenience, it is generally not required at stations, except perhaps in awkward layouts where drivers would otherwise need to look down numerous short side-aisles to see if there is a space.



A sensor in parking space detects occupancy and feeds into an app showing where spaces are available. This design is normally a smooth dome; the example shown on the left has been damaged. Newer designs tend to be flusher with the road surface.

Photos: WSP/Andrew Potter

An earlier design of sensor, seen here in a local authority's off-street car park.

Photo: WSP/Andrew Potter



Variable message signs at decision points allow customers to make an informed choice.

Photo: WSP/Andrew Potter

8.2 Wayfinding, signing and information

Car park signing should be considered as part of a holistic and consistent wayfinding strategy for the entire station. A step-by step approach to improving wayfinding is shown below.

A practical step-by step approach to improving wayfinding

1. Declutter

- Remove instances of ‘the wrong sign, in the wrong place, with the wrong information’. An audit could validate that all existing signs are still correct. The information to be shown will have changed over time, so like-for-like replacement may not be appropriate
- Focus on what’s not obvious – if a facility is clearly obvious in front of you, you don’t need a sign to it at that location

2. Replace with ‘the right sign, in the right place, with the right information’

- Consider signs holistically – this may require a co-ordinated approach with multiple departments and budget-holders. This includes co-ordination with advertising and ‘branding’ locations
- Ask local front line staff who know the ‘frequently asked questions’ and any existing causes of confusion at their location
- Also involve people who are unfamiliar with the location (perhaps even unfamiliar with the station car parking experience). This ‘stranger test’ avoids issues being overlooked due to assessors’ familiarity with the location or the experience
- Safety-related signing, important operational signing and the required signs for accessibility should have priority
- Beyond these, the key car park signs from the customer point of view are simply: “how do I pay?” (including signing for payment machines) and “how do I get to the station?” Painted pathways and/or ‘feet’ pictograms painted onto the surface can also guide customers
- Consolidate multiple signs wherever possible. In car parks, information such as the tariff, penalty charges, other terms and conditions, and CCTV information can be consolidated into a single neat sign
- Pay special attention to transitions between station signing and adjoining systems, such as highway signing

3. When new or altered signs are needed, treat these as changing the existing signing layout rather than as ‘bolt-on’ additional signs.

- For example, when introducing new permanent signing for ANPR enforcement in car parks, existing signing could be renewed with the new details, rather than adding a new sign, which may create clutter.

Other good practice includes:

- ✓ Where there are multiple car parks, colour-coding or another memorable system can distinguish between them and assist with signing
- ✓ In multi-storey car parks, floor numbers should be signed to help customers identify their location
- ✓ Payment machines and rail ticket vending machines should clearly advertise ‘parking tickets’ or ‘train tickets’ (or similar wording), to minimise customer confusion between the two roles. For the same reason, the ‘tickets’ pictogram on signs

should include ‘P’ for parking tickets in place of ‘1’ and ‘S’ as used for first class and standard class rail tickets.

National Rail Passenger Survey results show that information is a key factor for customers. In addition to signing, car park users will benefit from:

- ✓ Real-time train information
- ✓ Help points.

Virgin Trains is testing digital information boards in car parks. These operate wirelessly to avoid the cost of installing telecommunications cabling.



A single sign, located appropriately next to the payment machine, covers all the parking information, including the tariff displayed boldly.

Photo: WSP/Graham James



A single sign, located at the entrance, covers various information including warning signs that sometimes create clutter if mounted separately.

Photo: Graham James



Consider eye-catching temporary, but still professional-looking signs to pre-advertise changes to car park operation.

Photo: WSP/Graham James



Two key questions for customers are “how do I pay?” and “how do I get to the station?” This example sign illustrates how both can be answered. The wording ‘Car park payment’ is sometimes used as an alternative to ‘parking tickets’ to avoid confusion with charge notices or train tickets. For directions to the station, the wording could be ‘Platforms’ or ‘Station’ depending on what is most appropriate in the particular location.

Diagram: South West Trains



Help point within a car park

Photo: South West Trains

8.3 Space sizes and lining

Sizes

There is no single correct size for a parking space. The decision is a trade-off between:

- Efficiency (accommodating as many users as possible), particularly important with growing demand and overflowing car parks
- Customer-friendliness (the ease of driving into a space and exiting the car, or vice versa).

The mix of vehicles is changing. Today's version of certain models is significantly wider or longer than the same model 20 or 30 years ago. However, what matters more is the actual spread of vehicle sizes on the ground. In some locations, large cars are still the exception, with small hatchbacks much more common. But in others, a saloon car is the norm where once it was a luxury.

Apart from Blue Badge spaces, there is no legal maximum or minimum size for a parking space. The current norm of 2.4m x 4.8m suits most vehicles and generally works well. Practice has varied over the years and some older car parks may have smaller spaces. Other car parks may have been laid out more generously as a deliberate policy.

Some guidance documents differentiate between short-stay (2.5m width suggested), medium-stay or mixed-use (2.4m), and long-stay (2.3m) spaces. At stations, however, where users may have significant luggage, 2.3m spaces are generally less appropriate.

In response to larger vehicles and for added customer convenience, some car park operators have switched to a 2.5m x 5m standard, and even 2.7m width has been suggested. Widening spaces tends to be more valuable than lengthening them, partly because widening eases the turn into and out of a space, and partly because an occasional vehicle overhanging an aisle is rarely a practical problem.

With growing demand for parking and a limited amount of land, customers and taxpayers expect the rail industry to make cost-effective use of available land. Operators could therefore:

- ✓ Continue to use a 2.4m x 4.8m space as standard. (These and other dimensions are measured to the centre of the marked line)
- ✓ Decide, station-by-station, whether the spread and balance of customers' vehicles supports use of larger spaces instead

- ✓ Significant customer feedback about damage to vehicles can be an indicator that bays are too small. This tends to be spaces that are narrower than 2.4m due to historic practice or previous attempts to squeeze in more spaces
- ✓ In existing car parks where the length available for a row of spaces may not be an exact multiple of a space, use wider spaces rather than leaving an area unused. For example, a 25m parking aisle should be marked as ten 2.5m spaces, rather than ten 2.4m spaces with 1m unused. This is because the wider spaces improve the customer experience at no extra cost, and unused areas may encourage fly-parking.

A mixture of large and small (or 'compact') spaces is sometimes tried, and could work in theory if managed closely, but in practice drivers tend to ignore the distinction. Occasional compact spaces, where required to suit a localised constraint, are less problematic.

- ✓ Where demand warrants and space is constrained, small spaces could be designated and signed for smart cars and similar types of very small car. These are more likely to be self-enforcing due to their size. A reduced charge may be appropriate for these.
- ✓ Where demand warrants and space is available, consider having some larger spaces for a premium price
- ✓ Dedicated motorcycle spaces should be provided, as this avoids motorcycles occupying spaces that could be used for cars or obstructing cycle parking and walkways. The RDG's *Motorcycle Parking at Rail Stations Guide* provides more guidance.

The standard width for two-way drive aisles is 6m. This can be squeezed down if short of space, and significantly narrower aisles have often worked satisfactorily. However, the width is needed not only for two cars to pass but also to allow a car to turn into a space, so a particularly narrow aisle can require drivers to make multiple moves to enter a space. In general, the narrower the space, the wider the aisle needs to be. Technical guidance exists on this trade-off, and designers can test a range of options to make best use of the available space.

Alternatives to standard markings

The standard ‘box’ markings (Figure 2) are sufficient for most commuter and long-stay parking. However, alternatives have been successfully used to improve the ease and likelihood of accurate parking. They are particularly useful for short-stay, rapid-turnover parking and should also be considered in other circumstances where there are concerns over parking behaviour or obstructions such as columns at the edges of spaces.

Tramlines (Figure 3) work by encouraging drivers to align themselves in the centre of the space. They are generally used for high-turnover parking and involve small gaps between standard width spaces (a 2,400mm space plus a gap of around 200mm). However, they could also be considered for commuter parking with tramlines inside a standard width space (e.g. a 2,200mm space plus a gap of around 200mm), therefore encouraging accurate parking without growing or shrinking the width compared to a standard space.

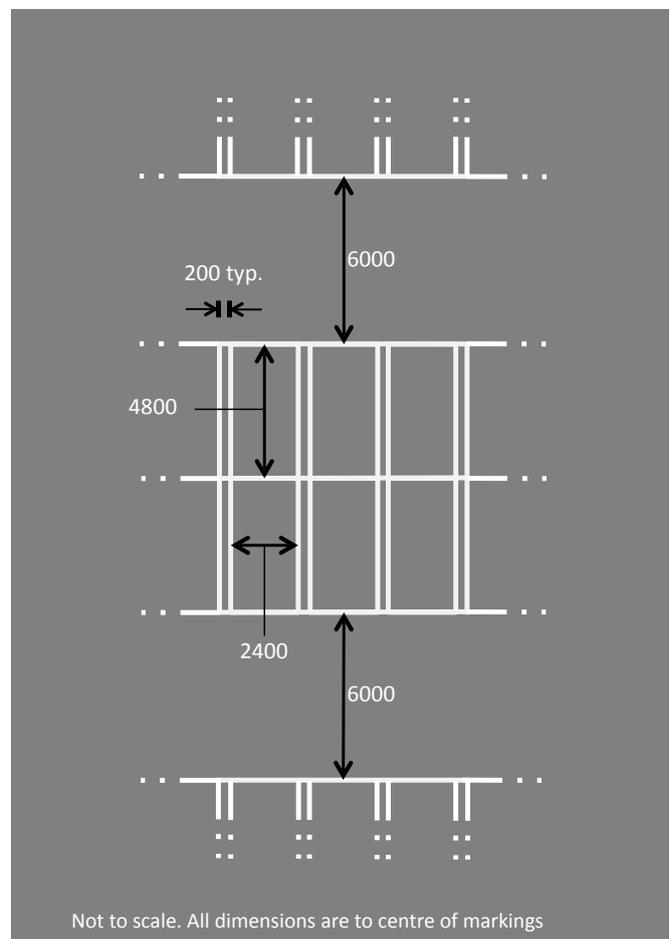
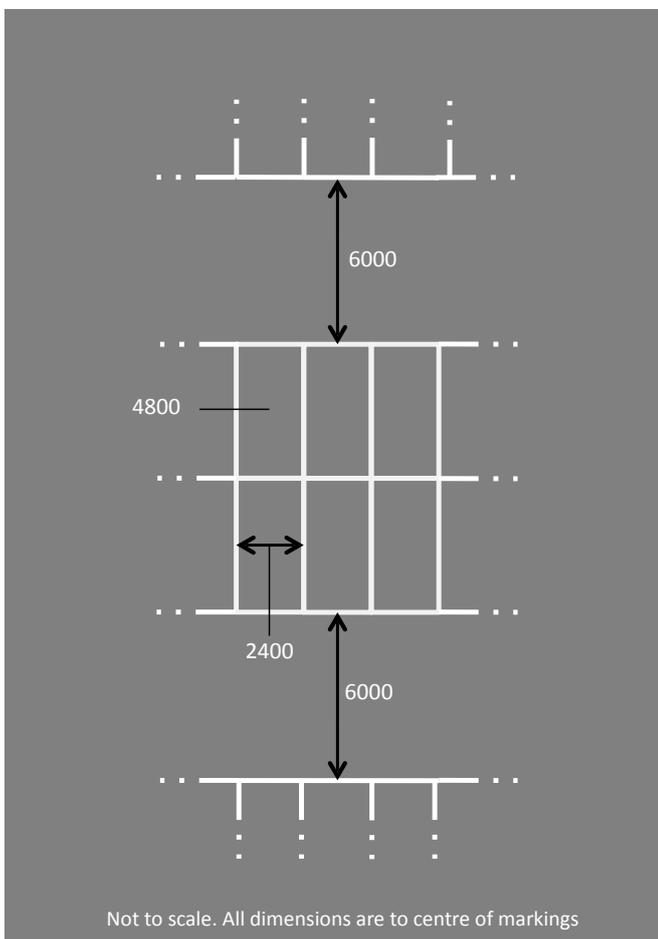


Figure 2: Standard layout

Not to scale. All dimensions are to centre-line of marking

Figure 3: Tramlines (typical dimensions)

Not to scale. All dimensions are to centre-line of marking

Parking pads take this idea a step further by creating a self-contained box for each space, with a gap all around (Figure 4). These have been used successfully in the retail sector, and also in structured parking where they help drivers to avoid columns that would otherwise intrude into the marked space (Figure 5 and Figure 6). The dimensions are not fixed and pads can be used in a more generous layout (Figure 4 below) or a tighter layout (Figure 6 below). There is a slight disadvantage that more markings are required with a corresponding additional cost, compared to standard markings.

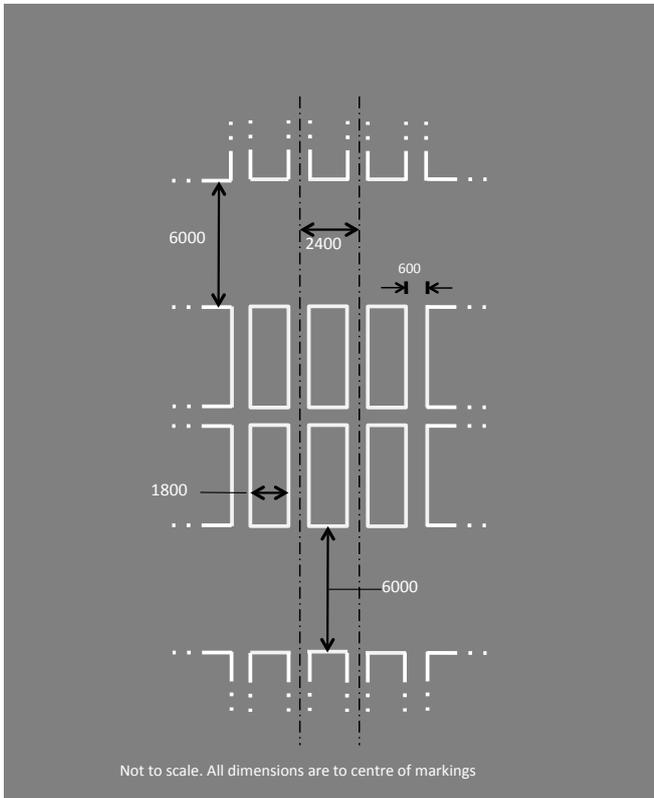


Figure 4: Parking pads (typical dimensions)

Not to scale. All dimensions are to centre-line of marking



Parking pads, seen here at Westfield Stratford City, encourage accurate parking. Here the spaces are coloured differently to add further visual clarity, although this is not obligatory.

Photo: WSP/Darren Pullen. Reproduced by kind permission of Westfield Stratford City

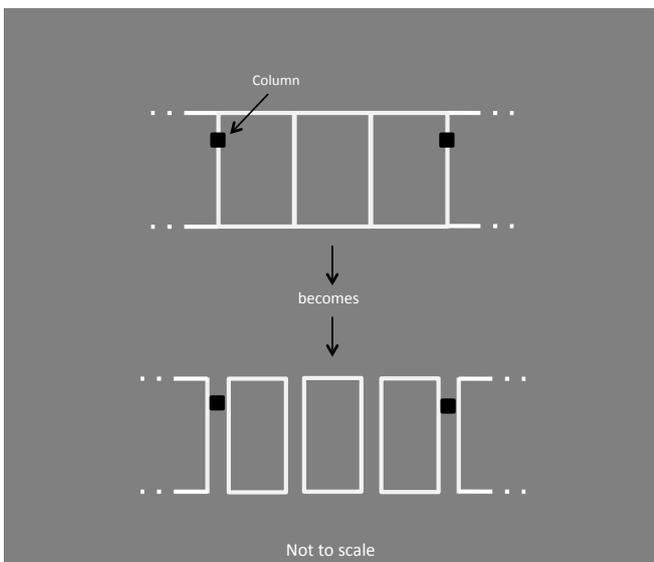


Figure 5: Parking pads with structured parking: generic principle

Not to scale

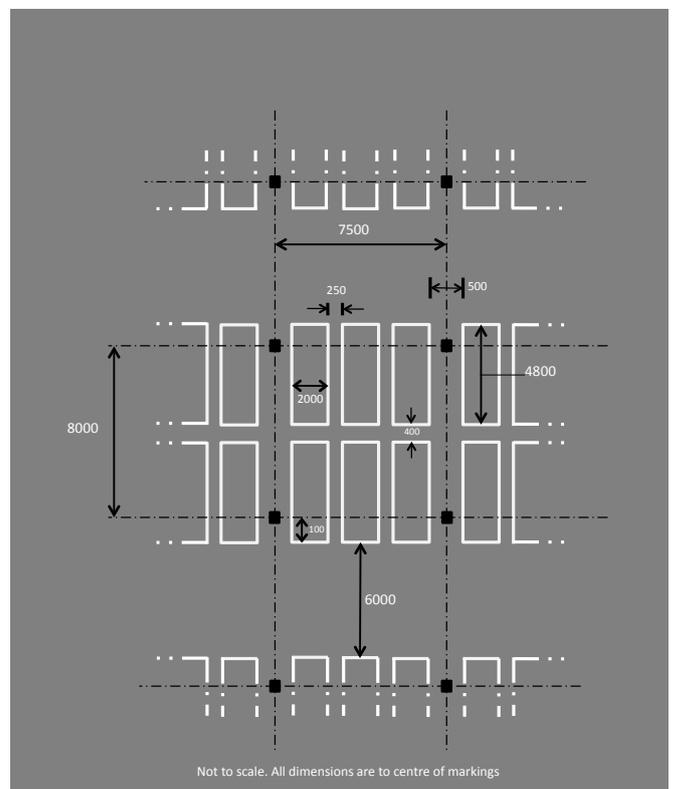


Figure 6: Parking pads with structured parking: example layout for an 8m x 7.5m structural grid

Not to scale. All dimensions are to centre-line of marking

Angled parking

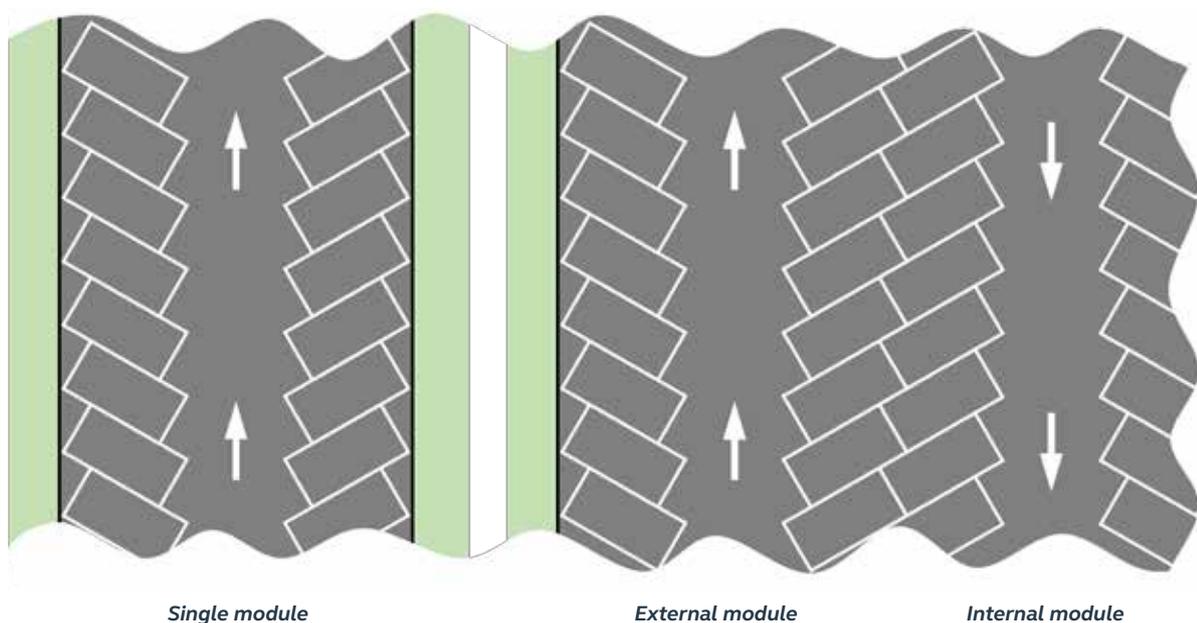
Angled or ‘echelon’ parking can be quicker and easier for customers to drive in and out of than 90-degree parking. However, it is generally less space-efficient, as shown in the table below. The main exception is when a site is slightly narrower than a multiple of the module width (the width of the drive aisle plus the spaces on each side) that is required for 90-degree parking. In such cases, angled parking, which has a smaller module

width, may be more efficient if it allows an extra module to be accommodated. Designers can test options. In an irregularly-shaped site, a mixture might be most efficient.

Angled parking requires one-way circulation and is therefore most suited to simple car parks where this circulation pattern can be made mandatory. It has the disadvantage of poorer sight-lines for reversing-out. Reversing-in is not possible.

Angle (degrees)	Drive aisle width (metres)	Total aisle width required including spaces (metres)			Area required per space (including adjoining aisle) (metres)		
		Single module	External module	Internal module	Single module	External module	Internal module
90	6.00	15.60	15.60	15.60	18.72	18.72	18.72
80	5.25	15.54	15.33	15.12	18.93	18.68	18.43
70	4.70	15.36	14.95	14.54	19.62	19.09	18.57
60	4.20	14.91	14.31	13.71	20.67	19.83	19.00
50	3.80	14.24	13.47	12.70	22.31	21.10	19.89
45	3.60	13.78	12.93	12.09	23.39	21.95	20.51

This table is based on 4.8m x 2.4m spaces and the recommended minimum drive aisle widths given in the *Car Park Designers’ Handbook* and *Design Recommendations for Multi-Storey and Underground Car Parks* (see Appendix A). The module widths and areas are calculated from these. A ‘module’ (also known as a ‘bin’) is the width of a drive aisle plus the spaces on each side of it. The area calculations illustrate the relative efficiency of different angles, and therefore refer to the main ‘run’ of spaces in a module; they do not take account of end aisles or site-specific constraints, and do not represent overall efficiency ratios for a car park.





The choice of parking angle to maximise the number of spaces often depends on the dimensions and access points of the individual site. The angle may also vary within a site. This car park, at Chippenham, tapers along its length. It has been laid out to make the most of the varying widths available, with 90-degree parking at the wider end (out of picture), then 45-degree spaces (left of picture), then 25-30-degree spaces (right of picture, starting at the white car).

Photo: WSP/Graham James

Parent-and-child spaces

Parent-and-child spaces, as often seen at large retailers and leisure attractions, have marked safety zones around them (similar to accessible spaces) and are generally provided near the main entrance.

At stations, this approach has the potential to support off-peak patronage growth. However, as with premium-type spaces, when car parks are operating close to capacity the space may be better used as standard spaces open to all – both to maximise the number of spaces and to avoid customer frustration (particularly among commuters) at being unable to use what might be the last vacant spaces.

- ✓ Parent-and-child spaces could be provided where space allows.

8.4 Other good practice in car park layouts

Other good practice includes the following:

- ✓ Consider users of all modes. This is particularly important for vulnerable users such as pedestrians and cyclists when the car park is also a station access for them. In any case, customers with parked cars will be walking to/from the platform or station building
- ✓ Surface colouring of pedestrian walkways and cycle lanes helps to highlight them for all users
- ✓ Speed bumps help manage vehicle speeds. These should not extend over designated pedestrian routes or over a cyclist's path. However, where unauthorised night-time or Sunday joyriding or racing is likely to be a risk, the bumps should extend into parking spaces to mitigate this

- ✓ Any speed bumps should be placed mid-way along the width of a space, rather than parallel with the long edge of a space. This is to avoid them obstructing customers who are entering and leaving parked vehicles
- ✓ Vehicle restraint measures ('crash barriers' or bollards as appropriate) should be provided at ends of drive aisles in decks, and at parking spaces that directly face the operational railway
- ✓ A safety audit of existing car parks could be carried out through a Road Safety Audit. This defined process is carried out by a trained specialist and focuses on practical issues rather than specific design compliance. Because behaviour and issues change throughout the day, the audit should look at not just the busy times (with cars queuing) but also off-peak times (with low volumes and higher speeds) and very quiet times. At one station car park, a safety audit highlighted a long-standing hazard involving pedestrians walking along an access ramp, which had not previously been highlighted as a risk
- ✓ Covered walkways are useful in large car parks where some spaces are a significant distance from the station. In bad weather, this not only benefits customers but also encourages the more distant spaces to be fully utilised.



Speed bump is uncomfortable for cyclists. A gap would have been preferable.

Photo: Rail Delivery Group



This speed bump, on the upper level of a deck, correctly provides a gap at the pedestrian walkway. Cycling on this upper level is unlikely, so no gap for cyclists is required. The bump, which extends across the width of the deck to discourage joyriding, is correctly placed within a marked space rather than where two spaces meet.

Photo: South West Trains



At Stourbridge Junction, where the car park is very long and thin, a covered footway is provided.

Photo: Transport for West Midlands



Yellow lines may encourage compliance in areas where drivers are tempted to park outside marked spaces.

Photo: Graham James

8.5 Lighting

Car park lighting requires careful consideration. The basic need is to allow motorists and pedestrians to safely navigate the area. Perceived safety and security are also important. However, the lighting installation also needs to manage energy use, as well as mitigating the impacts on sky glow, adjoining residents and wildlife. This can all be achieved through good design, which should be undertaken by a competent lighting professional. Appendix B provides further technical guidance.

- ✓ After construction, engage a competent lighting professional to carry out a post-installation acceptance inspection. This will identify the occasional instances when the design has not been installed as specified and intended
- ✓ Modern LED lighting and renewable energy options could be used where applicable
- ✓ Emerging technology allows paved surfaces, such as footways, to absorb light during the day and release an artificial glow at night.

8.6 Electric vehicle charging

Car park operators can install their own electric vehicle (EV) charge points using a manufacturer's equipment, or take part in a charge-point operator's scheme. In the last named, the charge-point operator supplies and maintains the equipment and there may be a profit-share arrangement. Drivers may have an account with one or more operator. There are several operators with broadly national coverage although some operators have stronger coverage than others.

For fitting charge points to an existing car park, electricity can be taken from existing supplies to the extent that available electrical capacity allows. Beyond this point an upgrade will be required, which is likely to be cost-prohibitive. The charge-point operator will advise on what can be achieved.

For car parks in new developments, many local planning authorities require a proportion of spaces to be provided with charge points ('active provision'), and additional spaces to be provided with ducting for future charge points ('passive provision'). Although this is not a requirement for car parks built as Permitted Development (PD), operators should use this local standard as a starting point.

- ✓ Consider the appropriate level of active and passive charge points, in the light of local planning standards and customer demand at each station.

Charge points come in slow, fast and rapid versions, with increasing price. Slow chargers are appropriate for commuter parking where it's not a problem to take all day for a full charge. Rapid chargers are more appropriate for fleet vehicles (such as mobile operational staff) or for taxis waiting at a stand (not at a rank) but are also increasingly seen as the electric equivalent of a 'petrol station' for convenient fuelling.

In physical terms, the most common type of charge point is a standalone column that can serve one or two spaces. These points have a minimum distance from other electrical street furniture (e.g. lamp columns or phone boxes) to avoid electrical interference. As technology stands today, rapid chargers are much larger items than slow or fast chargers.

An emerging alternative is a charge point contained within a lamp column, which is cheaper and less visually intrusive than a standalone column. However, these are currently only available as slow chargers, and they need to be coordinated with the lighting design.



Electric vehicle plugged into a standalone column charge point. This is on-street, but the principle of a cable to the front of the car is the same for off-street charge points.

Photo: Graham James



Electric vehicle charging points at Stoke Mandeville station.

Photo: Graham James



Electric vehicle charging points at Rowley Regis station.

Photo: Transport for West Midlands

The charging cables are housed at the front of the car. Both types of charge points need space for the user to plug in and unplug, such as a location along a footway (without obstructing the pedestrian route) or in a margin at the edge of the car park. Both types should have protection against vehicle impacts. Transport for London's *Guidance for Implementation of Electric Vehicle Charging Infrastructure* provides sample layouts and advice on installation, although the technology itself has evolved since that guide was produced.

Currently spaces with charge points tend to be designated for EV charging only, and at existing levels of one to two spaces at each car park this does not have a major effect on capacity planning. However, as EVs and their charging spaces become more common, this policy of designated spaces will need to be reviewed in the medium-term.

- ✓ Consider the balance between:
 - The need to offer an EV driver the certainty of a charging space – which points to reserving them for EVs.
 - The need to maximise use of available capacity in a busy car park – which points to leaving these spaces unreserved, or encouraging non-EV drivers to only use these spaces as a last resort. This could be considered when a large proportion of spaces are charging points.
- ✓ See if it's possible to offer some reserved premium spaces as charging points.

8.7 Added value for customers and operators

There is potential for a range of ancillary services in station car parks. These could include mobile food and drink vendors, pop-up shops, parcel lockers, click-and-collect groceries and convenience stores, as well as car-related services such as servicing and car washing. Some station car parks or forecourts have long-established food and drink vendors who provide a valuable service to customers and a human presence. In other cases, providers come and go in a market with significant churn.

As well as providing added value to the customer and increasing the level of activity and security in the car park, these ancillary services can provide additional income for the railway.

As always, the customer profile and level of footfall at each station will determine whether there is a market for each of these services. They will also be most appropriate where the space is not required for cars (i.e. the car park is not running full), or in marginal space. A location in the station building itself may be a better choice in some cases.

- ✓ Vendors should not be permitted to directly approach railway customers – this is seen as 'touting' and can be unwelcome.

In the same way, as with facilities within the station building, providers of ancillary services should be chosen to reflect the station's desired level of quality and overall image. As an example, car wash services using relatively informal operators have not been successful. A more professional approach is more likely to give better results. Prestige operators can also offer a water-free car wash and extra options such as internal dry-cleaning.

Farmers' markets have demonstrated the potential for commuter station car parks to be put to active use at weekends when occupancy is low. Other potential imaginative uses in that vein include drive-in movies, pop-up theatres or dance classes – local communities may well have ideas.



Click-and-collect grocery collections in station car parks can be a useful convenience for customers.

Photo: Graham James

8.8 Car clubs

Car clubs are now well established in our largest cities and beyond. Some stations have car club parking spaces (typically one or two at each station) and others have spaces nearby.

They offer people the flexibility of a car when needed, without the burden of car ownership. For rail customers, they are most useful at the destination end of the trip, where they can provide onward travel to hard-to-reach destinations and substitute for traditional rental cars.

Different car club operators are active in different areas. The parking spaces can be in on-street, public off-street or private off-street locations. The process of identifying potential spaces may be led by the operator or by the local authority, which may have an agreement with one or more operators to provide parking spaces in

the authority's streets or car parks. The traditional 'back to base' operational model, where the vehicle must be returned to its own space at the end of the hire period, is giving way to a 'point-to-point' model (the most apt for stations) where vehicles can be returned to any car club space, or a 'floating' model where vehicles can be left in any appropriate location.

In the rail context, station operators provide the spaces and car club operators provide the cars. No payments need flow in either direction. A station could be part of a local network of car club spaces, but could equally have the first car club space in the area and potentially be the springboard for such a network.

- ✓ Consider offering car club spaces in station car parks. These spaces should be highly visible and conveniently located.



Car club car at Peterborough station, in a dedicated space close to the main entrance. This is the car club operator's first vehicle in this city. Photo also shows some of the cycle lockers provided at this station.

Photo: Graham James

8.9 Security

General

The two keys to security are lighting and formal or informal surveillance.

Lighting is covered in section 8.5 and Appendix B. It can be dimmed at night on a site-specific basis depending on the car park's needs and level of activity.

CCTV is valuable but not always necessary as it is in part a substitute for natural surveillance. It is only as good as the equipment, its monitoring and management, and the speed of response. Good lighting can be more cost-effective than poor lighting plus CCTV.

- ✓ CCTV should comply with the *National Rail and Underground Closed-Circuit Television (CCTV) Guidance Document* issued jointly by the rail industry and the British Transport Police (BTP).

This provides practical guidance and technical specifications. Compliance also means the system will be compatible with the BTP's national monitoring centre.

- ✓ The BTP's *Stakeholder Brief: Output Requirements from CCTV Systems* provides further guidance.
- ✓ *The Surveillance Camera Code of Practice* sets out guiding principles for ensuring CCTV systems in public places are used proportionately and transparently
- ✓ CCTV cameras, if provided, should be housed in opaque domes as is now the norm. This prevents thieves from seeing where the camera is pointing, or if it is tracking them

- ✓ Ensure that CCTV, if provided, covers the entire car park. Thieves identify 'dark spots' without CCTV coverage. Correct specification, and checking against the specification, can avoid such issues.

Other good practice includes:

- ✓ A gate or shutter allowing the car park to be closed-off when not in use (e.g. when no trains are running)
- ✓ A smooth, solid surface. Lumps or pebbles can be thrown at cars
- ✓ Clear marking and signing add to customers' perception that the car park is well managed
- ✓ Refuse should be stored in a lockable area and wheeled out ahead of collection time, rather than stored in the car park.

BTP's crime prevention design advisers can advise on crime-reduction measures. BTP can also provide specialist counter-terrorism advice. Contact Crime-Reduction@btp.pnn.police.uk. While early engagement is always welcomed, Governance for Railway Investment Projects (GRIP) stage 2/3 is a good time to engage its BTP on specific proposals. This is early enough for their input to be easily reflected as the design progresses, saving time, money and effort.

ParkMark

The British Parking Association's Safer Parking Scheme, operating under the ParkMark brand, is a widely recognised accreditation for secure car parks, used in and beyond the rail industry. The accreditation process involves external assessors working with BTP crime prevention officers. To be successfully accredited, the car park needs to demonstrate a track record of low crime levels and is then inspected against defined security-related criteria. This inspection is free of charge and any issues can be addressed before re-inspection. If successful, there is a modest annual accreditation fee, which allows the ParkMark accreditation to be displayed and publicised. Accredited car parks are re-inspected every one to three years to ensure the standard is maintained.

When assessing for Secure Station accreditation, a car park with ParkMark is one of the criteria. It contributes to the 'points' needed to gain that accreditation.

- ✓ ParkMark accreditation should be sought wherever feasible.

DfT's security requirements

DfT's Land Transport Security Team sets and enforces counter-terrorism security measures on Britain's rail network. As our railways carry large numbers of people to and from thousands of stations, the aims are to reduce risks while allowing people to travel safely, and for protective measures to be proportionate to the threat without unduly affecting the industry's ability to serve its customers.

Station and train operators have legal obligations under DfT's security regulations. Each operator also has a Nominated Security Contact (NSC) who is a key communication channel with DfT and other stakeholders on counter-terrorism security issues.

Key aspects of the measures focus on helping to deter and detect terrorists, and limiting areas of potential concealment. Some of these, which might include not only physical design and location but also operating procedures, affect car parking. The precise requirements will vary according to the proposed scheme, the ancillary services to be provided in the car park (see section 8.7) and the station's individual circumstances. In some cases, the requirements are mandatory.

The NSC should be the first port of call for counter-terrorism security-related information and guidance. Both the DfT and the NSC will be happy to advise and to provide constructive feedback on proposals. DfT's Land Transport Security Team can be contacted at landsecurity@dft.gsi.gov.uk. Physical security advice should be sought at an early enough stage to ensure that appropriate input can be given on designing-in security. Ideally this should be before completion of Network Rail GRIP Stage 3 (option selection) or Royal Institute of British Architecture (RIBA) Stage 2 (concept design).

The Security in Design of Stations (SIDOS) Guide, produced by DfT, BTP and the Centre for the Protection of National Infrastructure (CPNI), is a key reference. A new edition is being produced to supersede the existing 2012 edition. The guide, which is publicly available, gives generic recommendations on physical measures to mitigate the risk of terrorist attacks and other crimes. It focuses on protecting users by designing-in proportionate security measures while taking account of ease of access. It includes guidance on car parking

location and management as well as station approaches, emergency access, and bus and taxi access.

Hostile vehicle mitigation may be required at some stations according to risk levels. Several DfT Traffic Advisory Leaflets and the Home Office's guidance document *Protecting Crowded Places: Design and Technical Issues* (all listed in Appendix A) give practical guidance and case studies, including ways in which street furniture or artwork can be used in support of such measures.



Hostile vehicle mitigation need not consist entirely of bollards, but can include suitable street furniture or other public realm elements.

Photo: British Transport Police



This locomotive at Stratford (London) is not only an attractive and eye-catching landmark in the station forecourt, but also forms part of the hostile vehicle mitigation measures.

Photo: British Transport Police

8.10 Respecting the character of the surroundings

Principles

Car parks in public settings should complement their surroundings. They should be of sufficiently high quality, in specification and visual appearance, to be in keeping with the character of the station concerned.

- ✓ Consider the visual impacts of any new parking infrastructure on the existing environment. An assessment of the site and surroundings should be undertaken at initial stages to determine sensitive locations in respect of visual impacts and heritage.

A few dozen stations in Britain are Grade I or II* listed, representing buildings of outstanding national interest. They may be iconic national landmarks. Hundreds more are Grade II listed. Others may be locally listed or lie within a conservation area, and these too are of significant architectural and historic interest. Car parks around these stations require careful consideration to ensure they do not detract from the character, appearance, setting and integrity of the existing station.

- ✓ Take particular care over shelters, barriers, payment machines and other car park furniture adjoining heritage buildings. Insensitive placement or choice of materials can be visually jarring and will be readily noticed by customers and stakeholders.

Consents

Although many station car park projects can be carried out as Permitted Development (PD), or through the railway's original Victorian legislation, this is not always the case. Some works will require Prior Approval from the Local Planning Authority (LPA) and if this is overlooked only a full retrospective planning permission would regularise the situation. In addition:

- In Conservation Areas, the demolition of a building may require consent. Trees also have inherent protection, and the LPA needs to be notified of an intention to cut down or cut back a tree so that it can assess whether a Tree Preservation Order (TPO) is required
- LPAs can make Article 4 Directions that restrict PD rights in matters such as external finishes. This is most often done in Conservation Areas, but is not confined to them
- The law on listed buildings always over-rides original Victorian railway legislation. Any works affecting the fabric of a listed building, and this includes internal spaces, will require Listed Building Consent. Any works close to a listed

building within its curtilage may also require Listed Building Consent or planning permission due to its impact on the setting of the building

- Historic England, Historic Environment Scotland or Cadw (as appropriate) will be a key consultee for Grade I and Grade II* listed buildings. Other stakeholders who may also be consulted for all grades of listed buildings include the Victorian Society (for buildings of the 1837-1914 era) and the Twentieth Century Society (for post-1914 buildings).

Some consents processes differ between England, Wales and Scotland, and this can also affect the timescales involved. Good practice is to:

- ✓ Seek advice from an in-house consents or town planning specialist, or from the LPA's planning and conservation officers
- ✓ Seek as much agreement as possible through informal pre-application discussions. Resolving issues can be more difficult and time-consuming once the consent application is formally submitted.



9 | Management, maintenance and monitoring



9.1 Management models

Numerous models are available for managing station car parks:

- In-house management
- Engaging a specialist parking contractor
- A hybrid approach – contracted maintenance, with customer service provided in-house by local station staff and enforcement by roving revenue protection inspectors
- Local authority management. This is the predominant model in the Transport for West Midlands area. Elsewhere, some stations have local authority-owned car parks for historic reasons or as a result of the authority's own initiative
- A parking concession. This model is widely used at hospitals but is rare in the rail industry. Concessions can be on a fixed-fee basis (concessionaire takes revenue risk) or a revenue-share basis. New facilities can be on a design, build, finance and operate (DBFO) model, which typically includes revenue-sharing above a certain threshold and handing back the facility after 20 to 30 years.

There is no single right or wrong answer. Different stations, and different financial positions, may benefit from different models.

9.2 Maintenance

The running of individual car parks requires a high level of commitment to ensure everything functions properly and continues to meet users' needs. This ranges from keeping it clean to regular checks on equipment. Close management helps to protect short-term income, such as ensuring payment machines are in service, as well as the long-term level of rail usage.

Daily maintenance

Every car park should have a Life Care Plan: a regime that allows for its whole life to be managed, with issues being spotted and dealt with before they become a major problem. In the rail industry, this is normally incorporated into the Asset Management Plan. Asset management applies to surface car parks too, where the surface layers are themselves a structure with a service life. Potholes, or issues with underground drainage, will affect this life.

Rail Delivery Group

Good practice includes:

- ✓ Drainage should be well-maintained, not just in structures (where drainage problems can lead to structural problems) but also in surface car parks where ponding becomes a nuisance for customers and can make spaces unusable in wet weather.
- ✓ Maintenance and enforcement staff should be encouraged to report ponding and other faults.

This is especially important in structures, where it can be a precursor of spalling or structural problems.

At Peterborough, Virgin Trains East Coast is proposing to install a new car park surface with steel content to significantly extend its service life. The performance of this will offer pointers to its potential wider use.



Before and after: Re-lining of worn markings can make a great difference to the ease of parking, maximising available capacity, and overall customer perception. (As an existing layout, there was no requirement as part of the re-lining to add a safety zone between the accessible spaces and the drive aisle. However, the safety zone would be required in any new layout).

Photo: Graham James



Ponding can be an inconvenience or even a danger for customers. In this example, minor ponding appears to be a result of mismatched surface levels. In other cases, it is an indicator of blocked gullies or drains.

Photo: Graham James

9.3 Monitoring

Operators should monitor:

- ✓ The number of spaces marked. Local changes on the ground may not always be reflected in existing datasets
- ✓ The number of spaces occupied
- ✓ The usage of Blue Badge spaces. This is a mandatory requirement under the Design Standards for Accessible Railway Stations to confirm the number of spaces remains appropriate. It will also be valuable evidence if a derogation is sought (section 7.3).

The measurement intervals may differ for each indicator and depending on the equipment available. For example, barriers and ANPR allow continuous occupancy data. Manual counts should be undertaken at peak parking periods. At most stations, these will be between the peaks on weekdays, during the ‘neutral months’ of April, May, June and September, avoiding public or school holidays. However, at some stations, such as ‘park and rides’ in holiday areas, the peak periods may be different.

9.4 Customer satisfaction

The National Rail Passenger Survey (NRPS) provides general data on satisfaction with access to the station. However, specific customer satisfaction surveys of car park users can identify issues at individual locations, as well as showing what is working well (especially as satisfied customers rarely give unprompted feedback).

These surveys could be carried out in their own right or as part of developing and monitoring a station travel plan. Progress and trends can be tracked through repeat surveys at regular intervals (such as annually, or other intervals in line with the station travel plan) and after any major changes to the car park. The aim should be for a repeatable survey with results recorded and accessible to allow comparison between stations and over time. A suggested approach is shown below.

Suggested approach to car park user surveys

Surveys can be face-to-face or by placing questionnaires on windscreens for the customer to return by post. A prize draw can improve the response rate.

The NRPS provides a good template on how to record satisfaction, with respondents asked: “How satisfied are you with ...?” on a scale of:

- Very satisfied
- Fairly satisfied
- Neither satisfied nor dissatisfied
- Fairly dissatisfied
- Very dissatisfied
- Don’t know/no opinion.

This allows each response to be given a numerical value for further analysis. Issues that may be surveyed, depending on the facilities at the station (or a group of similar stations), include:

- How easy was it to find and get to the car park?
- How easy was it to find a space?
- How easy was it to pay for your parking?
- How satisfied are you with the facilities in this car park?
- How secure do you feel your vehicle is?
- How secure do you feel when using the car park?
- How satisfied are you with the value for money of this car park?

Open questions can also be asked, such as:

- What would you like to see improved?
- What would encourage you to walk, cycle or take public transport to the station?

Finally, respondents can be asked for the postcode where their car journey to/from the station started/finished. This will help to understand the scope for promoting alternative modes.

9.5 Event and disruption management

Special events can pose challenges to car park operation and vehicular access, just as they do with other aspects of a station.

- ✓ Meeting the needs of parking customers, as well as drop-offs, buses and taxis, should be considered as part of special event plans.



With continual improvement and refurbishment of stations across the network, including the car parks themselves, it is sometimes necessary to close car parks entirely or partly. Meeting the needs of parking customers should be considered as part of the project's customer service plan. This could include:

- ✓ Limiting closures to weekends (or other quiet periods) as much as possible
- ✓ Providing temporary alternatives (decanting)
- ✓ Encouraging drivers to use other nearby stations where there is spare capacity – and co-ordinating projects so that adjoining stations are not affected at the same time
- ✓ Encouraging temporary use of alternative modes such as bus, cycling and walking, in line with station travel plan principles (section 3.1). This also has the potential to encourage users to switch to these modes permanently.

Unplanned disruption such as security alerts or power failures can close or restrict access to stations. Station management plans should therefore include appropriate control of and access to parking facilities during such events, especially where parking depends on electrical operation. Staff need to be aware of the procedures necessary to, for example, manually raise barriers if there is an equipment failure, or check parking areas during a security alert. Social media can also help keep users informed in such situations.

Special arrangements, with distinctive event-branded signing, at Cambridge station for the start of a Tour de France stage in 2014. (Alternative drop-off arrangements were available – this is simply a final reinforcement message.) The map on the back of the sign took advantage of this available space and provided useful information for the many visitors by train.

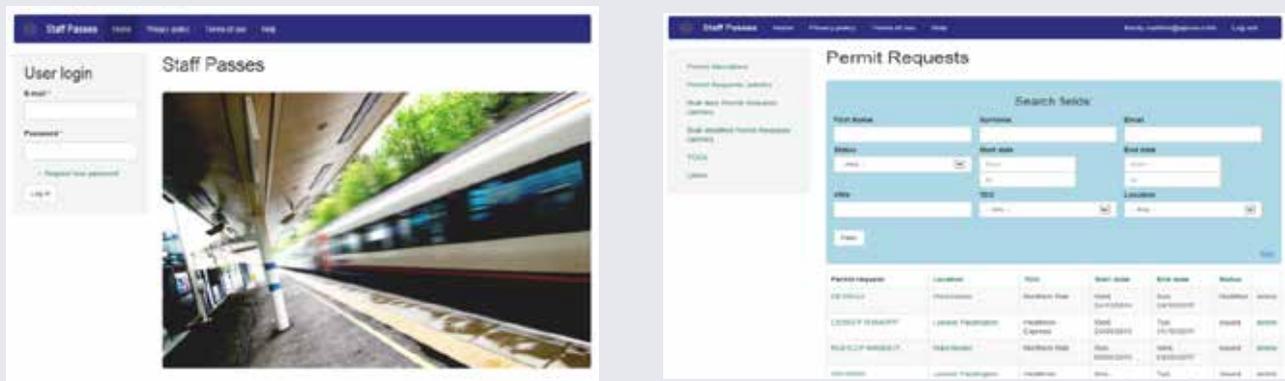
Photos: Graham James

9.6 Staff parking

As well as accommodating customers, station car parks provide operational parking for station staff and other essential users such as the police and Network Rail operations staff. This may involve designated spaces in customer car parks, or dedicated staff car parks. Staff parking permits need to be actively managed to maintain control and minimise the potential for abuse.

- ✓ Use radio-frequency identification (RFID) devices attached to vehicles as an alternative to proximity cards. These can assist traffic flow (quicker to operate barriers) and help to prevent misuse (they can be designed so that the device becomes inoperative if removed from the car). ANPR can also be used
- ✓ Consider use of a permit management portal, such as the Network Rail example below.

CASE STUDY –STAFF CAR PARKING PORTAL FOR NETWORK RAIL MANAGED STATIONS



Screenshots: Network Rail

Network Rail's major stations have staff parking requirements involving 30 companies and more than 4,000 permits. Working with its parking management contractor, Network Rail created a portal that allows all customers to have access to their data, update their vehicle details and request new permits. Deletions can also be made locally, and additional permits can be added up to a company's agreed allocation. If required passes numbers are over and above that allocation, this is flagged and allows the relevant staff to discuss solutions. The details stored in the system meet the additional security requirements associated with parking in non-public areas, and station managers can view vehicle details registered for their own station.

Benefits include:

- Improved customer service to industry partners, who have full control of who has access for the needs of their business
- Staff can obtain their passes immediately rather than having to wait several working days
- Administration workload has reduced, allowing staff to focus more time on other activities
- A reduced ability for permits to be supplied outside the agreed process.

9.7 Innovation and sharing success

Station car parking provides opportunities for innovation. Where new and innovative approaches have been found to be successful, the experience should be shared across all rail networks. This can be achieved by submitting projects for rail industry awards, as well as awards in the wider parking industry.

Technical appendices

Appendix A: Useful sources of information

Context

National Rail Passenger Survey. Transport Focus (annual)

Better Rail Stations Report. Department for Transport. November 2009

Vision for Stations – Nine principles for the future of Britain’s stations. Rail Delivery Group. October 2015

Parking at the Station: results of car park research for the East Midlands region and the Midland Main Line to London St Pancras (Passenger Focus, 2010)

General planning, design and management

Guide to Station Planning and Design. Network Rail. Document number BLDG-SP80-002

The Design of Car Parks for Railway Stations and Depots (NR/L3/CIV/160). Available through IHS

Car Park Designers’ Handbook. Jim Hill, Glynn Rhodes and Steve Vollar. 2013

Design Recommendations for Multi-Storey and Underground Car Parks. IStructE Ltd. March 2011 ISBN 978-1-906335-18-2

Managed Stations Wayfinding – Design Guidelines and Specifications Network Rail. Version 2 2011

Parking Practice Notes British Parking Association

Guidance for Implementation of Electric Vehicle Charging Infrastructure. Transport for London April 2010

Winter Arrangements for Stations. RSSB document ref ATOC/GN027. June 2015

Health Technical Memorandum 07-03: NHS Car-Parking Management: Environment and Sustainability

Integration

Guidelines for development management for stations. Rail Delivery Group publication. June 2014

Guidelines for development management for stations: ‘how to’ companion guide. Rail Delivery Group publication. June 2014

Guidance on the Preparation of Station Travel Plans. ATOC July 2013. (stationtravelplans.com)

Station Travel Plans – Research Toolkit. ATOC May 2013 (stationtravelplans.com)

Cycle-Rail Toolkit 2. Rail Delivery Group publication. April 2016

Motorcycle Parking at Rail Stations Guide. Rail Delivery Group publication. April 2014

Taxi Ranks at Major Interchanges: Best Practice Guidelines. Transport for London

Accessibility

Design Standards for Accessible Railway Stations. Code of Practice by Department for Transport & Transport Scotland. March 2015

Disabled Parking Award (DPA) Accreditation Handbook

Security

ParkMark Assessment Guidelines. British Parking Association guidelines and resources

Security in Design of Stations (SIDOS) Guide. Department for Transport. August 2012

National Rail and Underground CCTV Guidance Document. Rail Delivery Group Publication. November 2010

Stakeholder Brief: Output Requirements from CCTV Systems. Available from crime reduction officers at British Transport Police

Surveillance Camera Code of Practice. Surveillance Camera Commissioner. February 2014 Government website ISBN 9780108512421

Protecting Crowded Places: Design and Technical Issues. National Counter Terrorism Security Office. Government website

CPNI Hostile Vehicle Mitigation website. Centre for the Protection of National Infrastructure

Traffic Advisory Leaflet- Vehicle Security Barriers within the Streetscape. Department for Transport (TAL 01/11)

Traffic Advisory Leaflet -: Bollards and Pedestrian Movement. Department for Transport (TAL 02/13)

Traffic Advisory Leaflet - Influence of Bollards on Pedestrian Evacuation Flow. Department for Transport (TAL 01/16)

Appendix B: Lighting

Car park lighting requires careful consideration to address the task lighting requirements: enabling the mix of motorists and pedestrians to navigate the area safely. The lighting installation also needs to manage energy use, as well as mitigating the impacts on sky glow, adjoining residents, fauna and flora. This can all be achieved through good design, which should be undertaken by a competent lighting professional as defined by the Institution of Lighting Professionals (ILP) or the Society of Light and Lighting (SLL).

The designer should provide all required design information and specifications regarding the task area, as well as the impact on the surrounding environment, identifying where necessary any sensitive receptors.

The appropriate lighting levels and overall uniformity of the lighting scheme should be based on the car park's environmental area (urban or rural) as well as its level of use (light, medium and heavy traffic). Refer to table 5 of BS5489:201. The standard permits the lighting levels

to be considered at different periods of night when the usage is significantly lower. This essentially allows the lighting levels to be reduced during quieter periods such as late evening and overnight. This is good practice, reducing energy consumption as well as impacts on neighbours.

Requirements about obtrusive light are given in *CIE 150: 2003 Guide on the limitation of the effects of obtrusive light from outdoor lighting installations* and the *ILP Guidance notes for the reduction of obtrusive light GN01:2011*. Provided these are complied with, all concerns over light nuisance and pollution will be managed.

In general, the light source should provide a minimum colour rendering index of 60 with a colour temperature of between 3,000 and 4,000 Kelvin. These factors may need to be amended if there are any site-specific issues with respect to fauna and flora, such as bats.

Luminaires and their mounting arrangements should be selected, installed and angled correctly based on their optical performance. This will ensure that the lighting is limited to the task area and lit correctly, and that the requirements of obtrusive light as laid down in *CIE 150* and *ILP GN01:2011* are met.

It is good practice for a competent lighting professional to carry out a post installation acceptance inspection. This will ensure that the design has been installed as specified and intended.

Key documents that need to be considered include:

- *CIE 150: 2003 Guide on the limitation of the effects of obtrusive light from outdoor lighting installations*
- *ILP Guidance notes for the reduction of obtrusive light GN01:2011*
- *BS5489-1:2013 Code of practice for the design of road lighting, Part 1: Lighting of roads and public amenity areas*
- *RIS-7702-INS Rail Industry Standard for Lighting at Stations*
- Any relevant route-level Network Rail guidance.

Appendix C: Potential partners

Partners	Potential benefits
Central government	<ul style="list-style-type: none"> ✓ Sources of funding and guidance ✓ Advice on security
Local government, including Passenger Transport Executives (PTEs)	<ul style="list-style-type: none"> ✓ Local transport planning ✓ Sources of funding and guidance ✓ Delivery of improved routes to stations ✓ Help with developing station travel plans
Transport for London (TfL)	<ul style="list-style-type: none"> ✓ As above ✓ Specifies or manages other modes of transport in London
Local Enterprise Partnerships (LEPs)	<ul style="list-style-type: none"> ✓ Local economic planning ✓ Sources of funding and guidance
Network Rail	<ul style="list-style-type: none"> ✓ Manages the largest stations; landlord elsewhere ✓ Source of funding and guidance
Train Operating Companies (TOCs)	<ul style="list-style-type: none"> ✓ Manage most stations ✓ Sources of funding and guidance ✓ Integrated Transport Managers and Nominated Security Contacts (NSC) can provide specific guidance on their specialist areas
Local station managers	<ul style="list-style-type: none"> ✓ Sources of local information and guidance, plus links to TOC contacts ✓ Help with developing station travel plans
Individual customers	<ul style="list-style-type: none"> ✓ Feedback can be invaluable in understanding their needs and making sure that what is provided meets those needs ✓ Surveys and interviews after new facilities are introduced can help to confirm success and identify any operational snags
Statutory and local rail user groups, community rail partnerships, local amenity societies and transport user groups	<ul style="list-style-type: none"> ✓ Sources of local support and information ✓ Help with developing station travel plans ✓ Input into local improvements ✓ Help with user surveys, station audits and promotional events
Other public transport providers	<ul style="list-style-type: none"> ✓ Help with developing station travel plans ✓ Input into local improvements
British Transport Police and local force	<ul style="list-style-type: none"> ✓ Help with developing station travel plans ✓ Advice on security
Cycle retailers and cycle hire providers	<ul style="list-style-type: none"> ✓ Support for local cycle-rail initiatives ✓ Delivery of services (as contractors operating cycle hubs or hire) and promotional events
Car clubs	<ul style="list-style-type: none"> ✓ Help with developing station travel plans ✓ Making car club vehicles available
Rental car providers	<ul style="list-style-type: none"> ✓ Help with developing station travel plans ✓ Input into car park management
Ancillary service providers	<ul style="list-style-type: none"> ✓ Delivery of services (as contractors) and promotional events ✓ Input into car park management
Non-government organisations	<ul style="list-style-type: none"> ✓ Sector-specific bodies such as Sustrans, CTC, Confederation of Passenger Transport, and British Parking Association can help with technical advice and local contacts
Social enterprise and voluntary organisations	<ul style="list-style-type: none"> ✓ Delivery of services (as contractors operating cycle hubs or hire, or ancillary services) and promotional events



Appendix D: Autonomous vehicles and the future

What is an autonomous vehicle?

An autonomous vehicle (AV) is capable of completing journeys safely and efficiently, without a driver, in all normal traffic, road and weather conditions. Occupants can engage in tasks other than driving throughout the journey. As AVs can move while empty (if the law allows), they can offer door-to-door journeys to meet individual needs, without needing a parking space at either end of the trip. This is critical to the potential impacts on stations.

Is an AV a new mode or are they just the next generation of cars?

Road-based transport is already moving towards fully autonomous operation: all major vehicle manufacturers are heavily invested. Today's cars already have a great deal of automation on board, with cruise control, automatic braking and lane-changing technology trusted to keep customers safe. UK trials of driverless car technology are now continuing in several cities.

Within the next decade, an entirely new mode of transport is likely to emerge. These will be electric vehicles that are designed and built as AVs from the outset, even if they have optional manual controls as an interim step. AVs do not require significant on-street infrastructure investment before they can be used.

Who will own the AVs?

There are two main options: private ownership and shared use. With shared use, people will buy into a mobility service offered by AV providers, rather than owning an AV themselves. The principle is similar to cycle hire schemes and car clubs.

The two models are not mutually exclusive. But their take-up in a particular area will play a major role in determining the impacts on station parking.

What will be the impacts on stations?

The individual owner of an AV might choose whether to remain at the station or go home for the duration of the owner's trip, after making a real-time calculation of the station parking cost versus the operating cost of going home and back again.

With shared AVs, the impacts will depend on what other trips they can make during the day. At a parkway or rural commuter station, the home-to-station flow may be dominant, with relatively few other trips requested nearby, so the demand for station parking will continue.

At stations in town and city centres, AVs that have taken people to the station are likely to be recirculated for other, non-rail-related trips. The demand for station parking will reduce and land could be released for development. The demand for pick-up and drop-off will correspondingly rise, perhaps also eclipsing the role of the taxi rank.

So just as now, the local context of each station and its customers will shape its parking provision.

Appendix E: Example specification for decked or at-grade car parks

This example specification is based on one used successfully by a TOC in its capacity as a station facility owner (SFO). It has been adapted to be a starting point for general use, and also represents a checklist of factors to consider in the design and installation of a car park.

The following specification identifies the employer's requirements for the design and installation of modular decked and at grade car parks. This is to be read in conjunction with all other contract documentation.

The works are to include:

- Provision of all necessary design drawings and specifications
- Assist with the preparation, submission and completion of all necessary consents and approvals
- Provision of all necessary record information, operations and maintenance (O&M) manuals and certification
- Demolition where required
- Site preparation including vegetation clearance where necessary
- Substructure works, including piling where necessary
- Retaining structures
- Resurfacing of existing ground floor where specifically highlighted
- Upper deck frame
- Upper deck finishes
- Speed restriction and deck edge protection
- Cladding as necessary
- Access ramps and stairs (note: lifts are not required)
- Above and below ground drainage
- White lining works
- Fixtures and fittings
- Signage
- CCTV installation and containment
- Pay and Display machines
- Lighting
- Builder's work in connection (BWIC) with electrical and specialist equipment works
- Motor cycle parking
- Storage
- Pedestrian routes

The design and installation shall fulfil the following requirements:

- Ability to maximise the available space and number of car parking spaces on the existing sites within the boundaries indicated within the individual station scope of works
 - Ability to minimise the period over which the works will be delivered on site and therefore minimise the disruption to the existing car park and travelling public
 - Ability to phase the works to minimise the disruption to the existing car park and travelling public
 - Ability to adapt the modular design to meet and incorporate additional planning or site-specific requirements with a sympathetic functional design
 - The design should provide simple maintenance and renewals
 - The design should achieve the most economic and efficient delivery of the project to optimise the cost per car park space delivered
 - The design should consider advertising opportunities
 - The design should consider pest control issues.
- SFO will commission the following surveys to be undertaken and will provide the results to the Design and Build contractor:
- Topographical survey
 - Buried services
 - Statutory authority buried services
 - Electrical load test
 - CCTV underground drainage survey
 - Dilapidations survey
 - Ground investigations (bore hole/window sampling)
 - Ecological survey
 - Opening up works
 - Blue Badge space usage
 - 5m long x 1m deep trench surveys.

Standards

- NR/L3/CIV/160 *The design of car parks for railway stations and depots*
- *ParkMark Standard*
- DfT Code of Practice *Design standards for accessible railway stations*

- DEFRA *National Standards for sustainable drainage systems*
 - [SFO's *Design Guide*]
 - All relevant building regulations
 - All relevant British standards
 - All relevant Eurocodes
 - All relevant Network Rail specifications and standards
- The contractor is to advise the Project Manager of any proposed changes or derogation from the above standards together with justification for the proposed change. Changes from the standards are to be agreed with the Project Manager before implementation in the design or construction.
- The following identifies employer's requirements changes to the above standards.

[SFO's *Design Guide*]

[any changes required]

NR/L3/CIV/160

13.1: Height restriction barrier to be set at 2.1m and not 2.6m

13.1: Adjustable barriers not required

13.12: Lifts not required

15.3: Staff toilets are not required

17.3: Walls and soffits will not be decorated

17.4: Floor tiling not required

20.1: Electrical back-up generation plant and systems not required

20.1: Fire detection and alarm systems not required

20.1: Lifts not required

20.1: Mechanical ventilation not required

20.1: Generator flues not required

20.3: Back-up generators not required

22.2: Mastic asphalt not required to upper deck

23.3: Heated ramps not required

Design parameters

Minimum car parking space dimensions	2.4m wide x 4.8m long
Minimum distance between car parking spaces to allow a vehicle to reverse from space	6m
Minimum width of single access ramp	3m
Minimum width of double access ramp	6m
Access ramp gradient	1:12
Minimum clear head height from FFL to underside of structure: Standard access route	2.1m
Minimum clear head height from FFL to underside of structure: Rail road access route	3.5m (4.1m if a Hiab delivery is required)
Slip rating to upper decks and access ramp	Between R10 - R13
Design life of all elements	50 years

Pedestrian access

- Designated pedestrian access routes will be provided with anti-slip finish, within the 6m span
- Access stairs will be designed in accordance with the Design standards for accessible railway stations Code of Practice and the [SFO's *Design Guide*]

Electrical works and equipment

- Install containment and associated cabling for power and CAT 5 cabling for the installation of CCTV cameras. The containment and cabling will be linked back to the main station building. Install CCTV columns to upper deck
- Liaise with SFO's specialist CCTV manager and installer to co-ordinate the design and installation of the cameras
- Undertake a review of the existing capacity of the CCTV multiplexor and co-ordinate with SFO's specialist CCTV manager and installer regarding any necessary upgrade to the existing system
- Relocate existing pay and display machines as necessary to suit the new layout. The machines on the lower deck must be relocated outside the car park structure to ensure communication signal is achieved
- Install new pay and display machines to the upper levels. Allow for one per deck
- Relocate existing Help Points to suit the new layout.

Lighting

- Design and install lighting and emergency lighting to lower and upper decks
- Lighting lux levels should be designed and installed in accordance with [lighting standard(s)]
- The lighting lux levels should take into account the requirements for CCTV cameras and pay and display machines
- The designed lux levels will be depicted on the design drawings
- The light fittings will be LED and controlled with DALI LIGO
- The lighting should be easily maintained with the introduction of drop down columns to the top deck

- In areas where light pollution may cause a nuisance to the railway, neighbouring roads and/or property, suitable diffusers shall be installed to all necessary light fittings. Where necessary consideration should be given to the installation of additional screening
- The height of the new lighting columns, including those on the new deck, are not to exceed 11m above ground level
- The general surfaces and walkways of the new decks are to have an anti-slip finish

Signing and Lining

- Allow within the design for all necessary statutory directional and health and safety signage, including demarcation of accessible parking spaces
- Allow to liaise with SFO's specialist signage manufacture for the supply and installation of all signage
- The design will allow for the removal of all existing white and yellow lining affected by the new decked car park. The design will allow for the re-lining of new car parking spaces
- The lining of accessible parking spaces will be in accordance with the *Design standards for accessible railway stations* Code of Practice and the [SFO's *Design Guide*].
- Thermoplastic paint will be used for all lining
- Where the existing car parking spaces are of a non-compliant size, this derogation can be continued for all existing spaces. All new car parking spaces are to comply with the minimum requirements of current standards.

Drainage

- The design should allow for all necessary repairs to the existing drainage identified by the CCTV survey to be provided by SFO
- Drainage is to be provided to the upper decks and should be positively connected to the underground drainage system
- Install new underground drainage to suit the new layouts
- Install petrol interceptors to each car park that is larger than 800m² in area or has more than 49 car parking spaces. Separator alarms are to be fitted and linked back to the SFO fault desk

- Allow for a CCTV to be undertaken on the completion of the works
- ACO lockable healguard (or equal and approved) in black are the preferred drainage channel.

General requirements

- On the upper decks, speed restricting humps will be installed to the longer access runs
- On the upper decks, Armco barriers (or equal and approved) will be installed adjacent to the edge of the deck to the end of the longer access runs
- Accessible parking spaces are to be located at ground level only
- In areas where light pollution from headlights may cause a nuisance to neighbouring roads and/or property, a solid infill is to be installed to the balustrade of the upper decks
- The design should incorporate all measures to reduce noise and vibration to a minimum
- The design should reduce and wherever possible irradiate overlooking issues into neighbouring properties
- To comply with Network Rail's requirements for inspections on the structure, a minimum of 1 in 10 ground bearing baseplates are to be made fully accessible for regular inspections
- Where specifically identified under each individual scope of works document, the existing ground level surface is to be replaced in accordance with Network Rail's specifications
- Where the existing surface is to be retained, areas disturbed by the works are to be repaired/replaced to match the existing build up
- Provide storage areas for winterisation
- Provide storage areas beneath the ramp constructed from securi-mesh. Provide a gate with a CCC2 lock
- Heated ramps will not be required
- New height restriction barriers are to be installed to the car park entrance where not already provided
- Fire Service requirements are to be incorporated. Consideration to be given to the installation of a dry-riser
- Provide a central division between spaces on the upper deck

Optional Works

The following works are to be included in the design as optional works:

- Undertake the re-lining of existing car parking spaces and associated symbols and text not affected by the new decked car park
- Provide an option within the design to future proof each of the car parks to allow an additional two upper levels (three upper decks in total) to be constructed in the future. This optional design should take into consideration the inclusion of lifts

Optional electrical works and equipment

- Install containment and associated cabling for power and CAT 5 cabling for the future installation of CIS screens. The containment and cabling will be linked back to the main station building. Allow for two CIS screens per car park
- Install containment and associated cabling for power and CAT 5 cabling for future installation of Help Points adjacent to the pay and display machines. Allow for one per deck.

Appendix F: Glossary of abbreviations

ANPR	Automatic number plate recognition
ATOC	Association of Train Operating Companies (now part of RDG)
AV	Autonomous vehicle
BREEAM	Building Research Establishment Environmental Assessment Method
BTP	British Transport Police
CIL	Community infrastructure levy
CPNI	Centre for the Protection of National Infrastructure
CPZ	Controlled parking zone
DfT	Department for Transport
DMUK	Disabled Motoring UK
DPA	Disabled Parking Accreditation
DVLA	Driver and Vehicle Licensing Agency
EV	Electric vehicle
GRIP	Governance for Railway Investment Projects (Network Rail process)
LHA	Local highway authority
LPA	Local planning authority
NRPS	National Rail Passenger Survey
NSC	Nominated security contact
PCN	Parking Charge Notice or Penalty Charge Notice
PD	Permitted Development
PTE	Passenger Transport Executive
RDG	Rail Delivery Group
RFID	Radio-frequency identification
RSSB	The cross-industry body previously named Rail Safety and Standards Board
SFO	Station facility owner (i.e. station operator)
STP	Station travel plan
TOC	Train operating company
TPO	Tree Preservation Order
VMS	Variable message sign(s)



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