Final Report

Saltford Station: Feasibility Study

Prepared for

Bath & North East Somerset

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CH2MHILL®

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Saltford Station: Feasibility Study

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Executive Summary

This report outlines the more detailed feasibility study into a potential new station at Saltford.

Station location

Two station options have been considered for alternative locations –

- Option 1 - the previous (historic) site on A4 Bath Road, which is Network Rail owned land; and
- Option 2 – cutting north-west of the tunnel, off Chelwood Road, currently recreational ground.

SWOT analysis of both locations outline the key elements, including advantages and disadvantages of each site.

Option 1 has better connectivity with the main road and bus network, it is situated on Network Rail land and has capacity for limited car parking on site. There are potentially some concerns with the access from the A4, due to existing traffic safety issues, which would need to be considered during the design. The site has the benefit of a potential secondary location within 400m walking distance, which could be used for additional parking.

Option 2 is located more centrally within Saltford itself, which is a benefit for those users walking or cycling to the station. However the station would only be able to be accessed by vehicle from a local residential road, through a more residential area. It is situated on the community recreation ground, which would need to the acquired, although the site does have capacity to provide 200 car parking spaces. Due to the location of the rail tracks being in a cutting, some significant earthworks would be required to implement the platforms and associated infrastructure.

Infrastructure requirements and costs

Although both options can be delivered with regards to infrastructure, Option 1 is the preferred option in terms of land availability (within Network Rail land), permanent way and civil engineering considerations. The historic station location is well connected to Bath Road (A4) and has enough space for limited car parking.

Three cost scenarios (based on platform complexity assumptions and contingency) have been developed for the two options. Option 1 is the cheaper of the two options, principally due to the reduced amount of earthworks required to deliver the potential station. Both costings include the cost of providing of 200 car parking spaces (with the secondary car parking location developed for Option 1).

	Scenario A	Scenario B	Scenario C
Option 1	£4.0million	£5.3million	£6.2million
Option 2	£5.6million	£6.8million	£8.0million

Cost considerations include for design and management process, as well as 20% or 40% contingency to account for the preliminary level of the investigations at this stage. Costs do not include for TOC compensation, land acquisition or traffic management requirements.

Socio-economic analysis

Demand for Saltford station is estimated to be 203,700 trips per annum at current day usage levels (two-way movements). This represents some 647 trips per day made by around 325 individuals. To achieve this level of demand, requires two trains per hour to stop at Saltford, being provided by the existing 'stopper' services between Bath Spa and Bristol Temple Meads making an additional stop and the new Metro West stopping service. Demand commensurately drops to under 150,000 trips per annum (474 per day) with only one train per hour at a Saltford station.

Gross revenue forecast to be generated by Saltford station is just over £1m, based on the total demand forecast for the station and a station-to-station trip distribution and fares pattern based on Keynsham.

Of this, some £63,000 is attributed to trips that have transferred from other stations, and is therefore not net revenue for the railway.

In addition, allowance has to be made in determining net revenue to the railway for trips that are potentially suppressed as a result of changes to services to accommodate a stop at a new station. The overall net 'new' revenue for the railway as a result of Saltford station being implemented is £770,000 in the main case (2 trains per hour).

Most users at Saltford would be local to the station, essentially within the village of Saltford (some 72% within 2km and 82% within 3km). Most of these people would walk to the station, and indeed almost half of all station users are forecast to walk. However, as is observed at other stations (and in particular at Keynsham) a sizeable minority will drive to the station from within 2-3km of the station.

The car park at Saltford station would be a pay car park, otherwise transfers seeking free parking could be significant (especially from Keynsham). Assuming a similar parking charge as Keynsham, Saltford would generate almost £90,000 per annum (2013 figures), which would rise with demand into the future.

The results of the economic assessment indicate that Option 1 has the higher BCR (which range, depending on cost scenario, from a reasonable 1.93 to 1.23). As a comparison, economic assessments have also used the sensitivity case demand forecasts (based on one train per hour at Saltford station). The result of this assessment is a reduction in demand which gives a lower BCR between 1.43 and 0.91 (station site Option 1).

Parking and traffic considerations

Traffic calming measures, including 30mph speed camera, are already located on the A4 Bath Road in the vicinity of the potential vehicle access to the station. This indicates there were existing safety issues in the area.

Three traffic engineering options have been developed for access junction layout and its surrounds. All have been developed in consultation with B&NES traffic officers. These range from limited intervention on the existing highway layout, with no ghost right-turn, to a fully signalled junction with ghost right-turn.

The potential secondary parking location, situated on third party owned land, could provide an additional 175 spaces and encourage further mode shift from private car to rail. Although the increased walking distance compared with those drivers parking within the station car park does have in journey time implications and an increase in vehicle vs. pedestrian conflicts across The Shallows.

Public exhibition

As part of this study B&NES were interested to gauge the level of support of Salford residents, as such a public exhibition event was held on Tuesday 25th February 2014 at Saltford Community Centre and a survey conducted. There were 371 responses, of which 69% indicated their support for a potential station in Saltford.

44% of respondents indicated they would use the station on a daily or weekly basis, with the majority of all respondents stating they would walk to the station. Of those who would potentially drive and park, relatively equal numbers specified they would park in the station car park or on-street.

67% of respondents indicated that they would switch from travelling by private car (driver or passenger) to rail, if a station were provided. 9% stated they would switch from another rail station (abstraction).

Risks and next steps

The provision of a station at Saltford is only really viable with the delivery of the MetroWest proposals providing a two-train per hour frequency of service. Following recent discussions with Network Rail on MetroWest proposals, initial indications from their timetable assessment suggests there is sufficient capacity in the timetable to accommodate the extra stop at Saltford.

High-level civil engineering investigations have been carried out as part of this study, to understand if a station is deliverable at potential locations. Findings show that both station options are theoretically deliverable in terms of engineering, with Option 1 being the preferred site.

Ground investigations are required to understand the suitability of the land at the former station site on which the new station could be built. A particularly risk is the steep embankment to the east of the railway line, on which the eastern platform would be constructed. Although a potential mitigation has been proposed (modular platform on micro piles).

The preferred station site option is located on the former (historic) station site, which is owned by Network Rail. However permissions to develop this land into a station will have to be agreed, which may involve the transfer of ownership to B&NES, thus incurring an (as yet unidentified) additional cost. An amount of third party land may also be required to facilitate the station access arrangements. Further third party land would be required for the additional parking site for Option 1, located east of the station along the A4 Bath Road, which is currently owned by The Avon County Rowing Club.

SECTION 1

Introduction

1.1 Introduction

Bath & North East Somerset Council (B&NES) has decided to continue with the development of proposals for a potential station at Saltford, with the move towards ultimately preparing a rail industry GRIP2 study to progress the station towards implementation.

CH2M HILL has been commissioned to undertake a more detailed feasibility study into a potential new station at Saltford, including:

- Station location – consideration of alternative locations for a Saltford station, including an outline design and costings.
- Socio-economic analysis – more detailed demand forecasts, including user origins and access modes and initial set of economic benefits.
- Parking and traffic impacts – size of car park, control of access to car park and potential displacement, and traffic access to station.
- Public exhibition – including an event to seek local residents' views on options for the station.

1.2 Previous Study

The previous study, published in 2012, involved high-level investigations into the feasibility of reintroducing a station at Saltford, as part of the wider study into MetroWest network proposals. The study considered the location of a station on the previous station site only, with regards to demand and capital costs.

1.2.1 Operations

The findings of the previous study concluded that there is potential, operationally, for the existing local (hourly) service between Bath Spa and Bristol Temple Meads to make an additional stop on the line – which could be at Saltford.

Proposals for MetroWest also included provision another local (hourly) service between Bath Spa and Bristol Temple Meads, which could also call at a Saltford station. This could potentially provide a station at Saltford with a half-hourly service.

1.2.2 Demand and revenue

A series of bespoke spreadsheet models were developed to assess different aspects of the proposed rail enhancements, reflecting the available data at the time of the study (NRTS, ORR, PDFH and WoE survey). These models considered the following elements:

- Trips at new stations (on existing and reopened lines);
- Changes in demand at existing stations;
- Diversions of existing trips to new stations; and
- Suppression of demand by extra station calls.

The initial demand forecasts for Saltford station suggest annual gross revenues of almost £382,000, which was derived from over 400 daily station entries and exits (over 123,000 per annum). This gross revenue is identified by the 'direct demand' model of station patronage at Saltford and has been set against the amount of revenue that is abstracted from other stations (existing rail users changing their routes) and potential suppression from stopping and adding journey time to an existing service. This results in a new 'net revenue' for the railway figure of almost £214,000 per annum.

Parking considerations at the station were in line with what could be accommodated on the potential site (without any major infrastructure requirements – i.e. retaining wall) and was comparable with similar stations used in the existing station catchment comparison. This provided a notional car park station capacity of 50-60 spaces.

However the effect of car parking by potential station users does not necessarily directly correlate between demand and the availability of parking at a station, as use of on-street parking around a station is often observed, a particular consequence if a car parking fee is charged.

1.2.3 Capital and operating costs

Capital costs for a potential station at Saltford are dependent on the facilities provided, with indicative costs used based on previous CH2M HILL estimates (drawn from industry sources), project experience and Spon’s guide to railway industry costs.

In order to reflect the early stage of the design process within the study, allowances were made for project and contingency costs as a proportion of the total unit costs (+40%). Basic station costs, not including lifts or booking office, were approximated at £5.5million. This cost also did not account for connections to highway network, land purchase or access and parking considerations.

Operating costs are dependent on the level of provision (i.e. staffed) and whether lifts are required. A range of £35,000 to £140,000 per annum was estimated as a likely range.

1.2.4 Next steps

A number of key assumptions that underpin the case for Saltford were identified in the initial study. Gaining more understanding of the suitability of the assumptions is required to further develop the case, including more detailed demand forecasting, assessment of capital costs, including civil engineering requirements, and assessment of traffic impact and parking provision requirements.

1.3 Structure of the report

This technical report sets out findings of further investigations, including:

- Chapter 2 – station site option identification;
- Chapter 3 – infrastructure requirements;
- Chapter 4 – capital costs;
- Chapter 5 – socio-economic analysis;
- Chapter 6 – option development;
- Chapter 7 – public exhibition;
- Chapter 8 – risks; and
- Chapter 9 - next steps.

SECTION 2

Option Identification

2.1 Introduction

The project brief identified two potential locations for investigation within this study. These are discussed in more detail below, and include:

- Option 1 – the previous (historic) station site; and
- Option 2 – in the cutting north-west of Saltford tunnel.

Figure 2-1 shows the locations of the station site options. An initial SWOT (strengths, weaknesses, opportunities & threats) analysis has been completed for both locations, as a preliminary assessment of the key issues. This chapter reports the SWOT analysis of each location.

In the first instance, site visits were carried out to further understand feasibility of the different locations with regards to:

- Access – pedestrian, cycle and vehicle;
- Potential for car parking - on-site, on-street and alternative parking locations;
- Location within Saltford – proximity to population; and
- Suitability of site – to accommodate station facilities.

Following initial investigations into the suitability of each location, further examination of the locations has been carried out to assess potential civil engineering requirements, with indicative costs identified for each site, based on potential civil engineering requirements. Subsequent chapters outline these findings and associated costs.

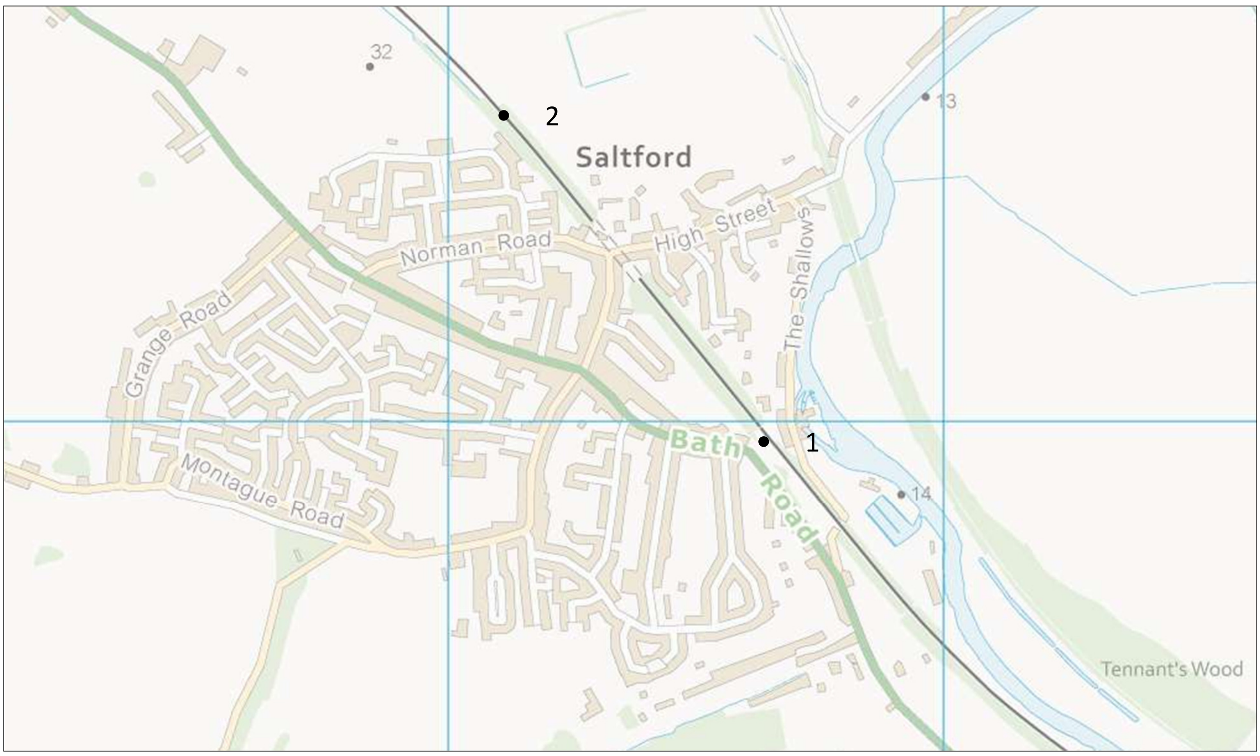

Figure 2-1: Potential station site location options

2.2 Option 1 – old station site

2.2.1 Site Description

The potential site is located directly off the A4 at the eastern fringe of Saltford. Figure 2-2 shows the location of the station site Option 1, illustrating distance contours from the station to the remainder of Saltford.

Vehicle and pedestrian access would be from the A4. The Network Rail owned land is currently used as a storage yard and as an access point onto the rail line. It has potential space for two platforms and limited parking spaces on-site. The station site is bounded by rail line to the north, A4 to the south; to the north of the rail line the embankment drops to the road level (The Shallows) and to the canalised river.

A 30mph speed limit has been adopted along the A4 outside of the potential station site, with static speed camera and traffic calming measures. Travelling from Saltford to the station, drivers would have to negotiate a sharp bend and steep hill prior to a left turn into the station access. Drivers travelling from Bath towards Saltford station would be travelling along a national speed limit single-carriageway road, dropping in speed to 30mph approximately 200metres before turning right into the station access.

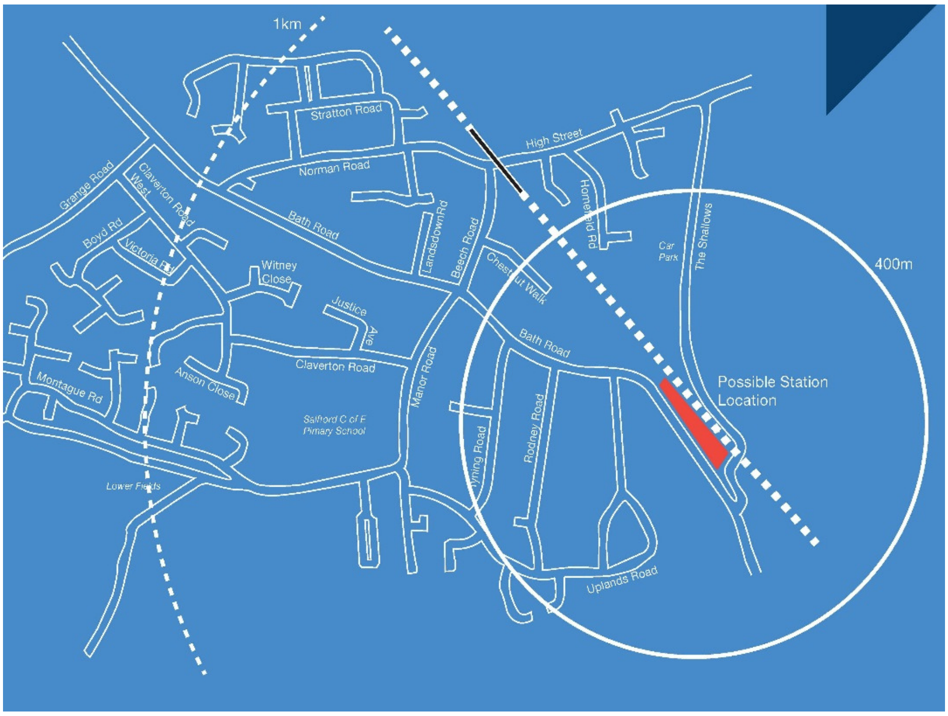

Figure 2-2: Potential station location – Option 1

2.2.2 SWOT analysis

The following strengths, weaknesses, opportunities and threats have been identified, with regards to the potential location of the site:

Strengths

- Old station site – network rail owned land;
- Potential for two-platform station with car parking;
- Bus stop located outside the site – enable those residents unable to walk or with no car to access the station from Saltford;
- Access off the main road, potential to intercept drivers and encourage mode shift; and
- No on-street parking along A4.

Weaknesses

- Limited space for on-site car parking;
- Local roads within 200-400m of site that could potentially be used for informal on-street parking by station users;
- Access issues due to road layout – steep hill and sharp bend, already traffic management mitigation in place; and
- Site over 800m walk distance from majority of Saltford population.

Opportunities

- Potential available land (private-green field) within 400m for additional parking, if demand requires;
- Space for disabled parking on site; and
- Located on approach to Saltford, mode shift could reduce traffic using A4 through Saltford and onto Bristol.

Threats

- The distance of the additional parking site from the station is likely to incur journey time penalties to make it less attractive as an alternative to driving;
- Potential traffic impact of rail users who travel by car to station;
- Potential for some on-street parking on side roads within 400metres of the site – could require controlled parking zones or double yellow lines; and
- Could cause abstraction from X39 bus service, reducing the commerciality and potentially triggering requirement for reduction in frequency or subsidy.

2.3 Option 2 – North-West of Saltford tunnel

2.3.1 Site description

The potential site is located on the northern edge of Saltford, near to High Street. Figure 2-3 shows the station site location, with accompanying distance contours across Saltford.

The site is directly north of the tunnel, located in a deep cutting. There should be space for two platforms to be constructed, although this may require engineering works to reconfigure the embankments to fit in platforms. The station is located within a cutting that is bounded by the tunnel to the south and houses above on both sides of the line.

Vehicle access would be from Chelwood Road, with the potential for non-vehicle access to also be gained by a single-track private road between two houses/walled gardens, off Norman Road. Drivers travelling from Bath towards Saltford would turn right off the A4, along Beeches Road, left onto Norman Road and right into Chelwood Road. There is private land (part of the community centre and recreation ground) adjacent the station site, which could be made into car parking.

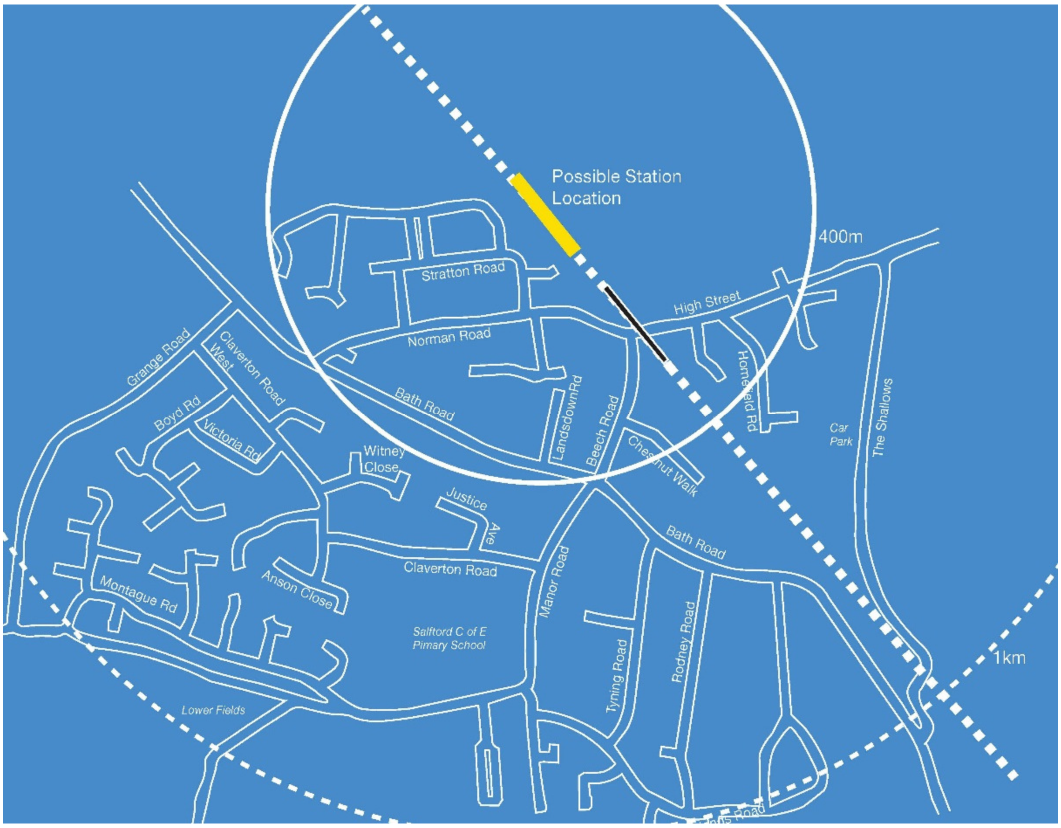

Figure 2-3: Potential station location – Option 2

2.3.2 SWOT analysis

Strengths

- Site is more centrally located within Saltford – potential for more rail users to walk; and
- Potential for two-platform station.

Weaknesses

- Access road to the station site is via residential streets, which is not suitable the level of traffic demand for the station;
- Bus access directly outside the station would not be possible;
- Require extensive engineering works to facilitate station platforms and access into the cutting; and
- Further from A4, would require drivers to 'divert' from the route, incurring journey time penalty.

Opportunities

- Land available in close proximity to potential site for car parking.

Threats

- Potential for on-street parking on Chelwood Road, Stratton Road and surrounding area unless controlled parking zone is implemented;
- Significant increase in traffic along residential roads within Saltford; and
- Land for car parking is currently community sports fields and recreation ground.

SECTION 3

3 Infrastructure requirements

3.1 Station sites

Having identified the broad station site location options and carried out a SWOT analysis, the next step was to determine station site locations in more detail (platform locations, access arrangements, car parking etc.) and investigate civil engineering aspects of potential station designs (in outline), as well as elements of permanent way and signalling, so that realistic costs could be developed.

An initial desktop study was undertaken using Google Earth, OS mapping, the NR Sectional Appendix, five-mile diagrams and Quail maps, in addition to a site visit, to get a general impression of the potential station locations, and to consider the sites based on four major criteria:

- land availability;
- size of station including construction footprint (varies due to earthworks);
- accessibility; and
- environmental factors.

Each station site has to be able to accommodate a minimum 160m platform length, with access arrangements and car parking facilities. As such, the potential sites need to have easy access to public roads. The final criterion was to make sure construction of the station would not be impeded by environmental concerns, mainly wetlands and farming. All these considerations were taken into account to ultimately find a preferred site for the potential station.

Key considerations for the station sites, drawing on the SWOT in chapter 2 and initial engineering assessments outlined above are set out in a series of access and engineering related advantages and disadvantages for the sites, as follows.

Option 1 – old station site

- Advantage – space for parking is available (adjacent to western platform).
- Advantage – the whole station, including parking area, is within Network Rail land.
- Advantage – road access to the parking area close by (Bath Rd, A4).
- Advantage – western platform area seems to be level so no retaining walls required.
- Disadvantage – space at the northern end of the eastern platform might be constrained, though there seems to be enough space for a minimum 2.0m wide platform.
- Disadvantage – the eastern platform area seems to be on an embankment so earthworks and retaining walls might be required (this may be avoided using a modular platform on micro piles).

Option 2 – North-West of Saltford tunnel

- Advantage – sufficient space for parking is available around the station site.
- Disadvantage – road access to a potential western parking area is only partially available, an extension of Chelwood Road via the existing recreation ground would be required.
- Disadvantage – road access to an eastern platform and potential parking area is difficult (off Norman Road, which would have to be widened, and might require a retaining wall which would infringe on existing property boundaries).
- Disadvantage – land would have to be acquired for the station, parking and access.
- Disadvantage – track at the station site is in cutting. As such, space for a western platform is very tight, and retaining walls are likely to be required to construct both platforms.

3.2 Permanent way

Horizontal track alignments have been established to assess the suitability of the station site locations in terms of track curvature, using a combination of OS mapping and Bentley Microstation. Outline results of this assessment indicate that:

- Option 1 is on a straight alignment which is ideal for platforms, and the preferred situation for siting new stations.
- Option 2 is located such that it would be partially within a transition between an approximately 4000m radius curve and straight track. While straight track is preferred for platforms, this level of curvature is considered achievable for a platform location. Note that it is assumed that the transition coincides with a cant transition between 0mm to 50mm with a transition length of 60m and a maximum line speed of 100mph.

Vertical track alignments have also been considered, to determine the suitability of the station site options in terms of track gradient at the station, established using the five-mile diagram of this area.

Both station site options are located on a track with a gradient of 1:1320. While flat sections of track are preferred for new stations, this gradient is well below the de facto maximum allowed gradient for new station platforms of 1:500, and thus likely to encounter no problems in being compliant with Network Rail standards.

Hence, both station site options appear to be feasible in terms of the key permanent way parameters at the locations considered.

3.3 Signalling

The signalling system, including the arrangement of existing signals, their positions and associated track circuits will need to be assessed for compatibility with the potential station locations. This has not been considered in this study, but it is likely that the signalling system will require modification, the detail for which would be identified during the design process of the station.

For instance, at platform ends, new start signals with associated berth track circuits and location cases will be required. Any bi-directional signalling requirements will also have to be examined. As a result a red-green signalling scheme plan should be produced for station signalling area at GRIP 3 stage (option selection). The final option will eventually be developed at GRIP 4 stage (outline design). Signal positions and train stopping point locations will be subject to a signal sighting chairman’s recommendation prior to GRIP 5 design.

The requirements are likely to be similar at either station site option.

3.4 Station civil engineering

The outline station designs considered in this study are based on the following assumptions, which are common to both station site options:

- Station platforms (160m long);
- Car parking spaces provided;
- Platforms shelters to be provided;
- Disability Discrimination Act (DDA) access arrangements;
- Long line public address (LLPA), customer information system (CIS), closed circuit television (CCTV) and ‘Help Points’ to be provided; and
- Adequate fencing is required.

Note that it is assumed that land outside B&NES or NR boundaries can be procured if required for either of the station site options, though the cost of doing so not included in the cost estimates.

3.4.1 Option 1 – old station site

This station option is located at the former Saltford station site, between Bath Road (A4) and Marina, as shown in Figure 3-1. One of the main advantages of this site is the availability of vacant space to its west. This area is flat, thus it avoids earthworks and associated costs, and is within NR boundaries.

Figure 3-1: Option 1 potential station site

Figure 3-2 shows an indicative station design layout for an option 1 station. The main disadvantage of this site is that the north-eastern platform and DDA ramp will have to be built on an embankment. In addition a retaining wall or micro piles would be required on the northeast side of the station to support the platform and DDA access ramps.

Figure 3-2: Option 1 potential station layout with parking facility

3.4.2 Option 2 – North-West of Saltford tunnel

The site selected is located just northwest of Saltford (at approximately MP 112) as shown in Figure 3-3. **Error! Reference source not found.**The main advantage of this site is that it is situated more centrally within Salford and as such offers easy access to the west via Chelwood Road with land available to build car parking facilities. However, the land required is part of the recreation grounds and would have to be acquired.

Error! Reference source not found.Error! Reference source not found. Figure 3-4 shows an indicative station design layout for an option 1 station

The main disadvantages of this site for station construction is that it is located in cutting and at the start of a transition curve towards the west. The platforms and DDA ramps would need to be built within the cutting, with the likely consequent requirement for earth retaining walls for their support.

From an environmental point of view, paving the land for parking has impacts, including loss of greenspace and additional costs.

Figure 3-3: Option 2 potential station site

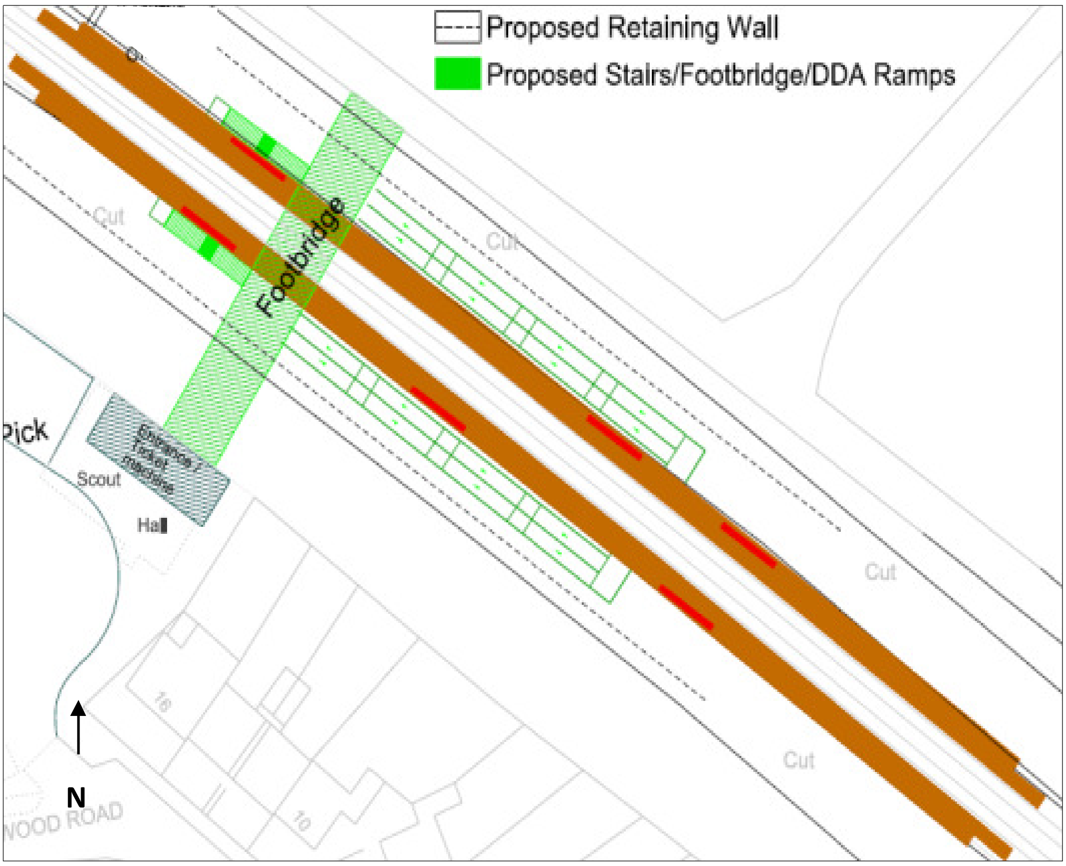

Figure 3-4: Option 2 potential station layout

3.5 Preferred location

Option 1 is the preferred option in terms of land availability (within Network Rail land), permanent way and civil engineering considerations. The old station location is well connected to Bath Road (A4) and has enough space for limited car parking.

A potential retaining wall is only required for the eastern platform; however using modular platforms on micro piles might erase the need for this retaining wall. A topographical survey at a later stage should clarify if this is a feasible option.

Even if there was a need for a retaining wall, it would only be to one side and thus result in less earthworks and disruptions than Option 2. This fact should have a decisive impact on costs as well.

For these reasons it is anticipated that this option is both the more feasible and the cheaper of the two.

SECTION 4

4 Capital costs

4.1 Introduction

This chapter sets out the capital costs for a Saltford station, both site options, including the assumptions used in the assessments. The total costs include the construction cost of the station, signalling and non-construction costs (design development and project management). Costs do not account for land acquisition (as noted earlier) or train operating company (TOC) compensation during construction.

Initial derivations of cost are outlined first, with sensitivities based on the level of contingency built into the cost assumptions. Recent discussions with Network Rail have resulted in consideration of a higher contingency assumption than previously used. In addition, this takes into account possible alternative civil engineering requirements for the northern platform (eastbound) at the old Saltford station site (Option 1), as well as both platforms at Option 2.

Hence, three capital cost scenarios have been developed:

- Scenario A – uses a 20% contingency assumption and standard cost build up with no alternative civil engineering considerations for the platforms (this scenario was used in the exhibition event costings).;
- Scenario B – takes into account enhanced platform considerations, with 20% contingency; and
- Scenario C – accounts for enhanced platform considerations, and introduces a 40% contingency in line with NR discussions.

4.2 Cost build-up

4.2.1 Station construction costs

Station construction costs include the following for each option:

- Station platforms (160m long);
- Car parking spaces;
- Platform shelters and ticket machines;
- Disability Discrimination Act (DDA) access;
- Ground works, including any cutting/re-profiling/stabilisation, retaining walls, piling, etc.;
- Fencing, landscaping and signage;
- Vehicle access link to highway; and
- Cycle parking provision.

Note though that no allowance is included for land acquisition required for the station and/or car park or for TOC compensation during construction.

Total station construction costs for each station option and costing scenario are shown below:

	Scenario A	Scenario B	Scenario C
Option 1	£2.3 million	£3.1 million	£3.1 million
Option 2	£3.2 million	£4.0 million	£4.0 million

4.2.2 Signalling

Basic changes to signalling should cost £125,000 for all signalling requirements (including associated telecoms), to take it through the full GRIP process of design, installation, testing and commission handover. This assumes existing three-aspect auto signals in the vicinity of the station may be retained and adapted to save on the need to provide extra signals and equipment. An additional cost of £30,000 has already been included within the base construction costs for LLPA, CIS, CCTV and Help Points at the station.

Total cost assumption for signalling = £125,000 for both options.

4.2.3 Non-construction costs

Non-construction costs cover overall design development and project management costs, including preliminary works, GRIP stage development, testing/commissioning and possession management. As the development of these costs are still at a high-level due to the preliminary nature of the investigations, the non-construction costs are provided as a percentage of the base station construction costs (excluding signalling costs).

Table 4-2 outlines the capital cost considerations for the potential station options in Saltford with cost assumption scenario B, including a more conservative account of civil engineering requirements for platforms than Scenario A. The 20% contingency has been retained for this scenario.

Table 4-3 outlines the capital cost considerations for the potential station options in Saltford with cost assumption scenario C. This includes a more conservative account of civil engineering requirements for platforms than Scenario A and a 40% contingency.

Table 4-1 outlines the percentage assumptions for the various non-construction costs with cost assumption scenario A. This includes a contingency of 20% applied to the totalled construction and development costs, which is standard practice at this preliminary level of investigation.

Table 4-2 outlines the capital cost considerations for the potential station options in Saltford with cost assumption scenario B, including a more conservative account of civil engineering requirements for platforms than Scenario A. The 20% contingency has been retained for this scenario.

Table 4-3 outlines the capital cost considerations for the potential station options in Saltford with cost assumption scenario C. This includes a more conservative account of civil engineering requirements for platforms than Scenario A and a 40% contingency.

Table 4-1: Scenario A – initial capital costs

Scenario A		**Option 1**	**Option 2**
Total Base Construction Cost		**£2,325,790**	**£3,243,540**
Signalling		**£125,000**	**£125,000**
Non Construction Costs	% of Base		
Contractor preliminaries	20%	£465,158	£648,708
GRIP stages 4 development	1%	£23,258	£32,435
GRIP stage 5 detailed design	2.5%	£58,145	£81,089
Project Management & Sponsorship	10%	£232,579	£324,354
Testing and commissioning	2.5%	£58,145	£81,089
Possession management	2.5%	£58,145	£81,089
TOC Compensation	0%	£0	£0
Land Acquisition Purchase	-	£0	£0
Total Non-Construction Cost		**£895,429**	**£1,248,763**
Sub Total		**£3,346,219**	**£4,617,303**
Contingency	20%	£669,243.83	£923,460.58
TOTAL		**£4,015,463**	**£5,540,763**

Table 4-2: Scenario B - capital costs (20% contingency)

Scenario B		**Option 1**	**Option 2**
Total Base Construction Cost		**£3,093,790**	**£4,011,540**
Signalling		**£125,000**	**£125,000**
Non Construction Costs	% of Base		
Contractor preliminaries	20%	£618,758	£802,308
GRIP stages 4 development	1%	£30,938	£40,115
GRIP stage 5 detailed design	2.5%	£77,345	£100,289
Project Management & Sponsorship	10%	£309,379	£401,154
Testing and commissioning	2.5%	£77,345	£100,289
Possession management	2.5%	£77,345	£100,289
TOC Compensation	0%	£0	£0
Land Acquisition Purchase	-	£0	£0
Total Non-Construction Cost		**£1,191,109**	**£1,544,443**
Sub Total		**£4,409,899**	**£5,680,983**
Contingency	20%	£881,980	£1,136,197
TOTAL		**£5,291,879**	**£6,817,179**

Table 4-3: Scenario C - capital costs (40% contingency)

Scenario C		**Option 1**	**Option 2**
Total Base Construction Cost		**£3,093,790**	**£4,011,540**
Signalling		**£125,000**	**£125,000**
Non Construction Costs	% of Base		
Contractor preliminaries	20%	£618,758	£802,308
GRIP stages 4 development	1%	£30,938	£40,115
GRIP stage 5 detailed design	2.5%	£77,345	£100,289
Project Management & Sponsorship	10%	£309,379	£401,154
Testing and commissioning	2.5%	£77,345	£100,289
Possession management	2.5%	£77,345	£100,289
TOC Compensation	0%	£0	£0
Land Acquisition Purchase	-	£0	£0
Total Non-Construction Cost		**£1,191,109**	**£1,544,443**
Sub Total		**£4,409,899**	**£5,680,983**
Contingency	40%	£1,763,959.66	£2,272,393.16
TOTAL		**£6,173,859**	**£7,953,376**

4.2.4 Summary

The capital costs for each scenario have been summarised for the two options below in Table 4-4.

Table 4-4: Summarised total capital costs (rounded)

	Scenario A	**Scenario B**	**Scenario C**
Option 1	£4.0million	£5.3million	£6.2million
Option 2	£5.6million	£6.8million	£8.0million
Contingency assumption	20%	20%	40%
Platform civils assumption	Standard	Conservative	Conservative

SECTION 5

5 Socio-economic analysis

5.1 Introduction

An important part of the socio-economic analysis is to understand potential demand for the station, in terms of the quantum of passengers, likely origins (and destinations) and means of accessing the station. This section briefly describes the demand forecasts carried out, including initial results for demand, catchment origins and access mode, and subsequent economic assessments

Outputs of the socio-economic assessment will ultimately be an initial set of economic benefits for the station, considering issues such as levels of demand, impact on highway congestion and overall time savings for all transport users. This includes an assessment of the Net Present Value (NPV) of benefits and Benefit Cost Ratio (BCR) for the scheme to develop into the business case for the station.

In calculating the economic benefits, the same demand forecasts (for station site Option 1) have been used for both station sites. Although there are differences of detail in access arrangements, they are similarly located with respect to the main catchment of the station.

5.2 Methodology

5.2.1 Models

A series of approaches are required to assess different aspects of a new station at Saltford. These consider three main elements that together enable the net total benefit to the railway to be established, including:

- Total trips generated by the new station;
- Existing rail trips diverted from existing trips to the new station; and
- Suppression of demand at existing stations by an extra station call.

Total station demand

Demand forecasting work undertaken as part of the previous Saltford station study was a very high level assessment based around the MetroWest rail proposals for the Bristol area. This used one or two specific benchmark stations as the focus for likely demand and revenue impacts, essentially a direct trip rate approach.

As part of this study, the method has been improved through use of a simple gravity model technique, which takes into account the relationship between journeys and catchments at a number of similar stations. Regression techniques have been used to identify a series of demand/catchment relationships for several types of movements, including journeys made using full price tickets, reduced price tickets and season tickets, and between ‘independent’ stations (such as Chippenham and Keynsham), ‘regional’ stations (such as Bath Spa and Bristol Temple Meads), ‘urban’ stations (Oldfield Park, Bedminster etc.) and London stations, as the characteristics of such trips can differ. Stations used in the regressions are drawn from the local West of England area locations as much as possible.

Diversions of existing trips to new station

An estimate of how many trips are new to the railway or transferring from other stations is assessed using a station choice logit model, using generalised costs calculated for whole journeys from origin (home in many cases) to destination (i.e. work) via the existing station used, which NRTS data identifies, compared with a similar trip using the new station.

Suppression of demand

This method overlays the direct demand impact of the station with an appraisal of lost demand to existing rail passengers on the stopping train. Where a new station is implemented on an existing line, there is potential to affect demand on services passing through (and stopping) at the new station, as a result of lengthening journey times. This can have a significant effect on revenue if the services to be stopped at a new station are fast and/or long distance, where the journey time penalty is greater and/or fares paid are higher than more local journeys.

5.2.2 Data Sources

A number of data sources have been used to develop demand forecasts for Saltford station. These are outlined briefly below.

National Rail Travel Survey (NRTS)

The National Rail Travel Survey (NRTS) provides estimates of the number of rail trips at stations on a notional and typical day and includes origins and destinations of trips using the rail network, both in terms of rail journeys themselves (the first, intermediate and last stations used) and the 'true' origin and destination of trips (including the locations where the overall journey started and finished, such as home, work or other location and the mode of station access/egress). Other journey characteristics derived from NRTS data includes ticket types, journey purposes and journey frequency. NRTS data is key to developing the bespoke gravity type model for Saltford station.

MOIRA2

MOIRA2 is used by the rail industry to forecast the impact of timetables on passenger revenue, including analysing the effect of changes to a timetable such as stopping patterns, infrastructure and rolling stock on the passenger numbers carried and the revenue impact. MOIRA2 is used to assess timetable changes. MOIRA2 is useful to this study in that it can assess the effects on existing services of instituting a new station stop. MOIRA2 was previously provided to the study team by the DfT for use in the Metro West studies. Information from these previous analyses has been utilised in this study in generalised cost and fare/revenue calculations, though no specific assessments have been possible for this study[1]. Note that information from MOIRA2 is provided as commercial in confidence and must not be reported in a disaggregated way that could jeopardise this confidentiality.

National Statistics and 2011 Census

Population and employment statistics are taken from 2011 Census population figures and National Statistics Nomis official labour market statistics for 2010 respectively.

GBATS & GBATH

The Greater Bristol Modelling Framework (GBMF) includes two multi-modal transport demand models that cover Saltford at the same level of disaggregation, where GBATS has its greatest detail in Bristol and GBATH is centred on Bath. These models have provided demand and generalised cost information to assist in station choice modelling and the development of transport economic benefits.

Office of Rail Regulation (ORR) statistics –

Station passenger counts. The latest ORR station statistics were published in February 2013. ORR station totals are used in conjunction with NRTS and MOIRA2 data to update o present day figures as required.

Passenger Demand Forecasting Handbook (PDFH) –

The PDFH summarises knowledge of the effects of service quality, fares and external factors on rail passenger demand, and provides guidance on applying this knowledge to the preparation of forecasts for investment and service planning. Values in the PDFH can be used to assess demand responses to timetabling and operating decisions. Note that (like MOIRA2) the PDFH contains material that is commercially confidential in nature. No specific details of the information used from PDFH will be included in this report.

[1] Note that Saltford was modelled using MOIRA2 as part of the 'new stations package' that would follow Phase 2 of Metro West – i.e. with 2 local trains per hour to Bath, 2 trains per hour to Severn Beach and Portishead (phase 1), plus Henbury line and Yate turn-back (phase 2) all in place.

5.3 Forecasts

5.3.1 Demand and revenue

Two scenarios have been considered; the main forecast with a half hourly operation (fully integrated with MetroWest) and a sensitivity forecast with an hourly operation. Headline results of demand forecasts are shown in Table 5-1.

Table 5-1: Saltford demand and revenue forecasts

2013 figures

Demand/revenue	Main case 2-trains/hr		Sensitivity case 1-train/hr	
	total	transfer	total	transfer
Annual demand	203,700	15,300	149,170	11,200
Annual revenue	£1,005,000	£63,000	£736,000	£46,000
Daily demand (average)	647	49	474	36

Demand for Saltford station is estimated to be 203,700 trips per annum at current day usage levels (two-way movements). This represents some 647 trips per day made by around 325 individuals. To achieve this level of demand, requires two trains per hour to stop at Saltford, being provided by the existing 'stopper' services between Bath Spa and Bristol Temple Meads making an additional stop and the new Metro West stopping service. Demand commensurately drops to under 150,000 trips per annum (474 per day) with only one train per hour at a Saltford station. Some 7.5% of demand is forecast to be existing rail users transferring from other stations in the area (mostly Keynsham and Oldfield Park).

Revenue

Gross revenue forecast to be generated by Saltford station is just over £1m, based on the total demand forecast for the station and a station-to-station trip distribution and fares pattern based on Keynsham. Of this, some £63,000 is attributed to trips that have transferred from other stations, and is therefore not net new revenue for the railway.

In addition, allowance has to be made in determining net revenue to the railway for trips that are potentially suppressed as a result of changes to services to accommodate a stop at a new station.

This has been assessed by identifying as many trips as possible that currently pass through Saltford on the existing 'stopping' services between Bath Spa and Bristol Temple Meads, and applying an increase in journey time to allow for an additional stop at Saltford. Trips previously output from MOIRA2 have formed the basis for this assessment (it has not been possible to re-run MOIRA2 for this study). A two minute additional journey time was added to the generalised journey times of these trips, and the revised demand calculated using elasticities derived from PDFH. The resulting suppression of demand at some £172,000 per annum (2013 demand).

The overall net 'new' revenue for the railway as a result of Saltford station being implemented is £770,000 in the main case (2 trains per hour), and £518,000 in the sensitivity case (1 train per hour).[2]

5.3.2 Catchment and access modes

The total demand forecasts have been further analysed to identify the locations that potential users of a Saltford station would come from, as well as the likely modes of transport they would use to reach the station. This is based primarily on analysis of users at Keynsham station, identified from NRTS data. NRTS data provides the true origin of trips, as well as the mode of transport used to access the station.

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[2] Note that suppression is the same in both main and sensitivity cases, as the service that forms the second train per hour in the main case is a new service, for which demand suppression is not applicable.

Trips using Keynsham station as the origin station for an outward journey on a return ticket and using a single ticket from Keynsham were considered as being indicative of users accessing the station. This information was extracted from NRTS and adjusted to better-represent the specific circumstances at Saltford. The resulting forecast pattern of movements and modes of station users is shown in Table 5-2.

Table 5-2: Catchment distribution and access mode shares

Based on Keynsham station

Catchment	Walk	Bus	Car parked	Car drop off	Bicycle	ALL
Less than 1 km	34.5%	0.8%	7.7%	1.9%	1.3%	46.2%
from 1 to 2 km	12.8%	0.8%	10.2%	1.3%	1.3%	26.4%
from 2 to 3 km	0.5%	-	6.6%	2.4%	0.5%	9.9%
from 3 to 4 km	-	1.2%	4.2%	0.5%	-	5.9%
from 4 to 5 km	-	0.2%	0.7%	0.2%	-	1.1%
from 5 to 10 km	-	-	7.0%	1.5%	-	8.5%
More than 10 km	-	-	2.2%	-	-	2.2%
TOTAL	47.8%	2.9%	38.6%	7.7%	3.0%	100.0%

numbers may not add up exactly to totals due to rounding

Table 5-2 indicates that most users at Saltford would be local to the station, within the village of Saltford (some 72% within 2km and 82% within 3km). Most would walk to the station, and indeed almost half of all station users are forecast to walk. However, as is observed at other similar stations (and in particular at Keynsham) a sizeable minority will drive to the station from within 2-3km of the station. Similarly a reasonable minority will travel from further away (mostly up to 10km from the station), and virtually all of these will use cars, mostly parking at or near the station. Almost as many station users are forecast to use cars as would walk, with up to 40% of all station users looking to park at the station.

Table 5-3 translates these catchment and mode splits into passenger numbers by mode of access and catchment distance, based on the main demand forecast for Saltford of 647 trips per day. Almost half of all trips are likely to be day returns, thus suggesting some 325 individuals arriving at the station. A key figure in Table 5-3 is that some 125 people are forecast to be seeking to park a car at the station each day. As such, car park capacity that demand forecasts indicate would be sought by users at Saltford would require around 130-140 spaces (allowing demand + 10% and spaces for disabled users). Demand forecasts assume that car parking is available, so would reduce if spaces were constrained.

Figure 5-2 illustrates the information in Table 5-3 on a map, showing where users of Saltford station could come from, and the mode of transport used to access the station (Figure 5-2 shows the wider catchment, where Figure 5-3 shows Saltford in greater detail). This distribution is based on aggregate centres of population within the distance catchment bands, with logical realism adjustments as appropriate (such as no station users from north of the River Avon, as a result of poor access to Saltford, or access routes passing other stations along the way).

Table 5-3: Rail users accessing Saltford – by origin catchment and access mode (2013)

Catchment	Walk	Bus	Car parked	Car drop off	Bicycle	ALL
Less than 1 km	112	3	25	6	4	150
from 1 to 2 km	42	2	33	4	4	86
from 2 to 3 km	2	-	21	8	1	32
from 3 to 4 km	-	4	14	2	-	19
from 4 to 5 km	-	1	2	1	-	3
from 5 to 10 km	-	-	23	5	-	28
More than 10 km	-	-	7	-	-	7
TOTAL	155	9	125	25	10	325

numbers may not add up exactly to totals due to rounding

Figure 5-4 shows the split approaching the station. Most station users (around 75%) come from west of the station (unsurprising since the station is located on the eastern edge of Saltford). However, there is an imbalance in access modes for station users from east or west of Saltford, with people approaching the station from the east being far less likely to walk and more likely to drive (96% of walkers come from the west). Some 45% of car trips are forecast to approach the station westbound along the A4.

It should be note at this point that these forecasts represent an ‘average day’ at 2013 demand levels, and do not take into account fluctuations in demand, such as seasonal variation. Likewise, demand forecasts are based on present day patronage for rail services, and there is every likelihood that demand will rise in future.

Parking revenue

The car park at Saltford station would be a pay car park, otherwise transfers seeking free parking could be significant (especially from Keynsham). Charges should therefore also be consistent with Keynsham, which currently costs £2.30 to park for a day (in cash – £2.10 if paid by phone). Assuming this sort of parking charge at Saltford would generate almost £90,000 per annum (2013 figures), which would rise with demand into the future.

Suppression of demand

It can clearly be seen from the forecasts that a significant proportion of potential station users will seek to drive and park at or near the station. This in itself has implications for the size of car park required, charging regime at the car park and a consequent possible need to restrict parking on streets within reasonable walking distance of the station. This issue is not discussed further in this chapter.

However, it is interesting to note the potential effect on demand should the car park be restricted in size, and no nearby street parking available. In simplistic terms, demand could therefore be reduced accordingly. Also, behaviour of users would adjust, with early arrivals filling the car park, preventing later arrivals from parking. Potential users within 2km of the station may decide to walk instead of drive, but others beyond that are more likely to divert elsewhere or use another mode, as the risk of not being able to park would be less easy to overcome. As such, the number of rail users at Saltford could drop to around 250 per day if the car park capacity was capped at 50 spaces, which is only marginally more demand than would be generated by a 1-train per hour service (sensitivity case).

5.4 Future demand

5.4.1 Growth rates

Demand for rail travel has grown significantly in recent years, with, for example, an almost 70% increase in passenger numbers being recorded through stations in the West of England area between 2004/05 and 2011/12 (based on ORR figures). This includes even larger increases on specific routes, such as more than doubling of patronage on the Severn Beach line. Historic growth rates at groups of West of England stations are shown in Figure 5-1 and

Table 5-4.

Apart from a slight levelling in 2007/08, growth has continued in spite of the economic recession, and seems likely to continue, albeit it is debatable whether the rates will be as high as seen in recent times. Industry forecasts produced by Network Rail as part of developing its Great Western Rail Utilisation Strategy (RUS) and Long Term Planning Process (LTPP) Regional Urban Markets Study identify lower rates than recently observed historic rates. The Great Western RUS (published in March 2010) forecasts that demand in the Bristol area would rise by 41% at peak times between 2008 and 2019 (a rate of 3.2% per annum), and 37% off peak (2.9% per annum), with an average growth rate of 3.0% per annum.

The LTPP Regional Urban Markets study (consultation draft published April 2013) uses a series of economic scenarios to frame growth in rail use. The resulting growth varies from 0.6% per annum to 3.9% per annum. More details of the LTPP growth rates are shown in Table 5-5.

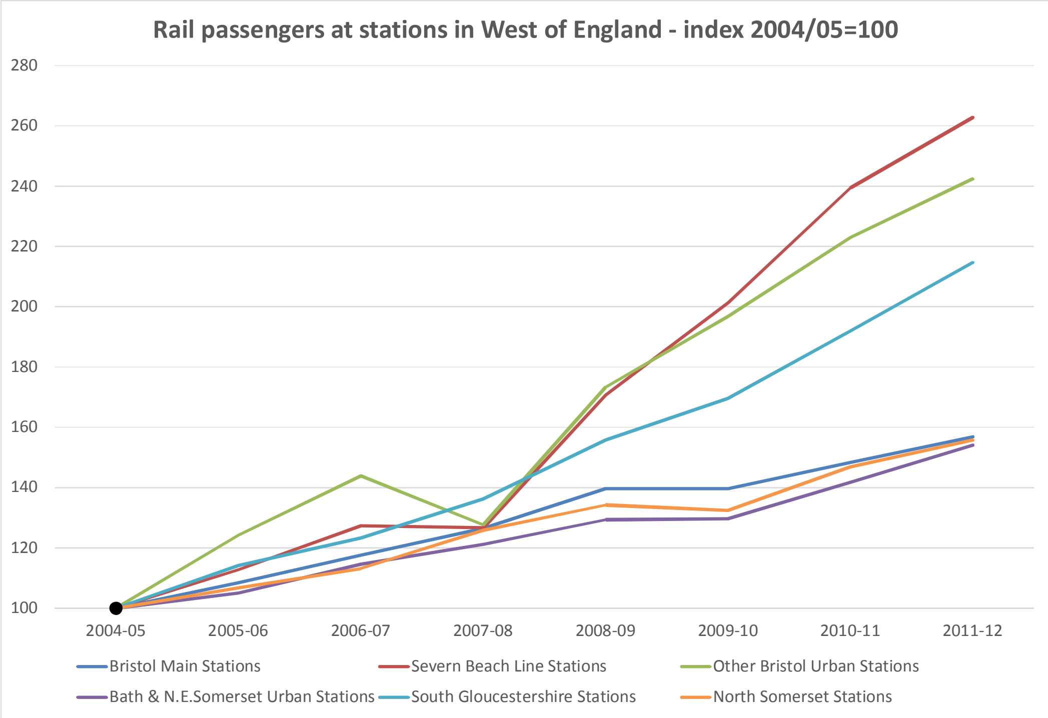


Figure 5-1: ORR historic growth in West of England area

Table 5-4: ORR historic patronage growth in West of England area (2004-2012 figures)

Station groupings	2010/11 to 2011/12 per annum	2009/10 to 2010/11 per annum	2004/05 to 2011/12 TOTAL	2004/05 to 2011/12 per annum
Bristol main (Temple Meads & Parkway)	5.7%	6.1%	57%	6.6%
Severn Beach Line	9.8%	18.9%	163%	14.8%
Other Bristol urban	8.7%	13.3%	142%	13.5%
B&NES (incl. Keynsham)	8.7%	9.3%	54%	6.4%
South Gloucestershire (excl. Parkway)	11.8%	13.2%	115%	11.5%
North Somerset	6.0%	10.9%	56%	6.5%
OVERALL	8.7%	10.9%	69%	7.8%

Table 5-5: Network Rail LTPP: Regional Urban Markets Study (consultation draft April 2013)

Economic scenario	2013-23 total	2013-23 per annum	2023-2043 total	2023-2043 per annum
'Prosperity in isolation'	14%	1.3%	33%	1.4%
'Global stability'	47%	3.9%	44%	1.8%
'Struggling in isolation'	6%	0.6%	15%	0.7%
'Global turmoil'	35%	3.0%	21%	1.0%
AVERAGE	26%	2.3%	29%	1.3%

It is clear from the industry forecasts that historic rates of growth are not considered to continue unabated. As such, future year forecasts for Saltford have been produced using a combination of historic rates, RUS and LTPP figures:

- 2013 to 2017 – taper from recent historic growth rates (6.4% at Bath & North East Somerset stations) to RUS average of peak and off peak (3.0% per annum);
- 2018 & 2019 – RUS average rate (3.0% per annum);
- 2020 to 2023 – taper from RUS average rate (3.0% per annum) to an LTPP average rate derived from the four economic scenarios (2.3% per annum); and
- 2023 to 2043 – taper from 2023 LTPP average rate (2.3% per annum) to 2043 LTPP average rate (1.3% per annum).

Table 5-6 shows the resulting profile of demand at Saltford from to 2043, assuming that Saltford station would open in 2019, including annual and daily (average day) demand, as well as the implied demand for car parking at the station. Figures are included from 2013 to 2019 for illustration purposes, as demand forecasts have been carried out in the current ear equivalent. It is clear from this table that car park capacity could be under pressure fairly quickly.

Table 5-6: Saltford station future year forecasts – main case (2-trains per hour)

Based on 2013 forecasts and NR RUS & LTPP growth rates

Year	**Rail trips**		**…park car at station**
	ANNUAL	DAILY	DAILY
2013	203,700	647	125
2014	210,100	667	129
2015	216,700	688	133
2016	223,400	709	137
2017	230,300	731	142
2018	237,300	753	146
2019	244,500	776	150
2020	251,500	798	155
2021	258,200	820	159
2022	264,600	840	163
2023	270,700	859	166
2024	276,700	879	170
2025	282,800	898	174
2026	288,900	917	178
2027	295,000	936	181
2028	301,000	956	185
2029	307,000	975	189
2030	313,000	994	192
2031	318,900	1,012	196
2032	324,800	1,031	200
2033	330,600	1,050	203
2034	336,400	1,068	207
2035	342,100	1,086	210
2036	347,700	1,104	214
2037	353,300	1,121	217
2038	358,700	1,139	220
2039	364,100	1,156	224
2040	369,300	1,172	227
2041	374,500	1,189	230
2042	379,500	1,205	233
2043	384,400	1,220	236

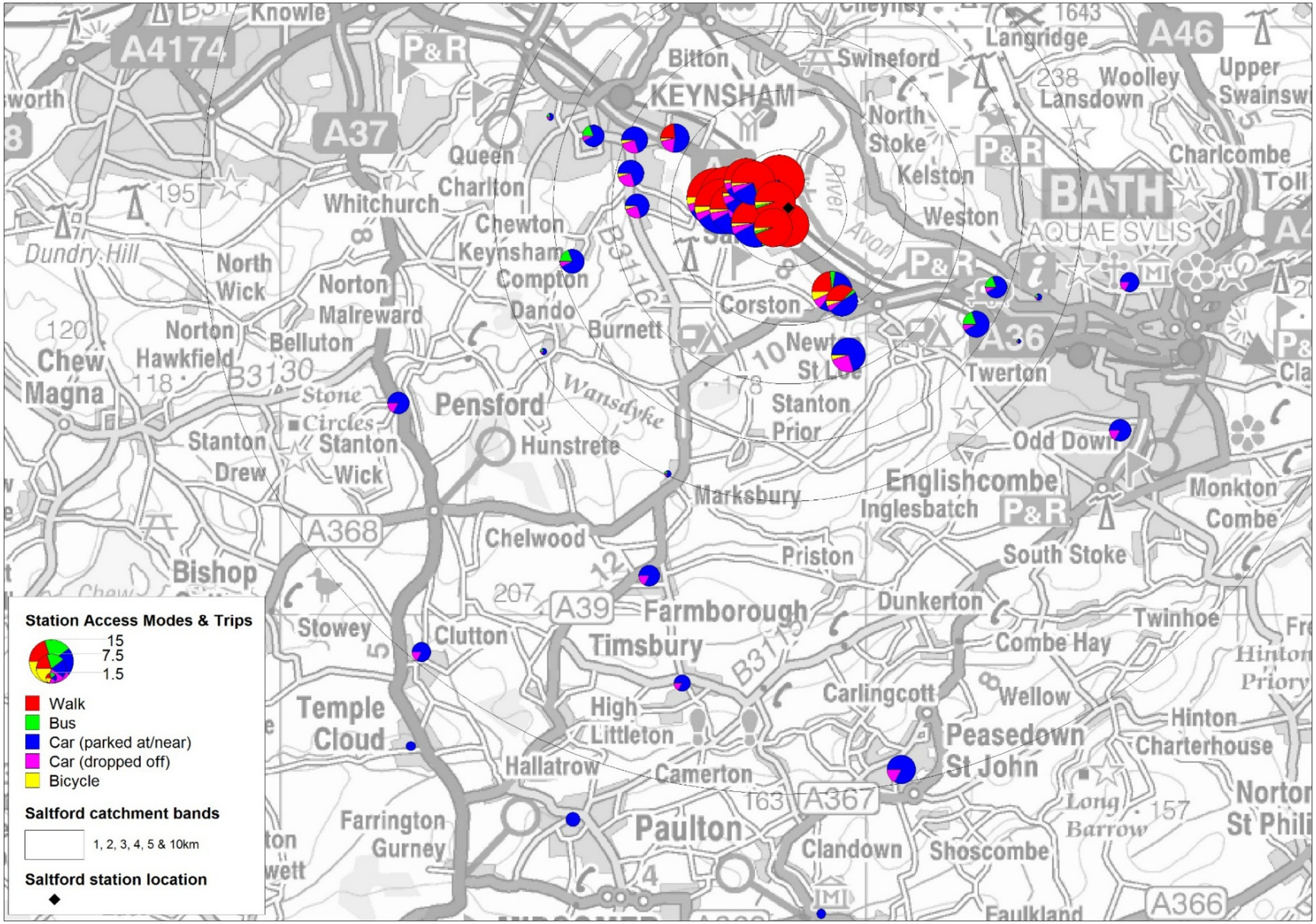


Figure 5-2: Saltford station catchment and mode of access (Option 1)

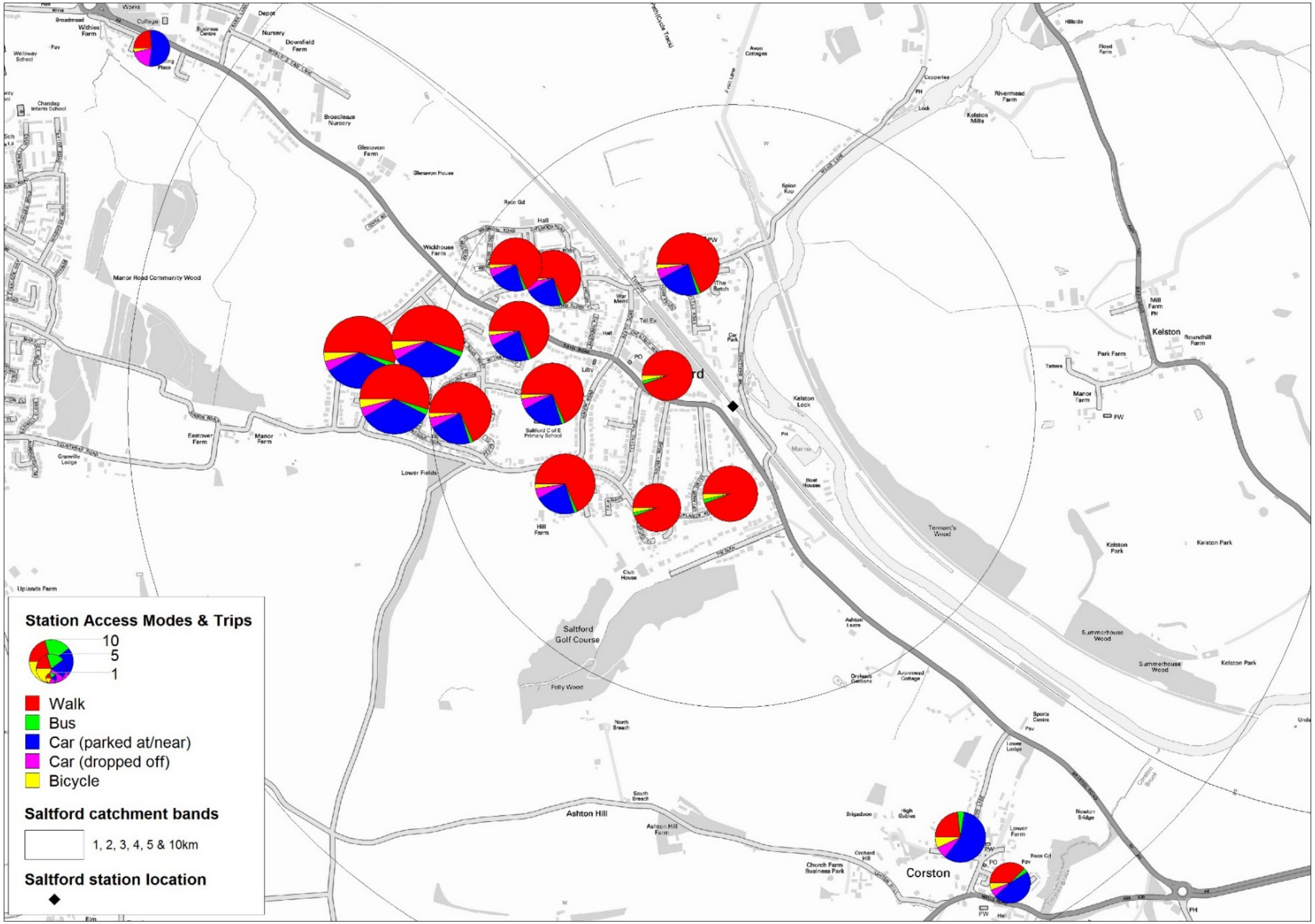
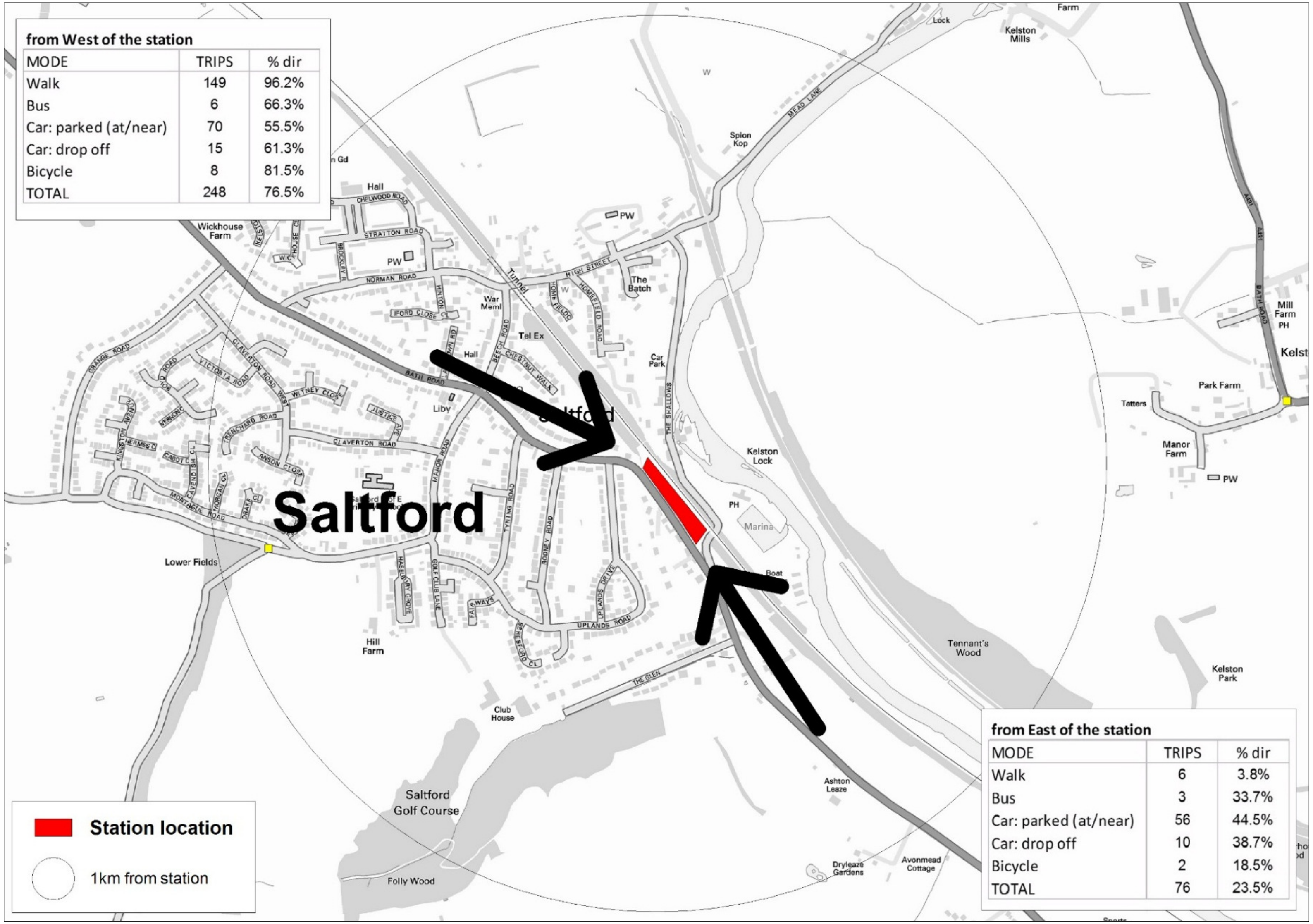


Figure 5-3: Saltford station catchment and mode of access (Option 1)



from West of the station

MODE	TRIPS	% dir
Walk	149	96.2%
Bus	6	66.3%
Car: parked (at/near)	70	55.5%
Car: drop off	15	61.3%
Bicycle	8	81.5%
TOTAL	248	76.5%

from East of the station

MODE	TRIPS	% dir
Walk	6	3.8%
Bus	3	33.7%
Car: parked (at/near)	56	44.5%
Car: drop off	10	38.7%
Bicycle	2	18.5%
TOTAL	76	23.5%

Figure 5-4: Saltford station catchment – local approach directions (Option 1)

5.5 Economic assessment

Demand forecasts and estimated costs for Saltford have been combined to produce estimates of the economic benefits of the station. This is a simplified assessment, making use of available data to convert direct demand forecasts for rail demand to road and rail user benefits. The economic assessment includes assessment of the time benefits associated with car and rail trip changes. Trips from Saltford are broadly assumed to generate benefits based on the AM peak, with trips to Saltford being related to PM peak conditions. Opening year is assumed as 2019, with construction being in 2018.

The economic assessment does not include vehicle operating costs, user charges (platform fees, fares and car park revenues), costs/benefits during construction and maintenance, monetisation of environmental or wider economic impacts, and assessment of the effects on tax revenues.

5.5.1 Times and trips

Results of Saltford station catchment analysis from demand forecasts are allocated to a grouped zoning system common to both the GBATS and GBATH models ('GBM zones'). The local station catchment is defined in terms of GBATS and GBATH zones that cover the distance-based catchments identified in the demand forecasts. The wider catchment includes zones that represent a possible distribution of stations that rail trips using Saltford could go to/from, based primarily on the distribution at Keynsham.

Corresponding car trip and journey times are extracted from the multi modal models, incorporating information from both GBATS (which is aimed at Bristol) and GBATH (centred on Bath), to utilise the different levels of detail of GBATS and GBATH appropriately. Similarly, existing rail trips and journey times are also extracted, to give consistent base figures for both modes for the station catchment.

Origin to destination car trips to/from the station catchment are adjusted to reflect station forecasts, using initial car trips to distribute changes. Similarly, forecast rail trips are allocated to the catchment using existing rail trips as a guide. Assumptions used in this adjustment are as follows:

- Mode split of Saltford station access is as reported above (almost 40% of station users are forecast to park a car).
- Demand forecasts are converted from 2013 equivalents to 2011 figures, for consistency with GBATS/GBATH trips/times.
- 7.5% of Saltford station trips are forecast to divert from other rail stations – car trips are added to the Saltford rail catchment accordingly.
- 25% of Saltford station trips transfer from car –trips are removed from the car origin-destination matrix for the station catchment, and added to movements that access the station itself. [3]
- The remaining 67.5% of trips are a combination of transfers from other modes and newly generated trips – some of these are assumed to access the station by car, so are allocated to car trips accessing the station accordingly.
- Car journey times for zone-to-zone movements are not adjusted to reflect reductions in congestion, as this has not been specifically modelled.
- Rail journey times derived from GBATS and GBATH are similarly not adjusted, to apply a consistent approach for rail and car trips.

[3] Adjusted figure based on generic figures presented in Leeds ITS research: "several studies have shown that, while around 60% of new usage comes from bus, around 20% is transferred from car use, and 20% newly generated (Nash, 1992; Cristobal, Garcia and Gonzalez, 2001)" – an additional 5% is allowed to transfer from car, reflecting the frequency, quality and destinations of bus services through Saltford.
http://www.konsult.leeds.ac.uk/private/level2/instruments/instrument004/l2_004b.htm

5.5.2 Costs

The assessment takes into account both capital and operating costs of the station. No allowance is made for fares and train operating costs, making the tacit assumption that any additional train operating costs incurred by stopping at Saltford are matched by additional revenue. This is considered pessimistic.

Capital costs

Capital costs calculated for both station site options were discussed earlier in this report. Costs include construction and development costs, contingency at 20% (cost Scenarios A & B) or 40% (cost Scenario C) of construction and development costs and an allowance for signalling (£125k for each option). Total costs as used in the economic assessments are as follows:

Scenario A

- Option 1 – historic Saltford station site £4.0m
- Option 2 – west of Saltford Tunnel £5.6m

Scenario B

- Option 1 – historic Saltford station site £5.3m
- Option 2 – west of Saltford Tunnel £6.8m

Scenario C

- Option 1 – historic Saltford station site £6.3m
- Option 2 – west of Saltford Tunnel £8.1m

The economic assessment provides results for the full range of these costs. Note though that no allowance is included for land acquisition required for the station and/or car park or TOC compensation during construction. Optimism bias of 50% is added to total capital costs for the assessment (based on rail scheme appraisal in WebTAG unit 3.13.3).

Station operating costs

Operating costs have been calculated using assumptions based on capital costs, derived from CH2M HILL experience on other studies, as follows:

- Annual maintenance at 1.5% of capital costs per annum.
- Periodic cost 1 – additional 9% of capital costs every 10 years.
- Periodic cost 2 – additional 13% of capital costs every 30 years.

A 5% premium is added to these figures to allow for on-going risk. Optimism bias of 40% is added to operating costs (based on rail scheme appraisal in WebTAG unit 3.13.3).

5.5.3 Results

In calculating the economic benefits, the same demand forecasts have been used for all station sites, as both are similarly located with respect to the main catchment of the station (i.e. Saltford itself). Hence the present value of benefits (PVB) is the same for each, with varying costs resulting in different present values of costs (PVC), and as a result net present values (NPV) and benefit cost ratios (BCR).

Table 5-7 shows PVB, PVC, NPV and BCR for the two Saltford station site options for Scenarios A, B and C. Figures 5.5-5.12 show more details of the assessment including Transport Economic Efficiency (TEE), Public Accounts and Analysis of Monetised Costs and Benefits (AMCB) tables for both of the station location options.

The results of the economic assessment indicate that Option 1 has the higher BCR, being based on the lowest costs (depending on scenario from a reasonable 1.93 to 1.23). As a comparison, economic assessments have also used the sensitivity case demand forecasts (based on one train per hour at Saltford station). The result of this assessment is shown in Table 5-8. In essence, reduced demand that a one-train per hour service would result in, gives a lower BCR between 1.43 and 0.91 (at the historic station site).

Table 5-7: Saltford station economic assessment – site option comparison – main case (two-trains per hour)

Costs and benefits both appear as positive numbers
All entries are present values discounted to 2010, in 2010 prices

Saltford station site		Present Value of Cost	Present Value of Benefits	Net Present Value	Benefit/Cost ratio
		PVC	PVB	NPV	BCR
Option 1 – historic station site					
	Scenario A	6,534	12,616	6,081	1.93
	Scenario B	8,601	12,616	4,015	1.47
	Scenario C	10,281	12,616	2,335	1.23
Option 2 – west of Saltford Tunnel					
	Scenario A	9,062	12,616	3,554	1.39
	Scenario B	11,080	12,616	1,536	1.14
	Scenario C	13,246	12,616	-630	0.95

Table 5-8: Saltford station economic assessment – site option comparison – sensitivity case (one-train per hour)

Costs and benefits both appear as positive numbers
All entries are present values discounted to 2010, in 2010 prices

Saltford station site		Present Value of Cost	Present Value of Benefits	Net Present Value	Benefit/Cost ratio
		PVC	PVB	NPV	BCR
Option 1 – historic station site					
	Scenario A	6,534	9,316	2,782	1.43
	Scenario B	8,601	9,316	715	1.08
	Scenario C	10,281	9,316	-964	0.91
Option 2 – west of Saltford Tunnel					
	Scenario A	9,062	9,316	254	1.03
	Scenario B	11,080	9,316	-1,764	0.84
	Scenario C	13,246	9,316	-3,930	0.70

Economy:Economic Efficiency of the Transport System(TEE)

Consumer - Commuting user benefits	All Modes	Road	Rail	
Travel Time	8,521	5,252	3,269	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**8,521**	**5,252**	**3,269**	
Consumer - Other user benefits	**All Modes**	**Road**	**Rail**	
Travel Time	1,394	859	535	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**1,394**	**859**	**535**	
Business	**All Modes**	**Road**	**Rail**	
Travel Time	2,701	1,665	1,036	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**2,701**	**1,665**	**1,036**	
Private Sector Provider Impacts	**All Modes**	**Road**	**Rail**	
Revenue	-	-	-	not assessed
Operating costs	-	-	-	not assessed
Investment costs	-	-	-	not assessed
Grant/subsidy	-	-	-	not assessed
Subtotal	**-**	**-**	**-**	
Other business Impacts	**All Modes**	**Road**	**Rail**	
Developer contributions	-	-	-	not assessed
NET BUSINESS IMPACT	**2,701**	**1,665**	**1,036**	
TOTAL	**All Modes**	**Road**	**Rail**	
Present Value of Transport Economic **Efficiency Benefits (TEE)**	**12,616**	**7,776**	**4,839**	

Benefits appear as positive numbers, while costs appear as negative numbers
All entries are present values discounted to 2010, in 2010 prices

Public Accounts

Local Government Funding	ALL MODES	Road	Rail	
Revenue	-	-	-	not assessed
Operating Costs	2,469	-	2,469	
Investment Costs	4,065	-	4,065	
Developer Contributions	-	-	-	not assessed
Grant/Subsidy Payments	-	-	-	not assessed
NET IMPACT	**6,534**	**-**	**6,534**	
Central Government Funding: Transport	**ALL MODES**	**Road**	**Rail**	
Revenue	-	-	-	not assessed
Operating costs	-	-	-	not assessed
Investment costs	-	-	-	not assessed
Developer Contributions	-	-	-	not assessed
Grant/Subsidy Payments	-	-	-	not assessed
NET IMPACT	**-**	**-**	**-**	
Central Government Funding: Non-Transport				
Indirect Tax Revenues	-	-	-	not assessed
TOTALS				
Broad Transport Budget	6,534	-	6,534	
Wider Public Finances	-	-	-	

Costs appear as positive numbers, while revenues and developer contributions appear as negative numbersin 2010 prices
All entries are present values discounted to 2010, in 2010 prices

Analysis of Monetised Costs and Benefits

Greenhouse Gases	-	not assessed
Economic Efficiency: Consumer Users (Commuting)	8,521	
Economic Efficiency: Consumer Users (Other)	1,394	
Economic Efficiency: Business Users and Providers	2,701	
Wider Public Finances (Indirect Taxation Revenues)	-	not assessed
Present Value of Benefits (PVB)	**12,616**	
Broad Transport Budget	6,534	
Present Value of Costs (PVC)	**6,534**	
OVERALL IMPACTS		
Net Present Value (NPV)	**6,081**	
Benefit to Cost Ratio (BCR)	**1.93**	

TUBA PVB	12,616	
Noise	-	not assessed
Local Air Quality	-	not assessed
Journey Ambience	-	not assessed
Accidents	-	not assessed
Reliability	-	not assessed
Rail	-	not assessed
Wider Impacts	-	not assessed
Final PVB	12,616	
NPV	6,081	
BCR	**1.93**	

Costs and benefits both appear as positive numbers
All entries are present values discounted to 2010, in 2010 prices

Note: This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

Figure 5-5: TEE, Public Accounts and AMCB – Scenario A – Saltford station site Option 1

Economy:Economic Efficiency of the Transport System(TEE)

Consumer - Commuting user benefits	All Modes	Road	Rail	
Travel Time	8,521	5,252	3,269	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**8,521**	**5,252**	**3,269**	
Consumer - Other user benefits	**All Modes**	**Road**	**Rail**	
Travel Time	1,394	859	535	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**1,394**	**859**	**535**	
Business	**All Modes**	**Road**	**Rail**	
Travel Time	2,701	1,665	1,036	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**2,701**	**1,665**	**1,036**	
Private Sector Provider Impacts	**All Modes**	**Road**	**Rail**	
Revenue	-	-	-	not assessed
Operating costs	-	-	-	not assessed
Investment costs	-	-	-	not assessed
Grant/subsidy	-	-	-	not assessed
Subtotal	**-**	**-**	**-**	
Other business Impacts	**All Modes**	**Road**	**Rail**	
Developer contributions	-	-	-	not assessed
NET BUSINESS IMPACT	**2,701**	**1,665**	**1,036**	
TOTAL	**All Modes**	**Road**	**Rail**	
Present Value of Transport Economic **Efficiency Benefits (TEE)**	**12,616**	**7,776**	**4,839**	

Benefits appear as positive numbers, while costs appear as negative numbers
All entries are present values discounted to 2010, in 2010 prices

Public Accounts

Local Government Funding	ALL MODES	Road	Rail	
Revenue	-	-	-	not assessed
Operating Costs	3,424	-	3,424	
Investment Costs	5,638	-	5,638	
Developer Contributions	-	-	-	not assessed
Grant/Subsidy Payments	-	-	-	not assessed
NET IMPACT	**9,062**	**-**	**9,062**	
Central Government Funding: Transport	**ALL MODES**	**Road**	**Rail**	
Revenue	-	-	-	not assessed
Operating costs	-	-	-	not assessed
Investment costs	-	-	-	not assessed
Developer Contributions	-	-	-	not assessed
Grant/Subsidy Payments	-	-	-	not assessed
NET IMPACT	**-**	**-**	**-**	
Central Government Funding: Non-Transport				
Indirect Tax Revenues	-	-	-	not assessed
TOTALS				
Broad Transport Budget	9,062	-	9,062	
Wider Public Finances	-	-	-	

Costs appear as positive numbers, while revenues and developer contributions appear as negative numbersin 2010 prices
All entries are present values discounted to 2010, in 2010 prices

Analysis of Monetised Costs and Benefits

Greenhouse Gases	-	not assessed
Economic Efficiency: Consumer Users (Commuting)	8,521	
Economic Efficiency: Consumer Users (Other)	1,394	
Economic Efficiency: Business Users and Providers	2,701	
Wider Public Finances (Indirect Taxation Revenues)	-	not assessed
Present Value of Benefits (PVB)	**12,616**	
Broad Transport Budget	9,062	
Present Value of Costs (PVC)	**9,062**	
OVERALL IMPACTS		
Net Present Value (NPV)	**3,554**	
Benefit to Cost Ratio (BCR)	**1.39**	

TUBA PVB	12,616	
Noise	-	not assessed
Local Air Quality	-	not assessed
Journey Ambience	-	not assessed
Accidents	-	not assessed
Reliability	-	not assessed
Rail	-	not assessed
Wider Impacts	-	not assessed
Final PVB	12,616	
NPV	3,554	
BCR	**1.39**	

Costs and benefits both appear as positive numbers
All entries are present values discounted to 2010, in 2010 prices

Note: This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

Figure 5-6: TEE, Public Accounts and AMCB – Scenario A – Saltford station site Option 2

Economy:Economic Efficiency of the Transport System(TEE)

Consumer - Commuting user benefits	All Modes	Road	Rail	
Travel Time	8,521	5,252	3,269	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**8,521**	**5,252**	**3,269**	
Consumer - Other user benefits	**All Modes**	**Road**	**Rail**	
Travel Time	1,394	859	535	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**1,394**	**859**	**535**	
Business	**All Modes**	**Road**	**Rail**	
Travel Time	2,701	1,665	1,036	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**2,701**	**1,665**	**1,036**	
Private Sector Provider Impacts	**All Modes**	**Road**	**Rail**	
Revenue	-	-	-	not assessed
Operating costs	-	-	-	not assessed
Investment costs	-	-	-	not assessed
Grant/subsidy	-	-	-	not assessed
Subtotal	**-**	**-**	**-**	
Other business Impacts	**All Modes**	**Road**	**Rail**	
Developer contributions	-	-	-	not assessed
NET BUSINESS IMPACT	**2,701**	**1,665**	**1,036**	
TOTAL	**All Modes**	**Road**	**Rail**	
Present Value of Transport Economic **Efficiency Benefits (TEE)**	**12,616**	**7,776**	**4,839**	

Benefits appear as positive numbers, while costs appear as negative numbers
All entries are present values discounted to 2010, in 2010 prices

Public Accounts

Local Government Funding	ALL MODES	Road	Rail	
Revenue	-	-	-	not assessed
Operating Costs	3,250	-	3,250	
Investment Costs	5,351	-	5,351	
Developer Contributions	-	-	-	not assessed
Grant/Subsidy Payments	-	-	-	not assessed
NET IMPACT	**8,601**	**-**	**8,601**	
Central Government Funding: Transport	**ALL MODES**	**Road**	**Rail**	
Revenue	-	-	-	not assessed
Operating costs	-	-	-	not assessed
Investment costs	-	-	-	not assessed
Developer Contributions	-	-	-	not assessed
Grant/Subsidy Payments	-	-	-	not assessed
NET IMPACT	**-**	**-**	**-**	
Central Government Funding: Non-Transport				
Indirect Tax Revenues	-	-	-	not assessed
TOTALS				
Broad Transport Budget	8,601	-	8,601	
Wider Public Finances	-	-	-	

Costs appear as positive numbers, while revenues and developer contributions appear as negative numbersin 2010 prices
All entries are present values discounted to 2010, in 2010 prices

Analysis of Monetised Costs and Benefits

Greenhouse Gases	-	not assessed
Economic Efficiency: Consumer Users (Commuting)	8,521	
Economic Efficiency: Consumer Users (Other)	1,394	
Economic Efficiency: Business Users and Providers	2,701	
Wider Public Finances (Indirect Taxation Revenues)	-	not assessed
Present Value of Benefits (PVB)	**12,616**	
Broad Transport Budget	8,601	
Present Value of Costs (PVC)	**8,601**	
OVERALL IMPACTS		
Net Present Value (NPV)	**4,015**	
Benefit to Cost Ratio (BCR)	**1.47**	

TUBA PVB	12,616	
Noise	-	not assessed
Local Air Quality	-	not assessed
Journey Ambience	-	not assessed
Accidents	-	not assessed
Reliability	-	not assessed
Rail	-	not assessed
Wider Impacts	-	not assessed
Final PVB	12,616	
NPV	4,015	
BCR	**1.47**	

Costs and benefits both appear as positive numbers
All entries are present values discounted to 2010, in 2010 prices

Note: This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

Figure 5-7: TEE, Public Accounts and AMCB – Scenario B – Saltford station site Option 1

Economy:Economic Efficiency of the Transport System(TEE)

Consumer - Commuting user benefits	All Modes	Road	Rail	
Travel Time	8,521	5,252	3,269	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**8,521**	**5,252**	**3,269**	
Consumer - Other user benefits	**All Modes**	**Road**	**Rail**	
Travel Time	1,394	859	535	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**1,394**	**859**	**535**	
Business	**All Modes**	**Road**	**Rail**	
Travel Time	2,701	1,665	1,036	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**2,701**	**1,665**	**1,036**	
Private Sector Provider Impacts	**All Modes**	**Road**	**Rail**	
Revenue	-	-	-	not assessed
Operating costs	-	-	-	not assessed
Investment costs	-	-	-	not assessed
Grant/subsidy	-	-	-	not assessed
Subtotal	**-**	**-**	**-**	
Other business Impacts	**All Modes**	**Road**	**Rail**	
Developer contributions	-	-	-	not assessed
NET BUSINESS IMPACT	**2,701**	**1,665**	**1,036**	
TOTAL	**All Modes**	**Road**	**Rail**	
Present Value of Transport Economic **Efficiency Benefits (TEE)**	**12,616**	**7,776**	**4,839**	

Benefits appear as positive numbers, while costs appear as negative numbers
All entries are present values discounted to 2010, in 2010 prices

Public Accounts

Local Government Funding	ALL MODES	Road	Rail	
Revenue	-	-	-	not assessed
Operating Costs	4,187	-	4,187	
Investment Costs	6,893	-	6,893	
Developer Contributions	-	-	-	not assessed
Grant/Subsidy Payments	-	-	-	not assessed
NET IMPACT	**11,080**	**-**	**11,080**	
Central Government Funding: Transport	**ALL MODES**	**Road**	**Rail**	
Revenue	-	-	-	not assessed
Operating costs	-	-	-	not assessed
Investment costs	-	-	-	not assessed
Developer Contributions	-	-	-	not assessed
Grant/Subsidy Payments	-	-	-	not assessed
NET IMPACT	**-**	**-**	**-**	
Central Government Funding: Non-Transport				
Indirect Tax Revenues	-	-	-	not assessed
TOTALS				
Broad Transport Budget	11,080	-	11,080	
Wider Public Finances	-	-	-	

Costs appear as positive numbers, while revenues and developer contributions appear as negative numbersin 2010 prices
All entries are present values discounted to 2010, in 2010 prices

Analysis of Monetised Costs and Benefits

Greenhouse Gases	-	not assessed
Economic Efficiency: Consumer Users (Commuting)	8,521	
Economic Efficiency: Consumer Users (Other)	1,394	
Economic Efficiency: Business Users and Providers	2,701	
Wider Public Finances (Indirect Taxation Revenues)	-	not assessed
Present Value of Benefits (PVB)	**12,616**	
Broad Transport Budget	11,080	
Present Value of Costs (PVC)	**11,080**	
OVERALL IMPACTS		
Net Present Value (NPV)	**1,536**	
Benefit to Cost Ratio (BCR)	**1.14**	

TUBA PVB	12,616	
Noise	-	not assessed
Local Air Quality	-	not assessed
Journey Ambience	-	not assessed
Accidents	-	not assessed
Reliability	-	not assessed
Rail	-	not assessed
Wider Impacts	-	not assessed
Final PVB	12,616	
NPV	1,536	
BCR	**1.14**	

Costs and benefits both appear as positive numbers
All entries are present values discounted to 2010, in 2010 prices

Note: This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

Figure 5-8: TEE, Public Accounts and AMCB – Scenario B – Saltford station site Option 2

Economy:Economic Efficiency of the Transport System(TEE)

Consumer - Commuting user benefits	All Modes	Road	Rail	
Travel Time	8,521	5,252	3,269	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**8,521**	**5,252**	**3,269**	
Consumer - Other user benefits	**All Modes**	**Road**	**Rail**	
Travel Time	1,394	859	535	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**1,394**	**859**	**535**	
Business	**All Modes**	**Road**	**Rail**	
Travel Time	2,701	1,665	1,036	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**2,701**	**1,665**	**1,036**	
Private Sector Provider Impacts	**All Modes**	**Road**	**Rail**	
Revenue	-	-	-	not assessed
Operating costs	-	-	-	not assessed
Investment costs	-	-	-	not assessed
Grant/subsidy	-	-	-	not assessed
Subtotal	**-**	**-**	**-**	
Other business Impacts	**All Modes**	**Road**	**Rail**	
Developer contributions	-	-	-	not assessed
NET BUSINESS IMPACT	**2,701**	**1,665**	**1,036**	
TOTAL	**All Modes**	**Road**	**Rail**	
Present Value of Transport Economic **Efficiency Benefits (TEE)**	**12,616**	**7,776**	**4,839**	

Benefits appear as positive numbers, while costs appear as negative numbers
All entries are present values discounted to 2010, in 2010 prices

Public Accounts

Local Government Funding	ALL MODES	Road	Rail	
Revenue	-	-	-	not assessed
Operating Costs	3,885	-	3,885	
Investment Costs	6,396	-	6,396	
Developer Contributions	-	-	-	not assessed
Grant/Subsidy Payments	-	-	-	not assessed
NET IMPACT	**10,281**	**-**	**10,281**	
Central Government Funding: Transport	**ALL MODES**	**Road**	**Rail**	
Revenue	-	-	-	not assessed
Operating costs	-	-	-	not assessed
Investment costs	-	-	-	not assessed
Developer Contributions	-	-	-	not assessed
Grant/Subsidy Payments	-	-	-	not assessed
NET IMPACT	**-**	**-**	**-**	
Central Government Funding: Non-Transport				
Indirect Tax Revenues	-	-	-	not assessed
TOTALS				
Broad Transport Budget	10,281	-	10,281	
Wider Public Finances	-	-	-	

Costs appear as positive numbers, while revenues and developer contributions appear as negative numbersin 2010 prices
All entries are present values discounted to 2010, in 2010 prices

Analysis of Monetised Costs and Benefits

Greenhouse Gases	-	not assessed
Economic Efficiency: Consumer Users (Commuting)	8,521	
Economic Efficiency: Consumer Users (Other)	1,394	
Economic Efficiency: Business Users and Providers	2,701	
Wider Public Finances (Indirect Taxation Revenues)	-	not assessed
Present Value of Benefits (PVB)	**12,616**	
Broad Transport Budget	10,281	
Present Value of Costs (PVC)	**10,281**	
OVERALL IMPACTS		
Net Present Value (NPV)	**2,335**	
Benefit to Cost Ratio (BCR)	**1.23**	

TUBA PVB	12,616	
Noise	-	not assessed
Local Air Quality	-	not assessed
Journey Ambience	-	not assessed
Accidents	-	not assessed
Reliability	-	not assessed
Rail	-	not assessed
Wider Impacts	-	not assessed
Final PVB	12,616	
NPV	2,335	
BCR	**1.23**	

Costs and benefits both appear as positive numbers
All entries are present values discounted to 2010, in 2010 prices

Note: This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

Figure 5-9: TEE, Public Accounts and AMCB – Scenario C – Saltford station site Option 1

Economy:Economic Efficiency of the Transport System(TEE)

Consumer - Commuting user benefits	All Modes	Road	Rail	
Travel Time	8,521	5,252	3,269	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**8,521**	**5,252**	**3,269**	
Consumer - Other user benefits	**All Modes**	**Road**	**Rail**	
Travel Time	1,394	859	535	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**1,394**	**859**	**535**	
Business	**All Modes**	**Road**	**Rail**	
Travel Time	2,701	1,665	1,036	
Vehicle operating costs	-	-	-	not assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**2,701**	**1,665**	**1,036**	
Private Sector Provider Impacts	**All Modes**	**Road**	**Rail**	
Revenue	-	-	-	not assessed
Operating costs	-	-	-	not assessed
Investment costs	-	-	-	not assessed
Grant/subsidy	-	-	-	not assessed
Subtotal	**-**	**-**	**-**	
Other business Impacts	**All Modes**	**Road**	**Rail**	
Developer contributions	-	-	-	not assessed
NET BUSINESS IMPACT	**2,701**	**1,665**	**1,036**	
TOTAL	**All Modes**	**Road**	**Rail**	
Present Value of Transport Economic **Efficiency Benefits (TEE)**	**12,616**	**7,776**	**4,839**	

Benefits appear as positive numbers, while costs appear as negative numbers
All entries are present values discounted to 2010, in 2010 prices

Public Accounts

Local Government Funding	ALL MODES	Road	Rail	
Revenue	-	-	-	not assessed
Operating Costs	5,005	-	5,005	
Investment Costs	8,241	-	8,241	
Developer Contributions	-	-	-	not assessed
Grant/Subsidy Payments	-	-	-	not assessed
NET IMPACT	**13,246**	**-**	**13,246**	
Central Government Funding: Transport	**ALL MODES**	**Road**	**Rail**	
Revenue	-	-	-	not assessed
Operating costs	-	-	-	not assessed
Investment costs	-	-	-	not assessed
Developer Contributions	-	-	-	not assessed
Grant/Subsidy Payments	-	-	-	not assessed
NET IMPACT	**-**	**-**	**-**	
Central Government Funding: Non-Transport				
Indirect Tax Revenues	-	-	-	not assessed
TOTALS				
Broad Transport Budget	13,246	-	13,246	
Wider Public Finances	-	-	-	

Costs appear as positive numbers, while revenues and developer contributions appear as negative numbersin 2010 prices
All entries are present values discounted to 2010, in 2010 prices

Analysis of Monetised Costs and Benefits

Greenhouse Gases	-	not assessed
Economic Efficiency: Consumer Users (Commuting)	8,521	
Economic Efficiency: Consumer Users (Other)	1,394	
Economic Efficiency: Business Users and Providers	2,701	
Wider Public Finances (Indirect Taxation Revenues)	-	not assessed
Present Value of Benefits (PVB)	**12,616**	
Broad Transport Budget	13,246	
Present Value of Costs (PVC)	**13,246**	
OVERALL IMPACTS		
Net Present Value (NPV)	**-630**	
Benefit to Cost Ratio (BCR)	**0.95**	

TUBA PVB	12,616	
Noise	-	not assessed
Local Air Quality	-	not assessed
Journey Ambience	-	not assessed
Accidents	-	not assessed
Reliability	-	not assessed
Rail	-	not assessed
Wider Impacts	-	not assessed
Final PVB	12,616	
NPV	-630	
BCR	**0.95**	

Costs and benefits both appear as positive numbers
All entries are present values discounted to 2010, in 2010 prices

Note: This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

Figure 5-10: TEE, Public Accounts and AMCB – Scenario C – Saltford station site Option 2

6 Option development

6.1 Introduction

The previous sections of the report all lead to the conclusion that the preferred option for a potential station in Saltford is Option 1, the previous (historic) site located on A4 Bath Road. This is based on the site's superiority overall, and in particular in comparison with Option 2 its:

- Easier general access arrangements;
- Lower complexity of station infrastructure requirements;
- Resulting lower capital costs; and
- Better overall economic assessment (in terms of BCR).

Therefore Option 1 has been further developed, with investigations into access arrangements (traffic engineering) and potential for additional parking spaces.

6.2 Station vehicle access arrangements

Traffic calming measures, including 30mph speed camera, are already located on the A4 Bath Road in the vicinity of the potential vehicle access to the station. This indicates there were existing concerns with traffic safety in the area, which in turn feed into consideration of access arrangements.

Current conditions along the A4 include footways on both sides of Bath Road, with a refuge located less than 100m from the existing access to the Network Rail owned site. A bus stop, with bus box, is also located within 100m of the potential site. However the location of this existing infrastructure requires modifying to enable increased right turns from Bath Road into the potential site.

Three traffic engineering options have been developed for access junction layout and its surrounds. All have been developed in consultation with B&NES traffic officers. The traffic management proposals have not been costed at this time.

Traffic management Option A

This option utilises the existing access location, with the relocation of pedestrian refuge crossing and uncontrolled access junction.

The use of the existing access limits third party or additional land take, reducing permissions and processes, along with capital costs. However to deliver the required junction visibility, the garages on The Shallows will need to be acquired and demolished. This layout also requires the existing refuge to be removed and relocated. A ghost right-turn lane cannot be provided as the layout is confined within the existing highway boundary, which may result in vehicles blocking back along the A4 northbound causing delay for through traffic.

Figure A1 in Appendix A outlines the potential layout proposed for traffic management Option A.

Traffic management Option B

This option also makes use of the existing access location and requires the relocation of pedestrian refuge crossing; it provides an uncontrolled access junction with ghost right-turn into the station.

As well as limiting the need for third party or additional land take by using the existing access, localised widening of the highway enables a right turn lane to be provided meaning right-turning traffic does not block and delay ahead traffic. Although the existing refuge requires removing and relocation, it is envisaged that the new location is closer to the anticipated desire line for pedestrians accessing the station. Similarly to Option A, to deliver the required junction visibility, the garages on The Shallows will need to be acquired and demolished.

Figure A2 in Appendix A outlines the potential layout proposed for traffic management Option B.

Traffic management Option C

This option continues to make use of the existing access location, though limiting the requirement for third party land take, with the benefit of also providing a signalled access junction with ghost right-turn.

In this option, the signalled junction means right-turning vehicles do not block ahead traffic and cause delays. Relocation of the pedestrian refuge crossing to the signalised junction, as part of a controlled crossing point, improves safety for pedestrians. As the junction is controlled, it will work more efficiently compared to an uncontrolled junction. The signals could however potentially delay through traffic on the A4 at the red signal. The garages along the Shallows are not required for visibility purposes for this layout option, as the inter-visibility of the junction can be achieved by a small element of third party land. The design of the right turn lane is currently sub-standard and requires further development.

Figure A3 in Appendix A outlines the potential layout proposed for traffic management Option C.

6.3 Additional car parking facilities

Station location Option 1 provides some car parking on site, however parking demand is likely to be greater than the facilities can accommodate in the future. Therefore in order to not discourage those users who cannot park, or impact upon on-street parking on the local roads in the surrounding area, a potential secondary car park site has been identified.

The site is located within 400m of the station, within easy walking distance for the majority of users, and could provide an additional 175 spaces, and thus has the potential to cater for an increase demand for parking at the station. However, the longer walking distance compared with those drivers parking within the immediate station car park does have journey time implications and would introduce an increase in vehicle vs. pedestrian conflicts across The Shallows. The secondary station car park access facilitates better visibility along the A4 for drivers.

The land suggested for the additional car park is currently owned by The Avon County Rowing Club in Saltford and would thus need to be acquired for use as a car park, which would have capital cost implications.

6.4 Parking management

Station car parking at a Saltford station would need to be a charged facility if implemented (this includes both on-station parking and any additional parking facility nearby if also delivered), for consistency of approach with other stations in the local area (in particular Keynsham). In addition, revenue from parking could help to defray the costs of running the station, depending on ultimate ownership and control of the station and car park.

However, it is noted at other stations, particularly with paid parking where avoiding charges is a sought by some rail users but also at free parking stations where demand can be un-met, that demand for nearby on-street (free) parking can be an issue. As such, this is a factor for consideration at Saltford. It has been assumed, but not costed at this stage, that a level of controlled parking would need to be implemented on local roads in Saltford to ensure residents would not be unfairly affected.

Any controlled parking zones would be fully consulted on with local residents as part of the Traffic Regulation Order process.

7 Public exhibition

7.1 Introduction

As part of this study into potential station options for Saltford, B&NES were interested to gauge the level of support of Salford residents. A public exhibition event was held on Tuesday 25th February 2014 at Saltford Community Centre, at which a series of exhibition boards were presented and members of the study team were present to discuss issues arising with attending residents. A questionnaire was distributed at the exhibition itself, as well as made available on the B&NES website. The chapter provides a record of the survey undertaken and the results received (up to 31st March 2014).

The survey used as part of the public exhibition event to gauge residents' views was developed with B&NES officers. An example of the questionnaire is shown in Figure 7-1.

Saltford Station – Public Exhibition - Survey

1: Postcode (where you live) ☐

2: Do you want a station at Saltford?
Yes ☐ No ☐
Don't know ☐ Don't mind ☐

3: If a station were provided, how often would you use it?
Daily ☐ Occasionally ☐
Weekly ☐ Never ☐
Monthly ☐

4: If a station were provided, how would you get to it?
Walk ☐ Bus ☐
Cycle ☐ Taxi ☐
Car (driver) - go to Q5 ☐ Motorcycle ☐
Car (passenger) ☐ Other ☐ please state: ☐

5: If you indicated you would travel by car (driver) above, where would you park?
Station car park - Pay & Display ☐
On-street ☐

6. If you were to use the station on a regular basis what would this be for? (only tick one box)
Work ☐ Education ☐
Leisure ☐ Health/Medical ☐
Shopping ☐ Other ☐ please state: ☐

7. If you were to use a re-opened station on a regular basis would this be instead of using:
Car (driver) ☐ Cycle ☐
Car (passenger) ☐ Taxi ☐
Bus ☐ Motorcycle ☐
Rail (different station) ☐ Other ☐ please state: ☐

8. Are you Male or Female?
Male ☐ Prefer not to say ☐
Female ☐

9. How old are you?
Under 18 ☐ 35-44 ☐ 65+ ☐
18 - 24 ☐ 45-54 ☐ Prefer not to say ☐
25-34 ☐ 55-64 ☐

10. Do you consider yourself to be a disabled person?
Yes ☐ Go to Q11
No ☐

11. If Yes, please tell us if your disability relates to any of the following (tick all that apply)
Physical/mobility impairment ☐ Learning disability ☐
Speech, hearing or eyesight ☐ Other ☐ please state: ☐
Ability to recognise physical danger ☐

If returning by post, please send to:
Transportation
Bath and North East Somerset Council
FREEPOST (SWB481)
Keynsham
Bristol
BS31 1ZZ

Bath & North East Somerset Council

MetroWest

Figure 7-1: Public exhibition survey

7.2 Survey results

There were 371 respondents to the survey (as received by B&NES up to 31st March 2014). The majority of results in the remainder of this chapter have been reported as percentages based on the total number of responses (371), unless otherwise stated.

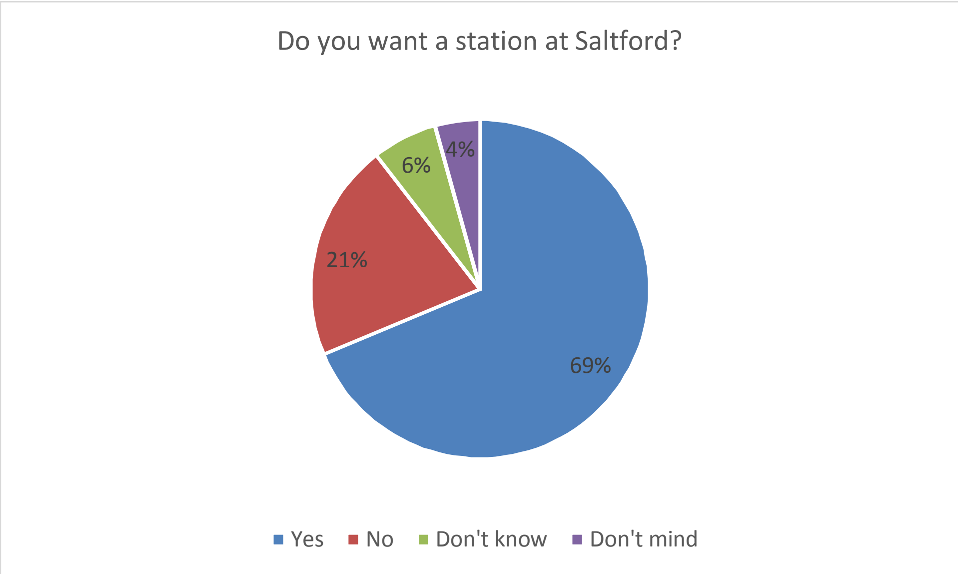
Opening the survey, the first question sought to identify the sources of responses by asking the postcode of the residence of the respondent. This is mostly to put the subsequent answers to questions into a context of whether it is given by a local Salford resident or not.

As a result of privacy considerations, it is not possible to report the results of this question in detail. Suffice it to say that the majority of respondents, as was expected, are local residents of either Saltford or its surrounds.

7.2.1 Opinion questions

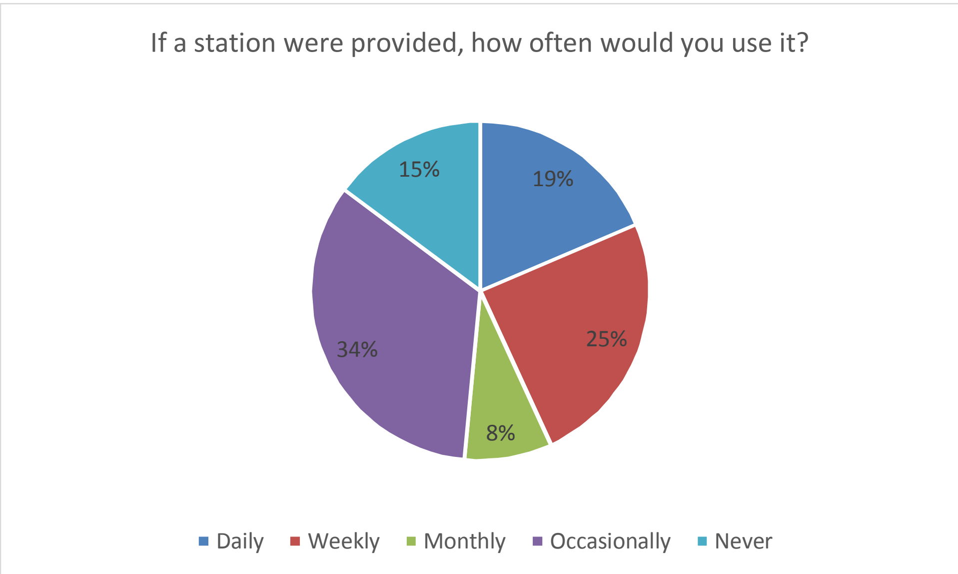
Question 2

The majority (over two thirds) of respondents indicated that they would like a station at Saltford.



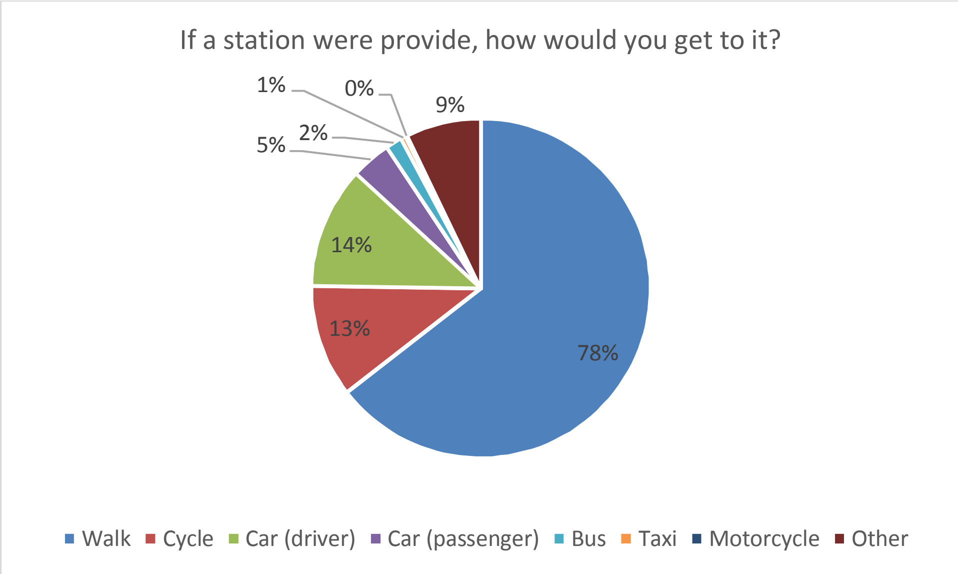
Question 3

According to respondents, 44% would use the station on a weekly/daily basis; with 34% using the station occasionally. It is interesting though that 31% of respondents either do not want or are ambivalent as to whether they want a station (question 2), but only 15% have said they would never use a station.



Question 4

A number of respondents provided more than one mode of travel as to how they would get to a Saltford station. These have all been included, so percentages do not add up to 100%. Only 14% of respondents indicated they would drive (and park) at the station, with the majority stating they would walk.

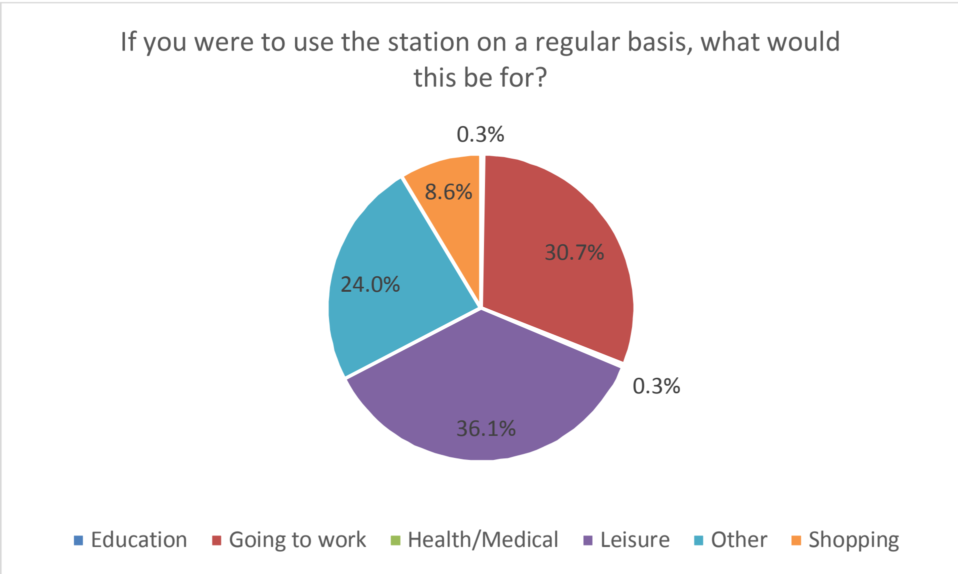


Question 5

Those respondents would indicated they would drive to the station were asked where would they park. Just over half (42 respondents) stated they would park in a station car park (on a pay and display basis), with the remainder (35) suggesting they would park on-street.

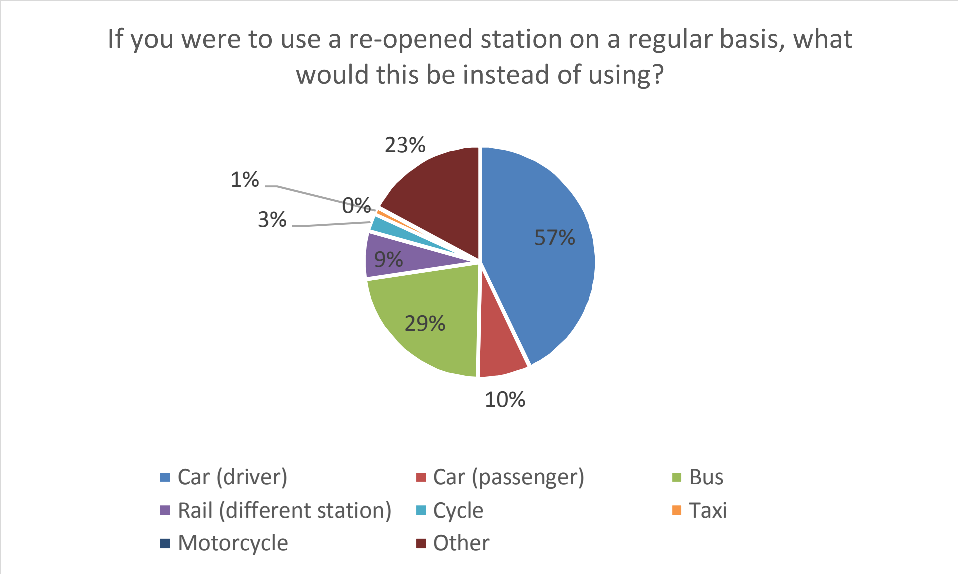
Question 6

The majority of respondents (67%) indicated they would use the station primarily for leisure or commuting purposes (roughly half each). Interestingly less than 1% said they would use the station for access to education. However this may be a result of the age of the majority respondents.



Question 7

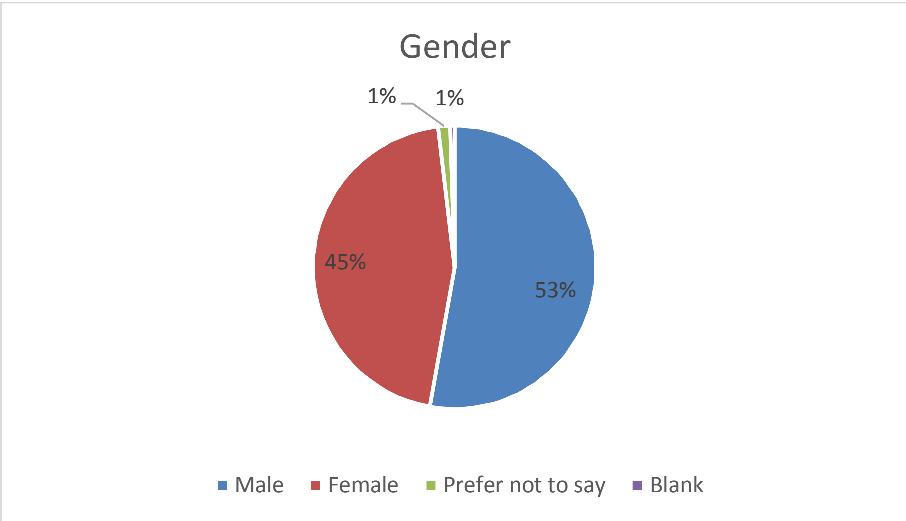
A number of respondents provided more than one mode of travel as to how they make journey now that they would consider using a Saltford station in future. These have all been included, so percentages do not add up to 100%. The majority of respondents (67%) indicated that they would switch from travelling by private car (driver or passenger) to rail, if a station were provided. 9% stated they would switch from another rail station (abstraction).



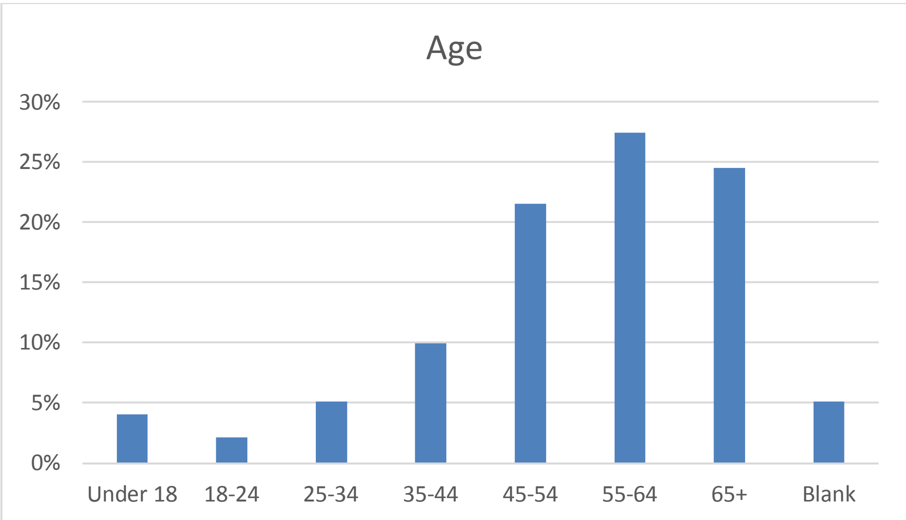
7.2.2 Demographic questions

The final questions on the survey sought to understand the demographic breakdown of respondents, to sit alongside the locations of respondents' residences requested in the first question.

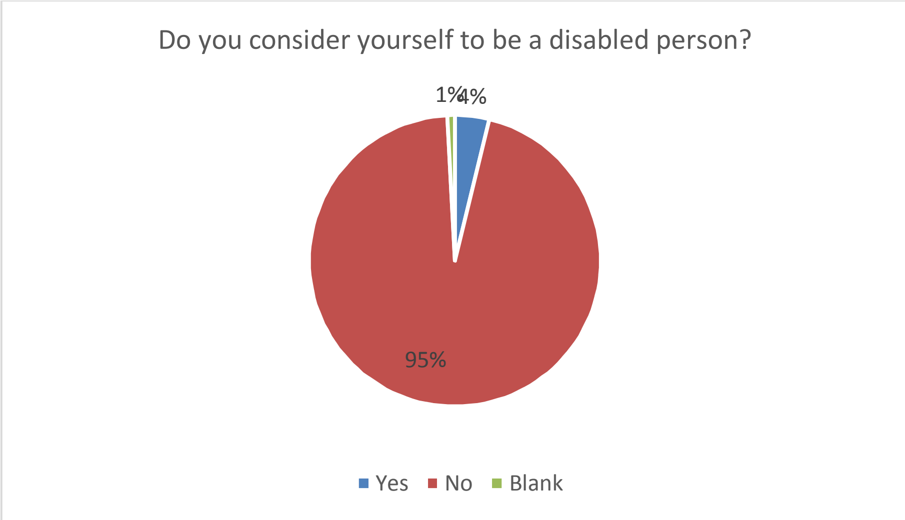
Question 8



Question 9



Question 10


Do you consider yourself to be a disabled person?
1%
4%
95%
Yes
No
Blank

SECTION 8

8 Risks

This chapter outlines potential risks to the project going forward for consideration if B&NES decide to continue to develop this study and take through to delivery. It also summarises the next steps in the process if the study is to be delivered.

8.1 Key risk considerations

The main risk elements associated with the delivery of a Saltford station (with specific reference to the Option 1 'old' station site adjacent to the A4) are:

- Confirmation of scheme costs – BCR is too low under the high cost scenario
- Ground investigations and embankments;
- Dependence on MetroWest;
- Traffic Management proposals and public acceptability; and
- Land acquisition.

Scheme Costs

Ground investigations and embankments

High-level civil engineering investigations have been carried out as part of this study, to understand if a station is deliverable at potential locations. Findings show that both station options are theoretically deliverable in an engineering sense, with Option 1 (old station site) being the preferred location for a Saltford station.

Further ground investigations are required though to understand the suitability of the land on which the station could be built. A particularly risk is the steep embankment adjacent to the railway line, on which the eastbound platform would be constructed. Although a potential mitigation has been proposed (use of a modular platform design located on micro piles), full ground investigations will be needed to determine the feasibility of platform location and the complexity or otherwise of the foundations and/or platform structures required. The enhanced cost assumption in Scenarios B and C take into account additional costs for more complex platform civil engineering.

In addition, in order to maximise the potential capacity of the car park at the station (Option 1), the current retaining wall adjacent to the A4 Bath Road could be further modified to allow for the maximum number by extending the level ground around the station towards the A4. Again, the feasibility and cost of doing this requires detailed ground investigations to be carried out.

MetroWest

While a Saltford station could be served by existing local stopping trains between Bristol and Bath, this would not be a viable project to deliver. A new station at Saltford is only viable with the delivery of MetroWest proposals, specifically in providing a two-train per hour frequency of local stopping services between Bristol and Bath that could serve Saltford.

The MetroWest proposals are currently being developed in more detail by the West of England local authorities, in partnership with Network Rail, including identification of a detail train service pattern and accompanying infrastructure requirements. Service patterns have to take into account potentially competing requirements of enhanced long-distance services as well local stopping services. However initial indications from Network Rail's timetable assessment suggests there is sufficient capacity in the timetable to accommodate the extra stop at Saltford.

Should MetroWest not be implemented as planned, or further timetable assessments show an additional stop between Bath Spa and Bristol Temple Meads is no longer available operationally, then serving a Saltford station would become more or less impossible. Developing proposals for Saltford station would then no longer be worthwhile.

Land acquisition

The preferred option is located on the former (historic) station site, which is still owned by Network Rail (currently used as a maintenance depot). Permission for change of use of this land into a station and associated car park will have to be sought. This could involve the transfer of ownership to B&NES, which would potentially incur an (as yet unidentified) additional cost.

An amount of third party land may also be required to facilitate the construction of a suitable vehicular access to the station site. The amount will ultimately depend on the access arrangements, and may indeed form part of the decision-making process in determining the optimum access arrangements.

Further third party land would also be required should the potential additional parking site, located east of the station site along the A4 Bath Road, ultimately be developed. The site is currently owned by The Avon County Rowing Club in Saltford. Though is not used for specific purposes at present. Some form of transaction would therefore be required to develop this as a car park (either compulsory purchase by B&NES or a rental agreement between the Club and B&NES).

8.2 Next steps

The logical next steps in the process will be to develop an understanding of the riskier areas of the project, and to mitigate against them going forward. To that end the following areas should be considered:

- Confirmation of scheme costs with particular reference to two areas:
    - Impact on scheme economics – lower cost assumption scenario are the ones that justify the scheme, are these valid?
    - Full development of GRIP 3 level design and costing to formalise the cost estimates.
- Ground Investigations – they key cost risk in terms of construction relates to the quality of the embankment on the northern edge of the station, and the ability to construct using micro piling. Moreover topographical surveys would assist in the detailed specification of the ramp access to the eastbound platform, with any formal designs being linked to the quality of the embankment as above.
- MetroWest appears to be developing well. There is a continued need to ensure the timetable capacity assumptions are still valid, in light of the developments to the wider scheme. It is clear from the analysis that the station does not make sense with only an hourly service.
- Traffic Management – it is suggested that a set of more detailed traffic management proposals be drawn up as the scheme develops.
- Land acquisition – more detailed work on land ownership and likely costs of acquisition needs to be undertaken. Not least on the extra parking suggested for the current Rowing Club site, but also of the station site itself, and any additional requirements from site access arrangements such as the garages on The Shallows.

Appendix A – Traffic management options

Key Plan:

Notes:

- Proposed Railway Platform
- Proposed New Footway
- Uncontrolled Dropped Kerb Pedestrian Crossing Point with Tactile Paving
- Required 4.5m x 90m Junction Visibility Splay
- 144 Approximate Number of Car Parking Spaces Achievable

Rev	By	Chkd	Apprvd	Date	Description
-	-	-	-	-	-

Client

Bath & North East Somerset Council

CH2M Hill
1 The Square Temple Quay Bristol BS1 6DG
tel +44 (0)117 910 2580 fax +44 (0)117 910 2581
www.ch2m.com
CH2MHILL

Project

Saltford Railway Station

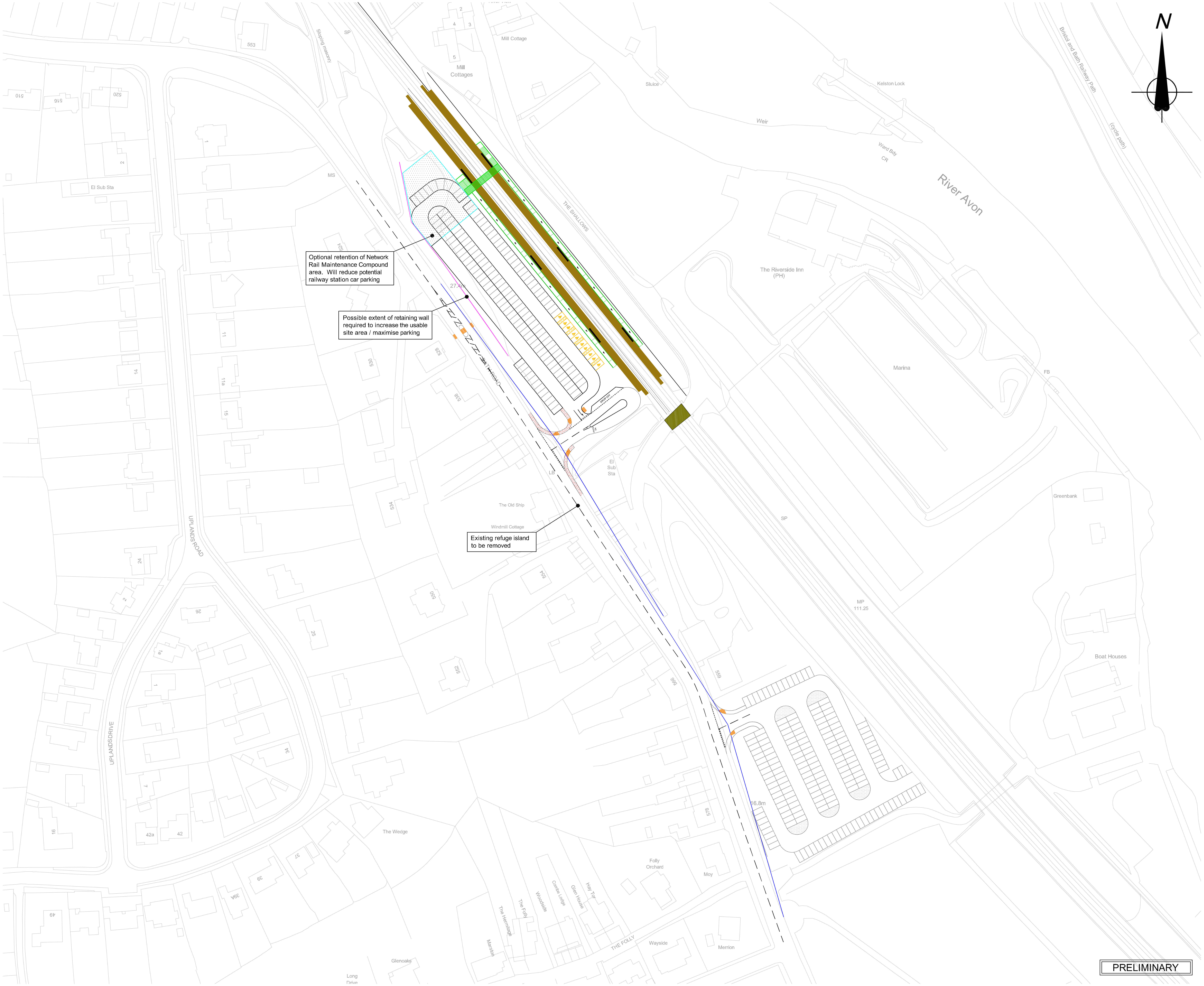
Drawing

Existing Access
Option 1

Drawn by: Darren Cox Date: Oct 2013
Checked by: David Lear Date: Oct 2013
Approved by: David Crockett Date: Oct 2013

Drawing No. 204269.AX.00.23/P/001
Revision -

Drawing Scale: 1:500 at A1



Key Plan:

N

Notes:

- Proposed Railway Platform
- Proposed New Footway
- Uncontrolled Dropped Kerb Pedestrian Crossing Point with Tactile Paving
- Required 4.5m x 90m Junction Visibility Splay
- 144 Approximate Number of Car Parking Spaces Achievable
- 173 Approximate Number of Overspill Car Parking Spaces Achievable

Rev	By	Chkd	Apprvd	Date	Description
-	-	-	-	-	-

Client

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Project

Saltford Railway Station

Drawing

Existing Access Option 1

Drawn by: Darren Cox Date: Oct 2013
Checked by: David Lear Date: Oct 2013
Approved by: David Crockett Date: Oct 2013

Drawing No. 204269.AX.00.23/P/001

Revision -

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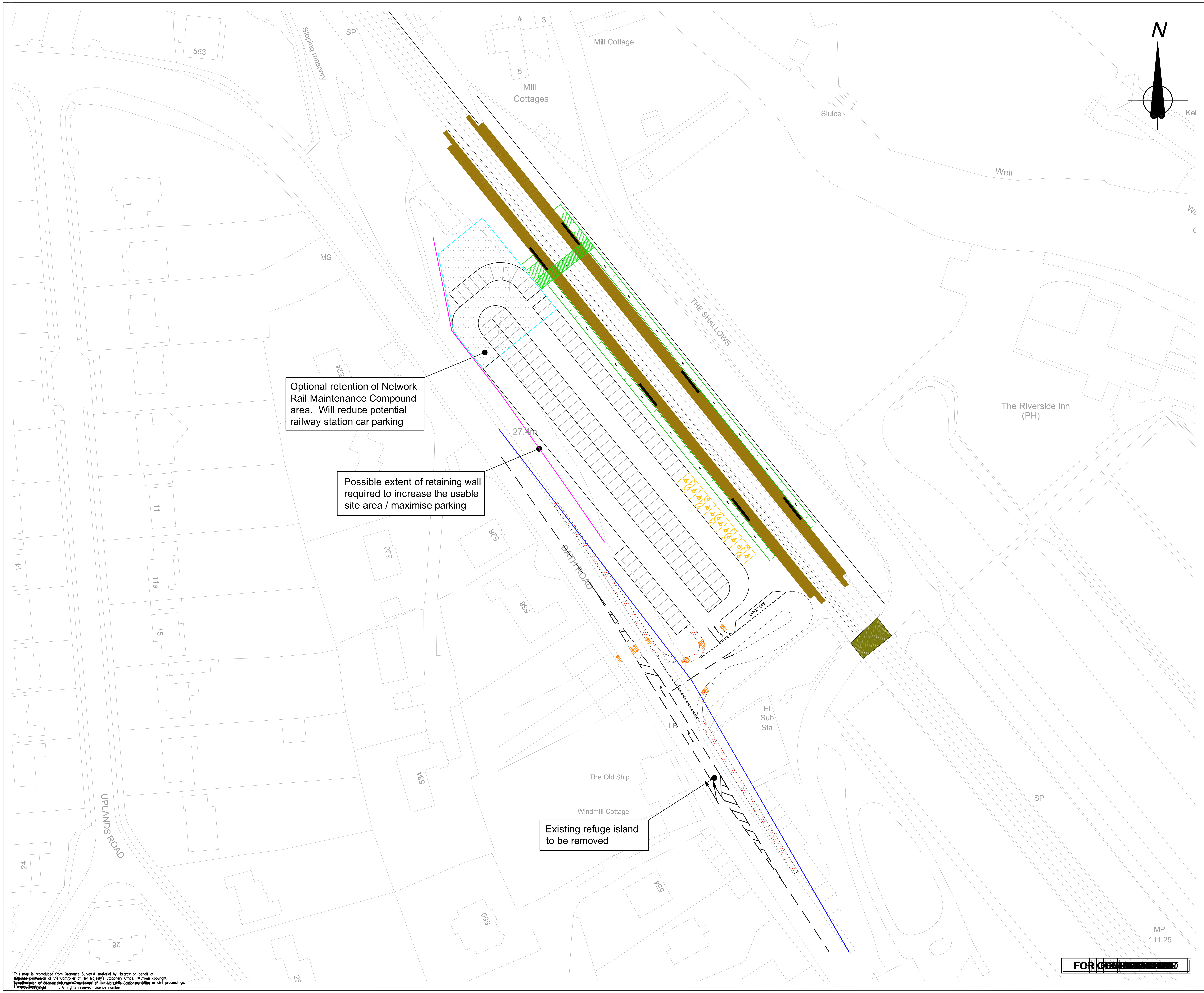

Key Plan:

Notes:

- Proposed Railway Platform
- Proposed New Footway
- Uncontrolled Dropped Kerb Pedestrian Crossing Point with Tactile Paving
- Required 4.5m x 90m Junction Visibility Splay
- 144 Approximate Number of Car Parking Spaces Achievable

Rev	By	Chkd	Apprvd	Date	Description
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Project

Saltford Railway Station

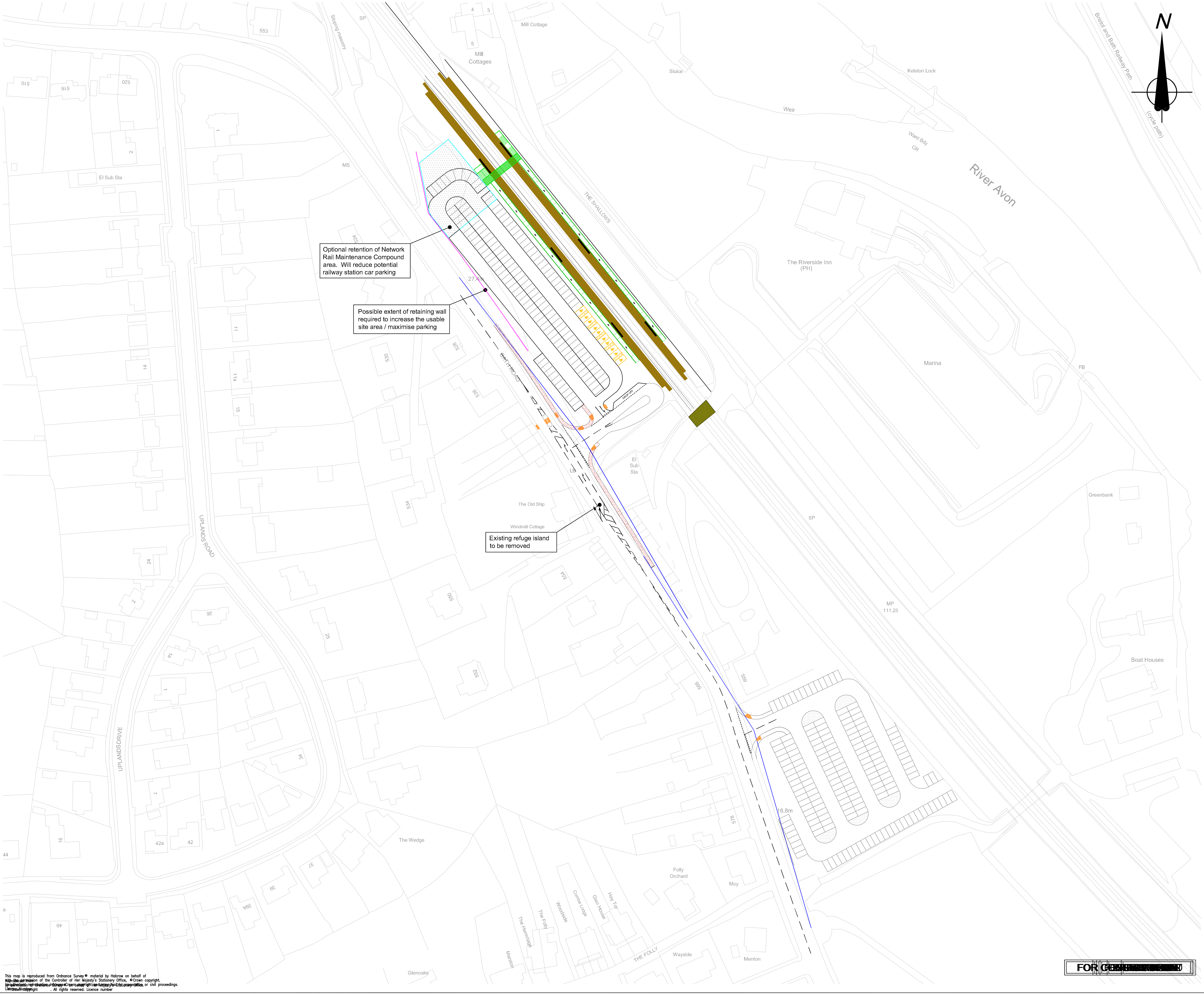
Drawing

Existing Access Option 2

Drawn by: Darren Cox Date: Oct 2013
Checked by: David Lear Date: Oct 2013
Approved by: David Crockett Date: Oct 2013

Drawing No. 204269.AX.00.23/P/002
Revision -

Drawing Scale: 1:500 at A1



Key Plan:

Notes:

- Proposed Railway Platform
- Proposed New Footway
- Uncontrolled Dropped Kerb Pedestrian Crossing Point with Tactile Paving
- Required 4.5m x 90m Junction Visibility Splay
- 144 Approximate Number of Car Parking Spaces Achievable
- 173 Approximate Number of Overspill Car Parking Spaces Achievable

Rev	By	Chkd	Apprvd	Date	Description
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Project

Saltford Railway Station

Drawing

Existing Access Option 2

Drawn by: Darren Cox — Date: Oct 2013
Checked by: David Lear — Date: Oct 2013
Approved by: David Crockett — Date: Oct 2013

Drawing No.: 204269.AX.00.23/P/002 — Revision: -

Drawing Scale: 1:500 at A1

Drawing file path & name : U:\Projects\204269 - Bristol Framework 2011 - B&NES\023 - Saltford Station\Plans\Proposed Junction Layout\Existing Access Option 2 with platforms & overspill.dwg

Key Plan:

Notes:

- Proposed Railway Platform
- Proposed New Footway
- Uncontrolled Dropped Kerb Pedestrian Crossing Point with Tactile Paving
- Primary Traffic Signal Head
- Secondary Traffic Signal Head
- Required Junction Intervisibility
- 144 Approximate Number of Car Parking Spaces Achievable

Rev	By	Chkd	Apprvd	Date	Description
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Project

Saltford Railway Station

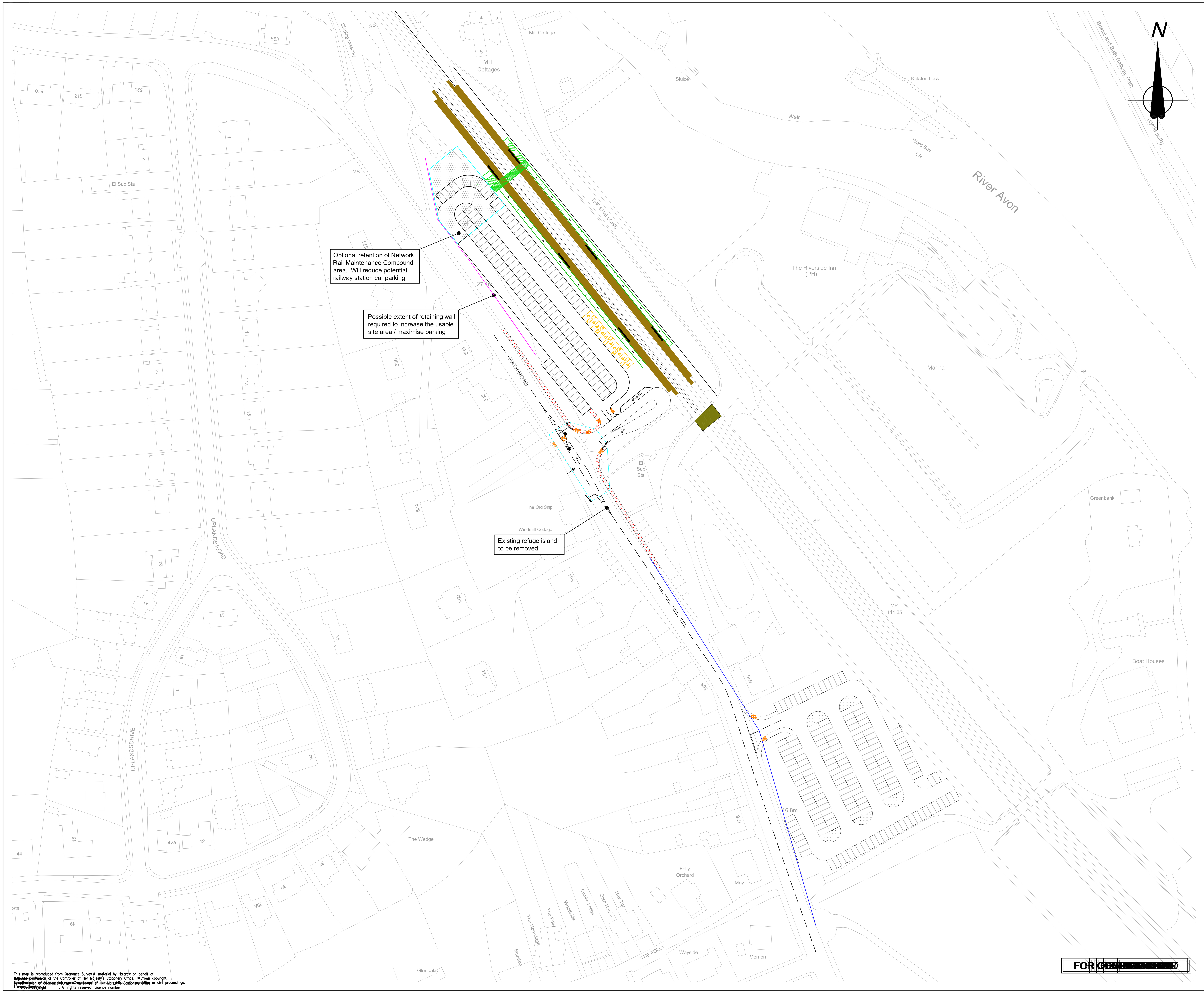
Drawing

Existing Access Option 3

Drawn by: Darren Cox Date: Oct 2013
Checked by: David Lear Date: Oct 2013
Approved by: David Crockett Date: Oct 2013

Drawing No. 204269.AX.00.23/P/003 Revision -

Drawing Scale: 1:500 at A1



Key Plan:

Notes:

- Proposed Railway Platform
- Proposed New Footway
- Uncontrolled Dropped Kerb Pedestrian Crossing Point with Tactile Paving
- Primary Traffic Signal Head
- Secondary Traffic Signal Head
- Required Junction Intervisibility
- 144 Approximate Number of Car Parking Spaces Achievable
- 173 Approximate Number of Overspill Car Parking Spaces Achievable

Rev	By	Chkd	Apprvd	Date	Description
-	-	-	-	-	-

Client

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Project

Saltford Railway Station

Drawing

Existing Access Option 3

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Checked by: David Lear Date: Oct 2013
Approved by: David Crockett Date: Oct 2013

Drawing No.: 204269.AX.00.23/P/003

Revision: -

Drawing Scale: 1:500 at A1