Dyce Rail Station Car Park – Initial Appraisal

nestrans

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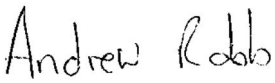

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Executive Summary

Executive Summary

Introduction

Nestrans commissioned AECOM to consider the potential for an extension to the existing car park at Dyce Railway Station. Car parking surveys were undertaken on Wednesday 11th February and Thursday 12th February 2015 of the existing car park and the surrounding streets of Station Road, Merrivale and Union Row. This enabled estimations for demand to be provided and preliminary design options produced.

Methodology

Surveys were undertaken for the following time periods:

Time periods surveyed

Wednesday 11th February 2015	Thursday 12th February 2015
AM	
07:00-07:30	07:00-07:30
07:30-08:00	07:30-08:00
08:00-08:30	08:00-08:30
08:30-09:00	08:30-09:00
PM	
16:00-16:30	16:00-16:30
16:30-17:00	16:30-17:00
17:00-17:30	17:00-17:30
17:30-18:00	17:30-18:00

The surveys captured the last four letters/digits of registration plates that were present during each time period surveyed. This enabled the number of vehicles remaining in or leaving the car park to be recorded, as well as the number of vehicles staying in the car park for extended periods of time.

Key Findings

1) Occupancy Levels

The maximum capacity of 82 vehicles at Dyce Station Car Park and surroundings streets was not reached during any period surveyed. The maximum combined occupancy level recorded was 84.1%, between 16:00-16:30 on Thursday 12th February; the lowest occupancy recorded was 59.8% between 07:00-07:30 on Wednesday 11th February. The average combined occupancy of the car park and surrounding streets was 75.1%.

When the car park is considered separately, the maximum occupancy recorded was 95% (the equivalent of 57 vehicles), indicating that the existing car park is almost at capacity.

2) Establishment of Demand

Survey results and existing passenger numbers at Dyce Station has enabled the demand for Dyce Station Car Park to be estimated up to the year 2035. Estimates suggest that passenger numbers may increase to over 2 million at Dyce Station by 2035, with demand for car parking spaces at Dyce Station reaching around 164 spaces, subject to forthcoming Network Rail demand forecasts and a number of identified risk factors.

3) Preliminary Design Options

Four design options and eight sub-design options have been established for the potential extension to the existing Dyce Station Car Park. The sub-design drawings present different drainage options (porous and swale) for the four preliminary design options. A fifth option of a decked car park was also considered, but has been sifted out based on implementability criteria.

Following an establishment of demand for Dyce Station Car Park, Options 1A and 1B (smaller in size compared to Options 2A and 2B) offer the most appropriate solution for enhancing the car park at Dyce Station. On this basis, it is recommended that the merits of Option 1B relative to 1A are considered, despite the minor additional safety risk associated with Option 1B as it would involve a two-way operation.

Introduction

Capabilities on project:
Transportation

1 Introduction

1.1 Introduction

AECOM has been commissioned to consider the potential for extending the existing car park at Dyce Railway Station. The key objectives of this study are to ascertain this potential, to undertake an initial appraisal (including preliminary costs) and to identify the appropriate scale of an extension. It will also consider the traffic implications (including proposals for traffic management) and provide indicative layouts and preliminary designs for a car park extension.

A client group has been established for the scheme, consisting of key officers from Nestrans and Aberdeen City Council.

1.2 Scope of Study

The preliminary designs proposed in this report will be used as the basis to support the representation on the Aberdeen City Council Local Development Plan (LDP) to reallocate an area to enable a car park extension area within the LDP.

It is necessary to form a detailed understanding of the principal problems, issues, opportunities and constraints relating to Dyce Station, particularly in terms of car parking and general access to the station. This will be assisted via a stakeholder consultation process. As specified by Nestrans, the scheme must ensure the following:

- A suitable level of access to one of the region's primary transport hubs;
- A high quality interchange, encouraging the use of public transport;
- Improve access to the railway and to the Formartine & Buchan Way long-distance route;
- A choice of transport options for travellers, including fair and equitable management arrangements to maintain availability for regular rail users; and
- Provide benefits for the local community by improving management of on-street parking as part of the wider traffic management plan for access to the new car park.

1.3 Structure of Report

The remainder of this report is structured as follows:

- Chapter 2 – Background and Context Setting;
- Chapter 3 – Establishment of Demand;
- Chapter 4 – Consultations;
- Chapter 5 – Objective Setting;
- Chapter 6 –Initial Appraisal of Options;
- Chapter 7 – Traffic Management;
- Chapter 8 –Preliminary Design of Car Park;
- Chapter 9 – Next Steps;
- Appendix A – Cost Estimates;
- Appendix B – Drainage and SUDS Report;

- Appendix C – Design Option Drawings;
- Appendix D– Sub-Design Option Drawings; and
- Appendix E – Survey Sheet.

1.4 Dyce Railway Station Car Park

Dyce Railway Station Car Park is located on the east side of the Aberdeen to Inverness Railway Line, adjacent to the southbound platform and is accessible only via Station Road. The existing car park is owned by Network Rail. The car park currently has 60 spaces (inclusive of three disabled bays), the majority of which are located to the north of the entry point. Figure 1.1 shows Dyce Station (circled in blue) within the Dyce area, with residential areas located to the east and industrial estates and Aberdeen International Airport located to the west. Further details of the car park are outlined in Chapter 2.

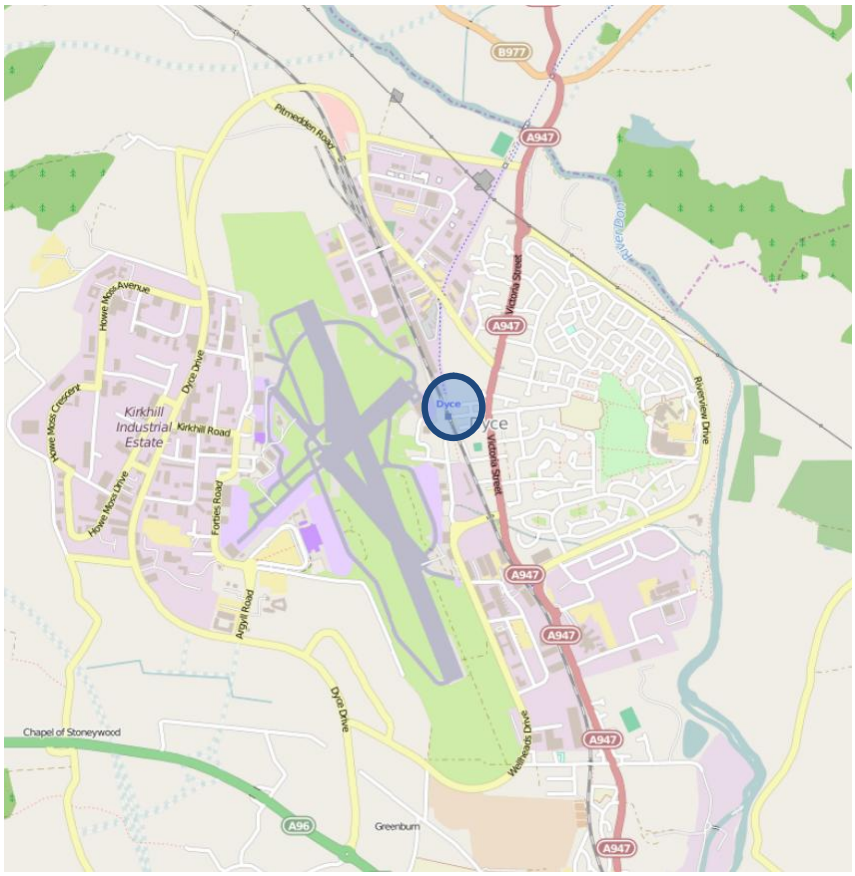


Figure 1.1 – Location of Dyce Station Car Park

Background and Context Setting

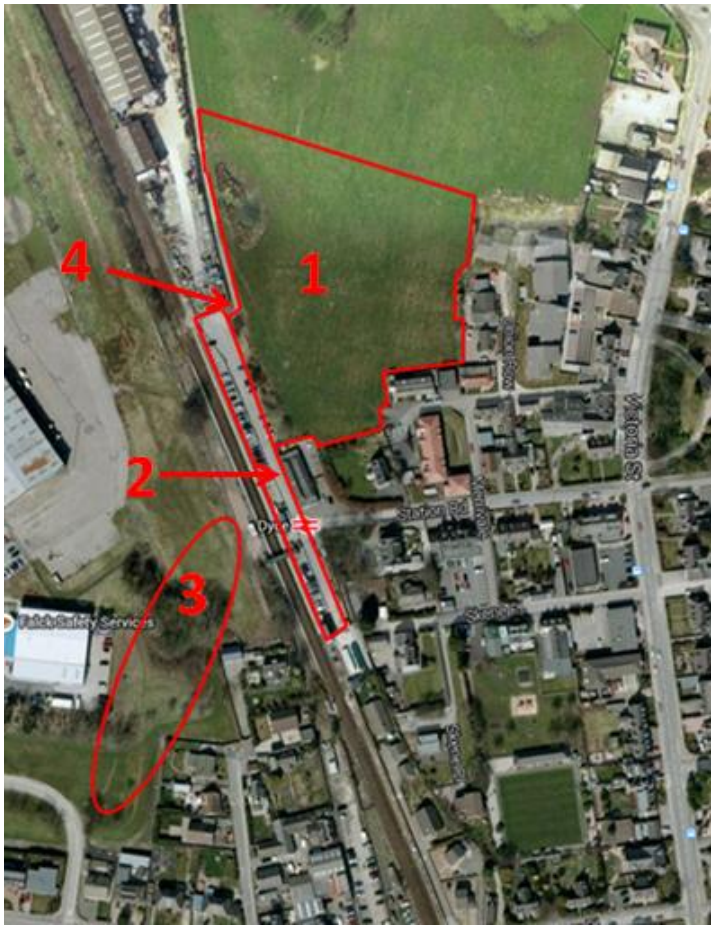
2 Background and Context Setting

2.1 Introduction

This chapter sets out the existing situation at Dyce Station Car Park. It includes a review of previous work relating to Dyce Station and key policy documents. Alongside responses from consultees outlined in Chapter 4, this chapter will help inform existing problems, issues, opportunities and constraints relating to Dyce Station Car Park.

2.2 Existing Situation

Dyce Railway Station is now the north east's second busiest, with an estimated 810,678 journeys made to and from the station in 2013/14[1], an increase of 201% since 2004/05. In addition to the 60 car park spaces, there are six spaces allocated for taxis at the south end of the car park and a small area opposite the entrance which operates as a pick up zone. Figure 2.1 below provides a visual display of the car park and its key features.



1- Approximate area proposed for extension of car park
2- Existing Car Park
3- Bus Turning Circle
4- Formartine and Buchan Way entry point

Figure 2.1 – Map of Dyce Station and Key Features

[1] http://orr.gov.uk/statistics/published-stats/station-usage-estimates

Dyce Station has ticket machines available for ticket purchases and for the collection of pre-purchased tickets. In addition to this there is a sheltered waiting area on each platform, although the station is unmanned and currently lacks public toilet facilities.

ScotRail car parking signs located in the car park state that "*ScotRail customers are permitted to leave motor vehicles within the area designated for this purpose"*, indicating that the car park is for rail customers only. The car park is free of charge.

The car park has changed in recent years as a result of the station upgrade to reflect the growing requirements of the station, particularly in terms of access. The construction of a new bridge and lift connecting both platforms has resulted in the loss of thirteen car parking spaces, with a further three spaces lost due to the installation of a power distribution sub-station. This sub-station is shown in Figure 2.2. At present there are no Electric Vehicle bays or charging points located at the station. Cycle parking consists of six cycle lockers, five covered Sheffield stands and two uncovered Sheffield stands. These are all located adjacent to the taxi bays.

Figure 2.2 – Sub-Station in Dyce Station Car Park

2.2.1 Public Transport Provision

In addition to the improvements noted in the previous section, a bus turning circle is in the process of being constructed on the west side of the station. This will be accessed via Foinavon Close and is anticipated to alleviate the congestion problems associated with buses accessing the existing car park. A Traffic Regulation Order has been approved, making the turning circle accessible to bicycles and buses only.

At present, the Stagecoach operated Service 80 (JET Connect) must enter the station via Station Road, turn right into the car park and reverse to the south end of the car park to pick up passengers, restricting vehicles from accessing or leaving this part of the car park whilst the bus is present. This is demonstrated in Figure 2.3.

Figure 2.3 – Service 80 operating at Dyce Station

The JET Connect operates every 30 minutes from early morning to late afternoon and hourly from late afternoon to early evening between Dyce Station, Aberdeen Airport, the Heliport, Kirkhill Industrial Estate and Pitmedden Industrial Estate. It should be noted that this route may be subject to change once the bus turning circle on the west side of the station platform is fully operational. The current route is highlighted in light blue in Figure 2.4.

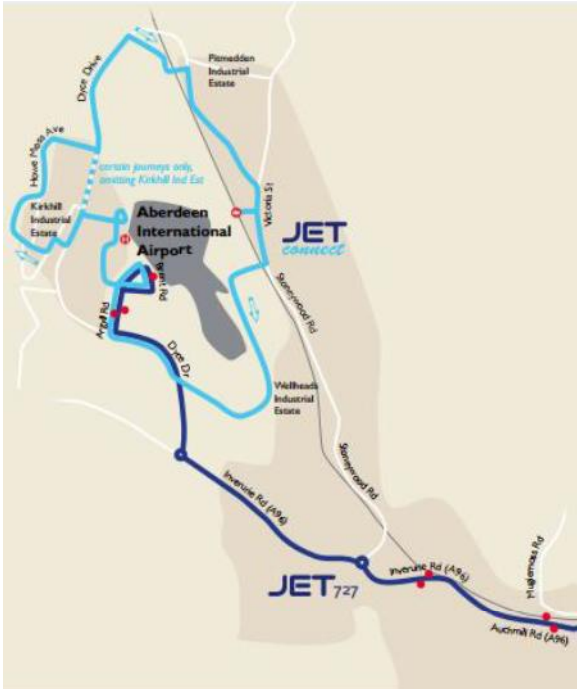


Figure 2.4 – Service 80 (Jet Connect) route

Buses on this route are timed to arrive and depart to enable transfer from rail services, providing an integrated service.

2.2.2 Rail Services

Dyce Station is served by regular services operating between Aberdeen-Dyce-Inverurie and onto Inverness. Southbound, the station is served by services operating to Aberdeen and beyond to Edinburgh and Glasgow. The AM and PM peak services operating between Aberdeen and Dyce are outlined in Table 1.1. Services operating between Aberdeen and Dyce typically take between eight and eleven minutes.

Table 2.1 – Dyce Rail Station Access to Aberdeen Timetable[2]

	Northbound							
	AM peak				PM peak			
Aberdeen-Dyce	0715 0727	0748 0757	0819 0828	0850 0858	1619 1629	1652 1701	1726 1735	1754 1805
	Southbound							
Dyce-Aberdeen	0726 0737	0759 0810	0827 0840	0859 0910	1630 1642	1639 1650	1705 1716	1735 1746

Rail services between Aberdeen and Dyce (and beyond to Inverness) mostly operate on a single track with passing loops, the positioning of which restricts the timetable and future service opportunities. As such, the Scottish Government has committed to upgrade the Aberdeen to Inverness line, the first phase of which is a

[2] http://www.scotrail.co.uk/sites/default/files/Inv-AbdDec14.pdf

£170 million package which will include doubling most of the track between Aberdeen and Inverurie and a new station at Kintore. This therefore increases the potential for additional services to be added to the existing timetable.

2.2.3 Formartine and Buchan Way

The 53 mile long Formartine and Buchan Way is an off-road pathway suitable for walkers, cyclists and horse-riders, which begins at the northern end of the existing car park at Dyce Station. This is a well signposted route and was observed to be a popular route for walkers and cyclists when accessing/leaving the station. The Formartine and Buchan Way also forms part of the National Cycle Network Route 1 (NCN1).

Figure 2.5 – Formartine and Buchan Way (north of Dyce Station) and NCN1 (Green path)

2.3 Previous Dyce Station Studies

An initial task of this study was to undertake a high level review of previous work undertaken at the station, including surveys of car park capacity, public transport surveys and rail overcrowding surveys. Previous studies summarised in this section include the following:

- Dyce and Inverurie Rail User Surveys, (2009);
- Nestrans Rail Overcrowding Survey, (2011);
- Nestrans Rail Occupancy Survey, (2013);
- JET Connect Passenger Survey Report, (2012); and

- Dyce Shuttle Bus Passenger Interview Survey, (2009).

2.3.1 Dyce and Inverurie Rail User Surveys, (2009)

This report presented the results of a series of rail user surveys undertaken at Dyce and Inverurie rail stations between December 2008 and March 2009. The following key findings in relation to Dyce Station were ascertained.

- Results showed that whilst there was a 19% increase in passenger numbers at Inverurie rail station between December 2008 and March 2009, analysis of the 2-day average results suggested that passenger numbers at Dyce Station only marginally increased (less than 1%) following the introduction of the new ScotRail timetable in December 2008.
- The report also analysed patronage levels for the Dyce Shuttle Bus service. Month on month following its introduction, the service experienced patronage increases. Increases were observed both in terms of users departing from train services calling at Dyce, and also from non-train users. Between January and March, patronage increased by 55% in total.

2.3.2 Nestrans Rail Overcrowding Survey, (2011)

This report gathered data to assess the extent of overcrowding on peak period rail services in North East Scotland between Stonehaven and Inverurie and on rail station platforms at various dates in June and October 2011. In relation to Dyce Station, the following results were found:

- The June and October results demonstrated that the majority of cases where the % occupancy exceeded the total number of seats available were on journeys between Aberdeen and Dyce stations.
- With only one exception, all services with greater than 80% occupancy capacity were on the Aberdeen – Dyce – Inverurie section of the local rail network.

2.3.3 Nestrans Rail Occupancy Survey, (2013)

This report is very similar to the rail overcrowding survey undertaken in 2011 in terms of results collated, with results of surveys undertaken in October 2011 being compared with the survey results from November 2013. In relation to Dyce Station, the following results were found:

- The route which most commonly exceeded the total number of seats available was on journeys between Dyce and Aberdeen rail stations, particularly in the AM peak.
- A particular stress point appeared to be on southbound journeys into Aberdeen in the AM peak. A number of these services originated in Inverness and by the time they reached stations in the survey area (including Inverurie and Dyce) they had occupancy levels exceeding 100%.

2.3.4 JET Connect Passenger Survey Report, (2012)

Following re-tendering of the Dyce Shuttle Bus service, the service was re-branded as JET Connect. A survey of passengers on the JET Connect service was undertaken in October 2012, supported by boarding/alighting surveys at Dyce Station, and an occupancy/turnover survey at the car park at the rail station. The following results were found:

- A survey of passengers on the JET Connect bus service counted 255 passengers in total. The trip profile showed that although 156 trips had an origin at Dyce Station, which accounted for 61% of trips, only 63 (25%) of trips had an ultimate destination of Dyce Station.
- The outcomes emphasised the importance of Dyce Station as a destination station for commuters, with total boardings and alightings at the station between 07:26 and 18:29 totalling 1,945 passengers.

2.3.5 Dyce Shuttle Bus Passenger Interview Survey, (2009)

A survey of passengers on the Dyce Shuttle Bus was undertaken on Tuesday 23rd February 2009 following the introduction of the service which linked Dyce Station with Aberdeen Airport, the Heliport and the Industrial Estates. A number of key findings were ascertained, as listed below.

- The results suggested that there was an asymmetrical pattern of demand, with fewer passengers using the bus in the evening.
- The dominant area to board the service was at Dyce Station (68.5% of respondents). The dominant disembarkation areas for the service were Kirkhill Industrial Estate (40.3% of respondents) and Dyce Station (29.8% of respondents). There was a smaller amount of Airport trips. These percentages include responses from returning passengers.

2.4 Policy Context

It is also important to consider wider local and regional policies which may impact upon Dyce Station. A brief review of the following documents has been undertaken:

- Nestrans Regional Transport Strategy, (2013);
- Nestrans Rail Action Plan 2010-2021, Second Draft, (2010);
- Nestrans Regional Parking Strategy, (2012);
- Aberdeen City Local Transport Strategy, (2008);
- Aberdeen City Local Development Plan, (2012); and
- Aberdeen City and Shire Strategic Development Plan (2014).

2.4.1 Nestrans Regional Transport Strategy, (2013)

This strategy provides a long-term regional transport strategy, developing and taking forward strategic transport improvements that enables a more economically competitive, sustainable and socially inclusive society. The RTS also ensures that Local Development Plans and the up to date Strategic Development Plan for Aberdeen City and Shire are supported.

In relation to Dyce Station, the RTS notes the improvements to the station as part of the Scottish Government's 'Access for All' scheme, which included the construction of a new overbridge with lift access, a waiting room and ticket office. The RTS also states that there has been a focus on improving commuter rail services into Aberdeen and Dyce from stations in Aberdeenshire, suggesting the strategic importance of the station.

2.4.2 Nestrans Rail Action Plan 2010-2021, Second Draft, (2010)

This plan was developed following the large increase in passenger numbers using the rail system in the north east of Scotland, leading to the necessity to improve the system and calls for enhanced services to accommodate further travellers. The vision for the Rail Action Plan follows the overarching vision of the RTS, which is to have a transport system for the north east of Scotland which enables a more economically competitive, sustainable and socially inclusive society. Like the RTS, the objectives of the plan focus on the economy, accessibility, safety and social inclusion, the environment and spatial planning.

The plan notes car parking demand and supply issues, highlighting that estimated demand at Dyce Station is high. Dyce, along with Stonehaven and Inverurie Stations, is listed as a secondary station, indicating that it acts as both origin for local commuting trips and a significant destination in its own right.

The key issues at Dyce Station are listed, including how the station was unstaffed with limited facilities for disabled travellers, although the latter issue has since been addressed, with major improvements taking place at the station since the report Action Plan was published in 2010.

2.4.3 Nestrans Regional Parking Strategy, (2012)

This strategy was developed following recognition in the Nestrans RTS that parking is a key element of managing demand and that parking policy will be an important element in influencing modal choice and achieving RTS objectives. The aim of a Regional Parking Strategy is to agree a policy framework under which actions can be delivered at a local level that ensures provision, management and control of parking in both Aberdeen City and Aberdeenshire, working towards and supporting the wider objectives of the Regional Transport Strategy and the two Local Transport Strategies.

The strategy does not emphasise Dyce Station, only noting the significant patronage growth at the station in recent years.

2.4.4 Aberdeen City Local Transport Strategy, (2008)

Aberdeen City Council is currently refreshing their Local Transport Strategy (LTS), which will cover the period 2015-2020. For the purpose of this review, the 2008 LTS will be reviewed.

The LTS has the vision of developing a sustainable transport system that is fit for the 21st century, accessible to all, supporting a vibrant economy and minimising the impact on the environment. This includes five high level aims, which focus on the economy, safety, the environment, integration and accessibility and ensuring the integration transport policies and sustainable development, health and social inclusion policies.

The strategy does not emphasise Dyce Station, only noting that the station could play a more significant role in the future public transport access to Aberdeen Airport. It is noteworthy that the period for which the LTS covers has now elapsed.

2.4.5 Aberdeen City Local Development Plan, (2012)

The Aberdeen Local Development Plan has the potential to have significant implications on the wider transport network, which should be taken into consideration. The aim of the plan is for Aberdeen in 2030 to be a sustainable city at the heart of a vibrant and inclusive North East of Scotland, with the plan providing a land use framework within which the vision can be worked towards.

Dyce Station is not noted in the plan, although the focus of the plan is on future land use. The plan has outlined substantial land allocations in the Dyce area, with the proximity of housing and employment land allocations opening up the opportunity for people to live closer to places of work. In total, there are allowances for 5,240 houses and 54.5 ha of employment land in the Dyce/Bucksburn/Woodside area between 2007 and 2030. The impact of this on Dyce Station is unclear from the plan.

2.4.6 Aberdeen City and Shire Strategic Development Plan (2014)

The plan has been developed from the previous Structure Plan published in 2009 and was written with a range of international, national and regional influences in mind. The Strategic Development Plan aims to provide a strong framework for investment decisions which help grow and diversify the regional economy, as well as taking on the urgent challenges of sustainable development and climate change. The focus of the plan is on the Strategic Growth Areas, of which one is Aberdeen City. It is estimated that around half of all new developments in the region will be within Aberdeen City and that there will be a need for 54,000 new homes in the region by 2035. The impact of this on Dyce Station is unclear from the plan.

2.5 Summary

This chapter has summarised the main findings from previous studies and key policy documents.

Previous studies have focused on surveying rail occupancy levels at Dyce Station (amongst other locations), finding that occupancy rates exceeded 100% on many services which operated between Aberdeen and

Dyce. Surveys have also been undertaken to assess the impact of the Dyce Shuttle/JET Connect service, showing that this is a popular connection for commuters between Dyce Station and Industrial Estates in the Dyce area.

Several of the policies reviewed are high level, taking the Aberdeen City and Shire region into consideration. As such, Dyce Station is not underlined in all policy documents reviewed, although other key policy documents have implications for Dyce Station, such as the Regional Transport Strategy specifically noting the importance of improving commuter rail services into Aberdeen and Dyce from Aberdeenshire, underlining the strategic importance of the station.

Establishment of Demand

3 Establishment of Demand

3.1 Introduction

This chapter outlines the methodology for the Dyce Station Car Park and surrounding streets occupancy surveys undertaken on Wednesday 11th February and Thursday 12th February 2015.

3.2 Methodology

A survey form split into survey beats, location and car registration plates was the preferred means of ascertaining existing demand for car parking spaces at Dyce Station Car Park. This also gave sufficient data to review overnight stays at the car park. As parked vehicles were more sporadic on surrounding streets, maps were printed out for each of the sixteen survey periods and the first four digits of registration plates recorded on the map.

Understanding the layout of Dyce Station Car Park prior to the site visit was essential so the surveys could be undertaken as efficiently as possible. Utilising a topography map provided in Mott MacDonald's 2010 Dyce Station Improvements study[3], each car parking space was allocated a number which corresponded to the survey form, allowing a registration plate to be allocated if the space was occupied. Numbers allocated to each parking space did require modifying once on site however, given the loss of space attributed to the construction of the new bridge/lift and the installation of a sub-station. An example of the survey form is provided in Appendix E. This method enabled a quick analysis of results based on the location of the vehicle by marking whether or not the same vehicle was present during the separate periods surveyed.

One beat was carried out, which covered Dyce Station Car Park and the surrounding streets of Station Road, Merrivale and Union Row. The surveys were undertaken between 7am-9am and 4pm-6pm on a half hourly basis on Wednesday 11th February and Thursday 12th February. This resulted in sixteen sets of occupancy data. Table 3.1 below details the time periods surveyed.

Table 3.1 – Survey Times

Wednesday 11th February 2015	Thursday 12th February 2015
AM	
07:00-07:30	07:00-07:30
07:30-08:00	07:30-08:00
08:00-08:30	08:00-08:30
08:30-09:00	08:30-09:00
PM	
16:00-16:30	16:00-16:30
16:30-17:00	16:30-17:00
17:00-17:30	17:00-17:30
17:30-18:00	17:30-18:00

[3] *Dyce Station Improvements Feasibility and Outline Design Study* (Mott MacDonald, 2010)

3.3 Results

3.3.1 Analysis of Survey Results

This section analyses the results from the Dyce Station Car Park and surrounding street surveys undertaken on Wednesday 11th and Thursday 12th February.

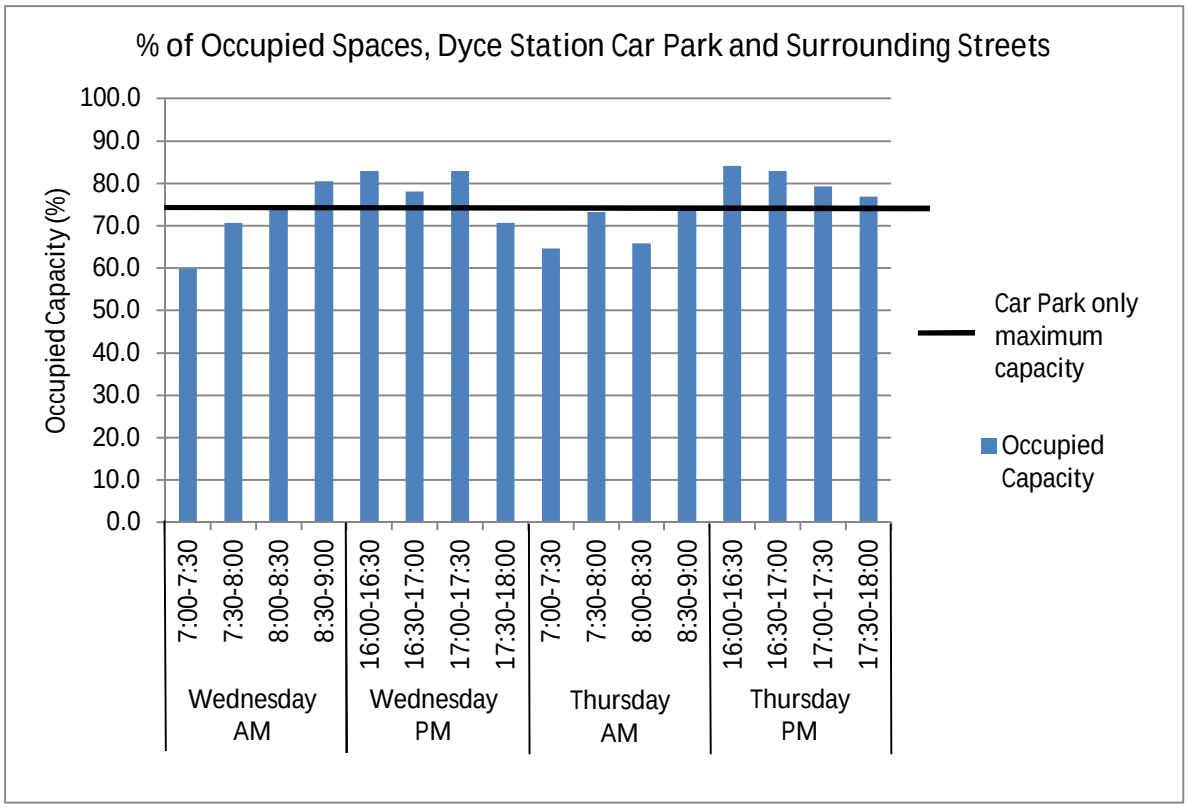


Figure 3.1 – Percentage of Occupied Spaces, Dyce Station Car Park and Surrounding Streets

The maximum capacity of the survey area was 82 vehicles. This figure has been obtained by adding together the maximum occupancy capability of Dyce Station Car Park (60 spaces) unmarked bays within the car park (two spaces) and the surrounding streets of Station Road (five spaces), Merrivale (12 spaces) and Union Row (three spaces). The horizontal line on the graph marks 73.1%, which is equal to the number of marked spaces in the car park. The remaining 26.9% is composed of all other available parking (unmarked bays and on street parking in surrounding streets).

Figure 3.1 demonstrates that the car park and surrounding streets did not reach the maximum capacity of 82 vehicles during the times surveyed, although the horizontal line shows that overall, the maximum capacity of 60 spaces in the existing car park was surpassed owing to on street parking on Station Road, Merrivale and Union Row. The highest occupancy rate recorded was 84.1% (the equivalent of 69 spaces) between 16:00 and 16:30 on Thursday 12th February, although an occupancy rate of 82.0% was reached between 16:00-16:30 and 17:00-17:30 on Wednesday 11th February and between 16:30-17:00 on Thursday 12th February. One of the two unmarked areas of the car park that were viewed to be occupied at various stages throughout the days surveyed was located at the northern end of the car park next to the Formartine and

Buchan Way entry point. The other occupied unmarked bay was to the north of the new bridge. These spaces were occupied despite not being formally marked. Three of the 60 marked car parking spaces (5%) were restricted to disabled bay user access only. It was not recorded whether vehicles parked in the disabled bays displayed a blue badge.

There are currently six spaces allocated for taxis, which are located at the south end of the car park. With the exception of one time period surveyed (07:00-07:30 on Wednesday 11th February) when eight taxis were recorded, existing space allocated for taxis was sufficient.

A breakdown of car park survey results and surrounding street survey results are shown separately in Tables 3.2 and 3.5 respectively. Percentages outlined in Table 3.2 are shown as a percentage of 60 (the total number of marked bays located in the car park).

The 'Residual cars from previous survey period' column records vehicles which remained in the same parking space and did not relocate between survey periods. The number of residual cars from the previous survey period enables the number of longer stay vehicles to be established. This explanation is also applicable to understanding Table 3.3.

The 'Total at end of survey period' column is the sum of the total from the end of the previous survey period and new arrivals in the car park minus any departed vehicles.

Table 3.2 – Car Park Survey Results

	New arrivals in car park		Departures from car park		Number of relocated cars in car park*		Residual cars from previous survey period		Total at end of survey period	
Wednesday 11th February										
	Number	%	Number	%	Number	%	Number	%	Number	%
07:00-07:30	0	0.0%	0	0.0%	0	0.0%	42	70.0%	42	70.0%
07:30-08:00	12	20.0%	1	1.7%	0	0.0%	41	68.3%	53	88.3%
08:00-08:30	4	6.6%	2	3.3%	0	0.0%	51	85.0%	55	91.7%
08:30-09:00	3	5.0%	1	1.7%	0	0.0%	54	90.0%	57	95.0%
16:00-16:30	5	8.3%	7	11.7%	0	0.0%	51	85.0%	56	93.3%
16:30-17:00	2	3.3%	7	11.7%	0	0.0%	49	81.7%	51	85.0%
17:00-17:30	5	8.3%	3	5.0%	0	0.0%	48	80.0%	53	88.3%
17:30-18:00	1	1.7%	6	10.0%	0	0.0%	47	78.3%	48	80.0%
Thursday 12th February										
07:00-07:30	9	15.0%	5	8.3%	7	11.7%	32	53.3%	48	80.0%
07:30-08:00	8	13.3%	1	1.7%	0	0.0%	47	78.3%	55	91.7%
08:00-08:30	1	1.7%	7	11.7%	0	0.0%	48	80.0%	49	81.7%
08:30-09:00	4	6.7%	1	1.7%	0	0.0%	48	80.0%	52	86.7%
16:00-16:30	6	10.0%	4	6.7%	1	1.7%	48	80.0%	55	91.7%
16:30-17:00	4	6.7%	5	8.3%	0	0.0%	50	83.3%	53	88.3%
17:00-17:30	0	0.0%	5	8.3%	0	0.0%	48	80.0%	48	80.0%
17:30-18:00	3	5.0%	3	5.0%	0	0.0%	45	75.0%	48	80.0%

* It is assumed that these vehicles departed the car park between survey periods and upon return parked in a different space.

Table 3.2 shows that a large number of vehicles remained in the same parking space between the AM and PM survey periods. 51 vehicles remained in the same space between 08:30 on Wednesday morning and 16:00 on Wednesday afternoon, whilst the figure was slightly lower for the comparable times on the Thursday, with 48 vehicles remaining in the same space.

As anticipated, the greatest number of new vehicles to the car park occurred during the AM periods on both days, with a net gain of 15 between 07:00 and 09:00 on the Wednesday morning and a net gain of four on the Thursday morning. Similarly, the pattern for cars leaving the car park was as expected. Overall, there were eight fewer occupied spaces between 16:00 and 18:00 on Wednesday 11th February and seven fewer spaces between the same time periods on Thursday 12th February.

The survey data also highlighted that a considerable number of vehicles remained in the car park overnight, with 32 cars recorded as remaining in the same space in the final survey on the Wednesday evening and the first survey on the Thursday morning.

Table 3.2 does not include occupancy rates of the two unmarked bays located within the car park.

3.3.2 Disabled Bay Occupancy Results

This section outlines the capacity of disabled bays at Dyce Station Car Park, of which there are three. They are located close to the entrance at Station Road.

Table 3.3 – Disabled Bay Occupancy Results

	New arrivals in car park	Departures from car park	Number of relocated cars in car park*	Residual cars from previous survey period	Total at end of survey period
Wednesday 11th February					
	Number	**Number**	**Number**	**Number**	**Number**
07:00-07:30	0	0	0	2	2
07:30-08:00	1	1	0	1	2
08:00-08:30	0	1	0	1	1
08:30-09:00	0	0	0	1	1
16:00-16:30	0	0	0	1	2
16:30-17:00	1	0	0	2	2
17:00-17:30	0	0	0	2	2
17:30-18:00	0	0	0	2	2
Thursday 12th February					
07:00-07:30	0	0	0	2	2
07:30-08:00	1	0	0	2	3
08:00-08:30	0	1	0	2	2
08:30-09:00	0	0	0	2	2
16:00-16:30	0	0	0	2	2
16:30-17:00	0	0	0	2	2
17:00-17:30	0	0	0	2	2
17:30-18:00	0	0	0	2	2

* It is assumed that these vehicles departed the car park between survey periods and upon return parked in a different space.

Table 3.3 shows that 100% occupancy was only reached during one time period surveyed; 07:30-08:00 on Thursday 12th February. Generally however, two of the three disabled bays were occupied throughout the periods surveyed. Despite this, the survey results demonstrate that maximum capacity of the disabled bays was reached, suggesting that additional spaces are required.

One car remained in the same disabled bay during all periods surveyed (between Wednesday AM and Thursday PM) and two vehicles remained in the same disabled bay overnight.

3.3.3 *Analysis of Surrounding Street Surveys*

As well as surveying the car park at Dyce Station, the surrounding streets of Station Road, Merrivale and Union Row were surveyed on the same beat. The results are outlined in Table 3.5.

The site visit enabled estimations to be made regarding the maximum occupancy capability of Station Road, Merrivale and Union Row, with measurements taken of each street. This has enabled more accurate estimations of maximum occupancy capability to be ascertained for surrounding streets based on a vehicle requiring a 6m bay length for parallel parking. This figure has been obtained from the SCOTS National Roads Development Guide[4]. Areas traversed with driveways or bearing double yellow lines were not included in measurements. Table 3.4 outlines the maximum occupancy capabilities of streets surrounding Dyce Station Car Park based on the previously stated criteria.

Table 3.4 – Maximum occupancy capability of surrounding streets

Street	Length	Maximum occupancy capability
Station Road	30.0m	5
Merrivale	70.5m	12
Union Row	17.0m	3

Several vehicles were viewed on Merrivale as parking on the kerb. As the street measures 4.8m wide, without this manoeuvre, the number of available spaces on Merrivale is likely to be zero.

Percentages outlined in Table 3.5 are shown as a percentage of the maximum occupancy capability figures outlined in Table 3.4.

Table 3.5 – Surrounding Streets Survey Results (cars parked)

	Street					
	Station Road		Merrivale		Union Row	
Wednesday 11th February						
	Number	%	Number	%	Number	%
07:00-07:30	2	40.0%	1	8.3%	4	133.3%
07:30-08:00	1	20.0%	1	8.3%	3	100.0%
08:00-08:30	1	20.0%	2	16.6%	3	100.0%
08:30-09:00	4	80.0%	3	25.0%	2	66.6%
16:00-16:30	6	120.0%	5	41.6%	1	33.3%
16:30-17:00	6	120.0%	5	41.6%	2	66.6%
17:00-17:30	6	120.0%	5	41.6%	4	133.3%
17:30-18:00	4	80.0%	2	16.6%	4	133.3%
Thursday 12th February						
07:00-07:30	1	20.0%	1	8.3%	3	100.0%
07:30-08:00	0	0.0%	1	8.3%	4	133.3%
08:00-08:30	1	20.0%	2	16.6%	2	66.6%
08:30-09:00	4	80.0%	3	25.0%	2	66.6%
16:00-16:30	5	100.0%	6	50.0%	3	100.0%
16:30-17:00	6	120.0%	5	41.6%	4	133.3%
17:00-17:30	6	120.0%	6	50.0%	5	166.6%
17:30-18:00	6	120.0%	4	33.3%	5	166.6%

[4] http://localapps.pkc.gov.uk/internet/flashmag/councils/nationalroadsguide/roadsfeb2014.pdf

Data collected from the streets surrounding Dyce Station found that occupancy rates were significantly greater in the PM peak when compared to the AM peak. The percentages greater than 100% recorded in the PM peak on Station Road is the result of one car parking over the entrance to a small car park for a local business. The percentages greater than 100% recorded on Union Row are the result of cars parking on double yellow lines.

3.4 Existing Patronage Figures & Trends

The Office for Rail Regulation[5] provides estimates of the total number of people entering and exiting a station, and for the purpose of this report, figures dating back to 2004/2005 for Dyce Station have been used. As previously noted, there has been an increase in journeys made to and from Dyce Station between 2004/2005 and 2013/2014 from 269,000 passengers to 810,678; an increase of 201%, on a trend of around 54,000 passengers increase per year. Assuming the existing trend continues, this data has enabled projections to be made for future patronage levels. Where it is assumed there is a proportional relationship of passenger growth to demand for car parking at the Dyce Station Car Park then a proxy estimate of demand for car parking can be established. The passenger trend is demonstrated in Figure 3.2

It should also be noted that Network Rail are in the process of producing the Scotland Route Study, (which involves demand forecasting for the Scottish network up to 2043). However, although this will not be published until December 2015, Network Rail anticipates that demand at Dyce Station will continue to increase.

[5] http://orr.gov.uk/statistics/published-stats/station-usage-estimates

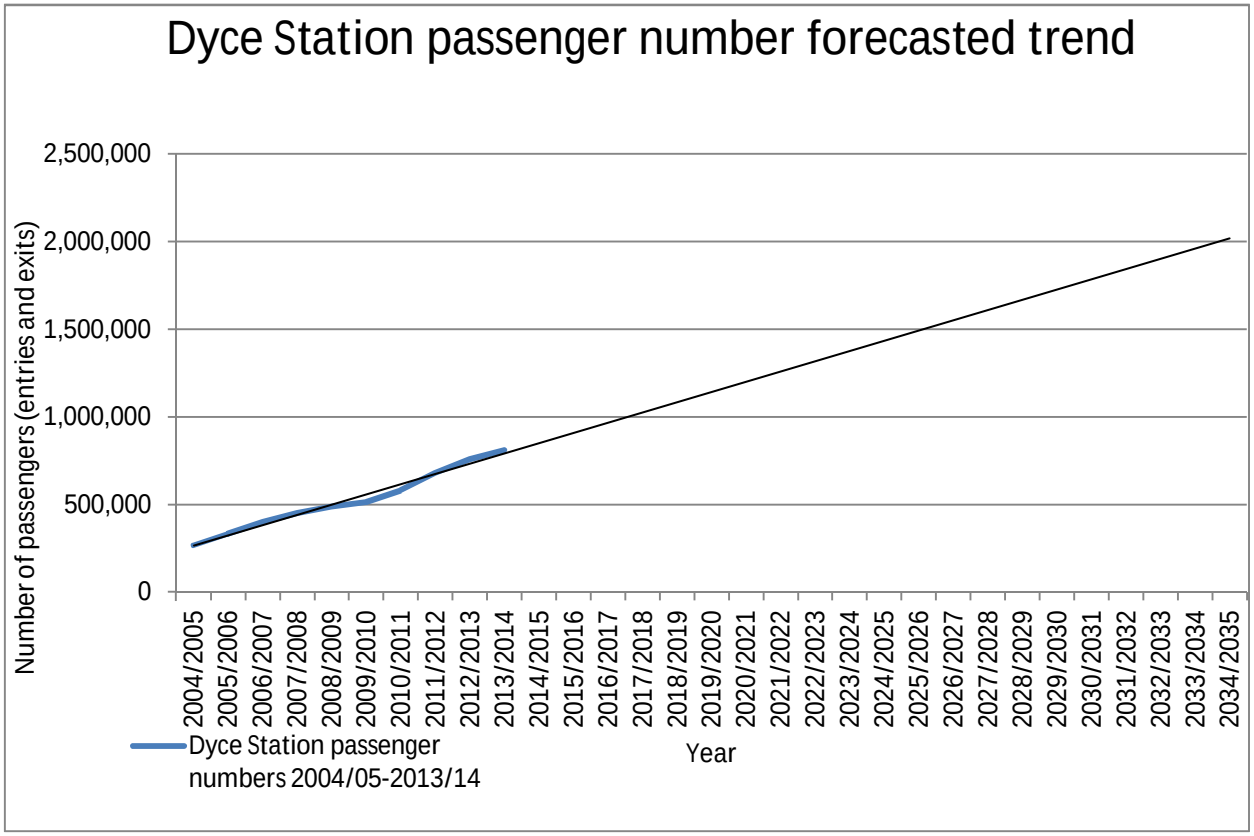


Figure 3.2 – Dyce Station passenger number forecasts 2014/15-2034/35

Using data recorded between 2004/2005 and 2013/2014, Figure 3.2 shows the number of passengers at Dyce Station and projections for future passenger numbers should the trend established since 2004/2005 continue into the future. This then enabled the potential number of car parking spaces to meet this anticipated demand to be estimated. This is outlined in Table 3.7.

Table 3.6 outlines forecasted passenger numbers for Dyce Station for the next twenty years. These have been calculated using existing passenger numbers and applying a formula based on the trend line shown in Figure 3.2. Based on the fixed growth trend, the number of passengers in 2014/15 would be 850,332 and in 2034/35 it would be 2,018,732, a projected increase of 137%. This same fixed growth trend has been used to project the required number of car park spaces at Dyce Station for 2034/35.

The estimated number of required car park spaces at Dyce Station Car Park for 2034/35 is outlined in Table 3.7.

Table 3.6 – Dyce Station Forecasted Passenger Numbers

Year	Forecasted passenger numbers
2013/2014	**810,678**[6]
2014/2015	850,332
2015/2016	908,752
2016/2017	967,172
2017/2018	1,025,592
2018/2019	1,084,012
2019/2020	1,142,432
2020/2021	1,200,852
2021/2022	1,259,272
2022/2023	1,317,692
2023/2024	1,376,112
2024/2025	1,434,532
2025/2026	1,492,952
2026/2027	1,551,372
2027/2028	1,609,792
2028/2029	1,668,212
2029/2030	1,726,632
2030/2031	1,785,052
2031/2032	1,843,472
2032/2033	1,901,892
2033/2034	1,960,312
2034/2035	2,018,732

Table 3.7 shows the number of spaces that would be required at Dyce Station Car Park directly based on estimated passenger number (pax) trend projections for Dyce Station from 2014/15 onwards. The rate of car parking demand used is that experienced in 2014/15 which represents one car parking space used per

[6] Existing passenger number for 2013/14.

12,324 annual passengers, - i.e. from around 850,332 annual passengers there was 69 car park space demand in 2014/15, giving a car parking rate of 12,324 pax/space at Dyce.

Table 3.7 – Potential required demand for Dyce Station car park (spaces)

Year	Dyce Station Growth Demand (spaces)
2014/2015	69
2015/2016	74
2016/2017	78
2017/2018	83
2018/2019	88
2019/2020	93
2020/2021	97
2021/2022	102
2022/2023	107
2023/2024	112
2024/2025	116
2025/2026	121
2026/2027	126
2027/2028	131
2028/2029	135
2029/2030	140
2030/2031	145
2031/2032	150
2032/2033	154
2033/2034	159
2034/2035	164

A figure of 69 has been used for 2014/2015 as this was the maximum occupancy recorded during the surveys on Wednesday 11th and Thursday 12th February in the car park and surrounding streets. Although an accurate record of the two vehicles parked in unmarked bays was not kept when the surveys were undertaken, it has been assumed for the purpose of estimating required number of car park spaces up to 2035 that those two vehicles were present between 16:00-16:30 on Thursday 12th February when the maximum number of vehicles (69) were recorded. Similar to passenger number forecasts, the relationship in the number of car park spaces at Dyce Station Car Park between 2014/15 and 2034/35 is an increase of

137%, where there was a recorded maximum occupancy of 69 spaces in 2014/15 increasing to 164 spaces demand in 2034/35.

The method outlined above provides one proxy estimate for the number of car parking spaces that may be required at Dyce Station Car Park by 2035. As previously stated however, Network Rail will publish their own demand projections later this year.

3.5 Risk Identification

Section 3.4 outlined an estimation of how many car parking spaces will be required based on existing passenger trends. However, it is necessary to note the risks of making these estimations and how these risks will be managed. Identified risks are outlined and summarised below.

- Latent (suppressed) demand- Figures produced for the required number of car parking spaces have been produced based on the survey results undertaken on Wednesday 11th and Thursday 12th February and a formula based on the growth trend. However, it is not known to what extent suppressed demand may contribute to a requirement for additional car parking spaces. As such, there is the potential for the estimated number of required spaces to be greater than stated.
- Growth forecasts- Although estimations of required car parking spaces have been based on existing trends, it is possible for future growth to be higher or lower than the anticipated trend.
- Bus Turning Circle- Increased use of the car park for Park and Ride could be associated with the new bus turning circle and any promotion of bus services.
- Park and Ride Provision- There is a risk that extending the number of parking spaces at Dyce Station may cause increased usage of the station car park by non-rail users. As noted earlier, there appears to be a degree of overnight parking at the station which may be attributed to use by non-rail users, or rail users on journeys involving overnight stays. Consequently, the provision of additional parking at Dyce Station may lead to this capacity being used by those who do not require to park as part of a rail journey or for long stay rail parking. It is considered that this would be to the detriment of the objectives of the scheme.
- Access Arrangements- The vehicular access via Station Road is not suitable for high capacity access and may be a constraint on the development and attractiveness of a large car park expansion, particularly when egressing the station car park at peak times of the day.

3.5.1 Key Findings

Key findings from the surveys are outlined below.

- The combined maximum capacity at Dyce Station Car Park (including the two unmarked bays) and surrounding streets is 82 vehicles. This is inclusive of three disabled bays located within the car park.
- The greatest combined occupancy rate was 84.1% (recorded between 16:00-16:30 on Thursday 12th).
- The total number of combined parked vehicles reached or exceeded the existing car park capacity (60 spaces) for over half of the surveyed time periods.
- The lowest combined occupancy rate was 59.8% (recorded between 07:00-07:30 on Wednesday 11th February). The average occupancy rate was 75.1%.
- With the exception of one time period surveyed (07:00-07:30 on Wednesday 11th February) existing space allocated for taxis was sufficient.

- 32 vehicles (53% of marked bays in the car park) remained in the car park overnight between Wednesday evening and Thursday morning.
- 25 vehicles (42% of marked bays in the car park) remained in the car park at the same location for all periods surveyed between Wednesday AM and Thursday PM.
- A heavy frost on car windows suggests that the majority of cars present at 07:00 on Wednesday 11th February had been parked overnight.
- Generally, occupancy rates were significantly higher in the PM peak on surrounding streets when compared to AM peak figures.

Consultations

4 Consultations

4.1 Introduction

Following discussion with Nestrans, it was agreed that targeted discussions should be held with the following:

Table 4.1 – Study Consultees

Consultee(s)	Element
Member of Scottish Parliament	Local representative
Abellio	Rail
Transport Scotland	Rail Policy
Network Rail	Rail development
Aberdeen City Council	Local Transport Strategy
	Park Maintenance
	Core Paths
	Traffic Management
	Local Development Plan
	Environment/Parks and Open Spaces
	Bus Connections
	Engineering
	Air Quality/Noise
	Car Club/Electric Vehicles
Aberdeenshire Council	Transportation
	Core Paths (Formartine and Buchan Way)
Nestrans	Cycling
	Travel Planning
First Aberdeen	Public Transport Operator
Stagecoach Bluebird	Public Transport Operator
Aberdeen Cycle Forum	Cycling
Disability Advisory Group	Disabled Access
Aberdeen and Grampian Chamber of Commerce	Businesses and Enterprise
Aberdeen International Airport	Airport surface access

Table 4.2 – Consultations: Key Outcomes

Consultee(s)	Key Points
Member of Scottish Parliament	• The extension of the car park should utilise a section of the field adjacent to the station. Alternatively there is an opportunity to look at land on the opposite side of the station by Farburn Terrace. • The loss of green space is a potential constraint to the extension. Likewise, an increase in congestion on the local road network could be an additional issue. To counter this some consideration should be given to the introduction of a one-way loop within the three adjacent streets. • Local businesses and residents around the station report pressures as a result of a low number of parking spaces at the station.
Abellio	• Space is very constrained from a railway ownership perspective, with no scope for ground level expansion. Decking or building out onto the adjacent spare ground may be options. • It is important that cars, taxis, cyclists and pedestrians are segregated as much as possible. A designated taxi rank should also be provided. • Traffic congestion on Station Road may become a bigger issue if the car park is expanded. • It is essential that the study considers station access as a whole, not just car parking. • No forecasting has been undertaken by First ScotRail for Dyce Station.
Transport Scotland	• By using parkland for the extension to the car park, some thought must be given to drainage- SUDS will be the issue. • An alternative location for extension could be the former goods yard on the airport side and south of the station. It is not in railway ownership and was previously used as a commercial car park previously, although Transport Scotland were unsure what it is now used for. • If long stay airport users are a problem in the car park, a charging regime will be required. Station car parking regimes would need to be tailored to local car parking charges.

Consultee(s)	Key Points
Network Rail	• Network Rail are currently in the process of the Scotland Route Study, which involves demand forecasting for the Scottish network up to 2043; a draft will be published in December 2015. It is anticipated that demand at Dyce will continue to increase. • It may be prudent to deliver the car park extension in stages, with the potential for expansion towards Pitmedden Road, or decking. There may also be potential for a car park on the west side of the station. • The existing road network may suffer further congestion if it was used in its current form.
Aberdeen City Council- Local Transport Strategy	• LTS action is to continue to improve access to Dyce Railway Station, particularly by foot, bicycle, bus and taxi. • Cycling and walking links must be maintained or improved. • As the area frequently floods consideration must be given to drainage issues. • 2016 LDP Supplementary Guidance states that 1% of car parking spaces/ minimum of two should have electric supply.
Aberdeen City Council- Park Maintenance	• The proposed area for expansion is large if allocated only for station parking, which may lend itself to long stay parking for the airport or a Park and Ride site. • Light pollution will have to be explored along with its impact on the area.
Aberdeen City Council- Core Paths	• No major issues raised.
Aberdeen City Council- Traffic Management	• ACC are looking to restrict/ remove parking on Station Road and Merrivale, either all day or imposing restrictions during peak times. ACC have to balance the effect on residents parking / loading / unloading etc. with maximising the efficiency of vehicles entering and exiting the railway station. • ACC have looked to have an in and an out access for the car park, but Union Row and the junction with Victoria Street were not appropriate due to reduced visibility and the existing crossing point on Victoria Street.

Consultee(s)	Key Points
Aberdeen City Council- Local Development Plan	• Land at Dyce Station has been identified in the Proposed LDP for extra car parking. • Primary issue is to ensure there is robust justification for the proposal in terms of the needs for it and that the scale of the proposal is proportionate to any anticipated future need. • Residential amenity should be considered through landscaping, buffers from properties and lighting arrangements. • Access to the Formartine and Buchan Way should be maintained or improved.
Aberdeen City Council- Environment/Parks and Open Spaces	• The proposed area for extension is marked as a Green Space Network, thus any constraints and implications of this will have to be considered via the Local Development Plan Policy NE1 Green Space Network. • The proposed land for extension is also a designated open space. Under the open space audit 2010 the proposed location scored poorly in quality and would require considerable improvements.
Aberdeen City Council- Bus Connections	• The potential expansion of the car park would have little impact on Public Transport. However, as access to the station and car park is difficult to manoeuvre, there may be an impact on private minibuses and coaches. • It is hoped the new bus turning circle will improve public transport services at the station and may lead to increased frequency of bus services. • More spaces will allow for more Park and Ride options at the station.
Aberdeen City Council- Engineering	• It is anticipated the extension would have a marginal effect on the local and strategic network/junctions. However, all new trips to the station would negatively affect link and junction performance. • The extended car park design should include a range of improvements, including (but not limited to) real-time information, bus waiting facilities, disabled parking and cycling facilities. • Free all day parking should be maintained at the station. • To reduce local car use, it is essential there is improved connectivity with Dyce Station by active travel modes.

Consultee(s)	Key Points
Aberdeen City Council- Air Quality/Noise	• Require to know the scale of expansion before specific comments can be made. • There are no major AQMAs in the vicinity of the station. • A noise assessment may be required due to the close proximity of residential areas.
Aberdeen City Council- Car Club/Electric Vehicles	• Currently, there are no electric vehicle charge points in the Dyce area, although ACC have been looking for a suitable location; the extended car park is considered an appropriate location for EV charge points. • Any extension should not interrupt walking and cycling movements. • Cycle lockers are well used in the car park and so these should be maintained.
Aberdeenshire Council- Transportation	• Any design should enhance walking and cycling options and cater for interchange with buses and taxis. • Timescales for the Aberdeen to Inverness upgrade work, AWPR works and the A96 Park and Ride will be an issue. • Drop off charges at the airport may alter travel behaviour. There is potential for the airport to be approached to divert some of this additional income from drop off charges to the running of the current shuttle service.
Aberdeenshire Council- Core Paths (Formartine and Buchan Way)	• It should be ensured that there is adequate bike/locker storage incorporated into plans. • Would be beneficial to have a few car parking spaces reserved exclusively for users of the Formartine and Buchan Way during the day.
Nestrans- Cycling	• There have been discussions between Sustrans and the Core Paths team within Aberdeen City to formalise a current desire line from the Formartine and Buchan Way to Union Row. • There have been discussions between Nestrans, Sustrans and Abellio to make Dyce Station a Bike and Go Hub. • Cycling infrastructure and facilities should be incorporated into the design and the link to the Formartine and Buchan Way should be preserved. • An increase in car park spaces should result in an increase in cycle parking provision. • Appropriate measures should be taken to ensure that drivers and cyclists are aware of one other around entrances and exits to both the car park area and the Formartine and Buchan Way.

Consultee(s)	Key Points
Nestrans- Travel Planning	• There are several Travel Plans in the Dyce area, but it is thought none are currently monitored. A large Travel Plan in the area is Aker, which is still being negotiated.
First Aberdeen	• If the extension is large, First Aberdeen would be concerned that a higher volume of traffic on Victoria Street and the surrounding interchanges could affect the reliability of service 18. • An extension of the Aberdeen PlusBus zone to include Dyce station could be a way of facilitating access to the station.
Stagecoach Bluebird	• Any development of the car park cannot impede the access of public transport to the railway station.
Disability Advisory Group	• The Disability Advisory Group was consulted. No significant issues relating to the study were raised.
Aberdeen Cycle Forum	• It would be good to see additional cycle facilities, perhaps bike lockers for people travelling by train onwards from Dyce. • Any extension to the car park should maintain easy access for cyclists and pedestrians onto the Formartine and Buchan Way.
Aberdeen and Grampian Chamber of Commerce	• Chamber members support the principle of extending the car park. • Given the location of the station in Dyce, some thought should be given to improving public transport access.
Aberdeen International Airport	• Any extension to the car park, either surface or structural, will require to be cleared by Aviation safeguarding as part of the statutory planning process. • Preference would be for the pricing strategy of the station car park to be formulated to ensure that the car park serves daily commuters and does not fill up with longer term parkers negating the purpose of the car park. • Aberdeen Airport is happy to continue to market the train link to the airport. There is potential to formally rebrand station signage as 'Dyce Aberdeen International Airport'.

4.1.1 Summary of Consultations

There was a strong response rate from consultees that were contacted by AECOM as part of the Dyce Station Car Park Extension consultation process. The most common issue raised was that of maintaining or improving existing cycling and walking links to and from the station; eight consultees raised this concern. Particular reference was made to the Formartine and Buchan Way, which serves as a popular link for commuters and recreational users.

Other issues raised from the consultation process included the potential to introduce a charging regime at the car park and the need to ensure Public Transport is not impeded by any potential extension. Drainage issues, long stay users and the impact a loss of green space would have were further issues raised.

4.2 Summary of Problems, Issues, Opportunities and Constraints

Using responses from the consultations, problems, issues, opportunities and constraints can be summarised as follows.

Table 4.3 – Summary of Problems, Issues, Opportunities and Constraints

Problems	**Issues**
• Long stay and overnight parking (which might not be associated with rail use), resulting in the loss of car parking spaces. • Access arrangements • Potential latent demand due to existing full capacity • Loss of car parking spaces from construction of new footbridge and sub-station.	• Committed development in the Dyce/Stoneywood/Bucksburn area. • Kintore station may limit the number of passengers utilising Dyce Station. • Lack of public toilets in immediate vicinity of station car park.
Opportunities	**Constraints**
• Provide Electric Vehicles bays and/or charging points. • Park and Ride provision. • Create a Public Transport hub at the station by utilising the new bus turning circle. • Improve links to the Formartine and Buchan Way. • Provide designated parking spaces for Formartine and Buchan Way users. • Installation of public toilets. • Provide additional secure cycle parking. • Kintore Station may offer additional patronage by enabling Kintore-Dyce rail travel.	• Extended site is at risk of flooding. • North eastern side of car park constrained by an embankment. • Proposed area for extension is not flat. • Proposed area for extension is part of the Green Space Network. Policy NE1 in the LDP states that proposals which are likely to destroy or erode the character or function of the Green Space Network will not be permitted. • Ownership issues need to be explored. • Narrow entry point to existing car park on Station Road.

Objective Setting

5 Objective Setting

5.1 Introduction

This chapter provides a set of transport planning objectives for the Dyce Station Car Park extension study. The objectives are based on the initial objectives provided by Nestrans, and have been considered in conjunction with the review of problems, issues, constraints and opportunities (PICOs) in the study area, reviews of previous studies, and targeted discussions with key stakeholders.

5.2 Objective Development

In the Scope of Study document provided by Nestrans for this work, it is noted that the scheme should seek to address the following objectives:

- Ensure a suitable level of access to one of the region's primary transport hubs;
- Ensure a high quality interchange, encouraging the use of public transport;
- Improve access to the railway and to the Formartine & Buchan Way long-distance route;
- Ensure a choice of transport options for travellers, including fair and equitable management arrangements to maintain availability for bona fide rail users; and
- Provide benefits for the local community by improving management of on-street parking as part of a wider traffic management plan for access to the new car park.

Table 5.1 – Transport Planning Objectives Development

Scheme Objectives	Key Elements	Proposed Transport Planning Objective
• Ensure a suitable level of access to one of the region's primary transport hubs.	• Accessibility	*Provide improvements which enhance the accessibility of Dyce Station to users of all modes of transport.*
• Ensure a high quality interchange, encouraging the use of public transport.	• Public transport attractiveness	*Improve opportunities for sustainable transport options, including public transport, at Dyce Station.*
• Improve access to the railway and to the Formartine & Buchan Way long-distance route.	• Accessibility • Recreation	*Support improvements which enhance connectivity between Dyce Station and the Formartine and Buchan Way.*
• Ensure a choice of transport options for travellers, including fair and equitable management arrangements to maintain availability for bona fide rail users.	• User choice • Capacity for rail users	*Maintain and enhance choice and capacity at Dyce Station for users of all modes.*
• Provide benefits for the local community by improving management of on-street parking as part of a wider traffic management plan for access to the new car park.	• Parking and traffic management	*Support improvements at Dyce Station through complementary parking and traffic management measures.*

Transport planning objectives for the study have thus been developed based on the scheme objectives noted above, and outcomes of the tasks outlined in Chapters 2, 3 and 4. The process undertaken is shown below.

The Transport Planning Objectives proposed above align with the scheme objectives identified by Nestrans for this work. In addition to these, it is considered that the scheme should ensure support for wider policy objectives for Dyce as set out by Aberdeen City Council in their Local Transport Strategy, and in the Local Development Plan. This will ensure an objective-led appraisal, and support the representation on the Aberdeen City LDP to reallocate an area to enable a car park extension within the Plan.

Table 5.2 – Transport Planning Objectives

TPO1 – Provide improvements which enhance the accessibility of Dyce Station to users of all modes of transport.
TPO 2 – Improve opportunities for sustainable transport options, including public transport, at Dyce Station.
TPO 3 – Maintain and enhance choice and capacity at Dyce Station for users of all modes.
TPO 4 – Support improvements at Dyce Station through complementary parking and traffic management measures.
TPO 5 – Support improvements which enhance connectivity between Dyce Station and the Formartine and Buchan Way.
TPO6 – Support wider policy objectives for Dyce as set out by Aberdeen City Council in the Local Development Plan and transport policies in the Local Transport Strategy.

Whilst not an essential part of this early stage in the appraisal process, it is often useful to develop indicators alongside the development of objectives. This process helps to identify any objectives which are not SMART. An initial set of indicators is shown below in Table 5.3.

Table 5.3 – Transport Planning Objectives and Indicators

TPO	Indicator
TPO1 – Provide improvements which enhance the accessibility of Dyce Station to users of all modes of transport.	People trips in peak periods / passenger numbers.
TPO 2 – Improve opportunities for sustainable transport options, including public transport, at Dyce Station.	Number of services serving Dyce Station.
TPO 3 – Maintain and enhance choice and capacity at Dyce Station for users of all modes.	Number of vacant spaces in AM peak.
TPO 4 – Support improvements at Dyce Station through complementary parking and traffic management measures.	Turnover in spaces (%).
TPO 5 – Support improvements which enhance connectivity between Dyce Station and the Formartine and Buchan Way.	Infrastructure improvements.

Capabilities on project:
Transportation

TPO	Indicator
TPO6 – Support wider policy objectives for Dyce as set out by Aberdeen City Council in the Local Development Plan and transport policies in the Local Transport Strategy.	Electric vehicles LTS actions and policies.

Initial Appraisal of Options

6 Initial Appraisal of Options

6.1 Introduction

Four preliminary design options relating to the Dyce Station Car Park extension have been developed for consideration in a high level appraisal. These are summarised in Table 6.1, with sub-design options summarised in Table 6.2. Preliminary design option drawings are presented in Appendix C. Sub-design drawings showing different drainage options are outlined in Appendix D. It should be noted, that although all drawings in Appendix D depict a two way operational car park, the layout and design of the car park is the same, irrespective of the operation being one way or two way.

Table 6.1 – Design Options

Option Description	Key Elements
Option 1A – 208 space car park (one way operation)	• 198 car parking spaces and 10 disabled spaces. • Based on one way operation. • Provides opportunity for optional demand management in the extended part of the car park, with a nominal charge to dissuade stays of greater than 24 hours. Further work would be required to determine an appropriate approach if this was taken forward.
Option 1B – 209 space car park (two way operation)	• 199 car parking spaces and 10 disabled spaces. • Based on two way operation. • Provides opportunity for optional demand management in the extended part of the car park, with a nominal charge to dissuade stays of greater than 24 hours. Further work would be required to determine an appropriate approach if this was taken forward.
Option 2A – 459 space car park (one way operation)	• 441 car parking spaces and 18 disabled spaces. • Based on one way operation. • Demand management is not anticipated to be necessary owing to sufficient parking capacity enabled by this option.
Option 2B – 460 space car park (two way operation)	• 442 car parking spaces and 18 disabled spaces. • Based on two way operation. • Demand management is not anticipated to be necessary owing to sufficient parking capacity enabled by this option.

Table 6.2 – Sub-Design Options

Option Description	Key Elements
Option 1A (a) – 209 space one way operation car park with porous drainage	• 199 car parking spaces and 10 disabled spaces. • Based on one way operation. • Based on porous draining
Option 1A (b) – 209 space one way operation car park with swale drainage	• 199 car parking spaces and 10 disabled spaces. • Based on one way operation. • Based on swale drainage
Option 1B (a) – 209 space two way operation car park with porous drainage	• 199 car parking spaces and 10 disabled spaces. • Based on two way operation. • Based on porous drainage
Option 1B (b) – 209 space two way operation car park with swale drainage	• 199 car parking spaces and 10 disabled spaces. • Based on two way operation. • Based on swale drainage
Option 2A (a) – 460 space one way operation car park with porous drainage	• 442 car parking spaces and 18 disabled spaces. • Based on one way operation. • Based on porous drainage.
Option 2A (b) – 446 space one way operation car park with swale drainage	• 428 car parking spaces and 18 disabled spaces. • Based on one way operation. • Based on swale drainage.
Option 2B (a) – 460 space two way operation car park with porous drainage	• 442 car parking spaces and 18 disabled spaces. • Based on two way operation. • Based on porous drainage.
Option 2B (b) – 446 space two way operation car park with swale drainage	• 428 car parking spaces and 18 disabled spaces. • Based on two way operation. • Based on swale drainage.

In addition to the four preliminary design options listed in Table 6.1, AECOM have considered the option of a parking deck on the proposed site for extension.

This option is estimated to cost approximately £2,000 per sqm per deck, thus posing affordability constraints. In addition to this, the consultation with Aberdeen International Airport noted that any extension to the car park, either surface or structural, would require to be cleared by Aviation safeguarding as part of the statutory planning process. The height of a parking deck is also anticipated to have high risks in terms of

public acceptability. Given these points, it has been decided not to take this option forward to detailed appraisal and design stages.

As such, the high level appraisal in this chapter considers four preliminary design options. These are considered against a **Do-Minimum scenario.** This assumes that no extension to the current car park is made, but incorporates committed improvements in the Dyce Station area, including the provision of the bus turning circle to the west side of the station, which is currently being progressed by Nestrans. All options also assume the completion of the bus turning circle.

It should be noted that different drainage options have not been appraised in this chapter, for this would result in a duplication of the same appraisals. However, they have been included in Appendix D as sub-design options, for the impact of the different drainage options primarily affects costs, and do not impact upon the overall footprint design of the car park. An updated topography survey will be undertaken at the detailed design stage. In consultation with Nestrans the inclusion of a new short cut exit to the car park layout has been included but this will require further investigation in detailed design stages.

It should also be noted that exact final numbers of car parking spaces may vary depending on detailed design further to topographic surveys including recently constructed or under construction Dyce Station infrastructure.

6.2 Assessment Criteria

6.2.1 Scale of Impacts

This section sets out the assessment criteria for the high level appraisal. For each criterion, impacts of the various design options will be assessed using the seven-point scale as set out in Transport Scotland's Scottish Transport Appraisal Guidance (STAG), as specified within Table 6.3.

Table 6.3 – STAG Guidance Seven-Point Scale

Impact	Description
Major Beneficial (+3)	These are benefits or positive impacts which, depending on the scale of benefit or severity of impact, should be a principal consideration when appraising an option.
Moderate Beneficial (+2)	The option is anticipated to have only a moderate benefit or positive impact, and although they would not be taken in isolation, these scores may be a key consideration in the overall appraisal of an option when considered alongside other factors.
Minor Beneficial (+1)	The option is anticipated to have only a small benefit or positive impact. Small benefits or impacts are those which are worth noting, but are not likely to contribute materially to determining whether an option is taken forward.
Neutral (0)	The option is anticipated to have no or negligible benefit or negative impact.
Minor Negative (-1)	The option is anticipated to have only a small negative impact. Small impacts are those which are worth noting, but are not likely to contribute materially to determining whether an option is taken forward.

Impact	Description
Moderate Negative (-2)	The option is anticipated to have only a moderate negative impact, and although they would not be taken in isolation these scores may be a key consideration in the overall appraisal of an option when considered alongside other factors.
Major Negative (-3)	These are negative impacts which, depending on the severity of impact, should be a principal consideration when appraising an option.

6.2.2 Implementability Criteria

The design options will also be assessed on the grounds of their implementability, as described in the STAG Guidance[7], as noted below:

Table 6.4 – Implementability Criteria

Implementability Criteria	Description
Technical	• Initial assessment of the feasibility of construction or implementation of a proposal as well as any associated cost, timescale or deliverability risks.
Operational	• An assessment of who would operate the proposal and any other issues which may impact on its operation.
Affordability	• An assessment of the scale of financial burden on the promoting authority and other possible funding organisations, as well as associated risks.
Public Acceptability	• An assessment of the likely public response to a proposal.

Technical and operational feasibility and public acceptability are assessed on the extent of risk (ranging from low risk to very high risk). Affordability has taken account of the anticipated cost of the access solution, with respect to the anticipated availability of finance likely to be associated with the specific design option being considered. It has been scored as high risk (highly likely to be unaffordable), medium risk (some risk of being unaffordable) and low risk (little risk of being unaffordable).

6.2.3 STAG Criteria

Table 6.5 sets out the characteristics of the STAG criteria.

Table 6.5 – STAG Criteria

STAG Criteria	Description
Environment	• Highlights the particular qualities of the area, making reference to specially designated sites within the study area and to known proposals for change.
Safety	• Comprises two sub-criteria of accidents and security.

[7] http://www.transportscotland.gov.uk/report/j9760-05.htm

STAG Criteria	Description
Economy	• Comprises three sub-criteria of Transport Economic Efficiency, Wider Economic Benefits and Economic Activity and Location Impacts.
Integration	• Comprises three sub-criteria of Transport Integration, Transport and Land-Use Integration and Policy Integration.
Accessibility and Social Inclusion	• Comprises two sub-criteria of Community Accessibility and Comparative Accessibility.

All options will be subject to a high level assessment against the five STAG criteria. In line with STAG (Part 1) principles, the assessment considers an overall impact on each criterion, rather than impacts on the individual components described above. Impacts have been scored on a +3 to -3 qualitative basis.

Capabilities on project:
Transportation

6.3 High Level Appraisal of Design Options

Table 6.6 – High Level Appraisal of Design Options

Ref.	Options	Transport Planning Objectives (TPOs)						Implementability Criteria			National Transport Appraisal Criteria				
		TPO1	TPO2	TPO3	TPO4	TPO5	TPO6	Feasible	Affordable	Publicly Acceptable	Environment	Safety	Economy	Integration	Accessibility and Social Inclusion
1	Do-Minimum	-1	1	-1	-2	1	-2	Low Risk	Low Risk	High Risk	0	0	-1	-1	-1
2	Option 1A – 208 space car park	2	1	1	1	0	2	Low Risk	Medium Risk	Low Risk	-1	0	1	1	1
3	Option 1B – 209 space car park	2	1	1	1	0	2	Low Risk	Medium Risk	Low Risk	-1	-1	1	1	1
4	Option 2A – 459 space car park	1	-1	0	1	0	1	Medium Risk	High Risk	Very High Risk	-2	0	2	1	0
5	Option 2B – 460 space car park	1	-1	0	1	0	1	Medium Risk	High Risk	Very High Risk	-2	-1	2	1	0

Capabilities on project:
Transportation

TPO
TPO1 – Provide improvements which enhance the accessibility of Dyce Station to users of all modes of transport.
TPO 2 – Improve opportunities for sustainable transport options, including public transport, at Dyce Station.
TPO 3 – Maintain and enhance choice and capacity at Dyce Station for users of all modes.
TPO 4 – Support improvements at Dyce Station through complementary parking and traffic management measures.
TPO 5 – Support improvements which enhance connectivity between Dyce Station and the Formartine and Buchan Way.
TPO6 – Support wider policy objectives for Dyce as set out by Aberdeen City Council in the Local Development Plan and transport policies in the Local Transport Strategy.

Capabilities on project:
Transportation

6.4 Key Outcomes of Appraisal

6.4.1 Do-Minimum

The Do-Minimum option performs poorly against the objectives. It is considered that it would not provide support for parking and traffic management measures, and it would not provide support for wider policies for Dyce as set out by Aberdeen City Council.

Although this scenario is both feasible and affordable, it may have high risk in terms of public acceptability. It would be unlikely to have any significant positive impacts against the STAG criteria.

Overall, it is considered that the Do-Minimum may inhibit the growth of passenger numbers at Dyce Station in future years.

6.4.2 Option 1A – 208 space car park (one way)

This option has the potential to deliver some positive impacts against the appraisal criteria.

It performs reasonably well across the Transport Planning Objectives, particularly in terms of enhancing accessibility to Dyce Station, and supporting wider Aberdeen City Council policies.

No significant implementability issues are associated with this option, though consideration would have to be given to ensuring a secure car park with adequate lighting. Medium risk (in terms of affordability) would be anticipated. However, the option of a charging regime would provide a potential revenue source.

Broad public acceptability with the scheme would be anticipated.

Although some minor environmental impacts may be anticipated during construction, this option would be expected to have some minor beneficial impacts on economy, integration and accessibility and social inclusion.

The capacity provided by this option would appear to be appropriate in terms of corresponding with projected figures for future patronage at Dyce Station.

6.4.3 Option 1B – 209 space car park (two way)

This option performs similarly to Option 1A, though may introduce a relative (minor) safety risk owing to two-way operation.

6.4.4 Option 2A – 459 space car park (one way)

This option performs less well against the Transport Planning Objectives than both Options 1A and 1B. A significant increase in parking spaces (compared with the Do-Minimum and Options 1A and 1B) would be expected to encourage car trips to Dyce Station, and thus limit opportunities for sustainable transport options (and trips) to the station.

Owing to the larger land-take required as part of this option (compared with Options 1A and 1B), medium risk in terms of technical feasibility may be expected. Consideration would have to be given to ensuring a secure car park with adequate lighting.

Given the size of the scheme, it is considered to have high risk in terms of affordability compared with the other options. The extent of the scheme may also lead to very high risk in terms of public acceptability, particularly amongst local residents and non-vehicular users of Dyce Station.

However, this option does have the potential for moderate beneficial impact on economy, owing to improved (car) access to the station, supporting potential connectivity enhancements to the key employment areas in and around Dyce Station, including Wellheads Industrial Estate.

Overall, compared with the other car park extension options (1A and 1B), and considering projected figures for future patronage at Dyce Station (Section 3.4), it is not considered that the level of capacity afforded by

this option is required in order to meet anticipated potential future demand based on current passenger increase trends.

6.4.5 Option 2B – 460 space car park (two way)

This option performs similarly to Option 2A, though as per Option 1B, it may introduce a relative safety risk owing to two-way operation.

As noted above for Option 2A, considering projected figures for future patronage at Dyce Station, it is not considered that the level of capacity afforded by this option is required.

6.5 Summary

In summary, this chapter has undertaken a high level appraisal of the Dyce Station Car Park extension options against the Transport Planning Objectives for the scheme, implementability criteria and the STAG criteria.

Overall, the appraisal has identified that there are benefits associated with extending the car park at Dyce Station, as opposed to maintaining the status quo in a Do-Minimum scenario (which does not consider enhancement to parking capacity).

It is considered that Options 1A and 1B, which involve enhancement of the existing car park to form a total capacity of 208 and 209 spaces respectively, offer the most appropriate solution for the station that takes cognisance of anticipated future demand, and which also offers a more cost effective solution than Options 2A and 2B. Option 1B potentially has a slightly higher safety risk associated with it due to its proposed two-way operation.

Options 2A and 2B would be expected to provide a significant number of spaces exceeding the anticipated future demand for rail travel at Dyce Station over the next 20 years. Thus, progression with either of these options may have the effect of encouraging non-rail users to use the car park, which may compromise the growth of the station in terms of rail patronage.

Traffic Management

7 Traffic Management

7.1 Introduction

The existing Dyce Station Car Park is owned by Network Rail, with a control system based on freely available parking bays for rail users with no restriction on the length of stay.

Chapter 3 has shown that there is currently little turnover of car parking spaces at Dyce Station Car Park, with a high proportion of long stay parking. There is some on-street parking in the vicinity, although the surveys undertaken suggest there is no evidence of this being an issue for the local residential population. However, one consultation response noted that businesses and residents around the station do report pressures as a result of a low number of parking spaces at the station.

It is anticipated that any car park extension would be owned by Aberdeen City Council, providing the opportunity to review traffic management with the increase in car park size to meet objectives. It is unclear at this time whether car park controls on land owned by Network Rail could be implemented or cost effective at Dyce.

The purpose of this chapter is to investigate options available to make the best use of available resources.

7.2 On-Street Traffic Management

The local roads that provide access to Dyce Station Car Park are residential and historic in nature, with subsequent issues for vehicular and pedestrian access. This is demonstrated in Figure 7.1. As part of any Traffic Regulation Order (TRO), a review of facilities for pedestrians would be required.

Figure 7.1 – Dyce Station Car Park Entrance (from Station Road)

There are existing on-street parking controls but these could be enhanced with a review of TROs on surrounding streets to ensure adequate access to an enlarged car park, and ensure emergency vehicle access routes at the busiest times of the day.

7.3 Off-Street Traffic Management

Although the existing car park is owned by Network Rail, it is managed by ScotRail as shown in Figure 7.2.

Figure 7.2 – Dyce Station Car Park Sign

There are a number of possible options to control demand in car parks. These are outlined below.

- Parking in Marked Bays Only;
- No Overnight Parking ;
- Pay & Display;
- Automatic Number Plate Recognition (ANPR) systems; and
- Barrier Control.

The control issues for these systems would have ongoing budgetary expenditure requirements, but equally some have the ability to bring in an income to support an ongoing business case.

It should be noted that in regards to land ownership, where a car park charge is not being levied fines can only be issued in Council owned car parks. So, for example, in the existing car park, fines could not be issued unless a charging regime was installed.

Capabilities on project:
Transportation

7.4 Further Traffic Management Issues

There are a number of further issues for consideration when reviewing car parking management treatments. In the case of Dyce it is apparent that any car park extension will form part of an overall package of measures to support access to sustainable transport across the city and wider region.

Further to this, attitudes to a number of issues may require investigating before deciding upon the traffic management structure.

Issues to resolve or clarify include:

- Regional and Local charging policies for parking at rail Park & Ride sites, and other Park & Ride sites;
- Confirming the policy on encouraging access to active leisure facilities by all modes; and
- Migration from parking charges may cause the potential for local parking nuisance and supporting TROs will be required.

7.5 Traffic Management Options

Not with standing a number of issues to clarify, there are two control systems presented for discussion purposes that align with the objectives of the study in the developed options.

In both of the cases stated below the existing car park would remain with existing controls. One control mechanism is suggested for each option in the Council owned car park extension, as follows:

- Apply Pay & Display with a nominal charge to bring in an income and ensure car parking turnover with potential for no long stays or overnight parking.
- Apply free car parking, parking in marked bays only, whereby there would be no parking charges. In this case it is anticipated that supply would be sufficient for all needs without control. Parking fines for parking out with bays would be possible. Potential to state no long stays or overnight parking permitted.

Each control system would require monitoring as the future demand for the car park will be subject to variance related to a number of factors, including those listed in Chapter 4.

Preliminary Design of Car Park

8 Preliminary Design of Car Park

8.1 Introduction

Layout drawings for the preliminary option designs are shown in Appendix C. The four design options (and eight sub-design options) are summarised below.

- Option 1A – 208 space car park (one way operation)
  - Option 1A (a) – 209 space one way operation car park with porous drainage.
  - Option 1A (b) – 209 space one way operation car park with swale drainage.
- Option 1B –209 space car park (two way operation)
  - Option 1B (a) – 209 space two way operation car park with porous drainage.
  - Option 1B (b) – 209 space two way operation car park with swale drainage.
- Option 2A – 459 space car park (one way operation)
  - Option 2A (a) – 460 space one way operation car park with porous drainage.
  - Option 2A (b) – 446 space one way operation car park with swale drainage.
- Option 2B– 460 space car park (two way operation)
  - Option 2B (a) – 460 space two way operation car park with porous drainage.
  - Option 2B (b) – 446 space two way operation car park with swale drainage.

8.2 Detailed Design Issues

It has been noted that if a detailed design phase is progressed, a topographical survey will need to be undertaken to ensure accurate designs can be produced given a number of recent additions to the existing car park and surrounding areas of interest that have been constructed or are under construction during the course of this report, namely:

- Dyce Station Platform Accessible Footbridge;
- Dyce Station Car Park Sub-station;
- Formartine & Buchan Way Improvements; and
- Dyce Station Bus Turning Circle.

These issues and the final number of resulting car parking spaces can be resolved in the detailed design phase.

Due to existing car park constraints there is insufficient width to include segregated cycle facilities in the car park design unless a significant reduction in car parking spaces could be accepted. However, a detailed design could have the lining arrangement in the car park refreshed to include an advisory shared use pedestrian/cycle lane within the shared use surface of the car park if this was desired by Aberdeen City Council and Network Rail.

8.3 Drainage

The study has reviewed in particular detail options for drainage of the car park extension in accordance with SUDS. A technical report on this is available in Appendix B. Sub-design options which detail drainage are presented in Appendix D.

8.4 Option Costs

The rates in this section have been compiled using the SPON's Civil Engineering and Highway Works Price book 2015. Where nonstandard items have been suggested prices have been acquired from various suppliers. Rates have been compiled for each of the four preliminary design options.

For the purpose of this report, it has been assumed that project costs for Options 1A (a) and 1B (a), Options 1A (b) and 1B (b), Options 2A (b) and 2B (b) and Options 2A (a) and 2B (a) are equal. This is due to the cost differences between a one way operation and two way operation car park being negligible, with the large cost differences primarily resulting from the different drainage options.

The full Cost Estimate report is included in Appendix A.

To date there has been no costings developed for Electric Vehicle Points or Additional Buildings or Station facilities other than the additional car park areas shown.

Optimism bias at a rate of 44% has been applied in accordance with STAG.

Table 8.1 – Option 1A (a) and Option 1B (a) Project Costs

Project Cost Summary	
Contents	**Value**
Series 100 - Preliminaries	£3,506.80
Series 200 - Site Clearance	£1,772.28
Series 500 - Drainage and Service Ducts	£74,581.86
Series 600 - Earthworks	£5,169.50
Series 700 - Pavements	£83,509.95
Series 1100 - Kerbs, Footways and Paved Areas	£21,777.86
Series 1200 - Traffic Signs and Road Markings	£3,469.89
Series 1300 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts	£20,000.00
Series 1400 - Electrical Work for Road Lighting and Traffic Signs	£6,901.43
Series 2700 - Accommodation Works, Works for Statutory Undertakers, Provisional Sums and Prime Cost Items	£0.00
Series 3000 - Landscape and Ecology	£770.00
Sub Total	£221,459.57
Contingencies (10%)	£22,145.96
Overheads and Profit (5%)	£12,180.28
Optimism Bias at 44%	£112,545.75
Total Cost	**£368,331.56**

Capabilities on project:
Transportation

Table 8.2 – Option 1A (b) and Option 1B (b) Project Costs

Project Cost Summary	
Contents	**Value**
Series 100 - Preliminaries	£3,506.80
Series 200 - Site Clearance	£1,772.28
Series 500 - Drainage and Service Ducts	£73,778.35
Series 600 - Earthworks	£5,169.50
Series 700 - Pavements	£143,271.20
Series 1100 - Kerbs, Footways and Paved Areas	£21,777.86
Series 1200 - Traffic Signs and Road Markings	£3,469.89
Series 1300 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts	£20,000.00
Series 1400 - Electrical Work for Road Lighting and Traffic Signs	£6,901.43
Series 2700 - Accommodation Works, Works for Statutory Undertakers, Provisional Sums and Prime Cost Items	£0.00
Series 3000 - Landscape and Ecology	£770.00
Sub Total	£280,417.31
Contingencies (10%)	£28,041.73
Overheads and Profit (5%)	£15,422.95
Optimism Bias at 44%	£142,508.08
Total Cost	**£466,390.07**

Table 8.3 – Option 2A (b) and Option 2B (b) Project Costs

Project Cost Summary	
Contents	**Value**
Series 100 – Preliminaries	£3,785.52
Series 200 – Site Clearance	£3,460.32
Series 500 – Drainage and Service Ducts	£136,087.16
Series 600 – Earthworks	£19,842.24
Series 700 – Pavements	£547,706.43
Series 1100 – Kerbs, Footways and Paved Areas	£29,475.30
Series 1200 – Traffic Signs and Road Markings	£7,629.01
Series 1300 – Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts	£40,000.00
Series 1400 – Electrical Work for Road Lighting and Traffic Signs	£14,119.04
Series 2700 – Accommodation Works, Works for Statutory Undertakers, Provisional Sums and Prime Cost Items	£0.00
Series 3000 – Landscape and Ecology	£1,540.00
Sub Total	£803,645.02
Contingencies (10%)	£80,364.50
Overheads and Profit (5%)	£40,182.25
Optimism Bias at 44%	£353,603.81
Total Cost	**£1,277,795.58**

Table 8.4 – Option 2A (a) and Option 2B (a) Project Cost

Project Cost Summary	
Contents	**Value**
Series 100 – Preliminaries	£3,785.52
Series 200 – Site Clearance	£3,460.32
Series 500 – Drainage and Service Ducts	£137,533.31
Series 600 – Earthworks	£19,842.24
Series 700 – Pavements	£317,024.82
Series 1100 – Kerbs, Footways and Paved Areas	£29,475.30
Series 1200 – Traffic Signs and Road Markings	£7,629.01
Series 1300 – Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts	£40,000.00
Series 1400 – Electrical Work for Road Lighting and Traffic Signs	£14,119.04
Series 2700 – Accommodation Works, Works for Statutory Undertakers, Provisional Sums and Prime Cost Items	£0.00
Series 3000 – Landscape and Ecology	£1,540.00
Sub Total	£574,409.56
Contingencies (10%)	£57,440.96
Overheads and Profit (5%)	£28,720.48
Optimism Bias at 44%	£252,740.21
Total Cost	**£913,311.20**

8.5 Summary of Costs

A summary of preliminary outline costs for the four potential designs (inclusive of the eight sub-option designs) are outlined below. They are in the region of:

- Option 1A – 208 space car park (one way operation): **£368,000** (porous drainage) to **£466,000** (swale drainage);
- Option 1B – 209 space car park (two way operation): **£368,000** (porous drainage) to **£466,000** (swale drainage);
- Option 2A – 459 space car park (one way operation): **£913,000** (porous drainage) to **£1,278,000** (swale drainage); and
- Option 2B – 460 space car park (two way operation): **£913,000**. (porous drainage) to **£1,278,000** (swale drainage)

Next Steps

9 Next Steps

9.1 Next Steps

This report has considered potential options for extending the car park at Dyce Station in Aberdeen.

The study has followed the principles of STAG, outlining problems, issues, opportunities and constraints associated with transport provision at Dyce Station, informed by reviews of previous studies in the area, stakeholder consultations and estimates of parking and rail passenger demand.

As noted in Chapter 8, Options 1A and 1B offer the most appropriate solution for enhancing the car park at Dyce Station. On this basis, it is recommended that Nestrans consider the merits of Option 1B relative to 1A, given the increased efficiency associated with a two-way operation. It should be noted however that there is minor additional safety risk associated with this option.

Detailed design of the preferred option should then be taken forward. In progressing either option, consideration should be given to how a demand management regime might be taken forward, as intimated above. Cognisance should also be taken of ensuring the provision of a secure car park with adequate lighting.

It is considered that it would also be appropriate to review the impacts of this option further against the appraisal criteria outlined above, particularly the STAG criteria, to ensure that the scheme does not conflict with aspects of environment, safety, economy, integration and accessibility and social inclusion.

Appendix A

Capabilities on project:
Transportation

Appendix A – Cost Estimates

Introduction

AECOM have been appointed by The North East of Scotland Transport Partnership (Nestrans) to undertake a high level feasibility study examining the possible options of extending the car parking facilities at Dyce Railway Station.

At this early stage of the design process there are a number of unknowns therefore a series of assumptions have been made for each outlined option. This document has been created using the Manual of Contract Documents for Highway Works, Volume 4 - Bills of Quantities. The rates herein have been compiled using the SPON's Civil Engineering and Highway Works Price book 2015. Where nonstandard items have been suggested prices have been acquired from various suppliers.

Cost Estimates

Option 1A – Small Car Park with Porous Surfacing Material

Notes
The following AECOM drawing has been used in compiling this cost estimate:

- 60338646-SKE-C-0001

Assumptions

Series 100 – Preliminaries

1. The construction element of this project is estimated to last five weeks.

Series 200 – Site Clearance

1. From site photographs looks like an open field therefore minimum site clearance is required.
2. Within SPON's there is no item for "take-up of kerbs to tip off site" therefore the cost of take-up or down and remove to store off site has been used.

Series 500 – Drainage and Service

1. 225mm internal diameter UPVC pipes have been selected with depths on average of 1.5m
2. 225mm Internal diameter UPVC perforated pies have been selected with average depths of 1.5m
3. Manhole are precast concrete depths assumed to be no deeper than 1.5m
4. Large control chamber approximate size 1800Ø x 1.5m deep.
5. A water storage tank providing storage for 300m^2 is a nonstandard item.
6. One connection to the existing sewer water drainage network is required.

Series 600 – Earthworks

1. Imported fill material may be required.
2. 70% of the site material is acceptable other than class 5C
3. 10% of the site material is acceptable Class 5C.
4. 20% of the site material is unacceptable material.

Series 700 – Pavements

1. The carriageway construction consists of 45mm HRS wearing course, 50mm Dense DBM, 80mm DBM base and 275mm Type 1 sub-base.
2. Parking bay construction consists of Porous bitumen material which is non-standard.
3. 20% of the existing carpark requires repairs.

Series 1100 – Kerbs, Footways and Paved Areas

1. Kerbs are assumed to be half battered dimensions 125x255x913mm.
2. Kerbs are assumed to be heel kerb dimensions 50x200x913mm.
3. Footway construction is 20mm DBM surface course, 40mm binder course and 100mm Type 1 sub base.

Series 1200 – Traffic Signs and Road Markings

1. Removal of existing white road marking paint.
2. Road Markings and signs are in accordance with the Traffic Signs Regulations and General Directions 2002.
3. New road traffic signs are to be retroreflective.
4. New road markings are to be white paint.

Series 1300 – Road Lighting

1. Standard lighting column is assumed to be 8m nominal height cost includes column, unit head.

Series 1400 – Electrical Work for Road Lighting and Traffic signs

1. Contractor is required to locate the existing lighting connection.
2. A 300mm not exceeding 450m m trench is required for cabling along with cabling, cable joints feeder pillars and earth electrodes.

Series 2700 – Series Accommodation Works, Works for Statutory Undertakers Provisional Sums and Prime Cost Items

1. As a utility search has not been undertaken at this early stage AECOM cannot verify where or not Accommodation works are required. Therefore this section cannot be quantified.

Series 3000 – Landscape and Ecology

1. An area of 1000m^2 would require being grass seeded.

Client	Nestrans
Project Name	Dyce Station Car Park Extension - Option 1A
Project Number	60338646
Revision	0
Date	2/3/2015
Prepared by	K.Chronopoulos
Checked by	J. MacIntosh
Approval by	M.Nimmo
Verified by	

Project Cost Summary

Contents	Value
Series 100 - Preliminaries	£3,506.80
Series 200 - Site Clearance	£1,772.28
Series 500 - Drainage and Service Ducts	£74,581.86
Series 600 - Earthworks	£5,169.50
Series 700 - Pavements	£83,509.95
Series 1100 - Kerbs, Footways and Paved Areas	£21,777.86
Series 1200 - Traffic Signs and Road Markings	£3,469.89
Series 1300 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever	£20,000.00
Series 1400 - Electrical Work for Road Lighting and Traffic Signs	£6,901.43
Series 2700 - Accommodation Works, Works for Statutory Undertakers, Provisional Sums and Prime Cost Items	£0.00
Series 3000 - Landscape and Ecology	£770.00

Sub Total	£221,459.57
Contingencies (10%)	£22,145.96
Overheads and Profit (5%)	£12,180.28
Optimism Bias at 44%	£112,545.75

Total Cost	£368,331.56

Option 1B – Small Car Park with swale drainage

Notes
The following AECOM drawings have been used in compiling this cost estimate are:

- 60338646-SKE-C-0002

Assumptions

Series 100 – Preliminaries

1. The construction element of this project is estimated to last five weeks.

Series 200 – Site Clearance

1. From site photographs looks like an open field therefore minimum site clearance is required.
2. Within SPON's there is no item for "take-up of kerbs to tip off site" therefore the cost of take-up or down and remove to store off site has been used.

Series 500 – Drainage and Service

1. 225mm internal diameter UPVC pipes have been selected with depths on average of 1.5m
2. 225mm Internal diameter UPVC perforated pies have been selected with average depths of 1.5m
3. Manhole are precast concrete depths assumed to be no deeper than 1.5m
4. One large control chamber approximate size 1800Ø x 1.5m deep.
5. One connection to the existing sewer water drainage network is required.

Series 600 – Earthworks

1. Imported fill material may be required.
2. 70% of the site material is acceptable other than class 5C which will be spread on site.
3. 10% of the site material is acceptable Class 5C
4. 20% of the site material is unacceptable material and will require to be removed off site.

Series 700 – Pavements

1. The carriageway construction consists of 45mm HRS wearing course, 50mm Dense DBM, 80mm DBM base and 275mm Type 1 sub-base.
2. 20% of the existing carpark requires repairs.

Series 1100 – Kerbs, Footways and Paved Areas

1. Kerbs are assumed to be half battered dimensions 125x255x913mm with a concrete base and hunching.
2. Kerbs are assumed to be heel kerb dimensions 50x200x913mm with a concrete base and hunching.
3. Footway construction is 20mm DBM surface course, 40mm binder course and 100mm Type 1 sub base

Series 1200 – Traffic Signs and Road Markings

1. Removal of existing white road marking paint.
2. Road Markings and signs are in accordance with the Traffic Signs Regulations and General Directions 2002.
3. New road traffic signs are to be retroreflective.
4. New road markings are to be white paint.

Series 1300 – Road Lighting

2. Standard lighting column is assumed to be 8m nominal height cost includes column, unit head.

Series 1400 – Electrical Work for Road Lighting and Traffic signs

1. Contractor is required to locate the existing lighting connection.
2. A 300mm not exceeding 450mm trench is required for cabling along with cabling, cable joints feeder pillars and earth electrodes.

Series 2700 – Series Accommodation Works, Works for Statutory Undertakers Provisional Sums and Prime Cost Items

1. As a utility search has not been undertaken at this early stage AECOM cannot verify whether or not Accommodation works are required. Therefore this section cannot be quantified.

Series 3000 – Landscape and Ecology

3. An area of 1000m^2 would require being grass seeded.

Client	Nestrans
Project Name	Dyce Station Car Park Extension - Option 1B
Project Number	60338646
Revision	0
Date	2/3/2015
Prepared by	K.Chronopoulos
Checked by	J. MacIntosh
Approval by	M.Nimmo
Verified by	

Project Cost Summary

Contents	Value
Series 100 - Preliminaries	£3,506.80
Series 200 - Site Clearance	£1,772.28
Series 500 - Drainage and Service Ducts	£73,778.35
Series 600 - Earthworks	£5,169.50
Series 700 - Pavements	£143,271.20
Series 1100 - Kerbs, Footways and Paved Areas	£21,777.86
Series 1200 - Traffic Signs and Road Markings	£3,469.89
Series 1300 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever	£20,000.00
Series 1400 - Electrical Work for Road Lighting and Traffic Signs	£6,901.43
Series 2700 - Accommodation Works, Works for Statutory Undertakers, Provisional Sums and Prime Cost Items	£0.00
Series 3000 - Landscape and Ecology	£770.00

Sub Total	£280,417.31
Contingencies (10%)	£28,041.73
Overheads and Profit (5%)	£15,422.95
Optimism Bias at 44%	£142,508.08

Total Cost	£466,390.07

Option 2A – Large Car Park with swale drainage

Notes
The following AECOM drawings have been used in compiling this cost estimate are:

- 60338646-SKE-C-0003

Assumptions

Series 100 – Preliminaries

1. The construction element of this project is estimated to last seven weeks.

Series 200 – Site Clearance

1. From site photographs looks like an open field therefore minimum site clearance is required.
2. Within SPON's there is no item for "take-up of kerbs to tip off site" therefore the cost of "take-up or down and remove to store off site" has been used.

Series 500 – Drainage and Service Ducts

1. 225mm internal diameter UPVC pipes have been selected with depths on average of 1.5m
2. 225mm Internal diameter UPVC perforated pies have been selected with average depths of 1.5m
3. Manhole are precast concrete depths assumed to be no deeper than 1.5m
4. One large control chamber approximate size 1800Ø x 1.5m deep.
5. One connection to the existing sewer water drainage network is required.

Series 600 – Earthworks

1. Imported fill material may be required.
2. 70% of the site material is acceptable other than class 5C which will be spread on site.
3. 10% of the site material is acceptable Class 5C.
4. 20% of the site material is unacceptable material and will require to be removed off site.

Series 700 – Pavements

1. The carriageway construction consists of 45mm HRS wearing course, 50mm Dense DBM, 80mm DBM base and 275mm Type 1 sub-base.
2. 20% of existing car park requires repairs.

Series 1100 – Kerbs, Footways and Paved Areas

1. Half battered Kerbs are assumed to be dimensions 125x255x913mm.
2. Heel kerbs are assumed to be dimensions 50x200x913mm
3. Footway construction is 20mm DBM surface course, 40mm binder course and 100mm Type 1 sub base

Series 1200 – Traffic Signs and Road Markings

1. Removal of existing white road marking paint.
2. Road Markings and signs are in accordance with the Traffic Signs Regulations and General Directions 2002.
3. New Road traffic signs are to be retroreflective.
4. New road markings are to be white paint.

Series 1300 – Series Road Lighting columns

1. Standard lighting column is assumed to be 8m nominal height cost includes column, unit head.

Series 1400 - Electrical Work for Road Lighting and Traffic Signs

1. Contractor is required to locate the existing lighting connection.
2. A 300mm not exceeding 450m m trench is required for cabling along with cabling, cable joints feeder pillars and earth electrodes.

Series 2700 – Accommodation Works, Works for statutory Undertakers, Provisional Sums and Prime Cost Items

1. As a utility search has not been undertaken at this early stage AECOM cannot verify where or not Accommodation works are required. Therefore this section cannot be quantified.

Series 3000 – Landscape and Ecology

1. An area of 2000m^2 would require being grass seeded.

Client	Nestrans
Project Name	Dyce Station Car Park Extenstion - Option 2A
Project Number	60338646
Revision	0
Date	2/3/2015
Prepared by	K.Chronopoulos
Checked by	J.Macintosh
Approval by	M.Nimmo
Verified by	

Project Cost Summary

Contents	Value
Series 100 - Preliminaries	£3,785.52
Series 200 - Site Clearance	£3,460.32
Series 500 - Drainage and Service Ducts	£136,087.16
Series 600 - Earthworks	£19,842.24
Series 700 - Pavements	£547,706.43
Series 1100 - Kerbs, Footways and Paved Areas	£29,475.30
Series 1200 - Traffic Signs and Road Markings	£7,629.01
Series 1300 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever	£40,000.00
Series 1400 - Electrical Work for Road Lighting and Traffic Signs	£14,119.04
Series 2700 - Accommodation Works, Works for Statutory Undertakers, Provisional Sums and Prime Cost Items	£0.00
Series 3000 - Landscape and Ecology	£1,540.00

Sub Total	£803,645.02

Contingencies (10%)	£80,364.50
Overheads and Profit (5%)	£40,182.25
Optimism Bias at 44%	£353,603.81

Total Cost	£1,277,795.58

Option 2B – Large Car Park with porous surfacing material

Notes
The following AECOM drawings have been used in compiling this cost estimate are:

- 60338646-SKE-C-0004

Assumptions

Series 100 – Preliminaries

1. The construction element of this project is estimated seven weeks.

Series 200 – Site Clearance

1. From site photographs looks like an open field therefore minimum site clearance is required.
2. Within SPON's there is no item for "take-up of kerbs to tip off site" therefore the cost of "take-up or down and remove to store off site" has been used.

Series 500 – Drainage and Service Ducts

1. 225mm internal diameter UPVC pipes have been selected with depths on average of 1.5m
2. 225mm Internal diameter UPVC perforated pies have been selected with average depths of 1.5m
3. Manhole are precast concrete depths assumed to be no deeper than 1.5m
4. One large control chamber approximate size 1800Ø x 1.5m deep.
5. Two water storage tanks are required one providing 300m^3 of storage the other 700m^3.
6. One connection to the existing sewer water drainage network is required.

Series 600 – Earthworks

1. Imported fill material may be required.
2. 70% of the site material is acceptable other than class 5C which will be spread on site.
3. 10% of the site material is acceptable Class 5C.
4. 20% of the site material is unacceptable material and will require to be removed off site.

Series 700 – Pavements

1. The carriageway construction consists of 45mm HRS wearing course, 50mm Dense DBM, 80mm DBM base and 275mm Type 1 sub-base.
2. Parking bay construction consists of Porous bitumen material which is non-standard.
3. 20% of the existing carpark requires repairs.

Series 1100 – Kerbs, Footways and Paved Areas

1. Kerbs are assumed to be Half battered dimensions 125x255x913mm
2. Kerbs are assumed to be heel kerb dimensions 50x200x913mm
3. Footway construction is 20mm DBM surface course, 40mm binder course and 100mm Type 1 sub base

Series 1200 – Kerbs, Footways and Paved Areas

1. Required to remove existing white road marking paint.
2. Road Markings and signs are in accordance with the Traffic Signs Regulations and General Directions 2002.
3. New Road traffic signs are to be retroreflective.
4. New road markings are to be white paint.

Series 1300 – Series Road Lighting columns

1. Standard lighting column is assumed to be 8m nominal height cost includes column, unit head.

Series 1400 - Electrical Work for Road Lighting and Traffic Signs

1. Contractor is required to locate the existing lighting connection.
2. A 300mm not exceeding 450m m trench is required for cabling along with cabling, cable joints feeder pillars and earth electrodes.

Series 2700 – Accommodation Works, Works for statutory Undertakers, Provisional Sums and Prime Cost Items

1. As a utility search has not been undertaken at this early stage AECOM cannot verify where or not Accommodation works are required. Therefore this section cannot be quantified.

Series 3000 – Landscape and Ecology

1. An area of 2000m^2 would require being grass seeded.

Client	Nestrans
Project Name	Dyce Station Car Park Extenstion - Option 2B
Project Number	60338646
Revision	0
Date	2/3/2015
Prepared by	K.Chronopoulos
Checked by	J.Macintosh
Approval by	M.Nimmo
Verified by	

Project Cost Summary

Contents	Value
Series 100 - Preliminaries	£3,785.52
Series 200 - Site Clearance	£3,460.32
Series 500 - Drainage and Service Ducts	£137,533.31
Series 600 - Earthworks	£19,842.24
Series 700 - Pavements	£317,024.82
Series 1100 - Kerbs, Footways and Paved Areas	£29,475.30
Series 1200 - Traffic Signs and Road Markings	£7,629.01
Series 1300 - Road Lighting Columns and Brackets, CCTV Masts and Cantilever	£40,000.00
Series 1400 - Electrical Work for Road Lighting and Traffic Signs	£14,119.04
Series 2700 - Accommodation Works, Works for Statutory Undertakers, Provisional Sums and Prime Cost Items	£0.00
Series 3000 - Landscape and Ecology	£1,540.00

Sub Total	£574,409.56

Contingencies (10%)	£57,440.96
Overheads and Profit (5%)	£28,720.48
Optimism Bias at 44%	£252,740.21

Total Cost	£913,311.20

Summary

The table below summarise the prices that are associated with each of the options presented.

Table 1: Estimated Costs Summary

Option	Description	Estimated Cost
1A	Small Car Park with Porous Surfacing Material	£368,331.56
1B	Small Car Park with swale Drainage	£466,390.07
2A	Large Car Park with swale Drainage	£1,277,795.58
2B	Large Car Park with Porous Surfacing Material	£913,311.20

Appendix B

Capabilities on project:
Transportation

Appendix B – Drainage and SUDS Report

Technical Note

Project:	**Dyce Rail Station Car Park Extension**	Job No:	**60338646**
Subject:	**SUDS and Drainage Strategy**		
Prepared by:	**Graeme Pearson**	Date:	**06th March 2015**
Checked by:	**Ross Millar**	Date:	**06th March 2015**
Approved by:	**Peter Maurice**	Date:	**06th March 2015**

Introduction

AECOM are retained as Framework Consultants under the Scotland Excel Framework. Accordingly, we have been requested to submit a proposal for a study considering the potential for extending the car park at Dyce Railway Station.

The existing car park is located on the east side of the Aberdeen to Inverness Railway Line, adjacent to the southbound platform and is accessible only via Station Road. The general site area for the car park extension, and its surroundings, is reproduced in **Figure 1**.

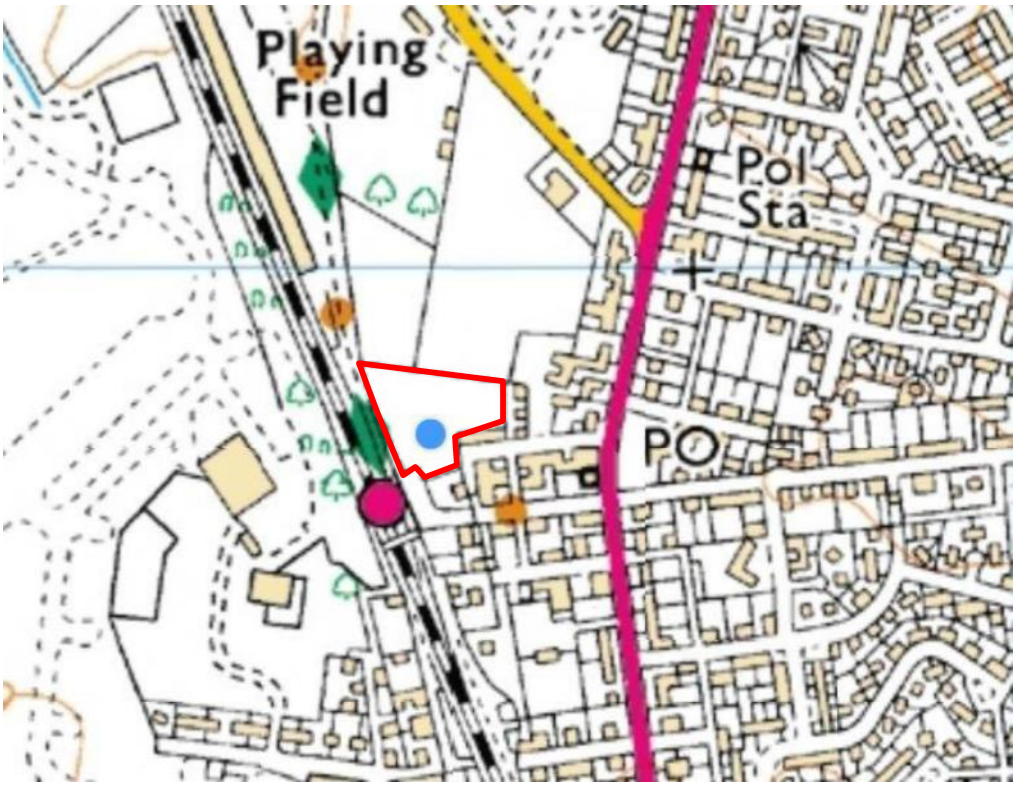


Figure 1: Site Location Plan

This Technical Note indicates two proposed car park layout options, with three outline surface water management & SUDs solutions for each layout. The proposed design options are outlined below:

- Car Park Layout Option 1 – 199no. car parking spaces; 10no. disabled parking spaces, as viewed in 60338646-SKE-C-0001 & 60338646-SKE-C-0002
- Car Park Layout Option 2 – 441no. car parking spaces; 18no. disabled parking spaces, as viewed in 60338646-SKE-C-0003 & 60338646-SKE-C-0004.

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Existing Site Conditions

The site, as observed in Figure 1, has been identified as greenfield. At this stage, the historic topographical survey information, which is available, is not in a form which can be utilised for design; however it has been identified via site walkover that the general area is at a higher level than the existing Dyce Station Car Park.

In terms of existing drainage, the current Dyce Station car park is drained via a system identified from historic topographical survey information, site walkover, and online mapping. An additional drainage system has also been identified in the adjacent footpath to the north west of the site, designated as Formartine & Buchan Way. Further information on these two drainage systems is currently unavailable and will require further investigation to establish outfalls and system capacity. A drainage test was undertaken by ACC for the Formantine and Buchan Way in the area in 2014. Technical details, where available, of this test should be reviewed as part of further investigation.

Policy and Guidance

The design of the drainage system is guided by a number of key policies in place which govern the planning and design of drainage systems and promote the use of SUDS where appropriate.

- *Scottish Planning Policy*, published in February 2010, sets out the general requirement for SUDS in new developments in Policy 209.
- *PLANNING ADVICE NOTE 79: Water and Drainage*, published in September 2006, paragraphs 47 – 49 highlights the necessity for separate foul and surface water systems, the removal of surface water from combined systems, and the use of SUDS to limit pressure on waste water treatment systems. Paragraph 48 comments that it is the policy of SEPA to promote SUDS. Paragraph 49 states that, "The design and construction standards for SUDS systems to be adopted by Scottish Water will be included in the second edition of Scottish Water's Technical Manual 'Sewers For Scotland'"
- *The Aberdeen Local Development Plan* (February 2012) promotes, through the guidance contained therein, and through Policy NE6, surface water management in general, and the incorporation of SUDS as designed in accordance with *CIRIA C697: the SUDS Manual*.
- *Regulatory Method (WAT-RM-08): Sustainable Urban Drainage Systems (SUDS or SUD Systems)*, published by SEPA on August 2014,

SUDS & Surface Water Management Measures

In line with the previously highlighted guidance, and due to the currently unknown status of the existing drainage systems in the immediate area, a drainage system which provides levels of SUDS treatment will be implemented. Furthermore, in line with good design practice, outflows from the site into any existing sewer system will be limited to a practical minimum of 5l/s, or 5l/s/ha, where the area to be drained is less than 1 ha in area. This minimum rate of discharge will ensure that that attenuation occurs at an acceptable low flow rate whilst reducing the chance for blockage.

Method of Drainage Option 1 – Drainage via dry swales. This method will incorporate the use of grassed swales with a minimum 0.5m filter trench. For both options of the Proposed Car Park Layout attenuation will be required, with Car Park Layout Option 1 requiring an attenuation volume of 300m^3 and Car Park Layout Option 2 requiring an attenuation volume of 1000m^3. For this method of drainage, the attenuation is to be achieved via a subsurface cellular storage, with outflow to the offsite limited by a

control chamber. In the case of Car Park Layout Option 2, attenuation of 1000m^3 is to be split over two sub surface tanks. The proposals for this method of drainage can be viewed in drawing nos. 60338646-SKE-C-0001 & 60338646-SKE-C-0003.

Method of Drainage Option 2 – Drainage via porous car park structure. This SUDS method utilises car parking bays that will be constructed of a porous material which allows the drainage of surface waters. With this method, the porous structure can also be designed as an attenuation structure, removing the requirement for a separate attenuation structure. Again, as per the previous method of drainage, a control chamber is required to limit discharges into the adjacent sewer system. The proposals for this method of drainage can be viewed in drawing nos. 60338646-SKE-C-0002 & 60338646-SKE-C-0004.

Method of Drainage Option 3 – Drainage via dry swales and porous car park. It is proposed that this method could incorporate a hybrid of the previous two SUDS solutions, where later site investigation and design work may determine that a combined drainage approach may be required.

Forward Approach

Based on the above findings, for each of the Car Park Layout Options, 3 separate drainage designs are proposed which provide two levels of appropriate SUDS drainage, in line with national guidance. The surface waters from the site are to be attenuated and discharged into an adjacent sewer system, at an appropriate rate.

To better inform the design of the desired Car Park Layout and Drainage solution, it is recommended that an up to date topographical survey of the area be undertaken in addition to a survey of the existing local drainage systems. Measures should also be undertaken to obtain any drainage records which may be in the possession of Network Rail.

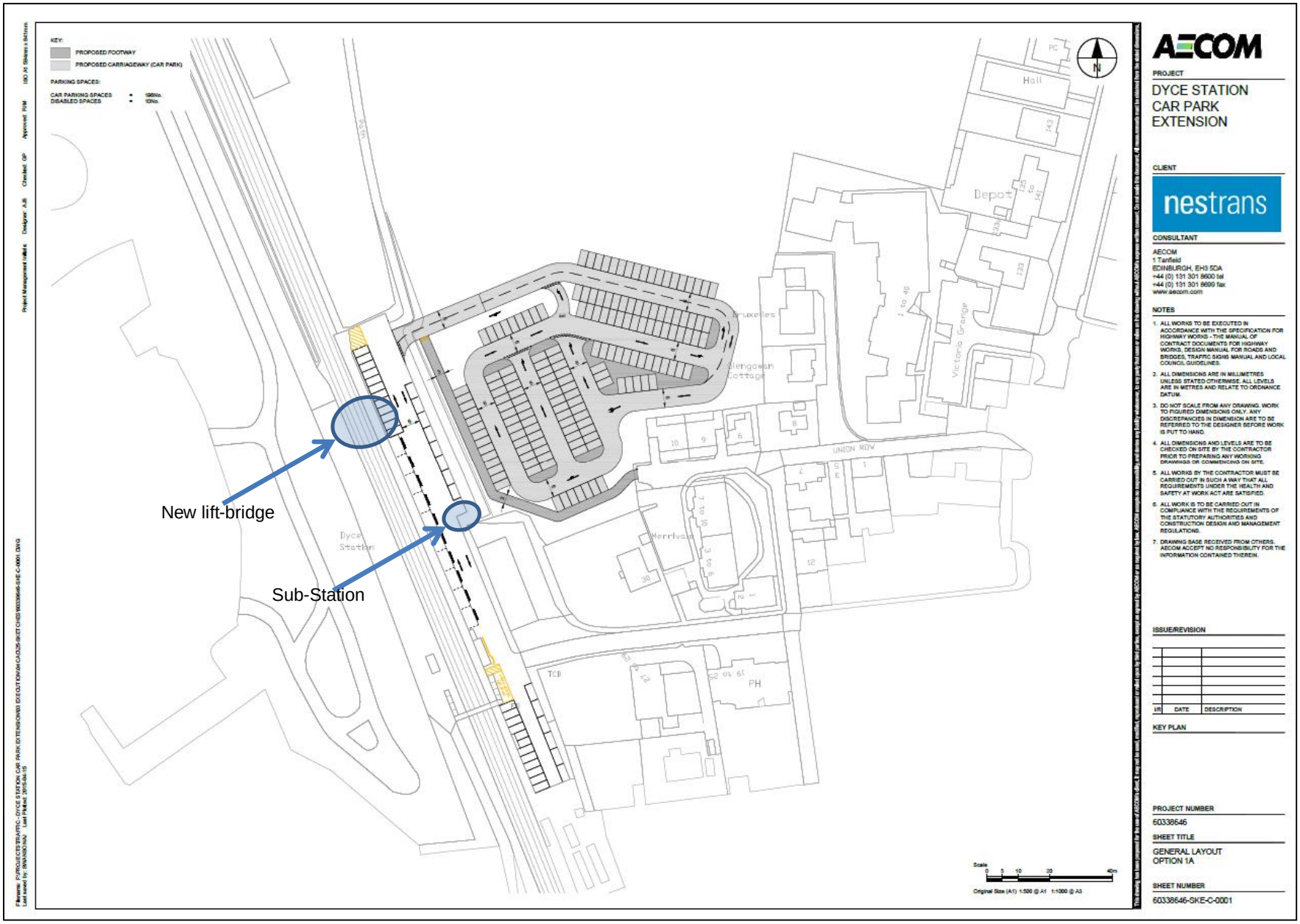
Appendix C

Capabilities on project:
Transportation

Appendix C – Design Option Drawings

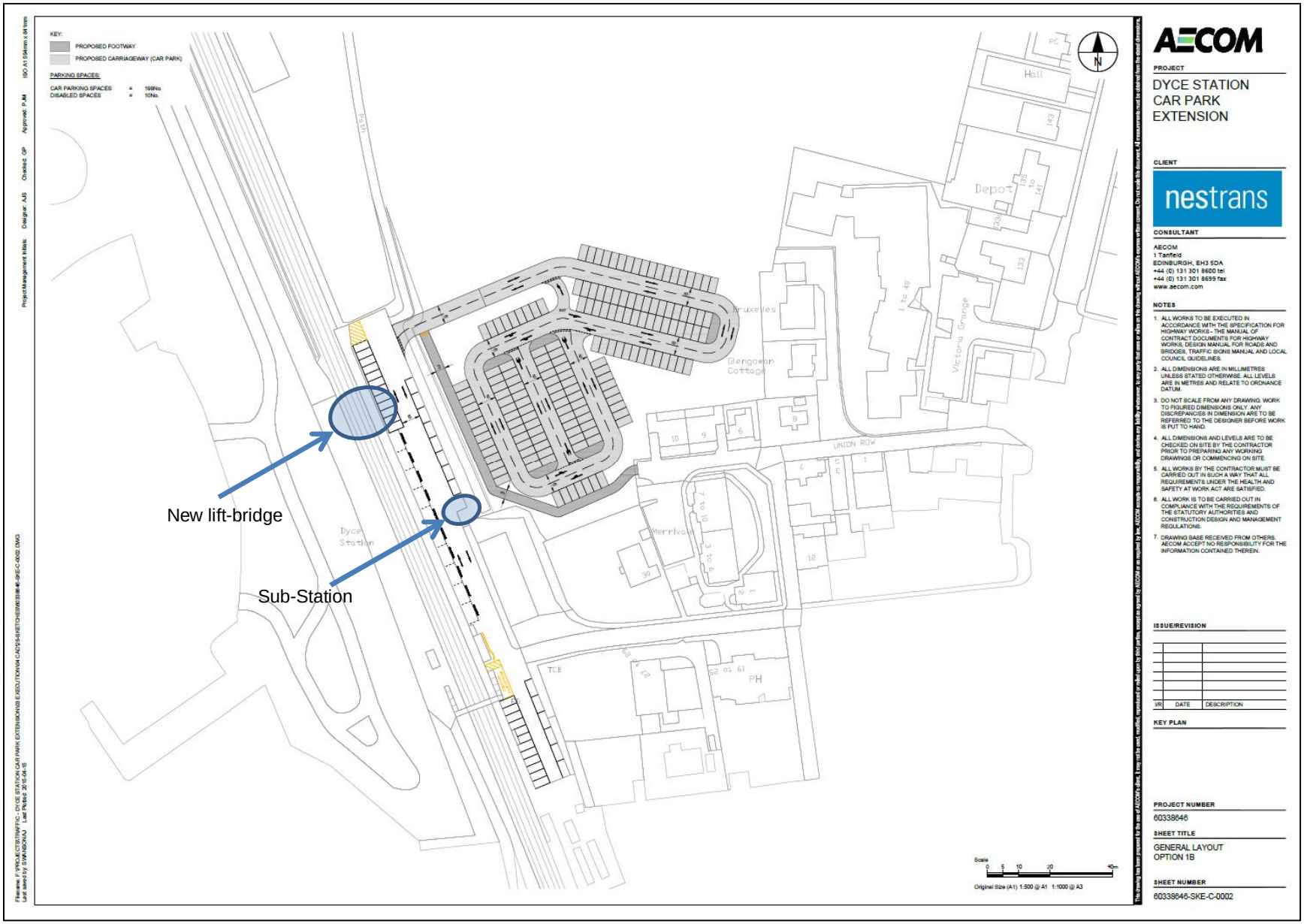
Capabilities on project:
Transportation

Option 1A – 208 space car park (one way operation)



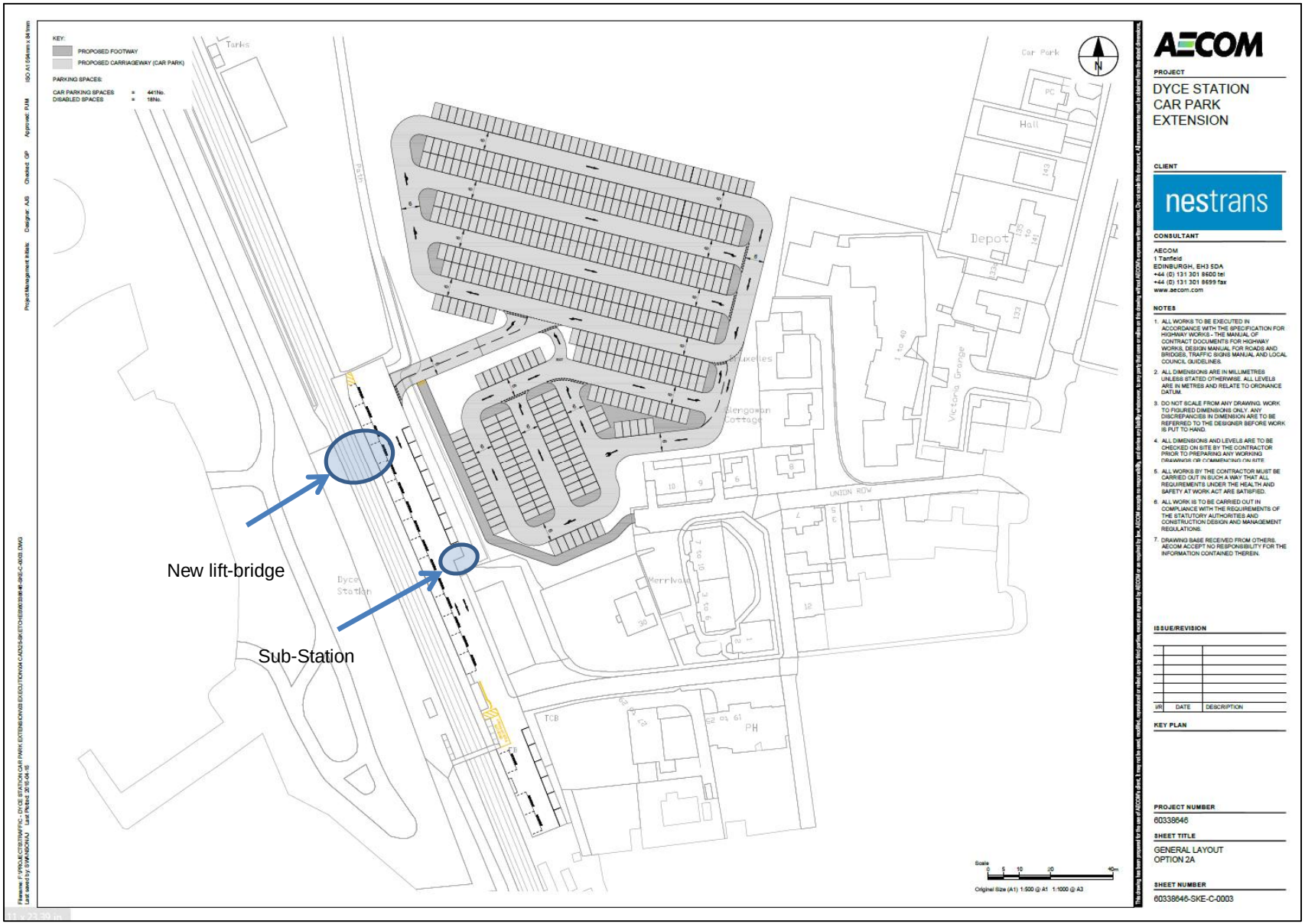
Capabilities on project:
Transportation

Option 1B – 209 space car park (two way operation)



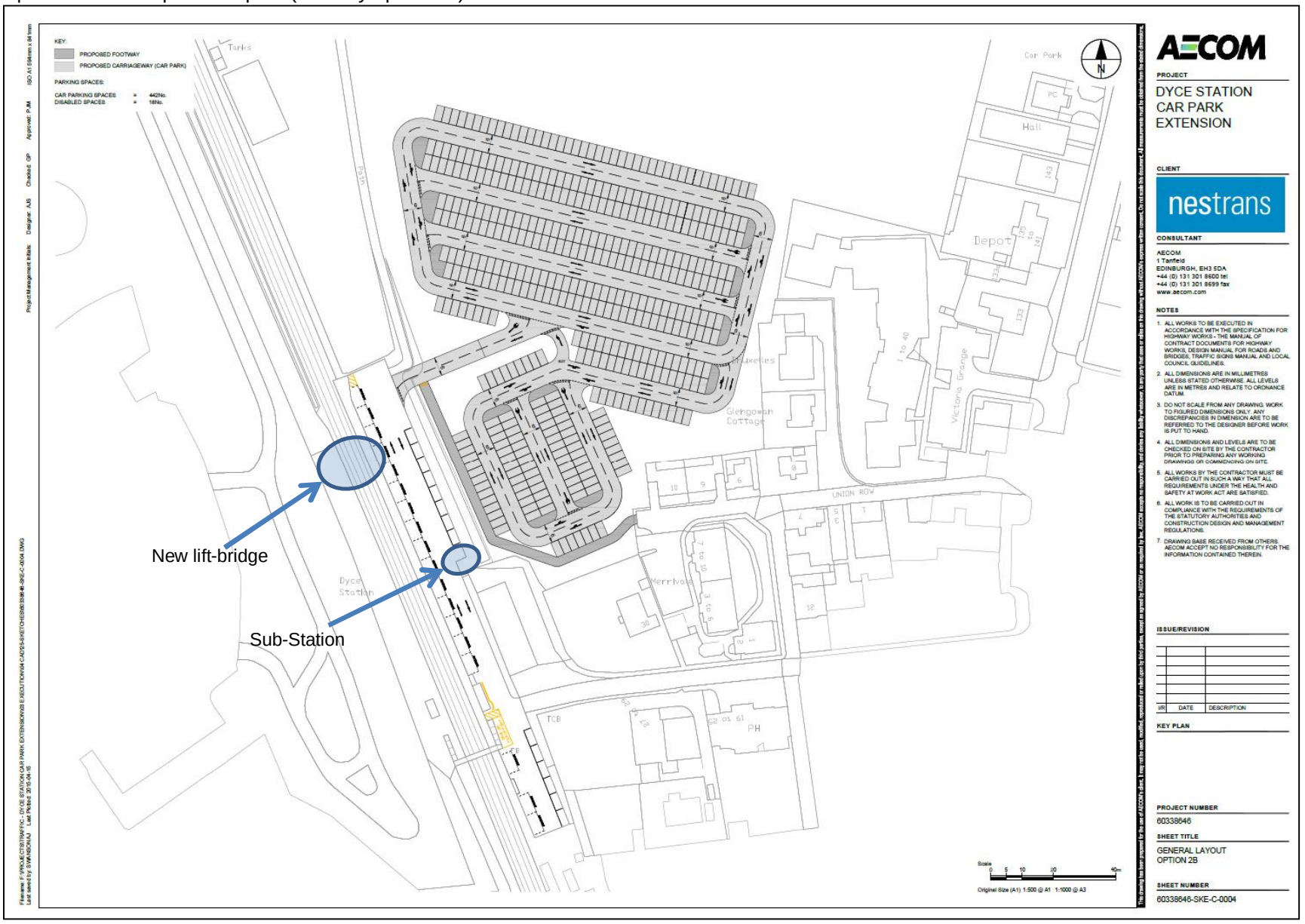
Capabilities on project:
Transportation

Option 2A – 459 space car park (one way operation)



Capabilities on project:
Transportation

Option 2B – 460 space car park (two way operation)



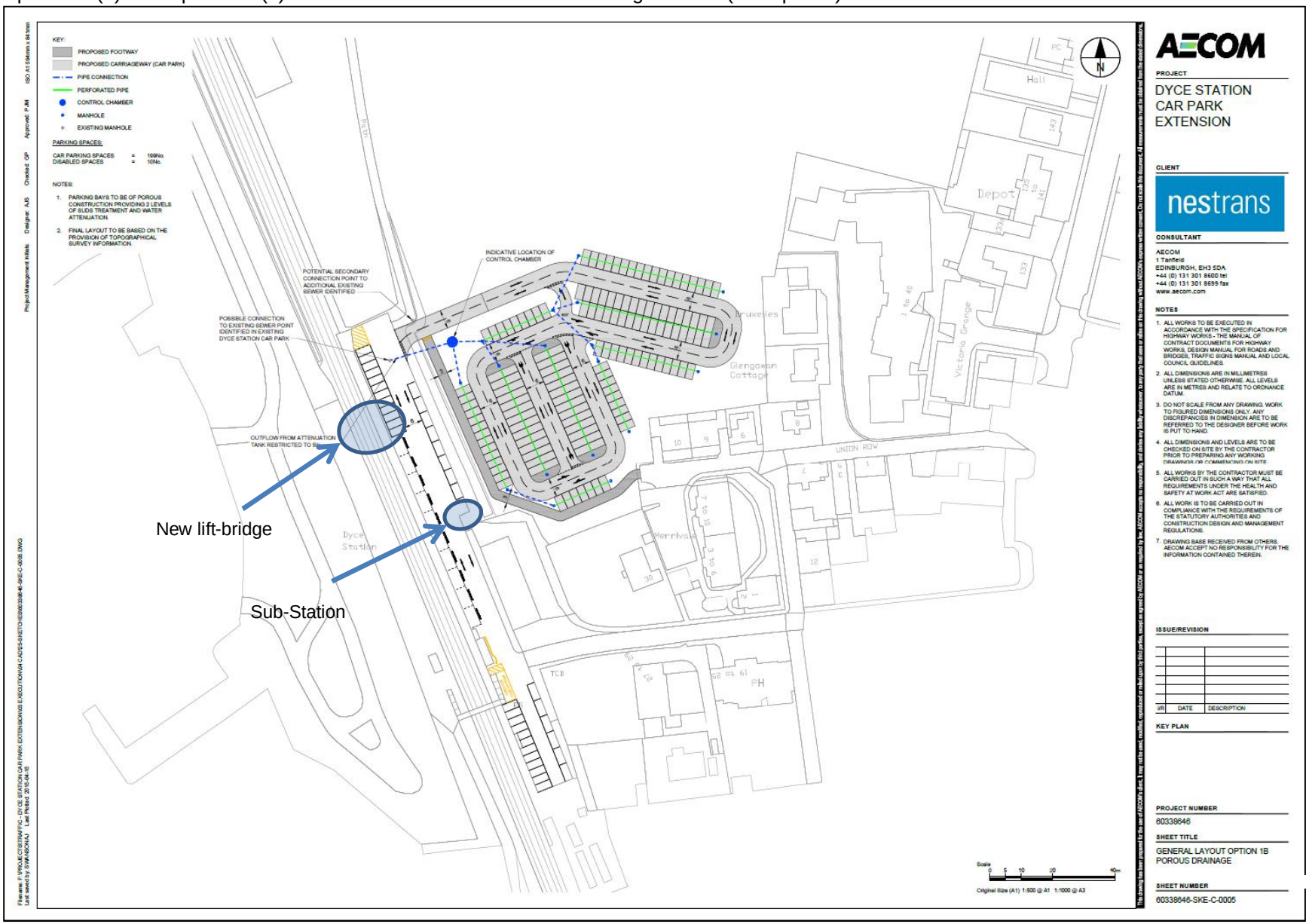
Appendix D

Capabilities on project:
Transportation

Appendix D – Sub-Design Option Drawings

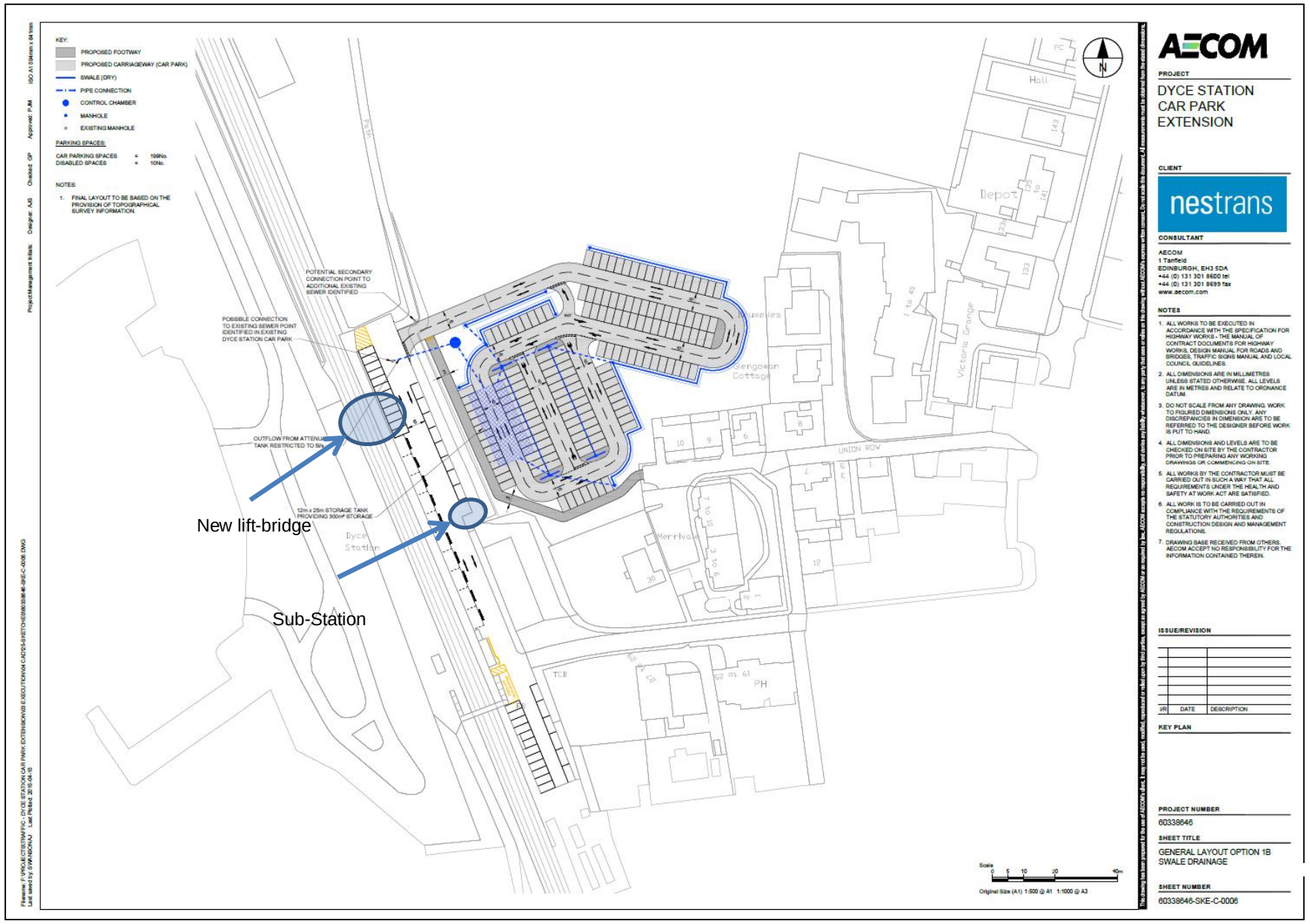
Capabilities on project:
Transportation

Option 1A (a) and Option 1B (a) – Small Car Park with Porous Surfacing Material (209 spaces)



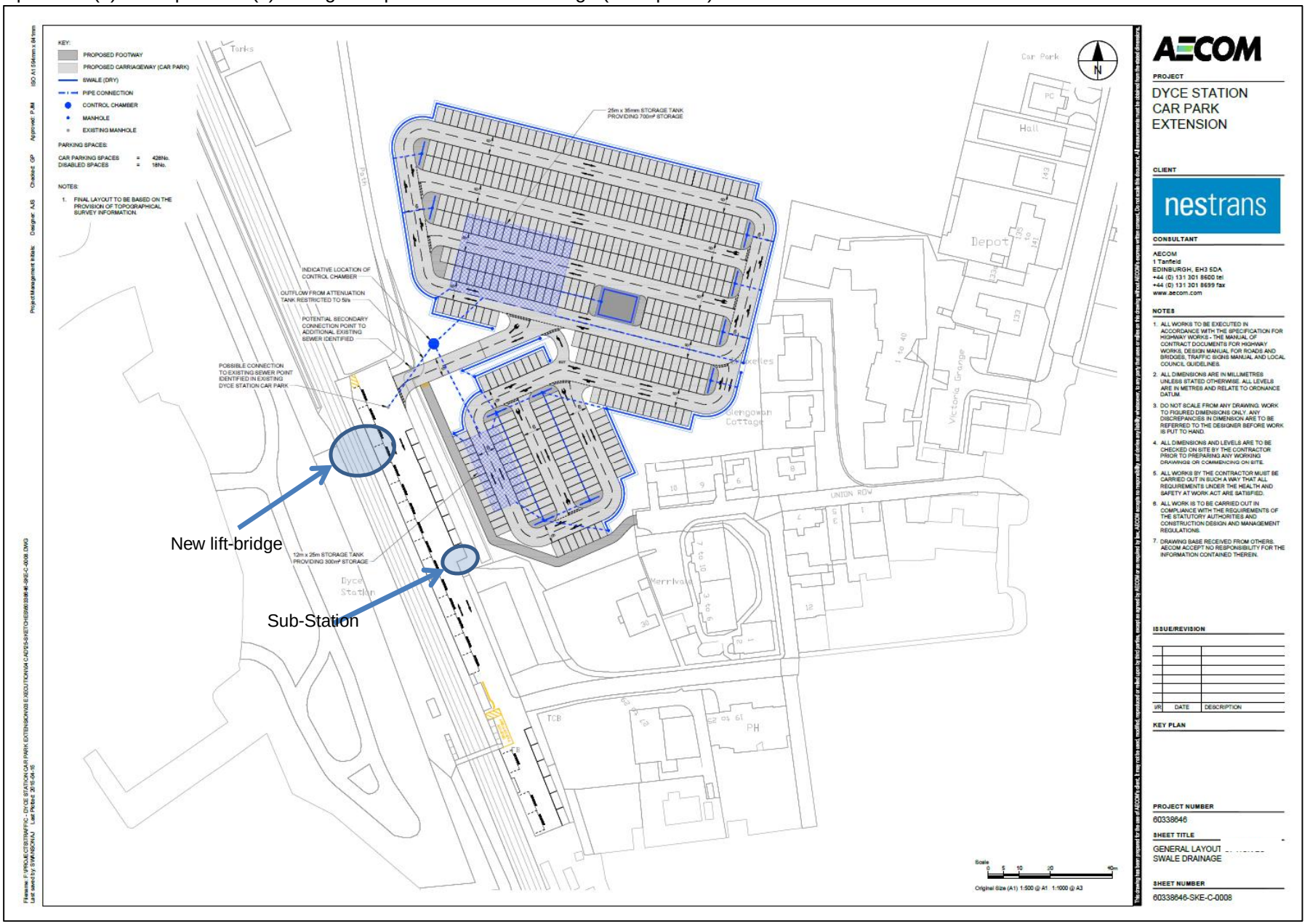
Capabilities on project:
Transportation

Option 1A (b) and Option 1B (b) – Small Car Park with swale drainage (209 spaces)



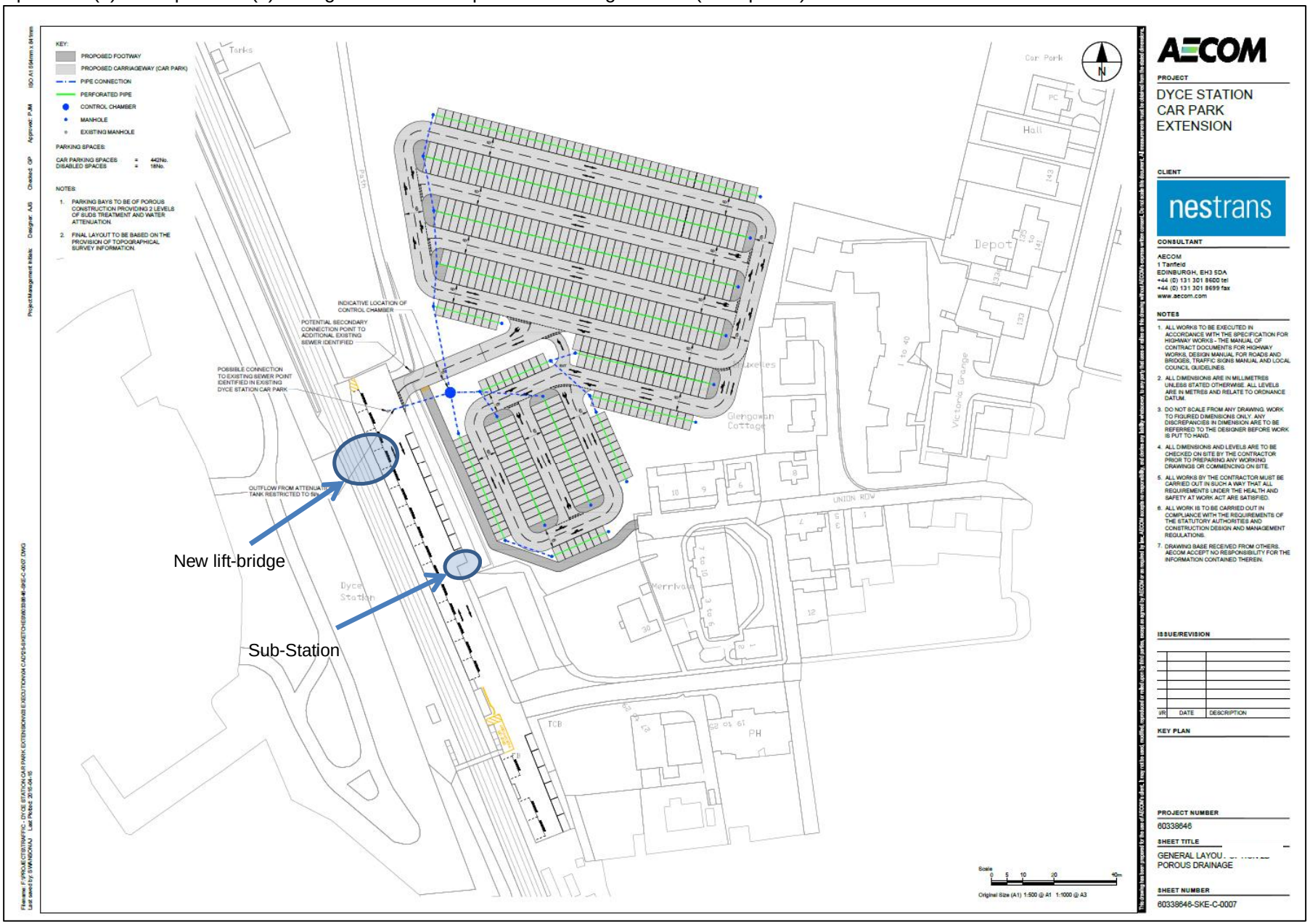
Capabilities on project:
Transportation

Option 2A (b) and Option 2B (b) – Large car park with swale drainage (446 spaces)



Capabilities on project:
Transportation

Option 2A (a) and Option 2B (a) – Large Car Park with porous surfacing material (460 spaces)



Appendix E

Capabilities on project:
Transportation

Appendix E – Survey Sheet

Sheet Number:

Date:

16:00-16:30		16:30-17:00		17:00-17:30		17:30-18:00	
Reg	**Location**	**Reg**	**Location**	**Reg**	**Location**	**Reg**	**Location**
	1		1		1		1
	2		2		2		2
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