Appendix F

Technical Note – Musselburgh Parking Management Financial Model

Stantec

Prepared for:
East Lothian Council

Prepared by:
Joshua Lee, Joshua Simmonds

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Stantec UK Limited

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Prepared by:

Joshua Lee

Signature

Joshua Lee

Printed Name

Reviewed by:

Joshua Simmonds

Signature

JW Simmonds

Printed Name

Approved by:

Joshua Simmonds

JW Simmonds

Signature

1 Introduction

East Lothian Council commissioned Stantec to develop a financial model to assess the income and cost implications of proposed parking orders in North Berwick. This model was developed in 2024 using the Flexible, Appropriate, Structured, and Transparent (FAST) financial modelling standard. FAST is a set of guidelines and best practices used in financial modelling and data analysis.

The FAST standard is designed to produce models that are both easy to create and simple to understand, enhancing their reliability and usability. The model for North Berwick was developed with the intention of being easily adaptable to assess parking measures in other towns. As such, the existing North Berwick model has been updated and used to assess the income and cost implications of the Preferred Parking Management Proposals for Musselburgh. This technical note outlines how the income and cost implications of those proposals have been estimated.

2 Model Updates

Since the development of the financial model for North Berwick, several minor updates / improvements to the model have been undertaken as follows:

Addition of Detailed Utilisation Rates by Location

The model was refined to add the ability to define specific utilisation rates for each off-street carpark or on-street parking charge group. This was done based on a review of the proposed measures in other East Lothian towns, as it was determined that the proposed measures meant that parking utilisation was likely to vary significantly by location or charging regime.

In the previous model version, a single seasonal utilisation rate was applied to all parking locations and charging regimes. In the updated version, utilisation rates for each location were added based on survey data. As parking surveys are not conducted over the course of a year, these utilisation rates are then factored by the seasonal utilisation rates that were already included in the previous version of the model. This creates a location-specific utilisation rate that is also adjusted for seasonality.

Update to Redistribution of Some Residents' Vehicles

An update was made to the approach used to redistribute residents' vehicles to other areas. The approach is applied in situations where the model estimates that the number of residents' vehicles will exceed the number of available spaces for them. This means that residents vehicles are 'redistributed' to nearby areas with available spaces to ensure all residents vehicles are accounted for in the model.

The previous version of the model divided the total number of 'excess' residents' vehicles from zones with a lack of capacity evenly into other areas with spare parking spaces. This was done regardless of the number of spare spaces available in the receiving area. Although this issue was not present in the modelling for North Berwick, this approach could lead to a situation where redistributed residents vehicles cause another area to exceed parking supply.

To prevent this issue from occurring, the approach was updated so that the total number of 'excess' residents' vehicles are redistributed based on the proportion of available surplus parking spaces

available in other areas. This makes areas with the most additional spaces receive the most redistributed vehicles, and vice-versa.

Residents' Vehicle Occupancy

A change was made to residents' vehicle calculation that may have led to the number of residents' vehicles being overestimated where there was on-street parking in combined chargeable spaces during the hours of operation. This would only have affected a small number of situations where the number of residents vehicles was less than the number of dedicated permit parking spaces available for them.

Addition of Toggles for Health and Social Care Workers Permits

Health and Social Care worker permits are being introduced across the county and are not specifically included in the Musselburgh financial model. The previous financial model was updated to include a toggle that can turn on or off the calculation of healthcare permit income and impacts on parking utilisation.

3 Financial Model Inputs

The following section describes how the updated financial model has been used to estimate income and cost impacts of the Preferred Parking Management Proposals for Musselburgh. The structure of the financial model is shown in Appendix A and Appendix B for on street and off-street locations, respectively.

3.1 Revenue Assumptions

Table 3-1 outlines the key assumptions used in the calculation of parking revenue in the Musselburgh financial model. Where possible, assumptions have been based on survey or census data. In other cases, professional judgement has been used to determine the most suitable values for forecasting.

Table 3-1: Key revenue assumptions

Revenue Source	Revenue Factor	Data Source or Assumption
Parking Charges	Number of spaces	On-Street Spaces Sections of street where parking would be permitted were mapped and length of kerbs measured using GIS software The number of available spaces was estimated by dividing the relevant kerb length by 6 metres for parallel parking spaces and 2.75 metres for bay parking spaces. Virtual review on Google StreetView were performed to check the estimations were close to the observed number of spaces.
	Average stay duration per user	Based on professional interpretation of parking surveys conducted in March 2022 and the likely impact of new parking measures on stay durations.
	Seasonal parking utilisation rate	Based on parking spot-check surveys conducted in Cupar from January 2022 to October 2023.

Revenue Source	Revenue Factor	Data Source or Assumption
	Utilisation rate by charging zone or carpark	Based on the median occupancy from off-street and on-street parking surveys conducted in March 2022. <u>Off-Street Carparks, Short-Stay On-Street Parking:</u> The median occupancies observed in the surveys were adjusted downwards by 15% for use in the financial model. This is to reflect uncertainty and account for any potential optimism bias in the parking model assumptions. <u>Medium-Stay and Long-Stay On-Street Parking:</u> The median occupancies observed in the surveys were adjusted downwards by 75% for these locations. As these streets are largely residential in land use, it can be assumed most vehicles parked in these locations are residents' vehicles. Therefore, utilisation rates observed during the parking surveys in these areas would have mainly captured the parking of residents' vehicles. This means using the survey's observed utilisation rate to estimate chargeable parking in these locations would result in a significant overestimation of paid parking uptake. This is because the model would effectively be using the **resident parking** utilisation rate to estimate the utilisation of **chargeable parking** instead. Parking of resident vehicles are already accounted for in the model permit calculation elsewhere. Therefore, the utilisation rate applied here needs to reflect a likely utilisation for chargeable parking only. As such, an adjustment of the surveyed utilisation rate downwards by 75% was performed to reflect the likelihood that most the vehicles on these streets are resident's vehicles. This provides a more appropriate estimation for the uptake of chargeable parking on these streets.
	Displaced parking adjustment factor	A factor set to reduce parking demand based on parking displaced to other areas without charges because of the parking measures. Set to 95%.
	Mode shift adjustment factor	A factor set to reduce parking demand that would be displaced to other modes because of the parking measures. Set to 95%.
	Parking charge regimes to and operational hours	Based on high level management proposals as of the end of August 2025. Parking charges are assumed to be applied between 8:30am and 18:00pm on Monday to Saturday. No parking charges are modelled for the Musselburgh Sports Centre Carpark. Sports centre users will be able to park free for up to 90 minutes so revenue generated from this car park is expected to be low.
Resident Permits	Number of resident vehicles in charging zones	Estimated using data from the 2011 Scottish Census.
	Estimated private off-street spaces by charging zone	Estimated by 2011 Census Output Area for each charging zone. Estimates based on desktop assessment using Google Maps and Google StreetView.
	Percentage of households with driveways and do not purchase permits	Set at 80%. Based on a professional judgement that parking measures will increase the utilisation of private driveways.
	Adjustment for non-purchase of resident permits	Set at 97.5%. Assumes that 2.5% of residents with vehicles that need to park on the street do not purchase a permit.

Revenue Source	Revenue Factor	Data Source or Assumption
	Occupancy of resident permit spaces during operational hours	Estimated by 2011 Census Journey to Work data. Calculated based on mode share of residents driving to work in each charging zones. This is factored to include non-commuting trips.
Enforcement Charges	Parking infringement rates for over-staying and non-payment	Set at 2% of all users. Based on professional judgement and more conservative estimation of potential infringements to be expected.
	Enforcement Levels	Set at 5% of all infringements. Based on professional judgement on the number of parking infringements that would be issued Penalty Charge Notices.
	Income Per PCN	Set at £50, which is the 50% discount rate for early payment of a PCN.

3.2 Approach to Modelling of Permit Revenue

There were several key differences between the North Berwick parking proposals and those for Musselburgh. These differences necessitated a slightly different approach to the calculation of permit impacts and revenue, which are outlined below.

Differences in permit scheme introduction

The North Berwick model included the provision to calculate the impact of holiday let permits, household visitor permits, and healthcare worker permits. Musselburgh has no proposals to include these types of parking permits. The relevant inputs and toggles for these permits have been set to zero so they have no impact on any forecasting performed in the model. However, the functionality to include these permits is retained within the model.

3.3 Cost Assumptions

Capital and operating costs associated with the delivery of the required infrastructure and personnel to enforce the proposed parking measures have been estimated. The capital and operating cost estimates are based on current costs for NSL supplying Decriminalised parking enforcement in East Lothian.

Capital cost assumptions

The capital costs are based on the following items and assumptions shown in Table 3-2. In the financial model, a 23% adjustment has been applied to all capital costs to reflect potential risks. This is based on guidance outlined in the DfT's TAG unit A1-2. The unit suggests an optimism bias adjustment must take an 'outside view' where the uplift amount is based on statistical modelling of similar projects such as using reference class forecasting (RCF). Our assumption uses the P(Mean) value at Outline Business Case stage for Road projects from the DfT's Optimism Bias workbook.

Table 3-2: Capital Cost Assumptions

Capital Cost	Unit Cost (£)	Number of Units (If Applicable)
Parking Charge Machines	4,100	83
Works associated with parking charge machines	5,000	83
Cost of signs and road markings per kilometre of kerb	550 per km	14.49 km

Capital Cost	Unit Cost (£)	Number of Units (If Applicable)
Set-up of resident's scheme	15,000	-
ANPR Cameras[1]	30,000	-
Office fit out, furnishings, and telephone connections	5,250	-
IT Equipment (PCs and Printers)	1,675	-
IT Equipment (HCCT Printers, cameras, and phones)	1,722	-
Resident Scheme system operational and upgrade	3,000	-
Publicity around new parking orders	2,000	-
Training Costs	This is already included in the current costs for NSL supplying Decriminalised Parking Enforcement in East Lothian so there will be no additional costs	

Operational cost assumptions

The operating costs are based on the following items and assumptions shown in Table 3.3. In the financial model, a 23% adjustment has been applied to all operational costs to reflect potential risks, reflecting the same approach taken for the capital costs.

Table 3-3: Operational Cost Assumptions

Capital Cost	Unit Cost Per Annum (£)	Number of Units (If Applicable)
Parking attendants	25,960	5
Consumables (fuel, office supplies, replacement uniforms etc.)	10,357	-
Parking Attendant Uniforms	500	5
Small van leases	£200 per Parking Manager is already included in the current costs for NSL supplying Decriminalised Parking Enforcement in East Lothian so there will be no additional costs.	
Notice processing software (SiDem)	These are already included in the current costs for NSL supplying Decriminalised Parking Enforcement in East Lothian so there will be no additional costs.	
Client account manager		
Enforcement manager		
Operations support manager		
Business intelligence analyst		
IT officer		
Training Officer		
Admin Assistant		
Senior Area Officer Grade 10	£65,826	To be split equally across the 5 towns in East Lothian where parking measures are proposed.
Area Officer Grade 8	£50,572	
Back-office processing	13,183	-
Adjudication Service	868	-

[1] There is a potential for ANPR Cameras to be installed at Musselburgh Sports Centre Car Park to facilitate the reimbursement or exemption of parking charges for centre users. This cost has been included to account for this possibility.

Capital Cost	Unit Cost Per Annum (£)	Number of Units (If Applicable)
Unexecuted Bailiff Actions	1,120	-
DVLA correspondence and owner tracing	120	-

3.4 Scenario Tested

The model has been used to test a 'core' scenario of parking charges in Musselburgh. These are based on the interpretation of the Preferred Parking Management Proposals for Musselburgh as of late August 2025. Assumptions on utilisation rates and average parking durations used in the financial model were interpreted from on street and off-street parking surveys conducted in March 2022. Further sensitivity and scenario testing has not been carried out at this stage.

4 Financial model outputs

Income

Table 4-1 outlines the expected annual income for the proposed parking measures in Musselburgh. The revenue forecast is reasonably balanced between both on-street parking and off-street car parks. However, a large portion of the revenue from on-street parking will come from the sale of permits. Only around half of the on-street parking revenue comes from parking charges, while 32 percent of the revenue comes from permit sales.

Supressed on-street parking revenue is because all the revenue forecast in the on-street parking areas comes from the medium and long-stay parking streets, which are much more residential in land-use and subsequently have lower utilisation rate assumptions. The model also assumes no revenue from the short-stay parking areas, as it is assumed all those parking in the short-stay parking areas in the centre of town will only park with in a 30-min free parking allowance and not pay for parking. This impact is combined with a large residential permit area, resulting overall in a large amount of revenue coming from permit sales.

Table 4-1: Forecast Income from Parking Measures in Musselburgh

Parking Location	Income Source	Core Scenario	
		Annual Income, £	10yr Modelled Income, £
On-Street	Parking	125,000	1,251,000
	Enforcement Income	51,000	515,000
	Permit Income	83,000	829,000
	Total	**259,000**	**2,595,000**
Off-Street	Parking	267,000	2,670,000
	Enforcement Income	14,000	143,000
	Total	**281,000**	**2,813,000**
Combined Total (On Street + Off Street)	Parking	392,000	3,922,000
	Enforcement Income	66,000	658,000
	Permit Income	83,000	829,000

Parking Location	Income Source	Core Scenario	
		Annual Income, £	10yr Modelled Income, £
	Combined Total	**540,000**	**5,409,000**
	Values rounded to nearest thousand		

Costs

Table 4-2 shows the expected capital and annual operating costs of the Preferred Parking Management Proposals for Musselburgh.

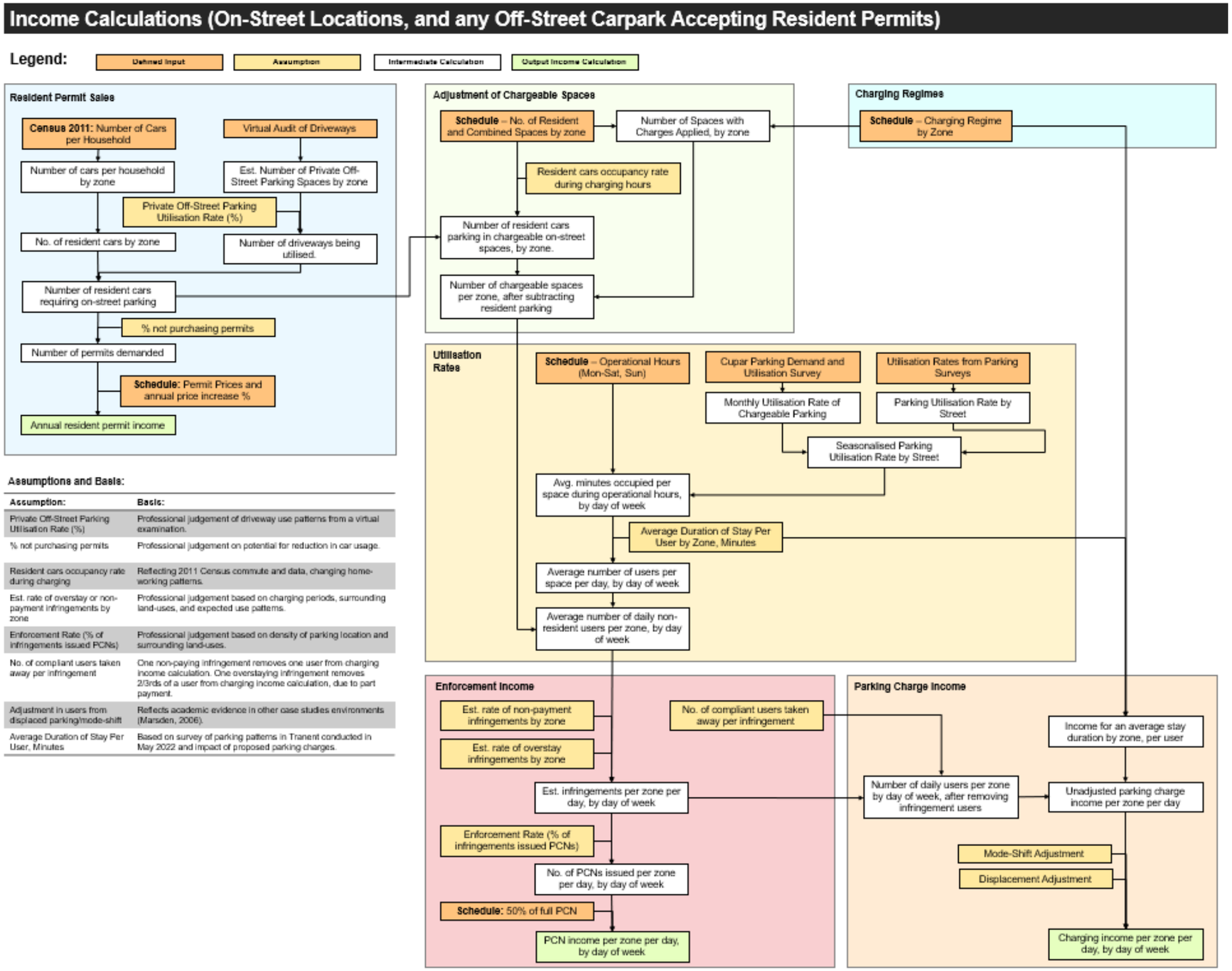
Table 4-2: Forecast Capital and Annual Operating from Parking Measures in Musselburgh

Cost Type	Cost Type (Breakdown)	Core Scenario		
		Year 1 Capital Costs, £	Annual Operational Costs, £	10yr Total Modelled Costs, £
Capital Cost	Excluding Risk	631,000	-	631,000
	Including Risk	**776,000**	**-**	**776,000**
Annual Operating Costs	Excluding Risk	-	185,000	1,845,000
	Including Risk	**-**	**227,000**	**2,270,000**
Total	Excluding Risk	-	-	2,476,000
	Including Risk	**-**	**-**	**3,046,000**
	Values rounded to nearest thousand			

Financial model outputs summary

For the 10-year modelled period, the financial model forecasts the income collected from the parking management measures will exceed both the initial capital costs and annual operational costs. The level of detail and assumptions used in the models means it is inappropriate to interpret these values as exact forecasts. However, the model is indicating on a broader level that the management income will likely exceed costs (capital and operating), with surplus revenue over the 10-year period of approximately **£236,000 per annum (including risk allowance)**.

Appendix A – Income Calculation for On-Street Parking Locations



Assumptions and Basis:

Assumption:	Basis:
Private Off-Street Parking Utilisation Rate (%)	Professional judgement of driveway use patterns from a virtual examination.
% not purchasing permits	Professional judgement on potential for reduction in car usage.
Resident cars occupancy rate during charging	Reflecting 2011 Census commute and data, changing home-working patterns.
Est. rate of overstay or non-payment infringements by zone	Professional judgement based on charging periods, surrounding land-uses, and expected use patterns.
Enforcement Rate (% of infringements issued PCNs)	Professional judgement based on density of parking location and surrounding land-uses.
No. of compliant users taken away per infringement	One non-paying infringement removes one user from charging income calculation. One overstaying infringement removes 2/3rds of a user from charging income calculation, due to part payment.
Adjustment in users from displaced parking/mode-shift	Reflects academic evidence in other case studies environments (Marsden, 2006).
Average Duration of Stay Per User, Minutes	Based on survey of parking patterns in Tranent conducted in May 2022 and impact of proposed parking charges.

Appendix B – Income Calculation for On-Street Parking Locations

Income Calculations (Off-Street Carparks, Excluding Carparks Accepting Resident Permits)

Legend: Defined Input | Assumption | Intermediate Calculation | Output Income Calculation

Assumptions and Basis:

Assumption:	Basis:
Est. rate of overstay or non-payment infringements by zone	Professional judgement based on charging periods, surrounding land-uses, and expected use patterns.
Enforcement Rate (% of infringements issued PCNs)	Professional judgement based on density of parking location and surrounding land-uses.
No. of compliant users taken away per infringement	One non-paying infringement removes one user from charging income calculation. One overstaying infringement removes 2/3rds of a user from charging income calculation, due to part payment.
Adjustment in users from displaced parking/mode-shift	Reflects academic evidence in other case studies environments.
Average Duration of Stay Per User, Minutes	Based on survey of parking patterns in Tranent and proposed charging periods.