

Fleet replacement: options appraisal (October 2018)

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1	10/10/2018	Initial version.

Introduction

- 1 Reigate and Banstead Borough Council ('the Council') operates a fleet of refuse collection vehicles (RCVs) that provide the statutory collection of recycling and refuse from the borough's domestic properties.
- 2 The fleet of vehicles providing this service have entered their seventh year of operation and are close to the end of their economical service life. In the last year the fleet's age has resulted in a significant increase in maintenance costs and a concurrent reduction in its availability. As the fleet continues to age further deterioration will become increasingly likely. As well as an increase in maintenance costs, further fleet deterioration will result in the need for the Council to temporarily lease vehicles on expensive, short-term spot hire arrangements.
- 3 The procurement of a new fleet to undertake the Council's statutory waste collection is therefore required. A new fleet will enable the Council to continue to deliver this important statutory service for the residents of the borough in a cost effective and efficient way.
- 4 There are a variety of options for replacing the Council's fleet of domestic RCVs. This paper presents an appraisal of these options, which are as follows:
 1. Outright capital purchase;
 2. Contract hire; and,
 3. Refurbishment of the existing fleet.
- 5 The possibility of procuring a fleet of alternatively fuelled vehicles is also considered. This paper concludes, however, that alternatively fuelled RCVs are not currently commercially viable.
- 6 In summary, this report recommends that the Council should outright purchase and maintain in-house the RCVs necessary to deliver the borough's domestic refuse collection service. This is the most cost effective option for fleet replacement and will ensure a resilient and robust refuse collection service in the years ahead.

Background

- 7 The Council is the statutory Waste Collection Authority (WCA) for the borough of Reigate and Banstead, whilst Surrey County Council is the statutory Waste Disposal Authority (WDA). The Environmental Protection Act (1990) created a statutory duty for WCAs to arrange for the collection of household waste within their area, whilst WDAs are responsible for the disposal of this waste.
- 8 The Council provides a recycling and refuse collection service to over sixty thousand properties in the borough of Reigate and Banstead. The Council is currently ranked within the top ten percent of authorities in the country for recycling performance and is committed to improving this performance still further.
- 9 The Council's policy is to continue to deliver domestic waste collection as an in-house service. As such, the possibility of outsourcing the service has not been considered in this options appraisal.

Legislative and regulatory context

- 10 Section 48 of the Environmental Protection Act (1990) makes provision for authorities to retain waste for the purposes of recycling. Since the Act came into effect the recycling obligations of authorities have increased significantly. The Waste Framework Directive (2008) introduced a target on local authorities to recycle 50% of waste by 2020.¹ If recycling targets are missed there are provisions in the Localism Act (2011) for fines levied by the European Union (EU) to be handed down to local authorities.
- 11 Since January 2015 the Waste Framework Directive has required WCAs to provide separate collection of paper, plastics, metal and glass in order to facilitate greater levels of recycling. England's WCAs are obliged to provide separate collections where they are technically, environmentally and economically practicable (TEEP). The Council's recycling service is fully compliant with the Waste Framework Directive and the current fleet of RCVs is configured accordingly.
- 12 Revisions to the Waste Framework Directive were recently ratified by the European Council. The revisions include more stringent municipal waste recycling targets, specific targets on the recycling of product packaging, new separate collection rules and mandatory separate bio-waste collections, amongst others.²
- 13 The European Union (Withdrawal) Act 2018 will repeal the European Communities Act (1972) – the principal instrument through which EU law and regulations are incorporated into national legislation – on March 29 2019, the day that the United Kingdom (UK) will leave the EU. The Act reimports (or 'onshores') into UK domestic law as 'retained EU law' most EU derived laws that applied in the UK immediately before the day of exit.
- 14 All EU waste legislation will therefore remain in force in the UK following EU withdrawal. The Government will be able to repeal or amend this law after March 29 2019 unless the UK seeks membership of the European Economic Area (EEA) or

¹ <http://www.legislation.gov.uk/uksi/2011/988/contents/made>

² http://europa.eu/rapid/press-release_IP-18-3846_en.htm

otherwise makes specific commitments to apply such law as part of negotiating new trade arrangements with the EU.

- 15 It is therefore highly unlikely that the recycling and waste duties of authorities will reduce in the years ahead. To the contrary, such duties will likely increase, particularly in light of the recent public attention on the prevalence of single use plastics and other important environmental issues. Moreover, as a responsible WCA the Council is committed to the handling and processing of refuse and recycling in an environmentally sustainable manner that maximises recycling.
- 16 In its capacity as the WDA for Surrey, Surrey County Council has recently proposed the abolition of recycling credits and the introduction of a new formula to distribute funding to the WCAs in Surrey. Recycling credits are payments made by the WDA to the WCA in order to incentivise increased recycling, particularly where without such payments collection would not be commercially viable.
- 17 Whilst the Council has clarity on the budgetary impact of such changes up to 2020/21, uncertainty on the levels of payments remains beyond this date. It is possible, therefore, that the Council's budgetary position could worsen as a result of the new funding formula.
- 18 The Council continues to be an active participant in the Surrey Waste Partnership (SWP) – the forum comprised of Surrey's ten other WCAs and the County Council – and will be closely involved in the development of future proposals in order to ensure an equitable financial settlement.
- 19 This uncertainty on funding and Brexit notwithstanding, the Council, in its capacity as the statutory WCA for the borough, will continue to require a fleet of RCVs that collect the required domestic waste streams in a manner that is fully compliant with all necessary legislation, the requirements of which are unlikely to reduce in the years ahead.
- 20 Whilst it is not possible – nor indeed desirable – to alter the materials that are collected, there is possible scope for altering the way in which these materials are handled to reduce operational costs, particularly if the settlement that is reached with Surrey County Council after 2020/21 is injurious to this Council's financial position. In this vein, the three tranche approach to fleet replacement that is recommended (see below) will grant the Council significant flexibility in its approach to procurement, thereby ensuring that the configuration of the acquired vehicles is appropriately balanced against the financial settlement reached with Surrey County Council and the duties of being the borough's statutory WCA.

The current fleet

- 21 The Council operates a fleet of seventeen RCVs that solely collect recycling and waste from the borough's residential properties; a separate fleet delivers the Council's Garden Waste and commercial waste services.
- 22 This paper is concerned with the replacement of the fleet of vehicles that collects refuse from the borough's residential properties; the Council's existing capital programme for fleet replacement includes provision for the replacement of vehicles

servicing Garden Waste and commercial waste customers along with other plant and equipment.

- 23 The current fleet is optimally configured in order to handle all waste streams in the statutory manner required. This involves the separate handling of certain waste streams which is achieved by refuse trucks having two internal compartments and bin lifts. Figure 1 provides a breakdown of the composition of the current fleet of domestic RCVs:

Vehicle type	Quantity
26 tonne Twinpack	14
15 tonne Twinpack	3

Figure 1 – composition of the Council's current fleet

- 24 The vehicles have entered their seventh year of operation and are fast approaching the end of their economical service life. Indeed, over the last year and a half the fleet has been afflicted by a variety of maintenance issues primarily associated with its increasing age. As a result, maintenance costs have increased significantly and have contributed to recent overspends in the fleet budget. The current fleet's historic maintenance costs are shown in figure 2.

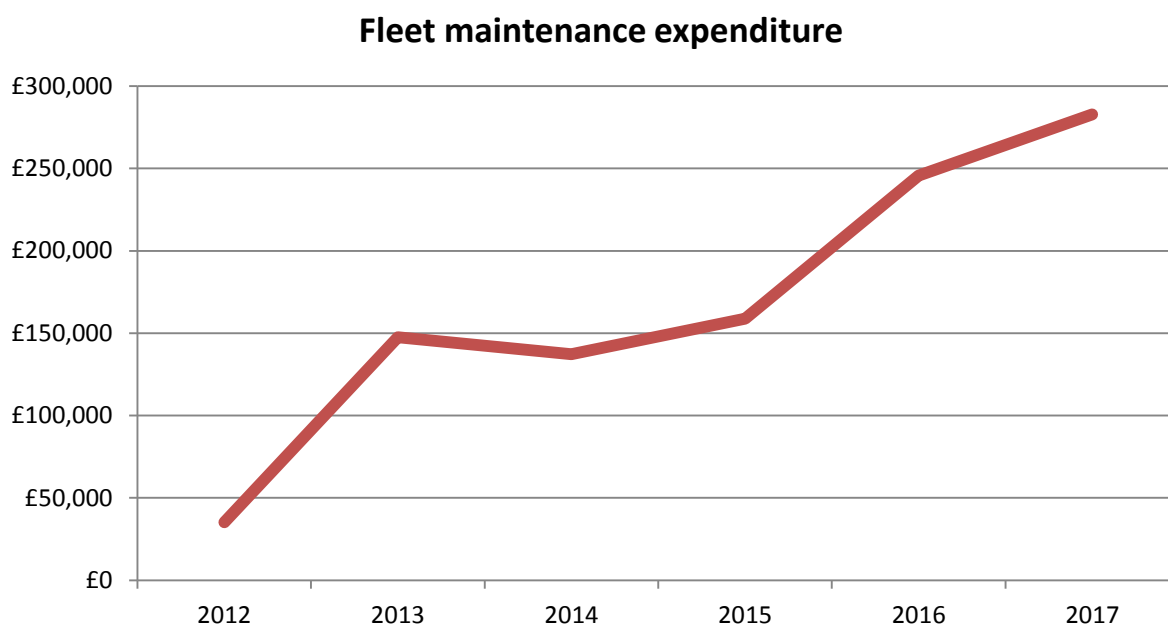


Figure 2 – Fleet maintenance expenditure³

- 25 In addition to increased maintenance costs, the fleet's advancing age has resulted in an increase in downtime as maintenance issues become more complex and

³ Includes all costs incurred in maintaining the fleet, including parts and labour. These costs do not include usual consumables such as fuel, tyres and lubricants. Maintenance costs increase significantly after year 3 as this is when the vehicles' manufacturer's warranty expires.

expensive to resolve. To illustrate, in Q1 2018/19 the fleet's availability was 86% which stands in contrast to the industry standard of 95%. The fleet's reduced availability has resulted in the need for the Council to temporarily lease vehicles on expensive, short-term spot hire arrangements in order to continue to collect refuse. The spot hire of such vehicles costs the Council circa £1,070 per week; since January 2017 over £41,000 has been spent on the spot hire of RCVs.

- 26 Whilst the situation is currently manageable, it is not sustainable in the long-term. Indeed, as the fleet continues to age its condition and concurrent availability will continue to deteriorate, with the trend of increased maintenance and the resultant need to spot hire vehicles continuing and perhaps gathering apace as the current fleet becomes irreparable.
- 27 The procurement of a new fleet of refuse collection vehicles is therefore required in order for the Council to continue to deliver its statutory function as the borough's WCA in a cost effective and efficient manner.

Acquiring a new fleet

- 28 At this juncture it is pertinent to note that all the options considered in this paper involve the complete and like for like replacement of the current fleet. Indeed, and as noted above, the fleet's ability to handle certain waste streams separately is fundamental to the completion of the Council's statutory duties as WCA – a like for like fleet replacement will achieve this goal.
- 29 It is proposed that fleet replacement will take place in three tranches straddling two financial years; the advantage of taking this approach is that it avoids vehicle warranties expiring simultaneously and, as noted above, ensures that the configuration of the acquired vehicles is appropriately balanced against the financial settlement reached with Surrey County Council and the duties of being the borough's statutory WCA.
- 30 Figure 3 provides a breakdown of the proposed approach to fleet replacement which is recommended regardless of whether outright purchase or lease hire is pursued.

Tranche	Number of vehicles		Approx. order date	Approx. delivery date
	26 tonne	15 tonne		
1	5	1	Feb-19	Aug-19
2	5	1	Apr-19	Oct-19
3	4	1	Jun-19	Dec-19
	14	3		

Figure 3 – fleet replacement schedule

- 31 It will take approximately twenty-five weeks (6 months) from ordering a vehicle to receive delivery. Those vehicles in most urgent need of replacement will be retired upon receipt of the first tranche of new vehicles.

Alternative fuels

- 32 As a responsible WCA it is incumbent upon the Council to explore the possibility of operating RCVs that use alternative fuels in order to reduce emissions and help protect the environment and the borough's air quality.
- 33 RCVs are heavy, operate on a stop-start cycle and likewise lift heavy bins. As such, they require significant amounts of energy to operate, of which has traditionally come from a diesel engine.
- 34 As a fuel for vehicles, diesel has received negative media and governmental attention in recent years due in large part to the emissions scandal that implicated a number of global vehicle manufacturers. As a result, policy makers are encouraging moves away from diesel and petrol to fuel sources that are less, or even zero, polluting. In the UK, for instance, the Government has pledged to ban the sale of all new petrol and diesel vehicles by 2040.
- 35 The Council's current fleet of RCVs are diesel powered and adhere to Euro V emission standards. Since the Council took delivery of its current fleet, Euro V has been superseded by Euro VI. Euro VI engines are significantly cleaner than Euro V, with the move to Euro VI resulting in large reductions in emissions and a more robust testing regime to ensure compliance.
- 36 The alternative fuel options to diesel are as follows:
1. Fully electric;
 2. Compressed natural gas (CNG); and,
 3. Fully hybrid (combining diesel and electric).
- 37 Notwithstanding the fact that the market has developed significantly in recent years, alternative fuel options are, at present, not commercially viable in comparison to modern diesel engines. This paper consequently does not recommend the acquisition of such vehicles. Each option is examined in turn below.

Fully electric

- 38 Fully electric vehicles draw power from an on-board battery. Whilst heavy duty vehicles such as electric buses are being produced in increasing numbers, they are significantly more expensive than traditionally fuelled vehicles and have several key operational limitations which, taken together, severely limits their commercial viability. Indeed, an electric RCV costs in the region of £300k, which is approximately £105k more than a similarly configured diesel vehicle. This would add circa £1.7 million (over 50%) to the cost of replacing the fleet.
- 39 A key operational limitation is that, owing to the vehicle's weight, they must rely on shorter routes and opportunity charging as battery technology is insufficiently advanced to power a RCV for the range required. The implementation of an electric

fleet would therefore likely require the Council to purchase more vehicles to compensate for such reduced range and would similarly require the installation of charging infrastructure at Earlswood Depot and at strategic points along collection routes. The installation of charging points currently costs approximately £12,500 each which therefore adds a significant level of expenditure to the fleet's replacement.

Compressed natural gas (CNG)

- 40 Compressed natural gas (CNG) powered RCVs are often touted as an alternative to diesel engines, with the ostensible advantage being that as a fuel it is inherently cleaner and cheaper than diesel.
- 41 CNG powered vehicles are approximately £20,000 more expensive than diesel fuelled vehicles, thus adding circa £340k onto the cost of replacing the fleet. In addition to being more expensive to purchase, the use of CNG also requires the installation of the necessary infrastructure to fuel vehicles. The latter includes connecting the depot to the CNG network and installing compressors to deliver the gas to pressurised fuel tanks. Whilst detailed costings have not been identified this will in all likelihood prove to be cost prohibitive.
- 42 Thus, whilst CNG is cheaper than diesel, such savings are offset by the need to install the required refuelling infrastructure. Moreover, with the advent of Euro VI emission standards CNG and diesel powered vehicles have similar pollutant emissions (see below).

Fully hybrid

- 43 In common with electric vehicles, fully hybrid RCVs are circa £105k more expensive than their diesel equivalents and are therefore similarly commercially unviable at present.
- 44 Whilst full hybridisation is commercially unattractive, it is possible to part hybridise our fleet. Indeed, the bin lift and compactors use a significant portion of the vehicle's energy and are driven by hydraulics that take power from the vehicle's diesel engine. Manufacturers now offer bin lifts and compactors that are operated electronically using an externally charged battery that can also be supplemented by energy harvested – and usually lost – through braking. Electric powered lifts and compactors are affordable in comparison to a fully hybrid vehicle and offer potential fuel savings as well as much quieter operation. This option for part hybridisation – as well as the likely costs and fuel savings – will be scoped as part of the procurement exercise which will follow.
- 45 Whilst the examined alternative fuels are unviable at present, rapid technological advance means that when the Council comes to replace its fleet of RCVs in 6 years' time this position may well be different.

Euro VI emissions

- 46 It is important to note that since the advent of Euro VI emissions standards diesel powered engines have become cleaner and emit significantly less carbon dioxide (CO₂) and nitrous oxide (NO_x) than their Euro V equivalents. Numerous scientific studies have shown that the latter pollutant has a particularly detrimental impact on human health.

- 47 The International Council on Clean Transportation (ICCT) has undertaken a series of tests that compares the NO_x emissions of Euro IV, V and VI heavy goods vehicles in real world driving conditions. Figure 4 shows the results of these tests which indicates a significant reduction in emissions from Euro VI vehicles. Each dot denotes a test result; the red dot shows the average for the category type.

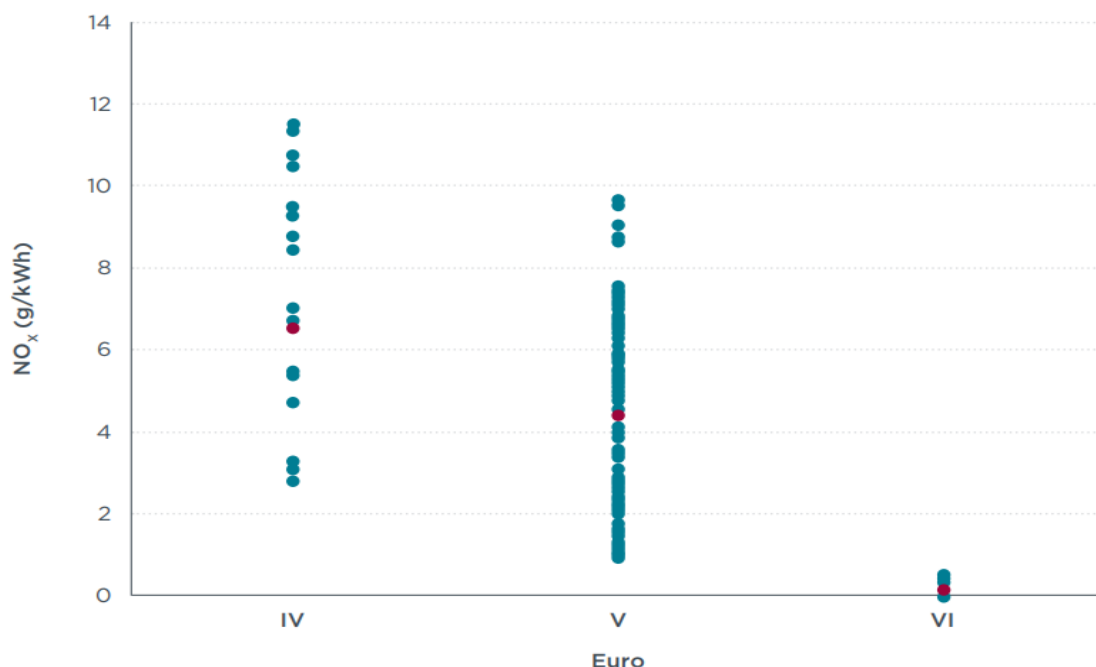


Figure 4 – ICCT emissions tests by Euro standard⁴

- 48 Moreover, the inadequate testing regimes that the emissions scandal highlighted have been overhauled and made significantly more robust to help prevent cheating. To illustrate, the ICCT has also tested for the 'conformity factor' of vehicles to the proscribed standards when driven in real world driving conditions. Figure 5 demonstrates the results of these tests. A result above the red line indicates non-conformity.

⁴ International Council on Clean Transportation (ICCT), 2015. Comparison of real-world off-cycle NO_x emissions control in Euro IV, V, and VI. Available at: https://www.theicct.org/sites/default/files/publications/ICCT_Briefing_EuroIV-V-VI-NOx_Mar2015.pdf

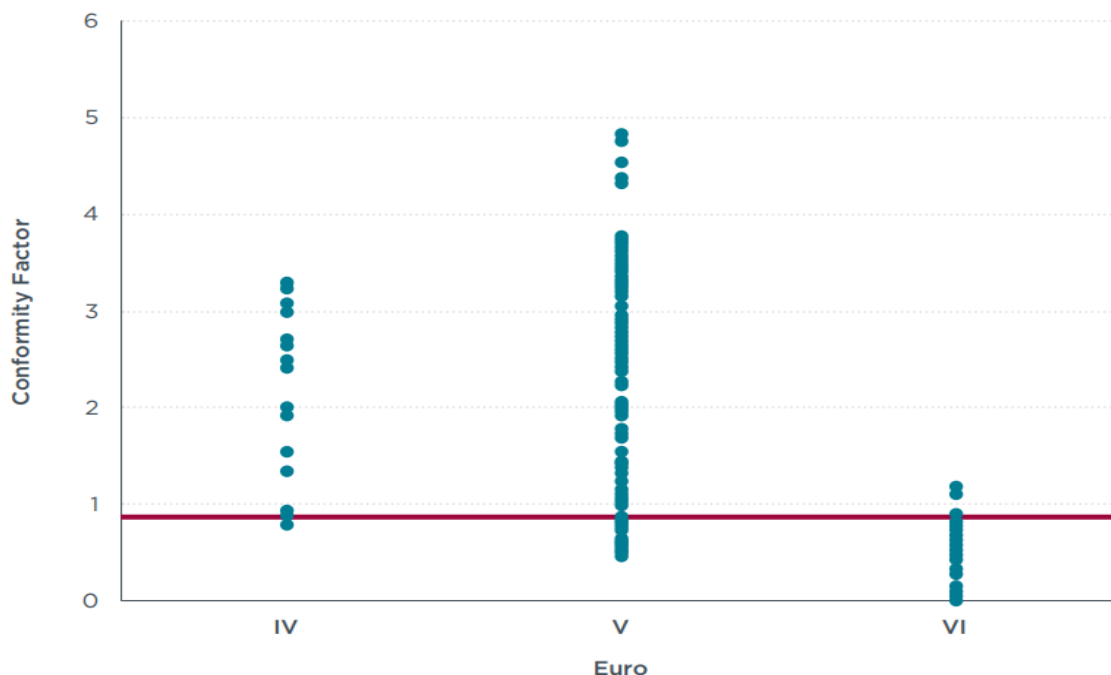


Figure 5 – ICCT emissions tests conformity factor⁵

- 49 The tests show that Euro IV and V vehicles typically emitted significantly more NO_x than was permissible, whilst Euro VI generally emits well below target, despite these targets being far more stringent.
- 50 Taking these cost and emissions considerations together, this paper therefore recommends that, in operating its new fleet, the Council should use diesel powered RCVs that conform to Euro VI standards. This is the most cost effective option for the Council which also minimises pollutant emissions.

Options for fleet replacement

- 51 As noted above, there are three broad options for fleet replacement:
1. Outright capital purchase;
 2. Contract hire with and without a maintenance package; and,
 3. Refurbishment of the existing fleet.
- 52 Approximate costs have been identified for outright capital purchase and contract hire, as well as the refurbishment of the existing fleet.
- 53 It should be noted at this point that the purchase and lease hire costs – including maintenance – identified in this paper are the best estimates available to the Council before the commencement of a procurement exercise. The costs are therefore subject to change though are sufficient for this options appraisal.

⁵ Ibid

- 54 There are also a number of external factors stemming from the UK's exit from the European Union which could negatively affect the costs identified in this paper, the details of which are examined below.
- 55 To summarise, this paper recommends that the council should pursue option 1, namely: the outright capital purchase – which necessarily involves continuing in-house maintenance – of a new fleet of RCVs as specified above. This is recommended as it offers the most cost effective solution for fleet replacement and will ensure a resilient, robust and legally compliant collection service in the years ahead.

Refurbishment of the existing fleet

- 56 At this juncture it is pertinent to consider refurbishing the council's existing fleet of RCVs, the main advantage of which is that it avoids the significant capital outlay associated with complete replacement.
- 57 Earlier in 2018 the service commissioned a refuse vehicle remanufacturer to provide a quotation to refurbish the Council's existing fleet of RCVs. The quotation covers the work required to the vehicles' hydraulic lifting systems and electronics, as well as bodywork repairs. The latter does not include work to the vehicles' engines or other mechanical repairs, which the Council will continue to be required to undertake, and likewise does not include any chassis repairs, the scope of which will only be known following dismantling and close examination. Chassis repairs can be very expensive, particularly if there are underlying issues with rust and corrosion. The remanufacturer provides a three year warranty on works carried out.
- 58 It will take approximately 6 weeks for a vehicle to be refurbished and returned to the Council. Owing to operational requirements the service is unable to release more than one vehicle at any one time. As such, it will take just over two years for the entire fleet to be refurbished. By this point thirteen of the seventeen vehicles will have less than a year and a half of the remanufacturer's warranty remaining and will therefore require replacement shortly thereafter.
- 59 It is also highly likely that the condition of the vehicles awaiting refurbishment but still in operation will continue to deteriorate, with the risk of fleet and concurrent service failure being heightened still further. In such circumstances the Council would be forced to incur the high costs associated with vehicle spot hire as described above. The likelihood of the latter is compounded by the fact that the service will have one vehicle unavailable at any one time through refurbishment.
- 60 In addition, and as noted, the refurbishment quote does not include mechanical repairs. As the fleet continues to age we can expect a marked increase in costs associated with maintaining the vehicles' engines as mechanical parts increasingly fail.
- 61 To refurbish each vehicle will cost approximately £36,000; refurbishing the entire fleet will therefore cost in the region of £612,000. Whilst this is cheaper than purchasing a new fleet of vehicles, it is considered to be inherently cost inefficient for the following reasons:
1. The refurbishment cost exceeds the vehicles' value;
 2. Refurbishment does not include mechanical works. As the vehicles continue to age the risk of mechanical failure and a further increase in maintenance

- costs becomes highly likely;
3. Refurbishment reduces operational capacity and exposes the Council to the risk of increased fleet failure, which requires the expensive spot hiring of vehicles; and,
 4. Older vehicles are less fuel efficient than their newer equivalents and therefore cost more to run in fuel terms.
- 62 In addition, the Council's current fleet of RCVs are diesel powered and adhere to Euro V emission standards. As noted above, these vehicles are significantly more polluting than the subsequent generation of diesel engines that were recommended in the section above. As an environmentally conscious and responsible organisation the Council should look wherever possible to minimise the emission of pollutants.
- 63 In short, refurbishment of the Council's existing fleet of RCVs is time intensive, cost inefficient and involves the continued operation of a fleet of polluting and outdated vehicles that face an ever increasing risk of failure. For these reasons it is recommended that the Council does not refurbish its current fleet; instead, the procurement of a new fleet of domestic RCVs should be pursued in order to deliver the service in an efficient and robust way.

Capital purchase vs. contract hire

- 64 After having discounted refurbishment of the current fleet, the remaining options are:
- Option 1:** Outright capital purchase and in-house maintenance of a new fleet
 - Option 2:** Contract hire of a new fleet, with outsourced maintenance
 - Option 3:** Contract hire of a new fleet, with maintenance undertaken in-house
- 65 The costs associated with each of the above options have been identified and modelled for this options appraisal. It should be noted that the costs identified are approximate and represent the best estimates available to the Council before the commencement of a procurement exercise.
- 66 Figure 6 provides an overview of the whole life costs for each of the above options, which includes maintenance/operation costs.
- 67 It should be noted that:
- The identified costs do not include costs which would be incurred regardless of which option is chosen (staff, fuel, tyres, operator licence and insurance, etc.);
 - In the case of capital purchase, the depreciation period is six years. In order to ensure an accurate cost comparison contract hire is also for a six year period;
 - The source of the capital funding required for option 1 has not yet been identified, though it is likely that the Council will be able to fund the purchase from its reserves and would therefore not incur interest on any loan agreements;
 - No residual value is assumed under option 1, however following six years of operation the resale value of the entire fleet is likely to be in the region of £400,000; and,
 - The operation and maintenance budget is unchanged from its current form. The budget is apportioned in accordance with the proportion of the Council's

fleet that collects domestic refuse and is weighted accordingly (i.e. RCVs require more maintenance than other Council vehicles).

Option	Description	Whole-life cost (six years)
1	Capital purchase and in-house maintenance	£3.77 million
2	Contract hire and outsourced maintenance	£4.30 million
3	Contract hire and in-house maintenance	£3.91 million

Figure 6 – fleet whole life costs

- 68 As figure 6 demonstrates, the outright capital purchase and in-house maintenance of a new fleet (option 1) is the most cost efficient option for the Council and is circa £500k cheaper than contract hire and outsourced maintenance and is likewise circa £145k cheaper than hiring the vehicles and maintaining them in-house. Option 1 is therefore recommended on this basis as well as due to the fact that it simultaneously ensures a resilient, robust and legally compliant refuse and recycling collection service for the borough's residents.

Risks

- 69 There are a number of risks associated with replacing the Council's fleet. Those that have been identified so far are detailed in figure 7. Fleet failure is also managed on the Council's operational risk register.

Risk description	Mitigation
<p>No-deal Brexit</p> <p>If the UK leaves the EU on 29 March 2019 without a deal the free circulation of goods between the UK and EU will cease.</p> <p>According to the Government's recently released technical notice on trade, this would mean that customs and excise rules would be applied to goods moving between the UK and EU, thereby resulting in import and export delays as well as an increase in costs as tariffs are applied on goods.</p> <p>Manufacturing supply chains are tightly integrated, with the constituent components of RCVs moving between the UK and EU many times before their final assembly.</p>	<p>The Council will continue monitor the situation alongside our procurement partners.</p> <p>The Council should be prepared to move quickly in placing orders for the new vehicles and should avoid unnecessary delays.</p>

<p>This close integration of supply chains, coupled with the risk of the imposition of customs and excise rules, could therefore result in significantly increased costs for purchasing the required vehicles as well as a significant delay in their delivery to the Council.</p>	
<p>Fleet failure</p> <p>The fleet will continue to age whilst the procurement process is undertaken. As noted, the vehicles' increasing age means that maintenance costs will continue to be high and vehicle failure is more likely. This will result in the Council being required to acquire vehicles on expensive spot hire arrangements to meet operational demands.</p> <p>The latter is underscored by the fact that the Council will not have taken delivery of the final tranche of vehicles until December 2019 – by this point these vehicles will be eight years old and far past their economical service life.</p> <p>Delays to the procurement and/or delivery of the new vehicles will exacerbate this risk.</p>	<p>The condition of the current fleet will continue to be monitored closely and maintenance undertaken as necessary.</p> <p>The most unreliable and problematic vehicles will be retired first.</p>

Figure 7 – Fleet replacement risks

Conclusion

- 70 This paper has examined the various options available to the Council in replacing its fleet of RCVs. It is recommended that the Council should purchase outright, and maintain in-house, a new fleet of Euro VI compliant diesel vehicles (option 1).
- 71 A new fleet acquired on this basis will enable the Council to continue to deliver this important statutory service for the residents of the borough in a cost effective, efficient and legally compliant way.