The Regulatory Policy Committee (RPC), an independent advisory non-departmental public body providing scrutiny on the evidence and analysis supporting the estimates of costs and benefits in regulatory proposals, considered this draft impact assessment. The RPC were not satisfied the impact assessment provided sufficient evidence to support the proposals, and required that it is further reviewed (see Section 5 in part B of the consultation for more details). We will review the impact assessment to address RPC concerns alongside the consultation. We will also use the responses to the consultation to improve the analysis. The revised impact assessment will only be published alongside the final government response to the consultation once it has received a fit-for-purpose opinion from the RPC.

Title: Tackling Illegal Activity at Sites with Registered Waste Exemptions	**Impact Assessment (IA)**
IA No:	**Date:** 22/06/2017
RPC Reference No:	**Stage:** Consultation
Lead department or agency: Defra	**Source of intervention:** Domestic
Other departments or agencies:	**Type of measure:** Secondary legislation
	Contact for enquiries: Alistair Paul Alistair.Paul@defra.gsi.gov.uk

Summary: Intervention and Options

RPC Opinion: Red Opinion

Cost of Preferred (or more likely) Option				
Total Net Present Value	**Business Net Present Value**	**Net cost to business per year** (EANDCB in 2014 prices)	**One-In, Three-Out**	**Business Impact Target Status**
£1431.99m	£913.26m	£-90.5m	Not in scope	Qualifying provision

What is the problem under consideration? Why is government intervention necessary?

Waste exemptions allow low risk waste operations to be carried out according to general rules, without the need to apply for an environmental permit, which can be both time intensive and costly. However industry bodies and regulators have collected evidence that some exemptions are systematically abused to hide illegal waste activities from regulatory oversight. In particular of the 59 exemptions, 10 have been identified as being associated with illegal activity. Illegal activity at waste sites creates serious negative externalities, including environmental pollution and disamenity for nearby homes and businesses. External stakeholders estimate this cost to the UK economy as being in the order of magnitude of millions of pounds.

What are the policy objectives and the intended effects?

The overall policy objective is to reduce the quantity of waste managed illegally at sites holding registered waste exemptions, thereby diverting it to legitimate waste businesses in England and Wales. The intended effect is a reduction in risks to human health and the natural environment by reducing criminal activity which is currently masked by waste exemptions. The removal of illegal and unfair competitive practices will also bring benefits to legitimate waste operators and the wider economy. Proposals to address these concerns are expected to have support from the private sector but will be tested in the consultation. A reduction in illegal waste activity will lower tax avoidance for the government and remediation costs for local authorities.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

Option 1: Do Nothing option. Under this base case, there would be no changes to the rules that apply to waste exemptions, but this option still incurs substantial costs (as explained below) as ongoing illegal activity negatively impacts the environment and compliant businesses, and Government; no benefits are identified.
Option 2: Keep nine of the ten exemptions of concern identified by the Environment Agency (EA) & Natural Resources Wales (NRW), but tighten controls. Quantities and types of waste allowed under these exemptions are restricted. The tenth exemption is removed.
Option 3: remove 8 of the 10 problem exemptions. These waste activities would now require permits. Tighten controls for the remaining 2 of the 10 problem exemptions.
Options 2 and 3 do not have widely constraining NPVs but Option 2 is preferred as it is lower cost, has a higher BCR and enables SMEs to continue to operate using exemptions, whereas Option 3 would not.

Will the policy be reviewed? It will be reviewed. **If applicable, set review date:** 02/2021

Does implementation go beyond minimum EU requirements?		Yes / No / N/A - N / A		
Are any of these organisations in scope?	**Micro** Yes	**Small** Yes	**Medium** Yes	**Large** Yes
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)		**Traded:** N/A	**Non-traded:** N/A	

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible Minister: ..... Date: .....

Summary: Analysis & Evidence

Policy Option 1

Description: No changes to waste exemptions system

FULL ECONOMIC ASSESSMENT

Price Base Year 2018	PV Base Year 2018	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: -497.7	**High:** -450.4	**Best Estimate:** -474.1

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	0	0	54.2	**450.4**
High	0		59.9	**497.7**
Best Estimate	0		57.1	**474.1**

Description and scale of key monetised costs by 'main affected groups'

Costs are those that are currently ongoing and reflect the current level of illegal activity at exempt sites.
To society: direct environmental costs and disamenity costs =£6m annually
To regulators and local authorities of incidents = £4.7m in Year 1, increasing over time.
To business of compliant sites being undercut by non-compliant exempt sites = £7.8m anually.
To government of lost tax revenues from illegal exemptions = £37m in Year 1, increasing with landfill tax.

Other key non-monetised costs by 'main affected groups'

Certain costs have not been possible to quantify due to lack of evidence. These would be negative impacts due to high numbers of illegal waste sites including health costs, risk of surface and groundwater contamination, and reputational damage of the waste industry and regulators due to incidents at illegal sites.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	0	0	0	**0**
High	0		0	**0**
Best Estimate	0		0	**0**

Description and scale of key monetised benefits by 'main affected groups'

There are no benefits identified with this option.

Other key non-monetised benefits by 'main affected groups'

There are no non-monetised benefits identified.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

A number of assumptions were made when calculating the costs and benefits. The key assumptions in Option 1 are the estimates of environmental and disamenity costs per tonne of waste and the estimated relevant waste site tonnages. The range in costs for all options is based on a +/-5% margin for uncertainty in the estimates. The method is explained in detail in the evidence base. We will confirm these assumptions with the waste industry during the consultation.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target (qualifying provisions only) £m: 0
Costs: 0	**Benefits:** 0	**Net:** 0	

Summary: Analysis & Evidence

Policy Option 2

Description: Tighten controls for 9 of the 10 identified problem exemptions, restrict quantities and types of waste allowed

FULL ECONOMIC ASSESSMENT

Price Base Year 2018	**PV Base Year** 2018	**Time Period Years** 10	**Net Benefit (Present Value (PV)) (£m)**		
			Low: 1360.3	**High:** 1503.5	**Best Estimate:** 1432.0

COSTS (£m)	**Total Transition** (Constant Price)	Years	**Average Annual** (excl. Transition) (Constant Price)	**Total Cost** (Present Value)
Low	12.5	3	3.9	**44.3**
High	13.8		4.4	**49.0**
Best Estimate	13.1		4.1	**46.7**

Description and scale of key monetised costs by 'main affected groups'

Transition costs to business of compliance, including familiarisation and time spent applying for permits and exemptions, capital, equipment, permit application costs = £4m per transition year.
Transition costs to regulators are £0.3m per transition year, to clean up abandoned sites.
Ongoing direct costs to business average £4m per year.
Ongoing regulator costs of incident clean up at newly permitted sites average £0.06m per year.

Other key non-monetised costs by 'main affected groups'

There is not sufficient evidence for us to estimate the transport and container costs for waste being affected by this policy. These would be transition costs incurred by businesses taking on additional waste, and could also increase the rate of abandonment of waste sites.

BENEFITS (£m)	**Total Transition** (Constant Price)	Years	**Average Annual** (excl. Transition) (Constant Price)	**Total Benefit** (Present Value)
Low	401.8	3	156.9	**1404.7**
High	444.1		173.4	**1552.5**
Best Estimate	422.9		165.1	**1478.6**

Description and scale of key monetised benefits by 'main affected groups'

Transition benefits accrue to society from avoided disamenity costs at £3m annually in years 1-3. Transition benefits to legal waste sites are valued at £137.8m annually in years 1-3. Ongoing benefits to legal waste sites are £103m annually in years 4-10. Ongoing regulator benefits are valued at £1m in year 1, increasing over time. Ongoing environmental benefits are £1m per year. Ongoing benefits to government include recovered landfill tax, corporation tax and VAT, valued at £61m in year 1 and increasing over time.

Other key non-monetised benefits by 'main affected groups'

Certain benefits have not been possible to quantify due to lack of evidence. These include regulator time saved due to fewer sites needing to be investigated and brought into compliance, reduction in negative health outcomes due to fewer incidents, reduced risk of surface and groundwater contamination, and improved reputation of the waste industry and regulators due to fewer incidents.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

A number of assumptions were made when calculating the costs and benefits. The key assumptions in Option 2 are the estimated impacts of the policy on non-compliance, and the costs of coming into compliance due to operational and capital costs. The method is explained in detail in the evidence base. We will confirm these assumptions with the waste industry during the consultation.

BUSINESS ASSESSMENT (Option 2)

Direct impact on business (Equivalent Annual) £m:			**Score for Business Impact Target (qualifying provisions only) £m:** -452.5
Costs: 4.5	**Benefits:** 95.0	**Net:** 90.5	

Summary: Analysis & Evidence

Policy Option 3

Description: Remove 8 of the 10 problem exemptions. These waste activities would now require permits. Tighten controls for the remaining 2 of the 10 problem exemption.

FULL ECONOMIC ASSESSMENT

Price Base Year 2018	**PV Base Year** 2018	**Time Period Years** 10	**Net Benefit (Present Value (PV)) (£m)**		
			Low: 1335.3	**High:** 1475.7	**Best Estimate:** 1405.5

COSTS (£m)	**Total Transition** (Constant Price)	Years	**Average Annual** (excl. Transition) (Constant Price)	**Total Cost** (Present Value)
Low	20.2	3	7.0	**77.0**
High	22.3		7.7	**85.2**
Best Estimate	21.2		7.4	**81.2**

Description and scale of key monetised costs by 'main affected groups'

Transition costs to business of compliance, including administration, familiarisation time, time spent applying for permits and exemptions, capital, equipment, permit application costs = £7m per transition year. Transition costs to regulators are £0.03m per year, to clean up abandoned sites.
Average ongoing direct costs to business are £7m per year.
Ongoing regulator costs of incident clean up at newly permitted sites average £0.24m per year.

Other key non-monetised costs by 'main affected groups'

There is not sufficient evidence for us to estimate the transport and container costs of waste being affected by this policy. These would be transition costs incurred by businesses taking on additional waste, and could also increase the rate of abandonment of waste sites.

BENEFITS (£m)	**Total Transition** (Constant Price)	Years	**Average Annual** (excl. Transition) (Constant Price)	**Total Benefit** (Present Value)
Low	401.8	3	156.2	**1412.3**
High	444.1		172.6	**1560.8**
Best Estimate	423.0		164.4	**1486.6**

Description and scale of key monetised benefits by 'main affected groups'

Transition benefits accrue to society from avoided disamenity costs at £3m annually in years 1-3. Transition benefits to legal waste sites are valued at £137.9m annually in years 1-3. Ongoing benefits to legal waste sites are £98m annually in years 4-10. Ongoing regulator benefits are valued at £2m in year 1, increasing over time. Ongoing environmental benefits are £0.95m per year. Ongoing benefits to government include recovered landfill tax, corporation tax and VAT, valued at £61m in year 1 and increasing over time.

Other key non-monetised benefits by 'main affected groups'

Certain benefits have not been possible to quantify due to lack of evidence. These include regulator time saved due to fewer sites needing to be investigated and brought into compliance, reduction in negative health outcomes due to fewer incidents, reduced risk of surface and groundwater contamination, and improved reputation of the waste industry and regulators due to fewer incidents.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

A number of assumptions were made when calculating the costs and benefits. The key assumptions in Option 3 are the same as in Option 2; the estimated impacts of the policy on non-compliance, and the costs of coming into compliance. The method is explained in detail in the evidence base. We will confirm these assumptions with the waste industry during the consultation.

BUSINESS ASSESSMENT (Option 3)

Direct impact on business (Equivalent Annual) £m:			**Score for Business Impact Target (qualifying provisions only) £m:** -420.5
Costs: 7.8	**Benefits:** 91.9	**Net:** 84.1	

Evidence Base

1. The problem under consideration

The adverse effects arising from waste crime constitute a serious and costly problem throughout Britain. A study released in May 2017 by Eunomia and the Environmental Services Association gave a very broad brush approximate estimate of the cost of waste crime in in England at c. £ 604m. in 2015.[1]

In 2010, under the Waste Framework Directive, 59 types of waste exemption were set out, covering a range of waste use, treatment, storage and disposal activities. Waste exemptions allow low risk waste operations to be carried out according to general rules without the need to apply for an environmental permit, which can be a complex process and requires payment of application fees and annual subsistence fees to the regulator. Exemptions are registered mainly by businesses, including farmers but also by charities, schools, public sector organisations and government bodies. It is free to register one or more exemptions at any given site, and the first exemption registered at a site is valid for three years. This can lead to sites registering for exemptions they do not need or use, and criminals registering exemptions to lend a veil of legitimacy to illegal activity.

An environmental permit gives "permission" to an operator to carry out a set of particular activities, whereas registering an exemption implies that the registering individual is self-certifying that they have read and understood the conditions of the exempt activity and will comply with them at their site. In turn, when an exemption is registered, the regulator does not assess whether the criteria defined in the exemption are met, as they would do with an environmental permit.

Since exempt waste activities are considered to be low risk to both the environment and human health, they are only subjected to limited checks at the point of registration and for ongoing operations. A limitation of this light-touch approach is that it can be prone to abuse. Since 2010 the regulators have collected evidence that suggests many sites with registered exemptions operate responsibly and comply with regulatory requirements. However, certain exemption types have been found to be routinely used to hide illegal waste activities from regulatory oversight. In 2016 13% of illegal waste sites stopped by the EA had one or more exemptions registered. Breaches of exemption conditions could include:

- accepting waste types which are not covered by the registered exemption
- storing waste in quantities far beyond what is allowed under the conditions of the exemption
- processing waste without the environmental protections required by the conditions of the exemption
- disposing of waste illegally so as to avoid landfill tax

Some breaches of exemptions conditions are technical in nature and operators that are committed to remedying them can be brought back into compliance. This impact assessment focuses on the problems caused by deliberate illegal activities at waste sites holding registered exemptions. In these cases the registration of an exemption is effectively being used to enable waste crime. The act of registration provides an easy route into the waste industry with minimum barriers to market entry and low levels of regulatory oversight. It is also used to convey to customers that an operation is legitimate because it is registered with the regulator. This means that illegal waste sites with registered exemptions can 'hide in plain sight', operating alongside and directly competing with compliant waste sites with limited risk of discovery.

The waste industry has identified exemptions related illegal activity as a key problem that undermines legitimate businesses in the sector. The 2017 study by Eunomia and the Environmental Services Association[1] estimated that illegal activity at sites with registered exemptions costs the English economy £87m a year in lost turnover to the legitimate waste management industry and lost tax revenue[2]. These

[1] http://www.ciwm-journal.co.uk/downloads/Rethinking_Waste_Crime.pdf

[2] It is thought that there is a proportionate problematic situation in Wales (email Welsh Government, 22.6.2017).

illegal sites are also anti-competitive; undermining legitimate sites may act as disincentive to investment for compliant waste companies. In addition to costs, these sites have many other negative impacts. They cause serious pollution to the natural environment and disamenity for nearby communities in the form of odour, litter, dust, vermin, fly infestations and fires. Dealing with these incidents may result in costs to the regulator and local authorities.

There are over 500,000 exemptions registered in England alone. These exemptions are registered for businesses, charities, schools, public sector organisations and government bodies. A large proportion of exemptions are registered at agricultural sites by farmers.

- In England there are 528,734 exemptions registered across 94,257 sites.
- In Wales there are 39,912 exemptions registered across 5,535 sites.
- The total number of businesses with exemptions registered is 66,952 in England and 3,703 in Wales.
- 86% (455,000) of all exemptions registered in England are for a mix of agricultural and non-agricultural waste and take place on agricultural premises, with 57% (303,000) for agricultural waste and 14% (74,000) for non-agricultural waste only.
- 30,100 of the exemptions registered are for those exemption types routinely used to mask illegal activity.

As exemptions are designed to cover low risk activities, very little information is collected on them and the scale of illegal activities at exempt waste sites is therefore difficult to establish. In 2015 the EA carried out a campaign of site visits to assess the magnitude of the problem. During the course of the campaign, a total of 609 sites visits were carried out across 5 areas in England, focussed on non-agricultural exemptions. The distinction between agricultural and non-agricultural waste exemptions is made because of the different types of waste being processed at agricultural and non-agricultural sites, the associated difference in environmental or disamenity risks, and the difference in systematic illegality between these site types. Data from the regulators implies that farmers often register multiple exemptions on a "just in case" basis which are then not used. The survey collected evidence which suggests that 10 exemption types are routinely used to hide illegal waste activities from regulatory oversight. The findings show that 22% of sites with registered exemptions were either illegal or potentially illegal[3].

The 10 exemptions in question and some associated issues are summarised in Table 1 below. These 10 exemptions are the focus of this IA, although after the consultation this target population could be expanded to cover all exemption types.

Table 1: Problem exemption overview

Exemption	Issues/Concerns
U1 - Use of waste in construction	• Additional waste types taken in. • Prescribed waste quantities exceeded. • Masking other illegal operations. • Avoid landfill costs, disposal or recovery. • Risk of contamination.
U16 - Use of end-of-life vehicles for vehicle pts	• Excessive numbers of un-depolluted vehicles. • Distort market by minimising costs. • Risk of pollution.
T4 - Preparatory treatments (baling, sorting, shredding etc)	• Prescribed waste quantities exceeded. • Risk of fire. • Additional waste types taken in. • Risk of pollution.
T6 - Treatment of wood wastes by chipping, shredding, cutting etc	• Prescribed waste quantities exceeded. • Risk of fire. • Additional waste types taken in.

[3] Meaning the legality of the operation was difficult to establish on the basis of a single visit because, for example, access to the site was restricted (locked gates).

	• Distort market by minimising costs.
T8 - Mechanical treatment of end-of-life tyres	• Prescribed waste quantities exceeded. • Sites abandoned. • Risk of fire. • Distort market by minimising costs.
T9 - Treatment of scrap metal	• Prescribed waste quantities exceeded. • Additional waste types taken in. • Distort market by minimising costs.
T12 - Manually treating waste	• Prescribed waste quantities exceeded. • Risk of fire. • Additional waste types taken in. • Not genuine recovery.
D7 - Burning waste in the open	• Disposal of imported wastes. • Inappropriately used in combination with other exemptions.
S1 - Storage of waste in secure containers	• Additional waste types taken in. • Prescribed waste quantities exceeded. • Non-compliant storage. • Distort market by minimising costs. • Risk of pollution.
S2 - Storage of waste in a secure place	• Additional waste types taken in. • Prescribed waste quantities exceeded. • Non-compliant storage. • Distort market by minimising costs. • Risk of pollution.

2. The Base Case

The IA conducts an economic assessment of three sets of policy options to determine on a strictly economic basis the costs, benefits and related net valuations relative to a "base case" yardstick. The base case which will act as the counterfactual in this IA is different from the generality of IAs. Unlike many others, this IA is addressing an ongoing issue of widespread incorrigibly illegal activity and criminal behaviour that developed following the introduction of the current regulatory system.

When the current regulatory system was introduced the extent of the ensuing incorrigible illegality was not envisaged. At that initial point it was expected that a light touch approach would be sufficient to ensure general large-scale adherence to socially beneficial behaviour. This presumption supported the introduction of the regulatory framework that is currently in place, and so provides the idealised and conceptual basis for the counterfactual.

However, from an analytical standpoint one must distinguish this idealised expectation of large-scale adherence from the subsequent realisation that there was greater than expected illegal behaviour. The point at which this was initially recognised by Government, some years after the introduction of the regulations, is therefore used as the actual base case yardstick against which the three policy options are compared in the IA.

This initial recognition of illegal behaviour was prompted by industry responses to a call for evidence by Government regarding compliance with waste exemptions together with the collection of some evidence by regulators that showed that actual compliance rates were considerably lower than originally expected. At this point it was partly recognised that actual business behaviour did not conform to original expectations, and that unacceptable levels of incorrigible illegality and criminality are occurring under the current regime[4]. This partial recognition of significant problems with respect to levels of compliance led to the commissioning of a larger scale review of compliance with exemptions regulations.

[4] The conceptual counterfactual for all the options, is the scenario that was planned for and envisaged by Government when they introduced the current regulatory system. They thought that site operators would generally speaking abide by the terms of the exemptions without the need for burdensome and intrusive enforcement. It represented the expectation at the outset and hence may now be considered ex post as being hypothetical. However this ex ante rationale and justification still prevails at

Part of the argument for this larger scale review was recognition by Government and industry that sizeable benefits could be obtained through improvements to compliance. However the full extent of potential benefits was still at this point not fully known.

Taking this approach means that in relation to the baseline, the 'do nothing' option entails the future continuation of illegality, criminality and environmental damage based on the findings of the exemptions review. To have adopted the traditional approach of taking the 'do nothing' option as the base case would have obscured to the point of disguising the ongoing substantial costs of maintaining the existing situation. It would leave matters open to the interpretation that the Government would countenance the option of ignoring the costs of widespread endemic criminality. By not using the typical 'do nothing' baseline, the Government is making clear that it does not endorse the criminality which has come to light in recent years. The outcome from this option is accounted for in the IA by Option 1, which has a negative NPV, reflecting the increasing scale of the problem recognised by the exemptions review.

Option 2 involves implementing more stringent and rigorous exemptions requirements, whilst Option 3 would include more stringent exemptions requirements or curtail exemptions. These will be considered relative to the base case of a non-prescriptive regulatory regime, as set out above.

Compared with the base case, options 2 and 3 do impose a cost on legitimate waste operators due to the more stringent nature of the regulations imposed. If there was no illegal activity (100% compliance), these options would be unlikely to confer a benefit on legitimate business. However the purpose of these regulations is to make it harder for illegal operators and so divert waste them to legitimate waste operators. We calculate that the resulting increase in demand for legitimate waste services increases their revenue and this together with wider benefits far exceeds the costs of more stringent regulations in both Options 2 and 3 . This outturn is accounted for by the options' positive NPVs.

It is important to understand that a direct comparison is not being made between Option 1 and Option 2, or between Option 1 and Option 3. The relative comparator should be the baseline of the counterfactual of a non-prescriptive regulatory regime, as delineated above.

2.1. Establishing levels of Illegality

Due to the strict manner in which waste regulations generally need to be enforced, the regulator makes no distinction in its official designations between sites that wilfully and persistently carry out illegal activity and sites that are non-compliant for other reasons or only on an occasional basis. From localised intelligence in the form of anonymised EA records, it is deduced that approximately 59% of illegal sites are such that they can be described as being occasionally or partially non-compliant/illegal sites. These are typically sites which may be administratively non-compliant but are disposing of waste otherwise broadly correctly, or sites that are in breach of allowable quantities under their exemption by only a small quantity.

For the purpose of conducting the economic analysis, since these sites carry out activities that are deemed valuable to the customers and stakeholders, this activity has to be taken into account in the IA. Correspondingly, any waste that will be transferred from these sites as a result of these proposals would equate to a transfer of value from one site to another, but will not involve an increase in overall value to the national economy. The losses incurred at marginally non-compliant/ illegal sites would result in an equivalent gain of the same value to fully legally operated sites which receive the waste removed.

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the present time and will continue to underpin the present regulatory arrangement up to and until the time that this system is changed. This is the reason that this scenario is being taken as the basis of the counterfactual. This scenario reflects how the situation was understood to exist up to an intermediate time period, but with hindsight it will be seen that in terms of realisation of its aims it was practically unrealistic because without having adequate enforcement provisions it lacked the means for proper implementation. A fairly recent development was that the Environment Agency carried out an investigation 'on the ground' into whether in practice site operators were adhering to the exemptions conditions. The EA survey discovered widespread non-compliance and incorrigible criminal abuse of the scheme.

In contrast, the remaining 41% of illegal sites represent those sites that are designated "incorrigibly illegal" sites for the purpose of the overall economic analysis, including NPV calculations[5]. In the current situation, they generate no beneficial social value and entail losses to compliant sites in the form of diversion of business. Hence, under a proposed new regime if activities currently performed by these sites move from having no associated value to being within the legitimate/official economy, an incremental accretion of social value would result. This incremental value would be treated as a benefit attributable to the new regulations. The benefit to the wider economy of bringing activity from incorrigibly illegal sites into the legitimate economy is estimated conditionally in this IA to be in the order of £200m per year (see pages 19 & 20). This includes benefits to legitimate business, Government, the regulator and society, in accordance with the NPV calculations.

3. The rationale for intervention

The rationale for Government and regulatory intervention is predominantly to rectify the negative impacts generated by sites that deliberately persist in illegal activities and are not compliant with the conditions of their exemptions. These sites generate externalities associated with market failure, which occurs when economic activities give rise to costs that are not reflected in market prices. Externalities in this case consist of the negative environmental impacts and disamenity effects, outlined above in section 1. Government intervention is necessary to address these externalities.

Not only do illegal sites directly generate externalities, they compromise fair competition and impede resource efficiency by undercutting compliant businesses who seek to recycle or recover resources and feed them back into the economy. The concomitant legal rationale for intervention is based on the duty of the Government to maintain the integrity of the law and to ensure that the legal framework for conducting business is not brought into disrepute.

The specific economic reasons include the following effects of illegal waste sites on the waste market:

- Legal operator profits are reduced
- Tax receipts are reduced
- Environmental costs increase

Academic literature suggests[6] that environmental crime is stopped by a combination of tighter environmental regulation, tougher enforcement, and increased provision of legitimate disposal alternatives. Intervention is therefore necessary to ensure that illegal activity at exempt waste sites is prevented as far as possible. Where illegal activities are carried out it is important to make it easier for the regulators to identify and stop such sites.

4. Policy objectives

The overall policy objective is to reduce the quantity of waste managed illegally at sites holding registered waste exemptions, by diverting it to legitimate waste businesses in England and Wales. The intended effect is the reduction in risks to human health and the natural environment. The removal of illegal and unfair practices will also bring benefits to legitimate waste operators and the wider economy.

[5] As the cost-benefit appraisal is conducted strictly on the basis of an economic analysis, the categorisations therein are determined in terms of the appropriate valuations of intermediate to longer run outcomes. Hence they are unlikely to correspond precisely with waste offence judicial sentencing categories (https://www.sentencingcouncil.org.uk/wp-content/uploads/Final_Environmental_Offences_Definitive_Guideline_web1.pdf). Nonetheless although not directly aligned, in some respects they are not wholly dissimilar. The incorrigible illegality addressed in this IA corresponds in part to deliberate and persistent illegal waste activities. Illegal waste activities involving risks of harm arising from recklessness or negligence would be considered within the incorrigibly illegal category if, because of their persistence and scale, they fall into the 41% of EA illegal sites. By definition, sites with low or no culpability would be unlikely to fall into the population of incorrigibly illegal sites.

[6] https://www.ncjrs.gov/App/Publications/abstract.aspx?ID=134961

It will reduce the cost of tax avoidance for the government and remediation costs for local authorities. Our proposals aim to tackle acute issues within the exemption regime in the UK, as identified by the regulators, and not to implement specific requirements of EU directives.

The principles of our approach are therefore that in future exemptions should be provided for:

1. Waste producers managing their own waste, where using an exemption allows them to recover this waste efficiently and with minimum health and environment impacts.
2. Operators wishing to enter the waste collection and recovery market, if they intend to cover waste activities that have been assessed by the regulator as low-risk.

To support this we consider that exemptions should be designed so that:

- They have well-defined limits and conditions that are easily understood and measureable by both the operator and the regulator.
- Lack of compliance is easy to identify, to make enforcement easier.
- They should be of a small enough scale that it is easy to identify when the activity is exempt and clear when waste quantities are stored in excess and a permit is needed.
- The risk arising from the exempt waste operations will be proportionate to the level of scrutiny the exemption scheme is funded for.

5. Description of options

The options to improve the waste exemptions regime are set out below. Each option explains how the measure will be taken forward and the associated costs and benefits. The two main groups that are impacted by the costs are waste site operators and the regulators. The options considered are:

Option 1

"Do nothing" – there would be no changes to the rules that apply to waste exemptions

Option 2

Keep but tighten controls for nine of the ten exemptions of concern identified by the EA and Natural Resources Wales (NRW). Quantities and types of waste allowed under these exemptions are restricted. The existing tenth exemption is removed and ongoing operations would shift to permits where necessary.

Option 3

Remove eight of the ten exemptions of concern identified by the EA and NRW. The activities previously carried out under the removed exemptions subsequently require permits.

Table 2: Proposed changes in options 2 and 3

Exemption	Option 2	Option 3
Use Exemption: U1	Keep but tighten controls	Remove exemption
Use Exemption: U16	Remove exemption	
Treatment exemptions: T4, T6, T8, T9, T12	Keep exemptions but tighten controls	Remove exemptions
Storage exemptions: S1 & S2	Merge and tighten controls	Tighten controls and remove S1
Disposal exemption: D7	Keep exemptions but tighten controls	

The options set out in table 2 take into account evidence of illegal abuse of that exemption (see table 3), together with the case for keeping that exemption to support legitimate waste management activities in line with the principle set out in section 4 above.

Options 2 and 3 both propose tighter regulations, which will remove the loophole provided by exemptions to mask waste crime and illegal activities. Option 2 is the preferred option because it minimises the impacts on legitimate site operators whilst reducing the illegal use of exemptions. These options will be reinforced by other Government measures including dedicated funding for waste crime enforcement for the EA up to 2020, and the potential extension of landfill tax to illegal waste sites by HMRC.

The accompanying consultation document also asks for views on additional discretionary measures that the Government could enable the regulator to introduce, for all or some exemptions at a later point in time. These include requiring additional information to support effective regulation of the regime, prohibiting the use of exemptions at permitted sites, or limiting the number of exemptions registered at a site. Because these measures are discretionary, they are not costed in the pre-consultation IA. They will be taken into account in the prospective final IA if the regulator is given the powers to levy these measures following consultation. Such measures could enable the regulator to:

- ask for additional information at the point at which exemptions are registered
- extend the registration period or simplify the registration system for genuinely low risk activities that raise no concerns over illegality and waste crime

6. Monetised and non-monetised costs and benefits

General Approach

The range of options presented on pages 2-4 are expected to result in a range of costs and benefits to a number of recipients, including legitimate businesses, Government, the regulators, society and the environment. The methodology to estimate these costs and benefits was developed in consultation with the EA and Natural Resources Wales (NRW)[7]. This has resulted in the use of a wide range of data sources as well as expert knowledge to address lack of data in some areas.

The EA and NRW provided the latest data, from 2016 and 2017, on the number of waste exemptions registered in England and Wales at sites processing agricultural or non-agricultural waste, or a combination of both waste types. The data were combined with the results of the EA campaign (see Table 3 below) to provide an updated estimate of the number of exemptions across England and Wales that are expected to be compliant with the regulations; are not in use; or where illegal activity is known to be occurring.

Table 3: EA Inspection Campaign Data

	% of all exemptions that are non-used	% of used exemptions that are non-compliant
U1	20%	15%
U16	22%	100%
T4	20%	10%
T6	65%	28%

[7] The appraisal methodology used to assess the costs and benefits of options to improve the exemptions scheme, adhere to the appraisal instructions set out in the Treasury Green Book and supplementary guidance. Green Book: Appraisal and evaluation in government, HM 8. 8. 8. 8. Treasury 2013 ; https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent; Green Book supplementary guidance: environment, HM Treasury 2013 https://www.gov.uk/government/publications/green-book-supplementary-guidance-environment

T8	42%	5%
T9	15%	86%
T12	24%	11%
D7	36%	26%
S1	18%	26%
S2	18%	60%

EA data from illegal waste sites provided an estimate of the risks associated with illegal activity and the negative impacts on the environment and legitimate businesses. In order to conservatively estimate the benefits of the policy options, out of the total number of illegally used exemptions only those deemed to be incorrigibly illegal were considered to be causing these negative impacts. Past and future costs to incorrigible criminal activity are not considered, in accordance with general IA guidance[8].

Once the population of incorrigibly illegal exemptions had been established, tonnages expected to be processed under the 10 problem exemptions were calculated from EA data on illegal waste sites holding exemptions. This includes a median tonnage for those exemptions which are below the tonnage threshold set out in the current exemption conditions, and a median tonnage for those that are above the threshold, i.e. sites with waste tonnages exceeding allowances in their exemption conditions (see Table 4). The median rather than mean is used, because mean tonnages were found to vastly overestimate the quantity of illegal waste treated at non-compliant exempt sites, as the distribution of tonnages over sites is significantly positively skewed.

In the absence of a detailed data breakdown, in order to determine quantities, all exemptions compliant with the current scheme were attributed a tonnage equal to the median tonnage below the threshold. Based on expert judgement, incorrigibly illegal exemptions processing non-agricultural waste were attributed a tonnage equal to the median tonnage above the threshold, while illegal sites processing both agricultural and non-agricultural waste, or agricultural waste only under an exemption, were attributed the median tonnage below the threshold. This is based on evidence from the EA which indicated that it is only non-agricultural exempt sites which tend to stockpile waste illegally.

Table 4: Exempt site tonnage estimates for annual processed waste tonnages on a site

Exemption	Median for site below threshold	Median for site above threshold
D7	3.2	130
T6	4.3	3840
U1	51	22616
T9	9	9570
S1	13.3	500
S2	N/A	N/A
T4	9.6	4500
T8	7.9	1808
U16	3.8	52.2

T12	3	1427.7

Policy Options

Option 1 is the "do nothing" option, where no changes to the current regulations result in the same level of illegal activity as currently observed. As such, no benefits are identified in this section, and the estimated costs directly arise from illegal activities carried under the totality of exemptions linked to illegal activities, as detailed on page 7.

Option 2 proposes to maintain most of the current problem exemptions, but with limitations on their use, and notably a reduction in the scale of operations (i.e. maximum waste throughput and stock allowances). Implementing more stringent rules or removing exemptions which are used to cover systematic illegal activity is expected to shift waste into the legal industry. This expectation is made in conjunction with the regulators, and is due to a greater level of regulatory oversight reducing the opportunity for illegal activity to hide in plain sight under the guise of a legal exemption. This would make illegal operations more visible both to the regulator and to those supplying waste to illegal sites, causing sites to become compliant, to transfer non-compliant waste, or to close down. Estimated waste tonnages affected would be 1.8 million tonnes of non-compliant waste and 0.05 million tonnes of compliant waste.

The benefits associated with this option directly arise from a reduction in the number of exemptions associated with illegal activity, and an increase in revenue for legitimate businesses and Government, as waste previously processed by illegal operators will be diverted to legitimate sites. Legitimate businesses will incur operational and capital costs to process larger amounts of waste, as well as additional costs to meet new legal requirements, for example when a reduction in allowed waste quantities under a particular exemption results in the need to apply for a permit rather than an exemption.

Option 3 further reduces the scope of the current exemption scheme by proposing to remove activities related to 8 of the 10 problem exemptions and shift this waste into the permitting regime, with a similar effect of shifting waste into the legal waste industry, as in Option 2. As such, the types of costs and benefits considered for this option are the same than for Option 2, but costs to legitimate business are generally greater as these require permits which are costly. Estimated waste tonnages affected would be 1.8 million tonnes of non-compliant waste and 2.9 million tonnes of compliant waste.

It should be noted that rounding of decimal places within the explanation of calculations below may lead to some very minor inconsistencies within the calculations and tables in the sections below, as we have rounded to the nearest integer as appropriate. Thus, the tables and calculations may not sum exactly.

6.1. Cost associated with Option 1

In Option 1, there would be no changes to the rules that currently apply to waste exemptions. However, as mentioned in Section 2, (page 7) this IA is addressing an ongoing issue of widespread incorrigibly illegal and criminal behaviour. This means that the 'do nothing' option entails future acquiescence in illegality, criminality and environmental damage. This outcome is accounted for in the IA by Option 1 having a negative NPV[9].

The key costs of Option 1 include:

- Direct environmental costs
- Disamenity costs
- Costs of incidents and fires
- Cost of compromised competition for sites that operate legally by being undercut by incorrigibly illegal sites, diverting waste to the latter for storage or treatment
- Loss of tax revenues from sites operating totally outside the legitimate economy

[9] It is worth noting that if this option were taken as the base case, as in the traditional approach, some of these costs would in that case have to be represented as corollary benefits in Options 2 and 3.

6.1.1. Direct costs to businesses

Compliant businesses do not incur direct costs from the "do nothing" option, however they lose revenue due to the operation of the incorrigibly illegal sites that are able to undercut them, diverting waste from legal treatment, disposal and storage. This results in lost revenue to compliant businesses, quantified by multiplying the tonnage of waste processed under illegal exemptions by the average value of waste processed under the different exemptions. Waste values were derived from the WRAP gate fees report[10], the WRAP Materials Pricing Report[11] as well as the WRAP reclaimed building products guide.

Material Prices	U1	U16	T4	T6	T8	T9	T12	S1	S2	D7
£/tonne	£0	£78	£132	£15	£93	£607	£945	£0	£0	£30

6.1.2. Regulator costs

Costs to the regulator arise from investigations, pollution incidents, fire incidents and site abandonment at sites holding exemptions. Although the landowner is responsible for the cost of clearing illegal waste at a site if the waste operator is unreachable, regulators do respond when they are aware of a site at high risk of an incident. The cost of investigating and responding to illegal activity at a waste site was an estimated 120 hours of staff time at an average of £84/h (which includes ancillary and overhead costs), according to the EA. An estimated baseline number of 316 investigations per year costs £3m in year 1, increasing at 2% per annum due to sites becoming increasingly obscure and therefore more costly to regulate, according to a report published by Ricardo for the EA, "Waste crime interventions and evaluation project". This report addresses the effectiveness of additional EA funding to tackle waste crime, which forms a key part of the evidence base for this IA, and will be referenced as (Ricardo & EA).

The cost of incidents dealt with by the regulators is based on the EA's average cost of clean up of a Category 1 or 2 incident (based on 30.5 hours), multiplied by the baseline number of incidents adjusted for the proportion of waste sites holding exemptions, excluding fires. The estimate of Category 1 or 2 incident risk is the EA's number of active high risk illegal waste sites (as of March 2016). These are estimated at £2,600 per site incurring incidents on average per year = £87,300 in year 1.

The cost of fire incidents excludes the cost of EA's response and investigation costs (£84/hr) and Local Authority incident response (£100/hr) as this is accounted for above. The cost is estimated for 2 local fire engines at £1000/hr, multiplied by the annual hours of exempt waste related fires according to EA incident data, estimated at 5 fires per year, which last on average 92 hours each. The estimate of the number of fires is 12% of total waste fires, based on regulator data. Thus, the estimated cost of fires is £1,000 * 92 hours of fires * 5 fires = £432,400 in year 1.

6.1.3. Direct Environmental costs

Non-compliant sites may stockpile large quantities of untreated waste, causing contamination of adjacent land, leakage and run-off of effluents into aquifers etc. Impacts on the environment such as water, soil and air pollution resulting from incidents, and pollution arising from inappropriate waste handling, disposal and recovery are summarised as the environmental cost of illegal activity.

This is estimated at £1.87/tonne based on the Ricardo & EA report. The total estimate of environmental cost is £1.87 per tonne * 806,700 relevant tonnes = £1.5m annually. These tonnage estimates are derived from the estimated incorrigibly illegal waste tonnages from non-agricultural sites only. Evidence from the regulator suggests that agricultural and mixed waste are less likely to generate environmental

[10] See here: http://www.wrap.org.uk/content/comparing-cost-alternative-waste-treatment-options-gate-fees-report-2016

[11] See here: http://www.wrap.org.uk/content/materials-pricing-report

or disamenity costs as they are stockpiled less frequently, and it is the stockpiles that generate environmental risks. Therefore only non-agricultural waste tonnages are used in these calculations.

6.1.4. Disamenity Costs

Disamenity refers to localised impacts of waste sites that generate negative consequences for those located in the immediate vicinity of a site. These include dust, smell, noise, vermin, and flies. Avoided disamenity costs are linked to the tonnage of waste diverted back into the legitimate waste management sector, specifically for waste stockpiled at illegal sites which the report from Ricardo & EA deem to generate disamenity. In this IA, the low estimate of disamenity cost is valued at £6 per tonne, based on EA figures. This is multiplied by the relevant waste site tonnages to reach a best estimate, as with environmental costs. The low estimate is £6 per tonne * 806,700 relevant tonnes = £4.9m annually.

6.2. Benefits associated with Option 1

There are no benefits associated with Option 1.

Table 5: Summary table of costs for Option 1, in constant prices

Option 1 Costs in £m	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**
Costs to legitimate Business (indirect)	7.81	7.81	7.81	7.81	7.81	7.81	7.81	7.81	7.81	7.81
Costs to Government	37.34	37.41	37.49	37.57	37.65	37.74	37.83	37.92	38.01	38.08
Costs to Regulator	4.74	4.83	4.93	5.02	5.13	5.23	5.33	5.44	5.55	5.66
Costs to Society	6.36	6.36	6.36	6.36	6.36	6.36	6.36	6.36	6.36	6.36
Total	56.25	56.41	56.59	56.76	56.95	57.14	57.33	57.53	57.73	57.91

7. Cost associated with Option 2

It is proposed under Option 2 to implement more stringent and rigorous requirements for waste sites exemptions. When appraised in comparison with a non-prescriptive regulatory regime there is a much greater likelihood that compliance with and adherence to exemption and permit conditions will increase. The relative comparator is the base case of a non-prescriptive regulatory regime. The new exemption stipulations will lead to a sizeable increase in the probability of consequential beneficial environmental outcomes. This outturn is accounted for in the IA by a positive NPV.

7.1. Direct costs to businesses

Businesses that chose to shift to permitted status will incur the cost of application fees for a permit, and annual subsistence fees to the regulator. Site owners/managers who wish to continue to operate under exemptions will need to reduce the tonnages processed in order to comply with the reduced thresholds in the tightened exemptions regulations. Some sites will no longer qualify to hold exemptions under the tightened regime and finally, some sites may choose to shut down. It may be somewhat unrealistic to anticipate total compliance with the new policy, so this is accounted for by assuming 95% compliance is achieved after the 3 year transition period. This assumption was made in consultation with the regulators. Additionally there is a small margin of these sites that may be abandoned, which is addressed below.

Legitimate businesses that continue to operate may incur additional operational and capital costs to accommodate and manage the additional waste diverted from illegal sites to legitimate businesses. There is a lack of data on the capacity of legitimate businesses to accommodate an increase in waste quantities at their premises, and as such it is not practically feasible to estimate what these costs would be. Having consulted with the regulator, the assumptions laid out below are deemed to be reasonable approximate expectations of the scenarios which are likely to result from the policy changes. These are that, regarding waste diverted from illegal exemptions, legitimate businesses:

- will apply for new permits to accommodate 50% of the waste arising from illegal exemptions;
- in addition, such businesses will apply for new exemptions to accommodate approx. 12% of the waste diverted from illegal exemptions.
- the remainder of the waste arising from illegal exemptions (approx. 38%) will be managed under existing environmental permits and waste exemptions.

For the majority of exemptions, the proposed reduction in the amount of waste stored or processed will mean that some previously compliant exemption holders would no longer be compliant. In this case, corresponding to above, regarding previously compliant exemptions, legitimate businesses:

- will apply for new permits to accommodate 50% of the waste arising from these previously compliant exemptions;
- such businesses will apply for new exemptions to accommodate 12% of the waste arising from such exemptions.
- the remainder of the waste arising from previously compliant exemptions (approx. 38%) will be managed under existing environmental permits and waste exemptions.

Three exemption types fall under the category of those that one would expect to see managed under existing permits and exemptions. These exemptions are:

- S1 & S2 - Storage of waste pending recovery elsewhere
- D7 - Burning waste in the open

For the other exemptions, the number of new permits was estimated using the maximum amount of waste allowed under environmental permits covering similar waste activities (see table below for exemption and permit numbers).

	U1	**U16**	**T4**	**T6**	**T8**	**T9**	**T12**	**S1**	**S2**	**D7**
Permits Generated	1	0	1	1	1	1	1	N.A.	N.A.	N.A.
Exemptions Generated	25	0	4	1	5	1	1	13	4	28

The quantity of additional waste received annually by legitimate businesses was calculated based on the number of illegal exemptions revoked and the median tonnages processed under each exemption (see Table 4). During the transition period, some waste arising from non-agricultural exemptions was added to the annual throughput. This amount, which corresponds to the waste that was stockpiled by illegal operators, was taken as equal to one year of throughput, evenly distributed across the 3 year transition period.

Legitimate businesses receiving waste diverted from illegal sites will incur operational and capital costs to manage and treat the additional waste, in addition to the application and maintenance cost of new waste exemptions and permits. The assumption that the waste industry will be willing and able to accept waste from previously illegal sites is based on the understanding that the waste industry's structure is sufficiently competitive to respond to an increased supply of material of value. This additional waste

supply could generate significant revenues and profits for legitimate sites, despite some sites requiring new capital investment and facing increased operational costs.

Based on the assumption that the waste industry already had some capacity to manage the additional waste, the impact assessment considers that 50% of the waste arising from illegal or previously compliant exemptions would require new capital investment and the consequential additional ongoing capital costs, e.g. repair & maintenance, depreciation, etc.

Ongoing operational variable costs are expected to increase proportionally to the totality of the waste diverted from illegal exemptions to legitimate businesses. Ongoing operational and capital costs (see Table 6) were derived using expert knowledge and available literature[12]. These include administration costs and labour costs as well as overheads.

7.1.1. Transition costs (Years 1-3)

Costs and benefits are indicated for a 10 year period post implementation of the new regulations. Given that waste exemptions are registered for a period of 3 years, a transition period of the same duration is considered. After this transition period, all registered exemptions are assumed to be compliant with the new regulations.

Costs specific to the transition period include permit application and new exemption costs, including fees to the regulator and time needed to process the applications (see Table 7). Permit application costs are between £980 and £1630 per permit, based on average costs for waste activities that are similar to the respective exemptions from the EA. In addition to this we expect that there will be familiarisation cost of approximately 30 minutes per business, carried out by an administrative employee at a cost of £12-15/hr.

Operational costs of permitted sites will increase to meet the new tonnages, represented by the estimates £/per tonne in Table 6. We have no formal data on operational costs of these sites as the regulator does not hold such figures, however based on expert knowledge and updating figures in an EU report from 2002[13] estimates are deduced as listed below in Table 6. These include administrative costs and labour costs as well as overheads. Increased administrative costs to those who will have to undertake the paperwork to deal with the material on permitted sites is accounted for in operational costs. Sites that incur transition capital costs will face proportional transition operational costs. These transition operational costs are estimated at double the ongoing operational costs in non-transition years.

For sites without excess capacity, we make the assumption that these sites will require capital investments such as standard equipment and machinery, these costs are calculated per tonne according to exemption types. The costs associated with the respective exempt waste types are listed in Table 6 below. Exemption types with a £0 value are assumed to not require any additional capital investment due to existing capacity in the waste sector, or because no waste of the relevant type will shift to permitted sites as a result of the policy option. It is postulated that sites requiring capital investment during the transition period will have estimated capital costs of double the non-transition year costs in line with operational transition costs, to account for the necessary new plant, machinery and equipment required upfront to process the additional waste introduced during the transition period.

Table 6: Cost associated with coming into compliance

Capital costs									
£ per tonne	**U1**	**U16**	**T4**	**T6**	**T8**	**T9**	**T12**	**S1 &2**	**D7**
	£0	£2.60	£2.60	£2.60	£2.60	£2.60	£0.70	£0	£0
Operational costs									
£ per tonne	£0	£25.46	£25.46	£25.46	£25.46	£25.46	£25.46	£0	£0

[12] http://ec.europa.eu/environment/waste/studies/pdf/financingmuncipalwaste_management.pdf

[13] http://ec.europba.eu/environment/waste/studies/pdf/financingmuncipalwaste_management.pdf

7.1.2. Clean up costs of abandoned sites & ongoing incidents

At present, less than 1% of sites are abandoned yearly, however there may be a spike in the rate of abandonment due to waste that is no longer compliant being abandoned on site. Waste wood and plastics are expected to be disproportionately affected by the policy changes, leading to an increase in the overall rate of site abandonment. The cost of sanitising an abandoned site falls to the local authorities, the regulator, or to the landlord if the site in question was rented. The EA estimates that the average amount of waste present on abandoned sites is 2,200 tonnes per site. For waste removed from abandoned sites we adopt a range of disposal costs to reflect the waste types, waste management options and treatment technologies. These cost range from £50 for inert waste up to £150 per tonne for hazardous waste, including all costs associated with loading, transport and ultimately disposal at landfill.

The total cost to landowners or the regulator would range between £74,550 and £247,800 depending on whether the waste is classified as non-hazardous or inert, and including £100 per affected site to account for administration or legal consultation costs. This is calculated based on the basis that overall, 1% of sites with the affected exemptions will be abandoned annually during the transition period. This rate of abandonment will be limited by EA preventative work. It has a range of enforcement tools and interventions it can use to identify and mitigate risks pre-abandonment to ensure that the environment and public health is protected.[14]

There is also an ongoing cost to regulators of responding to incidents at permitted sites. This is estimated at £63,000 per annum, and is incurred as permitted sites carry out waste activities which pose higher risks than at exempt sites and so incidents are more likely. The calculation is based on an average cost per incident multiplied by the expected rate of incidents given the number of permits generated, adjusted for different operational risk appraisal (Opra) ratings of permitted sites.

Table 7: Summary of approximate transition costs, per year of transition (constant prices)

Permit application costs	£12,800
Exemption application costs	£1,700
Familiarisation time cost	£12,500
Capital investment	£373,600
Operational costs	£3,661,600
Clean up costs of abandoned sites	£318,800

7.1.3. Non monetised costs

Any excess waste which needs to be moved from one site to another will incur transport costs. Since the regulator does not collect or hold data on the distribution of illegal sites to legally operating ones, it has not been possible to calculate transport costs. The regulator expects to see an increase in site abandonment, particularly sites dealing with end of life tyres, fuelled by the rising cost of shipping containers, since tyres are exported in containers for processing. Although site abandonment has been accounted for during the transition period, the cost of containers for sites becoming compliant in the transition period has to be treated here as a non-monetised cost, due to uncertainty.

7.2. Benefits associated with Option 2

7.2.1. Direct benefits to legitimate businesses

[14] The projected rate of abandonment and the rationale for this level has been provided by the EA as their best estimate.

The key benefits to legitimate businesses arise in the form of revenue earned from processing the excess waste shifted from incorrigibly illegal sites, previously operating ostensibly under exemptions, to legal sites. It is important to understand that this waste processing is a socially beneficent and an economically value-adding service in itself when and to the extent that it is conducted in conformity with legal requirements. These latter are designed to ensure that this activity does not endanger human and animal health, nor damage the environment nor constitute an unacceptable risk of fire or other hazard. Thus this activity is per se an economically valuable service and the benefits arising from it are not derived from nor represent simply 'resources used to comply with regulation'.[15] As explained above, this is estimated by multiplying the amount of waste diverted to legal businesses by the value of the waste, in £/tonne (see page 12). The value of this revenue after tax is estimated at £137m per transition year and £103m per year thereafter. For an explanation of why revenue is considered net of tax, see section 7.2.2.

7.2.2. Direct benefits to Government

The new regulatory measures will bring in value to the national economy that was formerly not accounted for, as this value would previously have been associated with incorrigibly illegal sites. As a consequence the value of their activities is unavoidably disregarded and is not incorporated into the gross product of the national economy. Under the proposed new regime it is postulated that most, if not all, of the value of the equivalent activities and services will in future be brought into the official economy. Hence this represents an accretion to gross product.

Regarding the ensuing distributional apportionment between relevant parties or stakeholders, it is assumed that no taxes would have been paid on the unaccounted value. Correspondingly, taxes accruing from value being brought into the economy for the first time will also be brought into the tax system. These taxes have been included in the IA as they are a new source of revenue to Government under Options 2 & 3, and a loss under Option 1. It is recognised that this aspect is essentially a distributional question and counterbalancing this benefit to Government is a corresponding cost to site operators as taxpayers. Thus businesses, which as legal operations will have to pay the additional taxes, incur this expense as a cost to them. Therefore in this analysis the revenues accruing to legal businesses due to diverted illegal waste under Options 2 & 3 are incorporated net of taxes.

The relevant taxes that were previously outside the official economy and totally unaccounted for but henceforth will be encapsulated within the system comprise of:

(i) Avoided landfill tax revenue,

(ii) VAT on new revenue accruing to legal businesses,

(iii) VAT on new landfill tax,

(iv) Corporate tax on new post VAT profit.

The proportion of illegal waste that would have been sent to landfill if correctly treated was estimated using 2016 UK Statistics on Waste[16]. U16, T8, T9, T12, S1 and S2 were deemed not liable for landfill tax, as these types of wastes would not be sent to landfill. The proportion of waste at illegal exempt sites that is eligible for landfill tax is estimated as follows:

	U1	T4	T6	D7
Standard rate	4.3%	1.43%	1%	2%
Lower rate	4.3%	0%	0%	0%

[15] As defined by the RPC in http://regulatorypolicycommittee.weebly.com/case-histories.html Section 4.3.4 - see Annex 1 for further explanation

[16] See here: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/593040/UK_statsonwaste_statsnotice_Dec2016_FINALv2_2.pdf

The proportion of waste eligible for the standard and lower landfill rates (£86/tonne and £2.70/tonne as per 1 April 2017, respectively) were used to quantify the total landfill tax. The landfill tax rate is updated over time in the IA as it is expected to rise in line with inflation. The best estimate for landfill tax is approximately £2m in year 1. These costs may be reduced if waste is inert by incurring the lower landfill tax rate, however we do not have evidence to support that this is the case.

Lost VAT was calculated at 20% of the sum of the lost landfill tax estimate, and 20% of the lost revenue estimate. An estimate of annual operational and capital costs for each exemption type was used to ascertain annual business profit losses from revenue losses. Corporation tax was calculated at 19% of lost post-VAT profits to businesses.

This accretion of added value to the economy will lead to tax revenue benefits to Government, and corresponding costs to businesses, amounting to £62m in year 1 of transition and then reduce after the transition period to £58m in year 4, increasing over time for assumed landfill tax increases. For simplicity new tax liabilities for businesses are accounted for in the IA as new revenue net of taxes, rather than a direct cost.

7.2.3. Direct benefits to the Regulator

The benefits to the regulator are based on the expected reduction in non-compliance and consequent reduction in the number of investigations, incidents, including fire incidents, and site abandonment. It is expected that implementation of the new rules will not only cause a decrease in exemptions being registered to hide illegal activity, but also in the overall level of new exemptions being registered (see above).

Cost savings to the regulator were calculated based on the average cost of an “instance” (e.g. an investigation). In order to deduce the expected number of “instances” we applied the same ratio that is used to project the number of registered exemptions that are expected after implementation of the new regulations. The benefits are estimated at £1m in year 1, increasing over time to reach £1.5m by year 10.
The reduction in non-compliant tonnages relating to this option may reduce the regulator’s costs in bringing non-compliant sites into compliance, due to a reduction in resources used to close non-compliant sites. This is a tentative outcome, as the measures may not be 100% effective in removing non-compliance in exemptions, as implied by assuming only 95% effectiveness and in this IA only the 10 problem exemptions are being considered.

7.2.4. Direct benefits to society and the environment

The amount of waste previously stockpiled under non-agricultural exemptions was used to calculate the environmental and disamenity benefits (see above). The reduction in non-compliant tonnages will reduce disamenity costs and environmental damage relative to Option 1. This will lead to a disamenity benefit of £3m per year of transition, and an ongoing environmental benefit equal to £1m per year.

Disamenity benefits are only considered to be transition benefits rather than ongoing because whilst these costs are ongoing in Option 1 when illegal activity is left unchecked, under Option 2 illegal activity boccurring should be reduced to a minimum baseline level by the end of the transition period. Thus, these disamenity benefits would accrue during the transition period and would end once the cause of disamenity is removed. However environmental benefits are calculated as ongoing over the 10 year period, as these avoided negative impacts from illegal waste would result in ongoing benefits, such as avoided GHG emissions of incorrectly treated waste or avoided leaching of pollutants over time.

7.3. Summary

Overall, the benefits cost ratio of this option is: 1469.8 / 46.7 = 31.5

Table 8: Summary of Option 2, £m in constant prices

Option 2 Costs in £m	**Year 1**			**Y2**			**Y3**			**Y4 to Y10 (annual)**
Costs to legitimate business	*Transition*	*Regular*	*Total*	*Tr*	*R*	*Tot*	*Tr*	*R*	*Tot*	4.07
	4.06	4.07	8.14	4.06	4.07	8.14	4.06	4.07	8.14	
Costs to Regulator	0.32	0.06	0.38	0.32	0.06	0.38	0.32	0.06	0.38	0.06
Total	4.38	4.13	8.52	4.38	4.13	8.52	4.38	4.13	8.52	4.13

Option 2 Benefits in £m	**Y1**			**Y2**			**Y3**		
Benefit to legitimate business	*Transition*	*Regular*	*Total*	*Tr*	*R*	*Tot*	*Tr*	*R*	*Tot*
	137.81	0	137.81	137.81	0	137.81	137.81	0	137.81
Benefit to Government	0	61.57	61.57	0	61.66	61.66	0	61.75	61.75
Benefits to Regulator	0	1.3	1.3	0	1.3	1.3	0	1.3	1.3
Benefits to Society	3.16	0.96	4.12	3.16	0.96	4.12	3.16	0.96	4.12
Total	140.97	63.83	204.80	140.97	63.92	204.89	140.97	64.01	204.98

Option 2 Benefits in £m	**Y4**	**Y5**	**Y6**	**Y7**	**Y8**	**Y9**	**Y10**
Benefit to legitimate Business	103.79	103.79	103.79	103.79	103.79	103.79	103.79
Benefit to Government	57.61	57.69	57.77	57.85	57.93	58.02	58.08
Benefits to Regulator	1.4	1.4	1.4	1.4	1.5	1.5	1.5
Benefits to Society	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Total	163.76	163.84	163.92	164.00	164.18	164.27	164.33

8. Cost associated with Option 3

In addition to the key costs identified in option 2, we can expect that this option will generate additional costs based on the expected scenarios laid out on page 15. All sites handling wastes under the 10 withdrawn exemptions will need to either become permitted sites or to transfer all waste previously held under these exemptions to sites with the relevant permits. This would have an annual transition cost of £87,300 for permit applications and £12,500 in familiarisation costs.

Capital and operational costs generally tend to be higher overall relative to those in Option 2, based on the requirements for additional permits. Due to the expected transfer of waste from illegal to legal sites, one would anticipate higher levels of clean up, capital and operational costs during the transition period in the same manner as Option 2. These are estimated at £28,400 for clean up of abandoned sites per year of transition, £642,300 capital costs per year of transition and £6m for operational costs per year of transition. The cost of cleaning an abandoned site falls to the local authorities, the regulator, or to the landlord if the site in question was rented. It is estimated that up to 90% of farmers holding any of the

affected exemptions will face costs of transporting their agricultural waste to sites holding the required permits, however this is non-monetised due to lack of evidence, as in Option 2.

The ongoing cost to the regulator of responding to incidents at permitted sites is higher in Option 3 than in Option 2 due to the greater number of permits generated, estimated at £0.24m per annum. As in Option 2, the calculation is based on an average cost per incident multiplied by the expected rate of incidents given the number of permits generated.

Non monetised costs

As in Option 2, any excess waste which needs to be moved from one site to another will incur transport costs. Since the regulator does not collect or hold data on the distribution of illegal sites to legally operating ones, it has not been possible to calculate transport costs. The regulator expects to see an increase in site abandonment, particularly sites dealing with end of life tyres, fuelled by the rising cost of shipping containers, since tyres are exported in containers for processing. Although site abandonment has been accounted for during the transition period, the cost of containers for sites becoming compliant in the transition period has to be treated here as a non-monetised cost, due to uncertainty.

8.1.1. Benefits associated with Option 3

The reduction in illegal tonnages resulting from this option leads to a value of legally generated revenue after tax estimated at £138m per transition year, and £98m per year thereafter. The same methodology is used to calculate disamenity and environmental benefits as in Option 2, but multiplied by the appropriate tonnage resulting from this option. The disamenity benefit is expected to be £3m per transition year and the ongoing environmental benefit to be £1m per year.

The reduction in non-compliant tonnages is expected to lead to a reduction in Category 1 & 2 incidents, fire incidents, investigations and the associated response costs. This benefit is estimated according to the same method as Option 2 at £2m in year 1; increasing by 2% annually for increasingly obscure waste sites (Ricardo & EA).

Reduction in non-compliant tonnages will also lead to an increase in tax revenue, including landfill tax, VAT and corporation tax. This is estimated at £61m in year 1 of transition, increasing with landfill tax increases over time. Government benefits are estimated at £63m per year after the transition, increasing with landfill tax increases over time. The reduction in non-compliant tonnages relating to this option may also reduce the total resources required by the regulator to bring non-compliant sites into compliance, as above. Under this option we expect a significant reduction in illegal activity, but given the complex nature of this issue, a residual element of illegal activity might remain and may not be totally eradicated.

Benefits to legitimate business are slightly smaller under Option 3, although the transition benefits between Options 2 and 3 are both around £138m. In terms of distributional allocations, direct benefits to business are adjusted for tax liabilities. Under Option 3 one would expect lower profit margins due to the cost of permits being greater than the cost of an exemption.

8.1.2. Non-monetised Benefits, Options 2 & 3

bBenefits from a reduction in non-use of permits have not been possible to monetise as the impacts of this are likely to be negligible. Health benefits of reduced non-compliance with exemptions have not been possible to monetise due to lack of evidence relating to exempt waste sites.

Reductions in GHG emissions due to reduced non-compliance with exemptions which results on correct treatment of waste have not proved possible to monetise due to lack of data on length of time waste is stored on sites, and uncertainty about reasons for non-compliance.

Benefits associated with reductions in risk and associated cost of Category 3 & 4 incidents were not possible to monetise as data was not available for these, only for more severe Category 1 & 2 incidents.

8.2. Summary

Overall, the benefits cost ratio of this option is 1486.6/81.1 = 18.3

Tabble 9: Summary of Option 3 (constant prices)

Option 3 Costs in £m	**Y1**			**Y2**			**Y3**			**Y4 to Y10 (annual)**
Costs to legitmate business	*Transition*	*Regular*	*Total*	*Tr*	*R*	*Tot*	*Tr*	*R*	*Tot*	7.13
	7.04	7.13	14.18	7.04	7.13	14.18	7.04	7.13	14.18	
Costs to Regulator	0.03	0.24	0.27	0.03	0.24	0.27	0.03	0.24	0.27	0.24
Total	7.07	7.37	14.45	7.07	7.37	14.45	7.07	7.37	14.45	7.37

Option 3 Benefits in £m	**Y1**			**Y2**			**Y3**		
Benefit to legitimate business	*Transition*	*Regular*	*Total*	*Tr*	*R*	*Tot*	*Tr*	*R*	*Tot*
	137.91	0	137.91	137.91	0	137.91	137.91	0	137.91
Benefit to Government	0	61.48	61.48	0	61.57	61.57	0	61.67	61.67
Benefits to Regulator	0	2.14	2.14	0	2.18	2.18	0	2.23	2.23
Benefits to Society	3.08	0.96	4.03	3.08	0.96	4.03	3.08	0.96	4.03
Total	140.99	64.57	205.56	140.99	64.7	205.69	140.99	64.85	205.84

Option 3 Benefits in £m	**Y4**	**Y5**	**Y6**	**Y7**	**Y8**	**Y9**	**Y10**
Benefit to legitimate Business	98.18	98.18	98.18	98.18	98.18	98.18	98.18
Benefit to Government	63.30	63.38	63.46	63.55	63.63	63.72	63.79
Benefits to Regulator	2.27	2.32	2.36	2.41	2.46	2.51	2.56
Benefits to Society	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Total	164.7	164.83	164.95	165.09	165.22	165.36	165.48

9. Risks and assumptions

Assumptions have been included in the explanation of costs and benefits, in the sections above, with further assumptions outlined below. Regarding Welsh data, as NRW have not carried out a similar campaign to the EA in England; there is comparatively limited availability of estimates for Wales. To enable an estimation of costs and benefits to be made for Wales, the number of problem exemptions for England and Wales is used (see Table 10 below). Thus, English and Welsh exempt sites are treated according to the same assumptions and calculations. As some assumptions are made on limited evidence, they may be refined after the consultation, when more evidence is available from the waste industry. Respondents to the public consultation are asked to provide for any evidence that would improve our appraisal of the costs and impacts linked with misuse of exemptions.

Table 10: Problem Exemptions split by England and Wales

England	**Total**
Agricultural	115,959
Mixed agricultural and non-agricultural	15,346

Non-agricultural	31,259
Totals	162,564

Wales	
Agricultural & mixed	12,758
Non-agricultural	3,752
Wales Totals	16,510

England & Wales Totals	179,074

It is assumed that the probability of an illegal site halting activity before the average end of year lifespan without any intervention from a regulator is equal to zero (i.e. an illegal site will not shut down early without intervention). Evidence suggests that by using an average lifespan, this is a reasonable assumption. Most of the calculations regarding affected populations are on an average basis; in reality the profit losses, disamenity costs and environmental damage may be localised to regions surrounding non-compliant sites.

Also of consideration is the distribution of the non-compliant sites themselves; whether they occur more in the north or south of England, for example. This level of detailed analysis was deemed beyond the scope of the IA.

The best estimates, derived in the NPV and EANCB, use a ± 5% margin for error to account for reasonable variability and uncertainty. This reflects the situation that the estimates are based on empirical evidence and where data were limited, gaps have been addressed in close consultation with policy colleagues and the regulators. However it must be emphasised that the IA is not attempting to determine the whole range of uncertainties around the overall unquantifiable unofficial criminal waste economy, as this would be inherently extremely difficult to ascertain and would be beyond the scope of the IA's analysis. Instead our margins for error reflect levels of variations and uncertainties that might be reasonably anticipated, based on analysis of recent empirical circumstances and knowledgeable judgement on the part of the regulators.

Table 11: BIT Score[17] & Business NPV for ten years,

2018 NPV base year

	Business (legitimate) NPV	**BIT Score**
Option 2	913.26	-452.5
Option 3	848.75	-420.5

10. Small and Microbusiness Assessment (SaMBA)

An overriding Government priority is to avoid imposing additional regulatory requirements on small businesses. Small and large businesses alike are affected by illegal activity at exempt waste sites. Small businesses make wide use of exemptions and should be able to continue to benefit from them where possible. Option 2 sets the exemption thresholds at a level that would enable SMEs to operate without

[17] Business Impact Target. NPVs are calculated to base year 2018 for this BIT Score.

changes. Due to the high proportion of exemption holders that are farmers and farms are predominantly small or micro businesses, they would make up around 75% of the businesses affected under Option 3.

11. Competition

It is to be expected that the measures will have some effect on competition within the waste subsector since mostly only operators who can afford to invest can stay in the market. As such the increased investment and running costs will probably be an economic barrier to entry to some. Micro-businesses are likely to be affected as some of them may lack the requisite resources, but these changes cannot be estimated due to lack of evidence.

Based on observations made by the regulator on the workings of the subsector, many large waste operators tend to move quickly to close any gaps in the markets, so it can be assumed that a proportion of existing large site operators will move in to fill waste treatment gaps left by closed illegal sites. Although these measures will tend to raise the prerequisite level of economic capability necessary to entry for waste operators, this intervention has been carefully designed to prevent non-compliant waste operators from entering the waste sector, whilst still enabling compliant businesses to operate.

The intervention will help towards establishing a level playing field in this waste subsector by increasing the likelihood that all waste operators will be effectively required to adhere to the same levels of compliance. Therefore, intervention should increase legitimate competition in this waste subsector as non-compliant waste operators will be less able to undercut legitimate and compliant operators.

12. Concluding Summary

Option 2 is the preferred approach as it incurs much lower costs but only slightly lower benefits, while still achieving the policy objectives and intended effects. An additional reason for selecting Option 2 rather than 3 is that there will be much less negative effects on SMEs, as they will be able to continue operating under exemptions, whereas Option 3 will lead to SMEs bearing relatively high costs of permit applications and subsistence fees which could force them out of the market.