

LANDFILL SPECIFIC ASPECTS OF ON-SITE TRAFFIC SAFETY

This WISH information document is aimed at health and safety improvements in the waste management industry. The Health and Safety Executive provided support to WISH in producing this guidance. This guidance may go further than the minimum you need to do to comply with the law with regard to health and safety

Contents

Introduction and scope

General and organisation

Mobile plant and vehicles

Ground conditions

Specific issues for landfill site roads

Towing and recovery of vehicles

Suggested signs and signals

Introduction and scope

This information sheet is a support document to WISH's formal guidance document WISH WASTE 09 'Safe transport at waste and recycling sites', available at: [WISH WASTE 09](#). You should read this sheet in conjunction with WASTE 09.

When WASTE 09 was first written in the 2000s landfill was the most common form of waste management in GB. As a result, it was appropriate for significant portions of WASTE 09 to cover landfill specific traffic safety issues. Over time the role of landfill has declined and the concentration in WASTE 09 on landfill became inappropriate. Accordingly, for its latest version the landfill specific portions of WASTE 09 have been removed. However, landfill still exists in GB and is likely to do so for the foreseeable future. This document captures the landfill specific portions included in previous versions of WASTE 09 and presents them as an information sheet. If you operate a landfill/s you should read both this information sheet for landfill specific issues and WASTE 09 for general waste and recycling site traffic issues.

General and organisation

Some areas of landfill sites are common with other types of waste and recycling site. For example, both landfills and recycling plants will have an access from the highway, parking areas for employee and visitor cars and vans, weighbridge areas etc. This information sheet does not cover these general areas – you should read WASTE 09 ‘Safe transport at waste and recycling sites’ for guidance. In addition, the sections of WASTE 09 covering issues such as contractors on site, monitoring and review, risk assessment, traffic management plans etc apply as much to landfills as other types of waste and recycling site.

In common with other types of waste and recycling sites, landfills have a history of serious and fatal accidents involving vehicle/plant collisions with pedestrians and/or between heavy and light vehicles. The common denominator in these accidents being inadequate separation and segregation between vehicles/plant and pedestrians and/or between heavy and light vehicles (such as site 4x4 pick-ups etc). Unlike many other types of waste and recycling site, traffic accidents on landfills often also involve other contributory factors such as:

- Inappropriate plant and vehicles
- Ground and road conditions
- Inappropriate towing and recovery operations for ‘bogged-down’ vehicles

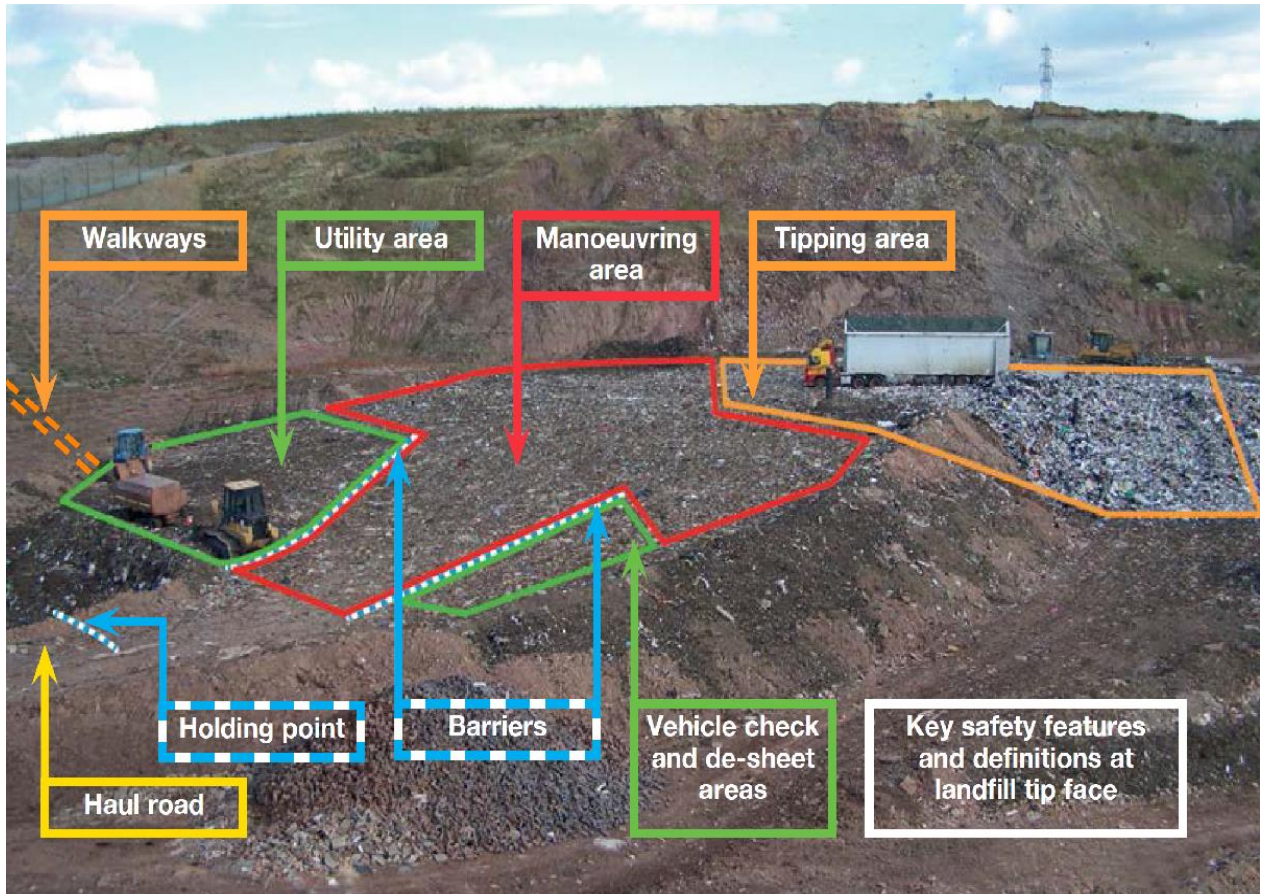
These specific aspects are covered in the sections below.

Outside of common areas as noted above, the operational areas of landfill sites are more similar to construction sites and quarries than other types of waste site. For example, on a recycling plant, roads, manoeuvring areas etc are usually concrete, tarmac or similar ‘hard-standing’ – this is generally not the case for landfills. And, as tipping operations progress across a landfill site, haul roads, manoeuvring areas, tipping areas etc are made and unmade and their locations, routes etc are changed.

Your traffic management risk assessment/s and traffic management plan/s need to take the above types of landfill specific factor above into account. You should also review and revise your traffic risk assessment/s and traffic plans every time you move or change tipping area, manoeuvring area/s, roads etc or they may rapidly become out of date. You should perform such reviews and revisions before you make any changes rather than afterwards. Changes to your traffic risk assessment/plan should also be communicated to your employees, visiting drivers, and any other relevant persons.

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That many operational areas of landfill sites are in a state of impermanence is not a reason for a lack of organisation and control. The graphic below shows an example organisation of a tipping and associated areas of a landfill site.



Tipping area/face – active area of landfill where waste is discharged from vehicles

Check and de-sheeting area – defined safe area for vehicle checks, preparation before leaving site, and for un-sheeting of vehicles/containers

Manoeuvring area – area adjacent to tipping area where vehicles manoeuvre before tipping

Utility area – for example, for refuelling, 4x4 site vehicle/plant parking, maintenance etc

Haul road – main site access road to tipping etc areas

Walkways – defined pedestrian routes such as for employees to access parked mobile plant

Holding point – vehicles held ready for access to manoeuvring area

Barriers – used to mark boundaries (can be bunds or other obvious barrier)

The above is only an example – your site may be different.

Manoeuvring areas

Manoeuvring areas should be pedestrian-free zones – pedestrians should be banned from the area when it is active, including drivers who should remain in their cabs in a manoeuvring area. If pedestrians are required to be in a manoeuvring area, such as for litter picking, attaching towing equipment to recover a bogged-down vehicle etc, then all vehicle and mobile plant movements in the area should cease until pedestrians are clear and at a safe distance.

Entry to manoeuvring/tipping areas

Entry into manoeuvring/tipping areas should be controlled. Where you place your control point will depend on your site and risk assessment. You should determine the safe number of vehicles allowed into manoeuvring/tipping areas at any one time and ensure this is not exceeded. For small sites this may be on a 'one-in-one-out' basis. For larger sites it may be safe to tip multiple vehicles at the same time, provided safe tipping distances are maintained (see below) and if your manoeuvring area is large enough.

The decision to allow entry should lie with a single individual (often called a 'traffic controller'). This may be a mobile plant operator at a small site, or a separate dedicated individual at larger sites. If a dedicated traffic controller is used then they should be protected from traffic, such as in an impact protected 'sentry box'. Traffic controllers should have sole control over entry. Visiting drivers should be made aware of the role of the traffic controller, what hand or other signals will be used (see section below), that they must obey the controller, and that failure to obey the controller will result in action, if required to the extent of banning from site.

Tipping operations

If more than one vehicle is to be allowed to tip at any one time a safe distance should be maintained between tipping vehicle, at least:

- 5 metres between push-out vehicles such as RCVs (refuse collection vehicles)
- 7 metres between other ejection non-articulated vehicles
- For tipping vehicles at least twice the maximum raised height of the vehicles

The use of articulated tippers on landfill sites is not recommended because of the increased risk of overturning presented by soft ground conditions, stuck loads, and high winds. On sites where they are allowed, their use should be subject to a specific risk assessment and the adoption of an appropriate safe system of work.

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Overloaded or badly loaded vehicles may need special handling or have to be 'dug out' by plant, such as an excavator, rather than being allowed to tip. Site operators need to have appropriate procedures and instruction and training to take account of this type of activity.

To prevent vehicles falling rearwards, tipping should not be carried out at sharply graded tipping faces. Where there are exposed edges, edge appropriate protection/bunds or barriers should be in place.

Mobile plant and vehicles

Heavy mobile plant used on landfills should be appropriate to their use, ground conditions, terrain etc. For example, it would not be appropriate to use a 'standard' forklift truck on a landfill tipping face area. Tracked mobile plant is typically preferred over wheeled plant, and specialised mobile plant such as compactors are usually designed with landfill in mind.

Waste companies who operate landfill sites should be aware of lorry/vehicle specifications best suited to landfill sites and should procure their own vehicle fleet accordingly. Dedicated vehicles are able to tolerate poor surface conditions that less suitable vehicles cannot. These lorries/vehicles often also include design elements to minimise damage from materials that become tangled in the vehicle's components.

Where third-party customer vehicles use a landfill site the same would be the case, although the responsibility for specification will lie with the customer/third party. However, if an unsuitable third-party lorry/vehicle arrives at your landfill you should contact the third-party before allowing it onto site – in some cases you should consider not allowing any such lorry onto your site as the risk of it becoming bogged-down and requiring recovery may be significant. Close cooperation and communication between site operators and customers on vehicle specification can reduce the risks associated with operating on a landfill site.

Much waste is delivered to landfill sites in 'bulkiers' (bulk haulage vehicles) from transfer stations, recycling plants etc. These can be ejection trailers or walking-floor vehicles etc. The industry recommended configuration for bulk haulage vehicles discharging on landfill sites is:

- Twin-drive axle
- Hydraulic ejector blade preferred over walking floor (see below)
- Construction to an 'off-road' specification that provides additional protection for vulnerable features under the vehicle, such as fuel tanks, air lines and brake pipes

Walking floor vehicles tend to be more prone to bogging-down because of the action of the walking floor. Ultimately, landfill site operators should exercise their discretion and refuse access to vehicle types not suitable for the prevailing site conditions.

Skip, REL (rear end loader), FEL (front end loader), hook-lift etc lorries used on landfills should be specified appropriately. As with other vehicles, you should exercise discretion and refuse access to vehicle types not suitable for the prevailing site conditions.

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It is less common today than in the past that RCVs (refuse collection vehicles – bin-lorries), TRVs (trade refuse vehicles) and similar use landfills. The vast majority tip/discharge their wastes at recycling plants etc. As a result, their specification may not account for the ground conditions, terrain etc found on landfills.

Some makes of RCVs, TRVs etc may not be suitable for operating on landfill sites. RCVs/TRVs with twin-drive axles tend to have adequate traction, single axle drive vehicles may be more prone to bogging-down. Likewise, low-riding RCV, TRV etc vehicles (unless they are fitted with height adjustable running gear), can be prone to becoming stuck as traction is lost as the vehicle chassis/body is grounded. Those responsible for procurement of vehicles for use on landfill sites should consider this issue.

Landfill site operatives, weighbridge staff etc should be empowered to stop unsuitable vehicles proceeding to the tipping face, at least until site management can be contacted to consider the issue. For example, if a low-cab-entry, low rear, single-axle-drive RCV arrives unexpectedly at a landfill site during torrential rainfall the likelihood of it bogging-down on the tipping face may be high, resulting in risks occurring during recovery/towing – operatives, weighbridge staff etc should be able to say ‘no’ in such situations. Some landfill operators use a basic checklist to assess vehicle suitability.

Landfill operators should be wary of ‘one-off’ situations which may result in unsuitable vehicles arriving at their site. For example, a recycling plant may suffer a fire and be out-of-action for a period of time. As a result diverted wastes from the temporarily closed recycling plant may arrive at a landfill as a contingency measure in unsuitable vehicles.

Any serious vehicle defects observed by landfill site staff that could potentially affect operation, and use should be brought to the attention of the driver and their employer.

The use of flashing beacons and/or headlights should be considered as means of highlighting the presence of vehicles and plant. The use of flashing indicators in hazard mode is not generally recommended as these should be used only as part of the signal for towing or emergencies (see section below) and may cause confusion.

While not a traffic issue, many lorries now have regenerative diesel particulate filters (DPF). When these filters regenerate significant heat is produced – as a result there have been several cases of fires being caused on tipping faces. Drivers should be instructed to manually abort regeneration if it starts on a tipping face or leave the area immediately.

Ground conditions

Where reasonably practicable, the use of hard-standings should be considered. On some sites, hard-standings are used and the cost of this provision factored into contract negotiations. It is possible that the cost of installing hardstanding areas could be offset against quicker turn-around times and reduced damage to lorries/vehicles. However, on some landfill sites environmental regulator requirements may be a limiting factor in their use.

Poor ground conditions and high winds can make tipping lorries unstable. If this type of vehicle is permitted on site, the site operator must assess the risks and implement control measures as appropriate.

Roads should be constructed to an appropriate standard and maintained to a good standard. Temporary haul roads and the landfill tipping areas, in particular, can be problematic and can result in lorries being towed on and off the tipping area and/or the immediate access road, with the higher risks this entails.

There are different types of ground cover material that can reduce the incidence of vehicles slipping and becoming bogged down. Selected waste material, typically waste hardcore or similar materials that cannot be easily recycled can sometimes be used.

The 'manoeuvring area' and 'tipping area' (see graphic above) are where most vehicles are likely to become bogged-down. These are the areas where most benefit can be obtained by using materials that provide the greatest traction and surface stability. An adequate stock of suitable materials should be available on site to enable a quick response to maintenance needs, poor weather, and/or unforeseen problems.

Contingency measures, to include the use of alternative areas to tip, should be available in difficult circumstances, such as very poor weather, arise.

Specific issues for landfill site roads

In addition to the general requirements for roads in WISH WASTE 09 and the above relating to ground conditions, there are other road considerations specific to landfill sites:

- Road edge limits may need to be defined clearly, such as in open areas, by use of clearly visible markers, cones, bunting, bunds etc
- Sites should use edge protection bunds or barriers, where appropriate, such as on the edge of steep inclines, drops and bends on downhill sections. For design requirements and specifications refer to Health and Safety at Quarries. Quarries Regulations 1999. Approved Code of Practice⁷ which states that they should be 1.5 m high or the radius (half the height) of the largest vehicle wheel/tyre on site, whichever is the greater
- Avoid excessive inclines. These can affect vehicle braking performance, particularly in poor weather conditions. You should aim for haul road gradients of no more than 1:10
- Only use construction materials appropriate for roads
- Ensure adequate compaction and drainage
- For exceptional circumstances, safe systems of work should be devised in advance (with appropriate advice and guidance from others if necessary) to ensure safe towing of vehicles requiring assistance (see section below)
- Separate procedures should be developed for the retrieval of vehicles where the routine towing procedure cannot be followed (see section below)
- Regular maintenance is required to ensure that the surface used for vehicular access to the tipping face is level and adequately compacted. Tipping faces at landfill sites need to be well maintained as excessive gradients, potholes and other defects can affect vehicle stability

Towing and recovery of vehicles

When mobile plant and lorries/vehicles become bogged down, the most serious hazards arise when people leave the safety of their cab and enter an area where pedestrians are not usually allowed or at least controlled and where there are mobile plant and/or vehicle movements. Small vehicles or pedestrians in the vicinity of large plant may not be seen and collisions are foreseeable.

This section deals with specific towing or recovery procedures required for vehicles that have lost traction or get bogged down on landfill sites. However, prevention or at least reduction of risk, is the best approach and the information above on vehicle specification, ground conditions, roads etc should be your first consideration. Appropriately specified vehicles, on good ground conditions and well-maintained haul roads etc, are less likely to bog-down.

Bad weather (heavy rain or melting snow etc) is often the most significant factor in causing adverse conditions, such as slippery and boggy ground. You should have contingency measures in place for such poor weather.

Pushing a bogged down vehicle using mobile plant was traditionally a widespread practice and was seen as a quick and easy way of moving vehicles that had lost traction. This proved to be a particularly hazardous practice and fatal accidents have resulted. Mobile plant operators were required to push their item of plant, either directly against the stuck vehicle, or into waste material used as a buffer at the rear of the vehicle. In these circumstances, a person standing in front of the vehicle can be crushed, as the plant operator is unable to see the front of the vehicle that is being pushed. Consequently, this practice either should not be used or only selectively used in exceptional circumstances and under controlled conditions.

Towing bogged-down vehicles should not be regarded as a routine activity and should be an exception rather than the rule. If you find that towing is becoming a 'routine' activity you should consider why and take action to reduce the need (incorrect vehicle specification, ground conditions etc). However, in some conditions, such as during bad weather, towing can become, by necessity, a more frequent occurrence. Even so, every effort should be made to reduce the frequency by ensuring that haul roads and access to the tipping area are fit for purpose and that the vehicles operating on site are suited to the working environment.

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Most towing incidents occur on areas of tipped waste rather than on the haul roads. A number of issues, such as the weather, driver competency (training and experience), suitability of the vehicle and the surface composition are common factors that can all contribute to the likelihood of vehicles getting bogged down.

Towing and recovery

These are high-risk activities and should only be carried out by specially trained operators. Recovery requires a higher level of competence because of the variability and complexity of the tasks. A clear distinction should be drawn between the *towing* and *recovery* of vehicles: *recovery* takes place only after any *towing* effort has failed or it is considered unsafe or impractical to tow a vehicle.

Most towing and recovery activity takes place at the active landfill area. However, it is possible that towing or recovery will be required anywhere on site, such as on haul roads; if so, the same basic methodology will apply to these situations. A written safe system of work should be in place for towing and recovery. This should be properly communicated to site staff and visiting drivers.

Equipment used for towing and recovery

Plant and equipment used for towing and recovery of bogged down vehicles tends to have been manufactured for that specific purpose. As a result, extremely powerful machines are often used, and they may not be compatible with the construction of bogged down vehicles manufactured to a less robust standard. Consequently, care should be taken to ensure that undue forces, in excess of design limits, are not imposed on the towing equipment and vehicle attachments.

During the operation, cables, wire ropes and chains can break causing whiplash or recoil incidents which could kill or seriously injure people. Large forces can build up that exceed the capability of the steel chain/rope/wire and/or the vehicle connection. The use of kinetic strops is a recommended safety mechanism, and their use should be carefully considered and the correct specification used: that is they must be correctly rated with weakened links installed that fail to safety before excessive loading. Towing points and associated attachments, such as towing pins, must be of suitable construction and fit for purpose.

Cables, wires, chains, strops etc used in towing would not normally formally fall under LOLER (Lifting Operations and Lifting Equipment Regulations). However, they would fall under PUWER (Provision and Use of Work Equipment Regulations). As such, cables, chains, strops etc used in towing, and towing attachments, should be checked periodically and before use. They should also be subject to formal inspection (for convenience, many landfill operators include towing chains, cables, strops etc, and towing attachments in their existing formal LOLER/PUWER inspection regimes).

Towing with casualty vehicle under power

Collisions between the towing plant and the casualty vehicle have occurred when the casualty vehicle is in gear and under power when being towed. In these circumstances, the decision on whether or not to have the vehicle under tow in drive will require an individual assessment which accounts for the individual circumstance and site rules.

Reverse towing

The likelihood of collision is greater when the casualty vehicle is towed by reversing plant. This is not the preferred methodology as there is a reduced capability for the plant operator and casualty vehicle driver to communicate effectively. If a reverse tow is to be used, the vehicle under tow should be in neutral gear and additional signalling protocols may be required to reflect the additional communication difficulties.

Pushing vehicles

This practice (see above) is hazardous and should be actively discouraged as a routine means of recovery. Pushing of vehicles should only take place in exceptional circumstances, and then only under strictly controlled conditions as part of a full recovery operation.

Monitoring and review

All risk assessments and systems of work that relate to towing or recovery of bogged down vehicles should be regularly monitored and reviewed to ensure they reflect any site-related changes that have taken place.

Suggested signals

In 2011 an industry-wide review was conducted by the Environmental Services Association of the signals used to control mobile plant and vehicles. This survey showed that generally there was very little difference between operators. The table below shows the results of this review. You do not have to use these suggested signs and signals, but a standardised approach is likely to assist. Whether you use the below or your own alternatives, the signs and signals used should be clear and communicated to all involved.

Item	Signal
Haulage driver requires assistance	Haulage driver engages hazard lights No separate signal required for reverse tow
Plant operator signals it is safe for haulage driver to exit cab and attach tow stop	'Thumbs-up' from plant operator For reverse tow – 3 x short horn blasts
Tow stop attached, haulage driver signals readiness for tow to commence to plant operator	Haulage driver switches off hazard lights No separate signal required for reverse tow
Haulage driver wants tow to stop	Driver re-engages hazard lights, also sounds horn repeatedly in event of emergency
Plant operator signals it is safe for haulage driver to exit cab and release tow	'Thumbs-up' from plant operator For reverse tow – 3 x short horn blasts
Haulage driver signals to plant operator it is safe for towing vehicle to move off	'Thumbs-up' from haulage driver

Disclaimer and WISH

This information document has been prepared by health and safety practitioners to assist health and safety improvements in the waste management industry. It is endorsed by the WISH (Waste Industry Safety and Health) Forum. This information document is not formal guidance and represents good practice, which typically goes beyond the strict requirements of health and safety law.

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The Waste Industry Safety and Health (WISH) Forum exists to communicate and consult with key stakeholders, including local and national government bodies, equipment manufacturers, trade associations, professional associations and trade unions. The aim of WISH is to identify, devise and promote activities to improve industry health and safety performance.