North-East Melton Mowbray Distributor Road

Case Study – Filter Feeder Sweeper Unit

Funded by UK Government

Leicestershire County Council

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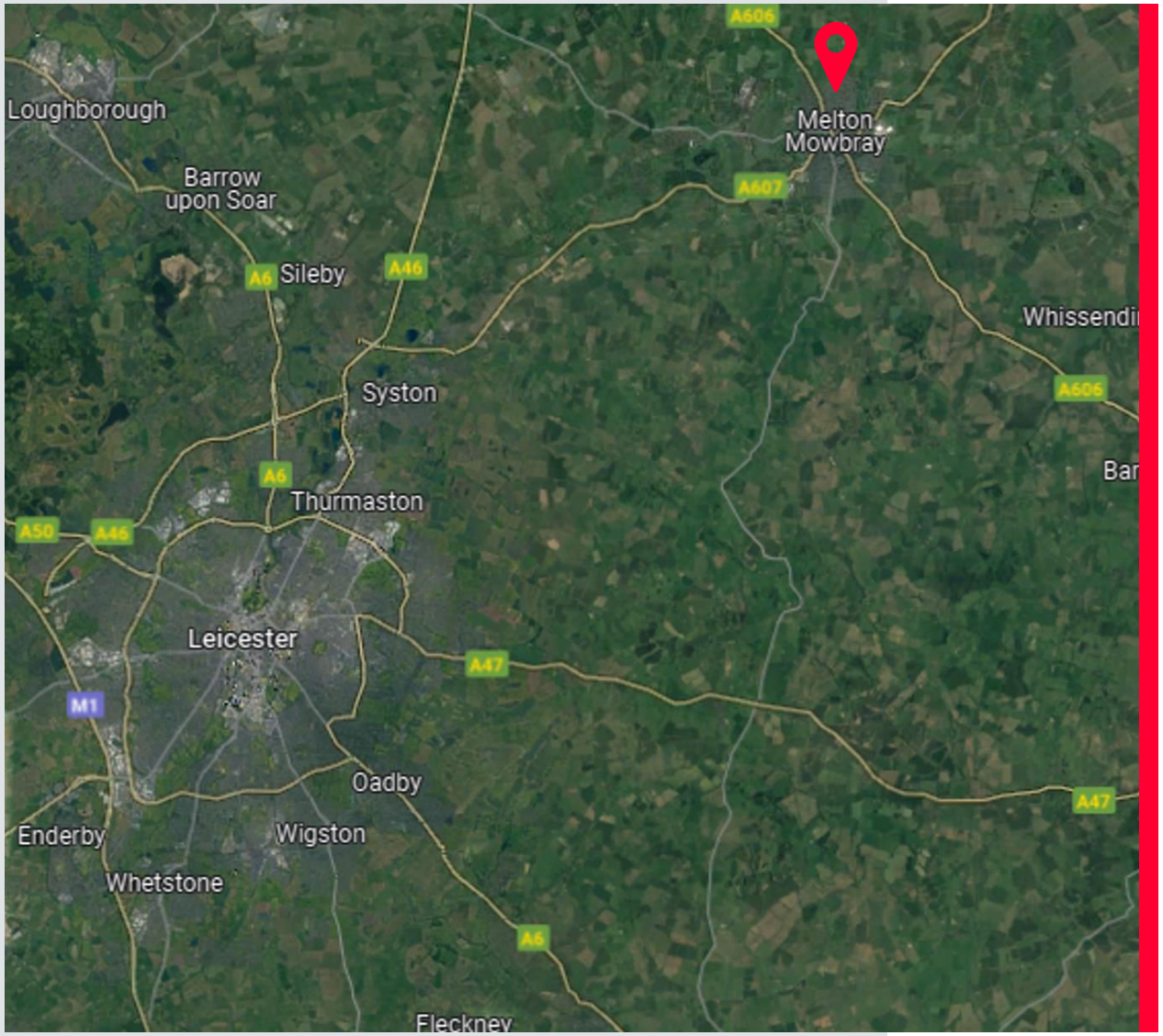
TOGETHER DELIVERING FOR MELTON

MHA Midland Highway Alliance Driving Collaboration

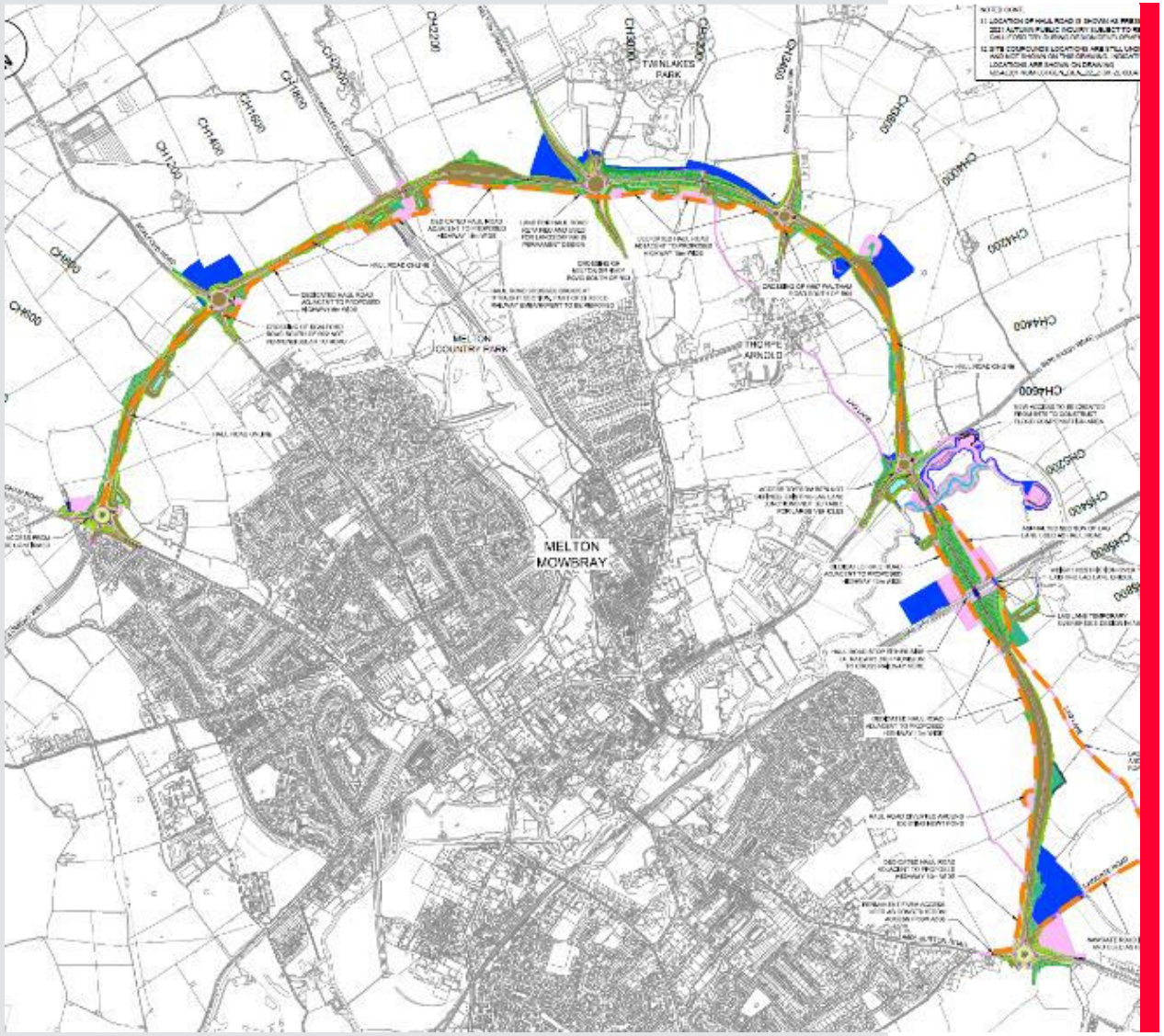
AECOM

GallifordTry



Overview

- The North-East Melton Mowbray Distributor Road is a new highway scheme to provide a bypass for through-traffic around the town of Melton Mowbray. It will also provide access to new housing.
- It in includes the Construction of approximately 7km of single-carriageway road, four bridges and six roundabouts
  Client: Leicestershire County Council



Overview

- Principal Contractor: Galliford Try
- Start date: May 2023
- End Date: Spring 2026
- Roundabouts are at each arterial route the distributor road intersects. Three of the new bridges are over watercourses (two near brooks and the River Eye) the fourth bridge is over the Melton-Oakham rail line.

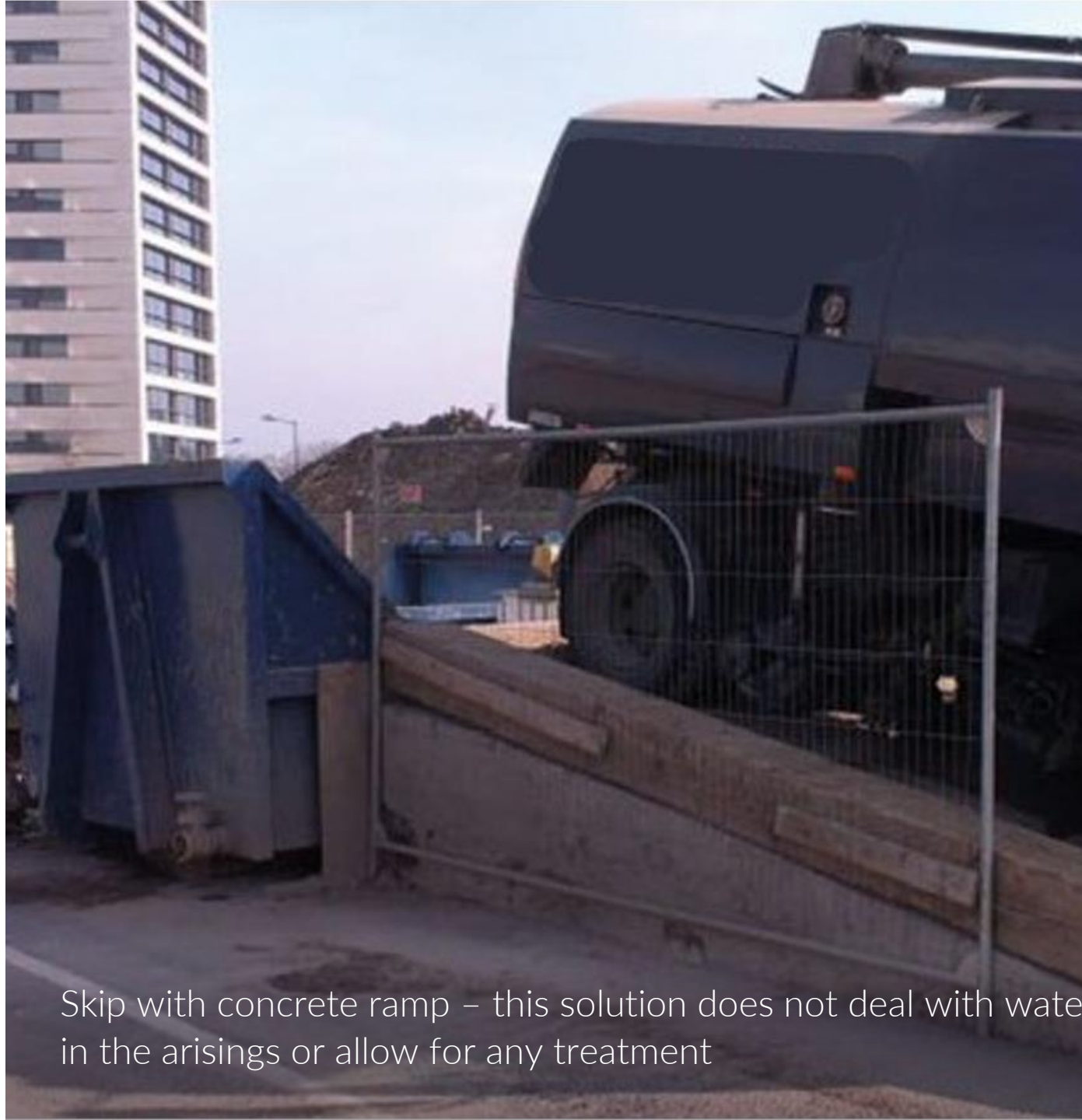
The problem

- Road sweeper arisings are classed as hazardous waste due to hydrocarbons and heavy metals which are deposited on road surfaces from vehicles via leaks, brake dust, debris etc.
- Sweeper arisings are often wet and sloppy due to the water used to sweep or after wet weather – therefore just tipping these arisings in a loose pile risks contaminated water runoff and pollution.
- Simple solutions of digging a hole and lining with polythene for arisings to be tipped are not suitable – the polythene is not durable-enough to withstand multiple tips and emptying.

Current solutions

Tip-off pit

- Current best practice is to construct a sealed, bunded tip-off pit for sweeper arisings to be deposited into, before being transported off site for treatment and disposal. These solutions can be very engineering-heavy.



Skip with concrete ramp – this solution does not deal with wate
in the arisings or allow for any treatment

Current solutions

Powered cleaning system

- Powered cleaning system – this requires a power and water supply and is expensive to run, at approximately £5-10k per month.

Current solutions

Concrete pits

- Concrete pits with filtration baffles and hydrocarbon traps, approximately £22-28k construction cost. Often bespoke and created in-situ, meaning they cannot be repurposed.

Trial a solution

Filter feeder

- The Filter Feeder is an on-site portable de-watering solution for sweeper arisings. It consists of large filtration baskets and a separate water filter. The water filter uses a specialist expanded polystyrene to trap silt and hydrocarbons.

Trial a solution

Filter feeder

- Sweeper arisings are tipped into filter baskets – these are removable metal slotted frames. The frames are lined with a geotextile filter bag which traps large solids but allows water to filter through. The baskets have lifting points so the solids can be removed and tipped into a skip or holding area for removal off-site.

Trial a solution

Filter feeder

- Water flows from the filter bags into the header unit, which contains EPS filter media that traps sediment and hydrocarbons. Clean water then discharges via gravity, meeting site-specific permit requirements for release into watercourses.
- The filter bags can be removed and jetwashed clean, allowing the bags to be re-used. These are quick and easy to replace when required.

Trial a solution

Filter feeder

Independent chemical analysis testing has proven Filter Feeder is effective in removing the following

99.99%

Total Suspended Solids

97.4%

(PAHs) Polycyclic Aromatic Hydrocarbons

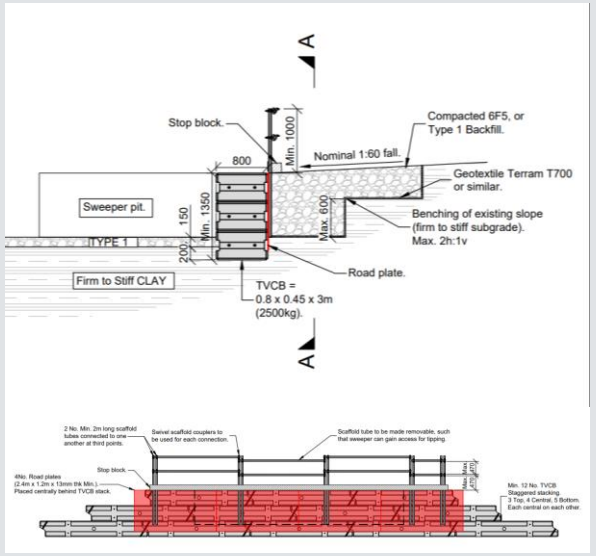
<99%

(TPHs) Total Petroleum Hydrocarbons

Trial a solution

Filter feeder

Galliford Try designed an approach ramp which was quick to construct and used precast concrete blocks available off-the shelf instead of in-situ concrete, allowing a build cost of approximately £15k.



Evaluation

Filter feeder

Galliford Try tracked how many tips the sweepers were doing, and how many times the baskets needed to be emptied.

One sweeper averaged at two to three tips a day, with the baskets being emptied approximately once per week.

This works out to an annual maintenance cost of £6k.

10/08/2024 Todays Date

GallifordTry

Filter Feeder Sweeper Unit Usage & Monitoring Records

Date	Number of tips	Weather	Supplier	Comments	Basket Empty	Liner Change
03/10/2023	2	Damp	Faulks			
04/10/2023	2	Dry	Faulks		Y	
05/10/2023	3	Wet AM/Dry PM	Faulks			
09/10/2023	1	Dry	Faulks			
10/10/2023	1	Dry	Faulks			
11/10/2023	2	Wet	Faulks			
12/10/2023	1	Dry	Faulks			
13/10/2023	4	Very wet	Faulks		y	
16/10/2023	2	Dry	Faulks			
17/10/2023	1	Dry	Faulks			
18/10/2023	1	Dry	Faulks			
19/10/2023	3	Wet	Faulks			
20/10/2023	4	Very wet	Faulks			
23/10/2023	2	Dry	Faulks			
24/10/2023	3	Damp	Faulks			
25/10/2023	2	Dry	Faulks			

Evaluation

Filter feeder

- Had the sweepers been required to tip arisings at an off-site facility, it would have meant the following:
  - Two-hour round trip to facility (Melton Mowbray to Derby).
  - Based on two tips per day, sweeper travelling four hours of an eight-hour shift, meaning the equivalent:
    - Fuel cost of £15k.
    - 38t of carbon emissions a year.
- To build an in-situ concrete pit and filter system would cost approximately £22-28k.
- No Environment Agency licences are required to install and operate the unit.
- The Filter Feeder sweeper arisings unit has worked well in trials at MMDR. It has been trialled elsewhere on housebuilding sites, but this is the first deployment on a highways scheme.
- The access ramp design by GT was cheaper than more heavily-engineered solutions (e.g. full concrete ramp) and was constructed in a week – the concrete blocks and aggregate can be reused elsewhere once the unit is demobilised, reducing waste.

Evaluation

Filter feeder

- The Filter Feeder is delivered on a Hiab as a ready-made unit, meaning installation and setup was completed in a day.
- By having a tip-off location on site, the sweeper can be used to its full extent. The site has managed with one sweeper – if the external facility was used, it is likely due to the travel time off-site a second sweeper would be required – this would cost approx. £50k a year.
- The filtered water has been stored in an attenuation pond and reused for dust suppression.
- Fuel savings of £15k/year and carbon saving of approximately 38t/year for one sweeper by not travelling off-site to tip.
- Temporary works savings of approximately £7k on constructing the access ramp.
- GT also provided operational feedback and suggestions for improvements such as splashbacks and guardrails.
- Different materials for basket liners also trialled and evaluated.

Future

Filter feeder

- Galliford Try continuing to operate the Filter Feeder and anticipate it will remain on site for the duration of the project.
- The unit has provided time and cost savings, and provided a carbon saving which contributes to the project's carbon reduction targets.
- Recognised as 'Best Practice' by Considerate Constructor's Scheme.
- Possibility to use on future Galliford Try sites.


GallifordTry