



## London Borough of Enfield

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<b>Report Title</b>	Highway Services - Carbon footprint associated with relaying pavements, highways repairs and maintenance, and an update on the design guide/ material being used.
<b>Report to</b>	Environment Forum
<b>Date of Meeting</b>	18.9.2023
<b>Cabinet Member</b>	Cllr Jewell – Cabinet Member for Environment
<b>Executive Director / Director</b>	Doug Wilkinson – Director of Environment
<b>Report Author</b>	John Grimes, Head of Highway Operations David Taylor, Head of Highways, Traffic and Transport and Parking Services
<b>Ward(s) affected</b>	All
<b>Classification</b>	Part 1 Public
<b>Reason for exemption</b>	For information and discussion

### **Purpose of Report**

1. This paper is for information and discussion as part of the Environment Forum's work programme.

### **Main Considerations for the Panel**

2. This report is for noting.

## Background and Options

### Scheme Prioritisation

3. Schemes for inclusion within the capital carriageway and footway renewal programme will be considered using information from the following sources: -
  - Condition survey data;
  - Visual condition assessments from the highway inspectors and engineers, based on local knowledge; and
  - Complaints and requests from residents and Members.
4. During a year, numerous locations will be identified from the above sources and officers will then conduct visual surveys to evaluate these sites. Condition (surface and structure), future life expectancy and network importance will be the key factors in prioritising both carriageways and footways for treatment.
5. Planned maintenance priorities need to ensure the most effective use of budgets and the most cost effective treatment at the right time for whole life asset management and improved customer satisfaction. Planned intervention can lead to savings in the long term by treating deterioration early. Adverse winter weather can result in some roads deteriorating to a greater extent than others and therefore it may be necessary to amend the proposed programme throughout the year.
6. In addition to identified full carriageway schemes, partial resurfacing of carriageways will also be undertaken in order to treat specific areas of carriageway, where treatment of the whole length of a longer road cannot be justified.
7. Footways are assessed and treated on an individual section basis, not a whole road basis, in order to maximise the value from the limited funding available by targeting sections of footways which are in the worst condition.
8. The current policy for the treatment of footways is to replace existing paved footways with bituminous asphalt surface (topping), except in shopping areas and conservation areas, where a character appraisal will be considered prior to any works being carried out. This current policy was introduced in the summer of 2003.
9. Enfield currently utilises a range of carriageway treatments to ensure that we are achieving the best value from the budgets available while also considering whole life costs and the carbon footprint of the products used.
10. We resurface, recycle, surface treat and surface dress our carriageways as part of our ongoing planned maintenance of the highway network.

These treatments aim to maintain the network in an acceptable condition for the travelling public.

## Resurfacing

11. We resurface our roads when the road surface has reached the end of its serviceable life. This means areas of the surface layer are no longer bonded to the base and are pulling up, where numerous cracks or potholes have appeared and have been repaired and where depressions have occurred in the surface.
12. Before we resurface, we evaluate what is the best value for money material to utilise as the new surface course while considering the whole life costings and whole life carbon. We have recently adopted a common approach of using low temperature asphalts on the majority of our work, which can reduce carbon usage by up to 15%. As per industry standards, asphalts used in the surface course contain 10% recycled material while asphalts in lower layers contain 20% recycled material. Once proven that the quality and durability of the product isn't affected as the recycled element is increased, we will adopt these materials reducing the need for virgin materials, further lowering the carbon footprint of these works.
13. Examples of innovation we are trailing are, we have used a rubber modified asphalt that incorporates recycled tyres in the mix in Lavender Hill, recycled plastics in the road surface in Green Dragon Lane, recycled steel slag (Blast furnace waste from the steel works industry) also at Lavender Hill. Where advance testing of the road surface highlights the presence of contaminated materials, cold mix asphalt or foam mix has been used in Oaklands. This is where the contaminated material is taken away from site, mixed and sprayed with a 'foamed' bitumen then returned to site and installed lower down in the road construction with a new surface laid on top. This technique is more cost effective than taking the material away to a contaminated waste site and alongside in-situ recycling, is a method preferred by the environment agency utilising almost 100% recycled material.

Before



After



Before



After



## Recycling

14. This is where we use the existing road structure and materials as the base to the roads' new foundation. This process is used when tar is found in the surfacing materials and rather than remove this at a considerable expense to a contaminated waste site, the existing road layers are combined using a pulverisation process and then cementitious powders are added to create a bound foundation layer. On completion of the formation a new surface course is then laid over this.
15. This process can reduce CO2 emissions by approx. 40% over traditional resurfacing /reconstruction techniques and increases the recycled content of the construction by over 70%, due to very limited amounts of new material being used.



Before



During

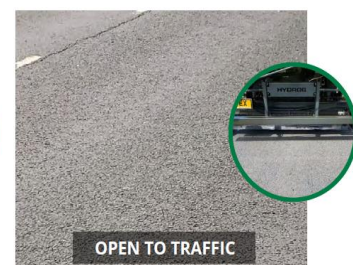


After



### Surface treatments

16. This type of treatment works to prevent cracks coming through at the micro level which, in time, cause defects and potholes to form on the surface. The surface of the road is treated with a cold spray emulsion which replaces some of the asphalt properties that have oxidised off through ageing, traffic volumes and weather.
17. “Reclamite” is a penetrative bitumen rejuvenator – the only one with an industry (BBA HAPS) certificate in the UK. This product has been used in the UK since 2012 by many authorities and Enfield were the first London Borough including TfL to use treatment, recognising the benefits to the lifecycle of the carriageway and long term budgets.
18. This process is ideally carried out before the road surface shows any major signs of degradation, at probably 6 to 8 years after initial surfacing, and can further extend the life of the surface by up to 5 years per application.
19. It has a reduced carbon footprint by at least 80% compared to traditional resurfacing and can lead to a 40% whole life cost reduction.





## Orpington Road N13

20. The pink area is where the treatment has just been applied and the mottled black/pink area is where the product is starting to break/soak into the existing surface.



## Surface Dressing

21. Another treatment we can use is to surface dress our roads. This entails patching any localised defective areas and then spraying a bond coat with a stone dressing over the top of the surface. This then ensures that the road is protected from water ingress, there is an increased skid resistance, and the appearance of the surface is now a continuous one. This type of process is suited to rural roads where there is less turning movement on the surface and more linear travel is experienced.

## Whitewebbs Lane- Before



After



Stagg Hill – Before



Stagg Hill – During





## Stagg Hill – After



## Footway Works

22. A bituminous asphalt provides a continuous, even surface compared to paving slabs where broken, missing or rocking slabs can create trip hazards for pedestrians. Enfield has been using bituminous asphalt on the reconstruction of residential footways within the Borough, except for certain circumstances i.e. Town Centres and some conservation areas, since 2003 when the policy was first adopted.
23. This bituminous surface along with a structural foundation ensures that if vehicle overrun occurs damage is negated or minimised with the surface remaining intact and minimal, if any, repair being required.
24. Many original paving slabs laid in the borough were laid on a minimal foundation, and some being constructed as far back as the early 1930's when a lot of the residential areas were developed. This has meant over time, with larger, heavier vehicles over running the paving, damage and cracks have appeared in the paving. Now with even more traffic on our roads and vehicles over running the footway, damage to the paving stones has continued to happen, challenging our limited repair budgets.
25. At present there is limited industry information on the actual carbon values for footway works however when looking at a comparison on the surface products laid on the same sub-base the value of carbon for asphalt is approximately 13kg/CO<sub>2</sub>e/m<sup>2</sup> and for paving manufacture is 17kg/CO<sub>2</sub>e/m<sup>2</sup>. This means for every m<sup>2</sup> laid there is at least a 4kg/CO<sub>2</sub>e saving when using an asphalt surface.

Before



After



### Reactive works.

26. Enfield has developed an asset management hierarchy for our highways which considers use and functionality to determine frequency of safety inspections and maintenance strategies. This means some roads get inspected at a greater frequency than others, our Principal Road network is inspected every month, compared to a small cul-de-sac which may be inspected once per year. In addition to our routine inspections, we will inspect locations that have been identified by the public, councillor, or other council officers when these are raised.
27. Enfield has a highway safety inspection regime to comply with our duty to maintain highways in accordance with Section 41 of the Highways Act



1980, and to provide a defence under Section 58 of the Act (see Section 1.2).

28. Highway defects are managed based on risk. Any potential defect for which the investigatory level is reached or exceeded is identified as a risk that needs to be investigated further. Our main investigatory levels are, for the carriageway (roads) a 40mm vertical face and for the footway or cycleway a 25mm misalignment or vertical face.
29. Once a defect has been identified, the inspector will then assign a response repair timeframe for the resolution of this defect. Response times can vary depending upon the risk that this defect poses, they can be from 2 hours to 28 days, all based upon risk level and network need.
30. When issuing repairs to the highway network, we will replace existing surfaces generally in line with our policies but will always take a considered approach, such as on the footway and carriageway with a like for like approach to provide uniformity and compliance with reinstatement specifications and standards.
31. In some instances, on the footway, we are unable to replace paving stones due to the presence of tree roots, which we do not want to damage, so we will utilise asphalt to locally fill the void created to prevent any safety issues.
32. In the carriageway we have experimented with an infra-red heated reinstatement system, which heats the area around a defect and then additional material is added to fill the defect. We found that this method reduced the volume of new material required to fill the pothole/defect however it took more time to complete causing longer network inconvenience while the works are carried out.

Before



After





Before



After



33. We have recently trialled a crack filling product in Willow Road which utilises recycled tyres into the mix, which is a mastic asphalt, similar to a hot roofing product, with aggregate added for grip. We will be reviewing its success over the coming months. It's too early to determine whether this will be successful.

## Willow Road, Enfield

Before



After



34. We continue to experiment and innovate wherever possible to reduce the use of virgin aggregates and to reduce our carbon use. With the use of bitumen as the primary product of road asphalts we will work with our suppliers to find alternative methods and materials for highway work.

### **Relevance to Council Plans and Strategies**

35. Highways Services contributes directly to the council's objectives set out in the council Plan.

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### **Appendices**

### **Background Papers**