

BY SUBMITTING THIS REPORT TO THE CABINET OFFICE, I, Andrew Gregory (DIRECTOR, Planning, Transportation & Environment) AM CONFIRMING THAT THE RELEVANT CABINET MEMBER(S) ARE BRIEFED ON THIS REPORT

**CARDIFF COUNCIL
CYNGOR CAERDYDD**

CABINET MEETING: Thursday 18th May 2023

REPORT TITLE:

Highway Asset Management Plan - 3 (HAMP)

CABINET PORTFOLIO:

Transport & Strategic Planning (Cllr. Dan De'Ath)

AGENDA ITEM: xx

Reason for this Report

1. To note the current state of the Highways Asset Management Plan - 3 (HAMP) which will inform the Cabinet's recommendations to Council for the Revenue and Capital 2024/25 and Medium-Term budget setting process.

Background

2. Cardiff Council has had a successful record of managing the highly complex highway asset. Recent years have presented significant challenges in terms of maintaining a multibillion-pound asset in the context of, significantly constrained budgets, the covid lockdown and recovery, and rising costs. Nonetheless, the Council has a track record of not just maintaining the asset but also delivering significant innovation, such as the LED rollout. In this context, the aim of this strategy is to develop a foundation for taking forward a robust approach to highway asset management that also begins to address in a meaningful way the wider issues of climate emergency, economic growth and transport sustainability.

3. The HAMP sets out the council's proposals for the management of, and investment in, the highway, and associated assets. That being – Adopted public realm, Carriageways, Footways, Drainage, Intelligent Transport Systems, Street Furniture, Road Markings, Street Lighting and Structures. The HAMP is designed to ensure that highways funding is used in the most efficient and cost-effective way. This plan is based upon the choices made by the Council in terms of the level of investment in the highway assets, what that investment will be directed at and the service standards that the users can expect. The highway assets listed above have a replacement cost with a modern equivalent estimated at approximately £2.37bn (based on pre-inflationary costs) and are the Council's most valuable financial asset.
4. The purpose of the HAMP is to:
 - Formalise strategies for investment in Highway asset groups.
 - Define service standards.
 - Improve how the Highway asset is managed.
 - Ensure the most efficient service is delivered within available resources.
5. In this plan for the first time, we will also be exploring the opportunity to focus on aligning the HAMP with the wider corporate priorities found in Stronger, Fairer, Greener (SFG) vision for Cardiff. This document states: *"A greener city which, through our One Planet Cardiff programme takes a lead on responding to the climate emergency (see para 59), which celebrates and nurtures biodiversity, with high-quality open spaces within easy reach for rest and play which are connected by convenient, accessible, safe sustainable transport options"*. In this regard the purpose of the HAMP will seek to align and integrate to wider corporate strategies and will seek to:
 - Align the strategy with – where possible - developing a low carbon response to Highway maintenance.
 - Maximise the integration of sustainable mode use on the Highway.
 - Regard the Highways within the wider context of creating high quality public realm, based on placemaking, greening, accessibility, and design quality – supporting wider economic approach to city and local centre regeneration.
6. The HAMP applies to the following objectives from the Corporate SFG document, it will enhance the experience of pedestrians, cyclists and motorists and encourage economic growth by making it easier and safer to use the highway network
 - Play a leading role in the Capital Region, including developing strategic economic development, transport and planning strategies, as well as governance and delivery arrangements that support Cardiff's role as the economic, cultural and leisure centre of the region

- Deliver the ‘One Planet Cardiff’ response to the climate emergency, accelerating the transition to net zero by putting sustainable development at the heart of everything we do as a Council.
 - Continue to deliver an extensive programme of localised improvements to our roads and footways to remove defects such as potholes.
 - Adopt the principles of a 15-minute city approach, focusing on sustainability, placemaking, and the density of development that this vision requires.
 - Integrate great design, placemaking, greening and sustainability principles into all proposals for development and public spaces.
 - City centre recovery
7. The delivery of innovative, cost-effective risk-based maintenance within allocated budgets underpins the aspirations above and implementation of the following transformative approaches:
- i. **Placemaking** is a multi-faceted approach to the planning, design and management of public spaces. Placemaking capitalises on a local community's assets, inspiration, and potential, with the intention of creating public spaces that improve urban vitality and promote people's health, happiness, and well-being. The Council's highway infrastructure links and often maintains these community assets creating a cohesive unit of greater value for the community.
 - ii. **Low Carbon:** The Council has already utilised a highly innovative approach to low carbon asphalt. We will develop further opportunities for low carbon approaches to materials, systems, and working practices.
 - iii. **Sustainable Transport:** Traditionally the highway has been designed to maximise the efficiency of car and vehicle movements. This innovative approach that this plan will adopt seeks to develop the highway in a manner that also supports the usage of other transport modes in a more balanced manner, including walking, cycling, as well as tackling wider accessibility issues.
 - iv. **Greening** promotes the concept of healthy streets. Urban greening helps to make streets part of a public realm network that is designed more for people than for vehicles. Greening of Cardiff's streets, buildings and other public spaces does more than change the look of these places. Roofs and walls covered in plants, **street trees** and small pocket parks in between buildings help combat climate change and make the city a better place to live, work and invest. The **HAMP** manages the interface between existing highway infrastructure (e.g. SuDS planting described below and future biodiversity and amenity opportunities relating to flood risk management) and these new and emerging green

- infrastructure initiatives including the Councils Coed Caerdydd project.
- v. **Sustainable Drainage Systems (SuDS)** have been developed to imitate the natural drainage process and provide the community with green spaces promoting diverse wildlife and wellbeing. Traditional drainage systems can increase the risk of flooding and pose a serious risk of contamination, SuDS can help maintain water quality and limit the total amount of water leaving a site. An excellent example of where Cardiff has implemented SuDS is the Greener Grangetown project providing an exemplar of SuDS design. The **HAMP** illustrates the design and maintenance of Cardiff's SuDS undertaken by the Councils highway drainage teams.
 - vi. The concept of the **15-minute city** seeks to improve liveability and develop more sustainable, local communities by planning for residents to be able to access most of the facilities they need on a daily basis within a 15–20-minute walk, cycle or bus ride from their home. Again, the **HAMP** manages the interface between existing highway infrastructure and these new and emerging initiatives.
 - vii. **City Centre and Local Centre Public Realm** enhancements and maintenance in these more focal economic and social areas with very high levels of footfall and usage provides a particular challenge. Furthermore, due to their prominence there is more attention to any defects. Managing these key environments often requires more attention and resources. However, the extent of support provided needs to be understood as a part of a wider assessment of budgets and priorities (see para 13 below). In this regard, it is proposed that we identify a ringfenced sum within the budget to tackle these issues in a balanced yet prioritised manner.
8. There are two key pieces of national legislation that should be considered for the HAMP. It is important to remember that any level of funding less than steady state (described in para 15 below) will result in, to greater or lesser extent depending on investment, a managed decline of the condition of the highway asset.
 9. Section 41 of the **Highways Act 1980** imposes a legal duty of maintenance on highway authorities (The Council) in respect of those highways that are maintainable at the public expense.
 10. The **Well-being of Future Generations (Wales) Act 2015** is an Act of the National Assembly for Wales to make provision requiring public bodies to do things in pursuit of the economic, social, environmental and cultural well-being of Wales in a way that accords with the sustainable development principle; to require public bodies to report on such action; to establish a Commissioner for Future Generations to advise and assist public bodies in doing things in accordance with this Act; to establish public services boards in local authority areas; to make provision requiring those boards to plan and take action in pursuit of economic, social,

environmental and cultural well-being in their area; and for connected purposes.

Of particular relevance to this HAMP is part 2, section 5 of the Act:

Well-being of Future Generations (Wales) Act 2015

Part 2 – Improved Well-being

Section 5 - The sustainable development principle

*(1) In this Act, any reference to a public body doing something “in accordance with the sustainable development principle” means that the body must act in a manner which seeks to ensure that the **needs of the present are met without compromising the ability of future generations to meet their own needs.***

(2) In order to act in that manner, a public body must take account of the following things—

*(a) **the importance of balancing short term needs with the need to safeguard the ability to meet long term needs, especially where things done to meet short term needs may have detrimental long-term effect;***

11. The Highway Asset Investment Strategy (see extract below) illustrates different levels of asset investment and its outcomes was endorsed by the Council’s Environmental Scrutiny Committee on 9th September 2014 and again on 17th May 2016. The committee recommended adoption of a steady state investment profile for the highway asset. The reason for this recommendation is that this proves to be the best long term economic solution whilst enabling the network to support other corporate priorities such as economic growth in the city.
12. It is recognised that current financial pressures may make this unachievable at the present time. To make the investment more affordable a “phased approach” to increasing Capital and Revenue investment could be adopted. This would mean investment could be increased annually over an agreed period to reach the required steady state level.

Issues

13. **Enhanced Public Realm** - Improvements in the public realm can provide significant enhancements to users as described in para 7 above. Currently the city centre is inspected in line with all other areas of the city, on a safety first, risk-based approach basis (in line with the Highway Safety Inspection Policy – Part C:001). Due to the prestige associated with the capital city centre and the high expectations of quality, an enhanced maintenance regime should be considered in this area. It should be noted, where higher quality materials or bespoke infrastructure are used this has an increased disproportionate demand on maintenance budgets due to their significantly higher replacement costs over those of routine materials. e.g., the maintenance of prestige granite paving in the city centre. Consideration should be made for increased maintenance budgets for the

ongoing maintenance and improvement of these areas of enhanced infrastructure.

14. **Achieving Steady State Investment & the Cost-of-Living Increase 2021 – 2023.** The Steady State calculations contained in the Asset Investment Strategy were undertaken in 2016. Annual inflation and its effects on increasing the cost of goods and services during the period 2016 to 2023 should be noted.
15. Steady State is a level of funding that maintains an asset in its current condition, neither improving nor deteriorating from an overall perspective. Maintenance funding below steady state will result in an ongoing deteriorating condition and consequent increasing maintenance backlog over time, the speed and level of deterioration is dependent on how far investment is below steady state.
16. A rapid increase in energy costs, particularly the wholesale price of gas, has been a key driver of the recent increases in inflation, compounded by supply chain stresses, increased prices for commodities and transportation. The cost of living has been increasing across the UK since early 2021. The annual rate of inflation reached 11.1% in October 2022, a 41-year high, before easing to 10.7% in November 2022. High inflation affects the affordability of goods and services.
17. This rapid increase of inflation is causing additional pressures in the area of highway and footway maintenance, especially around surfacing and surface treatments. This will be the first area that will show deterioration – structures, street lighting and drainage improvements will lag in terms of deterioration, albeit the cost of schemes will increase, so the risks of failed elements will increase over time.
18. Likewise, the costs relating to localised small-scale repairs such as patching, street furniture, tackling damaged paving, road markings renewal, signage and minor highway improvements has also increased in similar levels, so the volume of works completed will reduce. This unfortunately will promote deterioration further – moving early repairs to more expensive later treatments as we have not been able to provide the appropriate intervention in a timely manner.
19. Table 1 below shows how construction costs (illustrated by cost per square metre) have increased over the period 2021-2023. They are based on completed scheme costs delivered by carriageway and footway capital improvement programmes with the treatments listed in the left-hand column. The average cost increase is **circa 56%**.

Table 1 – Increases in Carriageway and Footway Construction Costs

Carriageway m2 rate				
Financial Year	2020-2021	2021-2022	2022-2023	% difference 2021-2023
Reconstruction	£115	£130	£185	61%
Strengthening	£30	£35	£45	50%
Resurface inlay/overlay	£17	£22	£27	59%
Micro Asphalt	£9	£11	£13	45%
Footway m2 rate				
Financial Year	2020-2021	2021-2022	2022-2023	% difference 2021-2023
Reconstruction	£75	£85	£125	66%
Renew surface course	£42	£50	£65	55%
FW Micro Asphalt	£7	£9	£11	57%

20. Table 2 below is an extract from the Asset Investment Strategy (2016) which shows the calculated steady state investment required for the main highway asset groups. Based on the 56% increases in actual carriageway and footway construction costs shown above, and the steady state calculation below from 2016, it could be logical to assume that the 56% increase demonstrated above could be considered representative across all highway assets. Therefore, we could assume the overall steady state figure could have increased by £4.09m (56% increase on £7.3m) to an annual steady state investment of **£11.41m in 2022-23**.

Table 2 – Extract from 2016 Asset investment Strategy (with 2023 adjustment added)

Overview of Investment Options						
Asset Group	2015/16 Revenue Budget (£,000)	2015/16 Capital Budget (£,000)	Future Capital Investment Option Costs (2016)			Adjusted Steady State Value for 2023
			Managed Decline (£,000)	Steady State (£,000)	Enhanced (£,000)	
Carriageways	£450	£850	£850	£3,075	£5,175	£4,797
Footways	£790	£595	£470	£2,360	£3,810	£3,681
Drainage	£400	0	0	£160	£160	£250
Street Furniture	£33	0	0	£125	£125	£195
Street Lighting	£585	£270	£300	£1,200	£1,200	£1,872
Structures	£320	£500	£0	£400	£400	£624

Total	£2,578	£2,215	£1,620	£7,320	£10,870	£11,419
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21. Table 3 below demonstrates the gap between current and estimated future funding and the requirements to reach steady state.

Table 3 – Gap between current and estimated future funding and the requirements to reach steady state.

Gaps Between Steady State, Current and Estimated Future Funding								
Asset	Funding source	Annual Funding - £k			Steady State Requirement (11,419 total)	Current 2023-24 Funding Gap between current funding & Steady State	Funding Gap between 2024-25 funding & Steady State	Funding Gap between 2025-26 funding & Steady State
		Current	Estimated					
		2023-24	2024-25	2025-26				
Carriageways	capital	3,350 (+2,000 additional funding)	3,350	3,376	4,797	-553	1,447	1,421
Drainage	capital	30	230	180	250	220	20	70
Footway	capital	880	595	595	3,876¹	2,996	3,281	3,281
Street Lighting	capital	1,000	1,070	270	1,872	872	802	1,602
Structures	capital	924	1,100	1,100	624	-300	-476	-476
Total Gap between Annual Funding & Steady State						3,235	5,074	5,898

1 – Footway funding includes £195k for Street Furniture

2- Future Steady State funding requirements will be subject to industry inflationary & other increase

22. It is important to note that the steady state levels of investment and gaps in current and future estimated budgets shown in Table 2 & 3 relate to Capital investment only. However, maintenance functions and cyclic activities financed through revenue budgets are experiencing equivalent pressures and have been frequently subject to historic budgetary reductions implemented to achieve annual cost savings.
23. **Additional Funding for the 2023/24 financial year** – an additional capital sum of £2M has been made available for the 2023/24 financial year. The investment of the additional sums will be directly linked to the asset of highest demand and that exhibiting the highest levels of deterioration. The additional sums will therefore be invested in the carriageway asset that has deteriorated significantly over the winter months and requires significant investment. Utilising a condition driven, risk-based approach, the additional funding will be utilised for resurfacing works in the following priority order:

- Principle Roads – e.g. A4232, A48
 - Main Distributor Roads – higher trafficked roads through wards
 - Secondary Distributor Roads – unclassified high usage routes
 - Estate Roads that are exhibiting highest levels of deterioration
24. **Revenue Pressures on Highway Maintenance Budgets** - There are strict financial rules on what the Council's Capital budgets can be spent on and there are many Highways Maintenance functions, repairs and replacements that can only be funded via Revenue budgets. Whilst we can demonstrate the effects of Capital funding on the condition of highway assets by its proximity to the steady state calculation, it is more difficult to achieve when considering the effect of Revenue investment. The reduction of Revenue budgets will often result in a reduction in service provision or an increase in maintenance backlog, both of which will have some detrimental effect on the short-, medium- and long-term condition of highway assets. Some of the key areas of Revenue pressure for Highway Maintenance functions are described below.
25. **Reactive Highway Safety Repairs** - The Council's Highway Safety Inspection Policy Part C:001 and the associated inspection and repair regime, is designed to maintain the highway network to an approved safe level and forms the basis of the Council's strategy for managing highway liability and risk. Utilising Section 58(1) of the Highways Act 1980 in the defence of 3rd party personal injury and property claims.
26. In accordance with the Highway Safety Inspection Policy, suitably qualified Safety Inspectors undertake cyclic inspections of the entire highway network identifying safety related defects and categorise them for an appropriate repair utilising the AMX asset management system. For the Council to have a successful defence against any 3rd party insurance claims we must demonstrate we've undertaken the safety inspection and completed any identified repairs in accordance with the defect investigatory levels and timescales of the Policy.
27. The Council has a robust safety inspection regime achieving an excellent 3rd party claim repudiation rate of 88%. In 2022 approximately 93% of critical defects were repaired within the required timescale. Over 25,000 safety and maintenance defects were picked up by Inspectors of which approximately 30% were unable to be repaired due to insufficient resources. The definition of these defects is shown below.

Highway Safety Inspection Defect Definitions		
Critical Defect	Safety Defect	Maintenance Defect
A situation where the inspecting officer considers the risk to safety high enough to require immediate action.	Defects that pose an imminent risk of injury to road users, Requiring a response as soon as possible to	Defects that warrant treatment to prevent them deteriorating into a safety defect prior to the next scheduled inspection,

Requiring an immediate response to make the site safe	remove a potential risk of injury to users	Requiring a response to prevent them becoming a safety defect
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28. The result of defects remaining untreated is their possible accelerated deterioration into more serious defects. To further improve efficiency, resources and processes are being upgraded for the management of performance and prioritisation of work. In addition, a new maintenance contract will be let in the new financial year which will develop more efficient working practices and a more robust legal defence.
29. Any defects not repaired as required pose a risk to the Council's 3rd party insurance defence. It is important to appreciate the level of financial risk associated with 3rd party insurance claims. Claims can be categorised into two main groups, property damage and personal injury. Property/vehicle damage claims (e.g., damage to a car wheel resulting from carriageway potholes) are generally of lower cost, in the region of £60 to £300. However, personal injury claims can range from several hundred pounds to millions of pounds, depending on the situation and injury sustained by the claimant. The average cost of a personal injury claim is approximately £15k. It should be noted that most higher value claims arise from footways as a result of claimed trips and falls.
30. **Replacement of Road Markings and Traffic Signs** - A significant proportion of road marking, traffic sign and street furniture (bollards, pedestrian guardrail, benches, fences etc) repair and replacement is undertaken using Revenue budgets, other than those replaced as part of wholesale capital highway improvement schemes.
31. The Council depends on signing and lining for the efficient control and movement of traffic, for enforcement of traffic regulations and, most importantly, as an aid to road safety. Traffic signs and road markings are placed by the Council, through the powers provided by the Road Traffic Regulation Act 1984, to provide warnings, information and details of restrictions to road users.
32. While faded road markings are not illegal in a definite black-and-white sense, the legislation of the Road Traffic Act 1988 outlines that roads must be safe for users. Therefore, if an accident were to occur due to the lack of road markings, or the inadequate quality of them, then the responsibility may well lie with the Council. An incident caused as a direct result of road marking quality could therefore be a violation of the law. In addition, missing, faded or incorrect road markings make parking restrictions unenforceable.
33. The recent RoadAI video survey of the highway network has identified that over 300km of the surveyed road markings were in the <25% condition value. At the time of preparation of this report, the RoadAI road marking data was being processed and evaluated by the Highways Asset Team. This data will enable us to establish a maintenance backlog and make more informed bids for planned improvement programmes.

34. **Traffic Signs** - Restrictions are legally unenforceable if the signs are missing, incorrect, wrongly orientated or obscured. Again, the legislation of the Road Traffic Act 1988 outlines that roads must be safe for users as described above.
35. Sign cleaning is undertaken following Councillor or customer request or where inspections have identified badly obscured signs. However, due to restricted Revenue budgets, a cyclic sign cleaning programme is unaffordable.
36. The replacement of faded, missing or damaged street nameplates is a good example of a continual demand on revenue maintenance budgets. During the three-year period 2020-2023 400 nameplates were replaced on approximately 200 streets at a cost of circa £60k. However, a backlog of 690 nameplates remains at an approx. replacement cost of £103k, at current investment rates this backlog will take more than 5 years to replace. (That is, if no more defective units were added to the backlog).
37. The recent RoadAI video survey has identified 23,800 traffic signs on the road network. At present the software is unable to automatically categorise sign condition. However, desk top condition analysis can be undertaken and recorded against each asset. At the time of preparation of this report, the RoadAI traffic sign data was being processed and evaluated by the Highways Asset Team. This data will enable us to establish a maintenance backlog and make more informed bids for planned improvement programmes.
38. **Painting of Highway Structures** - Painting structures are an essential and cost-effective maintenance strategy to protect the integrity of steelwork and help achieve their design lives of 120 years. Painting prevents corrosion and the subsequent structural deterioration of components minimising expensive repairs to strengthen or replace corroded beams. Elements of a structure that benefit from painting are steel beams under the bridge deck, parapets (the fences on the edge of the structure) and complete footbridges.
39. Modern paintwork systems used on highway structures have a lifecycle of between 20 to 25 years, a significant improvement over older systems lasting from 12 and 15 years, thus significantly extending new treatment cycles but limiting protection of older painted elements. It should be noted that access arrangements for carrying out painting can increase the cost of a scheme significantly, along with the legislative requirements of Railway companies and Natural Resources Wales over rivers.
40. The current revenue budget available for the maintenance of all Highway Structures is £130k, which is fully allocated to completing essential safety works and minor repairs. There is an estimated current backlog of £900k for painting Highway Structures that have significant steelwork

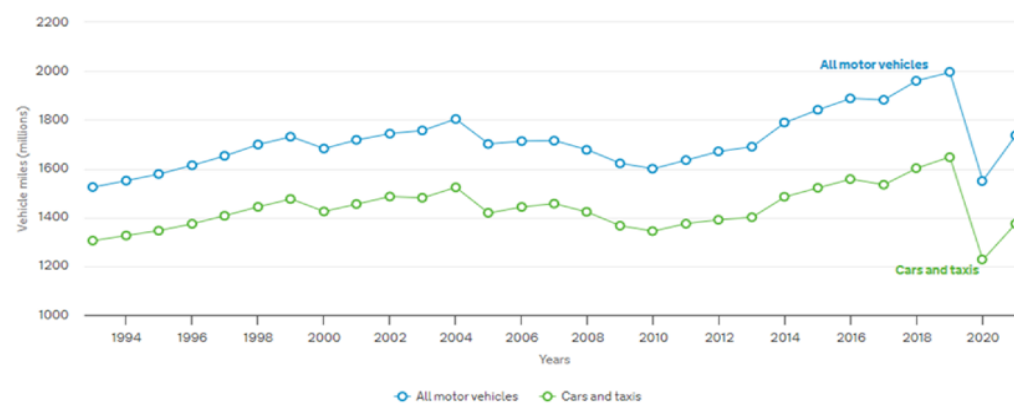
components. Based on current inspection data the painting of structural steelwork comprises approximately 25% of a £4m maintenance backlog.

41. **Gully Emptying & Sweeping Highway Channels** - The removal of detritus from the highway channels (gutter) and cleansing of drainage gullies allows the free flow of rainwater off the highway into the drainage system to prevent flooding. The removal of rainwater from the highway also helps to maximise the life of the asphalt carriageway.
42. Water can be one of the most damaging elements to an asphalt surface. Moisture damage decreases strength and durability of asphalt, weakening the bond between the bitumen and the aggregate, thus speeding up deterioration forming potholes and cracking. When cracks form it allows water to seep under the surface, which is damaging to the base beneath. Extended exposure to these defects can have significant detrimental effects to the structure and foundation of the road.
43. It is very difficult to quantify the direct damage to the carriageway caused by the effects of standing water because of blocked drains and channels. However, reductions in revenue investment for cyclic gully emptying and street sweeping functions, and their consequent reduced frequency, can be attributed to accelerated carriageway deterioration as described above.
44. **City Centre, Local Centres and Bay.** It is recognised that some focal areas of the city experience significantly higher volumes of pedestrian, cycle and public transport. Also, these central areas will require a higher level of materials and maintenance. This results from the higher levels of servicing activity, being driven on by loading vehicles, higher access of services by utilities, as well as general wear and tear. In the past materials may have been selected for these areas of a more specialised or decorative character.
45. The prestige maintenance expectation in these focal areas demands a higher “Serviceability standard” than our routine safety/risk-based approach. This higher serviceability standard will undertake repairs that would not trigger a safety repair but improve the aesthetics and maintain the overall appearance of these areas. For example, re-painting bollards and lampposts, early repair interventions to footway and carriageway surfaces and street furniture, re-grouting of paving joints etc.
46. Cyclic safety inspections would continue in these areas as specified in the Safety Inspection Policy to ensure statutory requirements are met and an appropriate claims defence is maintained.
47. The HAMP will seek to adopt an approach that supports the delivery of high-quality materials and maintenance that are also sustainable in terms of robustness and simplicity of pallet whilst continuing to provide an effective risk-based maintenance and management approach to the rest of the highway network.

48. **Asset Growth** - The highway asset grows each year due to the adoption and construction of new sections of highway often resulting from private developments. This will also include the introduction of new Council promoted schemes on the existing network such as high-status city centre public realm improvements, upgraded junctions, new traffic management such as raised tables and speed humps, segregated cycle lanes etc. This ongoing continual increase in the quantity of highway assets will require future maintenance as they age and deteriorate, placing a continually increasing demand on maintenance budgets.
49. For example, over the 10-year period 2012-22 the carriageway length has increased by 26.5km and over 1,700 new street lighting columns have been erected.
50. **Traffic Growth** - The graph below (source DFT) illustrates a steady growth in traffic volume placing increasing pressure on the Highway network and accelerating deterioration in carriageway condition with HGV's and buses causing disproportionate wear on road surfaces. Some of the main arterial routes into the city have in the region of 80,000 vehicles per day with a proportion of heavy goods vehicles of approximately 6%.

Annual traffic by vehicle type in Cardiff

Traffic in Cardiff from 1993 to 2021 by vehicle type in vehicle miles (millions)



51. **Changing Environmental Conditions** also place increased pressure on maintenance budgets.
52. Increased frequency of more extreme weather can have direct and indirect impact on road condition. The deterioration in asphalt construction from the effects of water is discussed in para 42 above. Changes in temperature (both high and low temperatures) and rainfall patterns can interact where wider temperature variation promotes cracking, compounding the effects of increased rainfall and damage caused by traffic (especially HGV's).
53. This cycle of climatic events places an increased burden on existing maintenance budgets. If such extreme events occur during the period of this HAMP and increased damage or deterioration is experienced, it may be necessary to divert existing budgets and revise service standards that are affordable unless additional funding can be secured.

54. Wherever possible highway teams are adopting modern materials, technologies and maintenance techniques to minimise the negative effects of climate change on the highway asset. Also, pushing suppliers and contractors to continually develop new approaches and alternative opportunities.
55. **Carriageway Condition Benchmarking** - Utilising WG all Wales KPI's for classified road condition a benchmarking analysis has been undertaken to compare how Cardiff's classified road condition compares with other Welsh Local Authorities, see Tables 3 to 5 below (full size tables are shown in section 12 of the HAMP document). These KPI's only apply to the classified A, B and C class roads and are not undertaken on the U class (unclassified) network.
56. It must be noted that historically classified roads (20% of the network) attract a disproportionate amount of funding compared to unclassified roads (80% of the network). This funding allocation adopts a risk-based approach based on the classified network carrying significantly higher levels of traffic, often at higher speeds, than unclassified roads. As can be seen from Tables 3, 4, & 5 below Cardiff's classified A, B and C class carriageway network conditions compare favourably against all Wales averages. However, it should be noted an effect of this risk-based approach and the availability of maintenance budgets means classified roads are kept in a better condition than the unclassified roads. Unfortunately, the majority of residents will live adjacent to the unclassified network in residential areas and might not fully appreciate the increased investment in classified roads that they may use infrequently.
57. In late 2022 the Council introduced a video data collection exercise utilising RoadAI technology commissioned to collect carriageway condition. The road Condition data generated by RoadAI can identify lengths of highway that are in various stages of deterioration feeding into the programming of improvement works. This survey is repeatable and will be undertaken on a cyclic basis, building an ongoing record of the changing condition of the carriageway network. At the time of preparation of this report, the RoadAI carriageway data was being processed and evaluated by the Highways Asset Team and a U class condition indicator will be developed from this data. Prior to this new RoadAI survey being implemented the condition of the unclassified network was measured via visual inspections undertaken by highway Safety Inspectors whilst carrying out their cyclic inspection of the highway network.

Table 4 – Condition of A Class Roads

Council	THS/012a - A Roads - % in Red Condition										
	Length (km)	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Anglesey	145.20	3.40%	3.10%	3.69%	2.70%	2.30%	3.20%	2.90%	4.00%	4.60%	3.00%
Blaenau Gwent	44.62	7.20%	4.80%	3.60%	2.60%	2.30%	2.60%	2.60%			
Bridgend	104.00	5.70%	5.00%	5.24%	4.70%	5.20%	4.50%	4.00%			
Caerphilly	96.60	5.00%	5.40%	4.16%	4.50%	4.30%	4.60%	3.90%	4.10%	3.00%	3.20%
Cardiff	152.00	7.00%	4.00%	4.29%	3.70%	4.10%	3.30%	3.50%	3.30%	2.60%	2.80%
Carmarthenshire	249.10	6.60%	4.70%	4.34%	4.60%	4.30%	4.10%	5.20%	5.40%	4.10%	3.60%
Ceredigion	158.30	6.60%	5.90%	4.90%	5.12%	4.10%	4.20%	4.70%		3.20%	
Conwy	118.06	4.30%	2.60%	2.87%	2.90%	3.10%	3.50%	3.90%	4.30%	3.90%	
Denbighshire	139.80	5.60%	3.70%	3.51%	3.00%	2.70%	2.70%	3.40%	3.60%	3.50%	2.60%
Flintshire	152.00	2.20%	1.50%	1.23%	1.40%	1.50%	1.40%	1.70%	2.20%	2.10%	
Gwynedd	310.20	5.20%	4.40%	3.53%	3.10%	3.50%	3.20%	3.30%	3.50%	2.80%	2.60%
Merthyr Tydfil	27.62	5.30%	5.60%	3.47%	3.30%	3.20%	3.30%	3.60%	3.70%	2.70%	
Monmouthshire	59.00	4.20%	3.00%	2.56%	2.30%	2.10%	2.40%	2.70%	2.60%	2.70%	
Neath Port Talbot	140.19	7.90%	6.80%	5.87%	4.50%	4.10%	4.50%	5.30%	5.00%		
Newport	51.30	3.10%	3.30%	2.58%	2.20%	2.60%	2.60%	2.30%	2.70%	2.30%	2.10%
Pembrokeshire	160.30	5.70%	4.50%	4.94%	4.60%	5.40%	5.40%	4.80%	4.40%	3.90%	3.90%
Powys	238.20	4.70%	5.00%	3.35%	2.80%	3.60%	3.90%	3.90%	3.90%	3.40%	3.00%
Rhondda Cynon Taf	165.40	7.60%	8.10%	8.01%	7.20%	5.70%	5.20%	4.90%	4.70%	4.60%	3.70%
Swansea	102.30	3.70%	3.90%	3.18%	3.30%	3.20%	3.20%	4.10%	4.00%	3.10%	2.60%
Torfaen	26.00	2.30%	1.50%	1.18%	1.40%	1.70%	2.10%	2.50%			
Vale of Glamorgan	73.90	6.80%	6.00%	5.62%	5.90%	5.90%	6.54%	6.30%	6.00%	5.10%	
Wrexham	110.00	2.90%	2.80%	2.70%	2.30%	2.40%	2.40%	3.30%	3.80%	3.20%	3.50%
Welsh Avg		5.14%	4.35%	3.86%	3.55%	3.51%	3.58%	3.76%	3.96%	3.38%	3.05%

Table 5 – Condition of B Class Roads

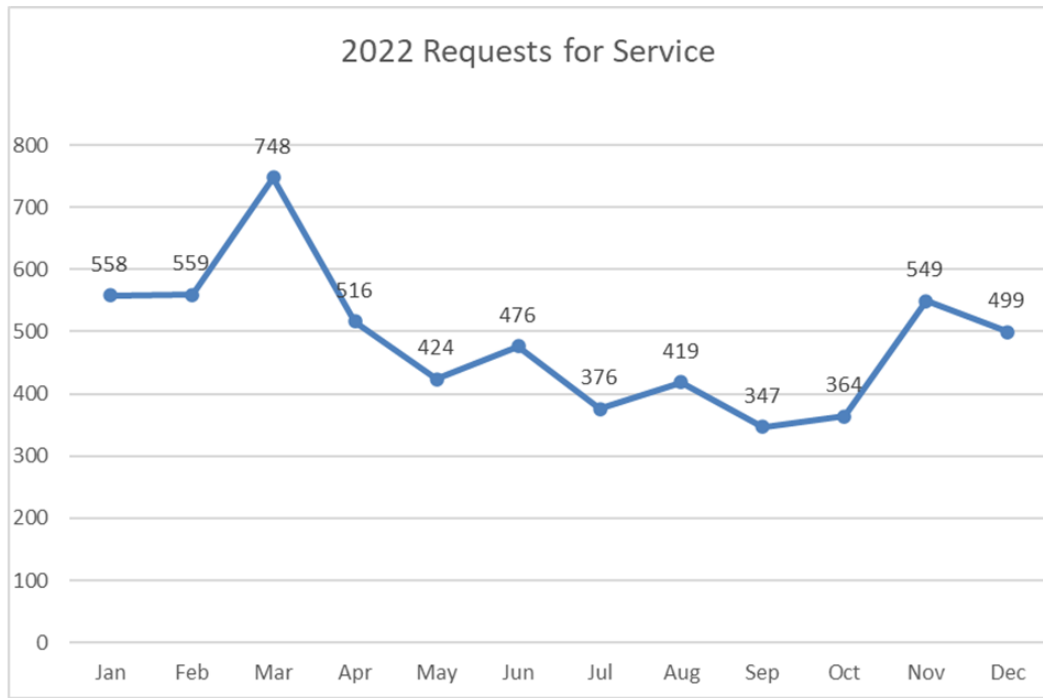
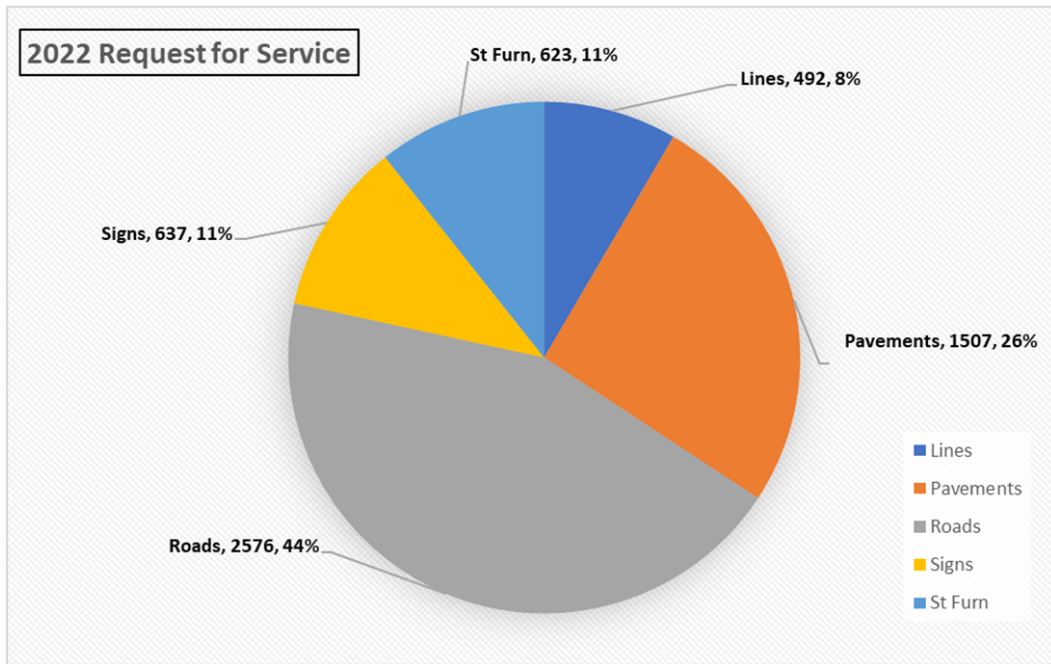
Council	THS/012b - B Roads - % in Red Condition										
	Length (km)	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Anglesey	122.50	7.50%	5.90%	5.11%	3.80%	3.20%	4.40%	3.80%	3.80%	3.80%	2.80%
Blaenau Gwent	17.95	8.10%	6.80%	5.48%	4.80%	5.10%	5.60%	5.60%			
Bridgend	30.90	7.70%	6.10%	4.84%	4.90%	3.30%	4.20%	3.90%			
Caerphilly	64.80	6.30%	4.80%	3.44%	4.10%	3.70%	3.60%	3.40%	3.30%	2.40%	2.20%
Cardiff	32.00	8.40%	8.20%	7.34%	6.50%	7.10%	5.60%	4.70%	5.60%	4.10%	3.30%
Carmarthenshire	331.50	7.70%	5.50%	3.61%	4.00%	3.50%	3.10%	4.20%	4.70%	3.40%	2.80%
Ceredigion	325.00	10.00%	7.70%	5.40%	5.17%	3.10%	3.00%	3.50%		2.00%	
Conwy	173.28	7.30%	6.50%	6.06%	4.30%	4.30%	4.30%	5.80%	5.90%	4.80%	
Denbighshire	133.70	9.30%	8.80%	7.71%	6.50%	5.80%	5.10%	4.70%	5.30%	5.00%	3.80%
Flintshire	78.00	2.80%	1.20%	1.34%	1.50%	1.30%	1.30%	1.40%	1.80%	1.90%	
Gwynedd	204.22	5.30%	4.70%	3.72%	3.40%	3.90%	3.80%	3.90%	3.90%	3.00%	2.50%
Merthyr Tydfil	12.13	11.80%	14.40%	10.83%	8.80%	8.60%	7.40%	6.20%	7.10%	7.20%	
Monmouthshire	151.00	6.10%	5.30%	5.30%	5.10%	4.30%	4.90%	4.70%	5.10%	5.20%	
Neath Port Talbot	63.42	6.70%	5.20%	4.04%	2.60%	2.40%	2.90%	2.90%	2.80%		
Newport	46.70	6.50%	6.00%	4.99%	4.00%	4.20%	4.40%	4.20%	5.00%	4.40%	3.10%
Pembrokeshire	240.90	6.90%	5.10%	4.97%	4.00%	4.40%	5.20%	5.60%	5.40%	4.10%	3.40%
Powys	604.10	9.40%	8.60%	5.98%	5.20%	5.50%	5.70%	5.30%	5.10%	4.50%	4.10%
Rhondda Cynon Taf	76.20	9.90%	8.40%	6.43%	7.10%	5.90%	6.20%	6.50%	6.20%	5.90%	4.80%
Swansea	101.60	5.70%	5.60%	4.04%	4.50%	5.00%	4.50%	5.10%	5.10%	4.20%	3.10%
Torfaen	17.00	6.20%	5.60%	5.60%	5.60%	4.20%	4.30%	4.80%			
Vale of Glamorgan	57.80	5.90%	4.80%	5.04%	4.70%	4.20%	4.20%	4.10%	5.10%	5.20%	
Wrexham	142.50	5.70%	4.60%	2.83%	2.70%	2.70%	2.40%	2.60%	2.90%	2.60%	3.00%
Welsh Avg		7.33%	6.35%	5.19%	4.69%	4.35%	4.40%	4.40%	4.67%	4.09%	3.24%

Table 6 – Condition of C Class Roads

Council	THS/012c - C Roads - % in Red Condition										
	Length (km)	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Anglesey	360.90	17.60%	17.60%	15.80%	13.40%	10.10%	8.90%	8.70%	8.20%	8.50%	8.20%
Blaenau Gwent	55.25	17.70%	10.50%	9.44%	7.00%	6.40%	6.10%	5.50%			
Bridgend	108.10	11.80%	11.40%	12.78%	10.10%	8.90%	8.60%	8.00%			
Caerphilly	152.40	13.40%	12.80%	9.90%	9.20%	8.70%	7.30%	6.60%	6.00%	4.90%	4.70%
Cardiff	106.00	12.80%	10.10%	9.29%	6.60%	6.90%	6.00%	5.80%	5.60%	4.50%	4.60%
Carmarthenshire	1,271.50	21.80%	20.40%	15.56%	13.70%	11.60%	11.90%	12.50%	12.50%	12.00%	11.70%
Ceredigion	840.60	22.60%	21.60%	21.90%	21.02%	19.10%	19.40%	17.30%		14.70%	
Conwy	485.86	13.80%	17.10%	16.95%	15.30%	15.70%	14.04%	15.40%	15.50%	15.10%	
Denbighshire	521.60	13.90%	14.50%	12.95%	13.30%	10.50%	10.20%	8.20%	8.30%	7.60%	7.50%
Flintshire	262.00	8.00%	6.90%	7.25%	6.30%	5.00%	5.30%	5.80%	4.90%	5.30%	
Gwynedd	923.25	10.30%	14.70%	14.23%	15.80%	15.20%	14.10%	14.50%	14.20%	12.90%	11.00%
Merthyr Tydfil	34.77	8.40%	6.70%	5.93%	5.20%	5.20%	4.00%	4.10%	3.90%	3.30%	
Monmouthshire	459.00	9.90%	14.20%	13.41%	12.30%	8.00%	7.70%	7.30%	7.60%	7.70%	
Neath Port Talbot	53.08	9.60%	8.20%	7.04%	5.90%	5.40%	5.30%	5.30%	5.70%		
Newport	142.40	11.00%	10.70%	10.63%	7.00%	6.90%	7.10%	6.90%	7.40%	6.40%	5.90%
Pembrokeshire	979.60	15.60%	14.90%	10.80%	7.50%	7.70%	7.20%	8.90%	9.40%	8.50%	7.60%
Powys	2,102.00	26.00%	26.70%	27.09%	25.10%	24.40%	23.00%	21.60%	22.00%	19.60%	17.90%
Rhondda Cynon Taf	123.50	13.90%	13.60%	13.28%	11.60%	10.20%	6.20%	3.00%	3.50%	3.40%	2.30%
Swansea	127.90	10.40%	10.10%	7.10%	7.30%	6.80%	6.70%	6.90%	7.00%	6.20%	5.20%
Tarfaen	85.00	9.10%	8.70%	7.58%	7.00%	6.00%	5.30%	5.10%			
Vale of Glamorgan	311.30	16.20%	15.10%	13.91%	12.30%	11.20%	10.47%	9.70%	10.30%	8.10%	
Wrexham	370.50	21.00%	24.00%	21.55%	19.70%	18.50%	16.30%	16.20%	19.00%	18.90%	19.70%
Welsh Avg		14.31%	14.11%	12.93%	11.48%	10.38%	9.60%	9.24%	9.50%	9.31%	8.86%

58. As discussed above the highway's teams adopt a risk-based approach to the development of highway improvement schemes and repairs. A number of innovative machine-based and manual survey techniques inform this process, for example:
- Vaisala RoadAI video survey (as discussed above)
 - SCANNER machine-based laser condition survey of the classified A, B and C class carriageways.
 - SCRIM skid resistance machine survey
 - Manual pendulum test skid resistance surveys (localised areas)
 - Cyclic safety inspections managed from inspection to repair via the AMX asset management system.
 - Core tests and trial holes.
 - Chemical analysis to identify existing tar-bound surfacing.
 - Engineers site inspections.
59. **Carbon Reduction** - The Council's One Planet carbon reduction policies play an important role in the delivery of the Highway Maintenance service. The service is actively seeking effective new working practices to achieve carbon reduction and help Cardiff become a carbon neutral city by 2030.
60. For example, warm mix asphalts are used wherever possible replacing traditional hot mixes and carriageway asphalt arisings (the removed existing asphalt surface) from resurfacing schemes are recycled by the contractor for future use. Also, utilising a new maintenance contract, arisings from routine repairs and maintenance will be recycled or reused wherever possible.
61. Preventative cold applied surface treatments are frequently used on carriageways and footways wherever appropriate.
62. Wales's first carbon neutral highway surfacing scheme utilising recycled steel slag in place of virgin quarried stone aggregate was delivered on

- 1.2km of the A470 Northern Avenue in 2022 with support of One Planet funding.
- 13,000m² of surfacing
 - First Net Zero Carbon Emissions scheme in Wales
 - Cost approx. £500k - One Planet Cardiff contributed £200k
63. At the time of preparation of this report the Highways teams were awaiting a response from the One Planet steering group for the funding of another innovative carbon reduction trial. This latest trial is taking the model used on the A470 described above a step further seeking to create genuinely Carbon Zero surfacing materials, without offsetting, using Biochar to sequester Carbon to form a carbon sink and Lignin (a natural plant material) as a bitumen replacement.
64. The service has had an ongoing programme of replacing existing street lighting units with modern efficient LED units across the entire network. As a result of the efficiencies associated with LED's and its reduced energy consumption, it will contribute favourably towards the Councils carbon reduction targets.
- Strategic Network – 16,500 LED units
 - Residential Network – 23,500 LED units
 - Over £1.2m energy savings/annum
 - Thousands of Tonnes of carbon emission reduction
65. The Highway teams will continue to seek innovative carbon reduction initiatives as technology and operational opportunities emerge. In addition, the engineers work closely with the County Surveyors Society all Wales HAMP project which is looking to develop models and approaches to assist Highway Authorities implement and measure Carbon reduction solutions.
66. It should be noted there is a general consensus in the construction industry that the adoption of new low carbon engineering opportunities may be more costly than traditional repairs, treatments and approaches.
67. **Customer Demand** - AMX records customer contacts regarding carriageways, footways, street furniture and road markings, the charts below show contact statistics for requests for service in 2022. There were over 5,800 annual requests, which on average equates to approx. 480 per month and over 110 per week. There are seasonal peaks between January and April because of the effects of winter weather on carriageway condition.



- 68. **Conclusion on Issues** - As described in this issues section, increased costs and reducing budgets, coupled with numerous external pressures and ongoing deterioration, are placing Highway Maintenance functions funded from both Capital and Revenue sources under significant pressure.
- 69. Whilst the highway teams have developed processes utilising available asset data and adopting risk-based approaches to best allocate funding to areas of greatest need, the increasing demand and consequent reduced availability of budget will mean that fewer repairs and improvements are able to be delivered. Therefore, increasing the risk of 3rd party insurance claims and reducing customer satisfaction in the condition of the highway asset.

Local Member consultation (where appropriate)

70. No requirement for consultation.

Reason for Recommendations

71. To note the current state of the Highways Asset infrastructure within the Highway Asset Management Plan – 3 (HAMP) which will inform the Cabinet's recommendations to Council for the Revenue and Capital 2024/25 and Medium-Term budget setting process.

Financial Implications

72. This report presents for approval by Cabinet the updated Highway Asset Management Plan setting out the proposals for future management and investment of the highway and associated assets. It further recommends that Cabinet note the steady state and revenue investment proposals as detailed within the plan and considers future funding levels that may be required in order to move towards this target of investment.
73. This report identifies a significant budget gap for future years between the current capital budget allocations and the investment level deemed necessary to achieve steady state, without reliance on additional Council resources. It must therefore seek to identify alternative external funding sources, actions, mitigations and efficiencies which enable the service to close the gap.
74. The Directorate must not undertake any activity approved as part of the future plan which cannot be managed within available budgets without impacting on existing maintenance obligations and minimum condition standards. Any additional funding requirements will need to be considered along with other pressures as part of the medium-term budget planning process.
75. The Directorate must ensure that at all times spend is managed within available capital and revenue resources and in accordance with relevant inspection policies. This will necessitate prioritisation of work and diversion of resources as appropriate in order to maximise resources within a cost effective and risk-based planned maintenance programme.
76. The report identifies the pressures on the service which include inflationary cost increases, customer demand, environmental conditions and increased traffic volume against a backdrop of significant ongoing repairs and investment requirements.

77. An additional £2 million capital funding was allocated for 2023/24 as part of the Capital Programme budget approved by Council in March 2023. Priorities for this funding are detailed in paragraph 22 which highlight that related spend will be directed toward the asset with the highest demand and level of deterioration.
78. It is essential that the Directorate use all means available to identify priorities for available capital and revenue budgets which meet existing commitments, reducing highway liability and risk as far as possible and which allocates resources to the areas of greatest need.
79. Alternative funding sources and efficiencies must be maximised and mitigations identified to manage the position and to further develop the medium to long term strategy.

Legal Implications (including Equality Impact Assessment where appropriate)

80. Legal Services have not considered the Highway Asset Management Plan document annexed to this report in detail but understand from the body of this report that it contains a number of potential schemes and initiatives. Legal advice should be obtained on each such scheme and initiative prior to being implemented to ensure the same can be achieved within legal constraints.
81. To the extent that any proposed scheme and initiative involves the procurement of works, goods or services then the Council must comply with its Contract Standing Orders and Procurement Rules and procurement legislation.
82. In addition, to the extent that any of the proposed schemes and initiatives are dependent on the making of any orders or the obtaining of any consents or the like then it will be necessary to follow the appropriate statutory processes. By way of example only if a scheme is dependent on the making of a traffic regulation order (TRO) then the outcome cannot be guaranteed as individuals have the right to object. Due and proper consideration would need to be given to any such objections in determining how to proceed.
83. The body of the report notes the Councils legal duty imposed by Section 41 of the Highways Act 1980 (“the Act”) to maintain highways which are maintainable at public expense. The section itself does not specify what is the standard required of the highway authority in executing this duty. Case law has however established, that the duty to maintain a highway requires maintenance of a standard necessary to accommodate the ordinary traffic which passes or may reasonably be expected to pass along the highway. Therefore, the extent of the duty will vary according to the type of highway and the type of traffic that may normally be expected on it.

84. In addition, it should be noted that claims can be brought against a highway authority for alleged failure to maintain the highway. Section 58 of the Act provides a defence against such claims where the highway authority can be shown to have taken such care, as in all the circumstances was reasonably required to secure that the part of the highway to which the claim relates was not dangerous. It is understood that the preparation and approval of the Highway Asset Maintenance Plan will, in part, assist the Council to demonstrate the approach adopted to carry out highway inspections.

Equality and Socio-Economic Duty

85. In considering this matter, the Council must have regard to its public sector equality duties under the Equality Act 2010 (including specific Welsh public sector duties). This means the Council must give due regard to the need to (1) eliminate unlawful discrimination, (2) advance equality of opportunity and (3) foster good relations on the basis of protected characteristics. The protected characteristics are: age, gender reassignment, sex, race – including ethnic or national origin, colour or nationality, disability, pregnancy and maternity, marriage and civil partnership, sexual orientation, religion or belief – including lack of belief.
86. When taking strategic decisions, the Council also has a statutory duty to have due regard to the need to reduce inequalities of outcome resulting from socio-economic disadvantage ('the Socio-Economic Duty' imposed under section 1 of the Equality Act 2010). In considering this, the Council must take into account the statutory guidance issued by the Welsh Ministers (WG42004 A More Equal Wales The Socio-economic Duty Equality Act 2010 (gov.Wales) and must be able to demonstrate how it has discharged its duty.
87. An Equalities Impact Assessment aims to identify the equalities implications of the proposed decision, including inequalities arising from socio-economic disadvantage, and due regard should be given to the outcomes of the Equalities Impact Assessment.

Well-Being of Future Generations (Wales) Act 2015

88. The Well-Being of Future Generations (Wales) Act 2015 ('the Act') places a 'well-being duty' on public bodies aimed at achieving 7 national well-being goals for Wales – a Wales that is prosperous, resilient, healthier, more equal, has cohesive communities, a vibrant culture and thriving Welsh language, and is globally responsible.
89. In discharging its duties under the Act, the Council has set and published well-being objectives designed to maximise its contribution to achieving the national well-being goals. The well-being objectives are set out in Cardiff's Corporate Plan 2023-26. When exercising its functions, the Council is required to take all reasonable steps to meet its well-being objectives. This means that the decision makers should consider how the proposed decision will contribute towards meeting the well-being

objectives and must be satisfied that all reasonable steps have been taken to meet those objectives.

90. The well-being duty also requires the Council to act in accordance with a 'sustainable development principle'. This principle requires the Council to act in a way which seeks to ensure that the needs of the present are met without compromising the ability of future generations to meet their own needs. Put simply, this means that Council decision makers must take account of the impact of their decisions on people living their lives in Wales in the future. In doing so, the Council must:

- Look to the long term
- Focus on prevention by understanding the root causes of problems
- Deliver an integrated approach to achieving the 7 national well-being goals
- Work in collaboration with others to find shared sustainable solutions
- Involve people from all sections of the community in the decisions which affect them
- The decision maker must be satisfied that the proposed decision accords with the principles above; and due regard must be given to the Statutory Guidance issued by the Welsh Ministers, which is accessible using the link below:
<http://gov.wales/topics/people-and-communities/people/future-generations-act/statutory-guidance/?lang=en>

General

91. The Council has to be mindful of the Welsh Language (Wales) Measure 2011 and the Welsh Language Standards when making any policy decisions and consider the impact upon the Welsh language, the report and Equality Impact Assessment deals with all these obligations. The Council has to consider the Well-being of Future Generations (Wales) Act 2015 and how this strategy may improve the social, economic, environmental and cultural well-being of Wales.

92. Cabinet must be satisfied that the proposal is within the Policy and Budget Framework, if it is not then the matter must be referred to the Council. All decisions taken by or on behalf the Council must (a) be within the legal powers of the Council; (b) comply with any procedural requirement imposed by law; (c) be within the powers of the body or person exercising powers of behalf of the Council; (d) be undertaken in accordance with the procedural requirements imposed by the Council e.g. Council Procedure Rules; (e) be fully and properly informed; (f) be properly motivated; (g) be taken having regard to the Council's fiduciary duty to its taxpayers; and (h) be reasonable and proper in all the circumstances

HR Implications

93. There are no HR implications for this report.

Property Implications

94. There are no property implications for this report.

RECOMMENDATIONS

Cabinet is recommended to:

- (1) To note the current state of the Highways Asset Management Plan - 3 (HAMP) which will inform the Cabinet's recommendations to Council for the Revenue and Capital 2024/25 and Medium-Term budget setting process.
- (2) Approve the expenditure of £2Million funding within 2023/24 budget against the carriageway asset as identified in this report to limit ongoing deterioration concerns relating to carriageways.

SENIOR RESPONSIBLE OFFICER	Director Name – Andrew Gregory
	Date submitted to Cabinet office.

The following appendices are attached:

Appendix A - Previously presented HAMP 2 (approved by Council Executive in February 2012 (Decision No. EXECM/11110 Min No. 121)

Appendix B - Highway Asset Management Plan – 3 (HAMP)