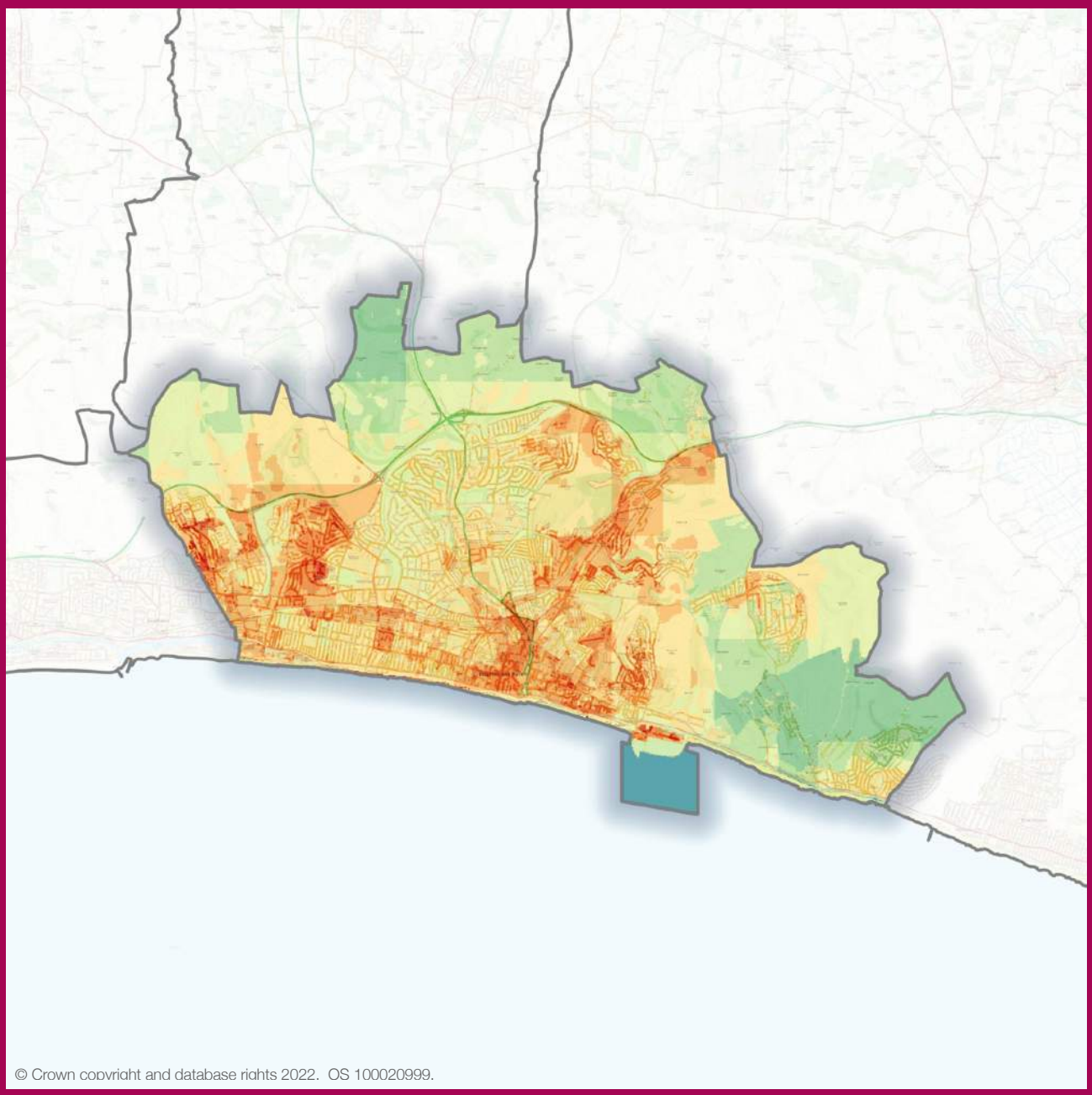

Brighton & Hove City Council

CPRE The countryside charity Sussex

Soft and Hard Landscapes Tree Planting Opportunity Mapping Report

Treeconomics

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June 2023

This assessment was carried out by Treeconomics

Contents

1. Executive Summary

This report outlines opportunities for new tree planting across Brighton & Hove, with exploration into potential available space in both hard and soft landscapes. Using a hotspot mapping approach, potential planting locations are ranked from low to high priority, depending on the need of that area for a raise in canopy cover and ecosystem service delivery based on five criteria: air pollution concentration, indices of multiple deprivation (IMD), risk of flooding, surface temperature and population density.

Brighton & Hove City Council has developed a tree planting strategy for 2022-2027. Some of the key parts of this strategy revolve around a vision to increase canopy cover and planting in appropriate places[1]. This report can facilitate the first steps towards bringing this vision to fruition.

Brighton & Hove currently has an average canopy cover of 10.5%, which is below the national average of 16.4%[2]; however, there are ample opportunities to explore extensive planting schemes across the whole city. In soft landscapes 5,222 ha of land is identified as potentially plantable, with 329 ha of that identified as actual plantable space. In hard landscapes 36,075 potential planting sites are identified. Each planting location is ranked by priority based on the urban challenges faced, and analysis is also provided at individual ward level.

This document, together with the digital mapping layers used in its creation, should enable the effective use of resources as Brighton & Hove determines where to plant to help build local resilience to climate change and increase the urban forest canopy cover.

Total Canopy Cover/Urban Forest Cover:
This is the area of leaves, branches and stems of trees and shrubs covering the ground when viewed from above.

Potential Plantable Space (PPS)
This is the space calculated from the ‘manmade surfaces’ and OS layers man made surfaces and existing canopy cover. It does not take account of other uses to which that land is usually put, such as pedestrian access.

Actual Plantable Space (APS)
This is the number of locations large enough to accommodate a tree pit, taking account of Brighton & Hove’s criteria for tree pit size, accessibility and tree spacing. It includes the small areas of soft landscaping, such as roadside verges, often associated with hard landscapes. It does not account of underground services.

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[1] Brighton & Hove City Council, 2022

[2] Doick et al, 2017

2. Introduction

As urban populations grow, our green spaces are under enormous pressure. Yet one of its most significant components - trees - provide a variety of ecosystem services and benefits to human health and wellbeing. Today, over 80% of the UK live in urban areas[3] and this is only expected to increase. Our cities occupy about 2% of the earths surface, but consume 75% of global energy and generate 80% of greenhouse gases[4]. In this context, our urban forests are set to become ever more important.

The urban forest is dynamic, trees are constantly being lost either because of sub-optimal growing conditions, pest and disease, development or they have reached the end of their safe useful life. Within the UK, 67% of urban forest receives no proactive management. New tree planting is critical to the health, resilience and longevity of our urban tree population.

Unlike woodlands, there is very little natural regeneration of the urban forest[5]. To tackle future challenges facing urban areas, new trees must be delivered through human intervention. New tree planting needs to be methodically planned to achieve future canopy goals and ensure a resilient, healthy and functioning urban forest, this becomes ever more pertinent with the future challenges our urban forests will face.

A number of factors need to be borne in mind in approaching any programme of tree planting, especially where goals are time-limited. In particular:

- Time: Trees take a number of years to reach their full potential size and their canopy cover develops over that period. However, as they grow tree canopies can extend over and above hard surfaces, potentially providing a larger coverage than estimated.
- Mortality: A number of trees each year will be lost and removed due to factors such as pest and diseases, health and safety issues and natural dieback . If mortality exceeds current growth and growth from new plantings, this will lower the canopy cover.
- Services: In urban areas there are a number of underground and overground services which can potentially be affected by tree roots or the tree canopies. Identifying suitable locations for planting is paramount and planting sites may require additional engineering solutions (such as Root space systems) in order to realise the actual plantable space figures given in this report.

This report outlines tree planting opportunities across Brighton & Hove as part of its long term approach to tree planting. This opportunity mapping report covers the ‘where to plant’ aspect of that challenge. It has been separated into soft landscapes and hard landscapes as this forms a clear divide on several parameters: ease of execution, decision making parties, species selection, maintenance requirements and finally costs. This separation often aid the distribution of resources and facilitates the different approaches to make tree planting in both landscapes a success.

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3 Govt Office for Science, 2021

4 World Economic Forum, 2016

5 Piana et al., 2020

3. Canopy Cover

3.1 Full Canopy Cover

Canopy cover is a simple, easily understood metric for measuring the extent to which we share our space with trees. However, it is a two-dimensional perspective and is only indicative of the levels of eco-system service benefits which those trees provide.

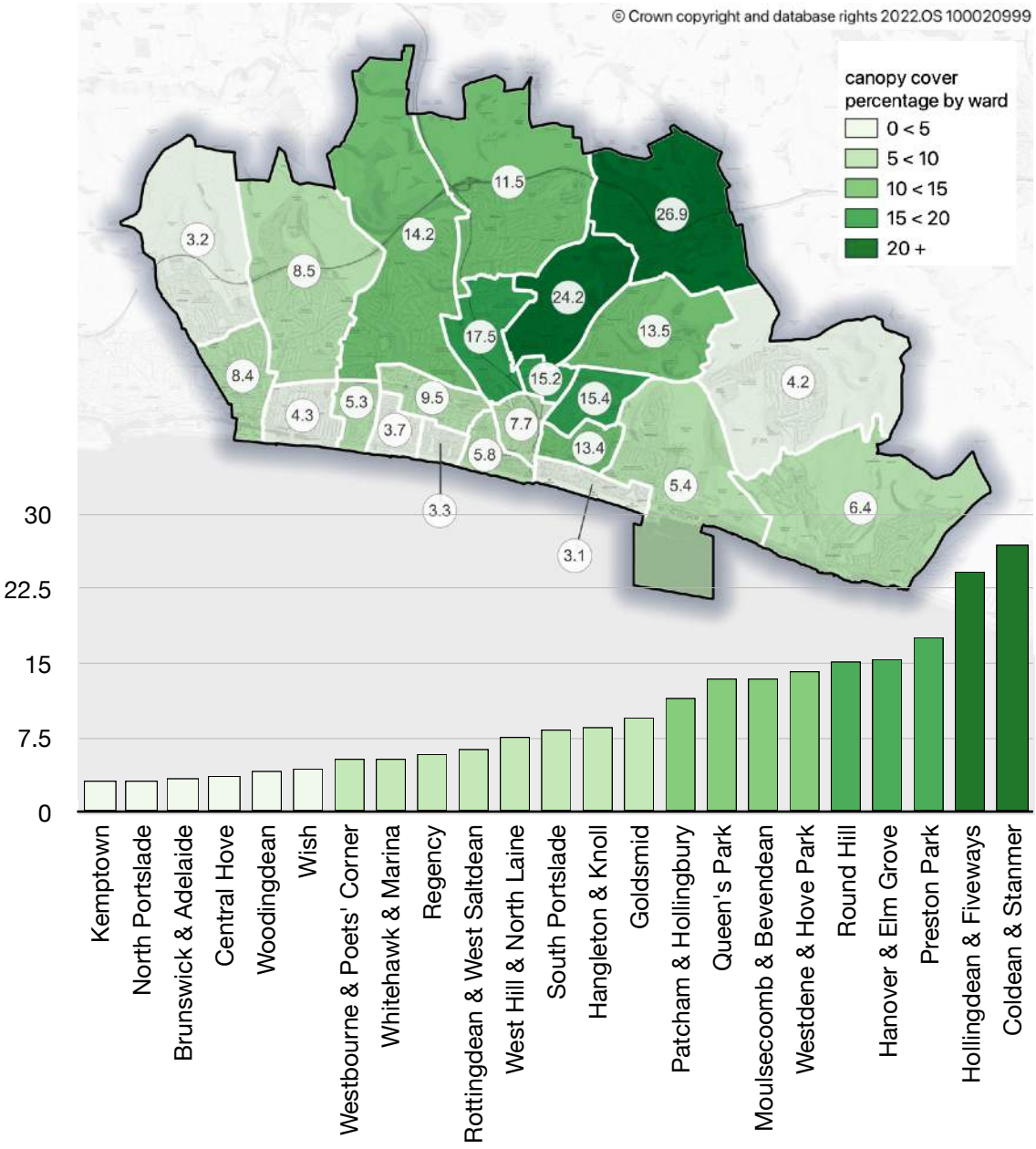


Figure 1: Percentage canopy cover in Brighton & Hove by Ward

The average canopy cover across Brighton & Hove was calculated at 10.5% using Bluesky National Tree Map data. It varies significantly from Kemptown with 3.14% to Coldean & Stanmer which has the highest canopy cover at 26.8%.

Canopy cover relates to all trees within the geographical area under consideration. This includes:

- Woodlands
- Trees in soft landscapes - e.g. Park Trees
- Trees in hard landscapes - e.g. Street Trees
- Hedgerow trees
- Private Gardens
- Trees along non-road linear corridors - e.g. railways and canals
- Trees in other green open spaces - e.g. Golf Courses
- All trees, irrespective of ownership are included in such a measure.

The average canopy cover for Brighton & Hove is below the average for England at 16%.[6] Towns and cities have generally proven to have higher canopy cover than rural areas, however coastal areas also generally suffer from lower canopy cover. The recommended target for coastal UK towns and cities is 15%.[7] Table 1 shows a selection of canopy studies across the UK.

City/District	% Tree cover	Source
Barnet	26.9	Blue Sky NTM 2022
Islington	25.0	i-Tree Canopy+ Blue Sky NTM Survey 2019
Greater London	21.0	i-Tree Eco 2015
Outer London	21.0	i-Tree Eco 2015
Kensington & Chelsea	18.4	i-Tree Canopy+ Blue Sky NTM Survey 2022
Inner London	18.0	i-Tree Eco 2015
Ealing	16.9	i-Tree Canopy+ i-Tree Survey 2018
Mid Suffolk	15.1	Forest Research; Canopy Cover Map UK 2021[1]
Cambridgeshire	13.9	Forest Research; Canopy Cover Map UK 2021
Fenland	12.5	Forest Research; Canopy Cover Map UK 2021
Torbay	12.0	i-Tree Survey 2011
Cambridge	11.6	Forest Research; Canopy Cover Map UK 2021
Brighton & Hove	**10.5**	**Blue Sky NTM 2022**
Peterborough	10.3	Forest Research; Canopy Cover Map UK 2021
Huntingdonshire	10.2	i-Tree Canopy+ Blue Sky NTM Survey 2021
Aberdeen	10.0	i-Tree Canopy 2016[2]
York	9.8	i-Tree Canopy 2016
Sunderland	9.2	i-Tree Canopy 2016

Table 1: A selection of UK districts, cities and towns and their estimated canopy cover
NB. Figures should be viewed with caution as they are derived from different sources

[6] Forest Research, 2021

[7] Doick *et al.*, 2016.

4. Tree Planting Hotspots - Soft Landscapes

4.1 Potential vs Actual Plantable Space

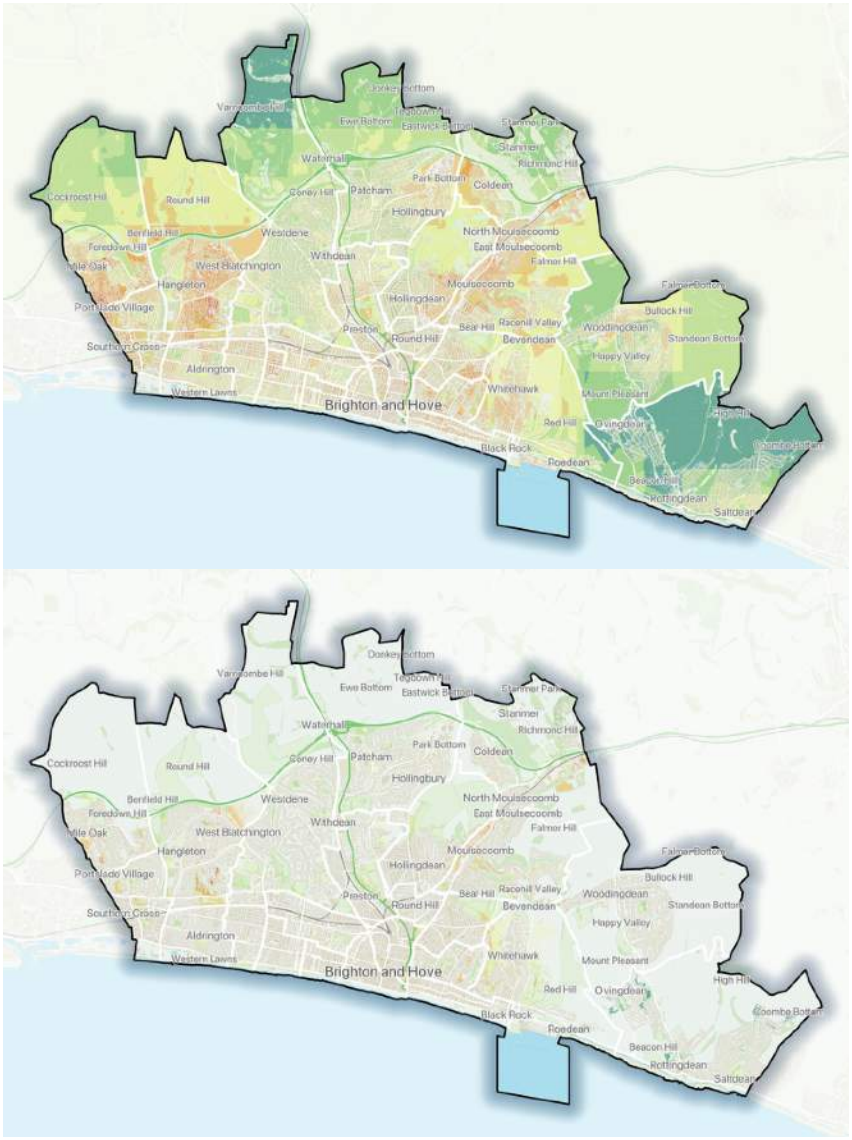


Figure 2: Potential vs Actual plantable space of soft landscapes in Brighton & Hove

Figure 2 shows the potential (above) and actual (below) tree planting space within Brighton & Hove in soft landscapes (hard landscapes tree planting follows). Potential plantable space of soft landscapes incorporates all natural areas, both public and private, removing any hard spaces, buildings, transport infrastructure and water, as designated by the Ordnance Survey. Trees could be planted in some of these locations, however it would take more planning and collaboration with private land holders. The actual plantable space additionally removes areas that can't realistically be planted on, such as private gardens, agricultural land, protected areas, and sports pitches. This narrows down the soft landscapes and identifies more practical tree planting opportunities for the Council to investigate. The areas of plantable space in figure 2 are ranked by priority which is determined by a number of weighted factors (see methodology). Areas with higher ranks have greater influence on communities and should therefore be considered as higher priority locations to explore planting.

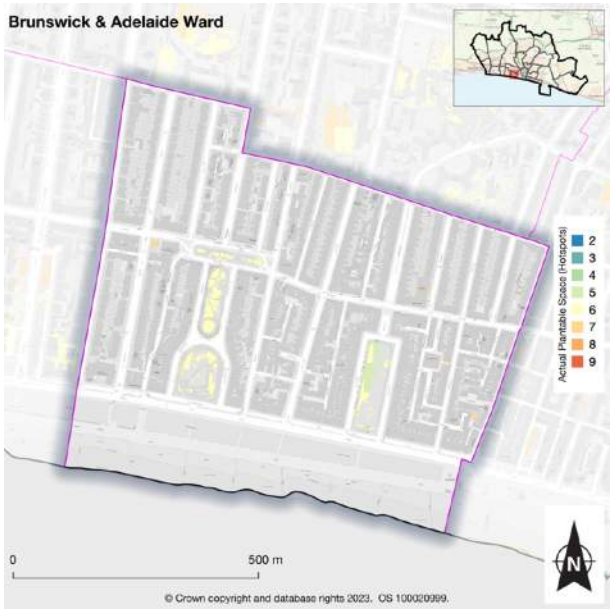
4.2 Wards by high priority share

Table 2 shows the plantable space in soft landscapes broken down by ward, ordering the wards with the highest proportion of high priority sites first. These wards are likely to gain the most from trees planted within their boundaries. All space is ranked by priority 1-10 based on the impact planting in that location could have; high priority is deemed to be value 7 and above. The share of actual plantable space which is ranked as high priority indicates which areas are most in need of increased tree canopy to tackle both environmental and social challenges, including poor air quality, increased flood risk, increased heat island effect, Index of Multiple Deprivation, and road proximity.

Ward	Total Area (Ha)	Potential Plantable Space (Ha)	Actual Plantable Space (Ha)	High Priority (Ha)	High Priority as share of Total Area
Queen's Park	107	34	6	6	5.2%
South Portslade	189	72	13	9	5.0%
Moulsecoomb & Bevendean	396	247	26	18	4.5%
West Hill & North Laine	98	15	4	4	4.1%
Hangleton & Knoll	724	526	40	28	3.9%
Coldean & Stanmer	638	347	29	15	2.4%
Whitehawk & Marina	524	366	47	11	2.2%
Hanover & Elm Grove	141	53	11	2	1.8%
Preston Park	239	87	15	4	1.7%
North Portslade	610	499	15	9	1.5%
Goldsmid	144	40	5	2	1.3%
Hollingdean & Fiveways	359	183	10	4	1.2%
Regency	92	11	2	1	0.9%
Central Hove	83	21	1	1	0.8%
Kemptown	99	15	1	1	0.7%
Wish	152	53	6	1	0.7%
Patcham & Hollingbury	815	562	29	4	0.5%
Round Hill	64	18	1	0	0.3%
Westbourne & Poets' Corner	93	30	2	0	0.3%
Brunswick & Adelaide	55	14	1	0	0.1%
Woodingdean	843	724	7	1	0.1%
Westdene & Hove Park	991	658	35	0	0.0%
Rottingdean & West Saltdean	828	649	23	0	0.0%

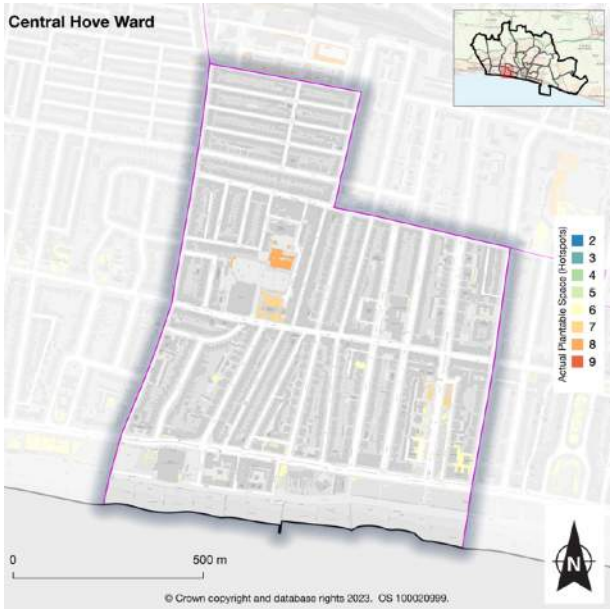
Table 2: No. Sites within soft landscape and high priority locations.

4.3 Actual Plantable Space - Hotspots by Ward (Individual Maps)



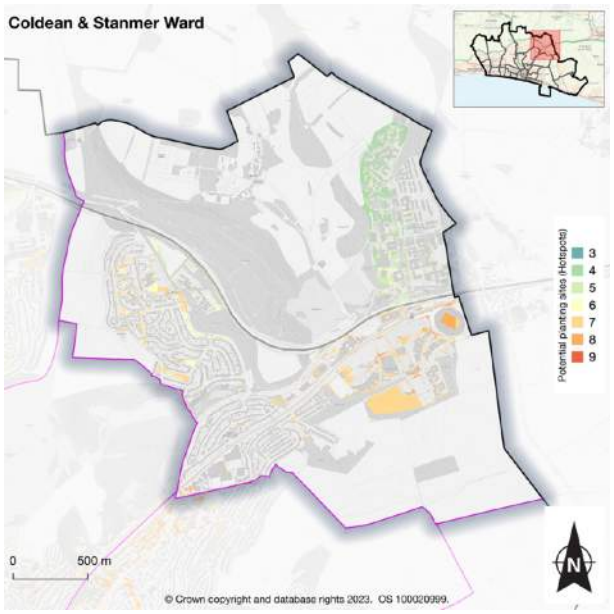
Actual plantable space of soft landscapes in Brunswick & Adelaide

Brunswick & Adelaide Headline Figures:
Canopy cover - **3.3%**
Potential plantable space - **13.5 Ha**
Actual plantable space - **0.9 Ha**



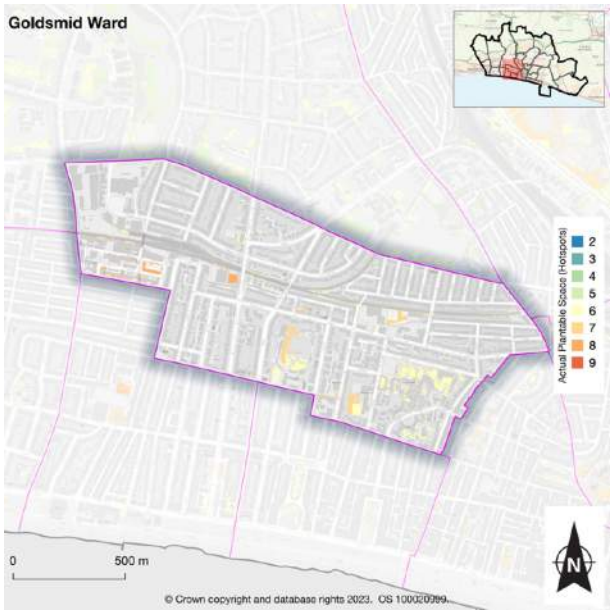
Actual plantable space of soft landscapes in Central Hove

Central Hove Headline Figures:
Canopy cover - **3.7%**
Potential plantable space - **20.9 Ha**
Actual plantable space - **1.4 Ha**



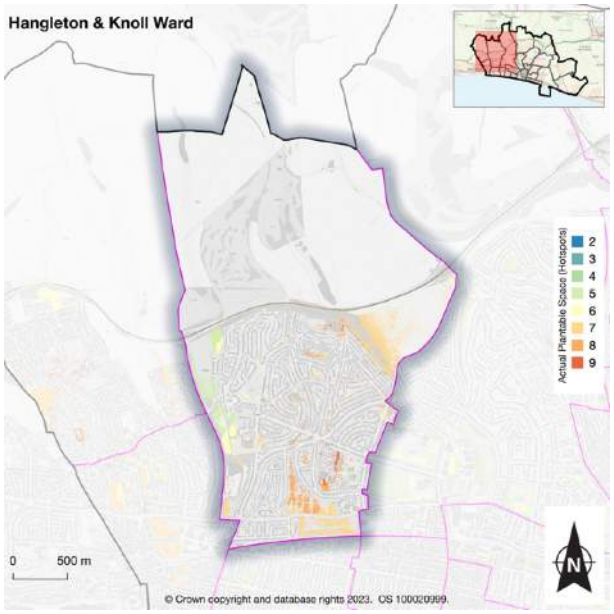
Actual plantable space of soft landscapes in Coldean & Stanmer

Coldean & Stanmer Headline Figures:
Canopy cover - **26.9%**
Potential plantable space - **346.8 Ha**
Actual plantable space - **29.3 Ha**



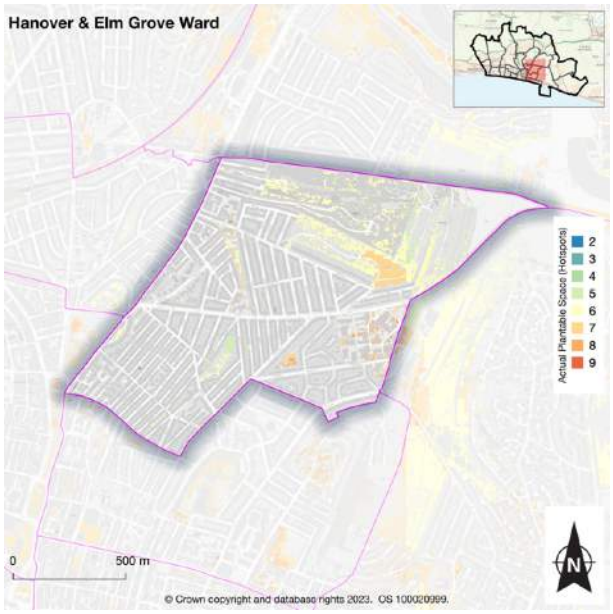
Actual plantable space of soft landscapes in Goldsmid

Goldsmid Headline Figures:
Canopy cover - **9.5%**
Potential plantable space - **40.3 Ha**
Actual plantable space - **5 Ha**



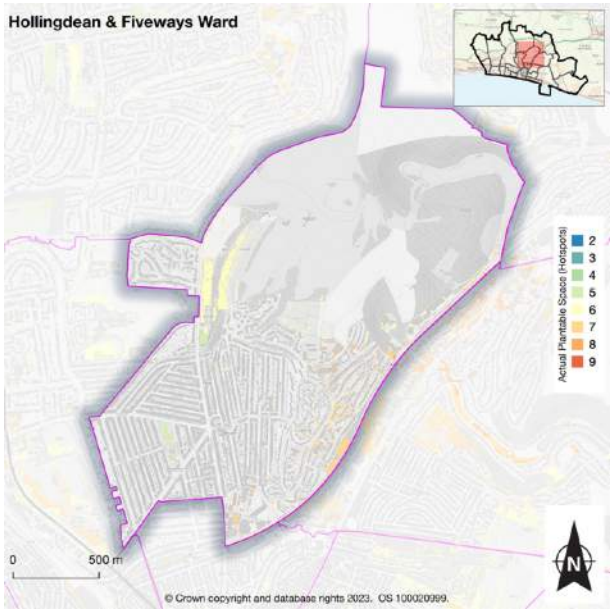
Actual plantable space of soft landscapes in Hangleton & Knoll

Hangleton & Knoll Headline Figures:
Canopy cover - **8.5%**
Potential plantable space - **525.6 Ha**
Actual plantable space - **39.6 Ha**



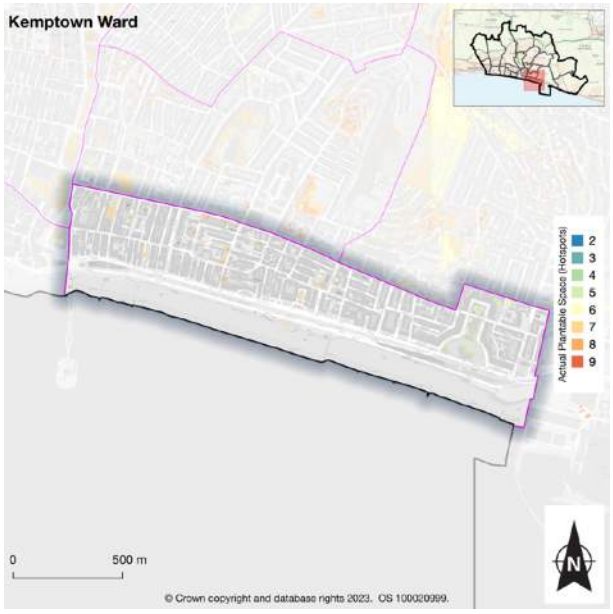
Actual plantable space of soft landscapes in Hanover & Elm

Hanover & Elm Headline Figures:
Canopy cover - **15.4%**
Potential plantable space - **52.8 Ha**
Actual plantable space - **10.7 Ha**



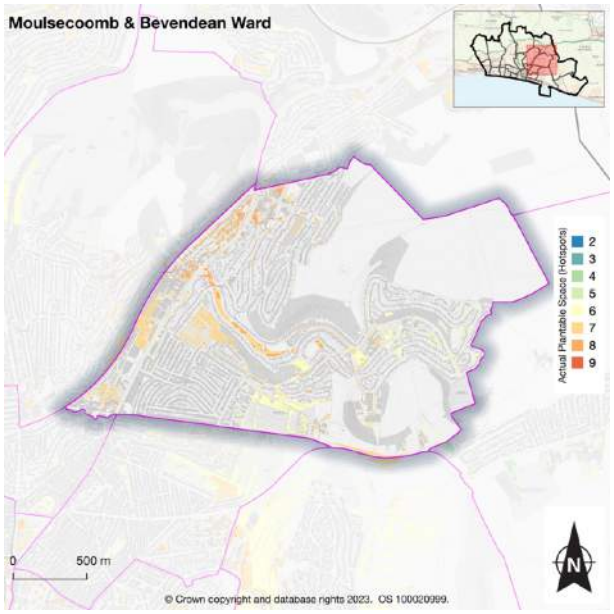
Actual plantable space of soft landscapes in Hollingdean & Fiveways

Hollingdean & Fiveways Headline Figures:
Canopy cover - **24.2%**
Potential plantable space - **183.4 Ha**
Actual plantable space - **10.4 Ha**



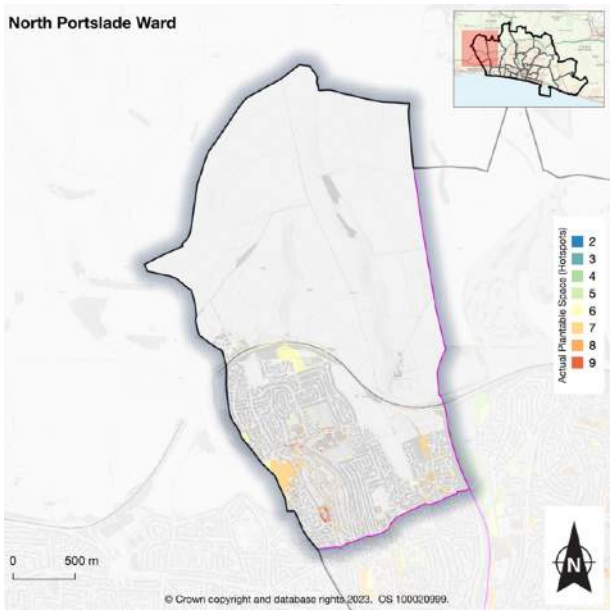
Actual plantable space of soft landscapes in Kemptown

Kemptown Headline Figures:
Canopy cover - **3.1%**
Potential plantable space - **15.2 Ha**
Actual plantable space - **1.4 Ha**



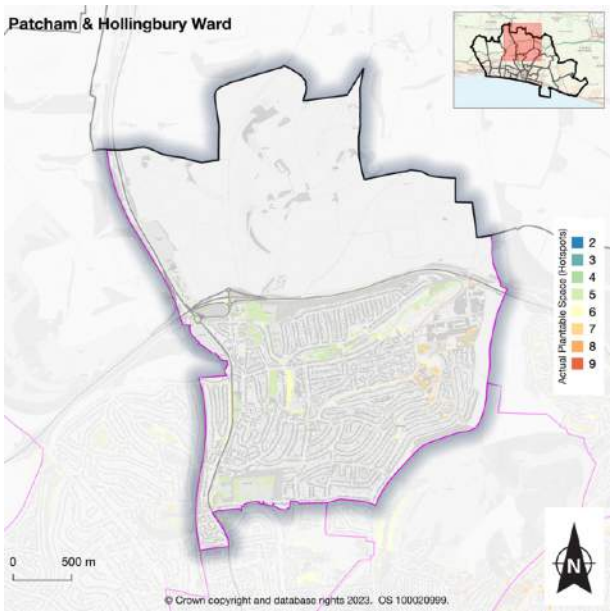
Actual plantable space of soft landscapes in Moulsecoomb & Bevendean

Moulsecoomb & Bevendean Headline Figures:
Canopy cover - **13.5%**
Potential plantable space - **247 Ha**
Actual plantable space - **25.7 Ha**



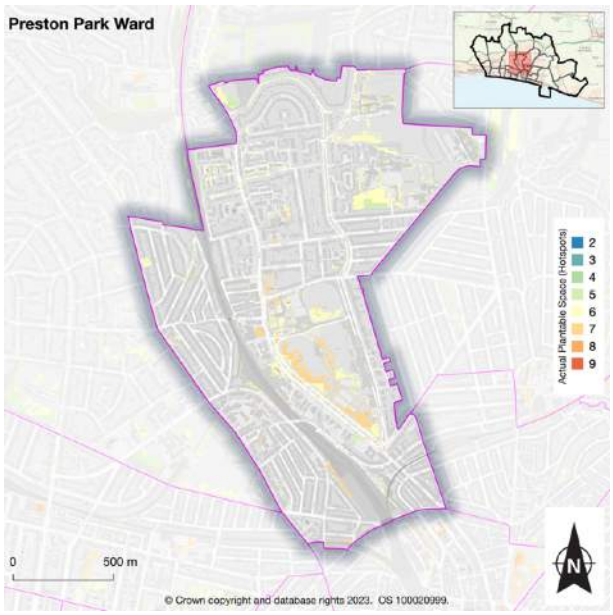
Actual plantable space of soft landscapes in North Portslade

North Portslade Headline Figures:
Canopy cover - **3.2%**
Potential plantable space - **499.3 Ha**
Actual plantable space - **14.8 Ha**



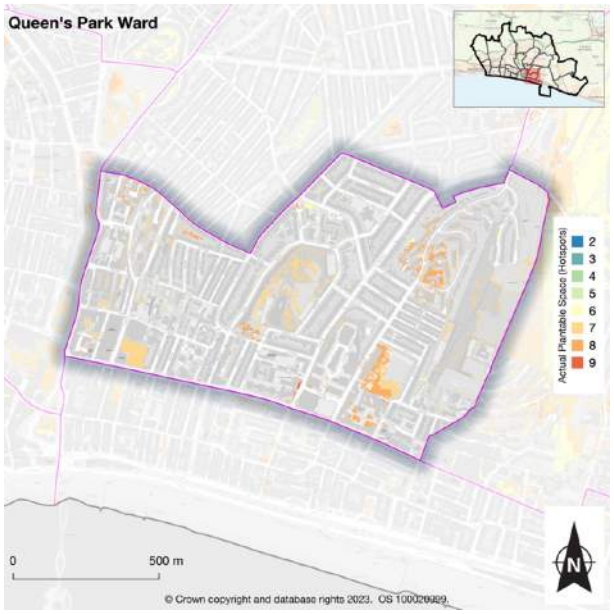
Actual plantable space of soft landscapes in Patcham & Hollingbury

Patcham & Hollingbury Headline Figures:
Canopy cover - **11.5%**
Potential plantable space - **561.7 Ha**
Actual plantable space - **29.3 Ha**



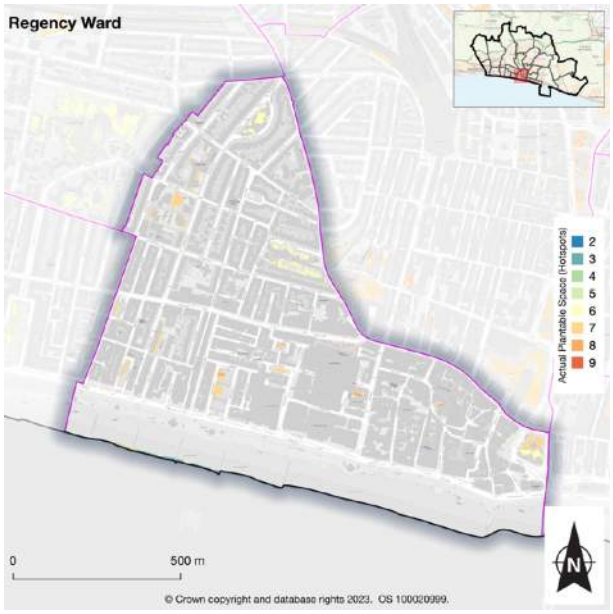
Actual plantable space of soft landscapes in Preston Park

Preston Park Headline Figures:
Canopy cover - **17.5%**
Potential plantable space - **86.9 Ha**
Actual plantable space - **14.5 Ha**



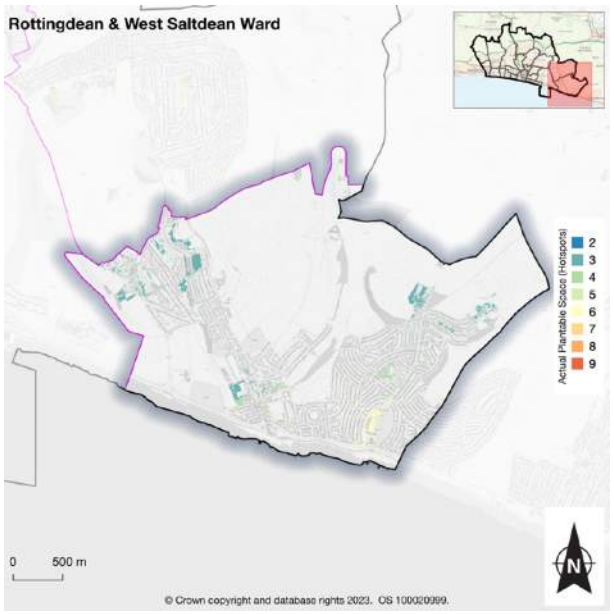
Actual plantable space of soft landscapes in Queen's Park

Queen's Park Headline Figures:
Canopy cover - **13.4%**
Potential plantable space - **34.3 Ha**
Actual plantable space - **5.8 Ha**



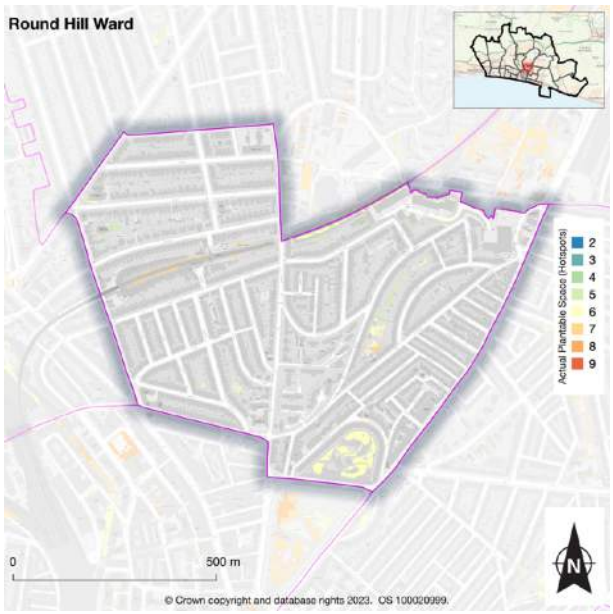
Actual plantable space of soft landscapes in Regency

Regency Headline Figures:
Canopy cover - **5.8%**
Potential plantable space - **11.3 Ha**
Actual plantable space - **1.7 Ha**



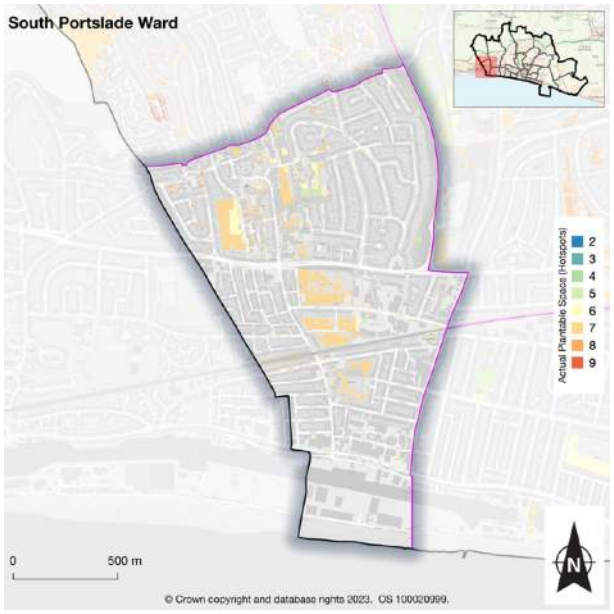
Actual plantable space of soft landscapes in Rottingdean & West Saltdean

Rottingdean & West Saltdean Headline Figures:
Canopy cover - **6.4%**
Potential plantable space - **649.1 Ha**
Actual plantable space - **23.2 Ha**



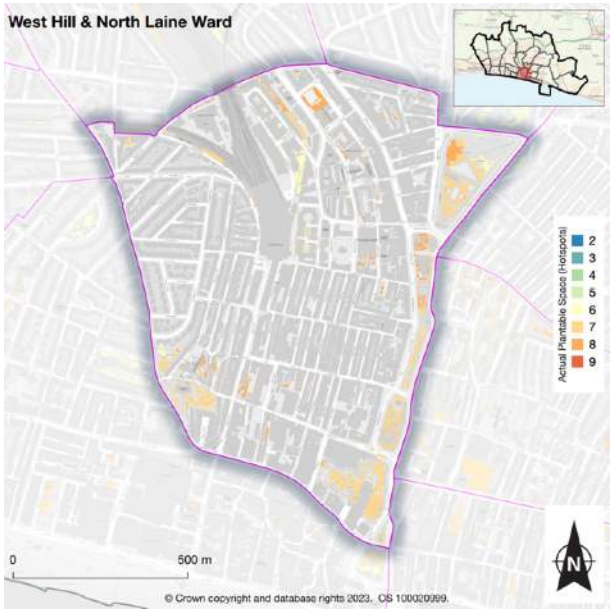
Actual plantable space of soft landscapes in Round Hill

Round Hill Headline Figures:
Canopy cover - **15.2%**
Potential plantable space - **17.5 Ha**
Actual plantable space - **1.3 Ha**



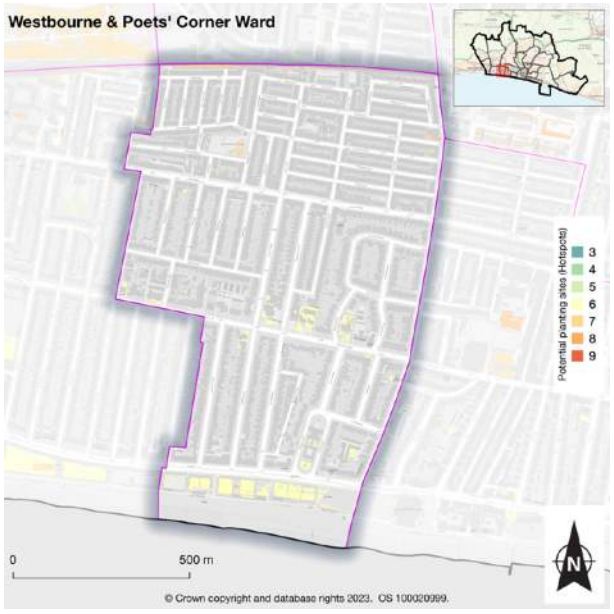
Actual plantable space of soft landscapes in South Portslade

South Portslade Headline Figures:
Canopy cover - **8.4%**
Potential plantable space - **71.9 Ha**
Actual plantable space - **12.7 Ha**



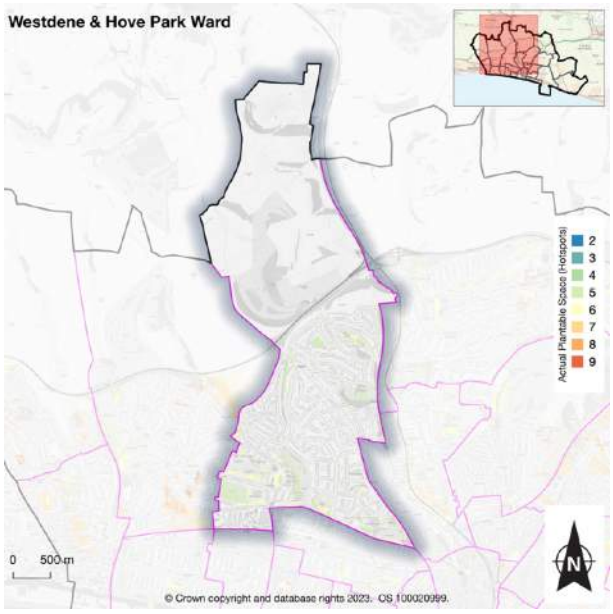
Actual plantable space of soft landscapes in West Hill & North Laine

West Hill & North Laine Headline Figures:
Canopy cover - **7.7%**
Potential plantable space - **14.9 Ha**
Actual plantable space - **4.4 Ha**



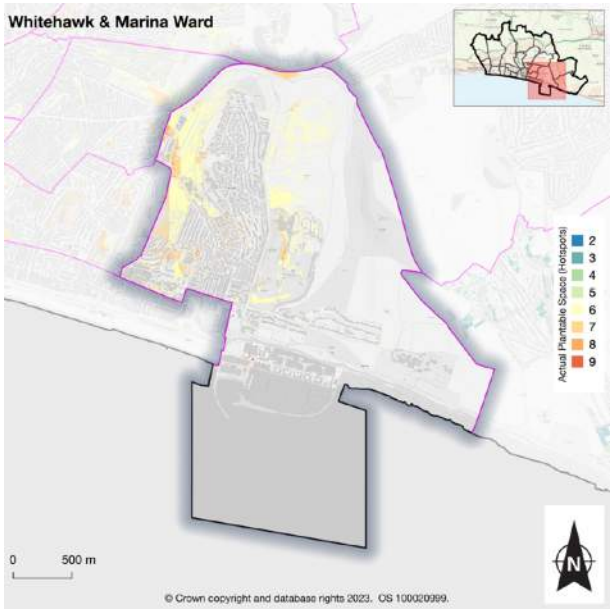
Actual plantable space of soft landscapes in Westbourne & Poets' Corner

Westbourne & Poets' Corner Headline Figures:
Canopy cover - **5.3%**
Potential plantable space - **29.8 Ha**
Actual plantable space - **2.1 Ha**



Actual plantable space of soft landscapes in Westdene & Hove Park

Westdene & Hove Park Headline Figures:
Canopy cover - **14.2%**
Potential plantable space - **658.2 Ha**
Actual plantable space - **34.6 Ha**



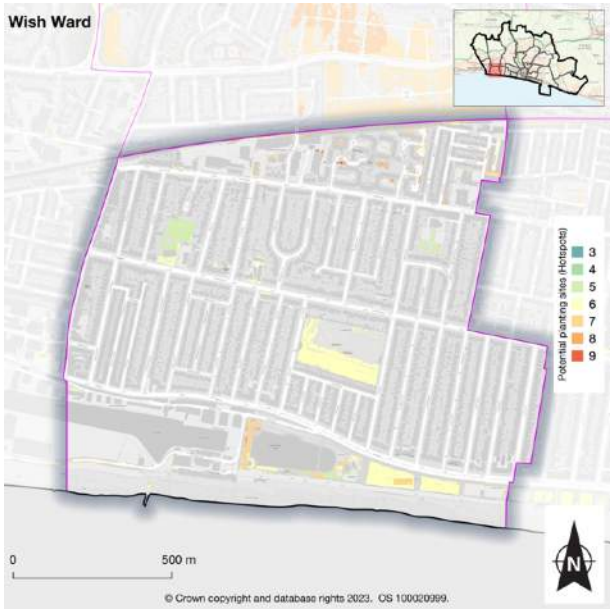
Actual plantable space of soft landscapes in Whitehawk & Marina

Whitehawk & Marina Headline Figures:

Canopy cover - **5.4%**

Potential plantable space - **365.6 Ha**

Actual plantable space - **46.8 Ha**



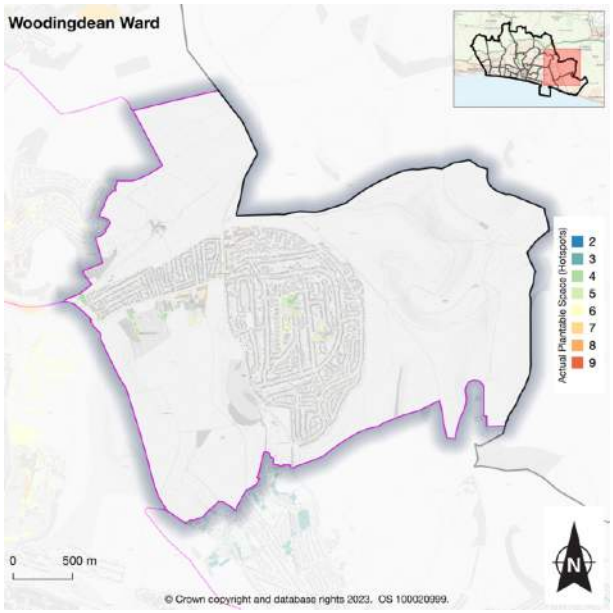
Actual plantable space of soft landscapes in Wish

Wish Headline Figures:

Canopy cover - **4.3%**

Potential plantable space - **52.7 Ha**

Actual plantable space - **5.9 Ha**



Actual plantable space of soft landscapes in Woodingdean

Woodingdean Headline Figures:

Canopy cover - **4.2%**

Potential plantable space - **723.7 Ha**

Actual plantable space - **7.4 Ha**

5. Tree Planting Hotspots - Hard Landscapes

5.1 Potential Planting Locations

Figures 3 shows the potential planting sites within Brighton & Hove in hard landscapes. Each site nominally has the potential for a tree to be planted there. The map shows a high level view of all the sites across the city, which number some 36,000 in total.

Figure 3: Potential plantable areas in hard landscapes in Brighton & Hove

Unlike in soft landscapes where a whole area is designated as plantable space, hard landscape opportunities are identified as point locations where each point represents a potential place for a new tree. The ranking criteria for the priority of each location is the same as in soft landscapes, however the increased effect of environmental and social issues means that significantly more of the planting opportunities in hard landscapes are considered to be in high priority locations.

It should be noted that this exercise is the output of a digital model and does not currently take account all other factors that have a major impact on the decision for any single location. Primary amongst these is the presence of underground services and access to adjacent properties. Consequently, whilst the map can highlight where resources should be directed, all sites should be subject to a ground survey to determine real world practicality and desirability. As with soft landscape analysis the priority values shown here is an indication of which sites would provide the most benefit of the community.

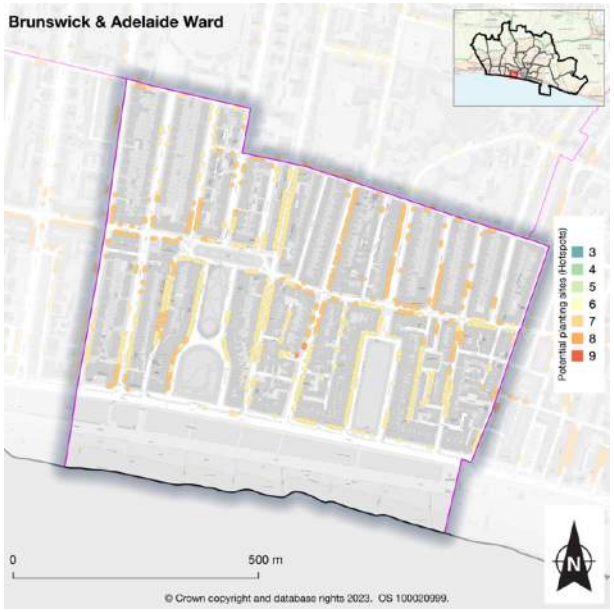
5.2 Wards by high priority share

Table 3 shows the plantable space broken down by ward, ordering the wards with the highest proportion of high priority sites first. These wards are likely to gain the most from trees planted within their boundaries. Also shown is the number of high priority sites by surface type. Fully natural and mixed sites are generally made up of small areas plantable soft landscapes immediately adjacent to paving or roads. They are usually far more cost effective to plant in, although are not always located in the locations most severely in need of additional trees. All space is ranked by priority 1-10, high priority is deemed to be 7 and above. Significantly more of the planting opportunities in hard landscapes are considered high priority than in soft landscapes despite the ranking criteria being identical. This is due to the proximity to roads, increased heat, and higher flood risk in these areas of Brighton & Hove.

Ward	Total No. Potential Tree Sites	High Priority Sites % of Total	No. High Priority Sites by Surface		
			Manmade	Mixed*	Natural
West Hill & North Laine	902	88%	865	24	13
Regency	755	85%	754	1	0
Hangleton & Knoll	3,009	78%	1,999	539	471
Whitehawk & Marina	1,313	78%	693	395	225
Queen's Park	687	75%	639	17	31
Kemptown	715	71%	706	2	7
North Portslade	1,585	68%	432	871	282
Moulsecoomb & Bevendean	1,987	64%	1,060	486	441
Coldean & Stanmer	1,919	62%	643	790	486
South Portslade	1,284	57%	855	350	79
Hollingdean & Fiveways	1,860	44%	1,295	323	242
Preston Park	1,140	37%	985	113	42
Round Hill	507	37%	505	2	0
Brunswick & Adelaide	888	37%	887	1	0
Westbourne & Poets' Corner	965	34%	965	0	0
Central Hove	934	34%	924	0	10
Hanover & Elm Grove	775	33%	769	1	5
Wish	1,583	32%	1,580	1	2
Goldsmid	925	25%	913	10	2
Patcham & Hollingbury	3,401	17%	856	1,556	989
Woodingdean	1,816	10%	327	1,204	285
Westdene & Hove Park	3,721	1%	1,538	1,631	552
Rottingdean & West Saltdean	3,404	0%	414	2,578	412

Table 3: No. Sites within hard landscape contexts showing high priority locations split by surface type.
***Mixed sites are typically paved areas with narrow planting strips alongside them.**

5.3 Potential Plantable Sites - Hotspots by Ward (Individual Maps)



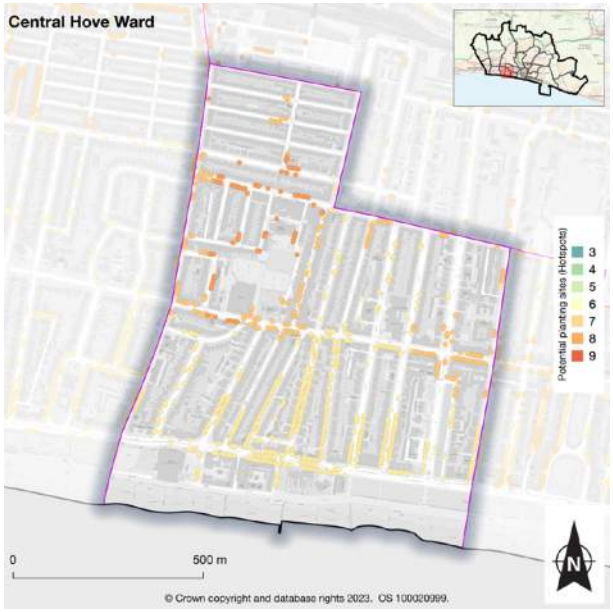
Potential plantable sites in hard landscapes in Brunswick & Adelaide

Brunswick & Adelaide Headline Figures:

Canopy cover - **3.3%**

Potential plantable sites - **888**

Of which is High Priority - **36.8%**



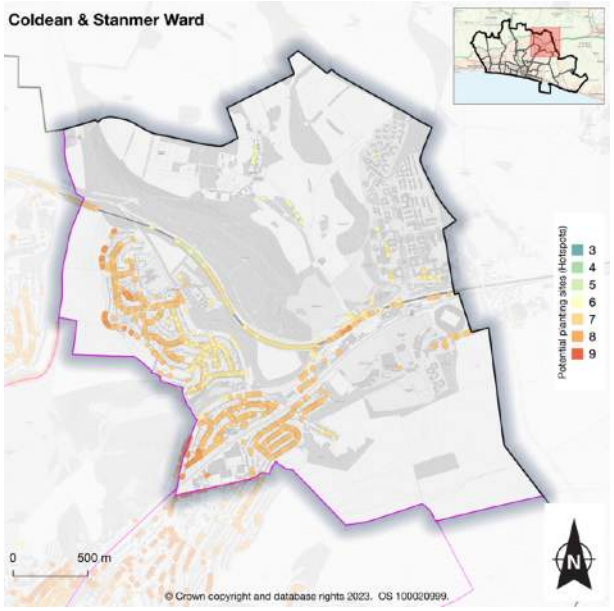
Potential plantable sites in hard landscapes in Central Hove

Central Hove Headline Figures:

Canopy cover - **3.7%**

Potential plantable sites - **934**

Of which is High Priority - **34.2%**



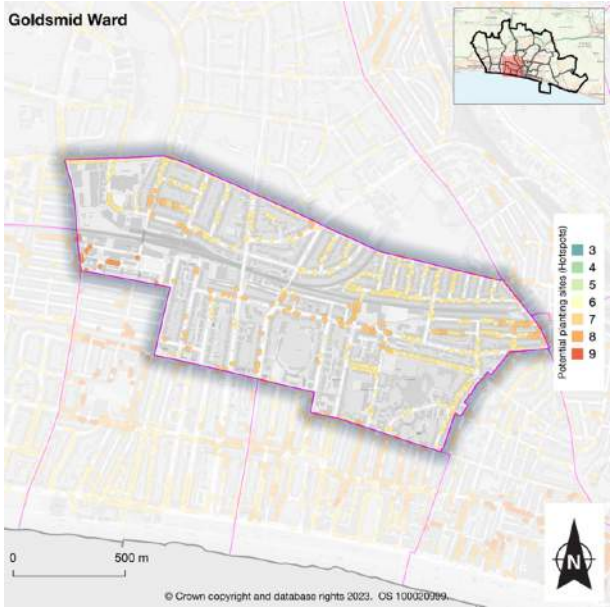
Potential plantable sites in hard landscapes in Coldean & Stanmer

Coldean & Stanmer Headline Figures:

Canopy cover - **26.9%**

Potential plantable sites - **1,919**

Of which is High Priority - **61.5%**



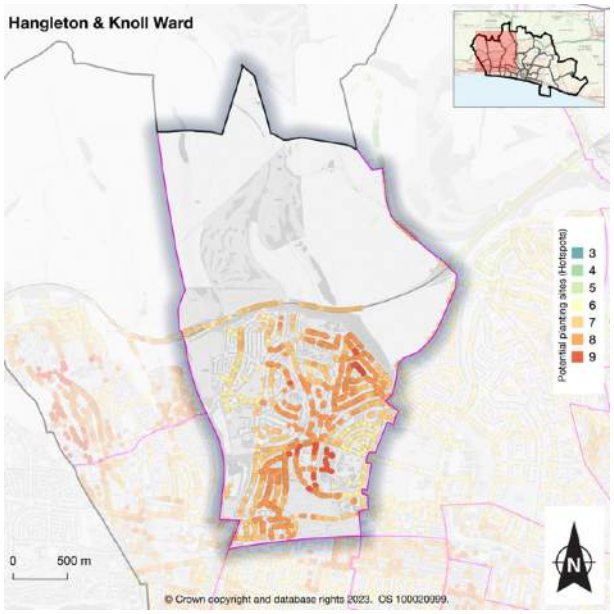
Potential plantable sites in hard landscapes in Goldsmid

Goldsmid Headline Figures:

Canopy cover - **9.5%**

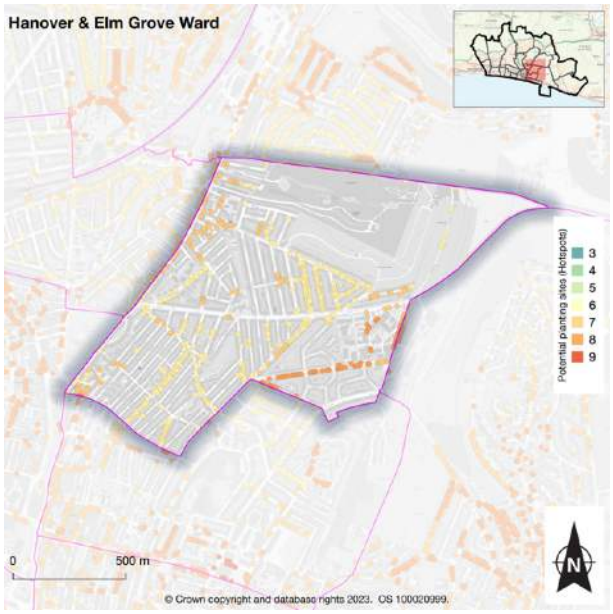
Potential plantable sites - **925**

Of which is High Priority - **25.1%**



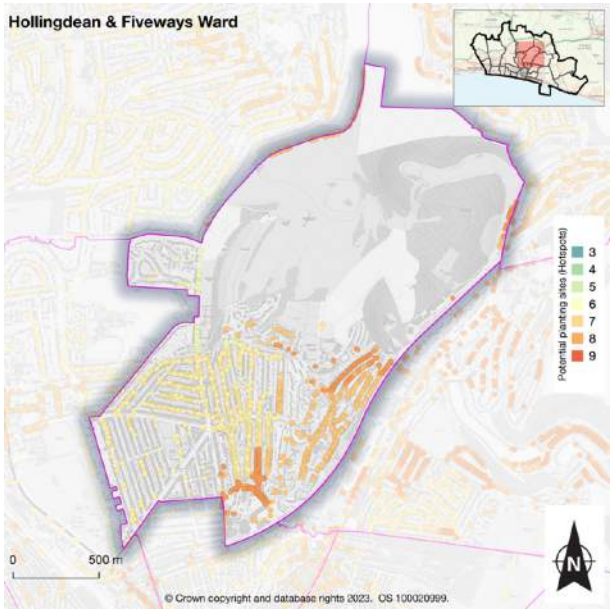
Potential plantable sites in hard landscapes in Hangleton & Knoll

Hangleton & Knoll Headline Figures:
Canopy cover - **8.5%**
Potential plantable sites - **3,009**
Of which is High Priority - **77.9%**



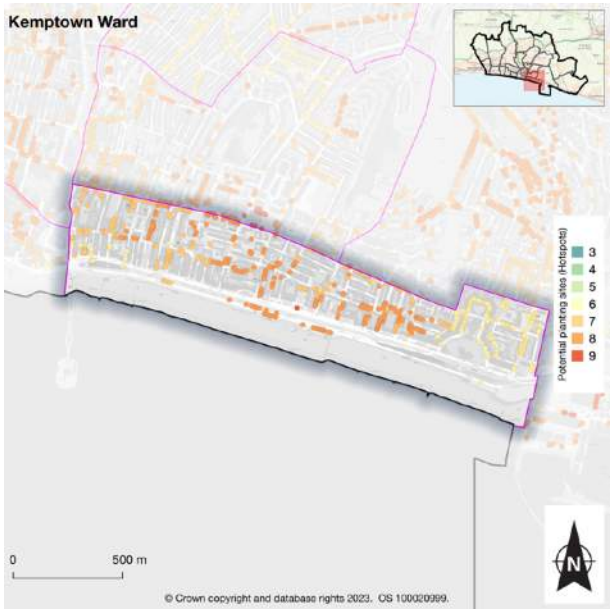
Potential plantable sites in hard landscapes in Hanover & Elm

Hanover & Elm Headline Figures:
Canopy cover - **15.4%**
Potential plantable sites - **775**
Of which is High Priority - **33.4%**



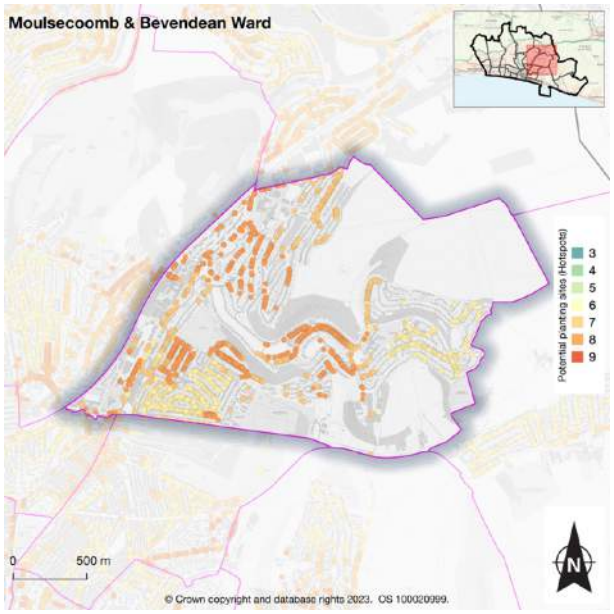
Potential plantable sites in hard landscapes in Hollingdean & Fiveways

Hollingdean & Fiveways Headline Figures:
Canopy cover - **24.2%**
Potential plantable sites - **1,860**
Of which is High Priority - **44.1%**



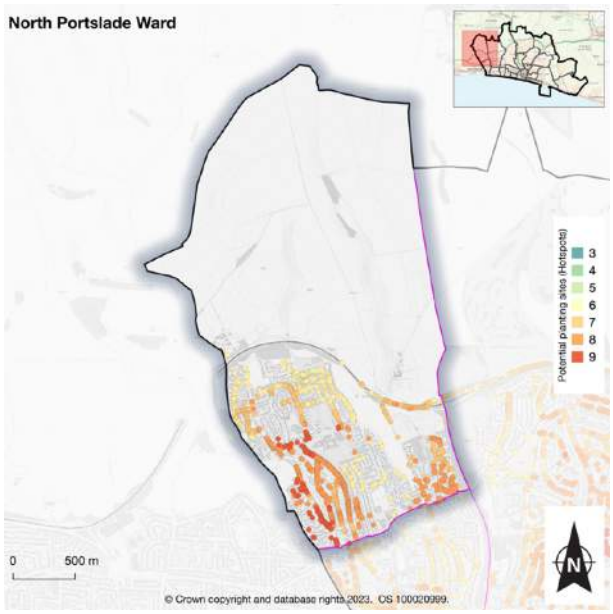
Potential plantable sites in hard landscapes in Kemptown

Kemptown Headline Figures:
Canopy cover - **3.1%**
Potential plantable sites - **715**
Of which is High Priority - **70.8%**



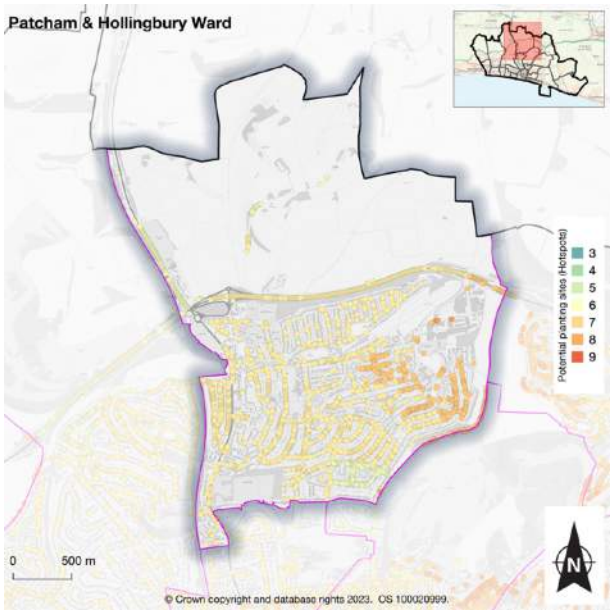
Potential plantable sites in hard landscapes in Moulsecoomb & Bevendean

Moulsecoomb & Bevendean Headline Figures:
Canopy cover - **13.5%**
Potential plantable sites - **1,987**
Of which is High Priority - **63.6%**



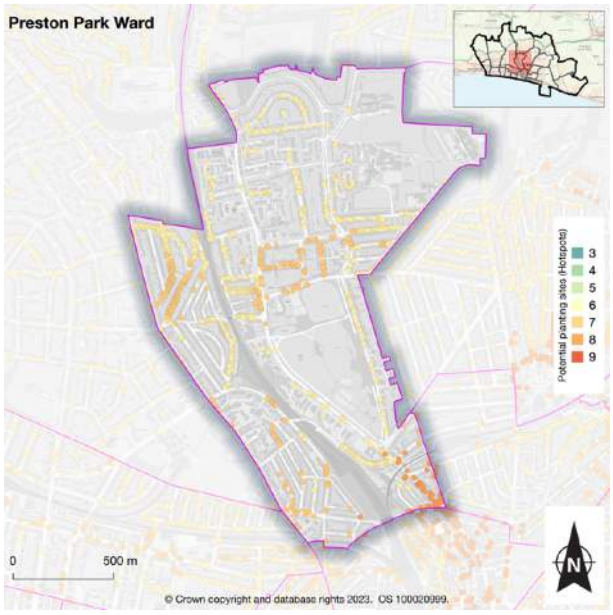
Potential plantable sites in hard landscapes in North Portslade

North Portslade Headline Figures:
Canopy cover - **3.2%**
Potential plantable sites - **1,585**
Of which is High Priority - **67.5%**



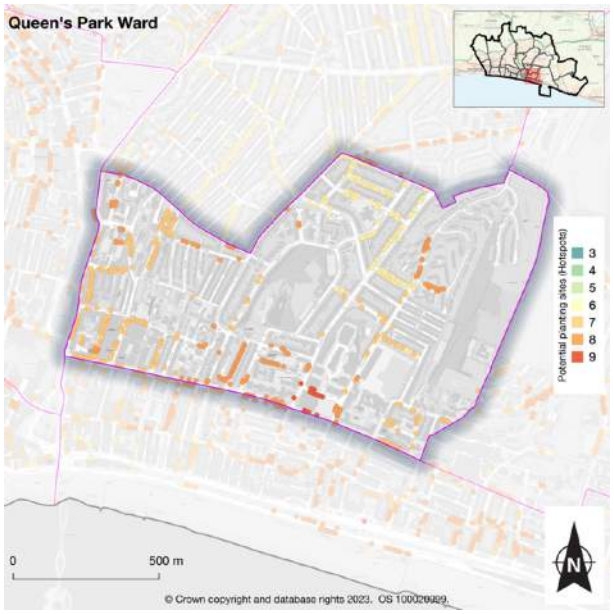
Potential plantable sites in hard landscapes in Patcham & Hollingbury

Patcham & Hollingbury Headline Figures:
Canopy cover - **11.5%**
Potential plantable sites - **3,401**
Of which is High Priority - **16.6%**



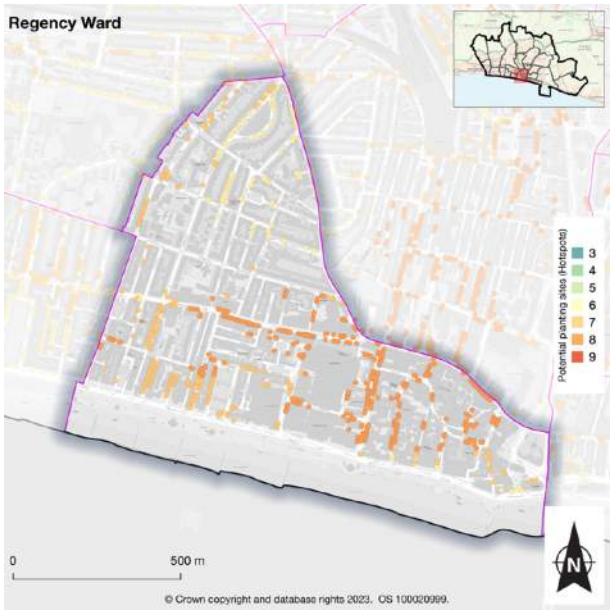
Potential plantable sites in hard landscapes in Preston Park

Preston Park Headline Figures:
Canopy cover - **17.5%**
Potential plantable sites - **1,140**
Of which is High Priority - **37.3%**



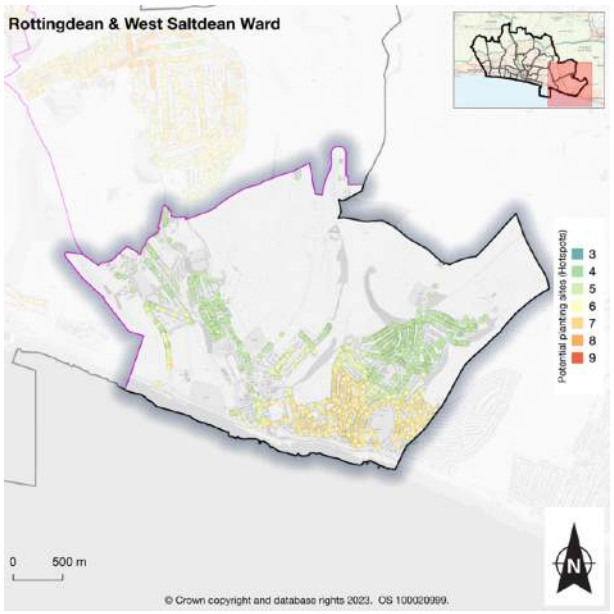
Potential plantable sites in hard landscapes in Queen's Park

Queen's Park Headline Figures:
Canopy cover - **13.4%**
Potential plantable sites - **687**
Of which is High Priority - **75.1%**



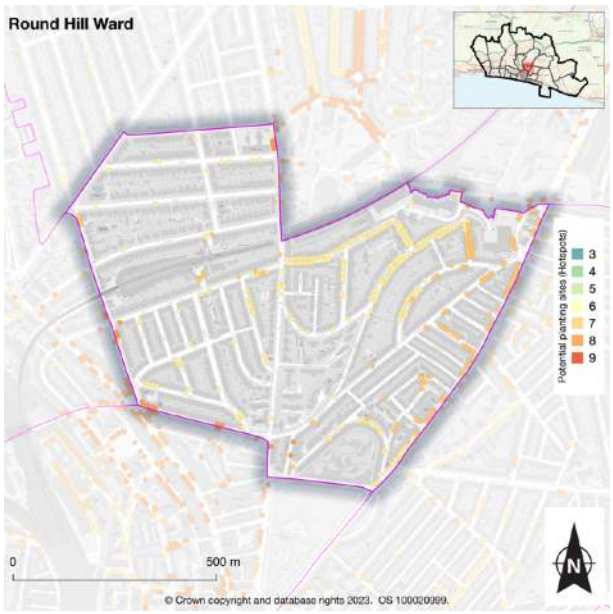
Potential plantable sites in hard landscapes in Regency

Regency Headline Figures:
Canopy cover - **5.8%**
Potential plantable sites - **755**
Of which is High Priority - **85.3%**



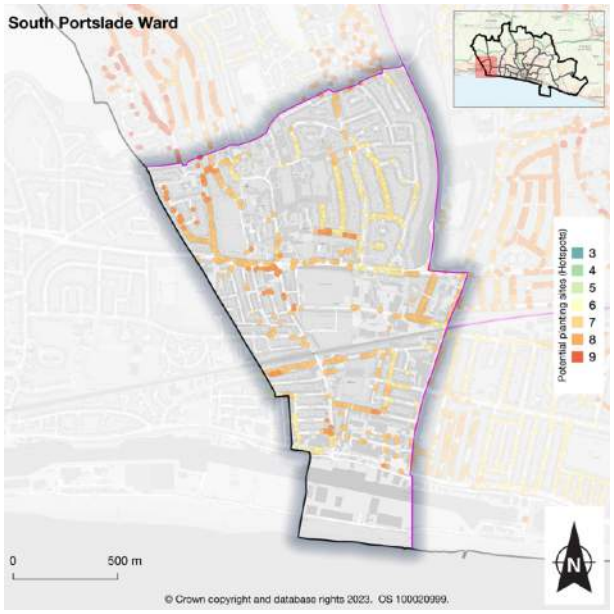
Potential plantable sites in hard landscapes in Rottingdean & West Saltdean

Rottingdean & West Saltdean Headline Figures:
Canopy cover - **6.4%**
Potential plantable sites - **3,404**
Of which is High Priority - **0%**



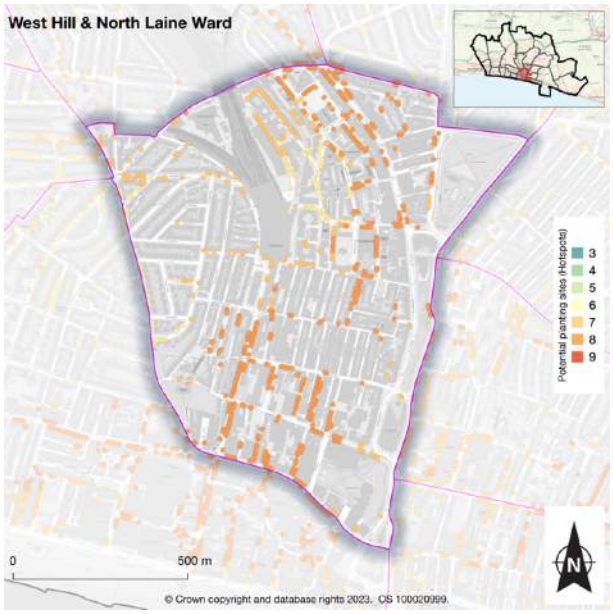
Potential plantable sites in hard landscapes in Round Hill

Round Hill Headline Figures:
Canopy cover - **15.2%**
Potential plantable sites - **507**
Of which is High Priority - **36.9%**



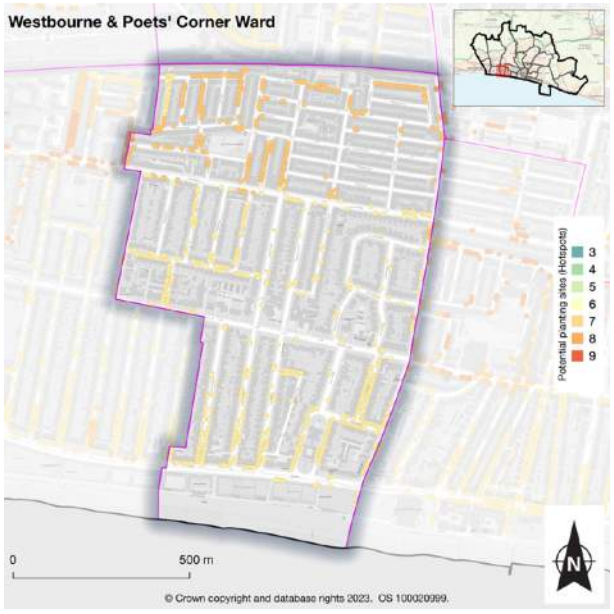
Potential plantable sites in hard landscapes in South Portslade

South Portslade Headline Figures:
Canopy cover - **8.4%**
Potential plantable sites - **1,284**
Of which is High Priority - **56.8%**



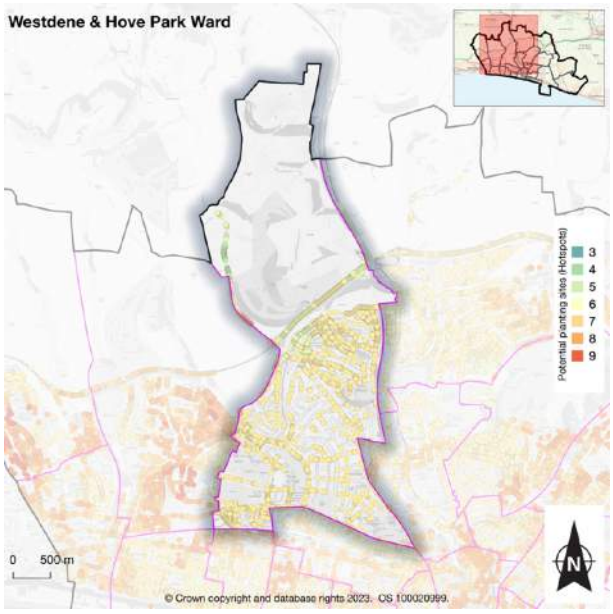
Potential plantable sites in hard landscapes in West Hill & North Laine

West Hill & North Laine Headline Figures:
Canopy cover - **7.7%**
Potential plantable sites - **902**
Of which is High Priority - **88.2%**



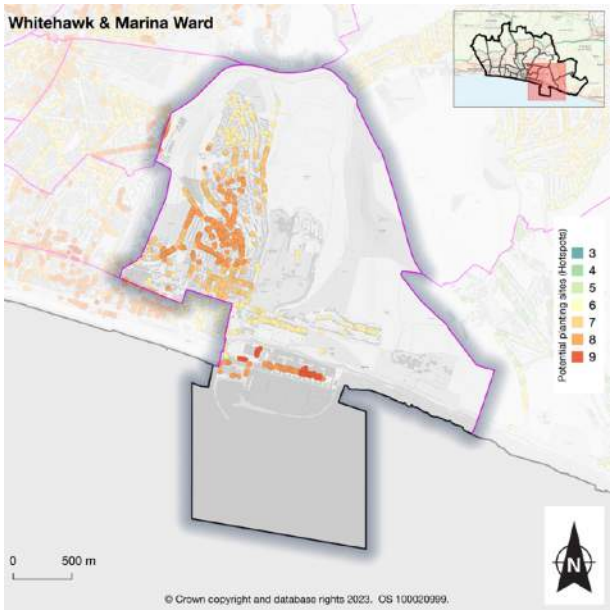
Potential plantable sites in hard landscapes in Westbourne & Poets' Corner

Westbourne & Poets' Corner Headline Figures:
Canopy cover - **5.3%**
Potential plantable sites - **965**
Of which is High Priority - **34.4%**



Potential plantable sites in hard landscapes in Westdene & Hove Park

Westdene & Hove Park Headline Figures:
Canopy cover - **14.2%**
Potential plantable sites - **3,721**
Of which is High Priority - **0.6%**

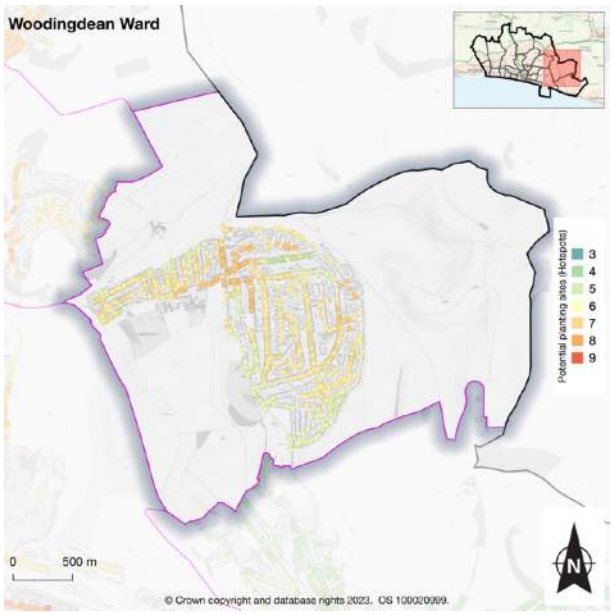


Potential plantable sites in hard landscapes in Whitehawk & Marina

Whitehawk & Marina Headline Figures:
Canopy cover - **5.4%**
Potential plantable sites - **1,313**
Of which is High Priority - **77.5%**

Potential plantable sites in hard landscapes in Wish

Wish Headline Figures:
Canopy cover - **4.3%**
Potential plantable sites - **1,583**
Of which is High Priority - **31.7%**



Potential plantable sites in hard landscapes in Woodingdean

Woodingdean Headline Figures:
Canopy cover - **4.2%**
Potential plantable sites - **1,816**
Of which is High Priority - **9.9%**

6. Conclusions

Canopy

Brighton & Hove has a canopy cover of 10.5%, lower than the national average of 16% and well below the 15% indicated as reasonable target for England's coastal urban areas. The tree canopy is also very unevenly distributed with the most well covered ward having 8.6 times the coverage of the most poorly covered ward.

As canopy cover is an indicator for ecosystem services, an increase in canopy cover in Brighton & Hove could see increased benefits for the community on parameters such as cooling, avoided stormwater runoff and air pollution removal alongside the long observed gains to be had in mental and physical wellbeing.

Soft Landscapes

Brighton & Hove has some 3.9% of its land (329 hectares) identified as actual plantable space, providing some flexibility in implementing a tree planting programme. Planting all of this space would still mean the canopy cover would be below the 15% benchmark for coastal locations.

Hard Landscapes

Brighton & Hove has some 36,000 locations within hard landscapes where tree planting could be considered. Although this would approximately double the number of street and park trees outside of woodlands managed by the council today, it does not take into account other elements such as underground services.

The following conclusions can be drawn from the report as a whole:

- The imbalance in tree cover between individual wards is high
- There are significant opportunities to plant in all wards
- The wards with the greatest share of high priority sites tend to towards those with lower canopy cover
- Both hard and soft landscapes present opportunities for large scale impact

7. Recommendations

This report can be used in several ways. It has been created to assist the Brighton & Hove City Council in making tree planting decisions with an evidence base that highlights the potential for individual pavement and soft verge sites, alongside larger soft landscape opportunities. Furthermore, each such site has been given a priority based on its ability to address the city's identified challenges around excess heat, air pollution, flood risk and multiple deprivation and its particular challenge with coastal winds. Accompanying this report are both GIS data layers and detailed digital maps. This should enable resources to be targeted towards those locations where need for planting is greatest. This is turn should maximise the benefits to be gained from tree planting across the city as a whole.

1. Prioritise high impact locations

The greatest value for money from planting trees will be achieved in locations identified as high priority, since trees' ecosystem services directly address the issues by which the high impact locations were selected. Air quality and flood risk mitigation are of particular importance in these areas.

2. Conduct digital checks, then ground proof checks

The hotspots produced in this report have been generated using GIS datasets. The suitability of these potential tree planting areas are subject to a further checks, both online using tools and, more importantly, physically on site to determine whether a location has any restrictions or services which would prevent tree planting. The large number of hotspots available gives the council a good chance of identifying suitable planting locations.

3. Consider wide local imbalances in delivery of tree benefits

Consider canopy goals at ward level to address inequities in the distribution of tree cover alongside overall city-wide targets. The greatest benefits from new planting will be obtained from adding cover to those areas currently poorly served.

4. Treat 'Tree Deserts' as special cases

Identify and address 'Tree Deserts' with fundamental re-engineering of street layouts. Areas with poor tree cover and no ability with approaches (tree pits in pavement) to plant new ones require a more fundamental approach. Space within the roadway/pavement can be redesigned to accommodate trees alongside other uses. This approach also provides the opportunity to incorporate other climate resilience features such as rain gardens and SuDS, both of which can include trees.

5. Plant forest-size trees whenever sites are suitable

Whilst the first criteria for tree selection is always suitability for its site and context, consideration should then be given to identifying species whose growth rates and mature size will most effectively meet the declared canopy goals - e.g. forest-size trees where the space exists. The breadth of available species is such that this should not preclude selection for other goals, whether based on adaption to climate change, resilience to pests and diseases, ecosystem services or aesthetics.

6. Community engagement for better tree establishment

Engaging the community after tree planting sites have been identified is beneficial in many ways. Involving residents and local businesses means they are more likely to cooperate with the planting of the trees in their local area and to nurture the new trees. Enlisting the help of local schools can increase the involvement of local residents and simultaneously highlight the benefits of trees to future generations, possibly being part of a social integration scheme.

7. Monitor core metrics regularly to enable course correction

Measure canopy cover down to ward level periodically to identify emerging challenges and course correct. Whilst canopy growth can be slow, canopy loss can be extremely fast, especially in areas of high building development or regeneration schemes, and the sooner it is identified, the sooner it can be addressed.

8. Explore complementary tree canopy expansion strategies

Planting in larger land parcels within soft landscapes enables relatively quick canopy expansion, but such locations tend to be away from population centres. Planting trees in hard landscapes is known to be effective at addressing particular urban challenges, but cannot be done at enough scale in all wards. A combination of the two should be adopted, whilst also exploring other routes, such as maximising growth from existing trees through fine tuning management practices, ensuring tree cover on new developments and encouraging tree planting within private gardens.

9. Make the urban forest accessible

Trees and green spaces can provide a host of benefits beyond ecosystem service; their health and wellbeing benefits are well known, though near impossible to quantify. Where neighbourhoods or ward lack existing canopy cover and/or the space for new trees, strive to ensure that people can access trees beyond (ie. in soft landscapes) with ease. Provide accessible paths to parks and woodlands, and when looking at soft landscape planting opportunities, consider parking so that all different people can have the opportunity to make the most of new green space once it is established. Good pathways encourage people to walk, run and cycle both in cities and out to fringe areas.

8. Appendices

8.1 Appendix I - Methodology

Canopy Cover

Tree canopy cover within Brighton & Hove was assessed using the Blue Sky National Tree Map.

Hotspot Maps

GIS (Geographical Information System) project boundaries of Brighton & Hove and the individual wards were accessed using the Ordnance Survey. Most beneficial areas for planting were identified by using the council Ordnance Survey mapping data and then adding different criteria in order to score the areas which would have a greater benefit for the local area by planting. The five layers used for scoring were air pollution concentration, indices of multiple deprivation (IMD), risk of flooding, surface temperature and population density. Amongst the five, air quality and flood risk were double weighted in determining the establishment of hotspots.

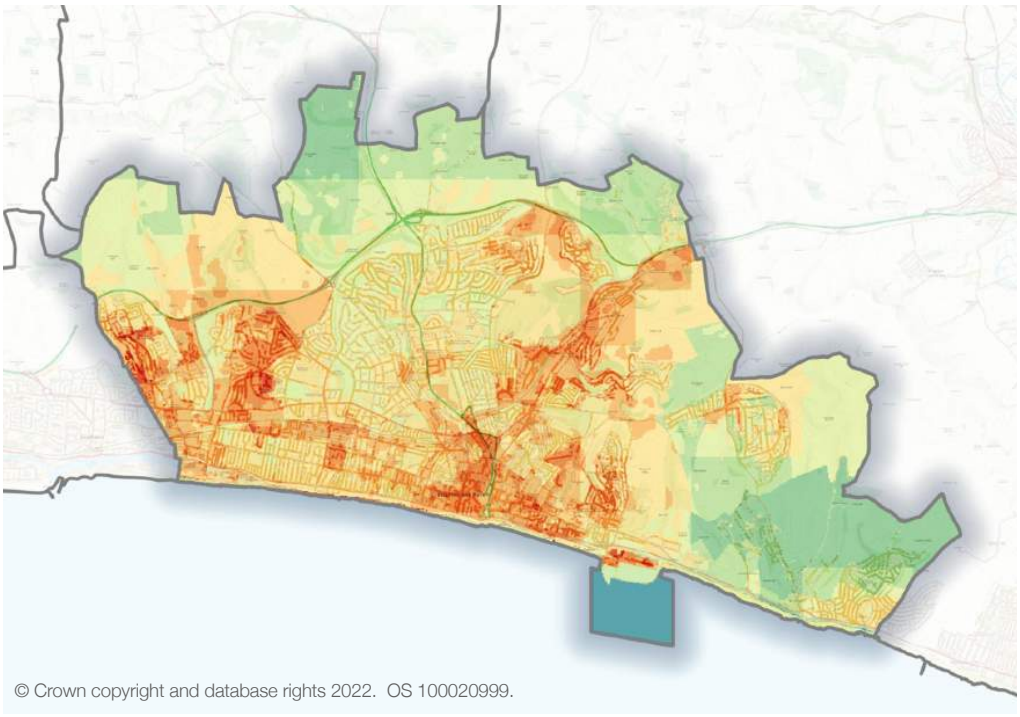


Figure 4: Aggregated hotspot map for Brighton & Hove

Datasets are normalised so they can be added together. This is done in two steps i) by creating map layers containing simple numeric values, higher scores being most suitable for planting and lower scores being less suitable. ii) Those scores are then set to the same scale by dividing each layer by its highest data value so for example if a layer was scored 1 to 5 then all values are divided by 5 so that

the maximum number for that layer is 1. The final hotspot map is generated by aggregating normalised scores and applying any weightings after discussion with the client. Figure 4 is the resulting hotspot map which is used as the basis for prioritisation throughout the report.

The following factors are well known to heavily affect people living in cities, and can be alleviated/ improved by increasing tree cover. The factors and their weightings were selected in discussion with Brighton & Hove City Council Tree Officers. To align with local risks and priorities, the air quality and flood risk factors are double weighted.

Factor	Multiple	Share
Air Quality	2	25%
Flooding	2	25%
Heat	1	13%
Index of Multiple Deprivation	1	13%
Within 10m of Road Network	1	13%
Total	7	100%

Table 4: Factors used to derive hotspots and their weightings

Soft Landscapes

Additional Ordnance Survey background mapping data was obtained from Brighton & Hove Council. This was used to address what was deemed a potential planting area in Brighton & Hove soft landscapes - not in areas of water, roads, buildings, paths or tracks or under existing canopy. Actual plantable space of soft landscapes further removes areas that cannot be practically planted on such as private gardens and sports pitches.

Hard Landscapes

Using GIS software the map of Brighton & Hove was adjusted to show only potential plantable space in hard landscapes - not in areas of water, green open spaces, agricultural land, buildings or under existing canopy.

Figure 5: Roadside polygons showing different pavement width and overlaps with tree canopy

Sites for tree planting were determined using specific criteria after discussion with the client, for example the minimum width required on pavements to allow assessable use. It its important to note that the requirements to be met do not exclude a location from planting a tree in perpetuity and that this exercise is used only as a guide - it remains a possibility that development of the street scene, such as curb build outs or use of existing parking space, can provide additional space for tree pits in the future. Other more standardised assumptions were also made in this process:

The algorithm used in GIS created polygons of hard landscapes with a width of <2m, 2-4m and >4m based on the following assumptions:
Tree pits within Brighton & Hove, have a minimum width of 0.75m
Trees expected to be planted at no closer than 5m spacing
Pavements less than 2.25m wide are too narrow to accommodate a tree pit, but may be suitable for kerb buildouts
Pavements 2.25m to 4.5m wide could accommodate trees in a linear, kerbside arrangement
Pavements >4.5m wide have the potential to accommodate non-linear planting arrangements
Pre-existing canopy cover was then removed from the potential plantable polygons using the Blue Sky NTM data. See Figure 6.

Figure 6: showing theoretical tree locations mapped against pavement sections with no tree cover

Based on a 5m tree spacing, a grid of potential trees was overlaid onto the roadside polygons. Where the centres of these intersected with the either of the two larger polygon sets, they were retained. All others were removed. See Figure 6.

Wind exposure

All land under consideration for planting was also mapped in terms of wind exposure, assuming a south westerly direction. Sites that are fully exposed were removed as part of the process for determining actual plantable space for soft landscapes and potential tree sites for hard landscapes. An extract of the wind mapping is shown in Figure 7.

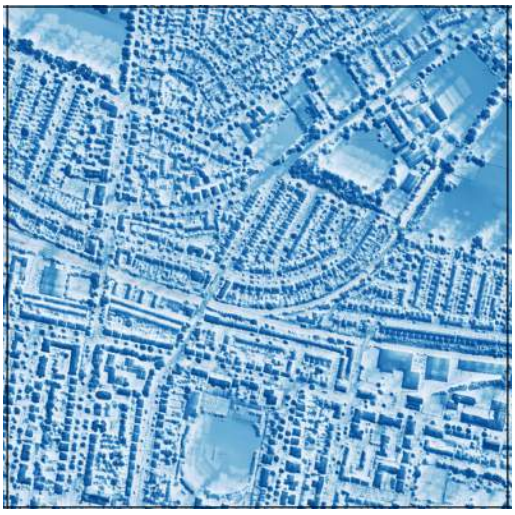


Figure 7. Example of wind exposure mapping

8.2 Appendix II - Bibliography

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