UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

Evaluating the implementation of a new smoke and vape-free area in the UBC health precinct

Alejandra Padron, Ece Cam, Javier Heredia, Amaka Nworjih, Chen Wu

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Themes: Transportation, Buildings, Land

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EXECUTIVE SUMMARY

The project team was tasked with collecting post-implementation date of new smoke and vape-free areas on University of Columbia's Vancouver campus. The objective of the project team's work was to identify areas of non-compliance and find ways to assess public support and awareness of the non-smoking and vaping policies.

The study consisted of field observations and a literature review. Field observations took note of smokers, cigarette butt accumulations, and the location of no-smoking signage. Observations took place on weekdays and weekend, with overcast and clear conditions. The literature review of the policies and initiatives at other universities and hospitals.

The project team was able to determine times and conditions when more smokers were active in the study area, hot spot areas of non-compliance, and the location of signage in relation to these observations.

This report concludes with a series of recommendations for next steps:

- Undertake a draft survey for further field research regarding on-campus support and awareness of the policies (draft provided);
- Increasing awareness through place-making methods, additional signage, and information campaigns;
- Avoiding conflicting messages by removing enabling structures and ashtrays; and
- Managing non-compliance through fines and policy enforcement, as well as designated smoking areas

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INTRODUCTION

This report was prepared as a collaborative project between the students of Dr. Martino Tran's Urban Systems Analysis and Planning course (URSY 520), and the Social Ecological Economic Development Studies (SEEDS) program at the University of British Columbia. The project was assigned in January 2020. The project team consisted of Ece Cam, Javier Heredia, Amaka Nworjih, Alejandra Padron, and Chen Wu.

The project team was tasked with collecting post-implementation data of the new smoke and vape-free areas (within the areas and around the boundaries), and identify non-compliance areas. The project team was also tasked with finding ways to assess public support and evaluate public awareness of the new smoke and vape-free area. The findings of the project team's investigation will be used in refining the implementation of the smoke and vape-free regulations of the health precinct and Library Garden. These findings would inform further smoke and vape-free areas throughout the University of British Columbia (UBC) campus and support smoking cessation initiatives.

The study will contribute to advancing broader community awareness of UBC's commitment to the health and wellbeing of people and places.

As shown in **Figure 1**, the study areas consisted of the Health Precinct and the Library Gardens at the University of British Columbia's Vancouver campus. The Health Precinct is approximately 37 acres in size and is bounded by University Boulevard to the north, East Mall to the west, Agronomy Road to the south, and Wesbrook mall to the east. The Health Precinct is comprised of a large number of institutional buildings, ranging between 2 and 5 storeys in height. The buildings are connected by a network of pedestrian walkways through open space areas, as well as local roads and laneways. The existing structures in the Health Precinct are occupied by University facilities, office uses, medical uses, and the UBC Hospital. The uses in this area of campus have a significant focus on health and wellness and therefore has been prioritized for the smoke-free policy.

Library Gardens is approximately 3.5 acres in size and is bounded by Memorial Road to the north, Main Mall to the west, Agricultural Road to the south, and Learners Walk and IK Barber Learning Center to the east. This portion of the study area is occupied predominantly by open space areas for student use, including outdoor furniture. The Library Gardens is also the location of the Indian Residential School History and Dialogue Centre, a building that is recessed into the ground, with a height of one storey above grade.

This report summarizes the observations and findings of the project team. The findings of this report were presented to the SEEDS team by way of an online presentation on April 2, 2020.

Health Precinct
37 acres

Library Garden
3.5 acres

Figure 1. UBC Smoke-free Zones

GUIDING QUESTION

In carrying out the study, the project team was guided by answering the following question:

Has the smoke and vape-free area designation been effective in deterring smokers throughout the University Health Precinct and Library Gardens?

PROJECT LEVEL ISSUES

The issues that the project team faced included the following:

- Inability to identify if smokers are students, faculty, staff, or visitors to the University campus;
- Limited time for field observation; and
- Difficulty identifying smoking areas where garbage bins are present.

MATERIALS & METHODS

Field Observation

Observational data of both cigarette butts and active smokers within the UBC Health precinct boundaries and Library Gardens were obtained, georeferenced, and categorized so as to provide a clear visualization of the smoking behaviors within the Health precinct. The specifics of the approach are explained below. A site cleaning was undertaken during the period of February 18-21, 2020 and site observation was conducted two weeks later on March 2-6, 2020.

In the project team's first meeting, it was agreed that in order to effectively capture the smoking behavior within the Health Precinct observations would be broken down as indicated in **Figure 2,** with a focus on cigarette butt accumulations and active smokers.

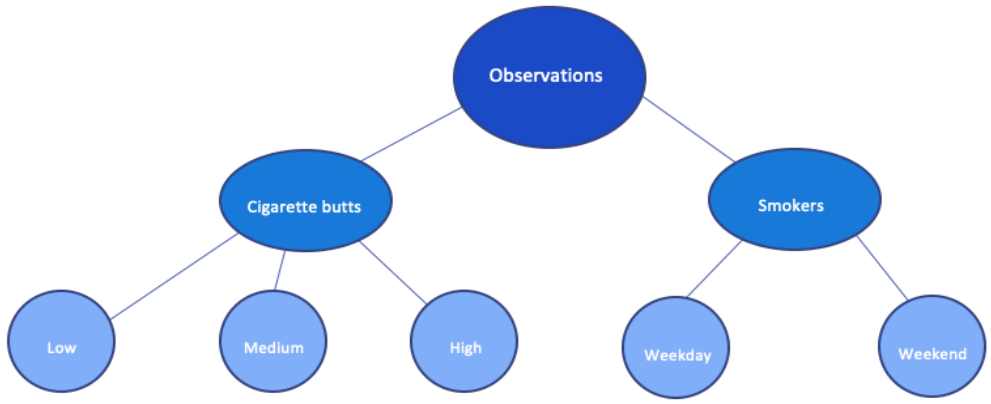

Figure 2. Visual Observation Categorization of Smoking Activity in the UBC Health Precinct and Library Gardens.

The locations of the cigarette butt were categorized based on the quantity of cigarette butts present as seen in **Figure 3**. Low cigarette accumulation consisted of approximately 1-10 cigarette butts, a medium cigarette accumulation consisted of approximately 11-50 cigarette butts, and a high cigarette accumulation consisted of approximately 50 cigarette butts or more**.**

A) Low Cigarette Accumulation B) Medium Cigarette Accumulation C) High Cigarette Accumulation

Figure 3. Categorization of Cigarette Butt Accumulation

For the observation of active smokers, four observation days were chosen: two being weekdays and two being weekends. Observations on these days were carried out in the morning, noon, and afternoon for both cloudy and sunny days in an effort to capture any difference in smoking behavior caused by weather conditions.

For each observation the following items were noted:

- Sign visibility
- Surrounding structures possibly affecting smoking behavior
- Age and occupation

Each smoker and cigarette butt accumulation observation was georeferenced using google maps and categorized and each categorized location was placed in layers as shown in **Figure 4,** with each rectangle representing a layer**.** Six map layers were created based on the following categories: Layer 1. Base layer: UBC Health precinct, Layer 2. Cigarette butts-High, Layer 3. Cigarette butts-Medium Layer 4. Cigarette butts-Low, Layer 5. Weekday smokers, Layer 6. Weekend smokers. A screenshot of the final map for the Health Precinct is shown in **Figure 5.**

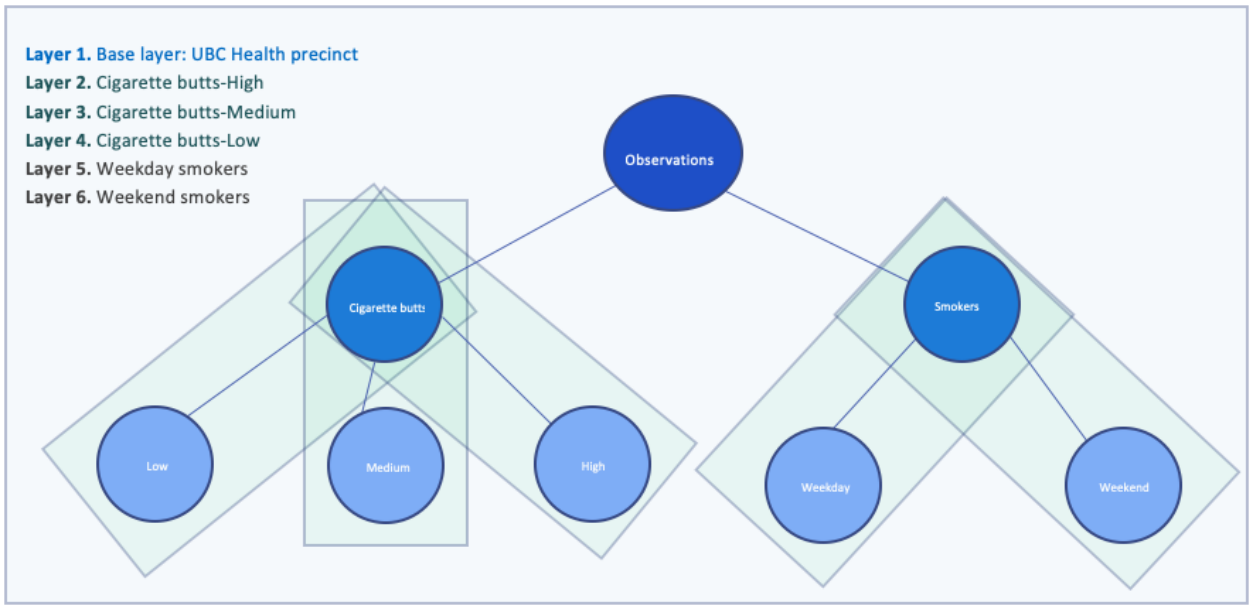

Figure 4. Map Layers

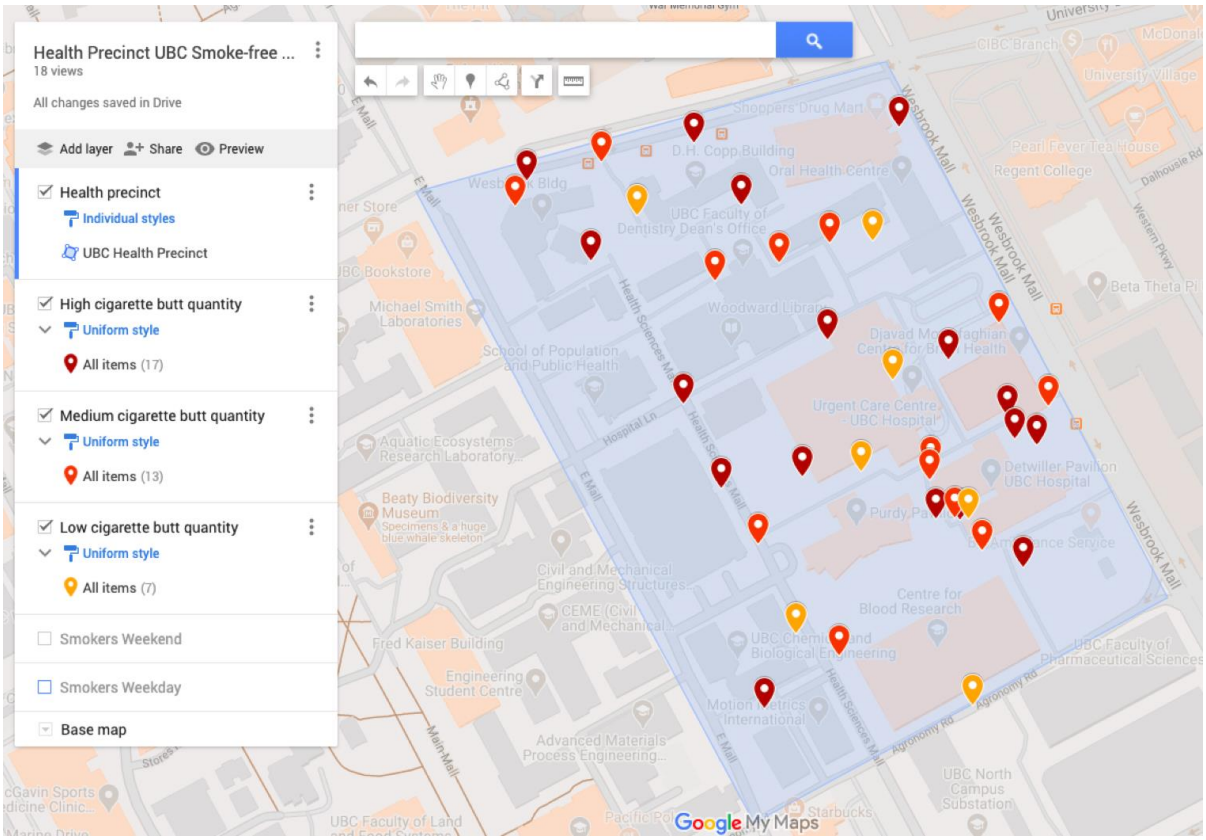

Figure 5. UBC Health Precinct Map and Layers for Each Category

As shown in Figure 6, for each individual coordinate, a description of the structures, weather and signage visibility were provided. Pictures have also been inserted for each point and for the purpose of this report images are inserted as reference of the location description.

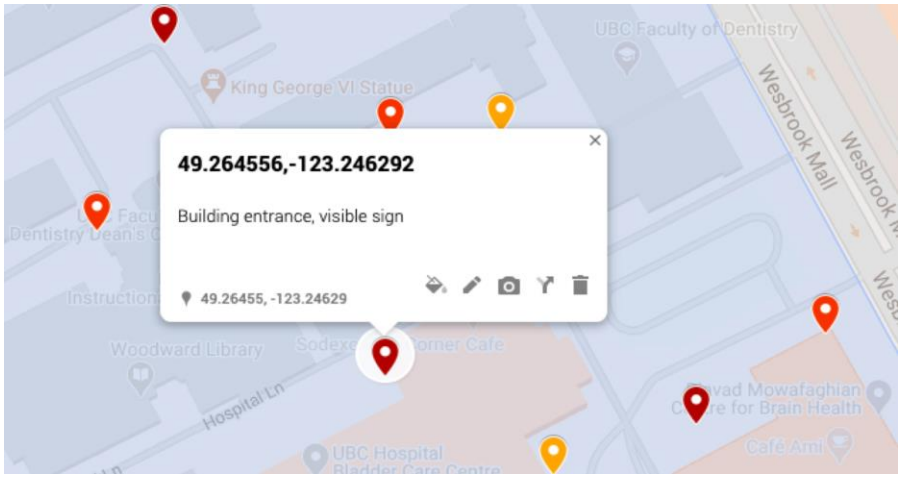

Figure 6. Categorized Coordinate with Notes

Figure 7 shows all of the observed smokers in the Health Precinct. Smokers were divided into different map layers by weekday and weekend as well as by the time of the day. Each smoker dot also contains text description of the observed ages, perceived occupations (student, staff, patient/visitor), and other information of the smoker (consumed substance). The number on the dots also shows the number of the smokers in each category.

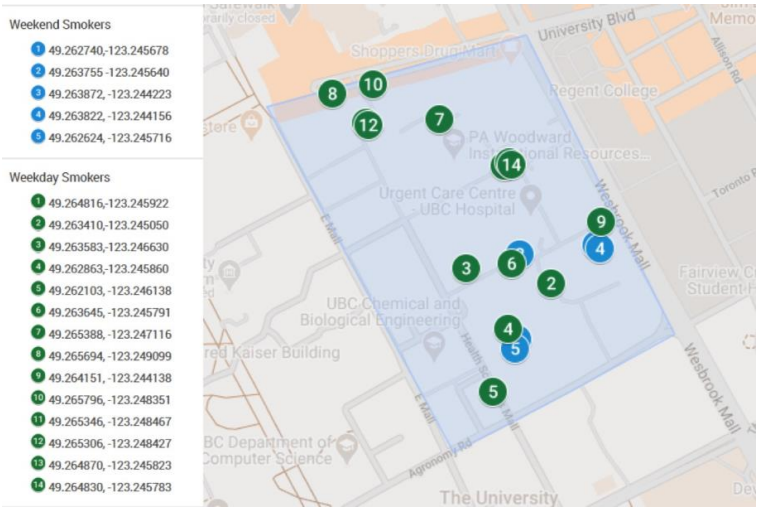

Figure 7. Smokers on Weekends VS Smokers on Weekdays

Additionally, the smoke-free signage locations were also noted down to for the signage inventory. The signage was differentiated by whether they are individual signages separated from the buildings or stickers placed on walls and windows. The signs were visualized on a map to show their relative relations with the buildings. **Figure 8** shows the signage map for the Library Garden.

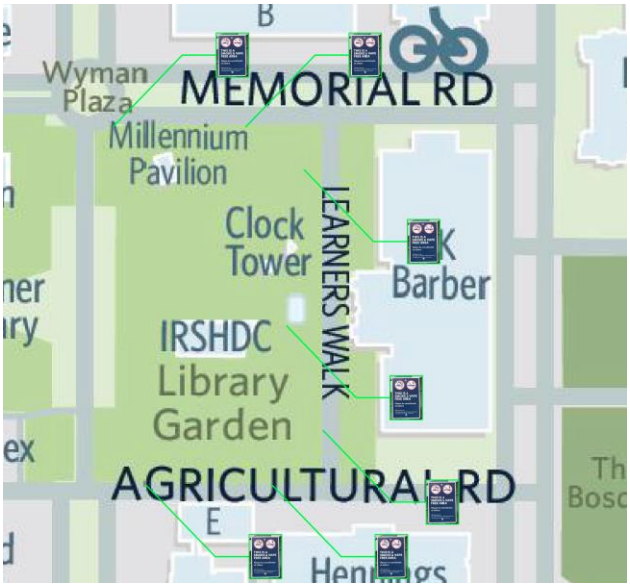

Figure 8. Smoke-free Signage Map for Library Garden

Literature Review

The project team reviewed the following in-force policies and regulations to learn more about how hospitals and universities can successfully implement smoke-free designations on their campus.

BC Tobacco and Vapour Products Control Act:

The British Columbia Tobacco and Vapour Products Control Act provides that one cannot smoke within 6 metres of any doorways, air intakes or open windows to any public and/or work place in British Columbia. The legislation gives Health Authorities the discretion to implement designated outdoor smoking areas that allow tobacco or vapour product use and whether the area will be designated for the use of one, both or neither of these products.

Vancouver Coastal Health (VCH):

VCH smoke-free policy is applicable in all VCH owned and operated premises, facilities and grounds such as UBC Hospital. Since 2014, smoking of tobacco, marijuana, and other products (including e-cigarettes) is prohibited by VCH. For the benefit and health of all staff, visitors, patients, clients, volunteers, and the general public; VCH encourages all persons to respect the smoke-free policy. Anyone smoking will be asked to leave the VCH property. Any failure to comply with this request received from staff, volunteers, and contractors will be subject to disciplinary consequences. A written warning to be issued for refusal and a request for the staff member to participate in a stop-smoking/nicotine program to be made for continued non-compliance. Visitors, patients and clients refusing to comply will be reported to Charge Nurse or Designate. Continued non-compliance will be reported to the responsible Physician or Designate.

University of British Columbia Okanagan—Kelowna, BC, Canada

UBCO policy provides that all smoking, including both cigarettes and cannabis, and vaping are banned on campus. Designated smoking areas are indicated by posted signage or markings that aid identification of the boundaries of smoking areas for information and compliance purposes. Smoking of certain types of products are permitted within designated smoking areas and the posted signage or markings indicates whether there are any restrictions on the types of products that may be used in the smoking area. However, in reviewing the effectiveness of the policy, it was found that some individuals continued to smoke outside of the designated smoking areas. UBCO community members and visitors are asked to respect the smoke-free area and by not smoking within the boundaries. However, there are no fines or bylaw infractions for those found contravening the smoke-free area. If found smoking within the smoke-free area, you will simply be asked to move and directed towards the permitted area.

McGill University—Montreal, Quebec, Canada

McGill policies indicate that The University shall remove any smoking receptacles located outside the Designated Smoking Areas, and ensure that a sufficient number of signs are posted on University property so as to identify that smoking is prohibited outside Designated Smoking Areas, in accordance with the Act. Policies also provide that the University shall place smoking

receptacles along the perimeter of University property to minimize impact on public property. Further, Designated Smoking Areas are considered to be a temporary and transitional measure over the course of a five-year period from the date of enactment of the policy, making the University completely smoke-free. Designated smoking areas are indicated by posted signage, lighting or simple landscaping and equipped with smoking-related infrastructure such as receptacles. Educational campaigns, outreach, communication and the promotion of tobacco cessation treatment options is the primary means to promote compliance. A comprehensive education and outreach campaign, including resources and referrals for cessation is available as part of campus implementation programs.

Yale University—New Haven, CT, US.

Yale University has taken an ambitious approach to curve down smoking by making the entire campus smoke free. The Tobacco Free Yale policy was introduced in 2015 and applies in any areas including property leased or owned by the university and affects all students, faculty, staff, visitors, contractors, and other persons on campus, regardless of the purpose for their visit. Tobacco is defined as all tobacco-derived or containing products including e-cigarettes and other comparable products. The University recognizes that compliance towards a wide area Tobacco free policy is difficult and takes careful notice of the transition process to maintain a steady and progressive decrease in smoking behavior in the campus. This progressive approach to reduce smoking behavior can be divided into the following categories:

- **Active:** The University is aware that demanding total cessation of smoking might result in a rebound effect in terms of compliance and may isolate a particular cohort in the university. To address this issue, they have created various smoking areas within the university in order to provide a safe space for smokers within the campus. These areas can be found at conference centers and be at least 25 feet away from doorways and air intakes. The overall goal is to progressively phase out these areas as well as any existing ashtrays as people adjust to the policy. The University has decided to use partners, also known as “Champions” who have committed to supporting the initiative by promoting cessation resources and creating a tobacco free environment within their areas. These Champions include Athletics, Environmental Health and Safety, and Human Resources departments.

- **Passive:** The University is aware that the effectiveness of the active measures hinges on the support that is given to its community in the form of smoking cessation programs including coaching and worksite programming, which have engaged over 100 members of the campus community in quit attempts. This has led to Members of the Yale community have shared their smoking cessation success stories in the” We Can Quit, So Can You” video series.

Harvard University—Cambridge, MA, US.

Harvard University has implemented a policy enforcing a smoke-free designation mandatory for all employees and persons visiting Harvard University. Employees found violating the policy are subject to disciplinary action which may include termination of employment. A smoking cessation program has also been implemented in order to provide the contacts and resources necessary to help staff successfully quit smoking.

Oxford University Hospitals—Oxford, United Kingdom.

Oxford University Hospitals operate a non-smoking policy across all of its buildings and grounds, including doorways and carparks. The guide highlights that a hospital has a duty to encourage good health. Therefore, it directs people who find it hard not to smoke to a pharmacist to advise on the smoking cessation programs. Free of charge 12 weeks-treatment and behavioral support services are provided within hospital sites and Oxfordshire helping those trying to cut down or quit. Outside the smoking cessation clinic hours, there is Here for Health service providing consultation tailored support services.

Draft Survey

The project team prepared a draft survey to aid further study on this project (see Appendix A). This survey is a sample questionnaire designed for the UBC community and aims to identify people's views and behaviour towards smoking in designated "No-Smoking" areas. It is assumed that the survey will also help to assess the level of compliance with UBC Policy 15 in the health precinct.

The draft survey questions can be presented in the form of a white board or voluntary and anonymous questionnaire to be completed and submitted by people in the study area, particularly in recognized hot-spots.

DATA ANALYSIS & DISCUSSION

Smoker Observations

An equal numbers of observation periods on weekends and weekdays were conducted by the team for a total of 16 3-hour periods in total), and took place in both the Health Precinct and Library Gardens. No active smokers were observed in the Library Garden, and thus, smoker maps were only prepared for the Health Precinct. As depicted in **Figure 9**, significantly fewer smokers were seen on weekends compared to the smokers observed on weekdays.

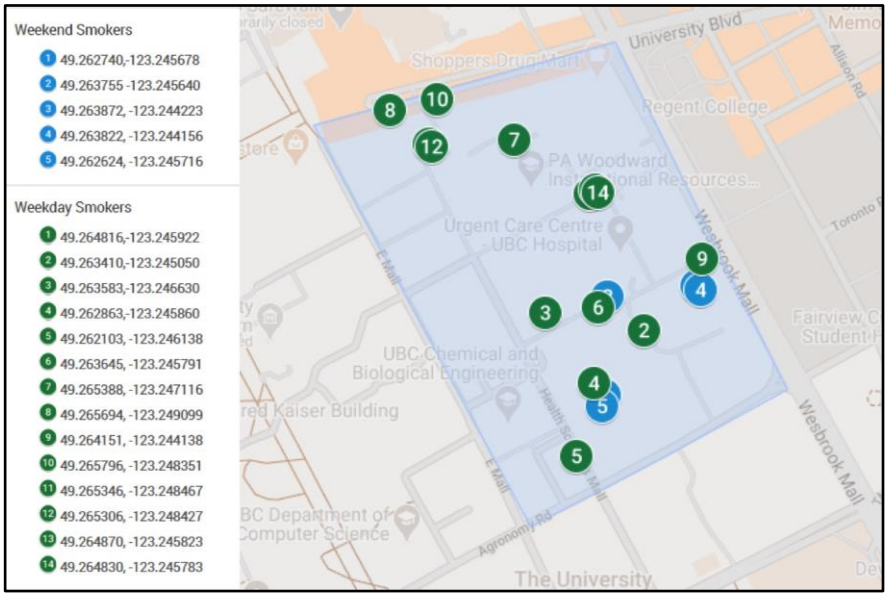

Figure 9. Smokers on Weekends VS Smokers on Weekdays

Comparison between the smoker locations and the signage map in **Figure 10** suggests that these smokers are smoking close to a smoke-free advisory sign except for the ones behind the Life Science Building. It can indicate that the signage is not well embraced by the people frequenting this area.

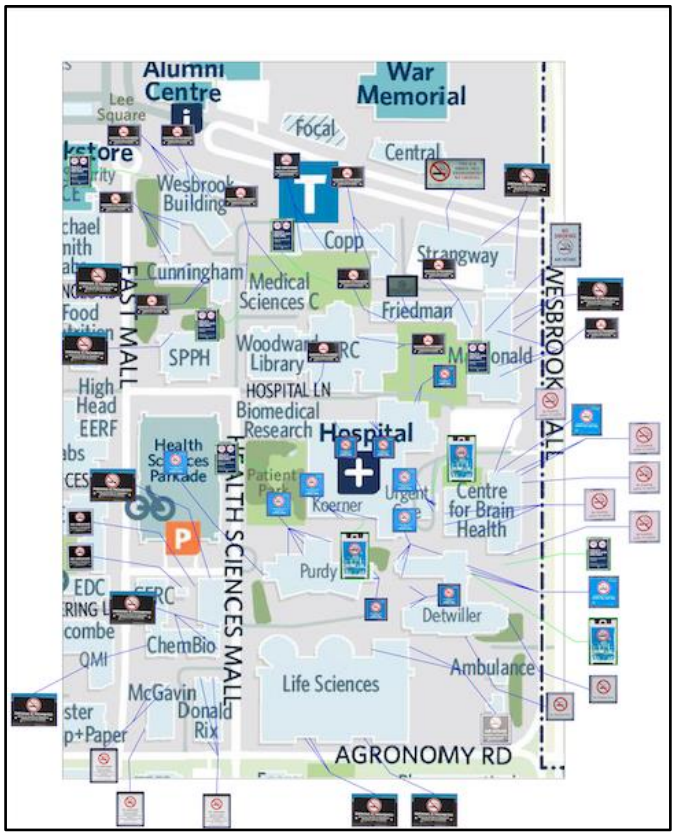

Figure 10. Signage Map for Health Precinct

The smokers observed during different times of the day are also shown in **Figure 11**. Note that no incident was recorded during the nighttime periods, and there were only very few smokers on rainy days compared with clear or cloudy days. Thus, the condition with the highest observed smoker intensity is the afternoons of clear or cloudy weekdays.

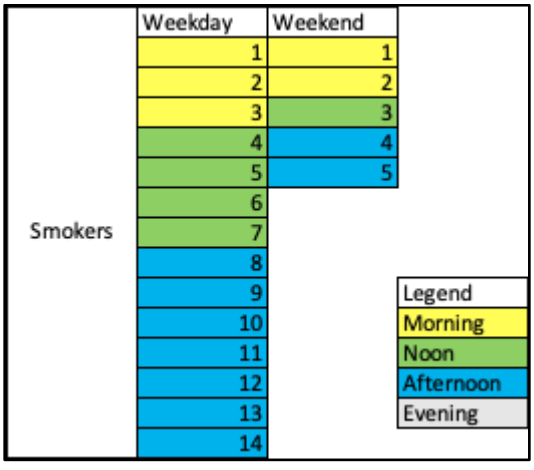

Figure 11. Smokers by the Time of the Day

The full text descriptions are presented in **Appendix B, Table 1**. It was noted from the descriptions that the smokers on the weekend involved no students and all the weekend smokers are identified as either visitors or staff. By extrapolating this information to assume that the non-student smokers' number is consistent throughout the week, about 1/3 of the weekday smokers are patients and staff (5 smokers on weekends over 14 smokers on weekdays).

Signage Inventory

The following two figures, **Figure 12** and **Figure 13**, show the numbers of separated individual signages and wall or window-mounted signages in the two smoke free areas. The detailed signage maps are included in **Appendix C**.

Health Precinct Total Signs	
108	
Individual Separated Signs	Wall/Window-mounted Signs
8	100

Figure 12. Health Precinct Signage Count

Library Garden Total Signs
7
Individual Separated Signs
7

Figure 13. Library Garden Signage Count

While observing the signages, it was noticed that some of the wall/window-mounted signs in the Health Precinct were delivering conflicting messages. Figure 14 shows the locations of the conflicting signs in the area.

Figure 14. Health Precinct Conflicting Messages

All mapping of smoker observations, cigarette butt accumulations, and signage is provided in **Appendix C** and can also be accessed on Google Maps at the link below.

https://www.google.com/maps/d/u/0/edit?mid=11Si6XbuTMFvIS0M_5F-QBCtSFFLALGVS&ll=49.26481306076188%2C-123.25609608252694&z=18

Observation of Cigarette Butt Piles

General Distribution of Cigarette Butts

The density of cigarette butt accumulation varies across the health precinct. This indicates the presence of varying smoking patterns in the designated smoke free area. The data point to a noticeably higher density of cigarette butts in the health precinct between Hospital Lane and Agronomy road. A higher incidence of smoking in this particular area of the precinct may be explained by the presence of high traffic buildings like the UBC Hospital, UBC Center for Blood research and half of the faculty of Engineering all of which are found in this area of the health precinct, and the connection to the bus stops on Wesbrook Mall.

Influencing Factors on Cigarette Density and Distribution

The results obtained regarding the specific cigarette butt accumulation piles and their proximity to signs, entrances, and enabling structures are illustrated and summarized in **Figure 15**.

It is important to note that the influencing factors are not mutually exclusive and many times cigarette butt piles were found both near entrances and visible no-smoking signs.

In taking a closer look at the high-density category, the cigarette butt piles were most frequently found in areas near what was deemed as enabling structures (e.g. overhangs, ashtrays), at 64%, followed by presence of signage at 59%, and the presence of entrances at 52%. For specific data point classification please refer to **Appendix B, Table 2**.

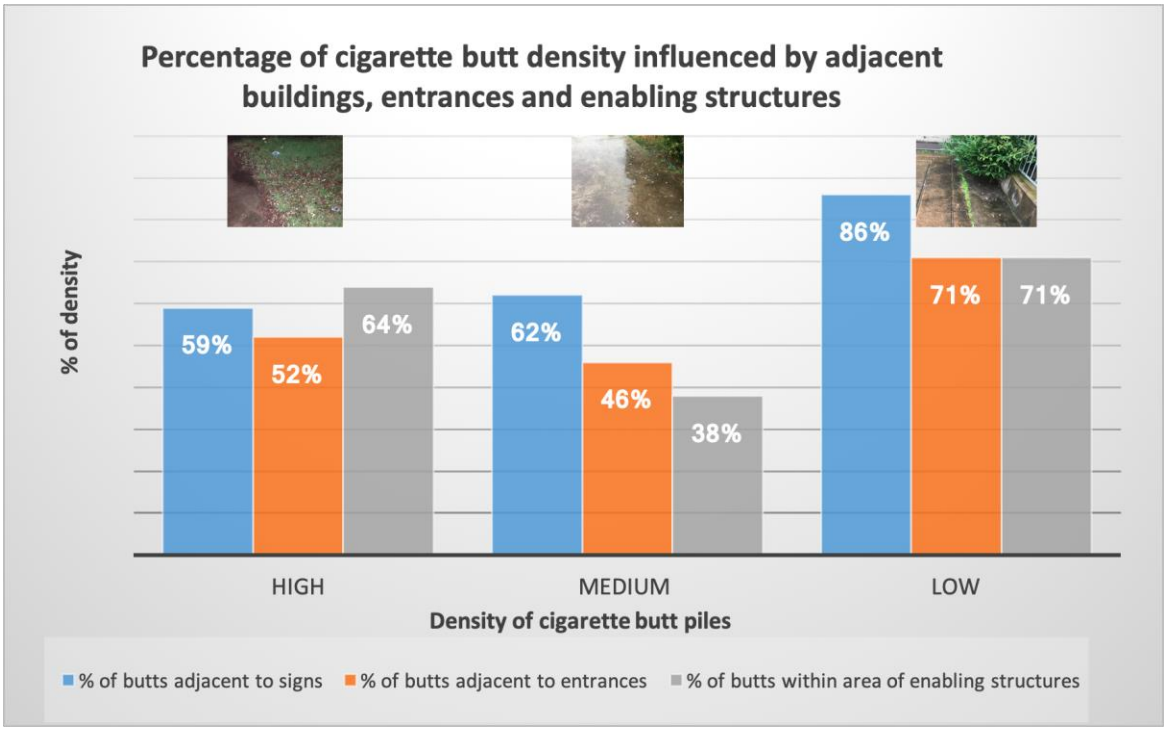

Figure 15. Percentage of cigarette butt density influenced by adjacent buildings, entrances and enabling structures

These results point to two main underlying problems. First, there is a clear ineffectiveness of the existing signage. Second, the high density of smoking behavior found near entrances and enabling structures may be indicative to a lack of consideration of staff´s break durations, and how either enabling structures or entrances are clearly playing an important role in the concentration of smoking behavior. As demonstrated in **Figure 15**, locations nearest to building entrances with benches and awnings or a general overhead cover had the highest density of cigarette butts. However, high amounts of cigarette butts were also found in open spaces between buildings. This may also be indicative of a smoker's attempts to step away from entrances and into open spaces; only doing so, however, during dry days.

Observation of Shelters and Enabling Structures

The project team observed a number of structural features that enabled or encouraged smoking within the health services precinct (**Figure 16**) and created smoking “hotspots”:

- **Gerald McGavin Building, north side**. The Gerald McGavin Building is located at the northeast corner of the intersection of East Mall and Agronomy Road. To the north of the building, on the east side of East Mall, is a small open space area with a variety of soft landscape features, a number of benches, a bike store locker, a footpath connecting East Mall to Health Services Mall, and a shelter structure abutting the facility waste bins. The shelter structure consists of one wall and an aluminum roof with two supporting pillars on a concrete slab base. The structure is occupied by two wooden benches.

  The structure is treated as a designated smoking area for individuals working within the Gerald McGavin Building as well as the adjacent Chemical and Biological Engineering Building. The project team observed that the structure attracts smokers daily, regardless of weather conditions.

- **Purdy Pavilion, northwest side**. Purdy Pavilion is located on the east side of Health Services Mall, to the north of the Life Sciences Centre. The building provides a canopied entrance on the north side of the building, abutting the canopied pedestrian walkway path connecting the building entrance to the sidewalk system at Health Sciences Mall to the east, and the Koerner Pavilion/UBC Hospital to the north and west. Purdy Pavilion canopied entrance area shelters a patio area on a concrete slab surface. The patio is enclosed by a low wooden fence. Sightlines into the patio area are obstructed by soft landscaping, including bushes, shrubs, and dense trees.

  This sheltered patio was identified as a high frequency smoking area for individuals working in Purdy Pavilion. Movable outdoor furniture pieces have been placed on the patio along with a cigarette disposal container. The project team observed that the structure attracts smokers daily, regardless of weather conditions.

- **Life Sciences Centre, north side**. The Life Sciences Centre is located at the northeast corner of the intersection of Health Services Mall and Agronomy Road. The building is flanked by a service driveway to the north, connecting to a loading and service area at the northeast area of the building. The building design includes two turret-style structures

protruding from the building face at ground level, with a building entrance centred between the two turrets. This is a low-traffic pedestrian entrance area.

The project team observed that this entrance is a frequent smoking area during clear weekdays.

- **Koerner Pavilion, east side**. Koerner Pavilion is located on the east side of Health Sciences Mall, to the south of Hospital Lane. The building operates a variety of healthcare functions, including UBC Hospital. The building is flanked by a recessed-grade open space area to the west. The space is designed with a combination of hard and soft landscape features, including pebbled concrete walkways, wooden benches on concrete retaining walls, and a concrete fountain. The open space area is bordered by concrete retaining walls, followed by dense foliage, including trees, shrubs, and ivy.

  During the study, the project team did not observe any smokers in the vicinity. However, evidence of cigarette butts was found in the ashtrays provided within this open space area.

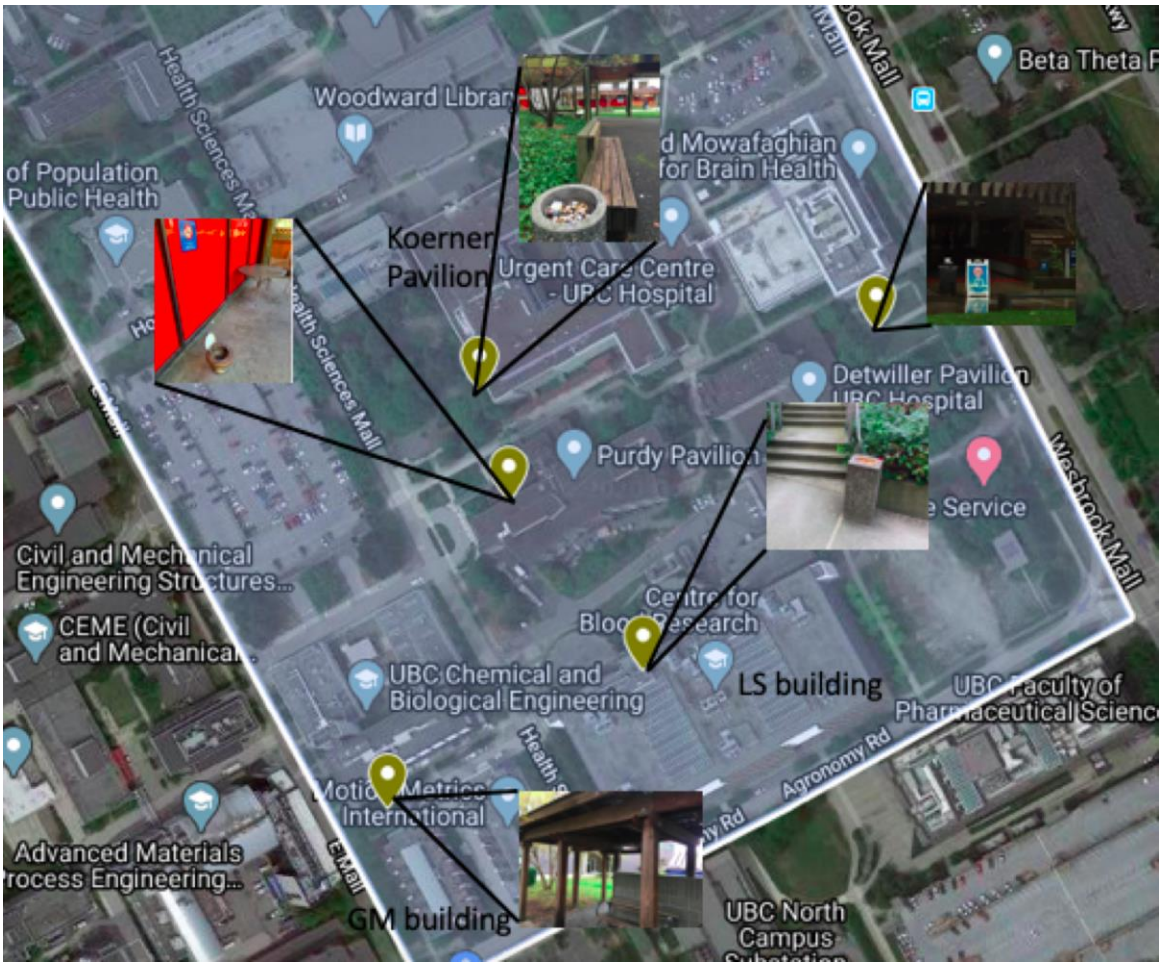

Figure 16. Enabling structures & Hotspots

Figure 17 identifies a hot-spot found with a very high number of cigarette butt accumulations. Although the latest site cleaning was undertaken on February 18-21, 2020 and site observation was conducted two weeks later on March 2-6, 2020, the amount of cigarette butt accumulation was significant. This remote area is located between Purdy and Detwiller Pavilions, away from primary pedestrian walkways and expected to be used mostly by the employees.

Figure 17. Hot-spot identified used by employees

As noted previously, all mapping of smoker observations, cigarette butt accumulations, and signage is provided in **Appendix C** and can also be accessed on Google Maps at the link below.

https://www.google.com/maps/d/u/0/edit?mid=11Si6XbuTMFvIS0M_5F-QBCtSFFLALGVS&ll=49.26481306076188%2C-123.25609608252694&z=18

Literature Review Summary

The project team made a comparison between UBC and other university smoke-free initiatives to understand the relationships (**Figure 18**). It was observed that Vancouver Coastal Health (VCH) and Oxford University Hospitals had more strict smoke-free policies compared to the universities by prohibiting smoking across all of their hospital buildings and grounds.

Universities such as UBC Okanagan, McGill and Yale implemented a transitional approach by providing some designated smoking areas within their university campuses. The rationale provided the Oxford University Hospitals on their website was strong, stating that a hospital had a duty to encourage good health.

The project team also found that although the Harvard University campus was five times bigger than UBC Vancouver campus by geographical area, it had a smoke-free campus.

● UBC Vancouver Campus: 1000 acres - 65,000 people ● UBC Hospital: Owned by UBC, Operated by VCH ● UBC Health Precinct: 37 acres	● BC Tobacco and Vapour Products Control Act *No smoking within 6 m of doorways, air intakes, windows to any public and/or workplace…* ● Vancouver Coastal Health (VCH) *All VCH premises and grounds are smoke-free* ● University of British Columbia Okanagan *516 acres - 12,316 people* *Smoke-free campus with some designated smoking areas* ● McGill University Downtown *80 acres - 41,860 people* *Smoke-free campus with some transitional designated smoking areas* ● Yale University *260 acres - 18,201 people* *Smoke-free campus with some transitional designated smoking areas* ● Harvard University *5,076 acres - 38,412 people* *Smoke-free campus* ● Oxford University Hospitals *Smoke-free buildings and grounds*

Figure 18. Summary of Literature Review

Draft Survey

In the design of the draft survey, the questions were intended to be short and simple in order to encourage participation. However, in accordance to client's directives, the survey was not conducted and is intended for future use. The draft survey can be found in **Appendix A**.

RECOMMENDATIONS

All universities and health agencies have a responsibility to set an example by ensuring a completely healthy environment for all students, staff, patients and visitors which should be complemented by smoking cessation advice and support programs. UBC commits to the wellbeing of people and therefore, implements a transitional smoke-free policy within its 1000-acre campus. Because creating an outdoor smoke-free environment is challenging due to the size of the area and the existing number of buildings, the project team observed high levels of cigarette butt accumulations pointing to significant non-compliance.

The following recommendations aim to avoid non-compliances and are categorized in three main areas:

- **Increasing Awareness**—which will require appointment of a specialist consultant;
- **Avoiding Conflicting Messages**—which can be undertaken by UBC Operation or Facility Management Teams; and
- **Managing Non-compliances**—which will require conducting a survey in order to make an informed decision.

Although smoke free policies are recognized as one of the most effective ways to eliminate the exposure to second-hand smoking and reduce smoking rates, creating a culture of compliance is a challenge. Therefore, a systematic process must be applied through the planning, implementation and enforcement processes to increase compliance with smoke-free policies.

Increasing Awareness

Compliance to smoke free policies is heavily reliant on human behavior and habits and there is no established measurement or control mechanism. Upon examining the reasons of non-compliances in large public areas through the literature review, it was understood that creating a culture of compliance is highly dependent on increasing awareness in order to avoid unintentional non-compliance. This is presented in three steps or actions:

Use public art or placemaking to define smoke-free zones (perimeter and/or within): An important barrier observed for smoke-free compliance is raising of awareness. One of the most effective solutions for increasing people's awareness is the use of art which is a powerful catalyst for bringing attention to important issues. Implementation of a public art program within or at the boundaries of smoke-free zones will inspire people to look at their environment in a new way by creating a sense of place that perpetuates the message of being a smoke-free environment. The presence of artwork or other placemaking methods can guide people's behaviour to the desired and defined action. **Figure 19** provides an example of simple and effective public art for communicating a message.

Figure 19. Examples of public art to increase perception of smoke-free zone (Source: Choosechicago.com)

Use informative signage: It was observed that existing signage is not sufficient to raise awareness about the smoke-free policy. **Figure 20** provides some examples of existing sign elements that are small in size and do not include any information about the level of restriction.

Figure 20. Examples of existing signage

Smoke-free policy recognition is highly reliant on signage. Using larger permanent signage informing the users about the level of restriction and the consequences that may arise for non-compliance will align policy intent with the physical environment. Examples of signage are shown in **Figure 21** It is recommended that improved signage be placed in proximity to hot-spots and the primary entry points to buildings within or abutting the Health Precinct and Library Gardens.

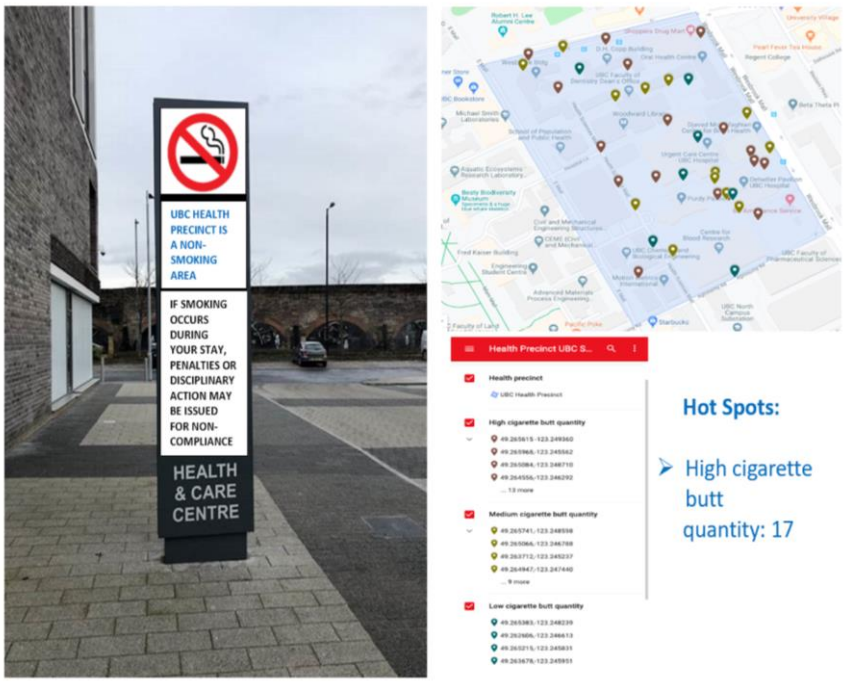

Figure 21. Recommended Primary Smoke-free Signage

Informational campaign: To inform employees, visitors, patients, and students of the smoke-free designation and new designated smoking areas it is important to communicate the message through a variety of avenues in order to ensure the policy is understood. The smoke-free designation can be promoted by way of…

- UBC Announcement Emails;
- Website;
- Social media channels;
- Distribution of flyers and posters;
- Advertising in university magazines, newsletters, handbooks; and
- Advertising at university events

Avoiding Conflicting Messages

Inconsistent understanding and communication of the expectation leads to conflicting situations. Therefore, expectations and obligations of the smoke-free policy must be clear within the boundaries of the area to avoid false assumptions. Ashtrays and conflicting signage were observed within the Health Precinct, contradicting the smoke-free policy implementation. Attempts to deal with the problem will likely be ineffective without the removal of those elements (see **Figure 22**).

- Removal of existing ashtrays
- Removal of conflicting signage

Figure 22. Existing ashtrays in Acute Care Patient Park and conflicting signage

Manage Non-compliance

Draft Survey: Examining reasons for non-compliance with the smoke-free policy will help to make an informed decision on how to manage repeated non-compliant behavior. Conducting the draft survey provided in areas where very high cigarette butt accumulations were observed will be critical for the clarification of the amount of unwillingness to quit and/or comply.

Create Designated Smoking Areas: In the event of a strong unwillingness to comply with the policy, a gradual transition approach can be implemented by providing some designated smoking areas mainly used by full time employees rather than students, patients and visitors. Examples of designated smoking structures are shown in **Figure 23.**

Figure 23. Examples of designated smoking areas

Increase Enforcement of Policies, Including Fines: Implementation of a clearly defined and actionable gradual enforcement plan to support and promote smoke-free policy.

- verbal warning
- written warning (first and second)
- notice of termination/fine

CONCLUSIONS

The delineation of Smoke-free zones at the University of British Columbia is certainly an important step in the right direction towards a smoke-free campus. However, like with any other project, the chosen approach requires an objective evaluation of its effectiveness to bring the project to a successful completion.

As part of the URSY 520 collaborating team, the project team was tasked with evaluating the effectiveness of the policies on the smoking behaviour in the Library Garden and the Health Precinct smoke-free zones.

The collected visual data of smokers indicates a higher incidence of smoking during the week, with the highest observed smoker intensity in the afternoon of clear or cloudy weekdays. No smoker was seen in the Library Garden smoke free zone for the entirety of our data collection. The project team found that the policies were effective in the Library Garden.

The data collected on cigarette butt piles points to a wide distribution of smoking behavior spread around the health precinct, with the highest density found in the east side of the precinct, housing high-traffic buildings like the UBC hospital and the Life Science building.

Enabling structures found both far from entrances and adjacent to them had the highest density of cigarette butts. Buildings like the Gerald McGavin Building, Life Sciences Centre, Koerner Pavilion, and Purdy Pavilion presented enabling structures in the form of shelter and ashtrays which appear to actively encourage smoking behaviour.

Overall, the data on smokers and cigarette butts suggest that smoking behaviour remains undeterred by the presence of signs placed around the smoke-free zones. The project team therefore found that the policies were not effective in the Health Precinct.

The results from the literature review of other University campuses suggests that the approach taken by UBC is in line with some of the other Universities in terms of adopting smoke free zones. However, it is noted that many institutions have included temporary designated smoking areas, something not currently done at UBC.

Finally, the recommendations we provided in order to increase the overall success of the program include: Increasing awareness of zone delineation existence through placemaking and the use of public art and informative messaging; avoiding conflicting messages such as the presence of ashtrays in smoke free zones; and managing non-compliances through the creation of designated smoke free areas to congregate smokers in specific areas. The draft survey developed by the project team is intended to gain a better understanding of the smokers and their current awareness of the smoke free zones and signage. We are hopeful this will also aid in the management of non-compliance.

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Appendices

Appendix A. Draft Survey

SMOKE AND VAPE-FREE IMPLEMENTATION SURVEY

You are invited to take part in this survey to share your thoughts on designated Non-Smoking Areas within UBC campus.

The summary of survey results will be used to assess the UBC's smoke and vape-free policy in the UBC Hospital area and determine community support.

Please respond by checking the box that best describes you.

Identity

1. Status: Student ☐ Staff ☐ Visitor ☐
2. Gender: Female ☐ Male ☐ Other ☐ I do not wish to disclose ☐
3. Age: Under 18 ☐ 19-24 ☐ 25-29 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ 60 and over ☐

Smoking Habits

4. Do you smoke or vape? Yes ☐ No ☐
(If no, skip to question 11)

5.What do you smoke? Cigarette ☐ Cannabis ☐ E-Cigarette (e.g. vape pen) ☐ Other ☐

6. Where do you often smoke/vape on campus?
Walkways ☐ Parking lots ☐ Inside buildings ☐ Outside buildings ☐ Anywhere ☐ Others ☐

7. When do you smoke/Vape? Morning ☐ Afternoon ☐ Night ☐ Anytime ☐

8. Are you conscious of "No Smoking/Vaping" posters when you approach a building to smoke?
Yes ☐ No ☐

9. Do you look for "No smoking/Vaping" signs when you smoke outdoors? Yes ☐ No ☐

10. Does the presence of the "No Smoking/Vaping" posters and signages prevent you from smoking in an area? Yes ☐ No ☐

11. Are you aware of the smoke and vape-free areas on campus? Yes ☐ No ☐

12. Do you see smoke and vape-free announcements on UBC's social media outlets? Yes ☐ No ☐

13. Do you support a smoke and vape free health precinct? Yes ☐ Neutral ☐ No ☐

14. Would you support UBC becoming a "100% vape and smoke-free campus?" Support ☐ Neutral ☐ No support ☐

15. Are you aware of the cessation programs and initiatives on campus? Yes ☐ No ☐

16. Do you believe UBC's smoking policy should be enforced rigidly? Yes ☐ No ☐

Thank you for taking the time to complete this survey!

Appendix B. Smoker and Cigarette Butt Accumulation Observations

Table 1. Smoker Descriptions

Weekend Smoker Descriptions

ID	Description
1	Clear Weekend - Staff smoker
2	Clear Weekend - Visitor smoker
3	Clear Weekend - Young adult patient smoker
4	Clear Weekend - Adult patient smoker
5	Clear Weekend - Middle age faculty smoker

Weekday Smoker Descriptions

ID	Description
1	Cloudy Weekday - Older visitor smoker
2	Cloudy Weekday - Old visitor smoker
3	Cloudy Weekday - Adult staff smoker
4	Cloudy Weekday - Adult staff smoker
5	Clear Weekday - 1 smoker
6	Clear Weekday - 1 smoker
7	Clear Weekday - 1 smoker
8	Clear Weekday - 1 smoker
9	Clear Weekday - 1 smoker
10	Clear Weekday - 1 Juul coming off the bus
11	Clear Weekday - 1 smoker
12	Clear Weekday - 1 smoker
13	Clear Weekday - 1 smoker
14	Clear Weekday - 1 smoker

Smoker by Time of Day

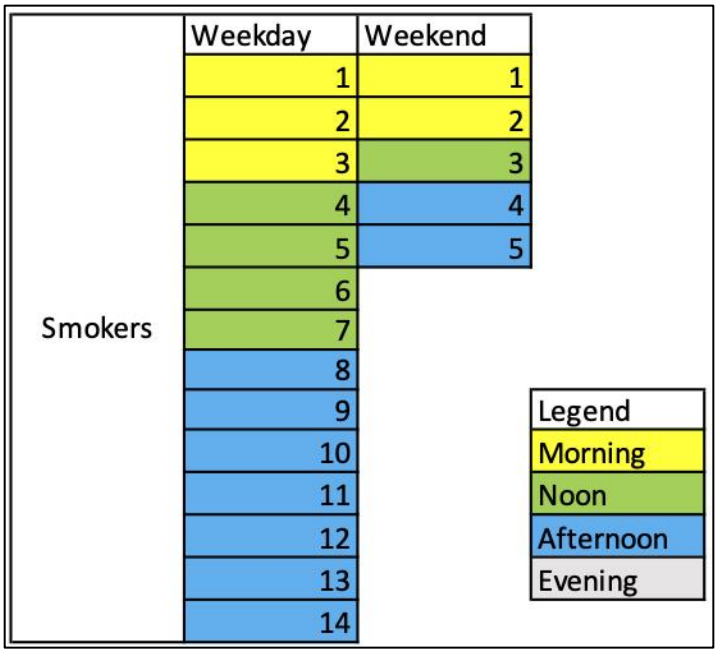
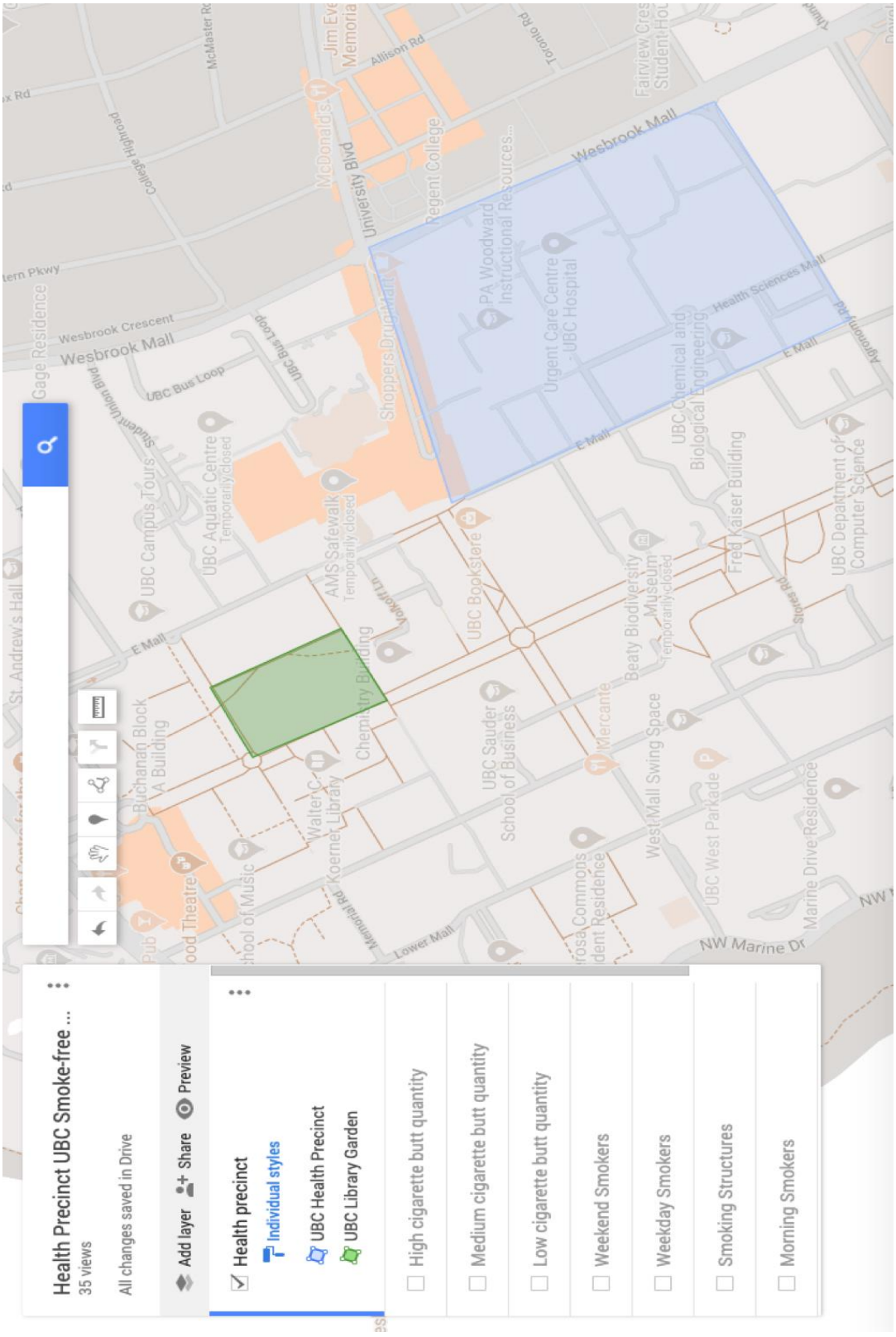


Table 2. Cigarette butt accumulation data categorized primarily by density

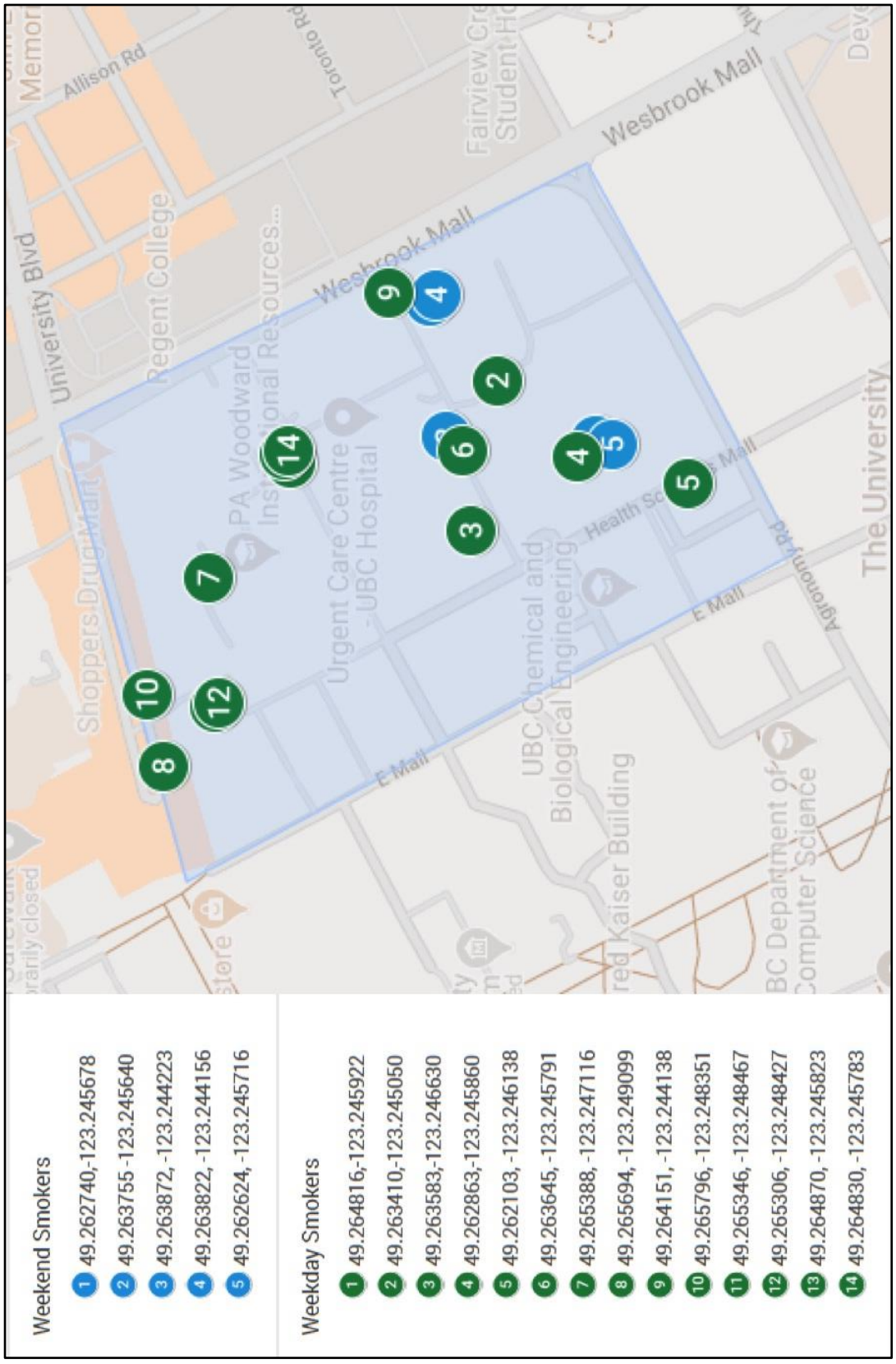
	High	Medium	Low
Cigarette butts	1 -E.S	1 - E.S	1 - E.S
	2 - E.S	2 - ENT	2 - E.S, ENT
	3 - ENT	3 - E.S	3 - E.S
	4 - E.S	4 - ENT	4 - E.S, ENT
	5 - E.S, ENT	5	5 - ENT
	6	6	6 - ENT
	7	7 - E.S	7 - E.S, ENT
	8 - ENT	8 - ENT	
	9 - E.S, ENT	9 - ENT	
	10	10 - E.S	
	11 - E.S, ENT	11 - ENT	
	12 - ENT	12 - ENT	
	13 - E.S, AT	13 - E.S	
	14 - E.S, ENT		
	15 - E.S, ENT		
	16 - E.S, ENT, AT		
	17 - E.S		

Legend
Visible sings (color)
No visible signs (color)
Undetermined signage visibility (color)
Enabling structures (E.S)
Entrance (ENT)
Ashtrays (AT)

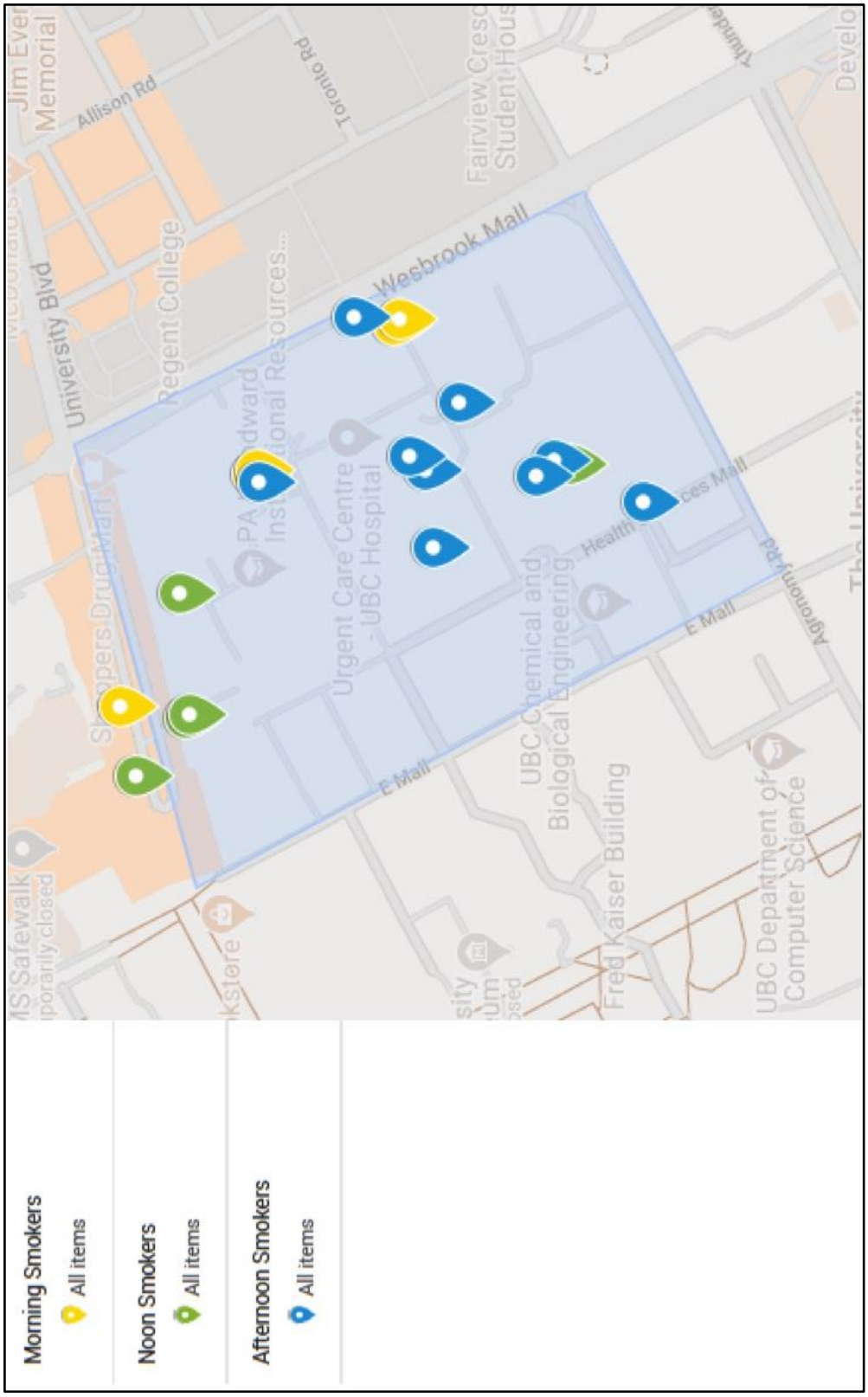
Appendix C. Maps



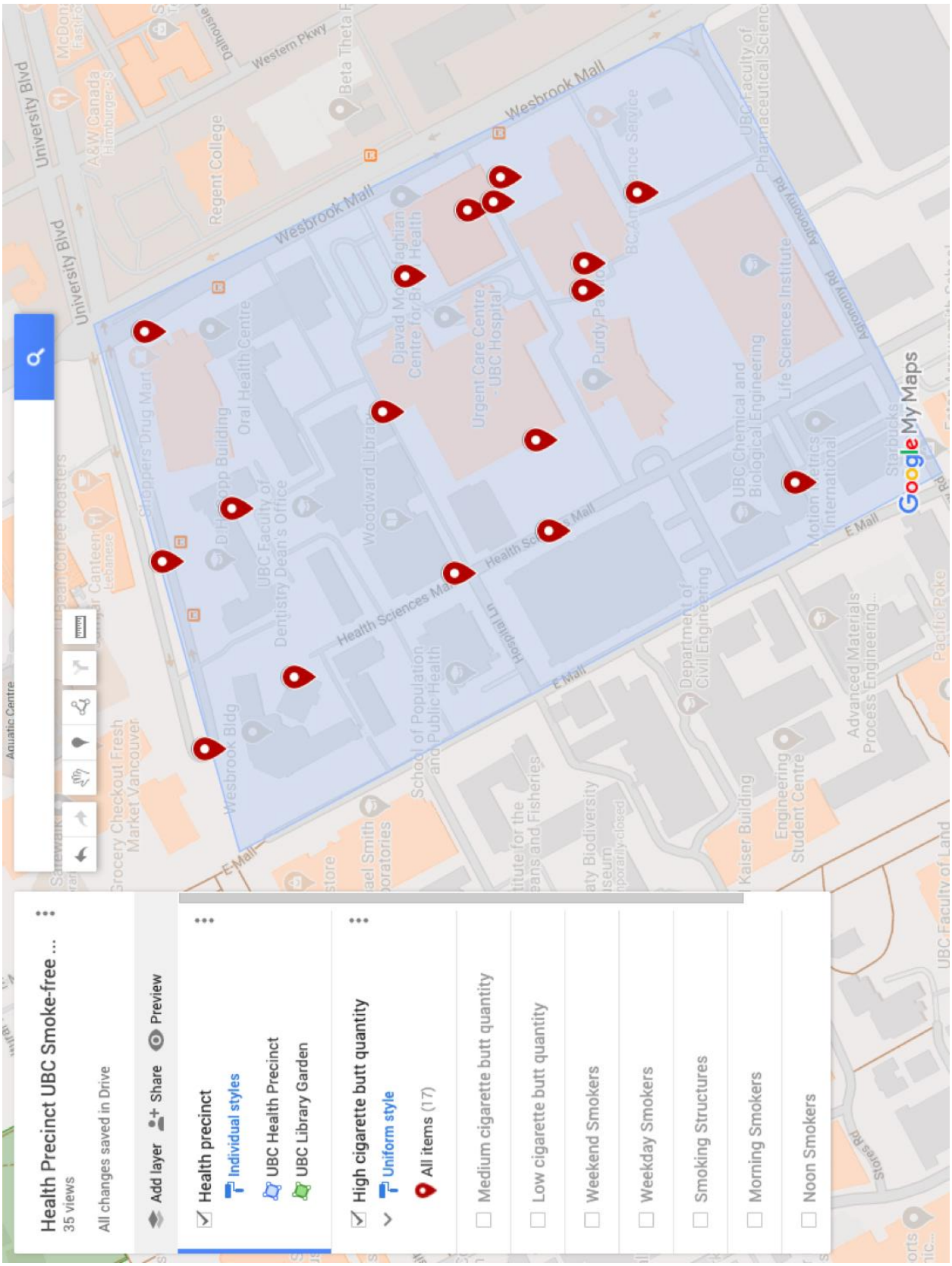
Map 1. Library Garden and Health Precinct Smoke free areas



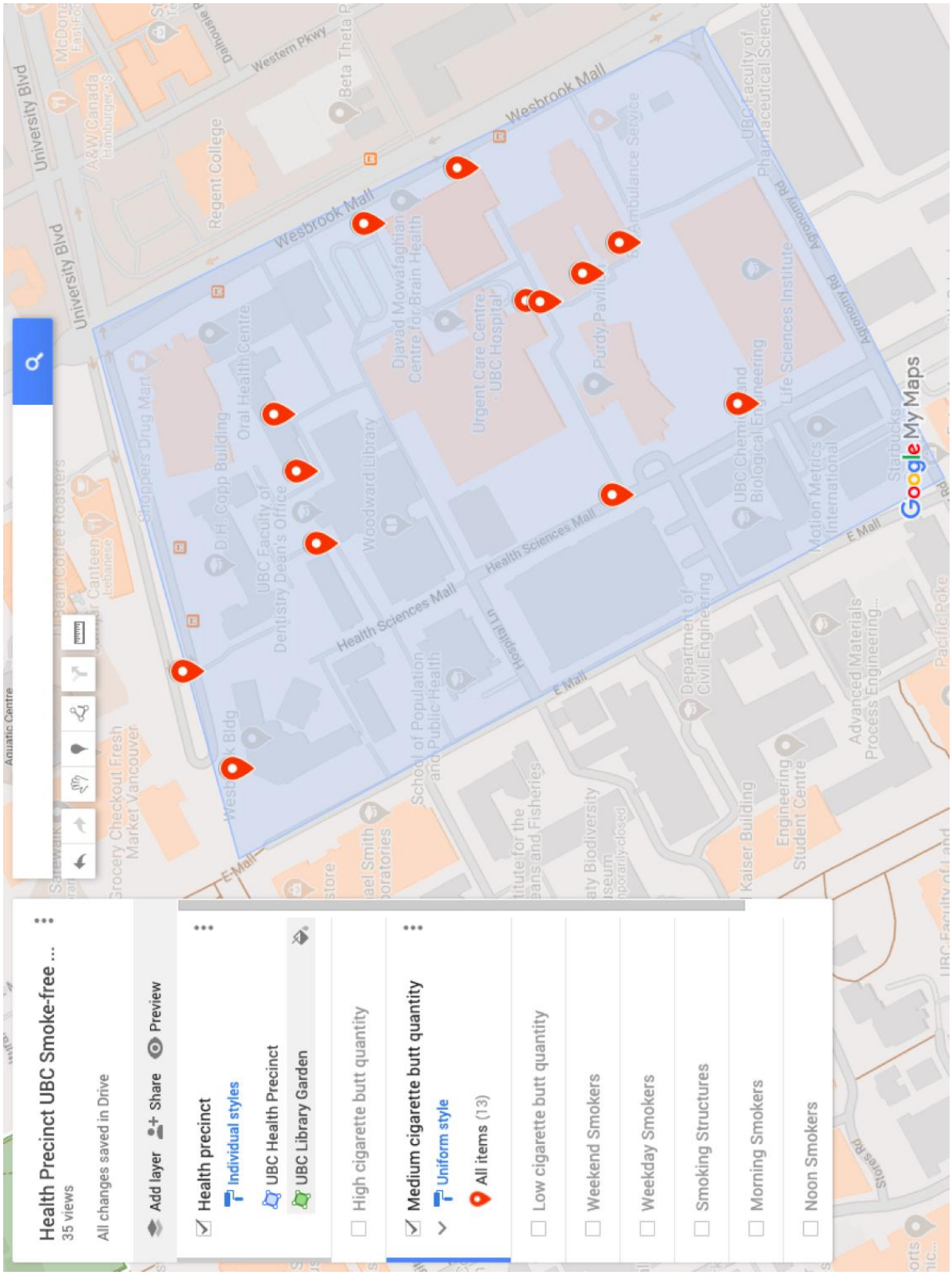
Map 2. Weekend and weekday smokers



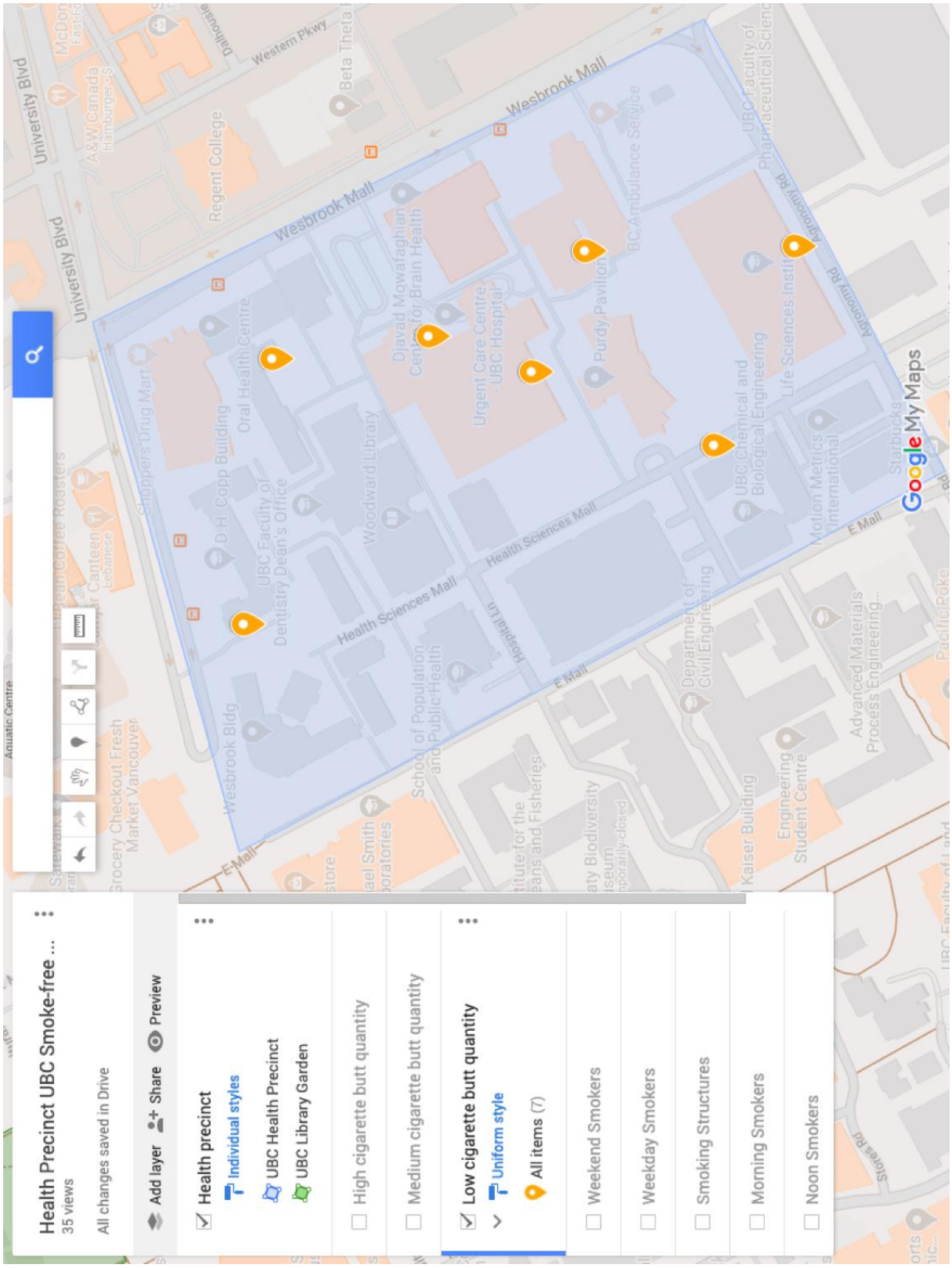
Map 3. Smokers by the Time of the Day



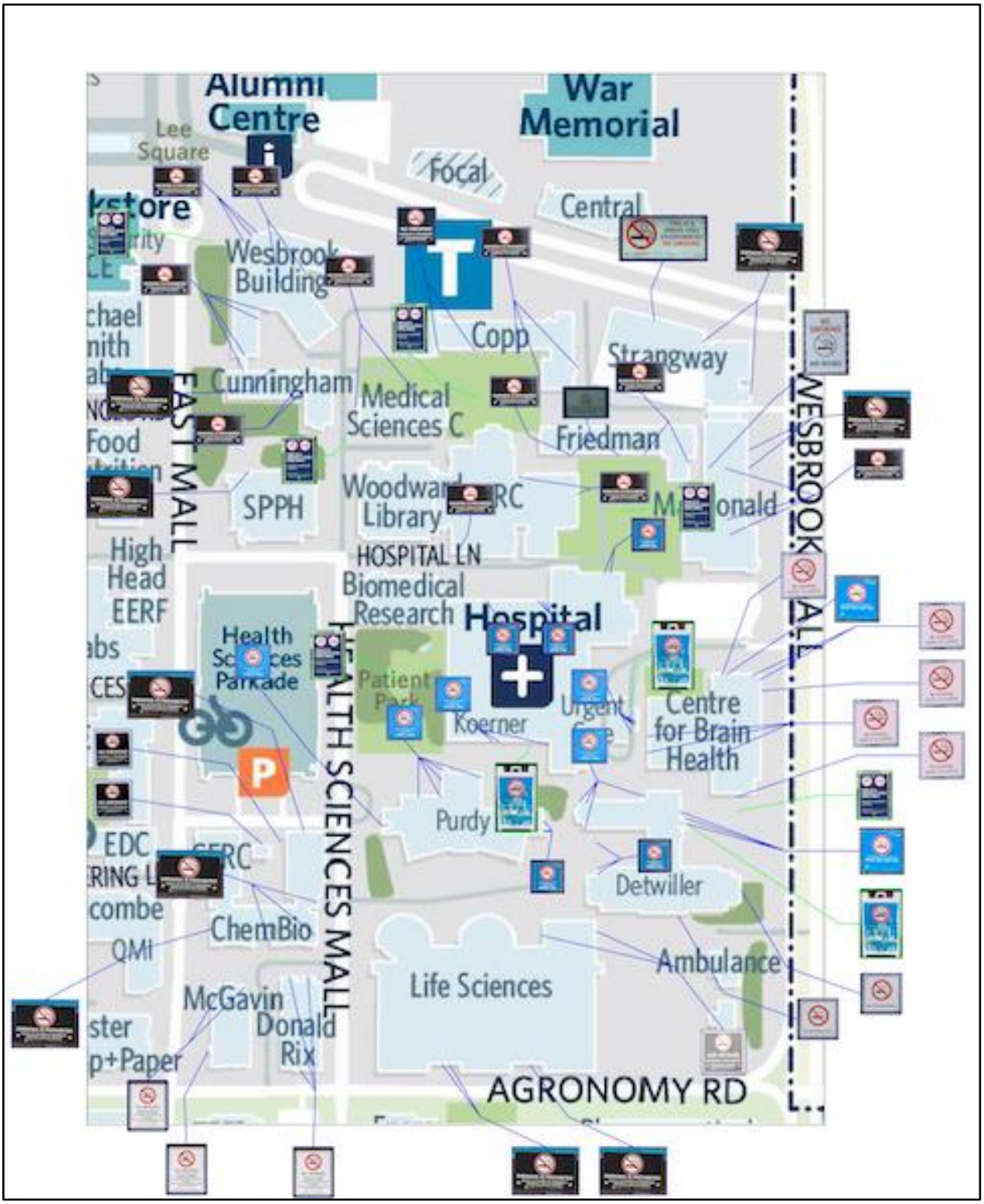
Map 4. High density cigarette butt piles



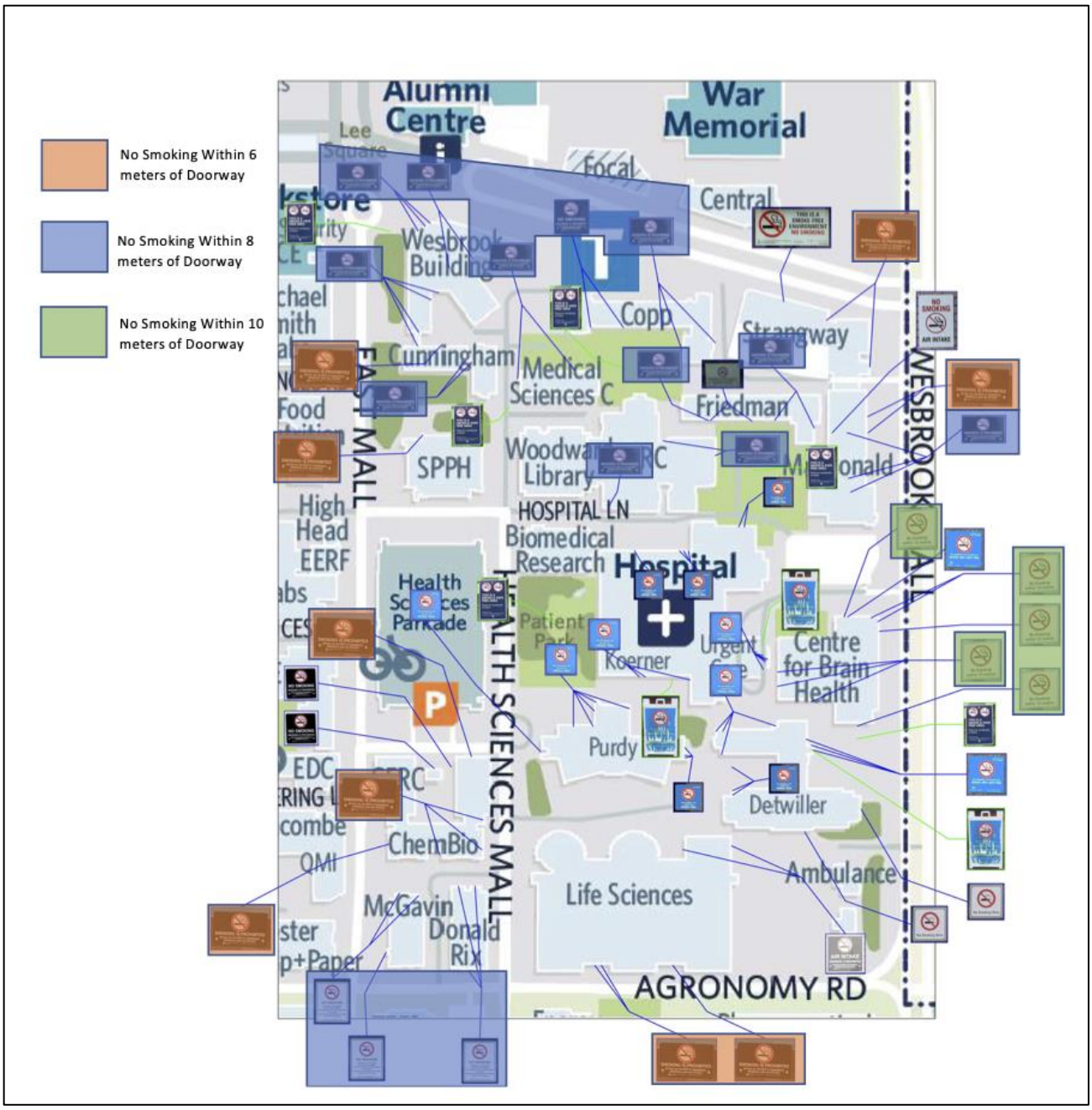
Map 5. Medium density cigarette butt piles



Map 6. Low density cigarette butt piles

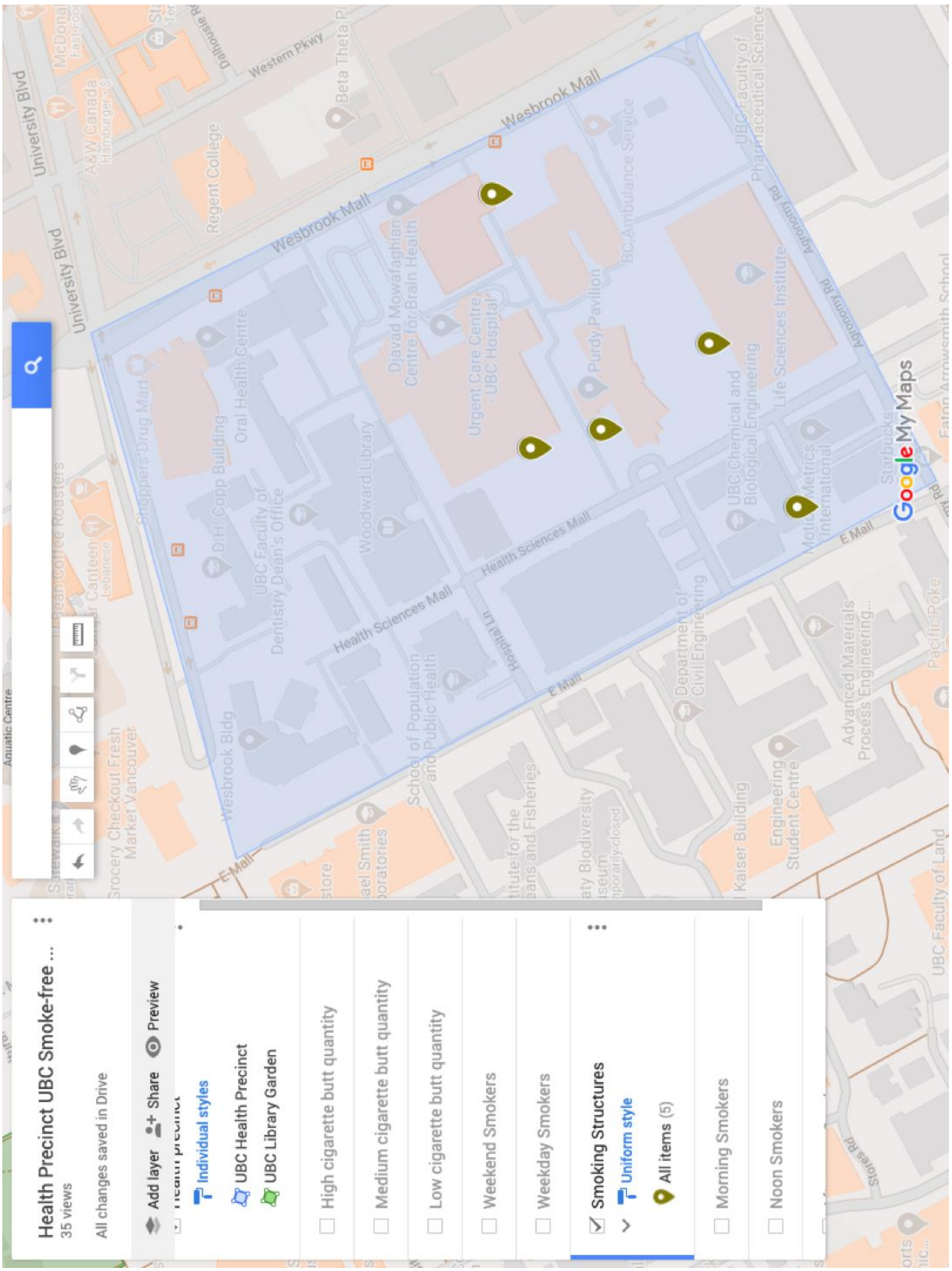


Map 7. Health Precinct Signage Inventory Map



Map 8. Health Precinct Conflicting Message Map

Map 9. Library Garden Signage Inventory Map



Map 10. Most prominent enabling structures