
State of the Park - 2020

Hamilton Park, Jersey City, 07302

Presented by the Hamilton Park Conservancy

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Statement of Intent

It is the purpose of this document to present a current state of the living ecosystem in Hamilton Park, and to provide reasons behind ecological and botanical challenges as they relate to human interaction and community use. As it is the first horticultural document written for this purpose, it should exist as a baseline for Park health, against which all further assessments may be measured. This report will provide observable and scientific evaluations of all horticultural areas of the Park with recommendations for continued maintenance and care. It is hoped that the information contained here will serve as a catalyst for improvement and change, and will be regarded as a first step towards establishing a healthy and beautiful Hamilton Park for the future.

Section One: Specifications, Seasonal History, and Major Events

1. Hamilton Park is a 5.57 acre park located in Downtown Jersey City in area code 07302. It was designated as a park in the early-to-mid Nineteenth Century, and is completely human made - with no areas of wilderness or natural environment. It is divided by centrally intersecting walkways into 8 sections; four of which are designated for active recreation, and four of which are designated for passive recreation. It is a public park, and as such is subject to the maintenance and jurisdiction of the City of Jersey City and its Department of Parks and Forestry. (The City Municipal Code can be found at library.municode.com) In 2008, a major renovation of the Park was undertaken. This included the construction of new recreational amenities, the restoration of existing structures, the remediation and capping of contaminated soil, the design and planting of new landscaping schemes, and the installation of extensive drainage and irrigation systems.

2. From the Autumn of 2019 to the Spring of 2020, the Park site saw weather conditions on the drier side compared to the wetness of past years. The third mildest February on record was followed by a colder than normal Spring which saw trace amounts of snow each month, including May. Summer 2020 saw excessive (but not record-breaking) daytime heat, and had higher than normal nighttime temperatures, making it the second warmest Summer on record. It was a generally wet and humid Summer, with Tropical Storm Isais bringing high wind damage and flooding to the area in August. Autumn saw widely varying temperatures with episodes of heavy rain as well as an extended dry spell in September (15 days). After unusual below freezing temperatures for a number of days, October and November were milder and wetter than normal, with excess precipitation from a number of peripheral tropical storms. The Growing Season ended in Northern New Jersey (as per Newark Station) on the 31st of October 2020. Mid-December saw the first snowfall of the season, though the month remained essentially warm and wet. The beginning of winter was quiet with temperatures ranging from mild to cold, but February brought higher-than-

average snow accumulations with some periods of high wind. Late winter saw quite varying temperatures and some heavy rains. (Weather and climate information is from the Office of the NJ State Climatologist at Rutgers University. Detailed data is available to the public at climate.rutgers.edu)

3. The Park was closed to the public due to Jersey City Covid-19 measures from March 2020 to June 2020. After re-opening, City regulations stated that masks must be worn in the park by all required to do so, and that social distancing should be observed. These regulations are still in effect at the writing of this document. In August, Tropical Storm Isais directly damaged two Park trees, with indirect damage to a third. An *Acer saccharinum* (Silver Maple) and liriodendron (Tulip Tree) on the Park's South side required complete removal. The Park's largest Silver Maple on the West Side endured the loss of some large limbs, but appears to still be basically structurally sound for the time being. (Closer inspection by the Department of Forestry is pending). In late Autumn, a *Lycorma delicatula* (Spotted Lantern fly) was identified and terminated in the Park. Reports were made to the NJ Department of Agriculture as per guidelines, and no other Lantern fly was observed in the Park through the season. (Egg sacks were not present)

Section Two: Projects, Maintenance, and Improvements

1. In Autumn, the bench and table installation project was accomplished by the Department of Buildings and Streets. The Conservancy was not involved in this project, and any further information can be obtained through that department or the HPNA. (Its mention is included in this report to document some damage to trees and tree roots sustained during installation).

2. In September, under the direction of Sammy Ocasio, Director of the Department of Parks and Forestry, Ed O'Malley, Municipal Arborist carried out much needed tree pruning throughout the Park. Extensive consultation was done before any decisions were made about pruning and removal, and detailed plans were in place before the work was done. A few trees still need attention in this capacity, and will hopefully get necessary maintenance in the upcoming Spring.

3. Multi-species of Spring bulbs were planted in bed areas of the Park in mid to late Autumn. In late Autumn, with the approval and partnership of the Department of Parks and Forestry, temporary fencing was erected around the planting bed areas to protect the planted bulbs from human and other damage. Also with the partnership of the Department of Parks and Forestry, temporary fencing was placed around a *Picea abies* (Norway Spruce) tree and a quercus (Oak) tree to protect them from additional human damage both to the trees and surrounding soil. (Details leading to this decision will be found in sections 1 and 2 of this document).

4. In the Autumn, the City officially contracted Gene's Landscaping to take over the regular maintenance of the Park. Gene's has been employed by the Conservancy for Park work in the past. Gene and his team will be significant partners in the restoration and preservation of areas of the Park, and a congenial and productive dialogue with them is in progress.

Section Three: The Canopy Report

1. The trees in Hamilton Park can be compartmentalized into the High Canopy (trees between 100 and 150 years old that are capable of growing to great heights) and the Lower Canopy (younger trees and/or trees that do not grow to towering heights). [Tree age has been estimated by multiplying trunk diameter by species growth factor.] There are also a few Very Young Trees that were planted within the last few years. In the Southern, Western, and Northern areas of the Park, High Canopy trees have grown to block a significant amount of sunlight from reaching the Lower Canopy and the ground, which is a contributing cause of a number of ecological issues in the Park that will be addressed later. *Acer saccharinum* (Silver Maple) can grow to great heights with age, but have a faster growth rate than other species and tend to be weaker as they get taller. (Bark inclusion and weak branch unions are common.) These are the trees that commonly fall or drop branches in the Park when highly inclement weather occurs and must be monitored for any visible weakness or dead branches throughout the season. Many of the Lower Canopy Trees are in need of extensive pruning for their continued health, and to allow more light to penetrate. Most of these are ornamental fruit trees which require seasonal attention to promote the best flowering and strength. The Very Young Trees in the Park are exhibiting signs of negative growth and health. Human interference, animal urine, and physical damage from landscaping machinery are putting them at risk for girdling.

2. A general comment that can be made from careful observation and scientific analysis, is that most of the trees in Hamilton Park are suffering from serious issues that either indicate or significantly impact their overall health and condition. Almost every tree exhibits some degree of fungal infection, a number of trees have open cavities and cankers, and both girdling roots and root rot symptoms have been observed. It is crucial to note that trees that are physically damaged or infected with minor pathogens become weakened which leaves them open to other more virulent, destructive, and irreversible disease. In a healthy ecosystem, strong trees have the ability to resist infection and infestation, but, as will become clear throughout this report, the ecosystem of Hamilton Park is not healthy, and its trees are showing strong signs of decline.

a. Fungus is the most widespread infection plaguing all woody and herbaceous organisms in the Park. Tar Spot has been observed in most of the maple and London plane trees, Anthracnose has been identified in the London Plane (f. *Apiognomonina veneta*) and European beech (f. *Discula umbrinella*), Juniper Tip Blight (f. *Phomopsis juniperovora*) is evident in all the Parks juniper trees, the Park's crabapple trees all

exhibit evidence of Scab (f. *Venturia inaequalis*) to different extent, and both Powdery and Downy Mildew have been observed on London plane trees. Some of these fungi are more damaging than others, but all serve to stress and weaken the tree, all are indicators of larger systemic issues, and all are very effective at spreading throughout an ecosystem and the surrounding neighborhood. Some fungal infections create an optimum state in a tree that attracts other more damaging organisms. (such as in Oak Wilt - a very serious disease). Fungi strains are specific to each individual species of tree, but they are all attracted to and encouraged to grow in an ecosystem with an excess of moisture retention and lack of sunlight - pervasive issues in Hamilton Park.

b. Insect infestation is another major concern for the Park trees. A quite extensive bee infestation has been observed in a large London plane tree which can be highly damaging to the physical structure. The Park had only one Lantern fly sighting this year, but experts believe that they will continue to grow to be a stronger presence in Northern New Jersey. The Park has one *Alianthus altissima* (tree of heaven) on the West side which is categorized as an invasive species, and is the strongest attractor tree of the Lantern fly -a decision may need to be made about its future. The Park has a number of large, old ash trees, which are highly susceptible to Emerald Ash Borer infestation, given the stressors of the Park environment. (Significant root damage and some trunk damage to one Ash during the picnic table installation could very possibly leave that tree open to Borer attack, which would spread to the other ash trees as well.) The pine and spruce trees in the Park show clear signs of woodpecker damage and sap ooze, which indicates a presence of Pine Bark Beetles in these trees. In general, insects and their larvae are not yet a serious factor in the Park, but given the direction in which the Park ecosystem is going, it is sound to assume they will be.

c. Throughout Hamilton Park, there are structural issues with trees, both in the manner of growth and in the quality of pruning, which will cause serious damage if not addressed. Improper pruning practices in the past, and pruning done specifically for utility maintenance (clearing branches from street wires), have left a number of Park trees in need of fixing and balancing. Improper or slapdash pruning leads to poor and potentially dangerous branch growth, often making the issue much worse than the problem the pruning was hoping to correct. (It should be noted here that the utility pruning done periodically to the Park's perimeter trees and others in the neighborhood to clear wires is mandated by the State of NJ - we do not have any say in these actions, or advanced warning). Many trees in the Park that require regular pruning maintenance have seen past neglect, causing them to grow branches at dangerous angles, branches that are growing into (and damaging) nearby trees, and excessive water sprouts that are blocking air and light from the tree. Many of these issues are not helped by the fact that quite a number of lower canopy trees are planted much too close together, and are forced, as they grow, to fight each other for already limited resources. A number of Park trees are displaying growth habits towards areas of light which is leading to poor structure, precarious trunk angles, and general branch weakness. These structural concerns have begun to be addressed with the Department of Forestry, but there is much yet to be accomplished.

Excessive climbing of the Park's trees is also a key factor in decline - it is against the City Code to climb the trees in any public park, and without proper enforcement of this, some trees that are already weakened from climbing and human scarring, may develop serious issues. Community obstruction often prevents some of this necessary work from being accomplished, and it is hoped that the information in this report will help to foster a better understanding of the measures that need to be taken for true tree conservation.

Section Four: Shrubs and Herbaceous Borders Report

1. Hamilton Park is home to hundreds of shrubs - deciduous and evergreen - both within designated planting areas, and in other areas in the open lawn. Some have been left to grow quite large (as the Park's extensive collection of holly), and some maintain a naturally smaller growth habit. (The original landscaping drawings from the Park's 2008 renovation show plans for almost 3 times as many shrubs throughout the Park - it is unclear whether or not the amount was reduced before planting, or if the difference did not survive.). In some instances, shrubbery has been used to camouflage industrial equipment, but mostly it has been used, along with fencing, to delineate natural barriers between lawn and planting areas. The health of the Park shrubbery is generally good, with a few notable exceptions. However, the Park has shrub species that can be highly susceptible to disease and rapidly spreading infection, and therefore require use of Best Management Practices and protection for their preservation.

- a. The Shrubs that are planted in the open lawn or on the outer side of fenced-in Park areas are primarily varieties of ilex (holly) including *Ilex crenata* and *Ilex opaca*. The crenata species maintains a natural height of approx. 3 feet, and with regular pruning maintains a clean look. The American Holly (opaca) can grow much taller - as can be observed throughout the Park. Many of the holly shrubs in excess of 15 feet in the Park are planted very close together, creating dense walls of foliage that are now blocking light from crucial areas of the lawn and limiting visibility necessary to monitor certain areas. It is unclear if the intention of the landscaping was to allow them to grow so tall (with regular pruning, shrub size can be contained and trained) or if they have just grown immense from neglect, but their height and density is adding to the continuing issues facing the Park and ecosystem. Three perished completely this season, and were removed. The Ilex shrubs throughout the Park are generally healthy, except where dense planting has starved some or their resources. It is clear, however, that many have perished over the years, as little evidence of a clear design

plan remains. Shrubs around the Splash Pad are exhibiting characteristics of stress due to human interaction and a drastic erosion of soil in that area. Other shrubs in the greater areas of the Park are basically healthy, though require yearly pruning to remain both healthy and attractive. (For example the *Spirea bumalda* and the *Pieris japonica* off the North West walkway.) If shrubs are permitted to get too dense, air no longer circulates, dampness festers, and disease follows.

2. The Park's herbaceous borders (collection of perennial plants and flowers) currently contain a number of plants that are well suited to dry sunny conditions and well-drained soil. Many are native to the prairie regions of the Americas and regions of South Africa. However, the Park's current environment of dampness and shade is no longer supporting these varieties of plants. Areas of the planting beds that once received Full Sunlight (defined as 6 or more hours of continuous sunlight per day) can now barely be classified as Partial Shade (2 hours of continuous sunlight). Many perennials this season either failed to thrive (never really took root or failed to exhibit any actual growth) or perished from rotting roots and fungal infection (all caused by excessive dampness). Some of these plants were removed before bulb planting in the Autumn, and will be replaced in the Spring with plants more appropriate for the changing environment of the Park. Some of these plants will be lifted and moved to other areas of the Park which, display more favorable growing conditions for them. The planting areas of the Park also contain a few rhizomic (Iris), tuberous (muscari,) and cormous (crocasmia) perennials that require periodic lifting and dividing to maintain plant health and strong flowering - all are currently in need of this procedure. This report will explore the state of each physical area individually. (It is noted here that the planting area of the park in the East/ South section designated as the "Children's Garden" does not come under the jurisdiction of the Conservancy, and will not be covered here except for the shrubbery borders surrounding it, which are.)

The Playground Garden

The Playground Garden is the fenced area adjacent to the North walkway contained inside the Playground. Most of it is in Part Shade, and the rest is in Full Shade. It is, like the rest of the Park, irrigated by sprinkler which, as will be seen throughout this report, is problematic for the health of the planting beds. This area contains a large and dense planting of Red and Yellow Twig Dogwood shrubs (*Cornus sanguinea*, *Cornus baileyi*, *Cornus sericea*) through which Anthracnose and a few other fungal infections spread rapidly towards the end of the season. The cause can be traced to a number of factors: necessary pruning at the wrong time of the season due to Covid closure, sprinkler irrigation, excessive irrigation, and density of the planting which blocked sunlight and air. (These shrubs should be planted 8 feet apart - most are barely 2 feet apart. The whole ecosystem of this area was infested with mosquitos.) As these shrubs are deciduous, it was necessary to cut them down completely in the Autumn to prevent fungal spread from falling leaves. They are undergoing a complete renovation, and at least half will be moved to other areas of the Park during a re-design of this bed. This part of the garden also contains a number of "Knock Out" Rose bushes which are relatively low maintenance, but still

require pruning and dead-heading to be their best. Spring pruning should correct growth issues, and thinning of the Dogwood in the area should solve any nascent fungal issues. There was an attempt made to plant a number of shade plants (fern, lungwort, hosta) under the tree on the North edge of this garden, but to no avail. This area receives no sunlight at all, and only the hosta and hydrangea on the edge of this tree's canopy shade will grow at all. There is also very little topsoil of any note under this tree, and what is there is most certainly lacking in nutrients. (It should be noted here that the Playground area of the Park is part of the soil remediation in 2008 where capping was employed. This means that the soil here was not only brought from elsewhere, but that it has no connection to the ground or bedrock below, which is how soil naturally replenishes and maintains its essential minerals and other nutrients.) As with all three planting areas of the Park, the Playground Garden struggles with human interference, including human presence in the beds and littering. The fencing here is higher than elsewhere in the Park, which does offer some protection, but it is quite frequently ignored.

The Gazebo Garden

The Gazebo Garden is contained in the four sections that face out from the Park's central Gazebo - North (Part Shade), North East (Part Sun), South East (Part Shade) and South (Part Shade). The Garden areas received much more sun in the past, but the four large *Ilex opaca* trees that grow in the corners of the beds have been permitted to grow to the point where they are blocking a fair amount of sun, thereby causing excess moisture retention and a general lack of vitality to the plants in these areas. Many plants and flowers in these beds that require Full Sun and well-drained soil did not grow well this past year, save for those in the North East facing quadrant which, though not thriving, survived well on the partial morning sun they received. This whole garden also suffered from over-irrigation and the damage of sprinkler irrigation. Both of these were evinced in the "flopping over" of a variety of tall-stemmed perennial and biennial flowers in these areas. Penstemon, brunnera, crocosmia, delphinium, digitalis, kniphofia, alchemilla, and lupinus - all of which exist in this garden - are plants that grow tall stems or racemes of flowers and require well drained soil and particular sunlight. If conditions are not met, and they are over watered (especially from above), the stems will not remain upright. This could be observed throughout the season last year. (It should be noted that after the sprinkler irrigation was turned down to 5 minutes per day in late Summer, these plants began to show a resurgence of growth. When the irrigation was turned off completely in early Autumn, they continued to look good late into the season.) The Gazebo Garden has a number of plants and shrubs that have been mobbed by the overgrowth of the holly shrubs, and many that are suffering from lack of sunlight. Much in this garden needs to be moved and re-designed for the health and appearance of everything in it. The Gazebo Garden also suffers greatly from human damage. There has been no fencing to protect this area from human traffic and activity, and it is constantly entered and trampled. A great deal of food and garbage is thrown into this garden from off the

Gazebo or elsewhere, and issues with the use of a corner of this garden as a toilet has plagued the maintenance of it all season. Temporary fencing has alleviated a lot of this over the Winter (except littering from the Gazebo), and the permanent fencing that is forthcoming along with community cooperation will, hopefully, allow this area to begin to recover.

The Fountain Garden

The Fountain Garden surrounds the fountain which is located on the South walkway. It is a fenced-off area also separated from the lawn by semi-circular hedgerows. This area receives widely varying amounts of sun throughout, which is clearly a challenge to plant growth, as was observed throughout the season. This disparity of sunlight has caused a garden that was initially intended to be symmetrical to lose visual balance due to the stunted growth of half the shrubs and perennials. As mentioned before, the three *Juniperus scopulorum* in this area all suffer to some degree from Phomopsis Tip Blight due to the rising damp conditions - so much so that the fourth one came down this year and was removed. The ilex shrubs in this area are healthy, as is the barberry (though, in the invasive fashion for which it is known, it has overgrown into the surrounding shrubs, posing a threat.) This garden does have two varieties of buxus (boxwood), however, that are under threat from a nascent fungal infection that may have been caused either by soil that was brought into the garden from an unknown outside source, or physical human damage sustained by one shrub that made it susceptible to infection. Three buxus shrubs perished rapidly and were removed immediately to prevent spread. In whatever manner the disease was brought into the garden, it was certainly spread within the garden by human vectors. The echinacea (purple coneflower) and rudbeckia (black-eyed Susan) flowers in this garden either perished from excess of moisture, or were trampled by human interaction, and were removed entirely from the garden to be replaced in Spring by plants and flowers more suited to the soil and sun conditions. (Bewilderingly, almost all of the flowers on the echinacea were removed perfectly from their stems toward the end of the season - no animal that lives in our region could have done it.) A great many *Perovskia atriplicifolia* (Russian sage) were planted in this garden, most of which failed to thrive, never took proper root, or simply perished - all a result of damp soil and over-watering. A large planting of *Liriope muscari* rims the inner circle of this garden, and has been spreading vastly - as is its growth tendency. It needs to be cut back and divided in Spring to thin it out for better aeration, cleaner growth, and increased flowering. The greatest threat to the health and vitality of the Fountain Garden, though, is human damage. The low fence around this area is not a deterrent to humans entering, running around in, and trampling all areas of the garden. Human vectors are very effective at spreading fungal disease throughout hedgerows, and broken stems and branches open shrubs and plants up to damaging diseases. (Fungi spores can move from place to place easily by attaching to clothing.) Temporary fencing was erected to protect this area and the bulbs over the winter, but without higher permanent fencing and community cooperation, this garden will never be able to live up to its potential.

Section Five: The Turf Report

1. The lawn areas in Hamilton Park have been declining in health and vitality for years. Attempts have been made to restore the turf, however if the underlying systemic issues in the Park are not addressed first, grass will no longer grow in certain areas. It is also essential that the turf challenges be solved for the health of the entire Park ecosystem. Doing this will require some hard decisions and, above all, the cooperation of the Park community. This report will explore the state of the turf by dividing the Park into two regions: one that is in very serious condition, and one where grass grows relatively healthy. (Refer to Park Diagram for sectional divisions)

a. The areas of the Park from the South / East section around to the West / North section are the open lawn areas of the Park, and are most in need of serious restoration and preservation. Grass does not grow at all in some areas, and very little in others. Evidence of significant loss of topsoil due to erosion is observable in some sections, as well as constant pooling of water around trees and in the open lawn. (A number of underlying systemic problems are root causes of these issues, and later this report will address soil health, damaging irrigation, and poor drainage.) As touched on before in this report, many of these issues stem from the pervasive dampness in the Park climate, which is caused by insufficient drainage and excess of shade. The establishment of healthy turf is possible in shade conditions, but the grass will often display shallow, weak roots, less vigor and density, and susceptibility to disease. The most challenging areas of the Park are in Deep Shade, and without some thinning of the canopy, it may be extremely difficult (and expensive) to ever have a real lawn. However, the absolute greatest challenge to establishing an actual lawn on these areas is human activity. Varieties of grass that do grow in shade tend to have shallow roots that are easily damaged by trampling, effectively destroying any new lawn as soon as it is open for public use. Another very crucial reason that a healthy turf-grass be established, is to stop the erosion of soil on the West / South and West sides of the Park. In the remediation plans of 2008, it was determined that no soil capping was necessary for the contamination in these areas since the future turf would grow thick and protect the public from any contaminants while holding the new, clean topsoil in place. However, due to complete turf decline, this protection no longer exists, and it is evident that a significant amount of that topsoil has been washed away by erosion. (It should be noted as well that as an added protection after remediation, to preserve the grass, these areas of the Park were designated for passive recreation only - a guideline that has never really been observed by the community or successfully enforced.)

b. The Park area from the North / West section (playground) around to the East / South section (second tennis court) display a healthier lawn. This can be explained by the fact that these areas are more open with fewer trees and therefore less dense canopy. Because of this, more light can penetrate to the ground, air circulation is better, and the excess of dampness seen in other Park areas is somewhat diminished. Sun is really the single most important element for the improved environment in these areas of the Park, though the fact that there is less human activity on the lawns in these sections (they contain all the separate designated active recreational areas) makes a big difference to lawn health as well. Because of a stronger Sun presence here, different varieties of grass seed can grow which have deeper and stronger roots than shade varieties and are more resilient to moderate foot traffic.

2. It is hoped that this Turf Report will begin to impress upon the community how critical it is for the lawn areas of Hamilton Park to be restored and protected, and for their usage to be modified, since it is only with community cooperation and enforcement that this will ever have a chance of being accomplished. The circumstances of Covid (and the great increase in property development) brought far more foot traffic to the Park than ever before, and the lawns became playgrounds and classrooms for a number of schools. It is understandable that this should happen during extraordinary times, however a great deal of damage was done to an already rapidly declining turf system, and if there will ever be healthy lawn areas again in Hamilton Park (and thusly a healthy ecosystem), plans must be laid and executed now, and some big decisions must be made.

Section Six: Soil Report

1. Perhaps the most important of all the subjects covered in this report, the state of the soil is where the health of everything else in the Park ecosystem begins and ends. It is unclear how much attention the soil has been given since the 2008 remediation, but with the poor condition of the ecosystem as a whole, it can be concluded that making soil health a priority going forward is critical. Rudimentary soil sampling has been done in various Park areas which has yielded some concerning results as far as pH and available nutrients, however having a full spectrum professional soil assessment should be made a priority in the Spring so a clear picture of all edaphic problems can inform all future decisions. It is also essential that the details of the remediation process in 2008 be made available to Park horticulturists, so that proper long and short term plans of care can be established for the soil system. This report will address the soil in two distinct areas: designated planting areas and greater lawn.

a. The quality of the soil in the planting areas is generally good and much healthier than the Park at large. An average pH for all 3 sites was 6.5 (slightly acidic), Nitrogen was deficient, Phosphorus was low to adequate, and Potassium adequate to elevated. Soil structure in these areas ranges from silty clay in the Fountain Garden to

silty clay loam in the Gazebo and Playground Gardens. Despite some presence of clay, most of the bed soil has decent crumb aggregate and does not display the compaction issues plaguing the rest of the Park. (It must be noted that the pH and nutrient readings were rudimentary, and professional level testing may yield altered results.) The soil in the planting areas, especially the Fountain Garden, was found to have a notable amount of broken glass, ceramic shards, and bits of brick and masonry, indicating that the soil was most likely from construction fill or a combination of fill and topsoil. (Reports during the 2008 remediation period also denoted the presence of construction debris under the soil.) This debris does not appear to be affecting the soil at this time, but its presence poses a threat to those that dig and work with their hands, and a possible soil replacement scheme for these areas should be considered. Natural amendments like compost and mulch should balance the nutrient levels and overall health of the bed soil, but additional amendments may be needed to satisfy the needs of new plantings. Planned restructuring of the border design in these areas and strategic planting methods in Spring will serve to protect and nurture this soil further. However, it is necessary that human activity in these fenced beds cease completely if the soil is to remain healthy and not become compacted from repeated trampling.

b. Soil Compaction is the beginning and end of soil decline. And Trampling-induced Soil Degradation, exacerbated by excessive dampness and lack of sunlight, is the greatest threat to Hamilton Park's ecosystem today. As mentioned, the Park soil was remediated in the renovation of 2008, and it has been proven that many standard remediation techniques can accelerate soil erosion. Compacted soil can also be inherited from construction damage to the subsoil layers, which undoubtedly occurred during the renovation. Compaction occurs when a force such as feet, vehicles, or excess water creates pressure on the soil surface and compresses the soil particles. This causes those aggregates to break into smaller and smaller particles reducing the amount of pore space in the soil thereby increasing its bulk density. Less pore space means fewer air pockets for water and waterborne nutrients to infiltrate, and the penetrating roots of trees, plants, and grasses have nothing to absorb as food. This is a large part of the rationale behind the degradation of the Park's tree and lawn health - they are ostensibly starving. The compaction level of the soil in Hamilton Park has been described by experts as "morbid", meaning that it has advanced to the point where it can no longer effectively support life. If the compaction cannot be resolved now, it will be the tipping point of decline in the Park ecosystem that will see a cascade effect of plant illness, tree disease, and eventual death. Morbidly compact soil also does not support any micro or macro organism life - all of which are crucial to a healthy ecosystem, and none of which have been observed in the greater Park soil for some time. (It can be noted here that the Park is generally lacking in a vibrant insect culture, both soil borne and pollinators - a definite sign of an environment in peril.) Soil sampling of the greater lawn revealed pH levels ranging from 5.5 to 6.0 (acidic), an almost complete depletion of Nitrogen and Phosphorus, and a marked excess of Potassium (which can affect the way soil absorbs other crucial nutrients). The lawn soil has an unusual texture and its structure seems to be a combination of silt and sand. It is hard to penetrate when

digging, and frequently develops a surface crust - both common characteristics seen with compacted soil subject to heavy foot traffic. (It is this crust and top layer of compacted soil, unable to retain moisture, that is eroded by wind on dry days creating an observable “dust bowl” atmosphere.) Pooling of water is observed frequently in lawn areas, especially around trees, and shows that the soil is unable to absorb water due to compaction. The persistent erosion of the South/ West section of the Park is also a clear indicator that water is unable to be absorbed, and therefore simply runs off into the drainage system taking a top layer of soil with it. It should be clear that reversing soil compaction in the Park needs to be a priority immediately going forward. If the factors contributing to the edaphic degradation in the Park cannot be mitigated, most likely the stability of the ecosystem will continue to break down, leading to eventual permanent decline.

Section Seven: Recommended Action

1. Throughout the different sections of this report, an attempt was made to link observed issues and challenges to their place in the ecosystem as a whole. Every component of an ecosystem affects and is affected by every other. There is no single solution to any of Hamilton Park’s challenges, instead solutions must be found for all the challenges before progress can be seen. Following are some of those solutions.

Soil and Lawn

An immediate full soil analysis is recommended before any decisions are made regarding soil restoration. The Rutgers University Soil Laboratory can run a full spectrum of tests including those for compaction and contamination. (This should be done every Spring going forward.) In Spring, after the last frost, and typically after a period of sustained warmer temperatures, a number of steps can be initiated to begin soil restoration, but it is important to keep in mind that more extensive remediation may be necessary depending on the results of the analysis. Compost and mulch should be added to the planting beds. Consultation on lawn compaction treatment should begin in order to determine the efficacy of three particular procedures: Core Aeration, Vertical Mulching, and Air Excavation. Compaction treatment should be coupled with a series of amendment applications which, for the greater lawn, would most likely be spreadable fertilizer. (Keeping in mind that fertilization will have no effect whatsoever on areas of morbidly compact soil unless de-compaction treatment is already under way). Only when an air temperature of 60 degrees has been sustained for a few weeks can grass seeding can get underway. (Most grass seed germinates between 60 and 75 degrees Fahrenheit). Areas undergoing de-

compaction treatment and seeding should be closely monitored throughout the season, and should be closed to any public traffic for a duration of time that will be determined by horticultural criteria. (Nothing less than a year should be expected.) It would be prudent to take a small section of this area to experiment with different grass seed blends. It would be in the best interest to also explore other lawn options such as sod, astroturf, fibar mulch, and other “turf alternatives” that may yield more immediate results, and may be the only options for a lawn in this stressed ecosystem. Any plan of action will definitely require community cooperation, and it does not seem possible that the community at large will tolerate multiple sections of the Park lawn to be closed for extended amounts of time. Of course, the fewer lawn sections that are closed at a time, the longer restoration will take - decisions must be made about the duration of this project. It is recommended to start with the most at risk section of the lawn which displays the most serious compaction and erosion issues; the South / West section (between the South and Southwest walkways). It is possible that by solving the problems in this section, issues in other sections might see some beneficial effects as well. Of course, closing one section must not put more stress on the rest of the lawns, and monitoring of this will be necessary. The larger discussion about this necessary restoration will of course be cost and affordability. Partnership with the HPNA and the Jersey City Department of Parks and Forestry will be crucial, as well as Conservancy fund-raising campaigns within Hamilton Park’s greater community of residents, property developers, and private schools - all of whom enjoy and benefit from the Park. A full restoration of the Park’s soil and lawn will be lengthy, somewhat inconvenient, and expensive, but it is anticipated that this report has been effective and honest in representing how critical and crucial this undertaking will be.

Trees and Shrubs

It is recommended that a Full Tree Condition Risk Assessment be performed by an ISA Certified Arborist on the Park’s trees of at least a VTA level 2 (which will provide detailed mitigation recommendations as well as numerical risk ratings), but a level 3 which would include climbing would be better, as the high canopy is difficult to observe from the ground. This assessment will provide a scientifically supported guide to necessary pruning maintenance and possible removal - treatments that are often met with obstruction from the Park community. It should be clear from this report that strategic thinning of the canopy will be a crucial element of restoring Park health going forward, and an understanding of the reasoning and science behind these decisions will be needed to further this cause. Fencing measures are already in place to protect two at-risk trees from human interaction and climbing. It is recommended that the fencing become permanent, and de-compaction and mulching strategies be employed around the trunk perimeters. A review of the state of other trees in the Park that exhibit human damage from excessive climbing should be undertaken, and decisions be made in regards to fencing them as well. In Spring, the maintenance and pruning of 5 trees that were unable to be serviced by the Forestry Department in September should be accomplished as soon as the soil is dry from melting snow. Two of the trees are adjacent to the Playground and will require its temporary closure, and the other three are on the street perimeter and will require

temporary street closure to access safely. Early Spring is the time to prune any ornamental cherry, pear, or apple trees (before flowering). All of the Park's ornamental fruit trees are in dire need of maintenance, and expert help will need to be hired in order to take care of them all in this short window and with the necessary equipment. (Once large scale maintenance work like this has been done this year, subsequent annual maintenance will require far less work.) Further assessment of the more serious fungal infections plaguing a number of trees and shrubs should be undertaken, with the goal of establishing some plan of care for them, whether it be actual anti fungal treatments, cultural measures, or removal. Shrub pruning should be done this season at more appropriate times, whether in early Spring or Autumn as the species parameters require, and all pruning shears and equipment should be bucket sanitized while the procedure is taking place in order to minimize the chances of fungal spread. A serious evaluation of the Park's larger *Ilex* shrubs should be undertaken to determine pruning or removal strategies for thinning excessive growth. It is recommended that consideration be taken to either drastically minimizing or removing the *Ilex opaca* in the Gazebo Garden as a conservation measure for the continued health and vitality of the entire area. As a final note, the City of Jersey City has worked with the Shade Tree Committee to establish new guidelines and rules for tree care and preservation citywide. When finalized into the City Code, this will dictate many of the parameters used in dealing with the Park's trees, and should be locally published to inform the greater community accordingly.

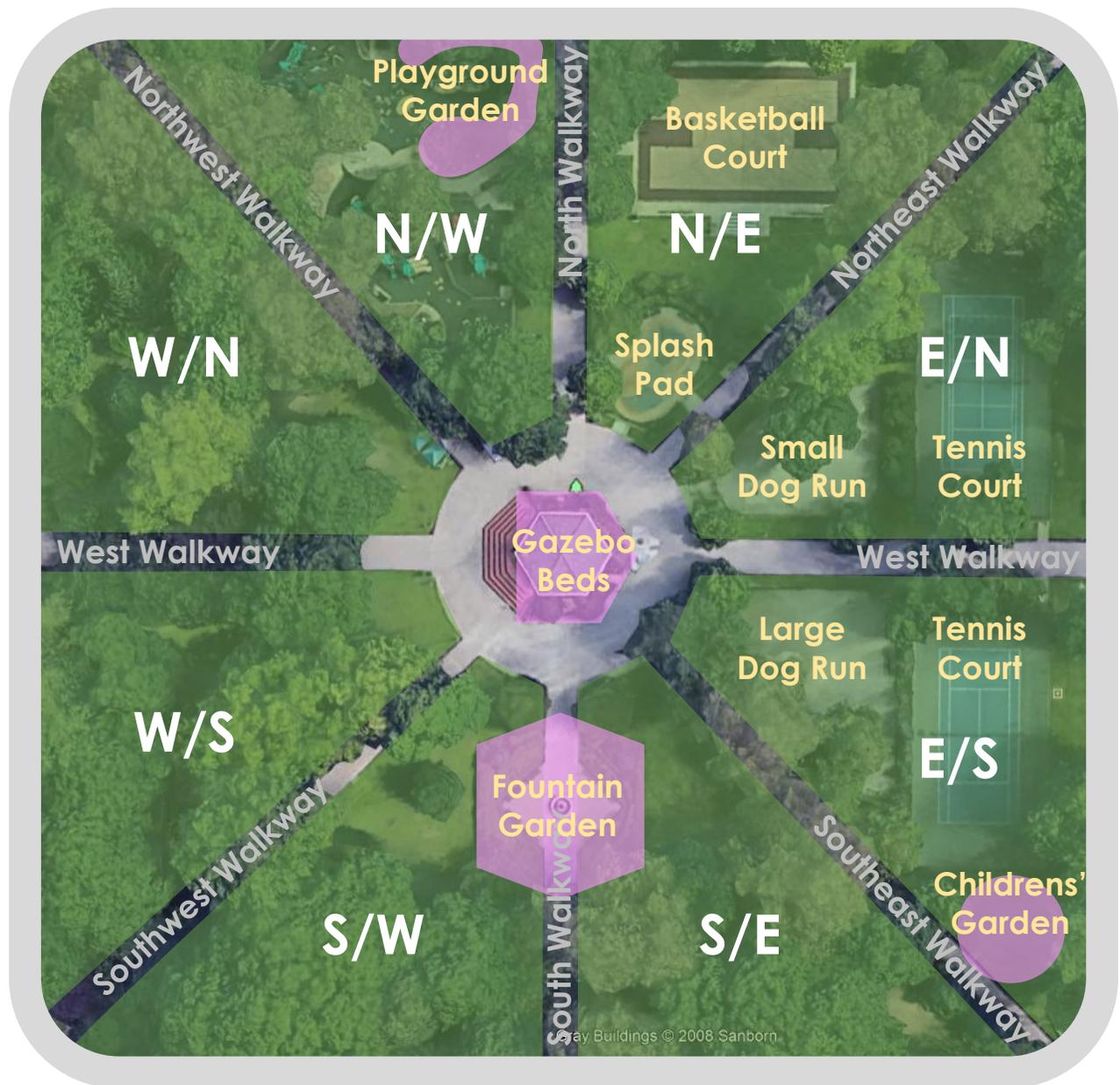
Irrigation and Drainage

A significant factor in the Park's issue of pervasive dampness, and a prominent cause of soil compaction and fungal disease, is the current irrigation system. As it stands now, the system is programmed by a City-contracted service to be automatic, but it is recommended that control of the system be given to the Conservancy so that water levels can be managed in accordance with weather and climactic needs. It is hoped that this report has shown that excess water is a key damaging element to the Park's ecosystem, and micro-managing the irrigation system will be a crucial element in creating some sort of moisture balance. The planting gardens in the Park are irrigated using the same sprinkler irrigation as the lawn, which is the worst way to irrigate shrubs and flowers - water coming from above the plant sits on the plant and can either scorch leaves in areas of high sun or lead to fungal infections in cooler shadier spaces. Almost all the damage to perennials, shrubs and annuals mentioned in this report was a result of over watering and "top watering". It is suggested that a change-over to drip irrigation be explored, as this puts water directly into the root zone of the plants, and can be used throughout the day if needed without any disturbance to Park guests. (As it stands now, all areas of the Park are irrigated in early morning darkness - the worst time to water plants.) The irrigation for the planting beds is on a separate circuit from the lawn irrigation, so it should be possible for this switch-over to be made. (If it is not possible, watering by hand may be the only option for beautiful and healthy flowers and shrubs.) Irrigation reform must go hand-in-hand with drainage reform. It is becoming more and more clear that the artificial drainage system underneath the Park's soil that was installed during the 2008

renovation is not performing at optimum levels. In 2021, the major City project to renovate the drainage in the Park's Dog Runs will begin, and it is hoped that some evaluation of the system as a whole will also be undertaken. New drainage strategies around trees where water pooling is consistent should be explored and accomplished - the Radial Trenching method may be a viable option. The Park's insufficiently functioning artificial drainage system - coupled with its morbidly compacted soil - is producing an often swamp-like environment, and should be contributing to the solution of pervasive dampness instead of actually exacerbating it.

Community Outreach

The final recommendation for action is less scientific in nature, but is equally as important as the horticultural and arboricultural discussions above. It has been mentioned in every section of this report that cooperation from the Hamilton Park community at large is the only way any progress will be made. It is crucial that outreach, communication, and knowledge continue to be tools used to bring the Park community together in agreement. Too often confrontations with persons or groups over Park issues have occurred because of a lack of information or understanding - this must no longer be the case. This report has been compiled for the use of the Hamilton Park Conservancy, but it is going out to the community-at-large to show the science behind the horticultural decisions the Conservancy makes to preserve the Park for everyone. It is hoped that knowledge and transparency will shed light on a number of damaging factors that human interaction brings to the Park, so that everyone may understand the importance of becoming stewards and caretakers. An ecosystem is "a community of living organisms in conjunction with the non-living components of their environment linked together through energy flows, and interacting as a system." The living components of Hamilton Park's ecosystem include not only those that are horticultural or zoological, but those that are human as well. The human factor will prove to be the most significant of all, and it will be the manner in which the humans of this community choose to interact with Hamilton Park going forward, that will truly determine its future.



Hamilton Park Sectional Map