
GREENSVILLE FOOD GROVE

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University of Guelph, Gavin Dandy teaching Fall 2021,
&
a proposal to the City of Hamilton under the Placemaking Pilot grant.

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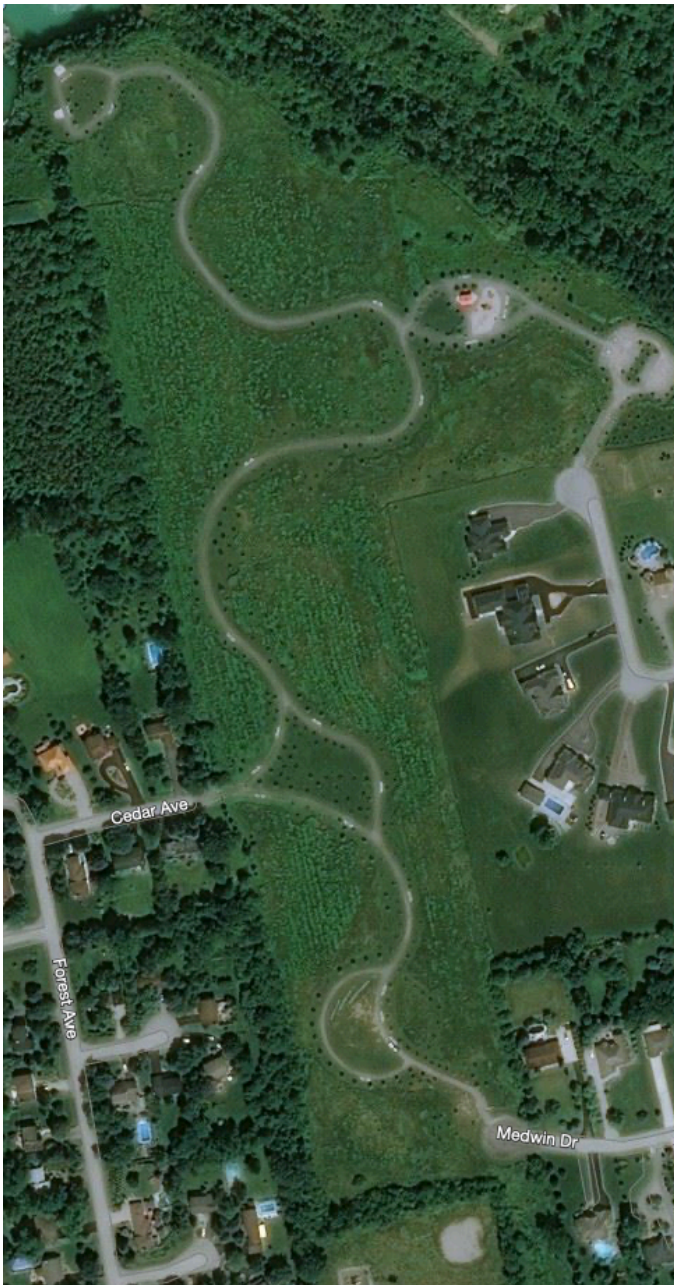
MISSION STATEMENT & GOALS

Greenville is an example for rural residents who want to grow food.

Goal: Build a FOOD GROVE in the Johnson Tew Arboretum.

Success looks like: perennial food-bearing plants provide inspiration and a light snack.

*Project proposal: installation of ~ 10 fruit and nut trees,
alone or in combination with other “partner plants”,
in the arboretum setting.*



Above is a diagram of the existing (but new) school, library, and community centre at the south end of the Arboretum, pictured at left.



Greensville (school at centre, north at left) was once farmland. Canada's earliest mills were along Spencer Creek during the early 1800's.

A FOOD GROVE

A food grove is a pleasant, approachable, explorable food forest. A passer-by could learn a gardening trick, grab a handful of berries, or simply behold a tree full of fruit. The grove is designed to encourage lingering, providing welcome shade in the present sun-drenched park.

A **food forest** is a *very* complex, intentionally-designed artificial ecosystem designed to maximize food output by using carefully timed plantings, inter-planting for mutual benefit, and vertical growth, among a number of other techniques. Like a forest, food forest layers¹ provide plant diversity and support natural processes to enhance soil and plant health, and reduce pests.²

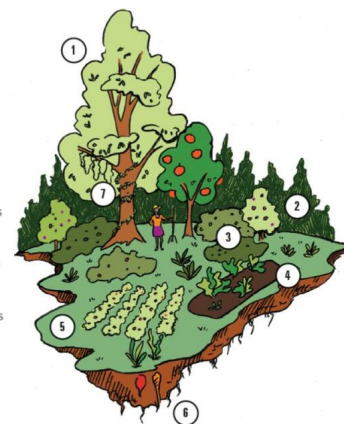
A **food grove**, in contrast, simplifies the “wall of plants” to a series of stand-alone, approachable examples of food plants mutually supporting each other. The grove will be designed to showcase the enormous variety of perennial (producing every year) plants and shrubs, with complementary plantings and simple landscape features, such as to encourage water retention.

These could be displayed in the museum-like presentation of the present arboretum (solitary trees around 8-16 feet tall today, about 35 feet apart), or in a more landscaped environment incorporating enough water management to keep the plants healthy, given the sporadic care these plants may receive.

Example of grove elements: plants to attract pollinators or discourage pests; species such as Haskap berry which need different varieties to successfully pollinate; nitrogen-bound plants (i.e. most trees and shrubs) paired with plants that are good at fixing nitrogen.

LAYERS OF A FOOD FOREST

1. **Canopy**
Large Fruit & Nut Trees
2. **Low Tree Layer**
Dwarf Fruit Trees
3. **Shrub Layer**
Berry Bushes & useful Shrubs
4. **Herbaceous**
Flowers, Herbs & Vegetables
5. **Soil Surface**
Low-Growing Ground Covers
6. **Root Layer**
Fungi and Root Vegetables
7. **Vertical Layer**
Vines & Espaliers



Food forests can also be impassable or crowded, usually due to an emphasis on maximizing the harvest.

¹ Illustration from “*What is a food forest?*”, FairAmountFoodForest.org

² Márcio Renato Nunes, Harold Mathijs van Es, Robert Schindelbeck, Aaron James Ristow, Matthew Ryan, *No-till and cropping system diversification improve soil health and crop yield*, *Geoderma*, Volume 328, 2018.

PERSONAL MOTIVATIONS

My family has a lengthy history in farming and agriculture. The family genealogy shows 19 generations whose occupation was *landbouwer* - “cultivator”.

The area I now call home is clearly under intense development pressure. Converting farmland into low-density residences, replacing a diverse soil culture with zombie grass — alive, but not in any interesting way — is a planning travesty we must all work against.

Sustainable horticulture means being able to feed yourself, your family, or your friends without degrading the soil, without constant soil amendment, and a reasonable amount of work. You may not sustain yourself out of your backyard garden, but you will nourish your relationships, have some tasty food, and develop a skill that would be useful in the zombie apocalypse.

The food grove is meant to illustrate how it’s done effectively, with examples of plant mutual support, and unique varieties. More than a series of edible museum pieces, this can also be a place for some horticultural flexing. A friend in the landscaping business assures me that with not much effort, one can craft an apple tree with 4-5 varieties grafted onto a single tree, something I wouldn’t believe it unless I’d seen it.

The learning garden is the short-term, quick-turnover side of the same coin. Whereas the food grove is planned around perennial crops that last years, the learning garden is designed to fit in the winter-centric school year, focusing on fast-growing herbs, berries, and flowers.

GREENSVILLE & JOHNSON TEW ARBORETUM

The area is in **Greensville**, the first settlement you find when you follow highway 8, climbing the Niagara Escarpment from Dundas towards Cambridge. Greensville is administratively part of the City of Hamilton.

It is dark at night, owing to an unspoken agreement to limit outdoor lights. Wolves and deer wander in from the forested areas of the Dundas Valley.

Flamborough was and is a farming area³, with Greensville being one of the earliest and busiest⁴ mill towns in Upper Canada, the first mill built in 1813⁵. Farm smells are not uncommon.

The area is rural when it is not rural-residential.



Greensville Elementary, first built 1848, was expanded several times, evolving into an architectural tragedy. The school was combined with nearby Spencer Valley, demolished in 2017, and rebuilt by 2020. The project was sized to include an attached public library⁶ - now open - and two public meeting rooms, termed by some a community centre.

The school is at the south end of a 37-acre park owned by City of Hamilton, the **Johnson Tew Community Park and Arboretum**⁷, built 2012. The arboretum extends north to a quarry, and is hemmed in on either side by suburban housing and forest.

Along the Arboretum's south edge is a tree line adjoining the school, with a sensitive tree corral, a neglected grassy depression, and path to the schoolyard.

Services: The site is serviced with electrical, water, and septic. TBD: roof drainage? There is an existing sort of gathering space, amounting to three lines of large seating-boulders, in the arboretum.

³ Map of Flamborough West, #CA-184, historicmapworks.com

⁴ "Upper Canada's First Industrial Complex", hikingthegta.com, 2016

⁵ https://en.wikipedia.org/wiki/Darnley_Cascade

⁶ "New Greensville elementary school construction a step closer", Laura Clemenson, *CBC News*, 2018-may-14.

⁷ "First city-owned arboretum in new Greensville park", Carmela Fragomeni, *Hamilton Spectator*, 2013-sep-24.

Evaluation: Being on City of Hamilton Land is favourable: Hamilton has an established community garden program, and the project aligns with this forward-thinking city's goals. They would make for a stable patron.

The site is easily walkable from at least 100 homes and has on-site parking at the community centre, and near the playground.

The area is USDA zone 5b. Greenville is subject to unpredictable micro-climate events given its position atop a Niagara escarpment valley gorge⁸. The many ravines in the area tend to increase the ambient humidity.

Frost dates: May 3 - Oct 11, a growing season of 160 days.

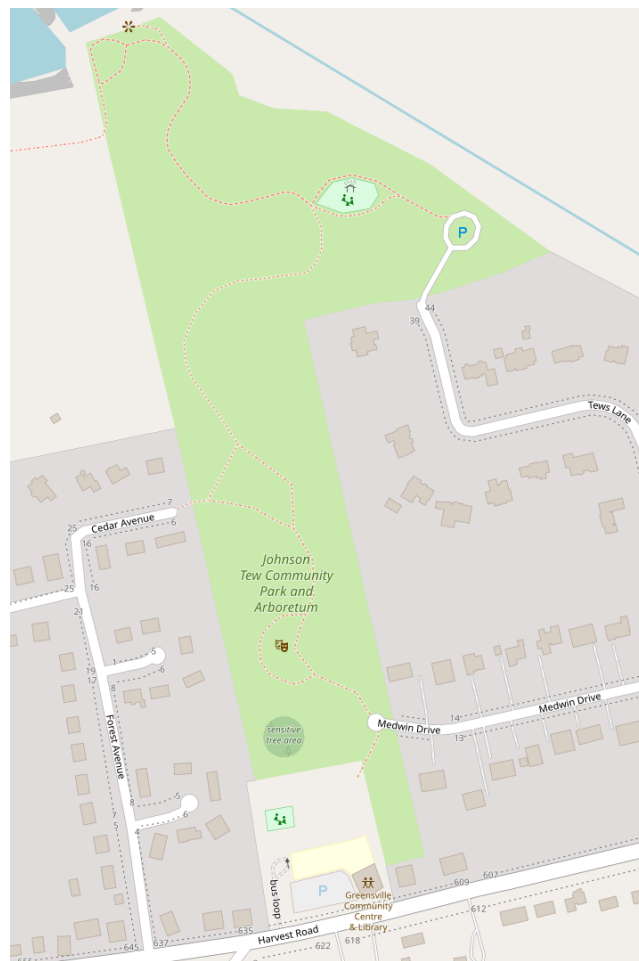
Annualized rainfall: 952mm.

Soil: poorly-drained sand and calcareous deposits, with a PH of 7, reacting neither to vinegar nor baking soda. The soil is formerly productive soil on the Johnson Tew farm. The slope is gently southward toward Spencer Creek.

Drinking water protection: The drinking water for approximately 37 homes and the school is drawn from a municipal well next to the school. As a result the entire area is a Drinking Water Source Protection area⁹.

Existing plants and fertility: The arboretum is bordered by stands of mature trees. Within, the land is described as a *Solidago canadensis* (Canadian goldenrod) grassy meadow with a meandering path bordered by lawn, punctuated by young trees of various types such as linden, oak, and maple. The goldenrod attracts many insects. Until 15 years ago, this was typical Southern-Ontario farmland. There is one (1) cherry tree which will never bear fruit until another is planted.

Impact on plans: The area's habitual fertility, mild PH, and plentiful pollinators are beneficial to the plan to grow examples of perennial crops. This is consistent with the vision



⁸ “Webster’s Falls, Tews Falls, Christie Lake closed for icy tree hazards”, CBC News, 2016-March-25.

⁹ <http://protectingwater.ca>

to display and promote crops suited for Southern Ontario. In addition, the resonance with the area's farming history, and the present-day risks to that land due to development, support the integration of food education with the youthful Arboretum.



School built; library in progress. "C" is a small extension to the Arboretum extends along the west edge of the school, described as two stands of trees on either side of a .7-acre dense meadow with more goldenrod and many ticks.



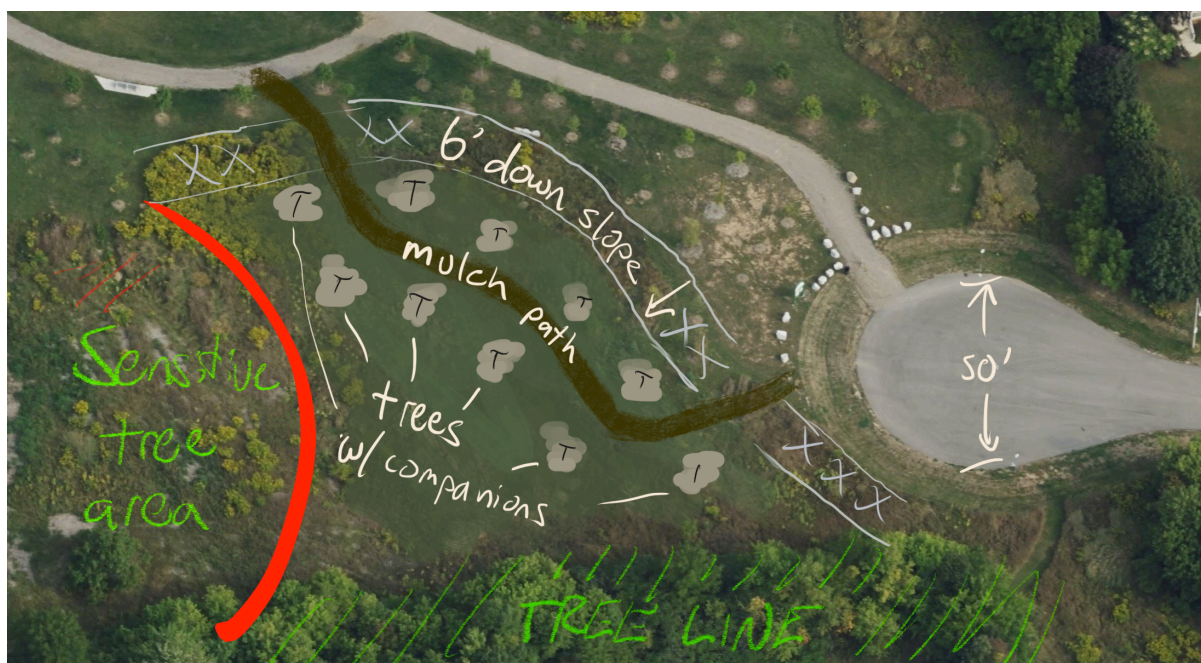
The sensitive species corral (west of "A").

A - SOUTH END OF THE ARBORETUM

Most of the park is grassland, the most common plant aside from indeterminate grass, is goldenrod, seemingly sown deliberately as rows are clearly visible on satellite maps. Through the grass wends a path, with 20 feet of well-tended lawn on either side, punctuated by young, solitary trees approximately every 35 feet.

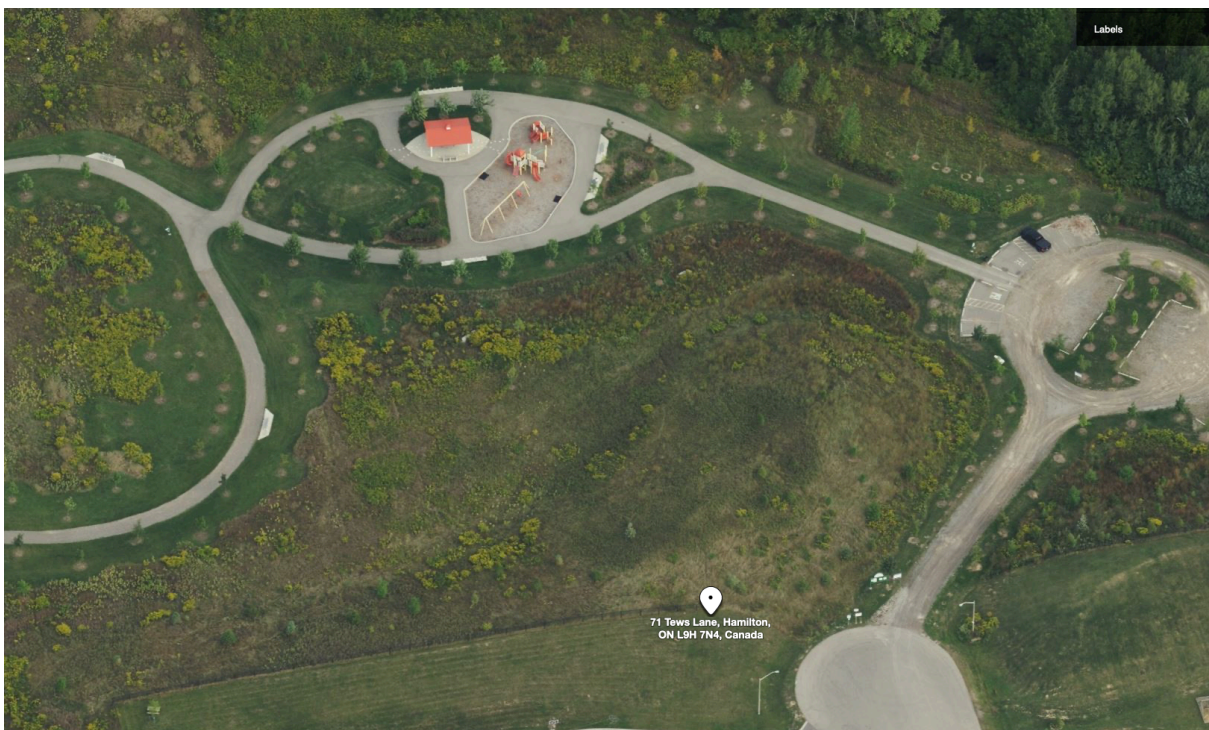


The arboretum today near the south entrance. The view is broadly of site "A". The treeline borders the school; at far right is the sensitive tree area.



Site A design sketch. Proposed for site A is a mulched trail descending the down-slope, wandering through the planting area, then climbing back to rejoin the existing paved trail.

B - NORTH-EAST CORNER OF THE ABORETUM



Shown above is an alternate location in the Arboretum, at the north-east corner. Clockwise is a covered picnic table & play area, a parking lot, and the cul-de-sac at the end of Tews Lane.

At centre is a sizeable berm which provides future opportunities for collecting rainwater. Between the berm and the play area is “B” - an approximately $\frac{3}{4}$ -acre grassland punctuated with goldenrod.



Proposed for site B is a mulched trail traversing below the berm. Between the path and the berm is either food trees or beds with perennial vegetables.

SITE PLANS

Sites A and B have similar soil, foot traffic, and available area, and no access to water.

- * B has a considerably larger berm, over 20 feet high, whereas A is depressed 5-6 feet below the Arboretum land.
- * B has adjacent parking and a playground, whereas A is next to the school playground.
- * A has shade next to the tree line on its southern border, whereas B is full sun.
- * A is adjacent the school, whose roof and play surface is entirely impermeable, with rain directed to a medium size rain garden/culvert. Site B's berm could provide a way to direct and collect rainwater.

As a result, the proposal for site A is primarily for food and nut tree planting, whereas B is trees with an option for beds at the base of the berm.

Design and crop selection principles

The City's placemaking program requires that proposals do not include any *permanent* changes or installations. Plants can be removed; mulch can be re-used or allowed to decompose; wooden bed materials can be removed. In contrast, a gravel bed is a step too far.

As a consequence, the budget must also include funds for removal of the installation.

The crops proposed were chosen for hardiness against winter and lack of ongoing attention; illustrative examples of partner plants; taste; and disease resistance. Preference is given to smaller (in some cases dwarf) cultivars.

Suggested Crops

This proposal puts forward ideas for ten different food trees. They were selected for their affinity for partner plants, ability to fruit without continuous care. (Course note: as yield and harvest are not specific priorities for this project they are not detailed.)

Crop	Cultivar	Qty	Partner plants	Location
Haskap Berry 4-6' deciduous shrub	<i>Lonicera caerulea</i> Aurora, Borealis	2	pollinators; needs 2 different cultivars to fruit	sun zone 3-10
Pawpaw deciduous understory shrub	<i>Asimina triloba</i>	2	pollinators; needs 2 different cultivars to fruit	filtered to full sun; zone 5-8
Saskatoon Berry	<i>Amelanchier spp.</i>	1	self-fruiting	full sun
Nanking cherries	<i>Prunus tomentosa</i>	2	pollinators; needs 2 different cultivars to fruit	sun, sandy; zone 2-7
Currants	<i>Ribes spp.</i>	3	benefits from nitrogen- fixing	likes shade; zone 2-7
Gooseberry 3-4' deciduous shrub	<i>Ribes "Poorman"</i>		benefits from nitrogen- fixing	likes shade
Pear	<i>Pyrus communis</i> - Flemish Beauty	2	Pears need well-suited different cultivars. Many cultivars will not pollinate each other.	variable
Plum	<i>Prunus domestica</i> "Alsace Damson"	1	self-fruitful	full sun zone 5-9
Nectarine	<i>Prunus persica</i> <i>nucipersica</i> 'Flavortop'	2	self-fruiting; vulnerable to insects	zone 5-9
Goumi Berry	<i>Eleagnus</i> <i>multiflora</i>	?	excellent partner plant - is a legume, nitrogen-fixer, and self-fruiting	zone 4-8

Source: OMAFRA and Cornell University planting guides.

Growing methods

Site preparation. The area is predominantly grassland. City parks/horticulture staff who no doubt know a lot more about this than I, can identify a mix of cutting, turning under, soil and compost application, to build walkable path selected according to approved budget. Instead of the bordering area being simple lawn that is mowed, a baseline layer of, walkable plants eg, corsican mint, or various well-chosen clover, thyme, oregano — maybe all of them; **who will win?** This planting will mature prior to tree planting.



Planting. Fruit trees are generally planted in late summer/early fall, and fruit shrubs often like planting in early spring. Each species selected for planting will be reviewed for suitable planting times. Prior to planting, suitable transplanting sites are excavated based on the size of the plant or tree. Post-planting, an application of compost and water is ideal.

Disease and pests. Root-lesion nematode is considered the most economically important plant parasitic nematode in Ontario fruit production. It is widespread in Ontario soils, particularly in orchards planted on sandy (coarse-textured) soils where it causes the most damage.¹⁰ The *Tagetes* species (marigolds), and numerous other plants, have been identified as nematicidal.¹¹

Soil health. Composting in spring and fall is a good start to encouraging soil health. In addition, several of the proposed species benefit from nitrogen-fixing companion plants. OMAFRA identifies legumes such as red clover as being beneficial for soil health. These can be chopped back in the fall and left as mulch, which will return nitrogen to the soil through plant and root decomposition.

Weed control. The existing weed control regime in the Arboretum would be suitable for this program.

Irrigation. City Water staff have made clear there is no prospect for access to water, even though a backup water-supply well is planned to be built in the precise centre of the Arboretum. The locations are in a depression downhill from a huge impermeable surface (site A) or below a sizeable berm (site B), providing generous amounts of run-off.

¹⁰ <http://www.omafra.gov.on.ca/IPM/english/apples/diseases-and-disorders/nematodes.html>

¹¹ Bakker, Jaap, “Photoactivation of the Nematicidal Compound α -Terthienyl from Roots of Marigolds”, Journal of Biological Chemistry, 1979.

Harvesting. All fruit trees will make a mess if left unattended. The volunteer brigade will organize harvests and, if warranted, cleanup of fallen fruit. Certain plants such as Haskap and Goumi Berry fruit earlier in the season, whereas most others are in August-September.

Demolition. The City placemaking grant program requires development of a budget for restoration of *status quo ante*. Uprooting the trees would be a dramatic and expensive step, but even so, the budget (see below) provides for tree removal. It's unclear that the area would need to be re-sodded at a cost of over \$12,000 when the original state is wild grassland. Costs from the arboretum construction might be examined to set a budgetary assumption. An alternate approach to decommission the food grove is to scatter the mulch, stop cutting the grass, and let nature reassert itself in the food grove.

Volunteers

The author is in the midst of making connections with similar project owners in the Hamilton area for advice and

As a food forest ages and stabilizes, the maintenance required to maximize productive output (mostly chop and drop) decreases up to 93% over 10 years.¹² The challenge of sustaining community investment of time and plant love can be met with an appealing public third space within the Grove. Problems will get noticed and dealt with if community members see the plants a few times a week.

¹² "The Reality of Food Forests", Fraser Bliss, Permaculture Research Institute of Australia, 2012.

Educational program

This proposal calls for the development of educational signage to achieve the goal of enlightening passers-by about the science behind what's happening in the Arboretum. Signage can be developed, in consultation with horticultural experts, to explain fruit and nut tree growth and care, and sustainable horticulture principles at work.



Source: pulsedesign.com

BUDGET

Greensville Food Grove - Tentative Budget

WALKING AREA			PLANTING		
pathway, linear m	200		# sites	8	
width, m	1.5		# plants	16	
pathway sqm	300		\$ per plant	200	
			total plant \$		\$3,200
planting sites #	10				
planting area radius m	2.5		quality compost for planting sites \$/yard ³	100	
planting site area sqm	196		yard ³ per site	1.0	
			quality compost \$ total		\$800
walkable area: planting + pathway sqm	496				
walkway depth cm	3				
walkway volume m ³	14.9				
walkway cost \$/m ³	100				
total walkway cost		\$1489			
re-sodding (not in budget)					
cost/ft ² for sod per city	6				
ft ² /m ³	10.7		installation costs		\$5,489
\$ to resod walkable area	\$12,606		signs, per		100
			signs #		8
			signage		\$800
			TOTAL		\$11778

BENEFITS

1. Students at Greensville Elementary get hands-on with food and growing.
 2. Hamilton gains a purpose for its lone arboretum, and an appropriate niche to complement — rather than compete with — the Royal Botanical Gardens. The project structure is designed to be replicated anywhere in the city, or in any other city, where a park is near a school.
 3. Everyone gains access to free fruit, herbs, and greens.
-

NEIGHBOURS & ENGAGEMENT

Demographically the area is largely white, protestant and/or Catholic. Compared to the rest of Hamilton, the age distribution is skewed toward 50-75 year olds, and away from 10-40 year olds. HWDSB has just consolidated two schools into one. Many of the neighbours have home businesses.

Economically, Greensville has auto garages.. and that's about it. There is no Greensville shopping area *per se*. The most plausible main street buildings are vacant and stuck in development hell due to their proximity to Greensville Falls, a wet ditch.

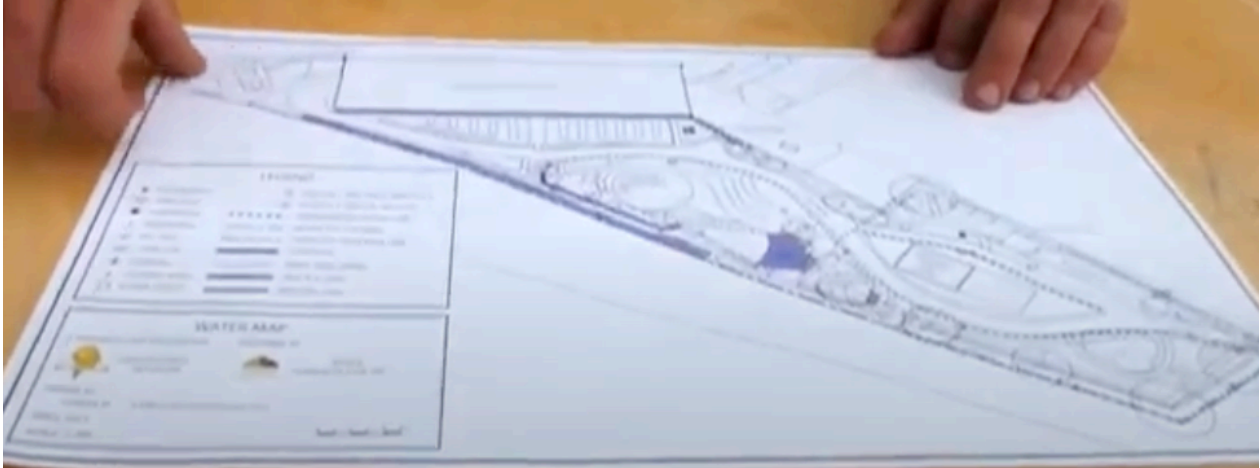
The **culture** of the area is suburban-rural, characterized by a car-centric culture, hanging out in one's back yard, shopping for food at local farm stands or big-box stores in town.

There are few occasions to bump into your neighbours in any public or private third space.

After this project's proposal's second iteration, it will be passed around to neighbours, city councillor, and the school and library administration for comment. The City of Hamilton's placemaking grant requires involvement from at least 3 residents.

THREE RELEVANT PROJECTS

Example #1 8,000 sqft garden in Invermere, BC



Where: Invermere, BC. Moist side of the Rockies south of Banff. Winter blizzards, summer paradise. **Zone** 6b. **Annual precip.** 832 mm. **Frost dates** Sep 21- May 21. **Soil:** sandy loam.



Site description: Large year-round solar greenhouse on high school property, 8000 sqft community garden and amenities.

People involved: Groundswell network was formerly the Colombia Valley Botanical Garden. They continue to be supported by volunteers. They have built (2012) a year-round solar greenhouse on the grounds of the local high school.

Legal structure: Groundswell was 'Spun out' from the city: now a volunteer-run board with dedicated fund raisers and an extensive calendar of community events.

Products and services: The community has funded the creation of a food garden in front of the greenhouse, the goal of which is to provide community gardening facilities, horticultural education, and a community meeting place.

Design of the 8000 sqft outdoor area, included integrated water management (the site is next to a road culvert), a food forest design, allotment planters, gathering space and a number of extras.¹³

Benefits: High school curriculum, community access to year-round gardening facilities, outdoor congregation area.

Alignment with project context: The project seems to be over-designed, featuring a complex underground heat energy system and elaborate stormwater management. To a degree, these seem to reflect Verge Permaculture's engineering background and fascination with energy systems. However these are appropriate for the climate of the Rockies and the climate zone. The 'built presence' of the greenhouse makes the project feel a permanent, constructed part of the community.

Three things to emulate: Community engagement model, being literally 'built in' to the school, and the design process employed to develop the planting plan.

One thing to avoid: The greenhouse was built first, resulting in a big capital outlay and a complex initial construction project.



¹³ <https://vergepermaculture.ca/2013/07/24/the-8000-square-foot-garden-designing-and-implementing-in-vermeres-community-garden/>

Example #2

Bev Facey Community Gardens, Edmonton

The author's brother is an organizer at the Bev Facey Community gardens in Edmonton. As such I can get an unvarnished look at what community gardening entails.

Goals: community gardening space, and an outdoor lab for the school's horticulture program. Main issue: food theft from garden plots, high school student vandalism.

Where: Sherwood Park, AB. Very cold in winter. **Zone** 3b.

Annual precip. 455 mm. **Frost dates** Sep 15- May 11.

Soil: soil from municipal compost

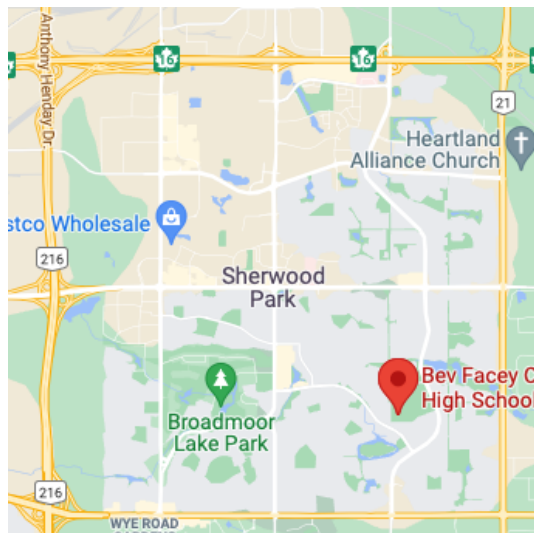
Area/site description: Sherwood Park is a large suburb built on farmland. The garden is adjacent to a high school with an established horticulture program

People involved: Residents maintain their own plots; volunteer board manages the garden; city provides predictable funding and extensive assistance; school board pays for horticulture teachers (or, used to).

Legal structure: Strathcona county provides help with planning, construction, delivering soil and water, signage, liability insurance, and manages applications for plots. Community members volunteer their work on a board that manages the garden, buys tools, and organizes work parties.

Products and services: High school students propagate plants for an annual plant sale; local residents grow their own food. Anything extra is donated to the food bank.

Benefits: Gardening space for residents, curriculum and fundraising for the school



Alignment with project context: Some friction from having the high school nearby. Big problems with food theft.

Three things to emulate: Engagement with a school; the plant sale idea is excellent; the support from the city is exemplary¹⁴

One thing to avoid: The garden is very secluded. For one, the gate is locked to discourage food theft. For another, it is hard to see from the street. This provides ideal ground for high school shenanigans.



The garden is next to the school — the greenhouse is visible at left.



¹⁴ “Community Garden Program” City of Strathcona, strathcona.ca, 2021.

Example #3

Westdale Apothecary Garden

Goals: Community stewardship of the Apothecary's Garden and the Plant Lover's Garden

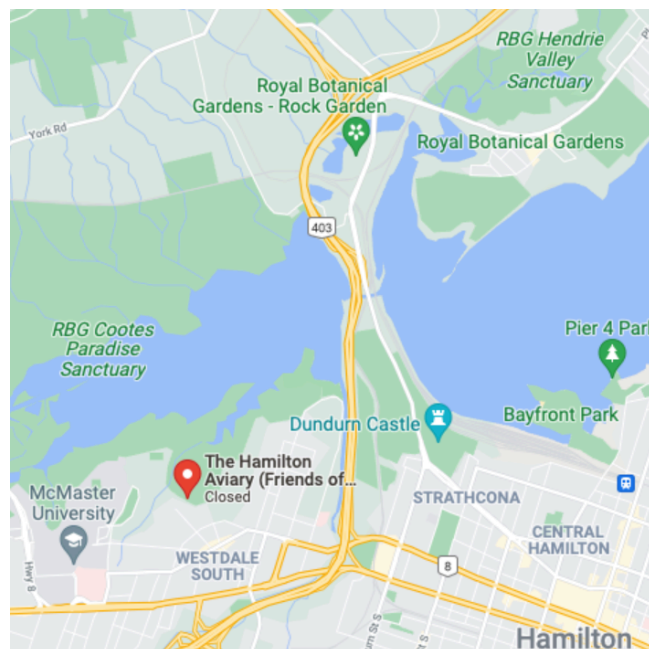
Where: Churchill Park, Hamilton, Ontario **Zone** 5b.

Frost dates: May 3 - Oct 11, a growing season of 160 days. **Annualized rainfall:** 952mm.

Soil: soil from municipal compost

Area/site description: The Gardens are located behind the Aviary, located on land owned by the Royal Botanical Garden. The herb gardens were originally built by the RBG Auxiliary, but had been suffering from years of neglect. In 2010, volunteers donated time and muscle to dismantling the garden, salvaging plants that hadn't succumbed to neglect, and the city removed a foot of infested soil, tilled new beds and provided yards of soil, screenings, cloth, and mulch.

People involved: Friends of Churchill Park, Dan Riegler and Mary Louise Piggott. Got involved to reclaim the beloved herb garden, which had become an acre-sized overgrown mess.



The garden seems quite fortified against intruders

Legal structure: The land is owned by the city, as a City-run park. There is a house in the park owned by the RBG, who lease the Aviary to the City. The gardens are in this property. The Aviary is moving out. The eventual use of the building and the gardens is unclear.

Products and services: *“[The garden’s redevelopment] signals an exciting return of the Teaching Gardens’ original interpretive function, maintaining the gardens original concept as a teaching garden and a place of education. The Teaching Gardens have been part of our community for many years. They were originally established by the RBG Auxiliary to teach children and youth the basics of agriculture through the cultivation of fruit trees, including the espaliered crab apple trees that still survive, and the garden plots which now form the community gardens.*

With this in mind, the Herb Garden was originally planted mainly with aromatic and culinary specimens, plants that were common in most households many years ago such as Parsley, Rosemary and Sage. Today, there is increased public awareness of the medicinal properties of plants as well. St. John’s Wort, Echinacea, Calendula, and Lavender are becoming common household names and familiar to many people today. We felt that the revitalization of the Herb Garden needed to recognize this new awareness through an expanded mandate, and thus the Apothecary garden was born. Featuring cultivated specimens of culinary, aromatic, and medicinal plants both new and familiar, it can be a valuable educational resource and compliment to the existing food production focus, as well as an educational and symbolic link to the many native medicinal, edible, and aromatic plants found nearby in the Cootes Paradise Nature Sanctuary.”

Alignment with project context: [TBD in-person interview : Did the RBG abandon the garden when they moved to the north shore of Cootes Paradise? Is the Apothecary garden a community-run overlapping project with the RBG Healing Garden?]

Three things to emulate: Engagement with the city for resources, emphasis on educational exhibits (espaliering!), strong volunteer-run board.

One thing to avoid: The garden is designed to keep visitors out, with a 20-foot tall green wall all the way around.



They have a lot of space to work with

References

Climate data from <https://en.climate-data.org> and, where possible, Environment Canada.

Maps from Open Street Map and Bing.



Source: Royal Botanical Garden