



PANAMA FLATS CONCEPT PLAN

Prepared for:
**District of Saanich
Parks Department**
(RFP No. 44/12)

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in association with

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February 17, 2014

Table of Contents

1.0 Introduction	3
1.1 Context.....	3
1.2 Objective.....	3
1.3 Methodology.....	5
1.3.1 Research, Field Reviews and Site Meetings.....	5
1.3.2 Client Consultation.....	5
1.3.3 Submissions to Client.....	5
1.3.4 Public Consultation.....	6
2.0 Site History	8
3.0 Site Analysis & Background Information	10
3.1 Archaeology.....	10
3.2 Floodplain.....	10
3.3 Ecological.....	11
3.3.1 General.....	11
3.3.2 Vegetation.....	13
3.3.3 Birds.....	18
3.3.4 Wildlife.....	20
3.3.5 Colquitz River Function.....	21
3.3.5.1 Fish.....	24
3.4 Geotechnical & Storage Barn Assessment.....	26
3.4.1 Geotechnical.....	26
3.4.2 Storage Barn.....	27
3.5 Recreational Activities.....	28
3.6 Food Security / Agriculture.....	31
3.6.1 General.....	31
3.6.2 Agricultural Capability Assessment.....	31
3.6.3 Agricultural Land Reserve.....	34
3.6.4 Hydrology.....	38
3.6.5 Agricultural Program.....	38
4.0 Concept Plan	39
4.1 General.....	39
4.2 Floodplain Management.....	39
4.3 Food Security / Agriculture.....	41
4.4 Ecological Enhancements.....	43
4.4.1 Colquitz River Watershed Function.....	43
4.4.2 Sensitive Ecosystems and Rare Species.....	43
4.5 Recreational Use.....	47
5.0 Rough Order of Magnitude Estimate	49

List of Appendices

Appendix A: Selected Reference Documents.....	51
Appendix B: Fact Sheet for Vancouver Island Beggarticks.....	54
Appendix C: Recommended Wetland & Riparian Species.....	56

List of Maps

Map 1: Context Plan	4
Map 2: Floodplain	11
Map 3: Victoria Official Community Map (1858)	12
Map 4: Existing Ecological Values	13
Map 5: Existing Recreational Use	30
Map 6: Agricultural Capability Units	33
Map 7: Agricultural History	37
Map 8: Concept Plan	40
Map 9: Proposed Agricultural Use	42
Map 10: Proposed Ecological Enhancements	46
Map 11: Proposed Recreational Use	48

List of Tables

Table 1: Invasive Plant Species of Greatest Concern	17
Table 2: Species at Risk (Birds) in Panama Flats	18
Table 3: Colquitz Fish Counting Fence Preliminary Results (2013)	25

1.0 Introduction

1.1 Context



Panama Hill Park



Panama Flats



Colquitz River Trail

The project study area comprises Panama Hill Park, a section of Colquitz River Park and the land known as Panama Flats. It is located in the Carey Neighbourhood, south of Roy Road and north of Hyacinth Park, between Interurban Road and Carey Road. It is valued by residents throughout the District of Saanich for its storm water and flood plain management, recreational trails, and natural environment. The study area is particularly popular with walkers, including dog walkers, recreational cyclists, and bird watchers.

A large portion of the study area, including all of the lands known as Panama Flats, has been used for a variety of agricultural purposes since the late 1800's, most recently for root crops. Active farming stopped when Panama Flats was sold to Island Berry Co. in 2008. In December, 2011, the District purchased Panama Flats from Island Berry; the acquisition was based on the District's desire to secure public open space which could provide flood plain management and opportunities to optimize environmental values, create new park and trails, and enhance food security. See Map 1 Context Plan.

The total study area is 46.21 hectares (114.18 acres), divided as follows:

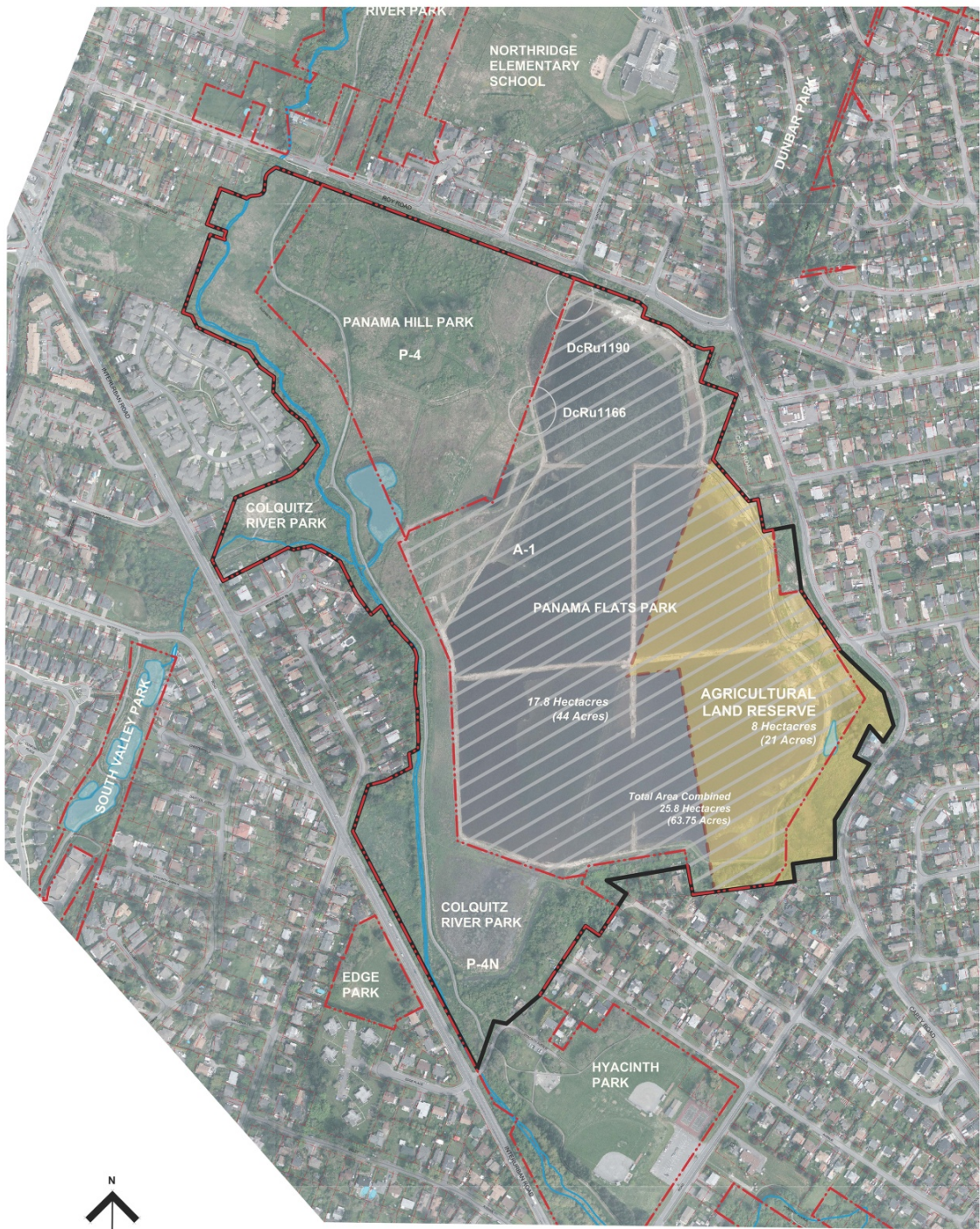
- Panama Flats - 26.56 ha (of which 8.5ha is currently in the Agricultural Land Reserve);
- Panama Hill Park - 8.97ha;
- Colquitz River Park (within the study area) - 11.68ha.

Panama Flats and the Colquitz River complex are identified in the *Parks Natural Areas Action Plan 2012-2017* as parks that warrant management plans due to their mixed use, ecological elements or other unique features. Policies within *Sustainable Saanich Official Community Plan 2008* support retention of the flats for agriculture, environmental protection, flood plain management and public open space. Carey Local Area Plan 1999, policy 7.3 supports an application to the Agricultural Land Commission to designate the farmland within Panama Flats as Agricultural Land Reserve. The Parks, Recreation and Culture Master Plan 2013 contains objectives and initiatives to promote urban agriculture, natural areas, invasive species management, ecosystem restoration, recreational trails and open space.

In November, 2012, The District of Saanich contracted LADR Landscape Architects to prepare a Management Plan for Panama Flats and surrounding public parkland, with particular focus on four equally weighted priority areas: flood plain management, environmental values, new trails and recreation opportunities, and food security. In March, 2013, Saanich Council moved to expand the percentage of Panama Flats included in the Agricultural Land Reserve (ALR), and, as a result, the project priority shifted to food security, specifically, to maximising the ALR within the lands known as Panama Flats, and preparation of a Concept Plan.

1.2 Objective

The objective of the Concept Plan is to establish a basic framework for future long term uses within the study area. Developed in consultation with the community and Saanich staff, the Landscape Concept Plan is intended to: 1) provide direction for the District as they implement key elements of the concept over several years, and, 2) ensure that short term management of the study area is complimentary to long term objectives.



Map 1: Context Plan



Site Review June 2013

1.3 Methodology

1.3.1 Research, Field Reviews and Site Meetings

From November 2012 to March 2013 the project Consultants reviewed background information related to the study area, and completed several field reviews to gain information about site conditions and park use. From February through October, 2013, site meetings to discuss field odour and water management were held with Saanich Parks, Public Works and Engineering staff, and with Ministry of Environment Lands and Natural Resources staff, Brian Epps, Water Resource Specialist, Dave Skarbo, Water Stewardship Technician, and Neil Goeller, Regional Hydrologist. In August 2013 members of the consultant team participated in a Saanich organized study area walkabout with wetland restoration expert, Tom Biebighauser and Ministry of Environment Conservation Scientist, Purnima Govindarajulu.

Meetings were also held with Ministry of Environment/Ministry of Forests, Lands and Natural Resources staff in May, 2013, with Agricultural Land Commission staff in October, 2013, and with Rob Kline, Ministry of Agriculture Regional Agrologist for the CRD & Southern Gulf Islands, in January 2014.

The consultant team includes:

- LADR Landscape Architects Inc. (Prime Consultant; Landscape Architects)
- Levelton Consultants Ltd. (Geotechnical Engineers)
- Millennia Research Ltd. (Archaeological Consultants)
- Swell Environmental Consulting (Qualified Environmental Professionals)
- CEI Architecture Planning Interiors (Architects and Planners)
- Cobble Hill Organics (Agricultural Consultants)
- Advicas Group Consultants Inc. (Quantity Surveyors)
- * Nicole Muchowski (Consulting Agrologist)
* contracted in May 2013 in response to Council's March 2013 move to expand the ALR in the study area

1.3.2 Client Consultation

The Consultants worked closely with Parks staff and an interdepartmental Steering Committee, whose members were a valuable resource to the consultants throughout the plan development. Parks and the Steering Committee provided relevant background documents prepared by or for the District; participated in site meetings with the Ministry of Environment/Ministry of Forests, Lands and Natural Resources; provided feedback on the draft concept plan; and assisted at the public open house. Parks arranged and summarized feedback from the public open house; prepared, posted, and tabulated a web based survey; arranged and assisted with advisory committee and community association meetings; and arranged and assisted with a meeting with the Peninsula Agricultural Commission.

1.3.3 Submissions to Client:

Study Area Background Report Summary (May, 2013). Based on consultant team research, field reviews and site meetings, the report includes an assessment of, and development considerations related to: archaeology, geotechnical conditions, ecology, agriculture, architecture, and bicycle/pedestrian mobility. Draft submitted April 2013.

Memo - Implications of Expanded ALR to Panama Flats Management Plan (May, 2013). The memo summarizes regulations that apply to activity in the study area (e.g. Water Act, Fisheries Protection Act, Environmental

Management Act, Integrated Pest Management Act, Agricultural Land Reserve Act, Heritage Conservation Act, Riparian Regulations Act, Saanich Bylaws 7058 and 5576, etc.)

Preliminary Draft Concept Plan (September, 2013). Submitted to Parks for review mid month; presented to the Steering Committee at month end. The preliminary draft plan consisted of 10 drawings presented in PowerPoint format, with five depicting context, existing conditions and site history, and five depicting proposed enhancements and expanded ALR.

Agricultural Capability Assessment Report (October, 2013): Prepared by Nicole Muchowski, consulting agrologist. Draft submitted September, 2013.

Draft Concept Plan (October 2013). Submitted to Parks in PDF format for review prior to presentation at public open house on October 23rd. The draft plan consisted of 11 presentation boards, with six depicting context, existing conditions and site history, and five depicting proposed enhancements and expanded ALR.

Consultant Study Area Assessment Reports (December 2013). Independent assessment reports prepared by Millennia, Levelton, Swell, Cobble Hill Organics, and CEI; these were the basis for the Study Area Background Summary submitted to Parks in

Rough Order of Magnitude Budget (February, 2014). Prepared by Advicas Group Consultants (Quantity Surveyors). Draft submitted February 13, 2014. See Appendix B for full report.

Concept Plan (February 17, 2014). Submitted to Parks in PDF format. The plan consists of this report and nine Arch D size maps. Draft submitted February 15, 2014.

Client Representatives:

Parks Department

- Mr. Doug Henderson, Director of Parks & Recreation
- Mr. Rae Roer, Parks Manager, Parks & Recreation
- Mr. Gary Darrah, Manager of Park Planning & Design, Parks & Recreation

Steering Committee

- Mr. Jarret Matanowitsch, Manager of Current Planning, Planning & Development
- Mr. Ben Bowker, Manager of Storm and Wastewater, Public Works
- Mr. Dwayne Halldorson, Manager of Underground Services, Engineering
- Ms. Adriane Pollard, Manager of Environmental Services, Planning & Development

1.3.4 Public Consultation

Numerous stakeholders meetings and one public open house were held as part of the planning process. In September, 2012, prior to the consultants being contracted, Parks staff held independent Q and A sessions with the Royal Oak and Strawberry Vale Community Associations. In May, 2013, the consultants met with Ann Nightingale of the Rocky Point Bird Observatory and, together with Parks staff, presented to the Peninsula Agricultural Commission and the following Saanich Advisory Committees: Bicycle and Pedestrian; Parks, Trails and Recreation; Environment and Natural Areas. The consultants and Parks



Project Signs Posted on Study Site July, 2013

staff presented to each of the Advisory Committees again in November, 2013. The consultants and Parks staff met with the Strawberry Vale Community Association executive in June, 2013, and with two members of the executive in January, 2014.

In July, 2013, Parks posted four signs on the study site, informing residents of the project and of opportunities for participation in the planning process.

A public open house held at Northridge Elementary School on October 23, 2013, provided an opportunity for the public to review and provide feedback on the draft concept plan. Notification of the open house was advertised in the local media, posted in the study area along the Colquitz River trail, and delivered in flyer format to 4000 Saanich residents. Consultants and Saanich staff were available to discuss the plan and answer questions. Over 300 people attended the open house.

Following the open house the Concept Plan was available for viewing at the Parks office, and a digital copy was posted on the District website.

Survey

A Panama Flats Open House survey, prepared by Parks staff, was available at the open house and posted on the District website from the end of October through mid-November, 2013. The survey was self selected and not random; there was no control over the number of times the survey could be filled out by an individual. Approximately 225 responses were received.

The responses indicate that, (percentages have been rounded off to the nearest whole number):

- 26% of responders visit the study area 2-4 times per week; 22% visit the study area less than once per month; 19% visit the study area 5 or more times per week; 18% visit the study area 1-3 times per month; 15% visit the study area once per week
- 67% of responders visit the study area to walk the trails; 65% visit the study area to enjoy nature; 43% visit the study area to bird watch; 34% visit the study area to walk their dog; other lesser reasons for visiting the study area included commuting and recreational cycling
- 87% of responders cited the natural environment as one of their main interests in the study area; 58% cited recreation as one of their main interests in the study area; 46% cited storm water and floodplain management as one of their main interests in the study area; 35% cited farming as one of their main interests in the study area
- Responding to the concept plan: 70% of responders cited Invasive Species Management as a feature they would like to see implemented; 65% cited trail enhancement as a feature they would like to see implemented; 64% cited Colquitz River enhancements as a feature they would like to see implemented; 58% cited restoration of natural areas/disturbed sites as a feature they would like to see implemented; 28% cited increased site furniture (benches, picnic tables, bike racks, etc.) as a feature they would like to see implemented; 26% cited new interpretive and directional signage as a feature they would like to see implemented; 24% cited creation of a small parking area on Roy Road as a feature they would like to see implemented
- 91% of responders found the information provided on the panels presented at the open house and posted on the District web site helped them understand the proposed concept plan

Reference Documents: See Appendix A for Selected References Used in Preparation of the Concept Plan.



Colquitz River 1913
(Saanich Archives)



Edge Family Farm 1968
(Saanich Archives)



Edge Family Farm
Flooding 1972 (Saanich
Archives)

2.0 Site History

Panama Flats, Panama Hill Park, and the Colquitz River fall within the traditional territory of the Esquimalt First Nation which is made up of descendants of the *Whyomilth* and *Kosapsom*. Historically, the Flats were likely a plant harvesting, trapping and hunting area, with associated camps located on Panama Hill and surrounds. In 1850 the *Kosapsom* signed a Treaty selling a portion of their land, including that which was to become known as Panama Flats, to the Hudson's Bay Company; maps from 1858 show the entire area, with minor exceptions, cleared and under cultivation. In 1869 Joseph Carey farmed and raised pigs and cattle in the area, on 40+ hectares purchased from the Hudson's Bay Company. In 1904 an Englishman named McDonald, chief engineer for the construction of the Panama Canal, purchased about 1200 hectares in the area of Carey and Interurban Road, and named the +/- 30 hectare swampy portion Panama Flats, in reference.¹

Land Use / Ownership (post 1900):

- **Early 1900's** - Bill Edge operates dairy and hay farm in study area
- **1922** – Chinese Commercial Aviation School uses Flats as runway/landing strip when weather is too rough over Esquimalt Harbour
- **1923** - John Edge operates dairy farm in study area. Lands in Panama Flats area flood every year and cultivation is not possible until late spring or early summer.
- **1960's - 1970's** – Agricultural production removed from Panama Hill
- **1977** – Geoff Vantreight leases 17.8 ha (44 acres) on Panama Flats
- **1977** - The Province purchases Panama Hill (12.5 ha) from Saanich to develop a social housing project
- **1978** – Geoff Vantreight purchases Panama Flats: 16.2 ha (40 acres) from Edge family and 8.1 ha (20 acres) from Saanich, with the intent to grow potatoes. Geoff Vantreight tries to solve flooding by building a ditch and a drainage basin (15.24m x 10.7m). The drainage basin is subsequently removed by order of Council because it was constructed 24 hours prior to gaining permission from Saanich to construct it.
- **1994** - Saanich buys Panama Hill back from the Province, to preserve it as parkland. Panama Hill is added to the Commonwealth Nature Legacy.
- **1994** (July) – Easterly 8.5 ha of land in Panama Flats is designated as part of the Agricultural Land Reserve (ALR) by the Province
- **1997** - Excavation for pond at the western end of Panama Flats results in spoil being dumped on the western face and southern foot of Panama Hill. Around this time, glaciomarine clay is also spread in the Flats.
- **1999** – Vantreight Farms leases Panama Flats land to the Galey family who grow potatoes, carrots and onions until 2008.
- **2006** – Artifacts are collected from Panama Flats but the Archeology Branch is not notified.
- **2008** - Island Berry Company Ltd purchases Panama Flats from Vantreight Farms. Active farming stops, central drainage ditch is filled in and drain tile removed. To support growing cranberries, Island Berry begins to develop berms, four cranberry bogs, and one irrigation holding area; they intend to keep polluted water from entering their fields. A cease and desist order is issued to stop Island Berry from constructing a 3m berm along the edge of the site; the order is ignored, and an application by Saanich for a court injunction is prepared. Wayne Hopkins, co-owner of Island Berry, argues that the site is a

¹ Historical information obtained from the Provincial Archives File, 'Panama Flats File BCARS 2089', and Saanich General Archives File, 'Panama Flats File'. Both files available at the Saanich Archives.

deposit for municipal stormwater even though it is a private site – a situation he finds unacceptable.

- **2011** (December) – Saanich purchases Panama Flats from Island Berry Company Ltd. for \$2.4 million. Purchase approved in February, 2011.
- **2012** – Odour emanating from Panama Flats generates numerous complaints from nearby residents. Saanich and CRD staff attempt to identify the source of the problem through field checks and water testing – tests come back negative. Research by Master Plan consultants suggests odour may be result of build up of decomposing vegetation in combination with increased amounts of standing water. Site is mowed and ploughed in September in an attempt to reduce amount of organic matter. Mowing and ploughing not fully completed due to rains. (results pending)

Site Proposals / Studies / Reports (post 1940):

- **1940s** - Saanich Planner proposes Panama Flats be developed into a lake surrounded by housing. Planner identifies Flats as being needed for future storm water management.
- **1946** – Daily Colonist reports that entire farm on Panama Flats is under water due to flooding (March 7, 1946)
- **1967** – Saanich Engineer, Frank Neate, prepares storm water management plan for Panama Flats. Neate recommends expropriation of properties and restoration of Colquitz Creek as a healthy ecosystem of value for residents and wildlife. This vision leads to Saanich acquiring property along the creek to maintain it as an open waterway and allow for stream restoration.
- **Late 1960s-early 1970s** – Many university students and consultants prepare reports that draw attention to the degraded condition of Colquitz Creek. (Neil *et al.*, 1968; Thomas, 1970; Langford, 1974; Shepard, 1975)
- **1977** – Saanich Council unanimously rejects Province’s rezoning application for 334 housing units on Panama Flats. Alderman Sandy Noel warns that Council will oppose any plan that interferes with the Colquitz Creek or the floodplain.
- **1996** – Ian Vantreight tells Times Colonist that he attempted to subdivide Panama Flats when he purchased the property but the attempt was stopped by winter flooding (TC Feb 10, 1996)
- **1999** – Carey Local Area Plan 1999, policy 7.3 states: “Initiate an application, in consultation with the owners, to designate the farmland within Panama Flats as Agricultural Land Reserve.”
- **2008**- BC Archeology Branch is informed of artifacts collected in 2006 when an archaeological site inventory form is filed. The form states that artifacts collected were given to the Royal British Columbia Museum; however, that information turns out to be false. Subsequent archaeological inventory testing of property shows no evidence of archaeological sites on property.
- **2008** – Surveyor Brad Cunnin prepares to buy Panama Flats from Vantreight Farms as a joint venture with Saanich. He proposes ‘Panama Gardens’ which would include 50-60 units off Carey, garden plots and social housing; trails, parkland, and storm water channels around perimeter of site; and a farm using a retention pond for irrigation in the middle of the site.
- **2009** – Aqua Tex Scientific Consulting completes the *Colquitz River Watershed Proper Functioning Condition Assessment* report
- **2011** – Ian Vantreight tells Saanich News that flooding on Panama Flats has increased every winter for the past 20 years, and that floods now cover the fields in 2m of water. (Saanich News Release, Feb 10, 2011)
- **2013** (March) - Saanich Council moves to expand percentage of ALR within Panama Flats.



**Recorded
Archaeological Site in
Panama Hill Park**



**Mowing Panama Flats
September 21, 2013**



**Panama Flats Flooded
September 30, 2013**



**Water at the 1.5m mark,
December 9, 2010. Photo
Courtesy of Saanich**

3.0 Site Analysis & Background Information

3.1 Archaeology

The project site is in the traditional territory of the Esquimalt peoples, includes two recorded archaeological sites, and has potential for additional archaeological sites within Panama Hill Park and in Colquitz River Park. In 2008, archaeological inventory testing showed no evidence of archaeological sites within the area known as Panama Flats. Archaeological sites, whether they have been identified and/or recorded or not, are protected under the *Heritage Conservation Act*.

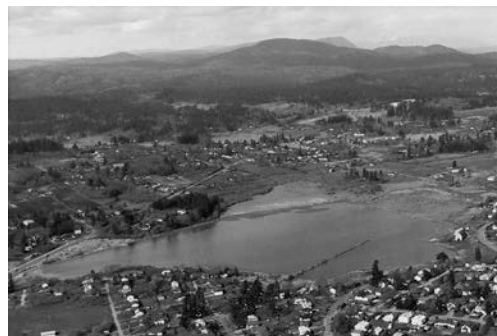
3.2 Floodplain

Panama Flats has served as a flood plain for a catchment area of approximately 3300 hectares for over 140 years.² It is critical that this function be protected, and that current flood water storage capacity be maintained, in perpetuity, and at all times. If the functionality of the floodplain is jeopardized, areas downstream of Panama Flats, including residential, commercial, highway, roads and parks, are likely to flood in high flow events.

The Flats capacity to store flood waters is also highly important for ecological reason: it moderates downstream flows in the fish bearing Colquitz and protects downstream aquatic ecosystems. Storm flow energy is dissipated, and the potential for downstream erosion and flooding is reduced.^{3 4}

Floodwaters have historically come from the Colquitz River overflowing its banks due to stormwater from surrounding uplands and Colquitz River backup. As water levels in the Colquitz recede the Flats remain wet for a prolonged period due to poor permeability, a high water table, and minimal grade across the site. Poor drainage does not reduce flood water storage capacity, however, it does impact agricultural opportunities on the Flats. Conversely, poor drainage supports migratory bird populations and can lead to ice skating/recreational opportunities in cold winters.

There are currently twenty-one storm outlets into the study area, ten of which direct water into a perimeter ditch along the east and south sides of Panama Flats, between Gladiola Avenue and just west of Clinton Place. One directs water into the east side of Panama Hill Park, just north of the formal floodplain limit (the 7.59m geodetic datum); one directs water into Colquitz River Park, east of the creek; nine direct water into Colquitz River Park, west of the creek.

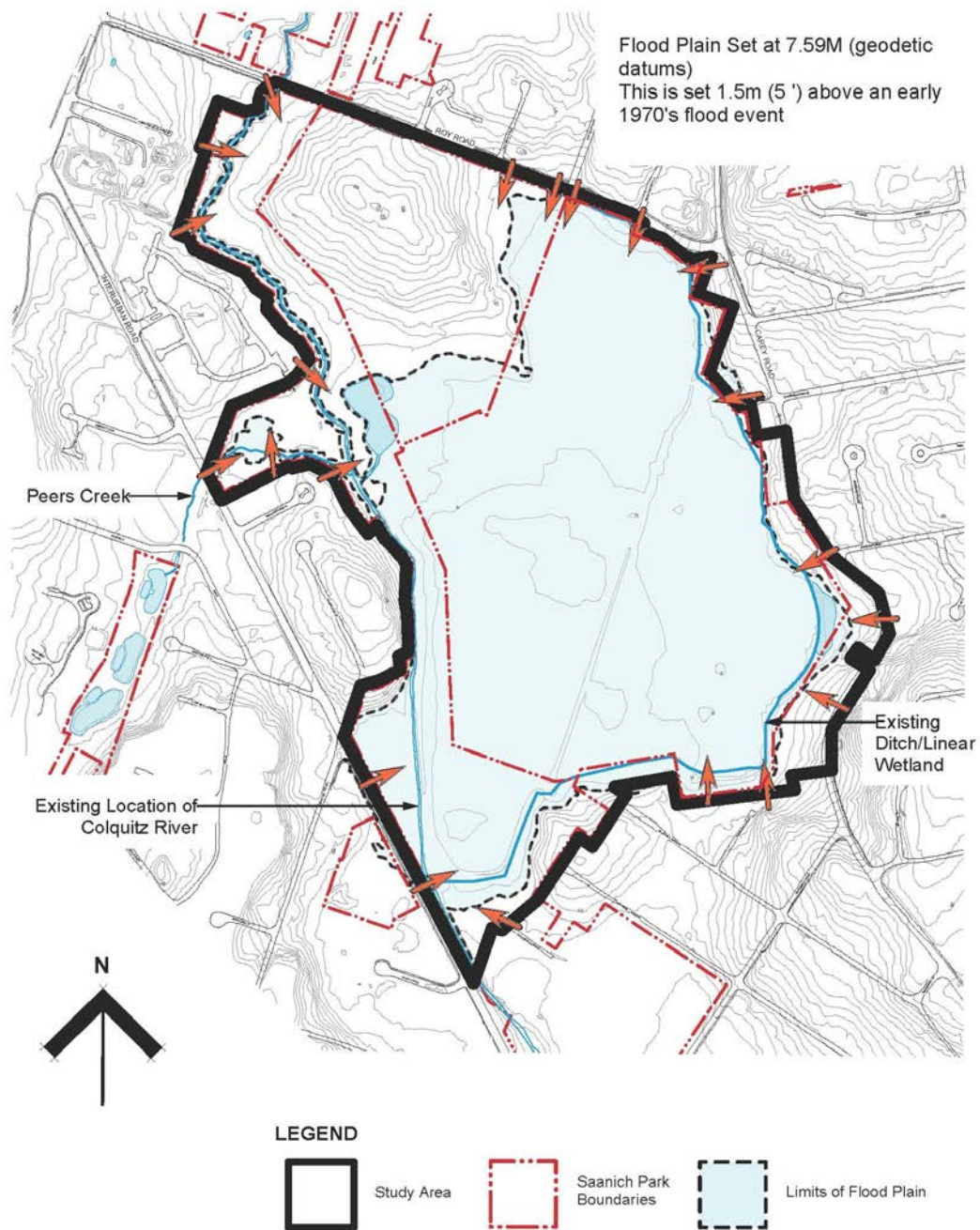


Panama Flats 1977.
Photo Courtesy of Saanich

² KWL 2008 Hydrotechnical Review

³ *Colquitz River Watershed Proper Functioning Condition Assessment 2009*, by Aqua-Tex Scientific Consulting

⁴ *Colquitz River, An Appraisal and Plan, 1967*. Prepared by Frank Neate, District of Saanich Engineer



Map 2: Floodplain

3.3 Ecological Values

3.3.1 General

The study area was historically a wetland surrounded by woodlands, with the Colquitz River flowing through it. The river appears to have been channelized (straightened and deepened) in some areas, especially in the southern half of

the site where agricultural activities took place. It is likely that the river is partially within its original location in the northern half of the site, where meander bends can still be seen.

The entire study area, with minor exceptions, was cleared and put under cultivation between 1858 and 1926 (see Map 3 below). In the 1960's and 70's areas in the north around Panama Hill were removed from agricultural production and trees, shrubs and grasses (primarily non-native invasive species) began to recolonize. The south, central and eastern portions of the site remained cultivated until 2008.

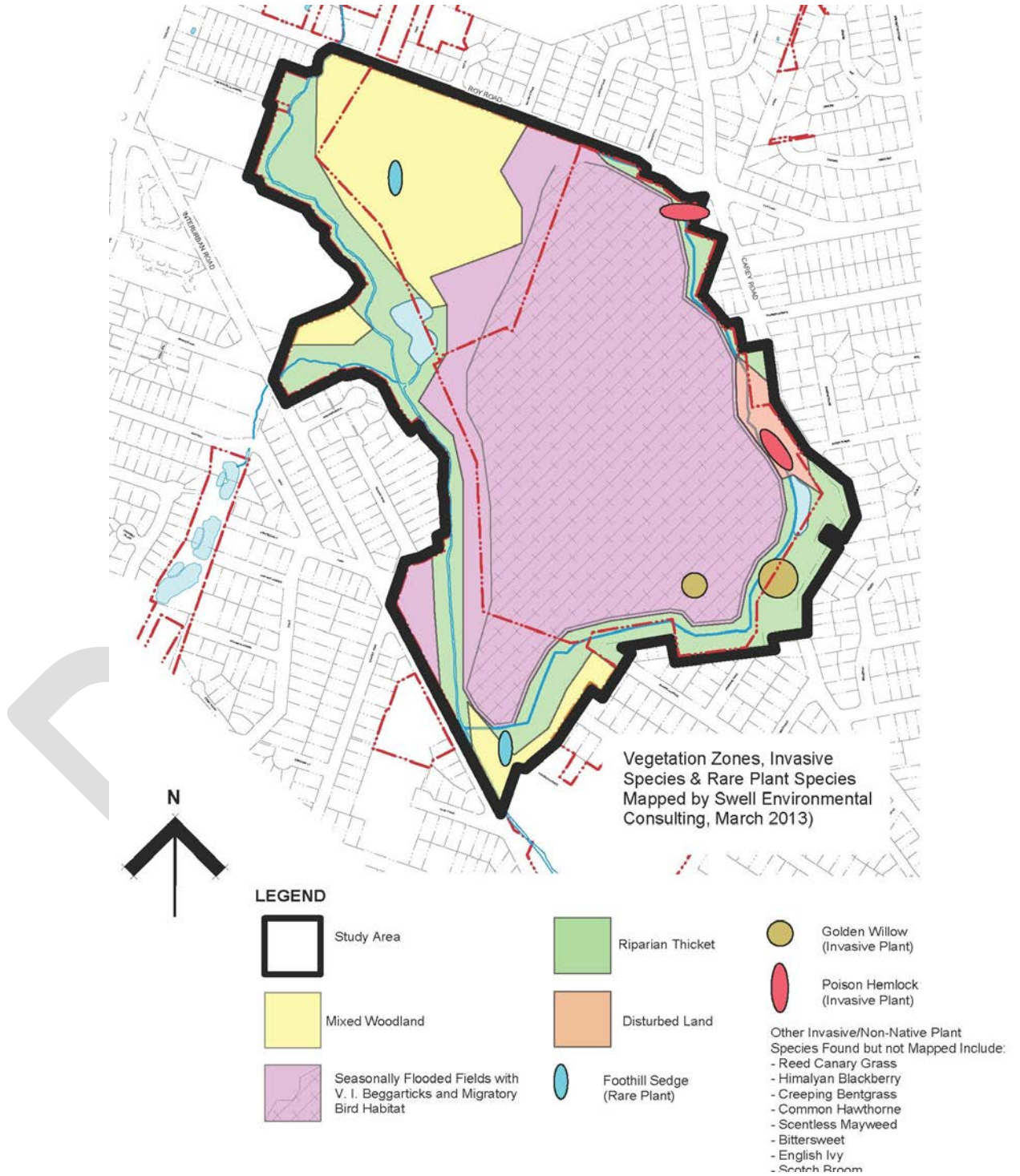
A 2008 report by Island Berry Company suggests Panama Flats was originally a raised sphagnum bog, however, it is the opinion of consultant biologist (Lehna Malmkvist, RPBio, Swell Environmental Consulting Ltd.) that this is unlikely due to the position of the site in the Colquitz River flood plain. As well, early maps (1858, 1888) show a wetland with a mix of deciduous & coniferous trees of a density greater than the open oak woodlands of Uplands, Oak Bay, but less than more forested sites such as Ten Mile Point, Saanich. It is impossible to determine by observation what the original wetland vegetation (pre-agriculture) may have been, however, based on historical maps, it is reasonable to suggest it may have included a mosaic of wooded swamp, shrub thicket, fen, marsh &/or wet meadow habitats.



Map 3: Victoria Official map, 1858, with Wetlands & Riparian Corridors Highlighted. #7 is Panama Flats

3.3.2 Vegetation

The study area currently includes four broadly defined vegetation communities: Disturbed Wetland, Riparian Thicket, Mixed Woodlands, and Disturbed. See Map 4 Existing Ecological Values..



Map 4: Existing Ecological Values



Disturbed Wetlands (north-east)



Disturbed Wetlands (west)



V.I. Beggarticks. Photo courtesy of BC's Coast Region: Species & Ecosystems of Conservation Concern



Riparian Thicket along Colquitz River

- **Disturbed Wetland.** The disturbed wetlands are found in areas that are seasonally flooded and historically farmed. Vegetation of the disturbed wetlands is variable on a fine scale, depending on the length of time since the last disturbance, the scale of disturbance, and the level of flooding. In general, there is a very low diversity and cover of native wetland plants. One of the only common native plants is common rush (*Juncus effusus*), which thrives in disturbed conditions and is not abundant in more natural-state wetlands. Another native plant is common cattail (*Typha latifolia*), which is scattered throughout and dominates in some areas. Most of the wetlands are vegetated by non-native plants, especially reed canarygrass (*Phalaris arundinacea*), creeping bentgrass (*Agrostis* spp.), and scentless mayweed. Reed canarygrass and creeping bentgrass have the potential to greatly expand, and will eventually occupy all but the deepest areas of the wetland to the exclusion of native vegetation. Without intervention, the end result will be a complex of marsh and wet meadow heavily dominated by these two non-native grasses. Despite the disturbed nature of these wetlands, they currently provide valuable wildlife habitat, especially for overwintering and migrating birds. These wetlands also support a large population (thousands of individuals) of the Blue Listed rare plant Vancouver Island beggarticks (*Bidens amplissima*).

- ▶ *Bidens amplissima* (Vancouver Island beggarticks) is a Blue Listed annual that germinates on mud exposed by falling water levels, flowers in summer, and drops seeds in fall. It is threatened by non-native grasses. The effect of cultivation on Vancouver Island beggarticks is unknown, but occasional disturbance likely favours the species by maintaining germination habitat. A community of V.I. beggarticks was identified, and a protection strategy developed, by consultant biologist and species-at-risk specialist (James Miskelly, MSc., Swell Environmental Consultants) prior to the fall 2013 mowing and tilling of Panama Flats.

- **Riparian Thicket.** Riparian areas in the study area form a discontinuous band around creeks, some ditches, and other areas of near permanent water. These areas support a mix of native trees including Douglas-fir (*Pseudotsuga menziesii*), grand fir (*Abies grandis*), red alder (*Alnus rubra*), black hawthorn (*Crataegus douglasii*), Pacific willow (*Salix lucida* ssp. *lasiandra*), and Garry oak (*Quercus garryana*). Native shrubs are abundant and include Indian plum (*Oemalaria cerasiformis*), Hooker's willow (*Salix hookeriana*), Pacific ninebark (*Physocarpus capitatus*), hardhack (*Spirea menziesii*), common snowberry (*Symphoricarpos alba*), and Nootka rose (*Rosa nutkana*). Riparian areas are impacted by non-native, invasive species such as Himalayan blackberry (*Rubus aremiacus*), reed canarygrass, English ivy (*Hedra helix*), common hawthorn (*Crataegus monogyna*), and bittersweet (*Solanum dulcamara*). Golden willow (*Salix alba* var. *vitellina*) is a rare invasive in these communities, but has the potential to increase greatly. There are also a series of non-native trees planted in riparian areas in the southern portion of the project area. These include weeping willow (*Salix babylonica*), hybrid poplar (*Populus* sp.), birch (*Betula* sp.), and spruce (*Picea* sp.). Though these trees are unlikely to spread, they nevertheless compete with native vegetation and contribute to the impoverishment of these habitats.

- **Mixed Woodland.** This vegetation community is most evident at Panama Hill, but is also present to some extent around much of the perimeter of the study area. The open woodlands fall along the spectrum of Garry oak ecosystems, and include meadows and open woodlands of Garry oak, Douglas-fir, and black hawthorn. Native shrubs are common, particularly common snowberry and Nootka rose. These woodlands are severely degraded and dominated by non-native grasses, especially bentgrasses. Reed canarygrass



Mixed Woodland – Garry Oak on Panama Hill



Mixed Woodland – Douglas Fir on Panama Hill



Disturbed Area around Vegetable Storage Barn



Nootka Rose in Riparian Thicket on east side of Panama Flats

dominates the wettest areas. Invasive shrubs are prevalent, especially Himalayan blackberry, common hawthorn, and Scotch broom (*Cytisus scoparius*). However, small populations of characteristic spring flowers, including great camas (*Camassia quamash*), harvest brodiaea (*Brodiaea coronaria*), and fool's onion (*Tritelia hyacinthina*), persist. Also present is a large population of the endangered Red Listed plant foothill sedge (*Carex tumulicola*) (described below). Panama Hill has specific attributes (transitional areas between Garry oak uplands and wetlands, and clay soils) that provide highly suitable habitat for a number of rare plants – it is likely that more rare plants occur within the project area than have been recorded. See Map 4 Existing Ecological Values, for known locations of rare plants.

► *Carex tumulicola* (foothill sedge) is a Red Listed perennial grass-like plant found in deep-soiled Garry oak woodland and open meadows, often near seasonally wetted areas, on Panama Hill and at the southern end of the project site. The full extent of the population is not known. In the project area it is threatened by competition with invasive non-native shrubs and possibly reed canarygrass.

▪ **Disturbed Areas.** Disturbed areas are limited to spots along Carey Road that have experienced heavy use both historically and recently (These areas are generally devoid of native vegetation and include significant areas of bare soil and buildings. These areas support very large populations of poison hemlock (*Conium maculatum*), a plant that is both invasive and highly toxic.

Invasive Plant Species: The entire project area is impacted by invasive species to a great extent. These species alter the physical structure of the plant community and have drastic ecosystem effects. Mud flats are converted into tall marshes, meadows are converted into shrub thickets, and native vegetation is all but eliminated. Those that appear to warrant the greatest concern are described in Table 1.

Reed canarygrass is a tall, rhizomatous grass that dominates all areas that are seasonally wet and have been left fallow for long periods. It is rapidly spreading into areas recently abandoned and eventually may occupy all but the deepest portions of the wetland. This will significantly reduce habitat for Vancouver Island beggarticks and many birds. It is also spreading into moister portions of the uplands. No large-scale reed canarygrass control has ever been attempted in Canada. In other jurisdictions, reed canarygrass has been controlled with herbicide. It is believed to be sensitive to tilling or repeated mowing. Reed canarygrass has high light requirements and is outcompeted by taller woody vegetation.

Golden willow is currently rare in the project area, seen at only two locations (see Map 4 Existing Ecological Values). However, this species has the potential to expand greatly and dominate riparian thickets. It should be removed now while it is still manageable.

Common hawthorn is common in the riparian habitats and dominates mixed woodlands on parts of Panama Hill. The removal of this species would greatly improve the ecological condition of the mixed woodlands and associated meadows. Removal of common hawthorn usually requires a chemical treatment to prevent the stump from re-sprouting.

Bentgrasses are well established throughout all open areas in the project area that are not dominated by reed canarygrass. Some species (especially creeping bentgrass) are highly tolerant of flooding and are rapidly colonizing the



Thistles in Panama Flats
August 2012



Scentless Mayweed
(Chamomile) throughout
Panama Flats August 2012



Scotch Broom in Panama
Flats May 2013

disturbed wetlands. This will significantly reduce habitat for Vancouver Island beggarticks and shorebirds. Bentgrasses are also common in upland meadows, where they provide strong competition for the remaining native flora. No large scale bentgrass control has ever been attempted in Canada. In other jurisdictions, these grasses have been controlled with herbicide. Bentgrasses have high light requirements and are outcompeted by taller woody vegetation.

Himalayan blackberry is common in riparian thickets and mixed woodlands throughout the project area. Riparian thickets along the southern portion of Colquitz Creek contain dense stands of Himalayan blackberry that exclude native vegetation. This may be due to the lack of active use of the stream banks for grazing or farming since initial clearing (Neate 1967). While stem density in the mixed woodlands is generally low at present, these plants have the potential to increase and coalesce into vast, dense thickets. Beginning control of Himalayan blackberry now is highly recommended.

Thistles, including bull thistle and Canada thistle, are common on the berms in and around the disturbed wetlands. Removal of berms and restoration of a more natural flooding regime will greatly reduce the area occupied by thistles.

Scentless mayweed (also known as scentless or wild chamomile) is classified as a noxious weed under the BC Weed Control Act. This species is very abundant in the disturbed wetlands of Panama Flats and occupies much of the area that is not dominated by invasive grasses.

Scotch broom is abundant on the north side of Panama Hill and scattered elsewhere on Panama Hill. The removal of this species would greatly improve the ecological condition of the mixed woodlands and associated meadows.

Poison-hemlock occupies severely disturbed sites along Carey Road. This plant is both invasive and highly poisonous. It is often removed as a public health concern.

Vegetation Outlook: Recovery of the natural vegetation ecosystem in the study area is severely hampered by invasive plants. Without intervention, the end result will be a complex of marsh and wet meadow heavily dominated by non-native grasses, and continued invasion of non-native grasses and shrubs in upland areas. Because of the high level of degradation, even slight improvements could greatly enhance habitat values. The occurrence of upland Garry oak ecosystem grading down to wetland is very rare in our region and represents a tremendous restoration opportunity. The project area could provide important recovery habitat (reintroduction site) for rare plants and animals if restoration work were undertaken. The preparation of any restoration plan will be constrained by lack of knowledge on the remaining native vegetation in both upland and wetland habitats. A systematic plant survey to locate remnant populations of native plants, both common and rare, is needed.

Table 1. Invasive Plant Species of Greatest Concern

Species	Common Name	Affected Vegetation Communities
<i>Phalaris arundinacea</i>	reed canarygrass	all
<i>Salix alba</i> var. <i>vitellina</i>	golden willow	riparian thicket
<i>Crataegus monogyna</i>	common hawthorn	riparian thicket, mixed woodland
<i>Agrostis</i> spp.	bentgrasses	disturbed wetland, mixed woodland
<i>Rubus armeniacus</i>	Himalayan blackberry	riparian thicket, mixed woodland
<i>Cirsium</i> spp.	thistles	disturbed wetland
<i>Tripleurospermum inodorum</i>	scentless mayweed	disturbed wetland
<i>Cytisus scoparius</i>	Scotch broom	mixed woodland
<i>Conium maculatum</i>	poison-hemlock	disturbed



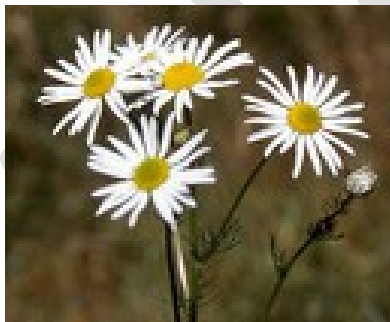
Reed Canarygrass



Bentgrass



Poison Hemlock



Scentless Mayweed (aka Wild Chamomile)



Golden Willow



Redwing Blackbird on Panama Flats



American Coot on Pond on Panama Flats

3.3.3 Birds

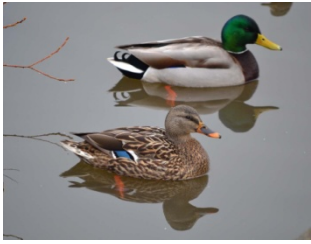
Panama Flats was surveyed by bird experts every five days from April 2012 to February 2013 (Victoria Natural History Society and Rocky Point Bird Observatory, unpublished report, 2013). There have also been a series of more casual or opportunistic bird surveys and observations over a period of years. These observations provide both a snapshot of the values that currently exist in the project area and a regional and longitudinal context. Panama Flats is considered by the birding community to be one of the most important sites in the Victoria area for migrating and overwintering birds. The site is especially important for shorebirds and waterfowl (detailed below). Over a period of less than two years, 164 bird species were recorded in the project area, almost one third of the total species ever recorded in British Columbia. For a relatively small area in an urban setting, this number must be considered very high.

Eleven at-risk (Blue and Red Listed) birds have been recorded in the project area. Most of these do not breed at Panama Flats but use the area for foraging. Of the eleven species, three use the area year round, three use the area only from spring to fall, and the remaining five are present only during migration or overwintering. See Table 2.

Table 2. Species at risk (birds) recorded from the Panama Flats project area (to February 2013)

Species	Common Name	Prov. Status	COSEWIC Status *	SARA Status*	Schedule 1.
<i>Ardea herodias fannini</i>	Great Blue Heron, <i>fannini</i> subspecies	Blue	SC	SC	Yes
<i>Asio flammeus</i>	Short-eared Owl	Blue	SC	SC	Yes
<i>Branta canadensis occidentalis</i>	Canada Goose, <i>occidentalis</i> subspecies	Red	NA	NA	No
<i>Contopus cooperi</i>	Olive-sided Flycatcher	Blue	T	T	Yes
<i>Falco peregrinus anatum</i>	Peregrine Falcon, <i>anatum</i> subspecies	Red	SC	T	Yes
<i>Falco peregrinus pealei</i>	Peregrine Falcon, <i>pealei</i> subspecies	Blue	SC	SC	Yes
<i>Hirundo rustica</i>	Barn Swallow	Blue	T	NA	No
<i>Larus californicus</i>	California Gull	Blue	NA	NA	No
<i>Patagioenas fasciata</i>	Band-tailed Pigeon	Blue	SC	SC	Yes
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	Blue	NAR	None	No
<i>Progne subis</i>	Purple Martin	Blue	NA	NA	No
<i>Tyto alba</i>	Barn Owl	Red	T	SC	Yes

* E = Endangered, T = Threatened, SC = Special Concern, NAR = Not at Risk, NA = Not Assessed.



Mallard Ducks in Flooded Panama Flats Fields, February, 2013



Canada Geese at Panama Flats, September, 2013



Mallard Duck & Ducklings at Panama Flats, June, 2013



Finch at Panama Flats, June, 2013

In addition to those species ranked by COSEWIC or the BC Conservation Data Centre, other bird species have been recorded at Panama Flats that are considered locally rare or of special interest. For example, Black-necked Stilts (*Himantopus mexicanus*) nested in coastal BC for the first time in 2012. Although the nests weren't located in the project area, they were in similar habitat and the birds were occasionally seen foraging at Panama Flats. Western Meadowlarks (*Sturnella neglecta*), extirpated from the Georgia Basin as a breeding bird, have been observed at Panama Flats in the non-breeding season. Panama Flats also provides valuable wintering and migration habitat for a number of non-rare birds. Waterfowl, in particular, are increasingly concentrated in the little remaining habitat in the region. More than one thousand individuals each of both Green-winged Teal (*Anas crecca*) and Northern Pintail (*Anas acuta*) have been observed at Panama Flats. This is a significant proportion of the total local wintering population for both species. The Flats also provide a critical resource for migrating shorebirds. These birds have very long migration routes and very high energetic requirements. Many species are in decline and the availability of suitable stopover sites is a major limiting factor. Most local wetlands do not provide suitable muddy habitat because of dominance by reed canarygrass. Over a period of two years, 21 species of shorebird were seen using Panama Flats. This is a high-quality shorebird site because of the relatively low cover of reed canarygrass and the persistence of shallow water through the spring.

Invasive Bird Species: Non-native, resident Canada geese are a major ecological problem in other wetland areas and throughout agricultural lands in the CRD, however, no studies have been conducted regarding the use and effects of the geese on Panama Flats.

Bird Outlook: Any efforts to reduce the period of flooding to enhance farming opportunities will reduce the value of the site to migrating and overwintering birds. The spread of reed canarygrass will likewise ultimately reduce the value of the site as bird habitat. The Rocky Point Bird Observatory and Victoria Natural History Society birding community has suggested that the southern portion of the project area, where water is retained longest, could be managed specifically as bird habitat. They recommend occasional tilling to maintain the open mudflats that are critical to migrating shorebirds. Many birds are sensitive to disturbance; disrupting migrating birds while they are feeding is particularly harmful. Removal of the constructed berms that penetrate the wetlands at Panama Flats may be beneficial for bird life in reducing human access and resultant disturbance. Conversely, the berms could be managed to control human (and dog) interference. Bird watching has become a significant pastime at Panama Flats, especially since agricultural activities stopped in 2008.

Additional bird studies, including the presence and effects of Canada geese, will aid in determining if special management measures are required for the geese. It is anticipated that the presence of Canada geese will conflict with future agricultural activity.



Deer Hip Bone at Panama Flats



Common Garter Snake at Panama Flats



Otters in Panama Flats - Photo posted by John Carter on A British Birder in BC Blog

3.3.4 Wildlife

There is no recorded information currently available on non-avian wildlife in the project area, however, park users have indicated they have seen mink, river otter, raccoon, and black-tailed deer (*Odocoileus hemionus columbianis*) on the site. Small mammals common to similar habitats include Townsend's vole (*Microtus townsendii*) and vagrant shrew (*Shrew vagrans*) - both of these species can reach high densities in seasonally wet, grassy areas; beaver (*Castor canadensis*) are known to occur in other parts of the Colquitz River watershed and are likely to use the project area to some extent, even if only in transit. Bat species, including some at risk, are known to forage over wetlands and are likely present to some extent.

There is limited information available on the presence of pond-breeding amphibians and reptiles on the site. Common and northwester garter snakes have been found on the site. Non-native American bullfrogs (*Rana catesbeina*) have been heard along the east perimeter of Panama Flats, and American bullfrog tadpoles have been found in ditches throughout the project area (Malmkvist 2008).

Pacific chorus frog (*Pseudacris regilla*) and red-legged frog (*Rana aurora*) both are known to breed in temporary pools, but it is unknown whether Panama Flats may provide suitable habitat. Likewise, no information is available on the use of the area by reptiles. A large common garter snake (*Thamnophis sirtalis*) was found dead on Panama Hill during March 2013 field reconnaissance. The area likely also supports northwestern garter snake (*Thamnophis ordinoides*). Use of the site by western terrestrial garter snake (*Thamnophis elegans*) or northern alligator lizard (*Elegaria coerulea*) is less likely.

No invertebrate research has been done at Panama Flats or similar local habitat. Invertebrates provide an important prey base to many of the birds and other species that rely on the flats.

Invasive Wildlife Species: American bullfrogs are generalist predators posing a threat to other amphibians, reptiles, birds, small animals and invertebrates; their presence may be a limiting factor in the ability of the site to support native amphibians or other small bodied animals. Because the tadpole stage lasts more than one year, this species requires permanent water bodies for breeding. However, the frogs readily move over land and feed in temporary water bodies when they are available. Breeding habitat at Panama Flats is relatively limited and it should be possible to remove the American bullfrog from the project area.

Wildlife Outlook: The current potential of the site to support populations of rare mammals, amphibians, or reptiles appears limited. It is possible that restoration work in the wetlands and the creek could provide suitable habitat for red-legged frog and/or the Vancouver Island subspecies of common water shrew (*Sorex palustris brooksii*). Restoration of upland meadows and oak woodlands could provide suitable habitat for a number of rare butterflies, particularly Propertius duskywing (*Erynnis propertius*) and common ringlet (*Coenonympha tullia*). Red and blue-listed dragonflies may already be present in temporary wetlands or the more permanent constructed pond.

There is a lack of information on use of the site by non-avian wildlife. In the absence of such information, it is possible that management decisions will have negative effects on wildlife.



Colquitz River adjacent Panama Flats, February, 2013



Colquitz River adjacent Interurban Road (Panama Flats reach), December, 2012



Colquitz River bank adjacent Panama Flats, February, 2013

3.3.5 Colquitz River Function

Colquitz River is a salmon bearing channel that has been altered by past agricultural land uses, increased runoff from impervious surfaces on adjacent urban development, and loss of upstream hydrological storage capacity. Its existing condition is described in detail in the 2009 *Colquitz River Watershed Proper Functioning Condition Assessment*. The report states, among other things, that Panama Flats floods annually in winter due to overflow from the Colquitz River which, in the reach adjacent the Flats, has been reduced to a ditch along Interurban Road. The report states “although high flows access the field as a floodplain, this only occurs in the wettest months, and is a result of increased peak flows from the surrounding effective impervious areas (EIA) in the watershed. If the channel had its historic shape and depth, it would flood more frequently and reduce the erosive forces in the channel. Not surprisingly, the stream banks in this reach are visibly eroding and slumping. This reach has been classified as Non-functional due to its ditch-like characteristics, inappropriate shape to handle high flows, and active erosion throughout.”⁵

Historical interpretation of the upper portion of the Colquitz River was also provided by Frank Neate, engineer for the District of Saanich (1967) and applies, in part, to the upper portion of the subject site (below Roy Road):

“Below West Saanich Road, much of the stream has a somewhat U-shaped channel and the general appearance of a man made ditch. It is probable that this has contributed to the belief expressed by some that “the bends and waterfalls have been taken out of the creek”. Examination of the route followed by the stream where this type of channel is found demonstrates the incorrectness of this view. It may readily be seen that the stream either follows an original path created by intersecting slopes of the mounds and ridges referred to above or is so irregular in its course as to make it hardly credible to attribute the pattern to the activities of farmers or engineers. The U-shaped or (since the banks are sloped at 45° in many places) steep walled cross-section is reasoned to be the result of the ability of undisturbed clay to maintain almost vertical banks up to two to three feet high. The depth of channel is felt to be due, not so much to the erosive effect of winter flows, but to more subtle factors. Alternate drying and wetting of exposed clay areas; encroachment of vegetation; burrowing of animals; all would produce a loosening of a small amount of the erosion resistant clay. Annual removal of the loosened material over the period of time which has elapsed since the sea retreated would result in a channel of the type described.”⁶

It is likely that the Colquitz River channel is partially within its original location in the northern half of the site, where meander bends can be seen, and has been channelized (straightened and deepened) in the southern half to drain the wetland area for agriculture. Additionally, the channel has likely been shaped (down cut and widened) by erosion from increased urban runoff as the upper watershed has developed and impervious areas have increased. While there has been occasional speculation that the original channel may have run through the top of Panama Flats, an examination of contour maps for the site reveal that this is highly unlikely, and the channel has almost certainly flowed along the west and south sides of Panama Hill.

⁵ *Colquitz River Watershed Proper Functioning Condition Assessment 2009*, by Aqua-Tex Scientific Consulting

⁶ *Colquitz River, An Appraisal and Plan, 1967*. Prepared by Frank Neate, District of Saanich Engineer

Colquitz River Water Quality: The Capital Regional District Stormwater, Harbours and Watersheds Program (CRD SHWP) has been conducting fecal coliform testing at the mouth of the Colquitz River since the 1980s. The CRD significantly expanded its stream sampling program in 2009 to include physical parameters and added upstream locations within the Colquitz watershed (Swan Creek above the confluence with the Colquitz and the Colquitz mainstem in Hyacinth Park, immediately downstream of Panama Flats). These parameters include continuing analyses for fecal coliform and estimation of flow volumes, with the additional recording of temperature, pH, dissolved oxygen (DO), specific conductivity (SC), turbidity, phosphorus, and nitrate-nitrogen (data not available at time of report).

In 2012, as part of a combined CRD and BC Ministry of Environment (MOE) initiative to characterize contaminant inputs to our harbours, the Colquitz watershed was selected for intensive sampling. This sampling consisted of multiple parameters obtained five times over a 30-day period (referred to as '5in30' sampling), both in the dry (Aug-Sept) and wet (Oct-Nov) seasons. This sampling seeks to quantify the contaminants from major stream systems during both low and high-flow regimes, as well as to capture "first flush" events where the first rains of the season carry the contaminant load accumulated from roads and other impervious surfaces over the preceding dry season. The 2012 5in30 sampling for Colquitz included all of the previously mentioned parameters, with the addition of E. coli, hardness (CaCO₃), total suspended solids (TSS), ammonia, chlorophyll a, metals, and benthic invertebrates in selected locations.

While the full data is not yet available the preliminary findings are much as expected. The average fecal coliform counts for the dry (670 CFU/100mL) and wet (630 CFU/100mL) seasons at Hyacinth Park were similar, while E. coli were much higher in the wet season (860 CFU/100mL) than dry (340 CFU/100mL), likely influenced by increased E. coli from upstream, as evidenced by high numbers in the river section flowing through Quick's Bottom. Dissolved oxygen (DO) remained relatively constant at 8.6 mg/L through both seasons. Salmonids generally begin to show stress at DO levels below 8 mg/L, but studies have shown an average of 3 mg/L loss of dissolved oxygen between the surface and intra-gravel substrate, reducing the dissolved oxygen of the developing eggs/alevins to approximately 5.6 mg/L (Carter 2005). Summer temperature averaged 15.1°C, with fall temperature reduced to 10.2°C; this is largely due to extremely high temperatures from Elk/Beaver lakes (>25°C on one day). Additional analyses can be made upon release of final results, including benthic invertebrate taxonomy (CRD unpublished data 2012).

Colquitz River Outlook: The 2009 Colquitz River Proper Functioning Condition Assessment addresses opportunities to improve the function of the Colquitz River: *"Given that there is a large amount of land available, there is great potential for restoration of [the Panama Flats] section of the reach. Restoration efforts should include reconstructing the channel with a large amount of sinuosity appropriate to a "C" channel type, with a series of constructed ponds/wetlands and floodplain areas. A replanting regime should focus on removing invasive species, establishing a shade canopy with fast-growing deciduous trees and shrubs, and an understory with conifer plantings. This will ensure less competition from shade-intolerant invasive species and improve survival of native plantings.*

Long-term restoration along Panama Flats (given a land ownership scenario that permits it) would focus on wetland creation and realignment of a sinuous "C" or "E" channel bordered by generous floodplains. In the short term, the

channel could be realigned to meander in wider areas and to establish floodplain terraces to allow for the dissipation of energy from peak flows. Removal of invasive species and replanting would occur during such work.

Connecting the existing pond (Panama Hill Pond) to the creek may also provide some energy dissipation and add oxygenated water to the pond to reduce the anoxic state. Due to the importance of Panama Flats in attenuating water flow for the reaches of Colquitz River downstream, it is absolutely essential to maintain the function of this area to act as a floodplain. If the functionality of this floodplain is jeopardized, areas downstream of Panama Flats, including residential, commercial, highway, roads, and parks are likely to flood in high flow events.

To restore this reach, meander, sinuosity, floodplain and other C channel characteristics must be recreated. If Panama Flats could eventually be acquired by the municipality, it represents an ideal opportunity for wetland restoration, which would ensure it continues to provide stormwater management in a much more functional way than annually cultivated fields. Where channel restoration is limited by the public trail and private property, there may still be an opportunity to create floodplain terraces with minimal sinuosity, which would allow more riparian plantings and reduce erosion. Farther upstream (between the stormwater pond and Roy Rd.), there is ample room for channel restoration with increased sinuosity and possibly adjacent ponds and/or wetlands. Additionally, invasive species removal followed by native riparian and upland vegetation planting will further enhance the health and function of the creek in this area. Connecting the stormwater pond to the creek will further aid in reducing the energy of peak flows resulting in less erosion (it currently appears to be connected only by subsurface seepage).⁷

An undeveloped/derelict property at Wilkinson Road and Dunsterville Avenue borders the northwest section of the creek and would be subject to the RAR, if developed. This is the only undeveloped piece of private property bordering the creek on the subject site. The grounds were saturated during site reconnaissance in February 2013; this property may provide an opportunity for increased stream enhancement.

Water quality within the Panama Flats reach appears to be moderately good, with the exception of higher summer temperatures, increased waste-related bacteria in high rainfall, and dissolved oxygen levels that may impede the use of this reach for successful egg and alevin emergence. Further examination of existing data, in particular benthic invertebrate communities, will greatly enhance the assessment of this reach. Upstream investigation for sources of waste-bacteria (such as sewage cross-connections, livestock) could also provide important remediation solutions. Regardless, many of the recommendations above will directly improve water quality.

The Colquitz Watershed Stewardship Project operated from the mid 1990s to the early 2000s by volunteers as an award winning environmental educational program for students, teachers and community members. The results of their water quality sampling efforts, including benthic invertebrates, included areas within the subject site and would have provided valuable information to evaluation of the Colquitz River in this reach (Lenny Bruce pers. comm. with

⁷ Colquitz River Watershed Proper Functioning Condition Assessment 2009, by Aqua-Tex Scientific Consulting

Lehna Malmkvist, 2013; Sutherst 2001). While the data has apparently been lost, a program such as this is invaluable to the community and future generations, and any potential for re-establishing a program of this type should be fully supported.

3.3.5.1 Fish

In the past, the Colquitz River and its tributaries were valued for recreational fishing, especially for coho salmon and cutthroat trout, and much recent effort has been put into programs to assess and rehabilitate fish stocks for their value in their own right. Anecdotal evidence of historical fish presence and capture has been compiled in previous studies. Recent fish counts and smolt trapping has provided information regarding current populations. By all accounts, fish species and overall abundance of populations are drastically decreased from historic times. This decrease is due to a combination of habitat loss, hydrological changes and deteriorating water quality from urban development, and, potentially, from the impact of aquatic invasive species. The Colquitz River watershed has suffered the loss of wetlands that would have served to attenuate high flows, while providing much needed sanctuary for juvenile fish in off-channel habitat.



Counting Fish on the Colquitz River, 2012. Photo posted by Bernard von Schulmann on Victoriavision.blogspot.ca/December_2012_12_01/archive.html

Species historically documented in the Colquitz and tributaries include coho and unspecified salmon, cutthroat and rainbow trout, steelhead, Dolly Varden, catfish/bullhead, sunfish, and crayfish (an invertebrate, but commonly mentioned in fishing accounts). The Fisheries Information Summary System (FISS) provides summary level fish and fish habitat data. A current query to the Fisheries Inventory produces a FISS Fish Distributions Report listing dated (1977-1995) and undated reports of the following species in Colquitz River: coho and chum salmon, cutthroat and rainbow trout, prickly sculpin, brown catfish (formerly brown bullhead), threespine stickleback, pumpkinseed sunfish, smallmouth bass, and a general category of bass/sunfish

None of the fish species found in the Colquitz River are listed as at risk federally in SARA or COSEWIC, but coastal cutthroat trout (*Oncorhynchus clarkii* subs *clarkii*) are a Provincially Blue Listed Species (special concern)



A fish counting fence on the Colquitz River behind Tillicum Mall was installed by the Victoria Fish and Game Protective Association in 2001, but has been operated by volunteers since that time (Table 3). Discussions are currently underway to determine future collaboration with the Esquimalt Anglers Association (Chris Bos, Barrie Goodwin, Colquitz volunteers, pers.comm. with Sara Stallard, 2013). A previous wooden fish counting fence operated from 1973-1983, but was dismantled due to vandalism (VFGPA 2010). This data was not available at the time of preparing this report. During a December 2012 field trip to the Panama Flats subject area adult coho were seen in the Colquitz River under the footbridge adjacent to the man-made pond and Peers Creek confluence. Numerous other incidental observations by the ecological consultants, from December 2012 to February 2013, noted coho spawning upstream of the subject site, including below Mann Avenue.

Smolt trapping on Colquitz River in the past 5 years has confirmed coho, cutthroat trout and sticklebacks are present in a number of tributaries and off-channel habitats. Coho, threespine sticklebacks and pumpkinseed sunfish were trapped in the drainage ditches around Panama Flats in 2008-2009.

Table 3. Colquitz Fish Counting Fence (Unofficial) Preliminary Results (courtesy Barrie Goodwin 2013) ^a

YEAR	Coho	Chum	Cutthroat	Other	Total	Comments
2001	535	75	5		515	
2002	230	6	3	48	287	Other = unknown species
2003	148	5	3	1	157	Other = Chinook female. Operated to December 10
2004	400	3	11	2	416	
2005	184			9	193	Other = unknown species
2006	55			10	65*	Other = unknown species. *Could only count 30 days due to high water
2007	75		4		79	
2008	79			2	81	
2009	156			54	210	Others were fish that swam over deck or were released due to high water
2010	197		1		198	
2011	285			1	286 ^b	Other = unknown species. See note b
2012	183		2	2	187 ^c	Other = unknown species. See note c

Notes:

a) Counting fence records are being compiled from field notes and these data may change slightly. Records distinguish catches by male, female, and jacks. This table has combined data to species only.

b) Counting was suspended in late November due to a heating oil spill in Swan Creek. The last day of counting saw 162 fish trapped in a single day.

c) Counting was continued during an underground BC Hydro leak from high voltage lines immediately adjacent to Colquitz River at Interurban Road and Columbine Way. However, Craigflower Creek had 1322 coho through the fence between October 14 and December 30, 2012, compared to 53 for September 11 to December 29, 2011 (Esquimalt Anglers 2013). It is reasonable to assume that fish were diverted from Colquitz River due to poor water quality.

Invasive Fish Species: Smallmouth bass, largemouth bass and pumpkinseed sunfish have been noted in the Colquitz River and are considered aquatic invasive species by Fisheries and Oceans Canada (DFO). The first recorded occurrence of pumpkinseed in the Vancouver Island Region was in 1953 in Swan Lake and largemouth bass were first noted in Elk/Beaver Lake in 1997 (Runciman and Leaf 2009). Aquatic invasive species are a concern as they can reduce natural biodiversity and native species, as well as reduce or destroy ecosystem functions and fish habitat (DFO 2012). Non-native, invasive species have been described as the second most prevalent threat for Canadian freshwater fish species at risk, next to habitat loss (Dextrase and Mandrak

2006, cited in Runciman and Leaf 2009). Currently there are no documented methods for eradicating these invasive fish species without harm to other aquatic life. However, as it appears that largemouth bass have not heavily populated downstream sections of the Colquitz River, a preventative strategy should be considered.

Largemouth and smallmouth bass are known for their ravenous appetites and predation on juvenile fish, including salmonids (Runciman and Leaf 2009).

Fish Outlook: The constraints and opportunities associated with improving fish populations include habitat, water quantity and water quality (refer to Environmental Values: Vegetation, Colquitz River and Hydrology sections). The portion of the Colquitz River through the subject site is currently constrained by reduced native riparian vegetation, a narrow riparian buffer, likely clay substrate throughout, steepened banks, limited floodplain access, reduced side-channel habitat, virtually no pool/riffle complexity, high flows in winter, low flows in summer, and contaminant inputs from urban streets, as well as repeated hydrocarbon spills.

Habitat rehabilitation can greatly increase salmonid populations. The location of residential housing immediately adjacent to the south bank of the creek is a severe constraint to riparian buffer and vegetation. However, the open area on the north bank, in particular upstream of Hyacinth Avenue, offers an excellent opportunity to provide complexity to the channel with the creation of increased sinuosity, pool/riffles, depth, anchored LWD and boulders, side channel access and floodplain capacity (Lill 2002). Reducing the ubiquitously steep-sided banks of this portion of the creek with stepped terraces would allow for increased flood capacity, without compromising low summertime flows. The planting of native riparian vegetation can reduce bank erosion and sedimentation, while providing improved stream bank cover, which adds LWD, reduces summer water temperatures and increases food supplies to the aquatic foodweb through insect drop and leafy debris for benthic macroinvertebrates. In particular, side channel habitat, such as could be afforded by clear connections to an increased wetland area and/or the man made stormwater pond, is essential for juvenile salmonids. Channel design would need to allow for continuous low flow through the pond in order to reduce mortality due to high temperatures and low dissolved oxygen.

Contaminants from accidental oil spills, construction sites and urban streets are best addressed through municipal Best Management Practices and are beyond the scope of this study. However, improved stormwater/rainwater management in the upper watershed, as well as increased treatment (e.g. constructed wetlands) at stormwater discharges could offer improvements in water quality. Reports of high sediment loads originating in the agricultural drainage from Durrell Creek (an upstream tributary) and from Panama Flats itself are an additional concern and could be addressed with agricultural BMPs (Lenny Ross personal communication with Lehna Malmkvist 2013). Recent water quality testing by the CRD may offer some guidance as to problem areas, once data is fully available. Concurrent invasive fish species control should be considered, but is beyond the scope of this study.

3.4 Geotechnical & Storage Barn Assessment

3.4.1 Geotechnical

Panama Flats is assumed to have a soil profile of highly organic peat over soft clays, as verified by boreholes drilled for previous projects in the surrounding neighbourhood; however, to the geotechnical consultant's knowledge, there have been minimal subsurface investigations due to the Flats' soft ground

which is generally considered not suitable for development. The presence of fine-grained soils at depth would generally provide seismic amplification but the likelihood of slope failure due to an earthquake is minimal on this site. It is understood that fill materials have been brought onto the site over the years, including for the construction of berms in 2010. Soil tests for an Agricultural Capability Assessment were taken as part of this study; see Section 3.6 Food Security / Agriculture, for soil test results and information on hydrology as it relates to agricultural activity.

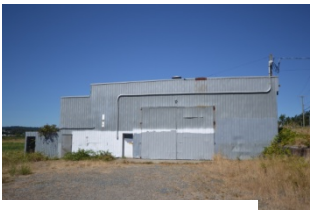


Erosion Control
near Storage Barn,
December 2012

Geotechnical Outlook: The site is generally not conducive to development without significant civil and geotechnical engineering input, except perhaps in the northwest corner and along Carey Road where shallow bedrock and competent soils are available. The highly organic soils within the site are prone to consolidation under additional loads, which would include any fill materials placed on the site to raise grades. Any development proposed within the low-lying portion of the site should be reviewed by a geotechnical engineer and would likely involve a subsurface investigation. Any significant changes to the water level within the site may lead to consolidation settlement of areas within and adjacent to the site. The current berms in the Flats are likely causing consolidation that may be detrimental by causing settlement of parts of the bog and prevention of water flow across the site to the Colquitz River.

3.4.2 Storage Barn

There is currently one structure built within the study site: it comprises a 6000 ft² storage barn and a 1000 ft² mechanical air distribution lean-to. It was built in the early 1980's by the Vantreight family for the sole purpose of storing their harvested potato crop.



Storage Barn,
South Side

The storage barn is in serviceable condition. It includes a wood truss framed roof (likely but not visible), with plywood or shiplap sheathing. Visible signs of water damage in the plywood ceiling indicate leaks in the roof membrane. The membrane (not visible) is likely a granular faced asphaltic membrane material applied directly to the roof sheathing or to a layer of fibreboard and mechanically fastened to the sheathing. Downspouts drain directly to the ground. Exterior walls are constructed with 2x10 wood stud framing on either subsurface foundation walls or on above grade concrete retaining walls in good condition, as in the case of the east wall. Exterior walls have galvanized metal siding over what the architectural consultant assumes to be plywood sheathing and building paper. Interior stud walls are faced with plywood and are in good condition although water damage is evident in a number of locations. There is some evidence of rodent activity in wall cavities with insulation pulled out and piled around holes in the plywood. The floor is concrete slab and in good condition with no evidence of cracking.



Mechanical Air
Distribution Lean-to

A concrete retaining wall extends +/- 54 ft from the south face of the barn to create a flat service yard immediately outside the service doors. The service doors and an adjacent man door, provide the only access to the building. There are no windows or skylights.

The foundation of this building is believed, by the geotechnical consultant, to be on the hard, brown, desiccated crust of the Victoria Clay layer that is expected to be at depth within the Panama Flats site. A visual review of the building foundation did not show any foundation distress.

The lean-to runs the full length of the barn's west side and acts as a mechanical cold air distribution duct supplying cold air from a chiller in a compound adjacent to the southwest corner of the storage barn, to the barn, via 15 low openings in the wall that separates the lean-to from the barn. Air is exhausted from the storage barn at its north end by a fan and louver system. The lean-to would not be considered as habitable in any building repurposing unless the exterior wall was removed and replaced with a vertical assembly.

The barn is served by a 2" water line from Carey Rd. The line terminates in the south wall of the barn, adjacent the man door, at an interior hose bib. There are no washrooms or other plumbing in the building. There is a 4" water connection from Roy Rd to the northern site perimeter; this was used for irrigation. Electricity is supplied to the building via an overhead line from 3 pole mounted transformers on Carey Rd. There is an electrical alcove in the southwest corner of the storage barn with electrical panels for the irrigation system, interior lights, fan and chiller.

Storage Barn Outlook: The storage barn appears to be in fair to good condition, however, the condition of non-visible construction (wood roof truss and wood stud framing, roof deck and membrane, building paper, water vapour, insulation, building paper) is unknown, and the chiller appears to be in advanced state of disrepair.

The building is of combustible construction and does not comply with current Building Code requirements for load bearing wall fire ratings. As older buildings are not required to upgrade to conform to new Codes unless major renovation work is being undertaken or they are being repurposed to suit a change in occupancy, Saanich would not be required to upgrade the facility if it were to remain a cold storage building. Repurposing the building will trigger Building Code upgrade requirements; it is difficult to anticipate the extent of the requirements without an indication of the new use and program. If the building is used for agricultural storage space, the sale of produce or other retail goods, and for community gathering, it is possible that upgrades could be completed within the existing structure. No matter what occupancy, however, washrooms will be required. A mixed occupancy will also trigger the need for a fire sprinkler system.

3.5 Recreational Activities

Feedback from the Panama Flats Concept Plan Open House held in October 2013, and from a web and paper based survey prepared and managed by Saanich Parks from the end of October through mid November 2013, indicate the most common reasons to visit Panama Flats are to walk the trails and enjoy nature (+/- 65% each). According to the survey this is followed by bird watching (43%) and dog walking (34%). Although recreational and commuter cycling do not seem to be as popular (19% and 13% respectively), cyclists were seen within the study area during most of the site reviews undertaken by the consultants for this project.



The primary recreational facility in the study area is the Colquitz River Trail/Linear Park, a 4 metre wide compacted gravel path that runs along the east side of the Colquitz River, and connects Panama Hill Park in the north end of the study area with Hyacinth Park, located just beyond the south end of the study area. The Colquitz River Trail is separated from the low lying Flats (floodplain) by a berm built in 2010, and is often flooded when the river overflows her banks. In the south portion of the study area, south of the

stormwater pond, the trail is located approximately 4-6m from the Colquitz River's high water mark, almost certainly within the Streamside Protection and Enhancement Area (SPEA) which is regulated under the Riparian Areas Regulation (RAR).



Skating, December 11, 2013. Photo courtesy of Times Colonist

The trail is defined as a 'community' trail by Saanich Parks, is marked as a Municipal Bikeway in the CRD Regional Pedestrian and Cycling Master Plan (PCMP) 2011, and is identified as a Bike Facility in the Carey Local Area Plan. It is well used by cyclists, pedestrians and dog-walkers, but has some limitations as a multi-use trail. The section from west Roy Road to the connection to Interurban Road at Peers Creek has a considerable elevation climb; the gravel surface is not ideal for wheelchairs, mobility scooters, children's strollers, or in-line skaters; the undivided and relatively narrow width puts cyclists in conflict with pedestrians.

Other recreational facilities include rustic trails, managed by Saanich, within Panama Hill Park, one bench along the Colquitz River trail in Panama Hill Park, and trail markers at the north and south ends of the Colquitz River trail within the study area (see Map 5).



Bench on Colquitz River Trail

As indicated in the survey results, bird watching is an important recreational activity on Panama Flats. The Flats are, in fact, a destination site for birding enthusiasts, especially during winter and shoulder months when birds are migrating. Unfortunately, due to a lack of vegetative buffer between bird habitat and park trails, including unofficial trails, there has been some bird decline in recent years. Dog and human access to the flooded fields can be especially detrimental to birds stopping over on migration and attempting to feed - they are on a tight energy budget, and lose feeding time and expend energy each time they are flushed out. See Section 3.3.3 Birds for additional information.



Temporary Bike Jump

Additional recreational activities within the study area include picnicking, playing in Panama Hill Park, skating on the Flats when winter temperatures are cold enough, jogging, walking and blackberry picking. Paths along the top of the berms are not formally developed trails, and are discontinuous in winter months. Nevertheless they are used by pedestrians throughout the year. Small temporary bike jumps are occasionally set up in the bush at the south end of the site (south of the watercourse), and have also been seen adjacent the berm on the east side of the site.

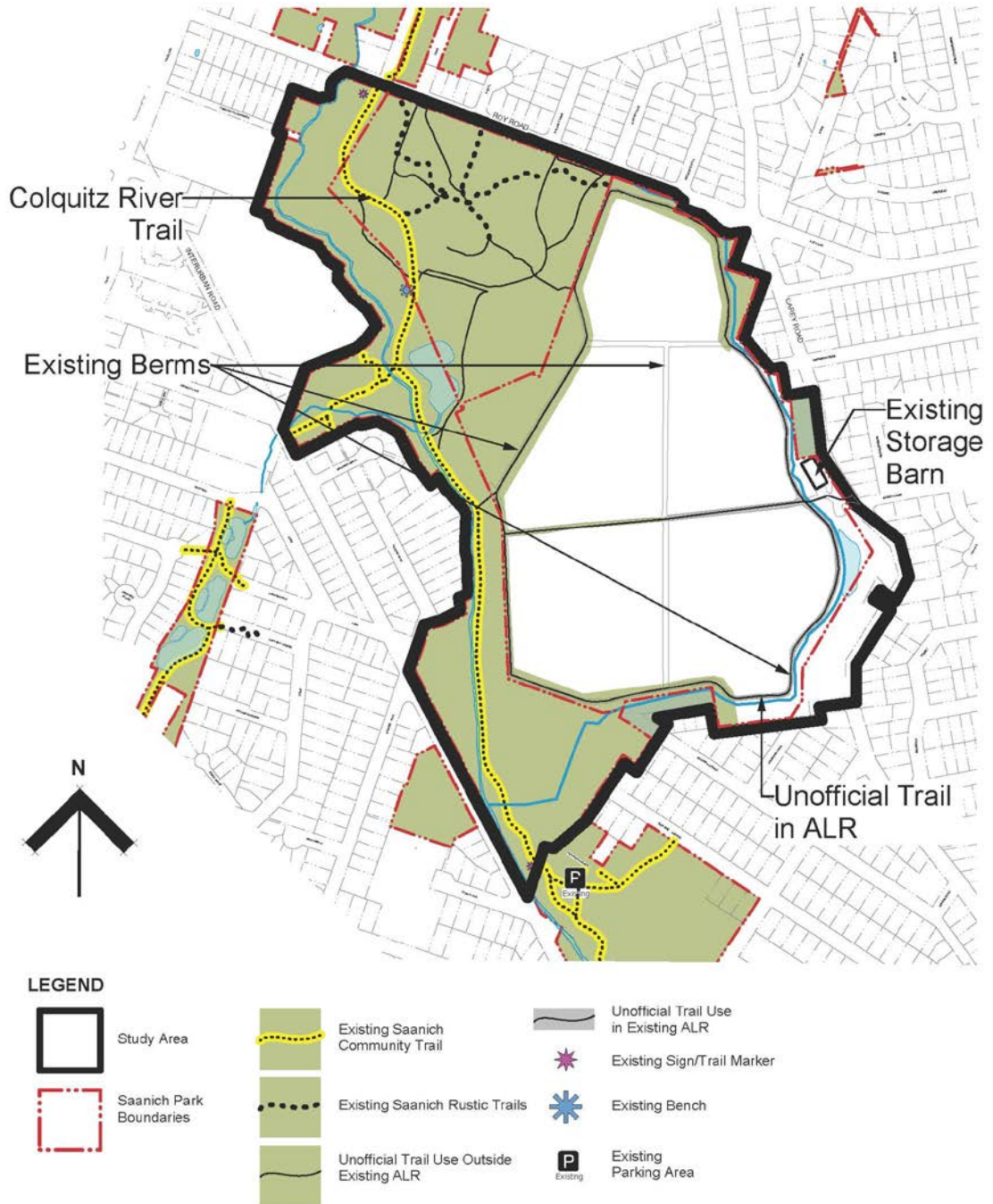


Unofficial Trails on Perimeter Berm

Recreational Outlook: There is both potential and demand for increased recreational opportunities in the study area. However, because of competing interests, what might be preferred by one user group may be problematic for another. Recreational improvements cannot impact flood plain capacity, and must be balanced with environmental protection/restoration and expanded food security, especially as it relates to expansion of the Agricultural Land Reserve.

Benches, picnic tables and way finding /nature information signs will increase socialization opportunities, enhance park user experience, and support education about sensitive areas and significant site features. An expanded trail network will both increase mobility opportunities, and control access within the site. Separating slow pedestrian traffic from higher speed commuter traffic, and providing universal accessibility to the various unique areas within the site, may be challenging.

Fencing between paths and flooded fields may be necessary to keep off-leash dogs from running into the water and flushing out birds; fencing may also be an Agriculture Land Commission requirement (see Section 3.6. Food Security/ Agriculture).



Map 5: Existing Recreational Use

3.6 Food Security / Agriculture

3.6.1 General

As noted in Section 3.3 Ecological Values, there have been agricultural activities in the study area for over a century. There is evidence that there was once a farmstead along Carey Road and several farmsteads in the northwest portion of the site; more recently, from 1978 to 2008, Panama Flats was farmed as a single large property. Flooding and drainage have historically limited agricultural production. As early as 1923 John Edge recorded that cultivation could not happen before late spring or early summer due to flooding and poor drainage (Saanich archives), and in personal correspondence at the end of 2013 with the agricultural consultant (Cobble Hill Organics), Ray and Ron Galey indicated that low permeability and excess water (i.e. poor drainage) were the most limiting agricultural factors when they farmed the land.

In 1978 Vantreight Farms improved drainage with the installation of drainage tile and construction of a centrally located 1.2m deep ditch. A sump pump located in the south-east corner of the property was used to pump winter flood water, starting in March, downstream to facilitate spring planting; without pumping the property could not be cultivated until May or June, limiting crop choices to forage crops (pasture, hay, silage) or lower yields of short season annual crops. Harvesting had to be completed before the fields were saturated and/or the Colquitz River overflowed its banks in the fall. Many long time residents of the area can recall seeing produce floating downstream when the harvest was not completed prior to the onset of fall rains.

The drain tile was removed, the central drainage ditch filled and pumping stopped, when Island Berry Company purchased Panama Flats in 2008. In addition to the drainage issues that resurfaced as a result of this, berms built by Island Berry in 2010, and subsequently opened up but not removed by Saanich after purchasing the Flats in 2011, restrict surface flow across the Flats and slow down what little drainage from grade there is; a pinch point in the perimeter drainage ditch at the south-west corner of the site further contributes to poor drainage by restricting flow from the Flats into the Colquitz.

The easterly 8.5 ha of Panama Flats adjacent to Carey Road was designated as part of the Agricultural Land Reserve (ALR) by the Province in July, 1994. In correspondence with the consultants at the end of 2013, Geoff Vantreight and Ron Galey identified the south east quadrant of the ALR as having the best soil and agricultural viability in the Flats. This aligns with the July 2013 Agricultural Capability Assessment, which was undertaken by agrologist Nicole Muchowski to verify agricultural capability.

3.6.2 Agricultural Capability Assessment

Agricultural Capability Unit ratings (ACUs) are derived from a combination of Class and Subclass ratings. Class ratings range from 1-7 with Class #1 having no or only slight limitations that restrict its use for the production of common agricultural crops, and Class #7 having zero capability for arable agriculture or sustained natural grazing. Subclass ratings describe soil attributes such as moisture deficient, excessively wet, saline, stony, etc. The Panama Flats Agricultural Capability Assessment 2013 report describes most (50%) of the Flats as ACU #1 and 25% of the Flats as ACU #2. The remaining 25% is described as not farmable and consisting of berms, houses, buildings, perimeter watercourse, and the area east of the east watercourse.⁸

⁸ *Agricultural Capability Assessment for Panama Flats*, October 18, 2013. Prepared by Nicole Muchowski.

ACU #1 areas on Panama Flats have 3DW soil ratings (Class rating #3 and Subclass DW), which means the soils have limitations that require moderately intensive management practices and that moderately restrict the range of crops that can be successfully grown on them. The Subclass 'DW' reflects low perviousness and excess water. The 3DW soils are potentially improvable to 2DW soils through conventional drainage practices such as ditching, tiling, pumping or some combination of water control measures, as well as deep tilling or occasional subsoiling to improve water infiltration through the low permeability subsurface layer that occurs more or less uniformly across the property. Associated costs can range from a moderate expense for basic drainage tile installation (\$50,000 - \$70,000), to hundreds of thousands of dollars (e.g., \$600,000 for cleaning and upgrading of drainage channels plus installation of large pumps for a 20ha site; BC Ministry of Agriculture, Food and Fisheries, 2002).⁹

ACU #2 areas on the Flats have 4DW soil ratings, which means the soils have limitations that require special management practices and that severely restrict the range of crops. These areas have exacerbated drainage issues due to recent berm placement, however, if drainage was improved through extensive soil drainage infrastructure (drain tile, ditching, pumping, or combination), the land might improve to Class 3DW or even 2DW. This improvement would be more costly to achieve than improving the ACU #1 areas.¹⁰

With no changes to the current soil conditions, Panama Flats will retain surface water well into the growing season and, as a result, may be only suited to the production of forage grasses, cereals or improved pasture. There are a limited number of crops that can be planted on Class 3DW soils and even fewer that will be successful on 4DW soils. It is the consulting agrologist's opinion that if improvements to drainage are implemented, the vast majority of the property will likely be suitable for high value crops or specialty produce such as field vegetables, root crops, some berries, herbs, bulbs or seeds. This opinion was supported by Rob Kline, Regional Agrologist for CRD and Southern Gulf Islands, Sustainable Agriculture Management Branch, Ministry of Agriculture (personal corresp with LADR (Bev Windjack) February 2014).



Mowing September 21, 2013

The Agricultural Capability Assessment concludes that: *'all of Panama Flats is suitable for agriculture. That is, no distinction between the agricultural capability of the 8.5ha of the ALR and the non-ALR lands was identified, and the unimproved (Class 3 and Class 4) and improved (Class 2) land capability ratings can be applied equally across all of the Panama Flats property.'*¹¹

See Map 6 for ACUs on Panama Flats. Soil ratings in brackets represent potentially improved soil rating if drainage is addressed.

⁹ Ibid

¹⁰ Ibid

¹¹ Ibid



Map Base Source: District of Saanich GIS Map Service, available online at:
http://www.saanich.ca/gis/2/1/m1.jsp?site=-saanich_axd

- Subject Property
- Agricultural Land Reserve

Map 6: Agriculture Capability Units (ACU) from Panama Flats Agricultural Capability Assessment 2013

3.6.3 Agricultural Land Reserve

Currently, 8.5ha of land within Panama Flats is designated as Agricultural Land Reserve (ALR). While any land can be farmed or used for agricultural activity, activities on land that is designated as ALR is subject to the Agricultural Land Commission Act (ALCA). The Act was established in 1973 to preserve agricultural land for present and future generations and to encourage the establishment and maintenance of farms as a secure source of food.¹² The Provincial Agricultural Land Commission (ALC) administers the ALCA.

The ALC encourages the widest possible range of agricultural activities within the ALR, and regulates non-farm uses. Specific Commission approval must be received prior to engaging in non agricultural activities including, but not limited to, the following: inclusion, exclusion, subdivision, or other use of land in the ALR for non-farm purposes; placement or removal of fill or soil for either farm or non-farm use; inclusion of transportation, recreational trails or utility corridors in the ALR for (BC Reg. 171/2002, Section 6).

Several non-traditional agricultural activities that benefit the farming community are supported by the Commission and considered farm use under the ALCA. Those that are potentially relevant to the study area include:¹³

- *Farm product processing* (ALC Policy #1, March 2003), *storage, packing, product preparation or processing of farm products, if at least 50% of the farm product being stored, packed, prepared or processed is produced on the farm or is feed required for farm production purposes on the farm.*
- *Farm retail sales* (ALC Policy #2, March 2003), *if the farm product offered for sale is produced on the farm on which the retail sales are taking place,*
OR
if at least 50% of the retail sales area is limited to sale of farm products produced on the farm on which the retail sales are taking place and the total area, both indoors and outdoors, used for the retail sales of all products does not exceed 300m².
- *Agri--tourism* (ALC Policy #4, March 2003), *e.g. agricultural heritage exhibit; farm tours; farm demonstrations; picnicking; farm related educational activities including cooking classes using farm products; catered food and beverage service special events where farm products from the farm are promoted, but not a service requiring the use of a permanent commercial kitchen; corn mazes; fishing (stocked pond); bird and wildlife refuges and rescue services, (et al.)*
- *Dikes for Flood Control and Irrigation* (ALC Policy #17, June 2003), *construction and maintenance, for the purpose of drainage or irrigation or to combat the threat of flooding, of dikes and related pumphouses, and ancillary works including access roads and facilities.*

The Commission recognizes that there can be complex relationships between agricultural activities and sensitive ecosystems, and encourages the use of Conservation Covenants to provide balance between agricultural and environmental values. The four page *Guidelines for Conservation Covenants*

¹² www.alc.gov.bc.ca/FAQ/FAQ_ALR.htm#3

¹³ www.alc.gov.bc.ca/legislation/policies

in the ALR provides detailed information on how to apply to the Commission for Conservation Covenant approval. It can be downloaded at: www.alc.gov.bc.ca/legislation/legislation_main.htm#pol.

The ALC regularly responds to conflicts between agricultural and non-agricultural land use; '*trespass and vandalism to farm crops and equipment, complaints about early morning farm vehicle noise, the drifting of dust and sprays from field operations and smells from the application of manures and composts, are only some of the more commonly expressed concerns*'.¹⁴ As a result, the Commission and the Ministry of Agriculture have developed guidelines to address the interface between agricultural and non agricultural land use. The 1993 ALC document *Landscape Buffer Specifications* provides a gradation of buffer recommendations, from minimal vegetative screens to comprehensive buffers with berms, fencing and planting, as well as planting and fence schedules – all to be installed on the non-farm property. The Ministry's June 2009 (working copy) document, *Guide to Edge Planning*, includes urban-side edge planning tools specifically intended for residential / agricultural land use interfaces.

In discussion between the consultants and ALC staff regarding the potential expansion of the ALR within Panama Flats, ALC staff offered the following:¹⁵

- It is unlikely that changes would be required in situations where minimum distances between ALR boundaries and adjacent residential land use don't meet ALC separation recommendations
- a 15m separation between the current and proposed ALR boundary and the rest of Panama Flats, as recommended on page 23 of the *Guide to Edge Planning*, may be appropriate for this site
- The ALC *Landscape Buffer Specifications* and *Guide to Edge Planning* offer edge condition/buffer recommendations; applicants are encouraged to follow the recommendations and/or to develop and submit alternate proposals that are customized to individual areas.
- The watercourse on the east and south side of Panama Flats should not be considered as an ALR edge buffer as it is relatively narrow and provides no visual screening. A year round watercourse can be a good barrier but only if it is wide enough to reasonably prevent someone from throwing bottles, rocks or other debris across the watercourse and onto farmland.
- Leaving all or part of Panama Flats open to access for recreational activity during the winter months may require an application for non-farm use. The concern is that opening the area to public access may in some way preclude or dissuade agriculture (litter, contamination, biosecurity, people believing the area is open access during farming times as well, etc.). Recreational access onto agricultural land also contributes to spread of noxious weeds by seeds attaching to and dropping off clothing.
- If an application to include additional Panama Flats lands in the ALR, it may be helpful to include different buffer proposals and their justification. Application of the ALC guidelines (setbacks, buffers, fences, etc.) will depend upon the specific circumstances. When the

¹⁴ *ALC Landscape Buffer Specifications*, 1993

¹⁵ Corresp between LADR (Bev Windjack) and ALC (Elizabeth Sutton & Gordon Bednard), January 21, 2014; corresp between LADR (Windjack). ALC (Tony Pellett, Sutton, Bednard) and Rob Kline (Regional Agrologist), Dec 20, 2013; conference call between LADR (Windjack & Julie Lommerse), Saanich Parks & Planning staff (Rae Roer, Gary Darrah & Jarret Matanowitsch), and ALC staff (Sutton, Pellett), October 17, 2014



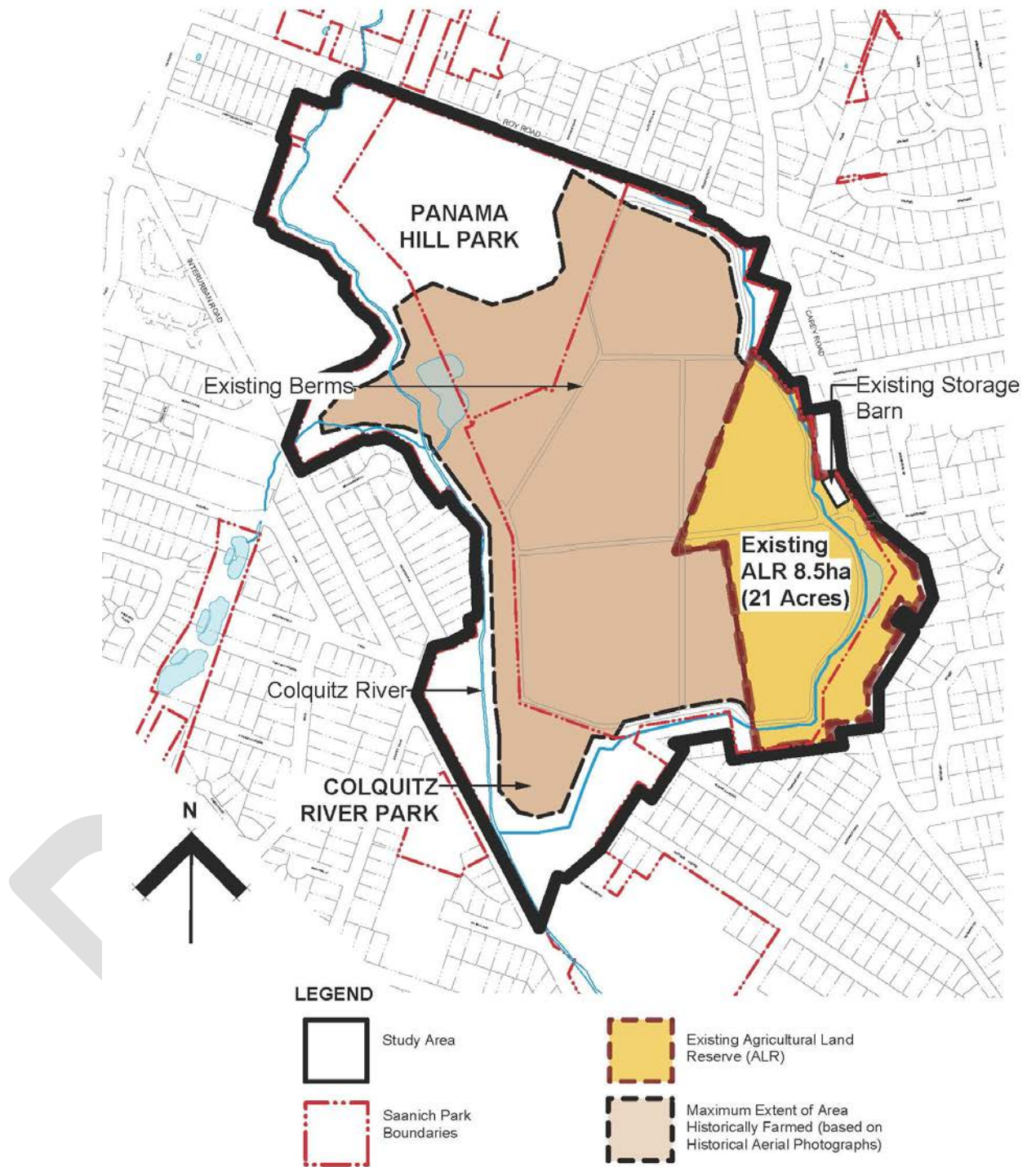
Scentless Chamomile
August, 2012

Commission has reviews the application, they may have some suggestions or alteration requirements with respect to buffers, etc., They may also want to conduct a site inspection to see how the implementation plays out on the ground

- The extent of separation buffer requirements will be impacted by the type of agriculture proposed.
- Scentless Chamomile is found throughout Panama Flats. It is listed as a noxious weed in the Weed Control Regulation under the *Weed Control Act*. Section 2 of the *Weed Control Act* states, “An occupier must control noxious weeds growing or located on land and premises, and on any other property located on land and premises, occupied by that person.” In this case the current occupier is the District of Saanich. To achieve real agriculture at Panama Flats, it will be essential to control all noxious weeds throughout the area to be farmed and on lands from which any noxious weed can spread into the Panama Flats.
- If Vancouver Island Beggar Tick habitat must be protected, ensure that the protection area is tightly confined with no opportunities for persons or animals to trespass within the beggar tick protection area; otherwise the beggar tick will continue to spread to the rest of Panama Flats and other Saanich farmland. Although the beggar tick is not listed in the Weed Control Regulation under the *Weed Control Act*, all subspecies of it have noxious characteristics and should be treated with great caution.
- Migratory birds and deer may conflict with farm use.
- Drainage will be required. A managed permanently wet field that supports agricultural activity by improving drainage may be acceptable. Habitat protection within ALR lands is also potentially acceptable.
- Removing or adding soil to improve agricultural viability is generally allowed by the Commission but requires approval.
- Where trails are allowed, they will need to be buffered from agricultural activity. The use of both vegetation and fencing may be required. It is essential that dogs are prevented from entering the farm land.

The ALC points out that, *‘whether or not a given parcel of land is put into agricultural production may have little to do with agricultural capability or suitability of the land base. External factors such as business costs associated with implementing and sustaining a given agricultural system, the closeness of the farm to transportation links, as well as the vagaries of the marketplace to which one sells and earns a profit also influence agricultural production. In general, however, good agricultural land facilitates the management activities for a wider range of products, while poorer agricultural land does not.’*¹⁶

¹⁶ www.alc.gov.bc.ca/alr/What_is_Ag_Land.htm



Map 7: Agricultural History

3.6.4 Hydrology

The Colquitz River and the water channel that flows along the east and south sides of Panama Flats are regulated by the BC *Water Act, Section 9*. The *Water Act* requires that Approval be obtained for “any modification to the nature of the stream including the land, vegetation, natural environment or flow of water within the stream, or any activity or construction within the stream channel that has or may have an impact on a stream.”¹⁷ This has several implications for Colquitz River restoration and drainage of Panama Flats:



Watercourse on East Side of Panama Flats, December, 2012



Flooded Fields & Central Berm, December, 2012



Abandoned Pump

- Pumping water directly into the perimeter channel (watercourse) from Panama Flats requires a water permit. After preliminary review of the site, Ministry of Forests Lands and Natural Resources staff Brian Epps, Water Resource Specialist and Neil Goeller, Regional Hydrologist, advised a permit application would not likely be approved.
- Prior to conducting any drainage improvements on Panama Flats, a formal proposal must be submitted to the Ministry of Forests Lands and Natural Resources for review and approval. The approval decision will be based on both stormwater and habitat values, and on potential impacts to groundwater. The application should include the results of a hydrological study.
- All work, including restoration and other improvements, in and about Colquitz Creek and the perimeter water channel requires a Section 9, Water Act Approval.

Additional information from Epps and Goeller :¹⁸

- It is likely that the berms on Panama Flats could be removed or opened up without a permit to reinstate the site to conditions prior to 2008, but reinstating the drainage ditch will require a permit. (Epps and Goeller do not feel the berms have to necessarily be removed.)
- A provision for pumping excess surface water will be necessary if the Flats are to drain sufficiently to support agricultural activity. As obtaining Ministry approval to pump surface water into the watercourse is unlikely, it will need to be pumped onto a field or into a settling pond in advance of the watercourse.
- Drainage from the Flats cannot lead to a net increase in Colquitz River downstream water volumes
- Irrigation ponds, stop logs and sumps require water licenses
- Relocating the Colquitz channel will be a high maintenance effort and may not be beneficial. A hydrological study is required to determine what shape the Colquitz should have for best performance; there have been instances where meanders introduced to watercourses have had little to no impact.
- While there has been no summer flooding in the Flats, with climate change extreme and out-of-season storms are becoming more frequent, and stormwater management opportunities should be available year round.
- With respect to permitting, the Ministry would prefer, and may request, a relationship with the landowner (i.e. Saanich) rather than with a tenant

3.6.5 Agricultural Program

There are several farming models that may have application on a portion or all of Panama Flats. These include:

¹⁷ www.env.gov.bc.ca/wsd/water_rights/license_application/section9/

¹⁸ Site meeting with Ministry of Forests Lands and Natural Resources staff (Brian Epps and Dave Skarbo), June 10, 2013; Site meeting with MFLNR staff (B. Epps and Neil Goeller) October 25, 2013

- SPIN farms (small plot intensive vegetable farming; possibly with farmgate sales)
- Incubator farms (land-based multi grower program that provides training and technical assistance to aspiring and beginning farmers)¹⁹
- Community gardens (allotment gardens, community shared gardens, community orchards, demonstration gardens)²⁰
- Farm cooperative
- Single property farm (single farmer)
- Agricultural Park (combination of a working farm and a municipal park that is located at the urban edge). Ag Parks are designed for multiple uses that accommodate small farms, public areas and natural habitat. They may include all or any of the farm models noted above, and may also be used to support research; farm school and technical training; garden-type job training; watershed management; wildlife habitat.²¹

Should agricultural activity be returned to Panama Flats, the agricultural program will need to balance floodplain management and recreational and environmental values, with agricultural values. The program will need to be sensitive to District resources and meet specific conditions of the Water Act. Activity within and on the edge of the ALR will require ALC approval.

4.0 Concept Plan

4.1 General

The proposed Concept Plan addresses future land use within Panama Hill Park, the lands known as Panama Flats, and the portion of Colquitz River Park immediately adjacent the Flats. It maintains floodplain function, places high value on environmental preservation and enhancement, proposes new trails and recreation opportunities, and maximises opportunities for ALR expansion within Panama Flats. The plan is intended to provide direction for the District as they implement key elements of the concept over several years, and to ensure that short term management of the study area is complimentary to long term objectives. See Map 8 Concept Plan.

4.2 Floodplain Management

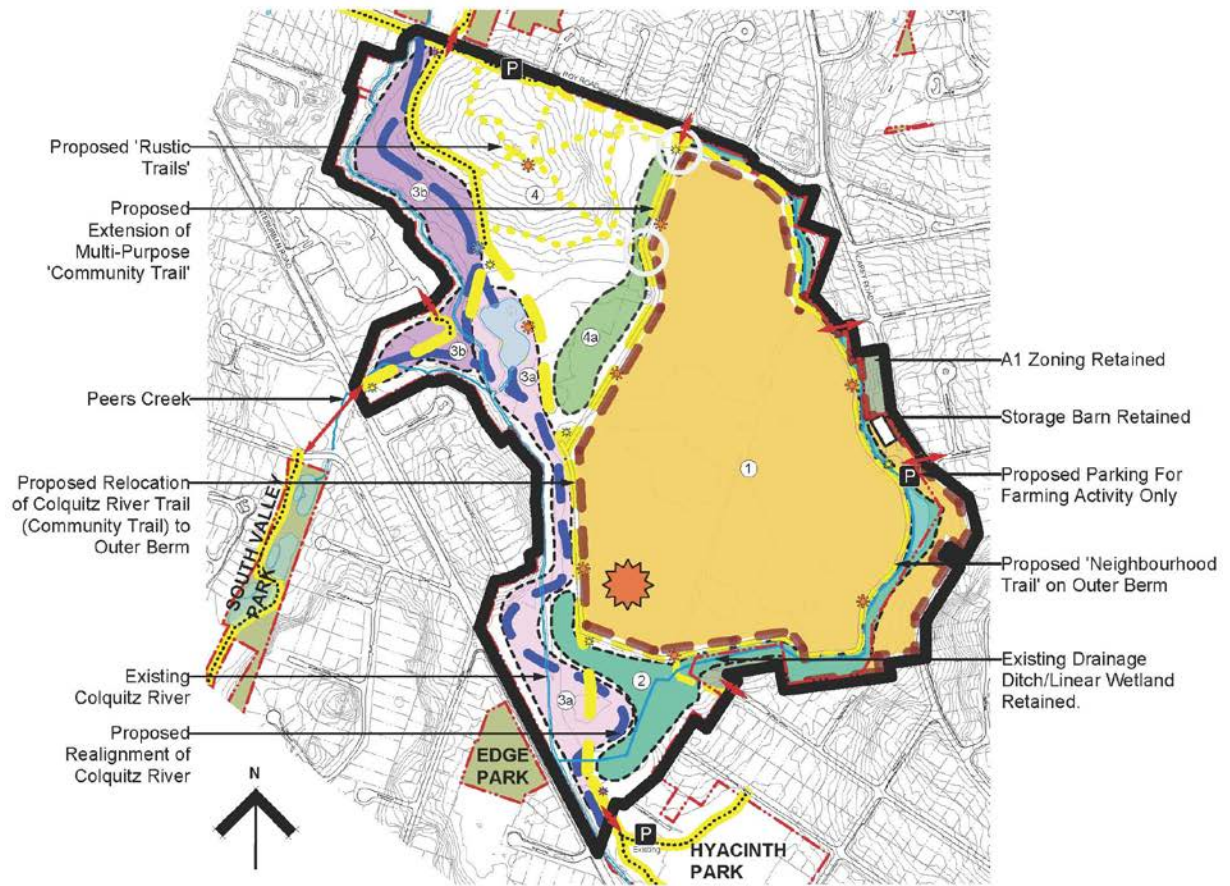
Flood water storage capacity will be maintained. No significant earthworks are proposed, however, minor surface regrading to support agricultural activity and surface drainage, will be required if farming opportunities are to be optimized. A hydrological study and a detailed topographic survey will be required prior to preparation of a drainage plan (required for agricultural activity); the influence of the berms on drainage and overall floodplain function will be determined at that time. The 21 stormwater outlets into the study area will be retained; 20 stormwater outlets will continue to discharge directly into the floodplain: 11 into the perimeter fish bearing watercourse and linear wetland, and 9 into the Colquitz River. One outlet will continue to discharge into the east edge of Panama Hill Park, immediately north of the floodplain. See Map 2, Floodplain.

The Concept Plan includes improved Colquitz River function, a managed drainage field and a recovering wetland. These elements will positively impact floodplain function, particularly drainage, without reducing flood water storage capacity. They are discussed under Section 4.3 Food Security / Agriculture and Section 4.4 Ecological Enhancements.

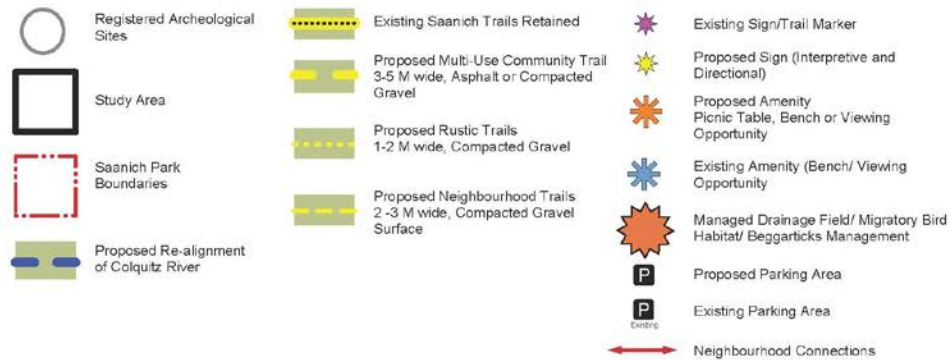
¹⁹ *Incubator Farms Introductory Guide*, CR –FAIR, December, 2013

²⁰ *Dig It*, SFU Centre for Sustainable Development, 2009

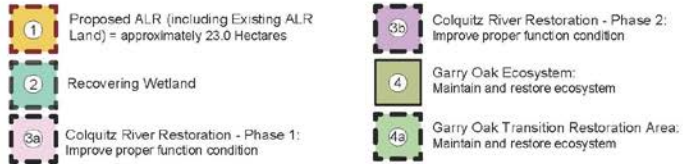
²¹ *Agriculture Parks*, CR-FAIR, January, 2013



LEGEND



KEY



Map 8: Concept Plan

4.3 Food Security /Agriculture

The Agricultural Land Reserve (ALR) is potentially expanded to 23ha. ALR designation must be applied for; given the long history of agricultural activity on the site, and the fact that 8.5ha of Panama Flats is already designated ALR, it is unlikely that the application will be denied if conditions of the Agricultural Land Commission (ALC) are met. See Map 8 Proposed Agricultural Use.

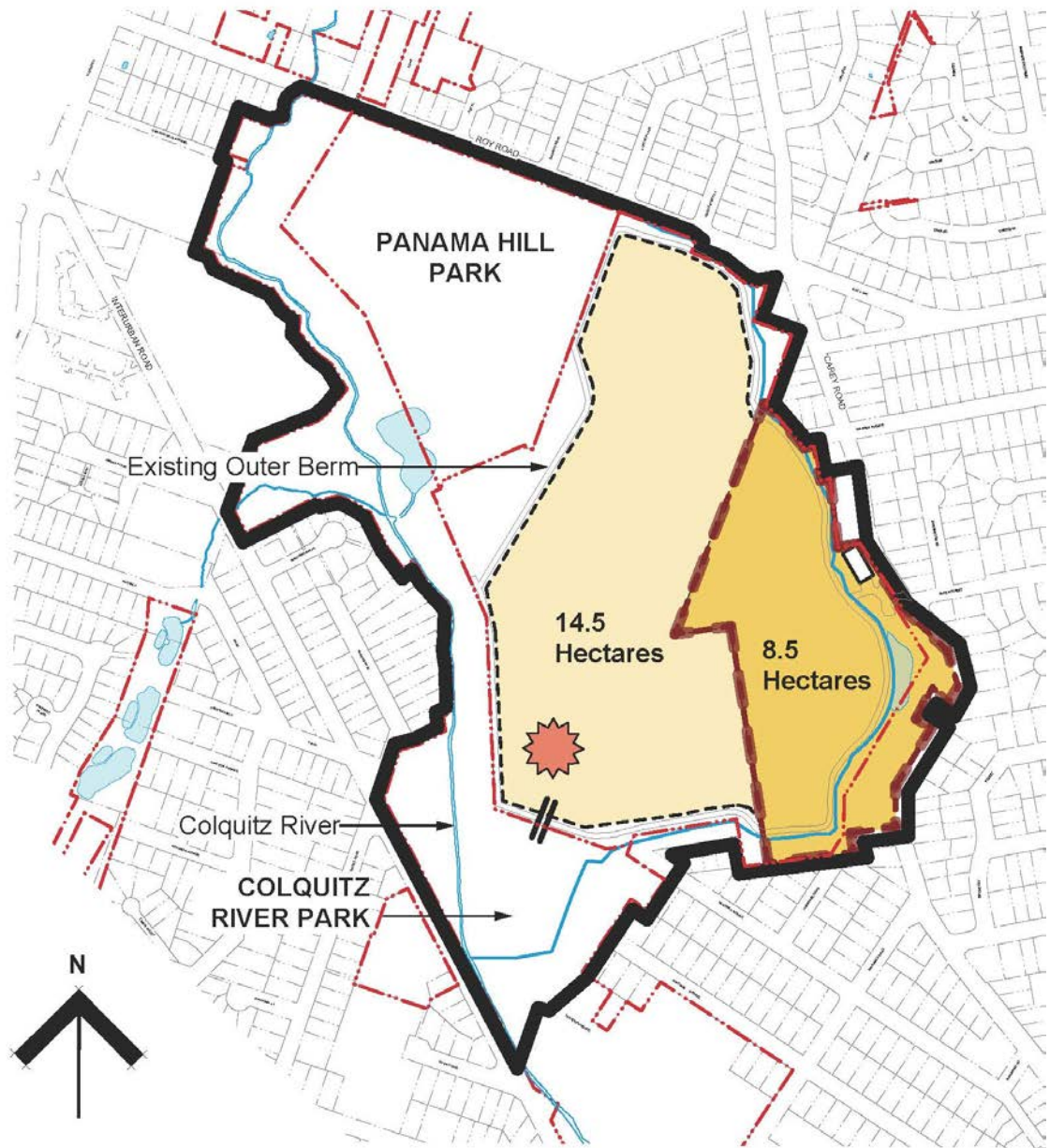
Information about the ALR, the Commission's role, and conditions of application are discussed in Section 6.6.3 Agricultural Land Reserve. It is likely that, at a minimum, the application will need to include a drainage strategy and one or more perimeter buffer options including fencing. A 15m separation between the current and proposed ALR boundary and the rest of Panama Flats may be required. It will be essential that dogs are prevented from entering the farm land.

The drainage strategy will require formal approval from the Ministry of Forests, Lands and Natural Resources, and will be subject to conditions of the *BC Water Act, Section 9*. See Section 3.6.4 Hydrology for background information. The approval decision will be based on both stormwater and habitat values, and on potential impacts to groundwater. The application should include the results of a hydrological study. Pumping surface water directly into the perimeter watercourse or Colquitz River will not be allowed.

Given that the single greatest factor limiting agricultural viability on the site is poor drainage, and that surface water cannot be pumped directly into a watercourse, establishment of a managed drainage field is recommended. The proposed drainage field is located in the lowest lying area on the Flats, in the southwest corner. It is an important area for migratory bird and blue-listed Vancouver Island beggartick habitat, and may be wet for the majority of the year, but could be used for farming activity from time to time. If managed as beggartick habitat it must dry out or be drained at some point because beggarticks germinate on bare soil, not in water. The Landscape Concept recommends that water from the managed drainage field be directed to a recovering wetland at the west end of the perimeter watercourse. Drainage from the Flats cannot lead to a net increase in Colquitz River downstream water volumes.

The extent of berm removal in Panama Flats will be determined by the hydrological study and agricultural program. The perimeter berm provides a natural boundary to the farm lands, is currently enjoyed as an unofficial trail and included as part of the upgraded trail system within this Plan, and provides access for agricultural purposes (farm equipment, trucks, etc.). Interior berms also provide access for agricultural purposes and may be useful in dividing the Flats into areas with different farming activities and requirements. If the land were leased to a sole operator it is likely the farmer would require the berms be removed to improve uniform site-wide access and drainage.

The extent of storage barn upgrades and/or repairs will be dependent on the agricultural program. If the building is used for vegetable storage and not repurposed, several repairs are still required. See Section 3.4.2 Storage Barn for background information.



LEGEND



Map 9: Proposed Agricultural Use

4.4 Ecological Enhancements

4.4.1 Improve the Colquitz River Watershed Function

The reach within the project site is classified as Non-functioning, however, there is great potential for the reach to be restored over the long term to a properly functioning channel complete with healthy wetland, riparian area and floodplain. This would support restoration of native ecosystems including fish and bird habitat, and positively address stream bank erosion, seasonal flooding and on-site stormwater management. See Section 3.3 Ecological Values for background information.

- **South Colquitz River.** Improving the function of the south section of the Colquitz in the study area is considered an ecological priority in the Concept Plan. In its current state, this section of the channel is functioning as a ditch with very few attributes of a functional stream. In the short term, the potential for this reach is a Rosgen “C” channel, but with proper restoration it could become a Rosgen “E” channel with wetland.

Improving stream function in this section of the reach includes removing invasive and non-native species throughout the bordering riparian thicket, and ultimately reconfiguring the channel. Much of the current channel is pushed up against the property boundary and opportunities for restoration on the west side are, therefore, limited. Given the large amount of land available, there is great potential for this section of the reach to be fully restored if the channel is reconfigured between the existing stream bed and west perimeter berm (the Concept Plan recommends the west berm be retained and the Colquitz River trail be relocated to the top of it). The new channel should include meanders, wetland and riparian planting, floodplain access, bank terracing, complexity (pools, riffles, runs, large wood), substrate suitable for fish, and off channel refuge from winter flows. A replanting regime should focus on removing invasive species, establishing shade canopy with fast growing deciduous trees and shrubs, and an understory with conifer plantings.

- **North Colquitz River.** Increasing the function of the north section of the Colquitz River in the study area is a long term goal, and would improve the channel’s width/depth ratio, sinuosity and complexity. This could be accomplished by modifying the existing channel (requires channel isolation, fish salvage and diverting flows around the work site), or by creating a new channel as recommended above for the south portion of the reach. Increasing the function of this section of the channel includes bank terracing, invasive species removal, replanting with native riparian vegetation, adding complexity, and providing floodplain access, substrate suitable for fish, and off-channel refuge for winter flows.

4.4.2 Protect Sensitive Ecosystems and Rare Species

There is an extensive, degraded, natural vegetation ecosystem in the study area, much of it in the Garry oak ecosystem spectrum and within Panama Hill Park. The park, part of the Commonwealth Nature Legacy, includes transitional areas between Garry oak uplands and wetlands (an especially rare type of Garry oak ecosystem), and clay soils, and provides a highly suitable habitat for rare plants. While only one rare plant has been recorded, red listed foothill sedge, it is expected that there are several on the site.

Unfortunately, the natural vegetation ecosystem on Panama Hill and throughout the study area is severely hampered by invasive plants. Without intervention, the end result will be a continued invasion of non-native grasses and shrubs in upland areas, and a complex of marsh and wet meadow heavily dominated by non-native grasses elsewhere.

Other sensitive ecosystems in the study area include Vancouver Island beggartick and migratory/over wintering bird habitat, riparian corridors, and the existing stormwater pond. See Section 3.3 Environmental Values, for background information on all sensitive ecosystems, rare species, birds, fish, and water quality; Section 3.3.2 Vegetation, for specific background information on vegetation communities and rare and invasive plants; and Section 3.3.3 Birds and Section 3.5 Recreational Activities for specific information on birds and birdwatching activities in the study area.

- **Garry Oak Ecosystem.** Restoration of the Garry oak ecosystem is considered an important feature in the Concept Plan, and restoration of the transitional Garry oak ecosystem is considered an ecological priority. Restoration work within the transitional Garry oak ecosystem would protect existing rare plants and likely provide important recovery habitat for additional rare plants and animals, Restoration work would include removal of invasive plant species and careful design of new or relocation of existing trails to avoid altering hydrologic regimes of seasonally moisture dependant species, and might include: adding large wood for complexity, re-grading altered slopes and excavations on the east edge of the hill, and planting appropriate native vegetation to accelerate the restoration process.

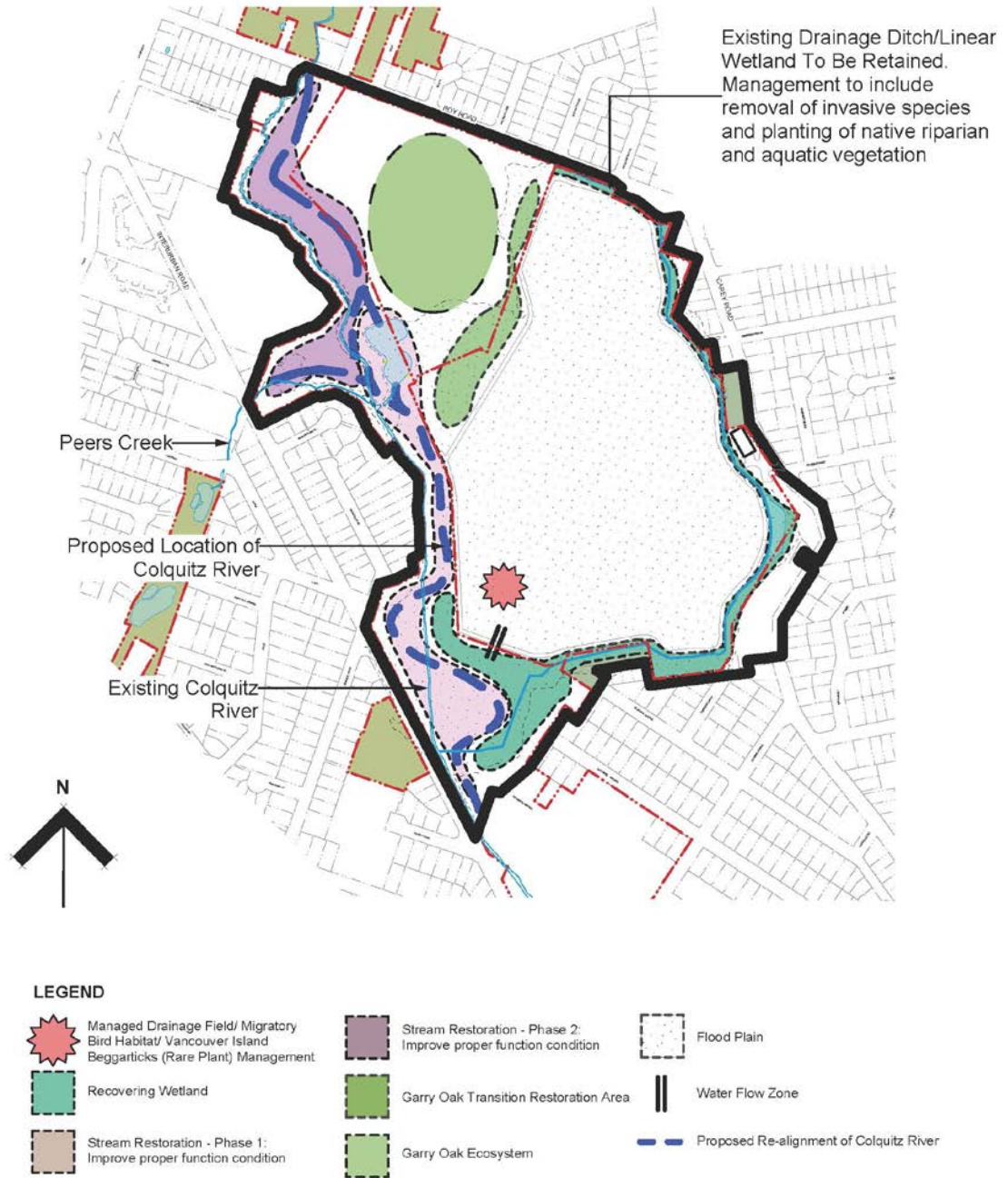
The preparation of any restoration plan will be constrained by lack of knowledge on the remaining native vegetation in both upland and wetland habitats. A systematic plant survey to locate remnant populations of native plants, both common and rare, is needed.

- **Vancouver Island Beggarticks.** A large population of this blue listed plant species exists throughout the agricultural fields in Panama Flats. The ALC has advised that beggarticks are incompatible with agricultural yet, at the same time, its Provincial rating as an endangered species indicates it should not be eradicated. The Concept Plan recommends controlling a population within the managed drainage field.
- **Migratory and Overwintering Bird Habitat.** The flooded fields at Panama Flats provide exceptional habitat for migrating shorebirds, and members of both the Rocky Point Observatory and Natural History Society have expressed concern that improved field drainage, combined with reduction of wetland generally in the Greater Victoria area, will have a negative impact on the migratory and overwintering shorebird population. Protection of migratory shorebird habitat is considered an ecological priority on the Concept Plan. the following is recommended:
 - do not drain the fields throughout Panama Flats until the latter half of March; if they must be drained earlier to support viable agricultural activity, consider leaving sections un-drained until mid March
 - maintain a managed drainage field at the south end of the Flats; periodically mow or plough this field to support open water habitat for birds (prevent eutrophication); this field can also support Vancouver Island beggarticks

- plant a vegetative buffer between bird habitat and trails, incorporating discrete observation points where appropriate; ensure that there are barriers to dogs accessing the ponds, especially the managed drainage field (fences required)
- **Perimeter Watercourse / Linear Wetland.** The perimeter watercourse contributes to the ecological integrity of the site, and with 10 stormwater outlets discharging into it, is especially important in stormwater management. Unfortunately, it has not been maintained in recent years and water flow is impeded by overgrowth of primarily invasive species and sediment buildup. Restoration of the watercourse to a proper functioning ecosystem where aquatic and riparian vegetation, wildlife and invertebrates are in balance is considered an ecological and drainage priority in the Concept Plan. All work, including restoration and other improvements, will require a Section 9 Water Act Approval. Restoration work will include removal of invasive species, especially reed canarygrass, and Himalayan blackberry, and possibly American bullfrogs. Given the extent of reed canarygrass, it may be prudent to begin by planting overhead vegetation which will ultimately kill the reed canarygrass by shading it out. The shading will also improve fish and invertebrate habitat by reducing water warming and adding leaf and insect drop.
- **Recovering Wetland.** An area in the south-west corner of the study area, that includes the rare plants Vancouver Island beggarticks and foothill sedge, is in the process of naturalizing from agricultural field to wetland. to a proper functioning ecosystem where aquatic and riparian vegetation, wildlife and invertebrates are in balance. The Concept Plan recommends that this wetland be enhanced; it will provide an important link in the Panama Flats drainage strategy, improve the connection between the perimeter watercourse and the Colquitz River, contribute to migratory bird habitat, and be an area for river water sediment drop if it is where flood waters are directed to first. Restorative assistance for this area will include implementing restoration activities recommended above for the perimeter watercourse linear wetland. Improving the connection to the Colquitz River will include a change in flow regime from the agricultural fields and might encompass creation of a more sinuous watercourse and/or river channel.
- **Existing Stormwater Pond.** The 2009 *Colquitz River Proper Functioning Condition Assessment* describes the stormwater pond (aka Panama Hill Pond), which is not connected to Colquitz River, as an anoxic pond with overly steep and sparsely vegetated banks; it also notes that although an abundance of algae was observed, it did provide habitat for wildlife.²² While not a high priority in the Concept Plan, pond improvements may have several benefits. Connecting the pond to the Colquitz would provide oxygenation to the pond, reduce its anoxic state and provide a side channel for fish; removing invasive plant species and American bullfrogs, and planting native species would improve the ecological integrity of the pond and support similar activity elsewhere on the site; decreasing the slope of the banks would improve wildlife access and have the bonus of also making the pond safer for pedestrians, especially children; and increasing complexity

²² *Colquitz River Watershed Proper Functioning Condition Assessment 2009*, by Aqua-Tex Scientific Consulting

by adding large woody debris to the pond centre as refuge for wildlife would enhance wildlife habitat.



Map 10: Proposed Ecological Enhancements

4.5 Recreational Use

Panama Hill Park, the Colquitz River Trail/Park and unofficial trails throughout the site provide significant recreational value as evidenced by the project survey results which indicate the most common reasons to visit the study area are to walk the trails and enjoy nature (+/- 65% each). Saanich places high value on the Colquitz River Trail (envisioned in 1967 by the District as one of the first efforts to protect urban streams at a local government level²³), on protecting the natural environment²⁴, and on providing accessibility (barrier free access; accommodating a variety of needs, activities and abilities)²⁵. Trail system improvement to reduce conflict between pedestrians and cyclists, to protect sensitive habitat, and to improve accessibility, is considered a recreational priority in the Concept Plan. See Map 11 Proposed Recreational Use.

Recommendations include:

- upgrade the Colquitz River Trail to comply with the 'community' trail guidelines in *Saanich Parks and Recreation Trail Guidelines 2007*. This includes providing an alternative to the elevation climb at the north end of the site between west Roy Road and the connection to Interurban Road at Peers Creek.
- relocate the Colquitz River Trail ('community' trail) in the south portion of the site to the perimeter berm on the west side of the Flats (the Concept Plan assumes the perimeter berm will be retained as an agricultural buffer and for trail use; if the berm is not retained relocation of the trail should be considered as part of the Colquitz River upgrade)*.
- create a 'rustic' trail network within Panama Hill Park. Review the existing network of 'desire paths' and, where possible, upgrade suitable ones for the new 'official' network. Protect sensitive areas.
- establish a 'neighbourhood' trail on the south and east perimeter berm; this trail will connect, at both ends, to the Colquitz River Trail and is important in creating a trail loop around the site (the Concept Plan assumes the perimeter berm will be retained as an agricultural buffer and for trail use)*
- improve trail connections to the surrounding neighbourhood
- incorporate signage along the trail system to improve awareness about sensitive habitat (wildlife/birds/fish/vegetation), floodplain management, site history and current agricultural activity,. Also provide wayfinding signs.
- provide benches, picnic tables, garbage receptacles, and dog waste bags/depositories, at appropriate locations throughout the site.
- Provide observation points and/or viewing platforms along the trails to support birdwatching/wildlife viewing, nature photography, etc., while protecting sensitive ecosystems and minimizing wildlife/bird disturbance.

* in some instances berms may require widening to build trails to standards set out in *Saanich Parks and Recreation Trail Guidelines 2007*; berm width may also be impacted by ALC buffer requirements

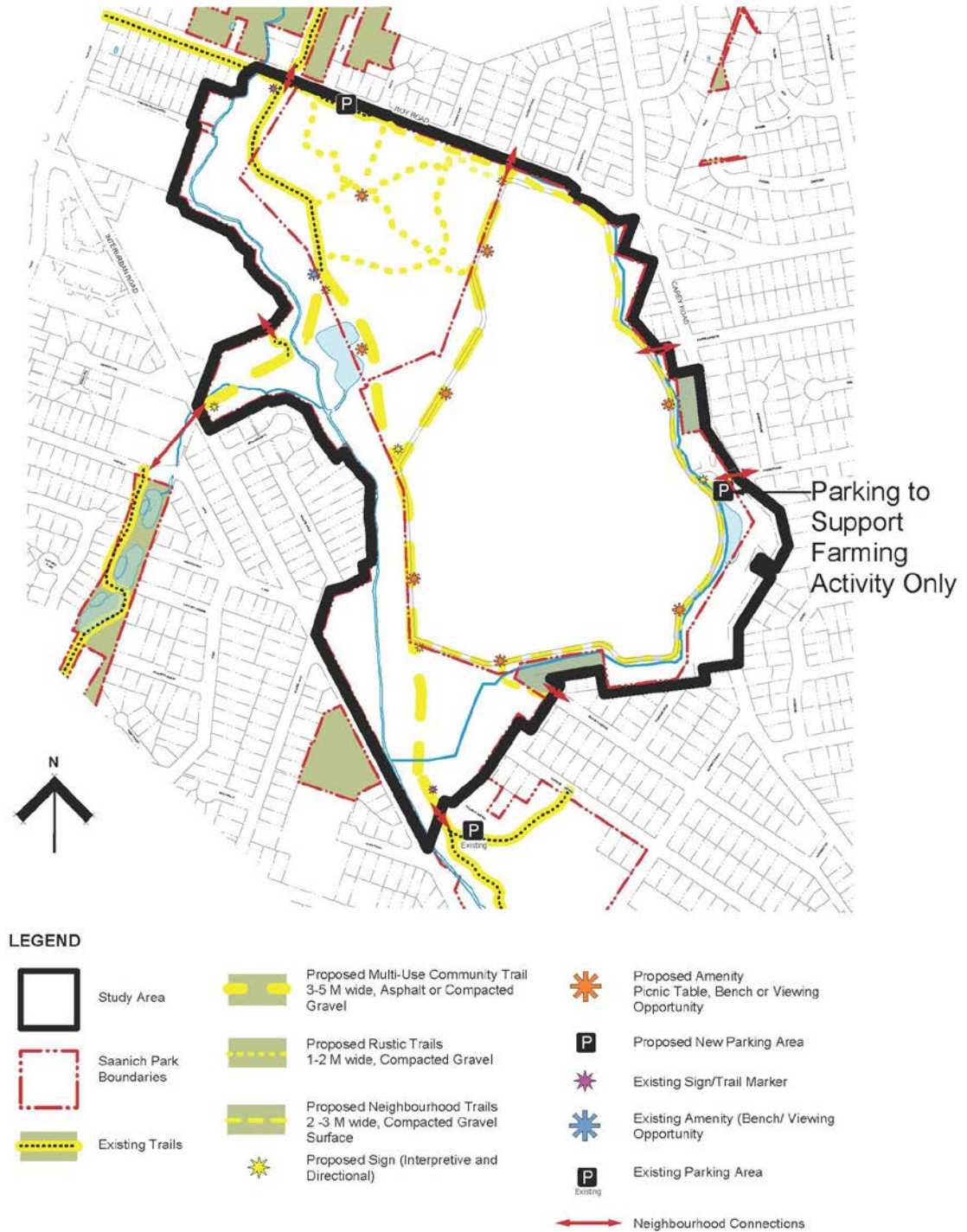
Additional recreational opportunities may be provided through the agricultural program. Community gardens, SPIN programs and related urban agriculture activities, could provide 'hands on' recreation and/or socialization opportunities;

²³ www.saanich.ca/parkrec/parks/trails/pdf/colquitz_river_trail.pdf

²⁴ www.saanich.ca/living/natural/planning/index.htm

²⁵ www.saanich.ca/parkrec/parks/info/pdf/TrailGuidelinesDocumentJune2007.pdf

other types of agricultural activity might create a beautiful environment to go walking or cycling through. An agricultural park might afford a bit of both, or a different experience altogether. It is hoped that in the long term, when the Colquitz River is returned to a proper functioning state, fish will return in sufficient quantities to support recreational fishing in the area.



Map 11: Proposed Recreational Use

5.0 Rough Order of Magnitude Estimate

Prepared by Advicas Group Consultants, February 13, 2014

This Rough Order of Magnitude Estimate sets out the estimate of capital construction cost for the proposed Panama Flats Restoration in the District of Saanich, BC. It is based on the October 23, 2013, Concept Plan, and the contents of this report (draft version), prepared by LADR Landscape Architects Inc.

Estimate Costs

The estimate costs have been developed in current (February, 2014) dollars. The estimated capital construction costs are:

Activity	Cost
Recreation	\$3,843,000
Agriculture	\$992,000
Ecological	\$4,336,000
Floodplain	\$100,000
TOTAL	\$9,271,00

Escalation: The estimate is priced at current market price levels and assumes the work will be tendered competitively in one contract.

The following items are excluded from the capital construction cost: Administration costs; Clerk of Works; Project Manager; Premium costs associated with environmental contaminants; Financing costs; Legal fees; Insurances costs; Development cost charges; Development permit fees; Out of hours working; Consultants' fees and expenses; Construction contingency; Project contingency; Escalation; GST.

The complete Rough Order of Magnitude Estimate report, including a breakdown of the estimate, is available as a separate document.

APPENDICES

Appendix A:

Selected Reference Documents

The following **Saanich Documents** were amongst those reviewed in preparation of the Concept Plan:

Aqua-Tex Scientific Consulting Ltd. July 2009. *Colquitz River Watershed: Proper Functioning Condition Assessment*

Correspondence from the District of Saanich

To: Island Berry Company. June 5, 2008. Re: Archaeological Concerns at Panama Flats (File # FIL2008-00002)

Correspondence to the District of Saanich

From: Kerr Wood Leidal Associates Ltd., Consulting Engineers. January 26, 2011. Re: Hydraulic Impact of the Newly Constructed Dykes in the IBC Lands (KWL file#: 437.066-300)

From : Kerr Wood Leidal Associates Ltd., Consulting Engineers. July 21, 2008. Re: Panama Flats Island Berry Co. Dyking Proposal Hydrotechnical Review (KWL file#: 437.066)

District of Saanich. 1967. *Colquitz River, An Appraisal and Plan*. Prepared by Saanich Engineer, Frank Neate

District of Saanich. 2011 Orthophoto-Cadastral (CAD) site plan of Study Area

District of Saanich. February, 2013. Notes from Environmental Services regarding available ecological, restoration / park planning, soil mapping, rare species, & related inventory & reports for Panama Flats

District of Saanich. January 20, 2014 (final draft). *Strategic Plan 2014 - 2018*

District of Saanich. July 11, 2008. Panama Flats Environmental Review of "Balanced Solutions". Prepared by Manager of Environmental Services, Adriane Pollard.

District of Saanich. July, 2008. *Carey Local Area Plan Bylaw 8940*

District of Saanich. July, 2008. *Saanich Official Community Plan 2008*

District of Saanich. June 12, 2007. *Saanich Parks and Recreation Trails Guidelines 2007*

District of Saanich. June, 2011. *Park Natural Areas Action Plan 2012-2017*

District of Saanich. June, 2011. *Park Natural Areas Management Guidelines*

District of Saanich. March, 2009. Notes from Thomas Roy on Fish Presence in Colquitz River adjacent Panama Flats

District of Saanich. March, 2013. *Parks, Recreation & Culture Master Plan*

District of Saanich. March 31, 2003. Council Policy: Community Gardens. Reference 03/CW

District of Saanich, October 2, 2003. *Centennial Trails 2006 and Beyond*

District of Saanich. October 24, 2011. Environmentally Significant Areas Inventory Map

Kerr Wood Leidal Associates Ltd. July 2008. Catchment Plan for Panama Flats (plan drawing). Project # 437.066.

KPA Engineering Ltd. March, 1993. *Colquitz River – Proposed Fill Prohibition Boundary*. File #: 3051/S01

Muchowski, Nicole. October 18, 2013. *Agricultural Capability Assessment for Panama Flats*. Project # 107-300

Additional References

American Planning Association. 2007. *City Parks Forum Briefing Papers*, Numbers 1-11.

Applied Ecological Solutions Corp. March 31, 2008. Correspondence to C&F Land Resource Consultants Ltd. Re: Fish Presence in Unnamed Panama Flats Agricultural and Drainage Ditches Tributary to Colquitz Creek, Ref Address 4112 Carey Road, Saanich, BC

C & F Land Resource Consultants Ltd., March 3, 2008. Correspondence to Provincial Land Commission. Re: Panama Flats Drainage Improvement Plan. Construction of Land Development Works on Lot A, Section 12, Lake District and Section 82, Victoria District Plan VIP557771 Except Plan VIP68425; PID 018-083-196

Capital Regional Food and Agriculture Initiatives Roundtable (CR-FAIR). January 2013. Policy Discussion Paper #3: *Agriculture Parks Model for the Capital Region*.

Capital Regional Food and Agriculture Initiatives Roundtable (CR-FAIR). December 2013. *Incubator Farms Introductory Guide*.

Correspondence with Rob Kline, Regional Agrologist; Liz Sutton, Agriculture Land Commission; Wayne Hopkins, former co-owner Island Berry Company

Cruikshank, Ian. March 2013. Panama Flats Bird Survey.

Cunnin, Brad. Document not dated. 'Panama Gardens' - Proposed Development Survey Plan (plan drawing).

E-Pro Enterprises Inc. March 25, 2008. Correspondence to Island Berry Company. Re: Surface Water/Soil Investigation at 4112 Carey Road

Fisheries and Oceans, Pacific Region. June 26, 2008. Correspondence to C&F Land Resource Consultants Ltd Re: Proposed Infilling of 4112 Carey Road, Victoria BC – Panama Flats

Ham and Yip. December 2008. *Archaeological Inventory and Impact Assessment of DcRu-1166 and Panama Flats, District of Saanich, British Columbia; British Columbia Heritage Conservation Act permit 2008-0342*.

HB Lanarc Consultants Ltd. December 2011. *Colony Farm Regional Park Preliminary Sustainability Plan* (Draft). Prepared for Metro Vancouver Parks, Central Area.

HB Lanarc Consultants. 2010. *Agricultural Urbanism – Handbook for Building Sustainable Food & Agriculture Systems in 21st Century Cities*

HB Lanarc–Golder Consultants (lead authors). 2013. *The Urban Farming Guidebook – Planning for the Business of Growing Food in BC's Towns & Cities*. Prepared for & published by the EcoDesign Resource Society.

Island Berry Company. June 2008. Report: *Panama Flats Balanced Solution Options & Information*

Island Berry Company. June 2, 2008. *Panama Flats Local and Regional Drainage Impact Analysis*
Ker, Priestman & Associates Ltd. October 1976. Study of Colquitz Creek Flood Boundaries, Saanich,
BC for Dunhill Development Corporation Ltd. File No. 990/200

Lewis, Megan, ed. January 2008. *From Recreation to Re-creation: New Directions in Parks and Open
Space System Planning.*

SFU, Centre for Sustainable Community Development. Winter 2009. *Dig It! A Practical Toolkit – How
Local Governments Can Support Community Gardens.*

Townsend, Lise. 2009. University of Victoria Master of Science Thesis: *Urban Watershed Health
and Resilience, Evaluated Through Land Use History and Eco-hydrology in Swan Lake Watershed
(Saanich, BC).*

DRAFT

Appendix B: Fact Sheet on Vancouver Island Beggarticks

Develop with Care
2012

FACT SHEET **#16** **Vancouver Island Beggarticks**

Environmental Guidelines for Urban and Rural Land Development in British Columbia



Are you planning a development or logging on your property? If your property includes the edges of ponds, lakes, streams, creeks, channelized watercourses, swamps, and other wetlands in the Lower Mainland, Gulf Islands, or on Vancouver Island, it may support critical habitat features for the Vancouver Island Beggarticks. This fact sheet will provide you with important information about complying with the law and protecting this species while still benefiting from the enjoyment and value of your property.

Despite its name, Vancouver Island Beggarticks is also found in the Lower Mainland in open, moist habitats at low elevations, where water levels are high in winter and spring and low in summer. These changing water levels help keep the species' open, silted, habitats suitable for growth. It is found in shoreline marshes, wet fields, bogs, willow wetlands, ditches, stream banks, pond edges, and lake margins, as well as within tidal zones of the Fraser River.

The Vancouver Island Beggarticks prefers silty alluvial soils and often occurs in locations used by waterfowl, where seeds have likely been deposited by preening birds.

There are several species and hybrids which resemble Vancouver Island Beggarticks (such as the very common Nodding Beggarticks), so a plant expert should be consulted to confirm the identification of this species.



AT RISK

This species is endemic to the Pacific Northwest, found only in coastal areas of southern British Columbia and Washington State. Over 85% of this species' range

Vancouver Island Beggarticks <i>Bidens amplissima</i>	Nodding Beggarticks <i>Bidens cernua</i>
Toothed, unlobed to deeply three-lobed leaves, widest near the base, 6–9 yellow ray petals	Strap-like leaves that are widest at the middle
Hemi-spherical flower heads	Spherical flower heads
Achene (seed) structure: no yellow layer on the top	Achene (seed) structure: thick waxy-looking yellow layer on the top of the body of the seed
Found along wet shorelines, can withstand daily inundation, dry habitat in summer	Found in standing water (year-round)



March 2012



is within B.C., with 30 recently recorded sites and 18 historical sites. It is rated as one of the highest priority species for provincial protection under the B.C. Conservation Framework and has been recognized as a species of global importance because of its narrow global range.

LEGALLY PROTECTED

The Vancouver Island Beggarticks is a species of **Special Concern** under the federal Species at Risk Act (SARA), and is provincially **Blue-listed**. Modifications to features that affect its habitat may require authorization under the Water Act and/or the federal Fisheries Act. Activities such as changes in site hydrology, soil composition or shade, pollution from toxic chemicals, and dumping of garden waste (including brush piling) as well as encroachment of urban development could damage or destroy a Vancouver Island Beggartick population.

DEVELOPMENT GUIDELINES

More detailed guidelines for protecting Environmentally Valuable Resources are provided in *Develop with Care 2012: Environmental Guidelines for Urban and Rural Land Development in British Columbia*.

- Maintain natural variation in water levels. Fixed, managed water levels will allow competing species to replace Beggarticks. Do not alter surface or groundwater hydrology, or channelize watercourses.
- Create buffer zones around populations to minimize access by people and animals. A minimum buffer of at least 30 m from the top of bank or the wetland high water level is recommended, however advice from a qualified professional should be sought. Within buffer zones, prevent overgrazing by livestock and overuse by



recreational activities such as trail building, boat launching, and storage. If fencing is required, use an open style that allows passage by small mammals and waterfowl.

- Ensure that site/park workers are aware of the species habitats, and closely supervise any work.
- Maintain open unshaded habitat. On overgrown sites, restore open areas by cutting back shrubs and saplings in late fall. Occasional mowing (between October and March) may be required after seed set. Do not plant other species near Beggarticks as they are susceptible to changes in shade, nutrients, and invasive species.
- Avoid digging or construction activities that can alter shoreline habitat, which harbours important seed banks and provides a critical seed source in adverse years.
- Do not discard garden waste, brush cuttings or other materials in Beggarticks habitat. Control invasive species and other species (such as cattails) that prevent germination of their seeds.
- Avoid using herbicides or other toxic substances (e.g., in nearby golf courses or gardens). Water bodies near populations should be protected from chemical impacts since this species often occurs on gently sloping ground and is impacted by surface and groundwater quality.
- Report occurrences or observations of activities threatening its habitat to the regional Species at Risk Biologist.

For more information: http://www.env.gov.bc.ca/wld/BMP/bmpintro.html#second_

Develop with Care 2012: Environmental Guidelines for Urban and Rural Land Development in British Columbia

Wetland Ways: Interim Guidelines for Wetland Protection and Conservation in British Columbia

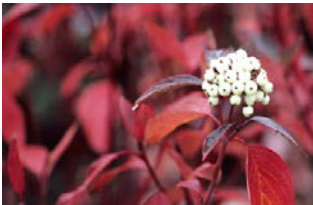
Protocols for rare plant surveys <http://www.geog.ubc.ca/biodiversity/eflora/>

Photos: Vancouver Island Beggarticks: Brian and Rose Klumbenberg

Appendix C: Recommended Wetland & Riparian Species



Bigleaf Maple



Redtwig Dogwood



Oregon Grape



Nootka Rose



Bracken Fern

Trees

<i>Acer circinatum</i>	Vine Maple
<i>Acer glabrum</i>	Douglas Maple
<i>Acer macrophyllum</i>	Bigleaf Maple
<i>Alnus rubra</i>	Red Alder
<i>Crataegus douglasii</i>	Black Hawthorn
<i>Malus fusca (Pyrus fusca)</i>	Pacific Crab Apple
<i>Prunus emerginata</i>	Bitter Cherry
<i>Pseudotsuga menziesii</i>	Douglas Fir
<i>Quercus garryana</i>	Garry Oak
<i>Thuja plicata</i>	Western Red Cedar

Tall Shrubs

<i>Amelanchier alnifolia</i>	Saskatoon
<i>Cornus stolonifera</i>	Red-osier dogwood
<i>Crataegus douglasii</i>	Black Hawthorn
<i>Holodiscus discolor</i>	Oceanspray
<i>Lonicera involucrata</i>	Black Twinberry
<i>Oemleria cerasiformis</i>	Indian plum
<i>Physocarpus capitus</i>	Pacific Ninebark
<i>Philadelphus lewisii 'Gordianus'</i>	Mock Orange (Coastal)
<i>Rhamnus purshiana</i>	Cascara
<i>Rubus parviflorus</i>	Thimbleberry
<i>Rubus spectabilis</i>	Salmonberry
<i>Salix hookeriana</i>	Hooker's Willow
<i>Salix lucida (lasiandra)</i>	Pacific Willow
<i>Salix scouleriana</i>	Scouler's Willow
<i>Salix sitchensis</i>	Sitka Willow
<i>Sambucus racemosa</i>	Red Elderberry
<i>Sorbus sitchensis</i>	Sitka Mountain Ash

Medium and Small Shrubs

<i>Spirea douglasii</i>	Hardhack
<i>Mahonia nervosa</i>	Dull Oregon Grape
<i>Ribes sanguineum</i>	Red Flowering Currant
<i>Rosa gymnocarpa</i>	Baldhip Rose
<i>Rosa nutkana</i>	Nootka Rose
<i>Rosa pisocarpa</i>	Clustered Wild Rose
<i>Symphoricarpos albus</i>	Common Snowberry
<i>Vaccinium membranaceum</i>	Black Huckleberry

Ferns

<i>Athyrium felix-femina</i>	Lady Fern
<i>Blechnum spicant</i>	Deer Fern
<i>Polystichum munitum</i>	Sword Fern
<i>Pteridium aquilinum</i>	Bracken Fern



Coastal Strawberry



Kinnickinick

Aquatics

- Alisma plantago-aquatica*
- Carex mertensii*
- Carex lyngbei*
- Carex obnupta*
- Carex rostrata*
- Carex sitchensis*
- Carex stipata*
- Eleocharis palustris*
- Iris missouriensis*
- Juncus effusus*
- Juncus ensifolius*
- Menyanthes trifoliata*
- Oenanthe samentosa*
- Polygonum amphibium*
- Sagittaria latifolia*
- Scirpus acutus*
- Scirpus microcarpus*
- Typha latolia*

Groundcover

- Arctostaphylos uva-ursi*
- Fragaria chiloensis*

- Water-plantain
- Merten's Sedge
- Lyngbei's Sedge
- Slough Sedge
- Beaked Sedge
- Sitka Sedge
- Sawbeak Sedge
- Common Spike-Rush
- Western Blue Flag
- Common Rush
- Dagger-leaf Rush
- Bog or Buck Bean
- Pacific Water-parsley
- Water Smartweed
- Wapato, Arrowhead
- Hard-stemmed Bulrush
- Small-flowered Bulrush
- Cattail

- Kinnickinick
- Coastal Strawberry