TRUE CREEK BOTANICAL PARK: RE-PRESENTING THE BOTANICAL GARDEN

by

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ABSTRACT

This design project extends VanDusen Botanical Garden into the city through a network of satellite sites that combine botanical information with site specificity. Once multiple sites are an option, and their locations a strategic decision, it is anticipated that a paradigm shift occurs. When the botanical garden becomes embedded into daily life with a broadened audience, new opportunities for design concept, layout, content and interpretation are created that reinforce the mission of a contemporary botanical garden, whilst contributing urban landscape experiences that are aesthetically captivating and engaging.

True Creek Botanical Park is developed as one example of a satellite botanical garden. It is located on Vancouver's False Creek and combines environmental education with landscape experience. Situated within everyday activities, it engages visitors with the beauty and importance of coastal marsh and related upland ecosystems and processes, to connect people with plants. The design is fundamentally informed by the ecology and history of the site itself and foregrounds the impact of urban development upon natural environments. The project also makes a positive material contribution to improving the environment at and beyond the site.

This site-determined botanical garden breaks with site-dominant tradition presenting a model for other sites in the VanDusen network and other botanical gardens.

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CHAPTER 1 Overview and Summary

1.1. Introduction

Botanical gardens have always been concerned with the connection between people and plants. The earliest gardens were established in southern Europe where they specialized in growing medicinal herbs native to the Mediterranean region. Known as hortus medicus, the physic gardens of Renaissance Italy inspired the creation of others in northern Europe in the seventeenth and eighteenth centuries. As the major powers acquired colonies in far-flung places and expanded world trade, plant collecting became a passion for wealthy landowners. In the tropics, botanical gardens functioned as colonial research stations specializing in native plants that had perceived economic value. Botanical gardens, such as Kew Gardens in London, used new horticultural techniques to grow and display the increasingly available array of exotic plants, constructing glasshouses for those that needed winter protection, and across Europe the arrival of formerly unseen splendours of the plant world generated great excitement. Most European botanical gardens were built on royal estates or were associated with universities. In modern times, botanical gardens are primarily public facilities with an educational mandate, however many people simply come to enjoy them as gardens, for their beauty, for inspiration and as respite from a hectic world.

Since the early 1960's, following Rachel Carson's ground breaking *Silent Spring*, there has been mounting concern for the health of the world's natural environment. The case for sustainable development including bio-diversity conservation was made by the Brundtland Commission in 1987 and numerous international agreements have followed. Botanical gardens have refocused their work to include such initiatives as seed banks, in-situ and ex-situ conservation research and education. VanDusen Botanical Garden in Vancouver, British Columbia, like many of its North American counterparts outside universities, has struggled to meet this challenge. This is mainly because until recently their audience has been comprised of keen amateur gardeners seeking information about suitable ornamentals for the home garden, those with an interest in botany, or visitors who come to enjoy a well-manicured garden. Expanding the mandate to include environmental education deepens support for the Garden, attunes it to current concerns and broadens the potential audience.

Since the latter part of the last century, there has been a return to artistic engagement with the natural environment, and artists have employed the land itself as sculpture and canvas, breaking away from the restrictions of the gallery milieu where the art object is a commodity to be bought and sold. In the field of landscape architecture, and in reaction against modernism's disregard for site specificity, ecological awareness first resulted in a concentration on design within regional ecosystems and largely ignored art. Since then, however, many landscape architects have reengaged with the artistic potential of the landscape and its natural processes, while actively attempting to make environmentalism manifest in their projects. In landscape design terms the botanical garden is a specific, intensively programmed landscape type with an implicit and explicit educational role. Botanical gardens can therefore benefit from precedents that have incorporated environmental

education into the landscape experience.

1.2. Thesis Statement

Despite population growth in Vancouver, the annual attendance at VanDusen has held to around 150,000 visitors for many years. It ranks seventh amongst other Vancouver cultural amenities that include the Vancouver Aquarium, Science World and the Vancouver Art Gallery. Many factors could account for this however it is a typical rating for other North American public gardens of similar size. Destination sites compete with each other in an era of limited leisure time and from anecdotal evidence it seems that the average person does not think of going to a botanical garden very often, especially in a city that offers so many free outdoor activities. For VanDusen to be in a position to raise public awareness of conservation and emerging practices of landscape design, new strategies for increasing contact with the public are required.

The concept of this design project is to extend VanDusen Botanical Garden into the city through a network of satellite sites that combine botanical information with site specificity. If botanical gardens are to promote public awareness of the importance of plants and, by extension, biodiversity conservation, then VanDusen, a fenced-in, fifty five acre destination site in a tony residential neighbourhood with paid admission, is limited in its reach. Once multiple sites are an option, and their locations a strategic decision, it is anticipated that a paradigm shift occurs. When the botanical garden becomes embedded into daily life with a broadened audience new opportunities for design concept, layout, content and interpretation are created that reinforce the mission of a contemporary botanical garden whilst contributing urban landscape experiences that are aesthetically captivating and engaging. This concept is particularly applicable to botanical gardens, such as VanDusen, that are part of a municipal or regional park system that have a built-in land base and therefore the opportunity to be more flexible with locations of sites.

The goal of this thesis is to design a satellite garden called True Creek Botanical Park at False Creek in Vancouver. Such a site will provide a model for other satellite gardens for VanDusen, as well as other botanical gardens. The proposed design builds upon landscape theory and built works engaged with environmentalism of the past 30 years. The insertion of the botanical garden into daily life opens up a surprising range of design options and furthermore, it creates the potential for joyful aesthetic experience in an urban environment for its own sake, and in support of the programme. In addition, satellite sites create out-reach alternatives not possible within the single site model

1.3. Botanical Gardens in the Twenty First Century

The consistent purpose of botanical gardens, in spite of all the societal changes of many centuries, has been to focus on the importance of plants to human life with the underlying reality that no life on earth could exist without them. The challenges of the twentieth century have added new dimensions to the importance of the connection between people and plants. We now know that global warming is a significant threat to life on this planet and that the forests which absorb much of the carbon emitted by

the burning of fossil fuels are being cut down. Each year, more natural areas become degraded or lost and many plants, and the animals that depend on them, are endangered or become extinct at an unprecedented rate. Indeed large scale global extinction rates in the twentieth century have been reported to be "a thousand times higher than the average rate during the preceding sixty five million years".[1]The quality of the air we breathe relies on plant processes and in cities, the need for green space is essential to our physical and mental health. In short, with such pressures on the natural environment, the impetus for botanical gardens to raise public awareness of plants has increased, along with the need to provide relief from the stress of modern life.

So how have environmental concerns affected the design of botanical gardens in today's world? Traditional botanical gardens in Europe, the U.S., Australia and Canada are a composite of many smaller themed gardens; Japanese, Iris, Victorian and so on. Long established gardens, such as the Jardin des Plantes in Paris, Kew Gardens in London and Berlin and the earliest American gardens such as New York, have inherited layouts and elements. Well-financed institutions have adapted such features for the new reality so that Paxton's Palm House at Kew, for example, has been renovated to include a marine and wetland ecosystem exhibit as well as reconfigured tropical plant exhibits and signage that emphasize biodiversity conservation. In the U.S., major gardens, such as New York and Missouri, have extensive scientific programmes engaged in conservation, and new built elements support these functions. In most cases, however, the fundamental design of all these botanical gardens remains true to the traditional format while shifting emphasis to current environmental concerns.

Some gardens were established from the start to focus on the native plants of their regions and therefore feature the local natural environment in their design. In the nineteen thirties, in the earliest days of the development of the science of ecology, the Santa Barbara Botanic Garden was established to feature the native plants of California. It was laid out by a plant ecologist according to California's various plant communities of chaparral, desert and prairie. The Crosby Arboretum in Picayune, Mississippi, best known for Fay Jones' Pinecote Pavilion, was created from neglected farmland in 1980. It purports to tell the story of the ecology of Mississippi's piney woods and reflects different stages of ecological succession by "re-establishing the structural combinations of plants in relation to processes" and contains a "mosaic of interlocking ecotones."[2] A small river was artificially dammed on the site as if by beavers, creating a wetland from which the story unfolds.

However, some new botanical gardens, informed by changes in twentieth and twenty first century park designs that challenge the Olmstedian tradition, are combining ecology with dramatic design for an artistic approach that moves away from the naturalism of Santa Barbara and Crosby. The Barcelona Botanic Garden, designed by Bet Figueras, sets out to provide a narrative of the evolution of the Mediterranean landscape using formal qualities that emphasize the topography of the site. Seventy two plant communities are organized along a bold network of paths leading down a steep hillside from the indigenous mountain wooded area at the highest point to the water-based species at the base. Along the way platforms with triangulated steel walls hold terraces that provide overlooks and planting areas.

Plate 1. Barcelona Botanic Garden, Figueras, 2000 (left)
Plate 2. Bordeaux Botanic Garden, Morbach, 2003 (right)

Another recent example is the Bordeaux Botanic Garden which opened in 2003. Designed by Catherine Mosbach, it is located in a newly developed district along the River Garonne. It sets out to be a synthesis of science, art and architecture by harking back to three main features of botanical gardens: exotic plants (in greenhouses), ethno-botany (cultivated fields) and ecology (gallery of natural landscapes). The latter occupies the largest area and draws its inspiration from the landscape of the Aquitaine Basin. There are five gardens ordered along a geological chronology according to the development of the flora, and six gardens arranged in topographical cross-section from the ocean to the heathland. Mosbach employs a sculptural approach drawing on the visual cues of the natural landscapes she portrays.

1.4. The Issue of Scale in Botanical Gardens

As a discrete landscape type that normally exists to display taxonomically related plants, botanical gardens often have design challenges with scale, on a visual level and on a conceptual level. When a large and diverse selection of plants is exhibited in a limited space, the result is a collection of a small number of examples of each type of plant in order to make room for the largest range of present and future acquisitions. This can appear cluttered particularly if the goal is to grow pretty much everything that is ornamental, exotic or interesting.

Frequently, order is attempted by means of categories, so that VanDusen for instance, has geographical areas such as the Sino-Himalayan Garden, horticultural categories such as perennials, taxonomical groupings such as rose gardens, and garden historical categories such as cottage gardens. Similarly, other botanical gardens such as Brooklyn have gardens specifically for the physically challenged; some like Atlanta and the Huntington have children's gardens and many, such as Montreal and Missouri, have classical gardens such as Japanese or Chinese gardens. Moreover, contemporary public gardens need flexible outdoor facilities for entertaining donors, for raising revenue through weddings and other large and small

events as well as a range of other visitor services. This confusion of typologies gathered together in one place compounds the difficulty of producing a cohesive garden design, which may be further complicated if, as at VanDusen, there are nostalgic overlays of compositional styles imported from England or elsewhere. Some venerable gardens such as Oxford, Padua and the Jardin des Plantes in Paris retain their original linear taxonomic bed layouts without attempting to be pleasure gardens, remaining true to their scientific priorities.

Often there are scale issues relating to miniature landscape scenes which are too small to convey the original landscape they attempt to represent. The Victorians built rockeries in the form of Swiss mountains to display collections of alpines and while this may be an extreme example, many botanical garden landscapes suffer from aspects of this problem. A recent example might be the Eden Project in the U.K., built in a disused quarry with about one third of the garden organized beneath a series of geodesic-domed greenhouses. Eden has the grand mission "to promote the understanding and responsible management of the vital relationship between plants, people and resources leading to a sustainable future for all."[3] Eden is interesting for its clear focus on sustainability and for its use of temporary sculptural art pieces as an interpretive tool, however, from a design point of view the scale problems are evident.

One way to address the scale issue is to take a more minimalist design approach such as we see used in gardens by Isamu Noguchi, for instance, *California Scenario*. This is not a botanical garden but is an imaginary landscape symbolizing the topographical diversity of California located in the space between two office towers and a parking garage. As landscape sculpture, it effectively represents the essence and nature of the state's landscape. In a similar way, Mosbach's ecological gardens of the Aquitaine at Bordeaux Botanic Garden effectively distil the formal characteristics of the regional landscape incorporating exhibits of native plants.

University of Georgia landscape architect Darrel Morrison uses the dynamics of natural ecosystems to create what he terms ecological art. At Santa Barbara Botanical Garden and the National Wildflower Research Center in Texas he uses ecological phenomena and plant communities for sculptural effect, often camping out on site to observe and understand the microclimatic conditions in order to best introduce the appropriate plants. George Hargreaves' work provides a framework for ecological process to occur, an approach he calls "open-endedness". At Guadalupe River Park, for instance, in the section that is downstream from the city centre, he has reconfigured the river's edge to resemble the braided character of western streams. He describes this as a "deconstructed levy" and when the river is in flood it serves to slow the water down, spreading it out as it would in a natural system. Hargreaves' projects work with the whole site in their ecological context. However, he does not foreground plants over other elements in the landscape and herein perhaps is the dilemma of botanical gardens from a design point of view in the contemporary holistic world of ecology. Accepting its role as a botanical garden however, True Creek attempts to address the scale problems of its parent institution VanDusen and other traditional botanical gardens, by drawing lessons from this precedent work.

1.5. Design Principles for the True Creek Botanical Park

1.5.1. Site Specific and Site Determined

Since this site is part of a network, it is not necessary to include a broad global plant palette and each individual botanical garden satellite can concentrate on a narrower theme. In his essay *Being and Circumstance*, 1985, Robert Irwin outlines a classification scheme for landscape works:
a) Site dominant
b) Site adjusted
c) Site specific
d) Site conditioned/determined
Stephanie Ross states that these categories form a continuum with each more context-bound than the preceding one, so that "an orangerie or a botanical garden is site dominant, in Irwin's terms, if its only purpose is to produce oranges, or to display and preserve certain species of plants." Site specific works are those conceived with the site in mind, and "site determined works are those where 'the sculptural response draws all of its cues (reasons for being) from its surroundings', the site itself 'determines all facets of the 'sculptural response'".[4] Contrary to its site dominant botanical garden heritage, True Creek Botanical Park is site specific and site determined as a consequence of its location within everyday urban life and its utilization of site history and ecology for aesthetic and programmatic ends.

1.5.2. Embody Environmentalism

The design of True Creek draws on landscape architectural precedents such as those described by Elizabeth Meyer in *Post-EarthDay Connundrum: Translating Environmental Values.* She writes, "One thread in the tapestry of the postmodern, post environmental movement landscape involves the search for significant forms and spaces that might embody, reveal, and express ecological principles while embodying and inculcating environmental values." She continues, "Some sought to emphasize nature's forms, others to make nature's subtle and transitory processes palpable and visible, and still others to reveal a site's entire history of cultural and ecological agents." Lastly, Meyer adds, "Post-Earth Day environmentalism was more than a movement to solve individual ecological problems. It was an attempt to change the value systems that had created those problems and then to modify the institutions that acted on those values."[5]

My project builds upon this eco-revelatory work with the explicit educational content and resources of a botanical garden and with an agenda to bring such matters to people's attention with the hope that attitudes and activities might be influenced to change. However if it is to truly embody environmentalism it should also contribute in a positive way to the ecological functioning of the site and beyond. The treatment and absorption of stormwater on site not only demonstrates and interprets environmental responsibility, it would genuinely improve the water quality of False Creek, and would hopefully inspire other projects along the waterway. Furthermore, saltwater and freshwater wetland plants are disseminated from this site as part of the programme, thereby contributing to wetland creation and preservation at other sites along the coast.

1.5.3. Develop the Aesthetic Qualities of the Site

The aesthetic opportunities inherent in the resurrection of this site's original ecological niche are explored to present its unusual beauty and to stimulate reflection upon vulnerable ecosystems. Referring to Irwin's *Filigreed Line,* Ross has written that art works that focus attention on the environment "force us to rethink our place in the landscape, our roles as perceivers, enjoyers, consumers, destroyers."[6] Meyer states that Land Artists such as Irwin "employed formal presence to focus attention on a place and its particular qualities—its ancient natural histories, its deep time, its recurring natural cycles and processes—that were almost invisible to a culture of distraction and disengagement"[7]

George Hargreaves has described the revelation that he experienced as a student upon seeing Land Art and the earthworks of Robert Smithson. He stated that for the first time her realized that designed landscapes could be meaningful and that they could introduce the concept of landscape as idea that had been lost in the pursuit of the functional landscape.[8] True Creek too is informed by these Land Art precedents to reveal the aesthetic qualities of salt marsh and inter-tidal ecosystems and processes. At the same time it presents the landscape as idea, particularly as advocate for urban development that is sensitive to the natural environment.

1.5.4. Insert Art and Aesthetics into Daily Life

By its location on busy commuter and recreational routes and in a future residential and commercial area, True Creek Botanical Park becomes an integral part of the city, not separate from regular daily affairs. As an aesthetic experience, it enriches the quality of life for those who pass through. In the 1930's, American philosopher John Dewey postulated that art belongs in the everyday world rather than as an art object to be found in a museum. He argued that art and aesthetic experience were too important to the quality of all our lives to be confined to the gallery or by reducing it to being a commodity.

More recently, Dewey's views have resonated within the context of late twentieth century art that has pushed the boundaries of the art object, such as performance or conceptual art; with what Beardsley labels as the late twentieth-century sculptural movement of Green Art; and in landscape theory that advocates for landscape and gardens as art. Susan Herrington quotes Richard Shusterman when she states that the removal of aesthetic experiences from everyday life also implies the "dismal assumption that ordinary life is necessarily one of joyless unimaginative coercion" and "provides the powers and institutions structuring our everyday lives with the best excuse for their increasingly brutal indifference to natural human needs for the pleasure of beauty and imaginative freedom".[9]

Some Marxist feminists take a similar view advocating for women's domestic aesthetic praxis. For instance, Josephine Donovan writes

> "such art remains embedded in the everyday. It is not extracted and commodified as a 'masterpiece', distinct from the everyday world. Because of this, the everyday world remains illumined by its beauty. Beauty and its

> ontological intensity—its sacrality—are not withdrawn, leaving the mundane workaday world all the more profane and providing aesthetic illuminations only for an elite. Rather it remains a part of the worker's world." [10]

1.5.5. Maximize Experience

At this site, particular emphasis is placed on physical interaction with plants and their habitat, observation of natural processes and the provision of a wide variety of possible means of engagement with the site, its components and its learning opportunities. Hargreaves describes his landscapes as "theatre of the environment", as places to observe the natural forces that shape the landscape.[11] At True Creek a range of means by which to observe are provided, from below, within and above; from near or far, from secure footing to the partaking in small adventures.

Meyer refers to Arnold Berleant's "participatory model of aesthetic experience" which she says "enables us to grasp the environment as a setting of dynamic forces, a field of forces that engages both perceiver and perceived in a dynamic unity."[12] In addition, James Corner observes,

> "To the degree that everyday inhabitants experience landscape, they do so in a general state of distraction, and more through habit and use than through vision alone. Their eidetic image of place is bound into a greater phenomenal range of significance than vision or contemplation affords. By contrast, the outsider—the tourist, the spectator, the state, the administrative authority, the designer and planner—views landscape as an object, a thing to behold, and not only scenically but instrumentally and ideologically."[13]

Because this site must meet many perfunctory needs, such as for example, rushing for the Skytrain on a rainy morning, a number of devices are explored to provide quality experiences that help to draw attention to that which might otherwise be overlooked. For instance, main paths take the most direct route to connect with transit stops and other destinations. These paths incorporate bridges which place the user in direct contact with various experiences of the wetland environments of True Creek. These bridges, in turn, form a linear progression toward intriguing features and focal points. All this would hopefully sufficiently disturb the state of distraction that Corner describes to tempt the busy commuter to return to explore the park at her leisure.

1.5.6. Site Narrative and Interpretation

One expects that a botanical garden will communicate interpretive information in an explicit manner. True Creek is intended to be a learning landscape, a place where the visitor has opportunities to acquire knowledge pertaining to the site, from the broadest historical and environmental perspective. However, the mode of presentation of information is restrained, avoiding where possible the use of traditional labels and signs. Pedantic methodologies give way to incidental, informal learning and the landscape itself, through its concept and design allows the participant to absorb its meanings almost subconsciously, engaging the casual visitor in the compelling story of the site.

Sebastien Marot describes what he calls the principle of 'Anamnesis' by stating that

> "the landscape reading of sites is not limited to quantities and capacities. Rather, it views the land and public space as an expression of ancient culture, or a palimpsest that evidences all of the activities that contributed to the shaping of that particular landscape and no other. Upon the tracks overlaid by the march of time, site interpretation detects potentialities to be nurtured and passed on. The reading is thus that of an inheritance and the eventual project a bequest."[14]

The hermeneutic qualities of landscape and semiotics are also discussed by Catherine Howett in *Systems, Signs and Sensibilities*. She argues that architecture can communicate visual and conceptual messages through a vocabulary of meaningful signs. She cites Maya Lin's *Vietnam Memorial* as illustrating how the landscape can incorporate rich layers of meaning through a simple gesture such as a simple wall incised in the earth that bears the names of the fallen.[15] Inspired by such precedent work, the narrated pathos of obliterated marine marsh landscapes, pursued at True Creek, is portrayed through signs and symbols as much as through straightforward textual descriptions.

CHAPTER II Site Selection

Creekside Park North is the site selected for an exploration of the concept meeting the following criteria:

Busy Location

The most important criteria for site selection is location in a place where people come into contact with it during the normal course of a day, taking the decision-making related to making a special journey, out of the equation. Also, it should be in a busy urban area, where many individuals, drawn from the broadest demographic range of age, income and ethnicity, come together at the site quite incidentally, for reasons unrelated to the programme of a botanical garden. A site that might be used at all times of the day and the week for some sort of combination of business, home, shopping and recreation is ideal.

Site Availability

The City of Vancouver's Official Development Plan for False Creek North designates it as a future public park, thereby providing a legitimate hypothetical botanical garden site. Located at the north-eastern end of the busy urban water-body that is False Creek, Creekside Park North is at a historic crossroads close to the city's downtown core. In a transition zone, between gentrified Yaletown and Vancouver's seriously rundown Downtown Eastside, the site is currently covered by asphalt and functions variously as a parking lot, pedestrian shortcut, recreational waterside trail and an annual week-long car race. At the intersection of Pacific Blvd and Quebec Street, it is situated in an area of planned densification including future residential and office development and is also on an existing commuter and recreational route

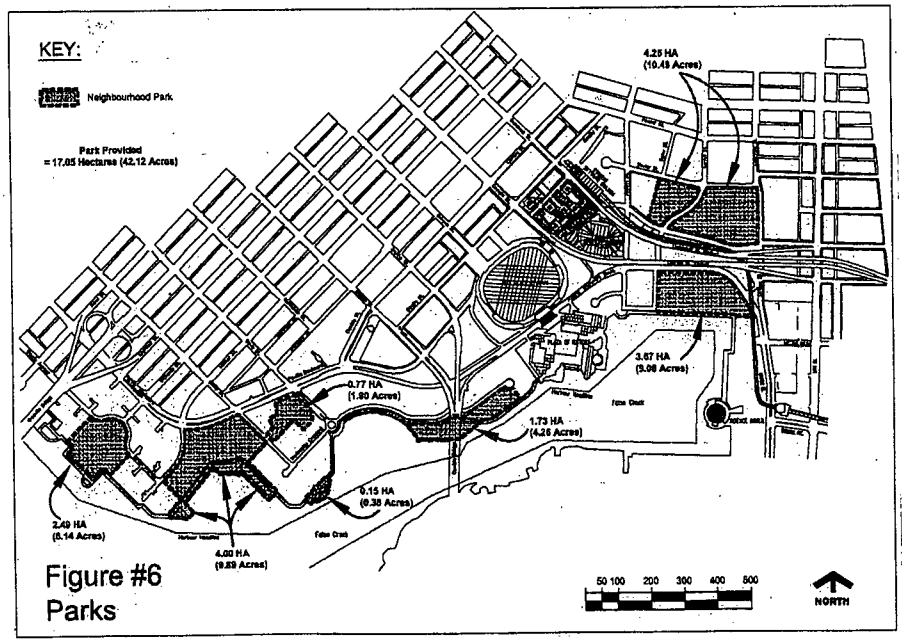


Figure 1. O.D.P. False Creek North with Creekside Park North (Highlighted)

Aesthetic Potential

The capacity (power even) which aesthetic beauty possesses to stimulate delight is not only a worthwhile contribution to daily life in its own right, but is also a useful tool for communicating with an audience. Therefore the more potential for aesthetic content presented by the site location, even in its raw state, the bigger draw it will receive.

Eco-revelatory Potential

In an urban situation natural processes are often absent or at least hidden, the built form of the city being primary. Former rivers are channelled into storm sewers, asphalt covers large areas of land and former ecosystems such as wetland or forest are eliminated. The optimum site for the purposes of a botanical garden, then, is one that offered opportunities for eco-revelatory experiences to open up awareness of the value of nature and its processes.

Historical and Cultural Potential

The history of a particular piece of land contains interpretive opportunities relating to the protection of nature in the face of development. So the final criteria considered is that the site contains some potential from its past uses that could be used to inform a narrative about the site in support of the programme.

CHAPTER III False Creek Site

3.1. Context

The immediate physical context provides the site with some significant attributes as well as some challenges. Creekside Park North is approximately 4ha in size and is located at the intersection of two street grid systems. The road system almost engulfs it, with fast one-way four lane roads to the north including two elevated highways and, to the east, another major road and elevated Skytrain tracks which pass over the eastern boundary of the park. Further to the north, behind the downtown core, the Coast Mountains form the backdrop. The southern edge of the site is taken up with the Waterfront bike and pedestrian trail that runs adjacent to the shoreline. Viewing the site from the water, in a kayak or other small craft, one is provided with a panorama of water, land, mountain and sky.

To the east of Cambie Bridge that spans False Creek, immediate neighbours include two major stadiums BC Place and GM Place, the Plaza of Nations and Science World, and their sterile landscapes. These structures dominate the area and set it apart from the dense urban form of a typical streetscape. For many people, Science World with its metallic globe-shaped construction, is an unfortunate leftover eyesore from Expo 87 on prime real estate.

There is parkland to the north of the elevated highways including active and passive recreation. Mixed income housing and some commercial office space is destined to be built on the adjacent lots to the west. A small marina is planned at the shoreline, to the west of the park site. Towers, existing and future, line Quebec Street facing west over the project site along the length of False Creek. Many hostels, rooming houses and taverns lie to the east, as well as the main city train station, rail-yards and tracks.

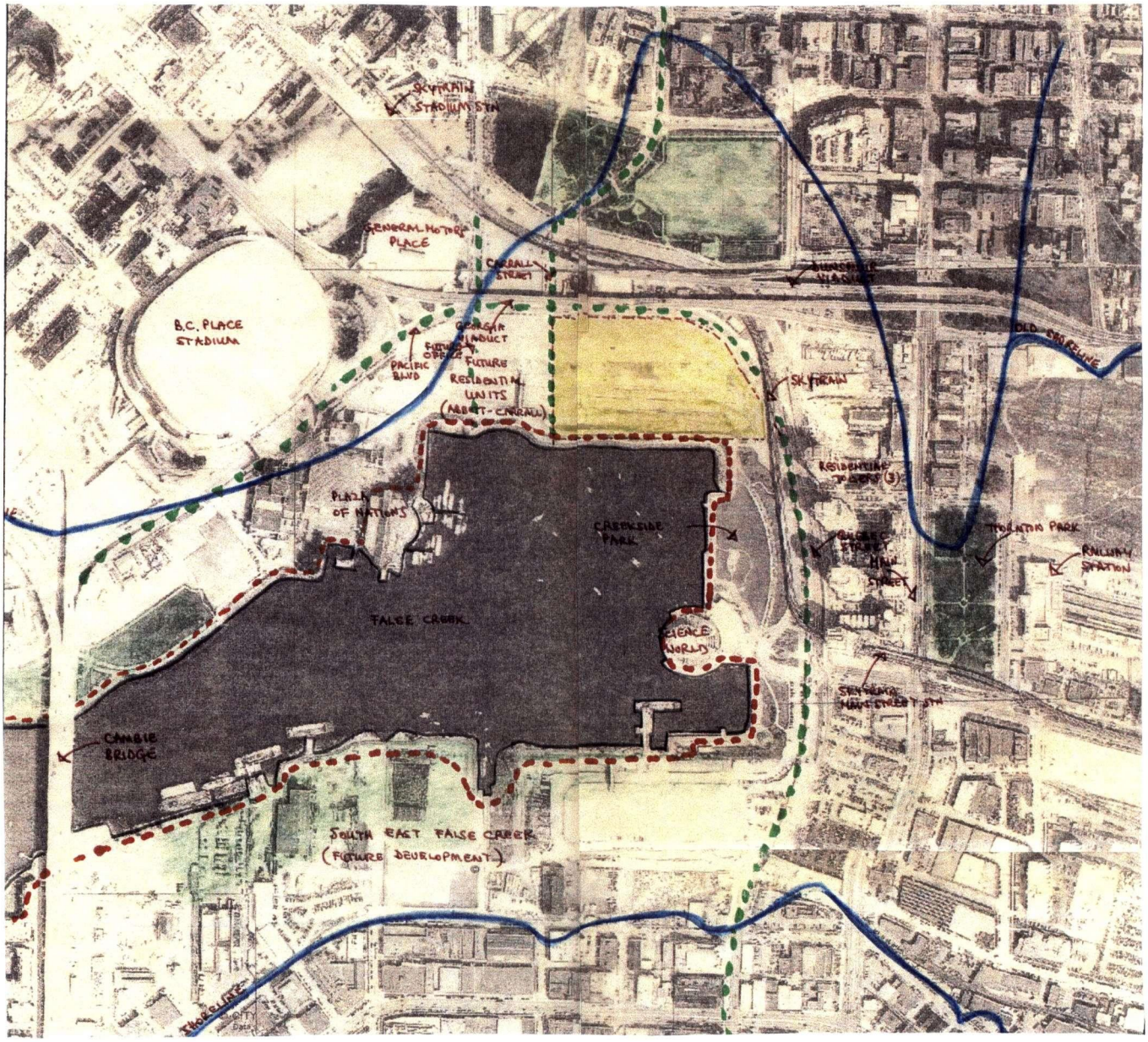


Figure 2. Context, Commuter and Recreational Trails and Old Shoreline

Plate 3. Site As Viewed From a Kayak

Plate 4. Site From Southeast Corner

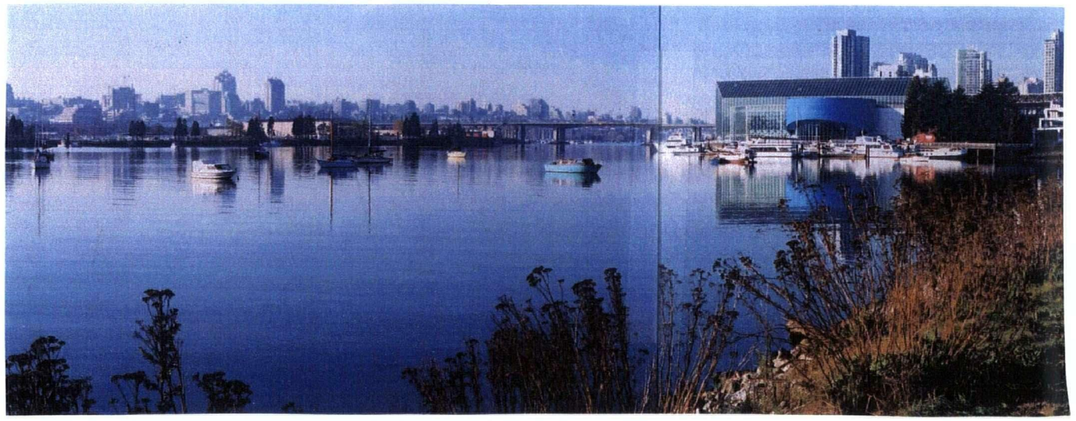


Plate 5. From Site to False Creek (left, right)

3.2. History

False Creek is a shallow saltwater inlet of Burrard Inlet, and is therefore tidal. Pre-development, it was significantly wider and longer than it is today, and eighteen salmon streams flowed into it. All have been eliminated, replaced by several storm-water sewer outfalls. East of Main Street, now filled, the Creek extended almost twice its current length as far as Clark, and was composed of shallow tidal flats and salt marshes. Brackish and fresh water marshes existed where streams met the inlet and the conditions existed for eelgrass meadows in the inter-tidal zone. Incidentally, it is now known that eelgrass meadows worldwide support fish stocks by providing breeding grounds for herring and many invertebrates and vertebrates which supply the food chain. Eelgrass plants growing together in dense mono-cultural meadows create a richly bio-diverse habitat. The detritus from dead eelgrass leaves provides food for many organisms and the roots of eelgrass stabilize shifting sands protecting shorelines from erosion. Nowadays, eelgrass is often eradicated in urban situations since its natural habitat is a softly graduated shoreline that is frequently eliminated by the hard-edged built form of concrete quays, marinas and other waterside development.

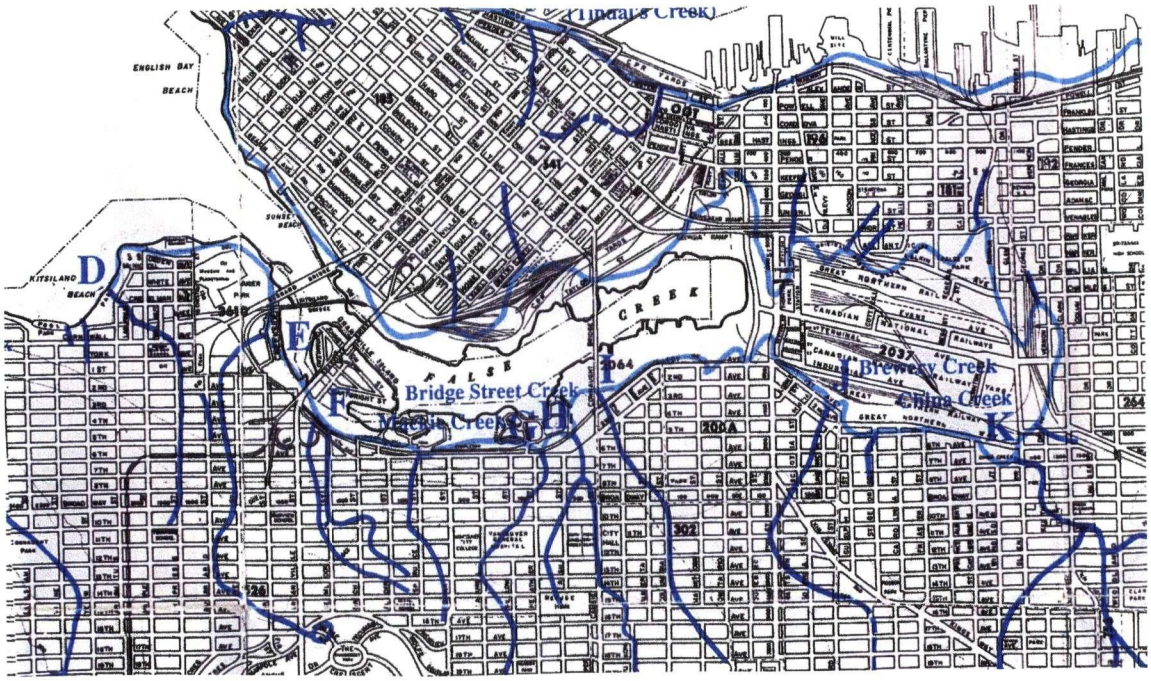


Figure 3. Map of False Creek with Old Shoreline and Streams

Plate 6. Tidal Flats, East of Main Street, Undergoing Landfill, 1916

Formerly, this region was inhabited by Central Coast Salish, specifically the Halq'emeylem peoples, and they fished for salmon, hunted deer and waterfowl, and used a variety of plants for food, tools and household implements. They used grasses and sedges for weaving mats, baskets, hats, fishing line and nets. Streams and False Creek supported coho, chum and pink salmon, rainbow and cutthroat trout and steelhead.

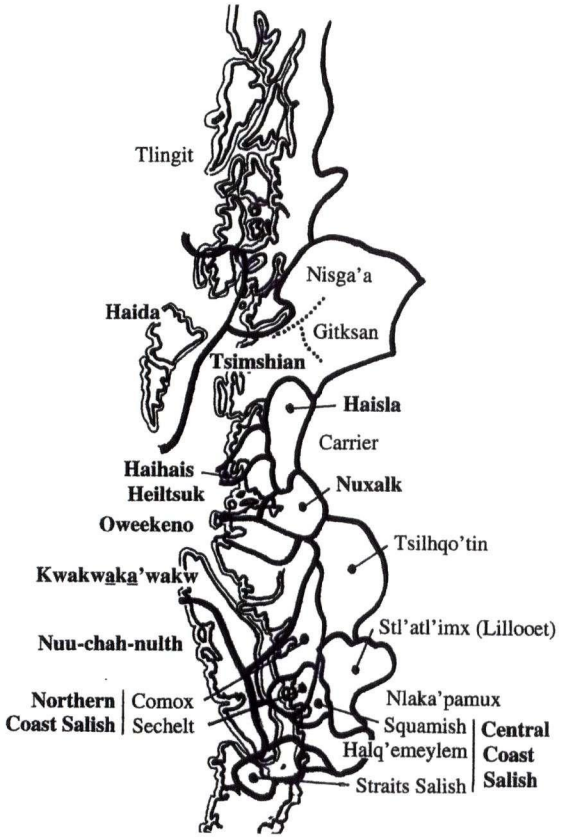
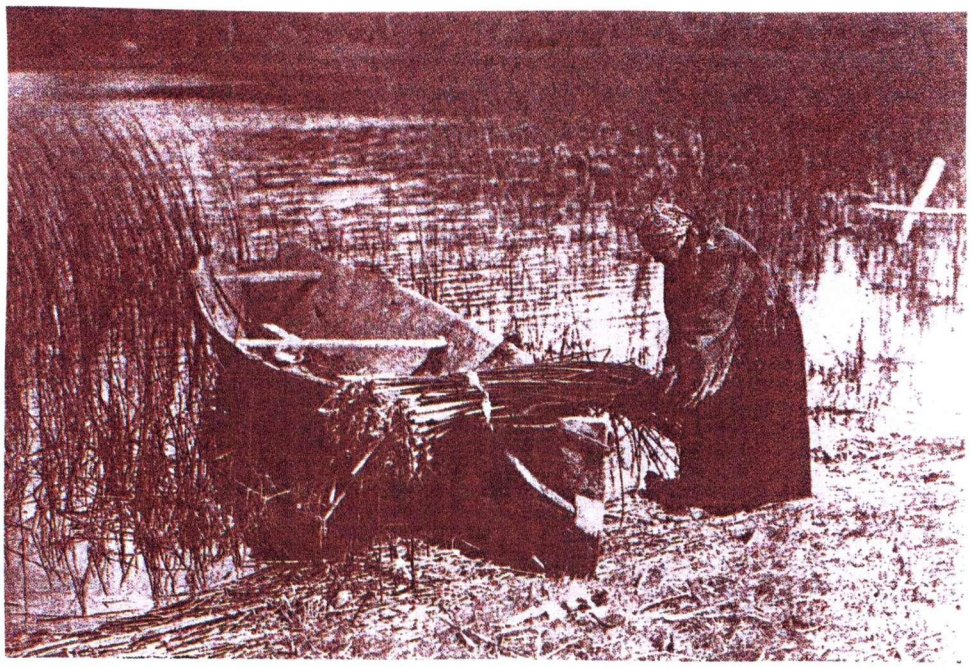


Figure 4.
First Nations of British Columbia (left)

Plate 7.
Gathering Tules at Cowichan Lake, E.S. Curtis, 1915 (below)



Captain George Richards surveyed and named False Creek in 1860. By 1914, what had been a quiet marshy inlet was transformed into a busy waterway serving the industrial centre of a large coastal city on the Pacific Rim. Most of the land adjacent to False Creek was owned by the Canadian Pacific Railway and, encouraged by transportation connections, False Creek sustained rapid industrial growth. After 1900, manufacturing plants for wood products predominated, along with iron works, machine shops and metal manufacturing firms. A prominent landmark at the foot of Carroll Street was the B.C. Electric Company Gas Works with its outsized white holding tank and adjacent processing plant. This is the location of the future Creekside Park North and the site of this project. By the mid 1960's industry had declined and other more public uses for False Creek were being proposed.

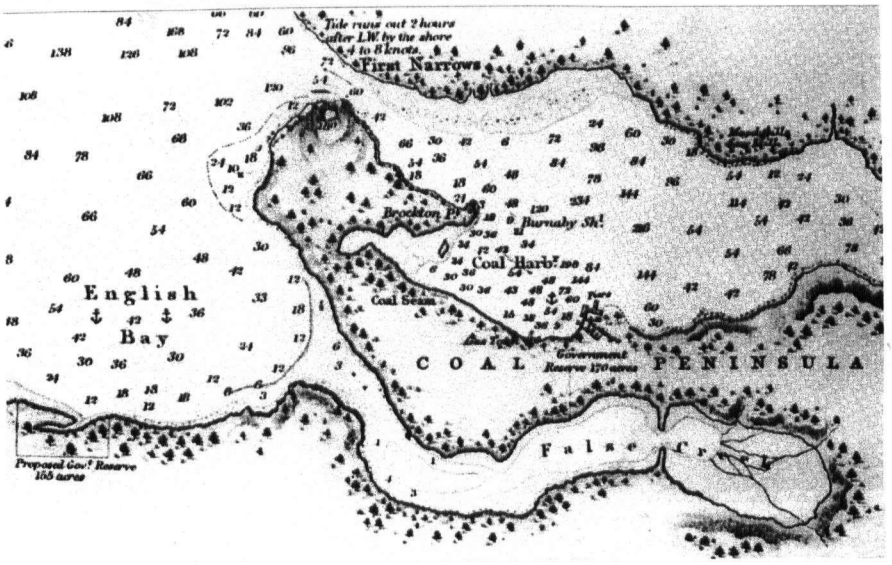


Plate 8. Survey by Capt. George Richards, 1860

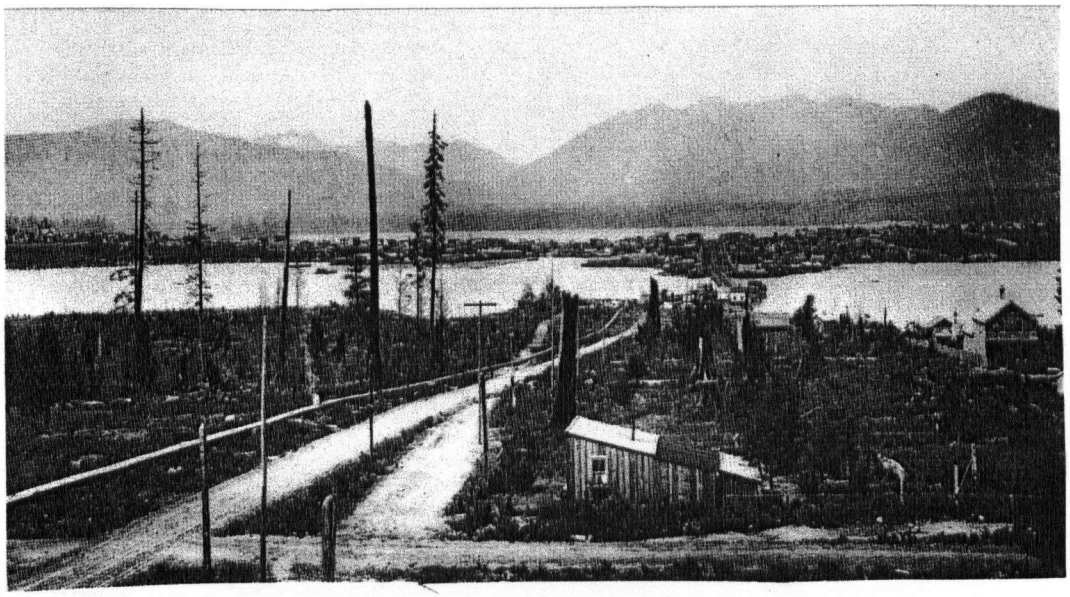


Plate 9. View of Site from Mt. Pleasant, After Clear Cut, 1889

Plate 10. Aerial View of False Creek with Industrial Development, 1929, (with Gas Works Tower, Centre Right)

3.3. Biophysical Complexity

This is a brownfield site along a constructed shoreline many hundreds of meters south of the original. It consists of fill materials of varying porosity to a depth in excess of 5m along the shoreline. Site elevations vary from 2 to 4m (geodetic datum) across the site. The shoreline edge consists of rubble and sheet pile. The intertidal zone has shopping carts and other debris and biodiversity at the water's edge is low. Tidal fluctuations in this coastal region are as high as 4.5 meters and hydrographic charts and tables for this area of False Creek show marine depths up to 7.3 meters at lower low tide.

Within its larger geographical context the city of Vancouver is situated at the confluence of a major river, mountain range and the sea. It is located on the Burrard Inlet which lies on the northern edge of the Fraser River delta and Fraser Lowland.

False Creek is a small inlet along the coastal edge of this extensive delta lowland area. Across the Burrard Inlet, to the north, the Coast Mountains dominate views across the city. The Fraser River discharges sediment-laden water into the Strait of Georgia where it is dispersed by currents and settles to the seafloor. Silt and sand are deposited on the tidal flats at the river mouth; over time this sediment builds up and the delta front migrates westward. Sediments drift eastward as well to form the Spanish Banks off Jericho, and spill into False Creek.

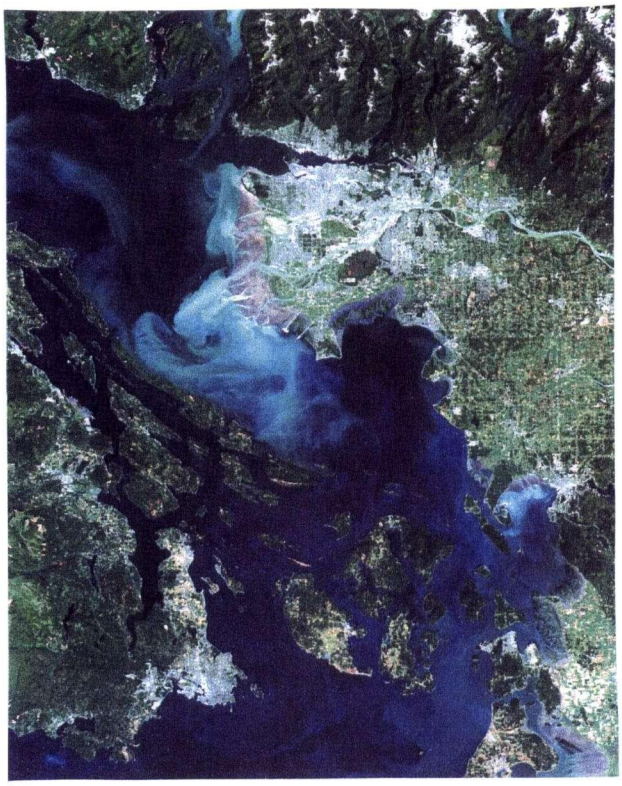


Plate 11. Greater Vancouver from space, 2000

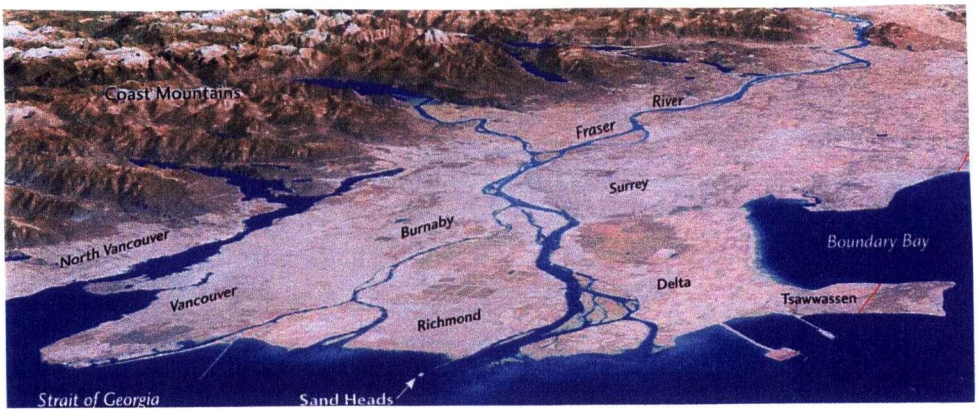


Plate 12. Computer-generated Image of Fraser Delta and Lowland

CHAPTER IV Programmes

True Creek Marsh Botanical Park is the name assigned to this design proposal and this calls for some explanation. When Captain Richards gave the narrow inlet the name False Creek he had presumably and mistakenly thought that he had entered the mouth of a river flowing into Burrard Inlet. As John Stilgoe points out, the popular meaning of the word creek for a small stream, has been confused for centuries. He states its true etymology is clearly described in the 1834 Websters– that a creek is an inlet or bay, extending longer and narrower into the land than a cove, a narrow recess of the sea, lake or river, the estuary of a brook, but not itself a type of stream or river at all. Furthermore, Stilgoe's thesis in *The Shallow Water Dictionary*, 2004, is that the ability to name the elements of ecosystems (in his case, wetlands) is directly related to how such ecosystems are valued and subsequently how well they are protected and conserved. In other words if you can't name a landscape's components, it is particularly vulnerable to loss. This certainly resonates with the goal of my botanical garden. There is irony in the fact that misnamed False Creek, for more than a century, was filled and polluted and its natural systems generally abused, even to the present day. It is the task of True Creek Marsh Botanical Park to bring all this and more to people's attention.

The term botanical park, rather than botanical garden, makes a statement about what kind of place this is. Use of this term implies the broad access of a public park that is casual and user friendly, while offering botanical interest as well. It signals that the expectations that visitors might have for such a place might need to be reconsidered.

The programme of a botanical garden is unique compared to other public spaces. As information-oriented landscapes for raising awareness of the importance of plants, in many instances they are intensely scientific, supporting education and research. As a genetic resource they preserve plants in documented collections and disseminate plant material. Moreover they also function artistically with all the cultural and metaphorical associations of other types of gardens, and like parks they are pleasure grounds for strolling and quiet relaxation. They mix leisure and intellectual stimulation much as museums or art galleries do and can be additionally powerful because of their capacity for landscape beauty.

The programmatic opportunities afforded by this particular site are exceptional on a number of fronts, starting with its busy urban location within the daily activities of local residents, workers and recreational users. This challenges the more traditional model of a botanical garden as separate enclave, to accommodate other desires and needs more commonly associated with public parks, such as recreational trails, lookouts, shelters and, since this is waterfront, docks. As well, the site is located on a commuter and recreational route and access must be efficiently provided while at the same time presenting opportunities to stimulate passers-by and entice them to make a return visit to the botanical park for further exploration.

Because this site is only one element of a larger network it is not necessary to provide the usual broad programme of a botanical garden. There is therefore an opportunity to allow the ecology and history of the site to be developed as the main

interpretive story, thereby reinforcing the conservation message. Also, it provides visitors with the experience of marine wetland ecosystems not commonly experienced since they are particularly vulnerable in urban settings. And, importantly for this thesis, the morphological potential of this ecosystem can be exploited aesthetically and experientially for discovery, engagement and interest.

PROGRAMMES

Existing (and Accommodated)

- Commuter route (to Skytrain and buses) (direct pedestrian and bike paths, bridges)
- Recreational route (Seaside walkway and bike paths)

Proposed

Botanical/Environmental Experiences

- Marsh—eelgrass, salt, brackish, fresh, swamp (tidal, intertidal and non-tidal)
- Upland—Birch Grove, Big-Leaf Maple Bosque, Raincoast Ridge, Willow Woods, Alder Avenue, Cottonwood Court
- Ethno-botanical—First Nations Food Plants
- Gardening for ecological restoration (Marsh Plant Nursery)
- Community environmental activities (Centre for Environmental Activities)
- Interpretive trails
- Bird watching (marshes, First Nations Food Plants, Sitka Swamp)
- Observation, photography etc
- Weirs, bridges and banks (Trestle Bridge, Boardwalk Bridge, Gabion Weirs, Gabion Bridge, Gabion Terraces)

Interpretation (Informal)

- 360 degree, five level tower lookout (Sea Mark Discovery Lookout)
- Tide-viewing Pavilion
- Eelgrass-viewing Dock
- Observation bridges
- Gabion features
- Interpretive trails

Interpretation (Programmed)

- Community-based nature education (Centre for Environmental Activities)
- Aboriginal knowledge and culture, art and crafts

Park Activities

- Community theatre
- Café (Cottonwood café concession)
- Exercise tower (Sea Mark Discovery Lookout)
- Jogging, biking, blading, walking, picnicking, climbing, looking, bird watching, sitting...
- Adventure (low tide trails, gabion weirs, mountain bike trails)
- Sheltered sitting (Tide-viewing Pavilion, Sea Mark Discovery Lookout)

Table 1. Programme List (Existing and Accommodated, and Proposed)

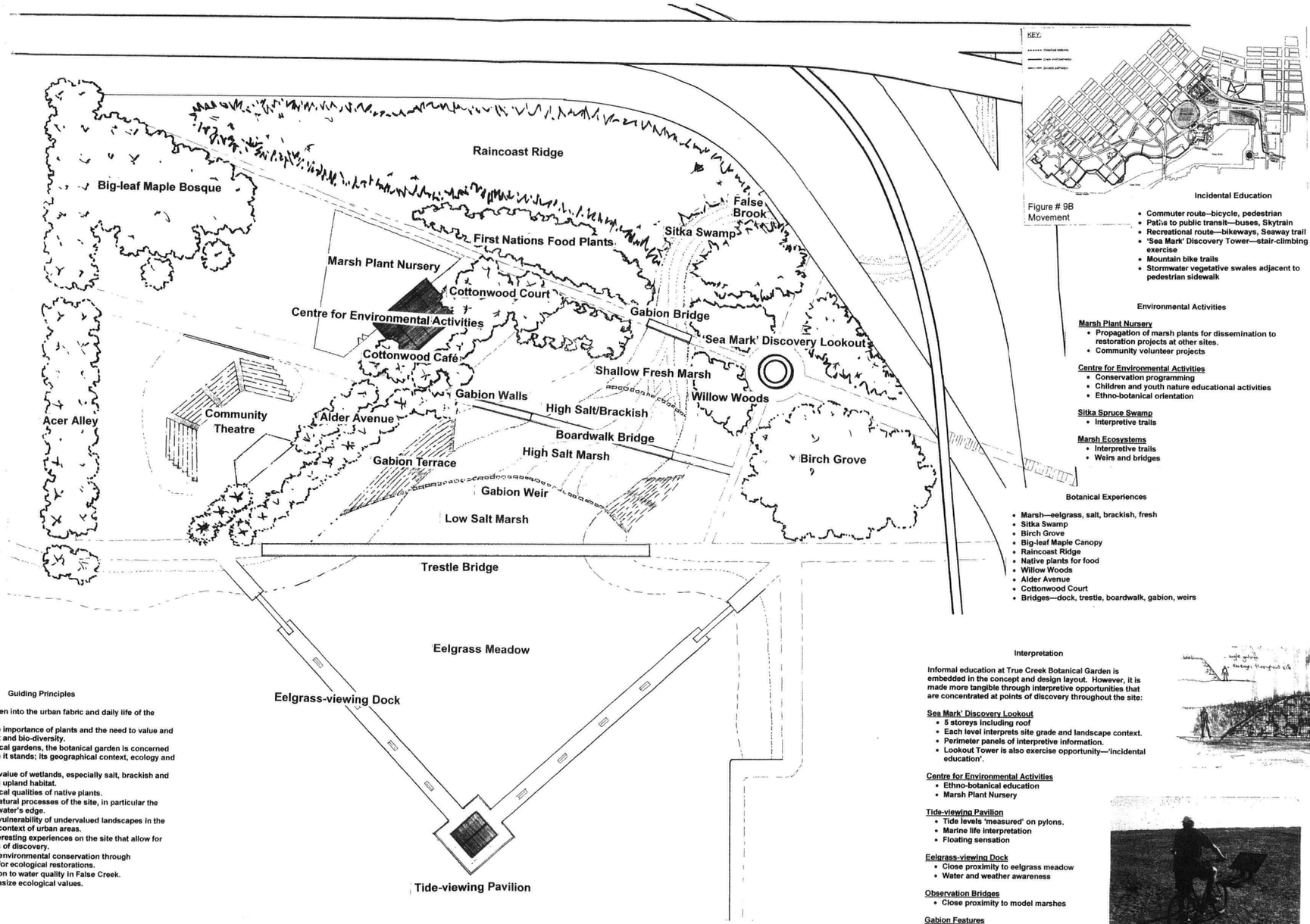


Figure # 9B
Movement

Incidental Education

- Commuter route–bicycle, pedestrian
- Paths to public transit—buses, Skytrain
- Recreational route—bikeways, Seaway trail
- 'Sea Mark' Discovery Tower—stair-climbing exercise
- Mountain bike trails
- Stormwater vegetative swales adjacent to pedestrian sidewalk

Environmental Activities

Marsh Plant Nursery
- Propagation of marsh plants for dissemination to restoration projects at other sites.
- Community volunteer projects

Centre for Environmental Activities
- Conservation programming
- Children and youth nature educational activities
- Ethno-botanical orientation

Sitka Spruce Swamp
- Interpretive trails

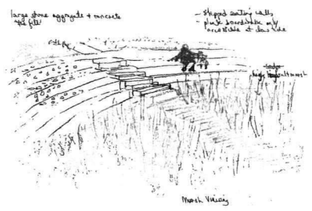
Marsh Ecosystems
- Interpretive trails
- Weirs and bridges

Botanical Experiences

- Marsh—eelgrass, salt, brackish, fresh
- Sitka Swamp
- Birch Grove
- Big-leaf Maple Canopy
- Raincoast Ridge
- Native plants for food
- Willow Woods
- Alder Avenue
- Cottonwood Court
- Bridges—dock, trestle, boardwalk, gabion, weirs

Guiding Principles

- Integrate botanical garden into the urban fabric and daily life of the community
- Connect people with the importance of plants and the need to value and conserve natural habitat and bio-diversity.
- Unlike traditional botanical gardens, the botanical garden is concerned with the site upon which it stands; its geographical context, ecology and development history.
- Raise awareness of the value of wetlands, especially salt, brackish and fresh marsh, and related upland habitat.
- Exploit the ethno-botanical qualities of native plants.
- Connect people to the natural processes of the site, in particular the inter-tidal zone and the water's edge.
- Raise awareness of the vulnerability of undervalued landscapes in the economic development context of urban areas.
- Provide pleasurable, interesting experiences on the site that allow for education in the process of discovery.
- Contribute materially to environmental conservation through dissemination of plants for ecological restorations.
- Make positive contribution to water quality in False Creek.
- Engage artistry to emphasize ecological values.



Botanical gardens are 'information-based' landscapes for raising awareness of the importance of plants. Traditionally, this has been accomplished by setting plants of the world within geographically appropriate scenery or in groups of individuals with similar botanical attributes. Such botanical gardens are both 'living museums' and pleasure gardens.

Conservation issues in the 21st century require increased out-reach and alternatives that emphasize ecological relationships over more 'plant-centric' models. The realities of the 'information age' as well as limited leisure time demand a reevaluation of educational methodology and the optimum locations for botanical gardens.

Interpretation

Informal education at True Creek Botanical Garden is embedded in the concept and design layout. However, it is made more tangible through interpretive opportunities that are concentrated at points of discovery throughout the site:

Sea Mark' Discovery Lookout
- 5 storeys including roof
- Each level interprets site grade and landscape context.
- Perimeter panels of interpretive information.
- Lookout Tower is also exercise opportunity—'incidental education'.

Centre for Environmental Activities
- Ethno-botanical education
- Marsh Plant Nursery

Tide-viewing Pavilion
- Tide levels 'measured' on pylons.
- Marine life interpretation
- Floating sensation

Eelgrass-viewing Dock
- Close proximity to eelgrass meadow
- Water and weather awareness

Observation Bridges
- Close proximity to model marshes

Gabion Features
- Walls, Terrace, Weir, Bridge
- Industrial history—reference to landfill

Figure 5. Programme Plan

True Creek Marsh Botanical Garden	Jill Cherry 25313008	For: LARC 598	Scale: 1:400	Title: **Programme**	N
		Date: Dec. 2004	Sheet # 5		

Figure 6. Site Plan

True Creek Marsh Botanical Garden	Jill Cherry 25313008	For: LARC 598	Scale: 1:400	Title: Site Plan	N
		Date: Dec. 2004	Sheet # 6		

The ecosystem-based collections consist of native plants that are for the most part not commonly available in the nursery trade, therefore propagating and sharing them with other ecological restoration projects contributes to conservation in a material way. In addition, given the garden's location on the water and the natural drainage of the site, there is an opportunity for the site to demonstrate and indeed to function as a storm-water treatment system using natural processes, prior to its discharge into False Creek. And, the physical and geographical contexts of the site permit at least symbolic reference to, and interpretation of, the larger ecosystem within which the site resides; to relate ocean to marsh to rainforest to mountain, in other words.

All botanical gardens present the magic and wonder of the plant world. At True Creek the plants are not only viewed, examined and appreciated but there is an atmosphere about the place that can be felt. For instance, the morphological qualities of marsh with its expansive stands of reeds and rushes can be experienced from a range of vantage points beside, above or within. In addition, there is the tide and the ever-changing landscape of the inter-tidal zone. As well, there is the vista of False Creek from many vantage points. Indeed the activity of viewing, both within and from the site, is an important part of the programme.

Upland areas of the park offer a range of experiences from forest to avenue to grove. The former aboriginal use of the site inspires the ethno-botanical collections of First Nations food plants that provide content for programming that is educational, accessible and fun. The Environmental Centre serves as a platform for a wide range of environmental recreational activities pertaining to the elements and aspects of the site, for all age groups. The Marsh Plant Nursery involves participants in restoration efforts through participation in the growing and dissemination of salt and freshwater marsh plants.

Interpretation is an important programmatic element at botanical gardens and at True Creek various alternative methodologies are pursued. First of all, environmentalism is embedded in the overall concept and design of the park. The extension of the shoreline into the site, the incorporation of tidal flux, the various marsh habitats expressed, the historical references, the revealing of previously buried ecosystems and the changes in the appearances of objects in the landscape as a result of the tide, all draw attention to process and issues in a non-textual way. For instance, viewed from a distance, the architectural form of the Tide-viewing Pavilion changes as the tide rises and falls, appearing taller at low tide than at high tide. Up close, the spatial experience of sitting on a bench within the pavilion with the roof high overhead at low tide differs markedly from the height of the structure at high tide. As well, graphic markings on the pylons supporting the floating pavilion, measure the water depth as it rises and falls and provide further tidal awareness.

Secondly, the traditional use of labels and signage is limited to points of discovery so that the educational aspects are less overt and more casually and unconsciously absorbed. Textual, graphic interpretation is primarily located on the five levels of the Sea Mark Discovery Lookout, the Tide-viewing Pavilion, the Centre for Environmental Activities and the Marsh Plant Nursery. Furthermore, the descriptive naming of areas and elements, such as Eelgrass-viewing Dock, Acer Alley and so

on, communicates and emphasizes potential function, possible related activities, ecological processes and botanical information.

Finally, elements that have overlapping functions are efficient from an experiential point of view. The lookout tower is for taking in the view, for interpretation and for exercise. Wooded areas are designed for trail bikes and bird watching by separating the activities through circulatory and protective devices. Tables and chairs are set in the courtyard for use by café customers and by nature programme participants. The community theatre is for performances as well as providing one more elevated point from which to view both the garden and its environs.

CHAPTER V Major Areas

5.1. The Inlet: True Creek, False Brook

A key feature of this site, and primary inspiration for the design, is the continually fluctuating boundary and meeting point of land and water, placing a particular focus on the inter-tidal zone at the water's edge. The cycle of the tide creates challenges for design implementation but offers significant opportunities for the experience of the garden. As well, salinity is a limiting factor for plant growth, reducing biodiversity while at the same time creating the potential for a dramatic morphological aesthetic and phenomenological affect, from the few plants capable of surviving it.

An inlet (True Creek) from False Creek is insinuated into the land area of the park so as to create a series of marsh habitats (True Creek Model Marsh). These range from those which are entirely marine and underwater most of the time, such as the Eelgrass Meadow at the point where False Creek becomes True Creek, through salt marsh to brackish marsh to shallow freshwater marsh where True Creek becomes False Brook. It should be emphasized that this ecosystem is a model and does not pretend to be an ecological remnant found on site. Since this is a small urban site it is not possible to recreate an entire marsh ecosystem, nor can biotic complexities be produced artificially, even though some conditions for them to occur can be set out. True Creek and Model Marsh configurations take their visual cues from the meta-landscape of large delta and marsh areas, in the same way that architecture has drawn from natural forms such as the spiral of shells and tendrils, or leaf shapes such as the acanthus of the Corinthian capital.

The True Creek inlet is the most botanically intense area of the park and divides the site into two parts diagonally. As False Brook it passes under the road through a culvert to connect with a system of vegetated swales that course down Quebec Street from an opened storm-sewer several blocks north of the site.

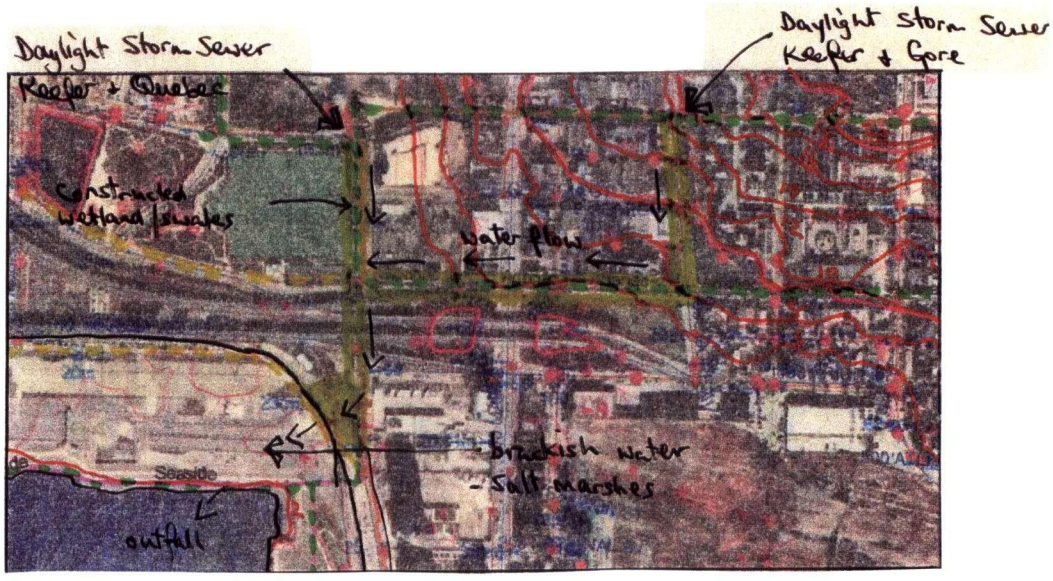


Figure 7. Diagram of Stormwater Flow

The correct growing conditions for the marsh ecosystems being modelled were established within required ecological parameters. Such factors as frequency of inundation, salinity levels and optimum depth of water for growth, led to groupings of plants that range from very low diversity (with 2 or 3 indicator species and little else) in the low salt marsh to the greatest diversity (8 indicator species with many other possible genera) in the shallow freshwater marsh. There are precedents for eelgrass meadow creation in Washington State and for high and low salt marsh at Campbell River. Suitable plants for the marshes were selected through field guides cross referenced with local nursery availability. Examples of several remnant marshes remain in the Vancouver area, including brackish marsh on the Fraser River at Steveston and Ladner, low salt marsh and eelgrass meadows at Boundary Bay, and freshwater marsh and Sitka Spruce marsh at Maplewood Flats in North Vancouver. In addition, there are excellent examples of salt marsh on Sidney Island off Vancouver Island. The most directly pertinent precedents for this site however are the historical photographs in the Vancouver Archives of the salt marshes and mudflats of pre-development False Creek as well as contemporary landscape paintings showing shoreline vegetation.

Plate 13.
(left, top)
False Creek, 1909

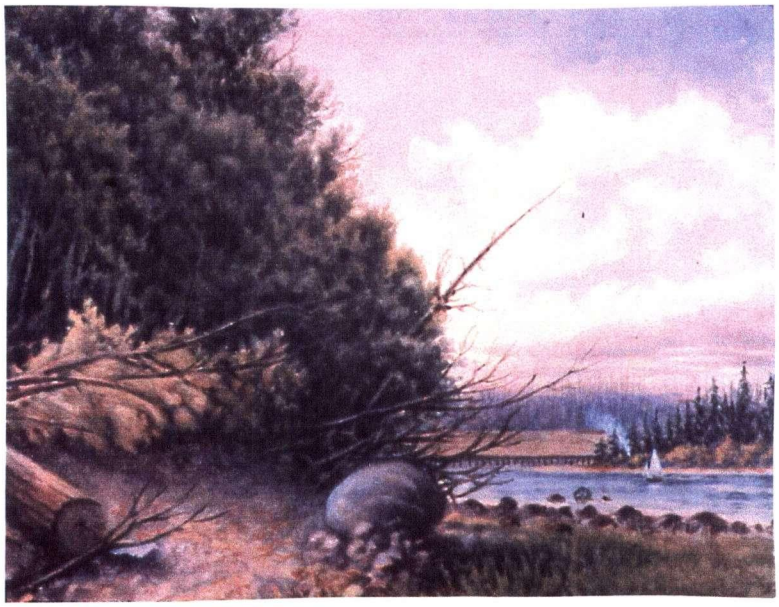
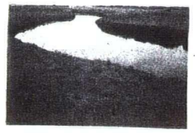


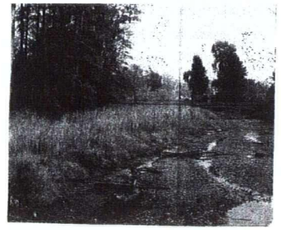
Plate 14.
(left, bottom)
False Creek , Painting by
William Ferris, 1900

Eelgrass meadow

Brackish marsh, South Arm Marine Wildlife Reserve, Ladner



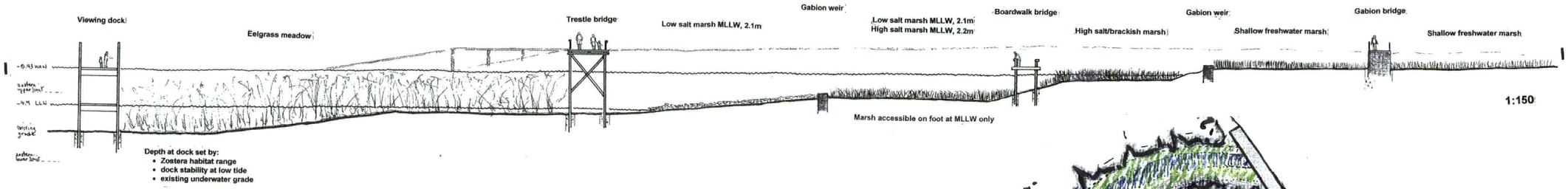
Low salt marsh

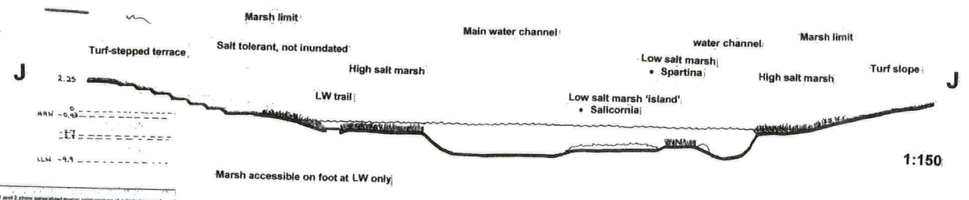


Tidal slough, Ladner

Lyngby's Sedge, brackish marsh

Fresh marsh, Maplewood Flats, N. Vancouver





Figures 1 and 2 show generalized spatial relationships of selected types of wetlands. The user should understand that each of these wetland types represents a loose-ility of habitats with much overlap in plant species composition in response to site-specific environmental conditions. As a result, many of these classes will be found in more than one wetland type and may also occur in non-wetland situations.

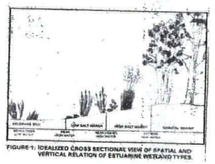


FIGURE 1: IDEALIZED CROSS SECTIONAL VIEW OF SPATIAL AND VERTICAL RELATION OF ESTUARINE WETLAND TYPES.

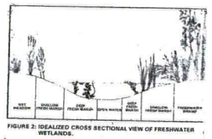


FIGURE 2: IDEALIZED CROSS SECTIONAL VIEW OF FRESHWATER WETLANDS.

Creek \'krēk, 'krik less frequent in the South and urban areas\ starts this dictionary of estuary English. From Maine to Cape Fear in North Carolina, the word designates, according to Hans Kurath in *A Word Geography of the Eastern United States*, "salt-water inlets of small streams that empty into the sea." Now **stream** is a general term for what New Englanders call a **brook**, and southerners call a branch or creek. Larger than a **rill** but smaller than a **river**, a brook is always a fresh-water flow. Early on, however, creek came to be a "corruption" of brook, as James Fenimore Cooper lamented in 1838 in his *American Democrat*: "'Creek,' a word that signifies an *inlet* of the sea, or of a lake, is misapplied to running streams, and frequently to the outlets of lakes." In his 1852 revised version of *Noah Webster's American Dictionary of the English Language*, Chauncey A. Goodrich understood *creek* to mean "a small inlet, bay, or cove; a recess in the shore of the sea, or of a river," but admitted too that it meant also "in some of the American States, a small river. This is contrary to English usage, and is not justified by etymology; but as streams often enter into creeks and small bays, or form them, the name has been extended to small streams in general."

The 1934 Webster, perhaps the greatest of American dictionaries–and as the last hand-bound one, the last as thick as its editors wanted, not, as all subsequent machine-bound dictionaries, as thick as the biggest binding machine in the Republic could bind it–explains *creek*, in part, as follows: "a small inlet or bay, narrower and extending farther into the land than a cove; a narrow recess in the shore of the sea, a river, or a lake...the estuary of a small river or a brook, emptying on a low coast or into the lower reaches of a wide river, together with the upper course of the small river or brook to its source." Here, after centuries, some sense, some awareness of the low coast, some precision about the estuaries of brooks. But not enough.

In the marshes a creek may be the estuary of a brook, although not always. Satuit Brook empties directly into Scituate Harbor. No part of it any native calls a creek. But a mile away, across a cornfield last flooded by spring tides in 1786, creeks reach across marsh from creek to creek, lacking all connection to inland brooks. In them *Essay* moves slowly, under oars, and sometimes, above an oar forced into the muddy bottom when the creek is too narrow for rowing. Such creeks are cracks. Not only do they appear so from atop the marsh, when they stymie hikers, hunters, and fishermen caught by rising tides, they appear so from the boat. Always the banks are caving, the salt meadow cordgrass and creek sedge grass losing their grip on the mud and tumbling into the current. The marsh is cracking always, always quietly, with only a splash now and then to mark the fall of the bank.

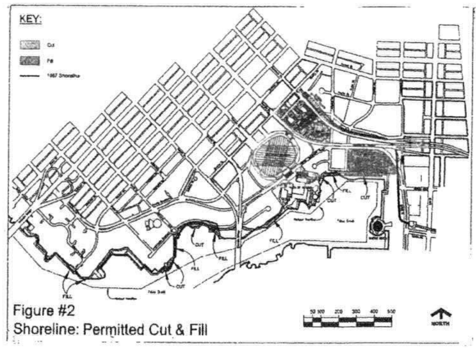
How far up a creek does a brook begin? Where salt water turns **brackish**? To crack the marsh realm, to burgle it by boat, involves naming such indistinct zones as the creek-brook boundary.

Shallow Water Dictionary, John R. Stilgoe

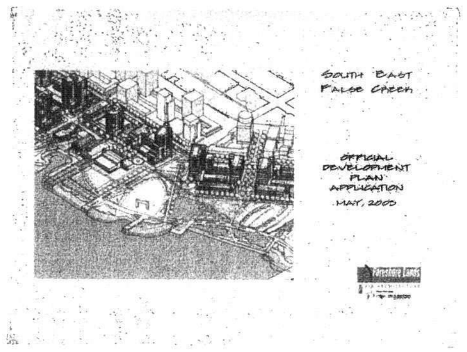
Figure 8. Model Marsh

True Creek Marsh Botanical Garden	Jill Cherry 25313008	For: LARC 598	Scale: Various	Title: Model Marsh	▲N
		Date: Dec. 2004	Sheet # 7		

Shoreline Alteration

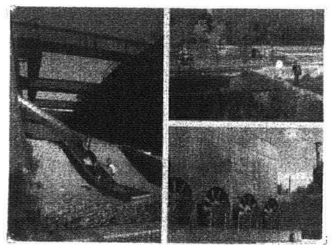


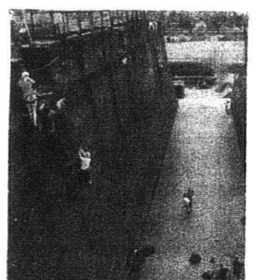
Existing ODP requirements, shoreline cut and fill



S.E. False Creek, ODP Application, 2003
showing proposed (unsuccessful) shoreline alteration

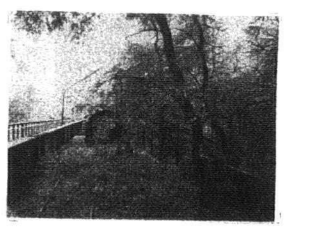
European Precedents for Brownfield Sites





Emscher Park, Duisberg-Nord, Latz

Active use and close physical contact with formerly (?) contaminated industrial site



Pedestrian walkway, former Zollverein Colliery, Essen, Germany

Eelgrass and Marsh Restoration Precedents

The marsh creation project in the Campbell River estuary has resulted in the establishment of plant communities with typical intertidal marsh plant species at this latitude. Over the 13-yr study period, the constructed islands remained stable, with little apparent erosion. As a result, most of the planting blocks on the islands established *Carex lyngbyei*- or *Juncus balticus*-dominated communities with total cover similar to that of the natural low-marsh or mid-to-high marsh communities of adjacent Nunn's Island. A striking result was the vegetation growth on the unplanted blocks that, between the 7th and 13th years, had reached species composition and aboveground biomass levels comparable to those of both the planted and the natural marshes. Thus, the project has achieved Zedler's (1988) marsh creation goals of establishing plant cover and species richness near natural levels.

http://www.consecol.org/vol4/iss2/art12/main.html

Salt Marsh creation project, Campbell River

Washington State Department of Transportation

Eelgrass Protection Project

Innovative Eelgrass Protection Project A Huge Success

Results And Next Steps

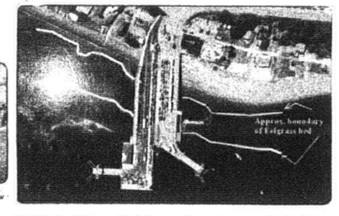
Battelle divers just replanted 11,000 eelgrass shoots at the Clinton dock site, the third of four transplanting efforts scheduled for the project. When the planting was finished, the recently barren area had turned into row upon row of green grasses swaying in the surf. Curious surf perch and crabs inspected the new plants soon after the divers swam out of the way.

At this time, a total of 14,230 square feet of eelgrass has been successfully transplanted around the Clinton ferry dock. One of the transplanted plots lies directly underneath the glass blocks of the pedestrian walkway.

Amy Borde of Battelle Marine Sciences Laboratory prepares eelgrass for transplanting underneath the new Clinton ferry dock

John Southard and ... Laboratory harvest eelgrass for replanting underneath the new Clinton ferry dock

So far, the project has expanded the area of eelgrass beds around the Clinton ferry dock and increased the total number of shoots as compared with pre-dock construction. In general, the transplanted eelgrass beds appear to be healthy and are becoming indistinguishable from the surrounding eelgrass beds.



http://www.wsdot.wa.gov/ferries/your_wsf/corporate_communications/clinton

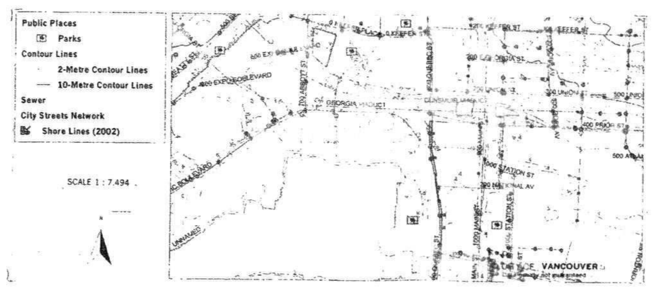
Eelgrass bed creation project, Clinton Bay, WA

Assumptions

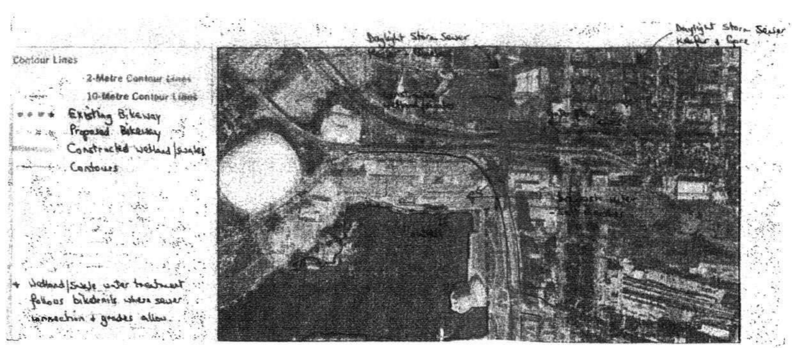
That:

- municipal and senior levels of government would permit the altering of the shoreline to allow for landfill excavation.
- the technology exists to create wetland marsh habitat; salt, brackish and fresh, and to bio-engineer and establish eelgrass beds in the intertidal zone.
- the plant material required is available from local specialty nurseries, and that VanDusen could propagate challenging species.
- City of Vancouver Engineering Department approves the 'daylighting' of a stormwater sewer line, north of the site.
- it is feasible and City approved to create vegetative swales to filter stormwater prior to entering the True Creek Marsh Botanical Garden and, ultimately, False Creek.

Stormwater Treatment

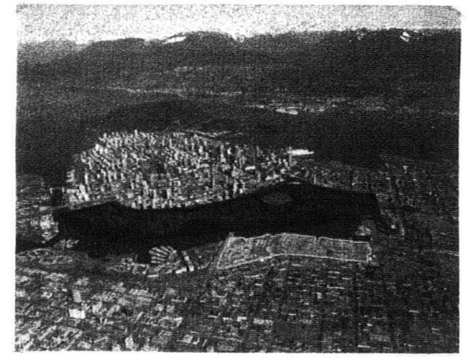


Contours and sewer network



Flow chart for proposed overland water treatment
1:7945

False Creek North Official Development Plan



False Creek North ODP area (red) with South East False Creek area (yellow)

1.2 **Intent**
The intent of this plan is to achieve a high standard of design and development within a number of residential neighbourhoods, parks, public facilities, and commercial areas with False Creek North. It is also intended that the buildings, open spaces, circulation patterns, and land uses be designed and planned to complement and take advantage of the setting on the water, with a southern aspect, near the centre of the city.

2.2.1 **Integrate With the City**
To integrate well with the city, the following should be addressed:

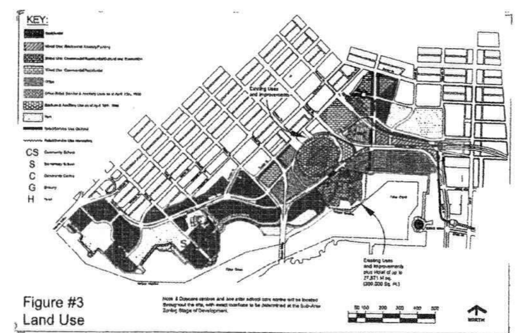
- Key elements of the street grid should be extended as streets, pedestrian routes, or vistas;
- The built form, block and land use patterns of the nearby areas should be extended or logically completed;
- The waterfront walkway system should be completed to a finished standard and include several clear linkages to Pacific Boulevard to connect to existing pedestrian routes;
- Strong visual and physical connections should be established through the area from Pacific Boulevard to the shoreline through the public open space system;
- Land uses, built form, and circulation patterns should encourage non-residents to visit the area and move through its various sub-areas; and
- Important view should be maintained and attractive new views should be created by development.

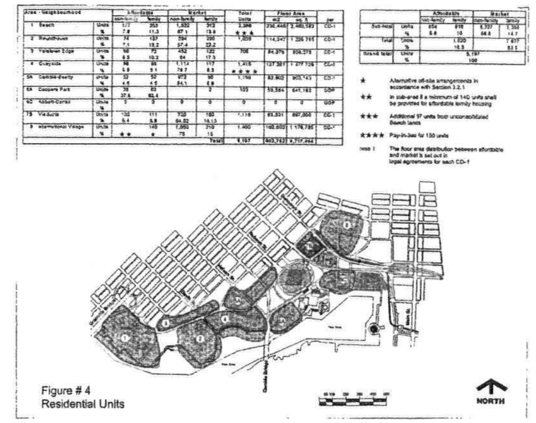
2.2.2 **Build on the Setting**
...the following should be considered:

- Southerly aspect;
- Water oriented land uses and activity settings;
- Visual, physical and functional linkages between the water and the land...
- ...history of the place;
- ...bridges...

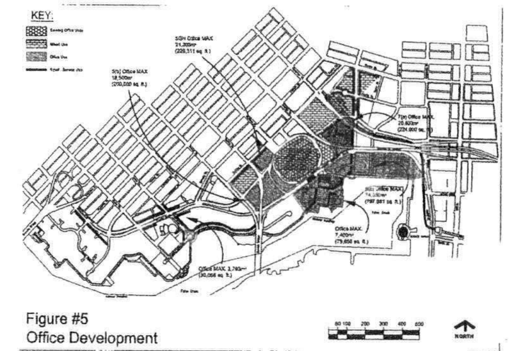
2.2.3 **Maintain the Sense of a Substantial Water Basin**
The False Creek water basin is an important geographical feature in the centre of the city. Adjacent development should enhance its presence...

- Locations of major open spaces;
- Configuration of the shoreline; and
- Views to the water.

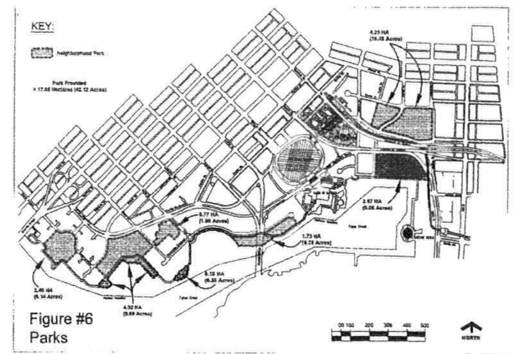




3.2.1 **Residential**
It is intended that False Creek North be developed as a predominantly residential area to achieve regional and City objectives and recognize the special amenity of the area as a place to live...
Twenty-five percent of the total number of dwelling units shall be suitable for families with children...
16.6 percent of the total number of dwelling units shall be designated for affordable housing, with priority on housing for core-need households, with fifty percent of the affordable units to be suitable for households with children.



Office development locations and density



3.2.7 **Parks**
It is intended that parks be distributed throughout the area as a focus for the neighbourhood. The size, location and configuration shall meet the needs of residents and workers, provide attractions for visitors and take full advantage of the waterfront environment...

Figure 9. Background and Assumptions

True Creek Marsh Botanical Garden	Jill Cherry 25313008	For: LARC 598	Scale:	Title: Background and Assumptions
		Date: Dec. 2004	Sheet # 3	

Plate 22. Brackish Marsh, Fraser River

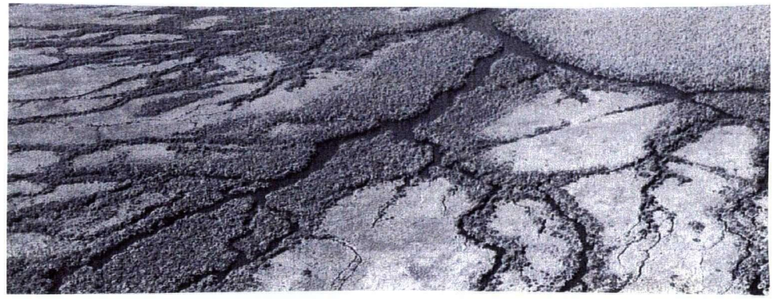


Plate 21. Marsh Meta-landscape

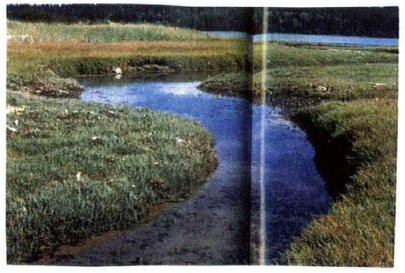
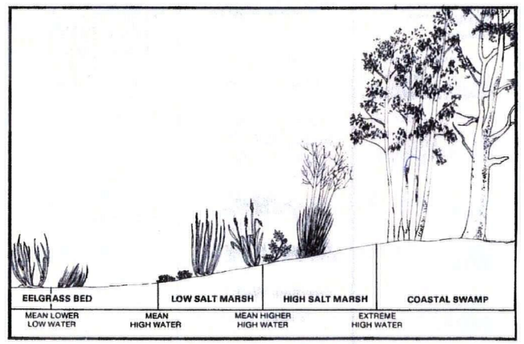


Plate 16. Low Salt Marsh, Sidney Island

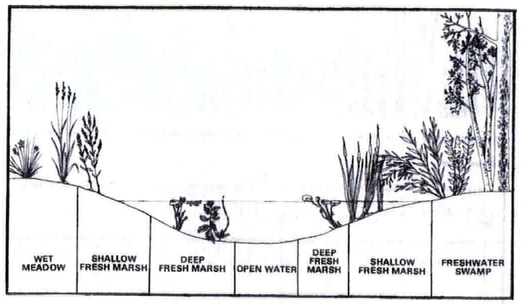
Plate 15. Eelgrass Meadow

Plate 17. Brackish Marsh, Ladner

Plate 20. Sitka Spruce Swamp, Marsh to Mountain



IDEALIZED CROSS SECTIONAL VIEW OF SPATIAL AND VERTICAL RELATION OF ESTUARINE WETLAND TYPES.



IDEALIZED CROSS SECTIONAL VIEW OF FRESHWATER WETLANDS.

Figure 10. Cross Sections of Wetlands

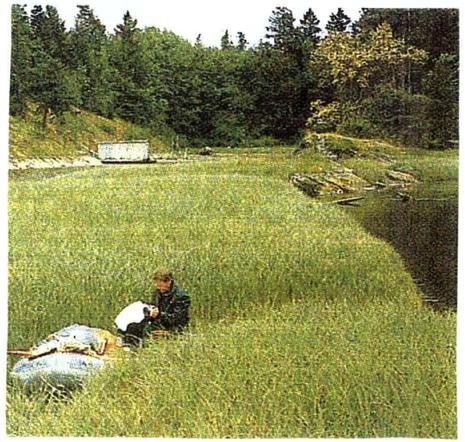


Plate 19. Brackish Marsh With Dominant Stand of Lyngby's Sedge

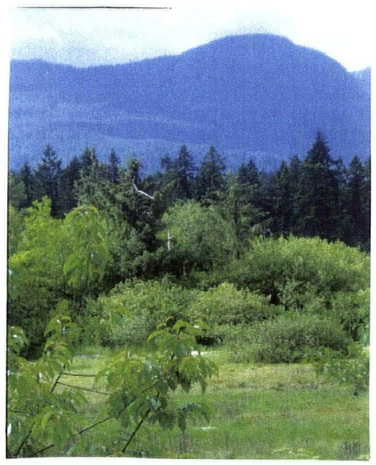


Plate 18. Maplewood Flats, N. Vancouver, Sitka Spruce Swamp

Plate 23. Shallow Freshwater Marsh, Maplewood Flats

For the purposes of this thesis project an assumption is made that municipal and senior levels of government would permit the altering of the shoreline to allow for landfill excavation. There is a precedent set by the Southeast False Creek ODP application of 2003 that implies that the existing restrictions could be challenged. Numerous precedents exist for public use of brownfield sites, primarily in Germany and France, where the toxicity issues are addressed in a variety of ways. Arguments could be made given the environmental benefits to be derived from the botanical park, its educational mandate, nursery activities and the material benefits of cleansed stormwater and saltmarsh plant dissemination.

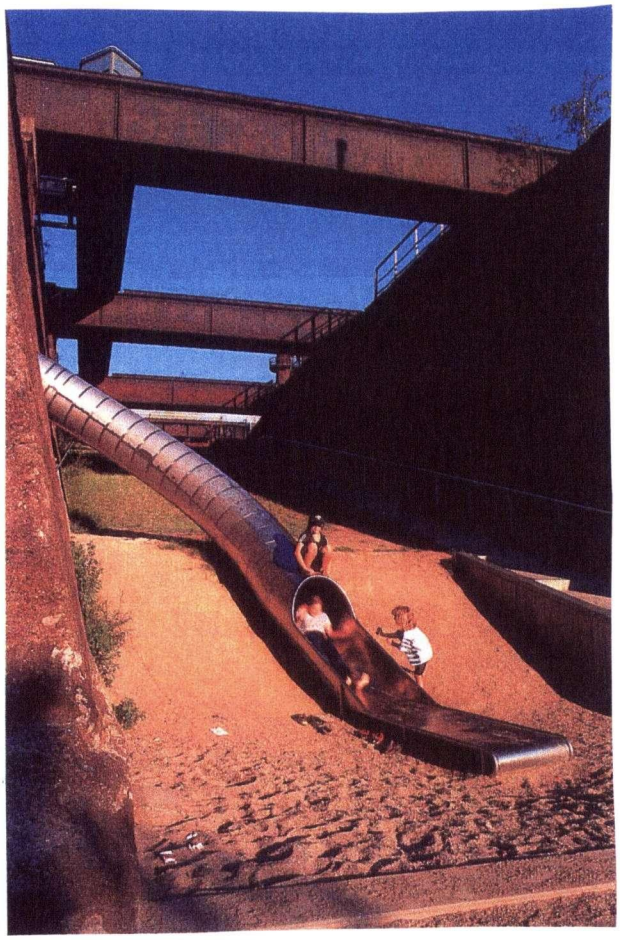


Plate 23. Emscher Park, Duisberg Nord, Latz, (Former Brownfield Site)

It is also assumed that the City of Vancouver Engineering Department would approve the daylighting of the stormwater sewer line north of the site, and the provision of vegetated swales between the pedestrian sidewalk and the road along Quebec Street, to filter stormwater prior to it entering True Creek. This would also provide a green linkage all the way from Andy Livingstone Park to False Creek. Vancouver City Council adopted its Greenways Plan in 1995 and subsequently adopted a set of principles for sustainability. A pilot project has been established for stormwater source control through a naturalized streetscape on Crown Street in Southlands that will reduce peak flows through infiltration and evapo-transpiration. Given the success of such projects in San Francisco and Seattle it is probably only a matter of time before naturalized streetscapes are commonplace.

The establishment of an eelgrass meadow and salt marsh requires cross referencing between hydrographic datum charts and tide tables with land datum topographic maps. Because Vancouver experiences two tide cycles per day with variances of more than 4.5 meters over the course of a year, it is necessary to work within a range of depth possibilities both for the selection of appropriate plant material and for establishing pedestrian accessibility and well-functioning hydrological processes. It is also important that tidal water be able to drain freely to avoid stagnation. The grading of the marshes drew on natural precedents as well as salt marshes managed for salt harvesting, such as in the Guerande area of Brittany in France.

chart datum -- (or *datum, datum plane, hydrographic datum, plane of reference, reference plane, tidal datum, tidal datum plane*). The permanently established surface from which soundings or tide heights are referenced (usually **low water**). The surface is called a *tidal datum* when referred to a certain phase of the **tide**. In order to provide a factor of safety, some level lower than **mean sea level** is generally selected, such as **mean low water** or **mean lower low water**.

high water -- (abbreviated HW; also called *high tide*). The highest limit of the surface water level reached by the **rising tide**. High water is caused by the astronomic **tide-producing forces** and/or the effects of meteorological, hydrologic and/or oceanographic conditions.

higher high water -- (abbreviated HHW). The higher of two **high waters** occurring during a tidal day where the tide exhibits mixed characteristics. *See* **mixed tide**.

mean higher high water -- (abbreviated MHHW). The average height of all the daily **higher high waters** recorded over a 19-year period, or a computed equivalent period. It is usually associated with a tide exhibiting mixed characteristics. *See* **mixed tide**.

low water -- (abbreviated LW; or *low tide*). The lowest limit of the surface water level reached by the lowering tide. Low water is caused by the astronomic **tide-producing forces** and/or the effects of meteorological, hydrologic and/or oceanographic conditions.

lower low water -- (abbreviated LLW). The lower of two **low waters** of any *tidal day* where the **tide** exhibits mixed characteristics. *See* **mixed tide**.

mean lower low water -- (abbreviated MLLW). The average height of all the **lower low waters** recorded over a 19-year period, or a computed equivalent period. It is usually associated with a tide exhibiting mixed characteristics. *See* **mixed tide**.

Figure 11. Hydrographic Glossary

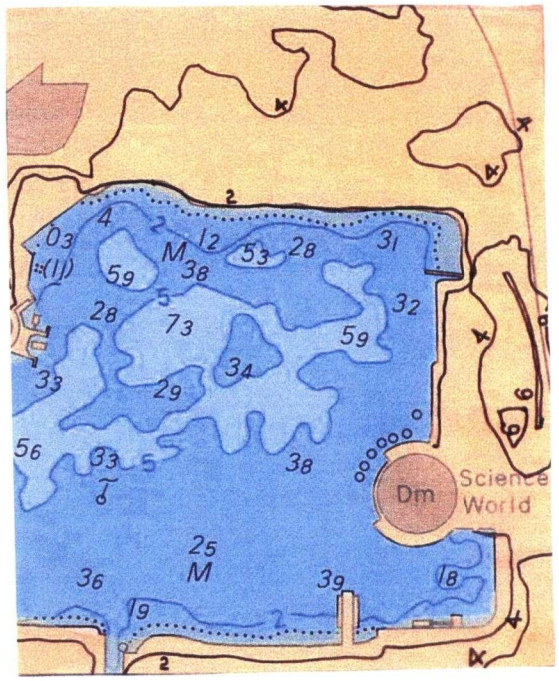


Figure 12. Eastern End of False Creek, Hydrographic and Land Datum

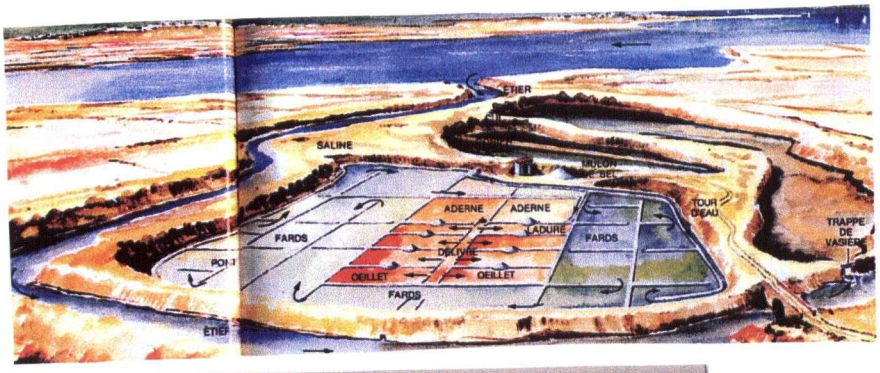


Figure 13. Drainage Diagram, Guerande Salt Marshes (middle left)

Plate 24. Harvested Salt, Guerande, (lower left)

The banks of True Creek are given different treatments to emphasize the sinuous lines of the inlet and the water's edge. Adjacent to the Trestle Bridge, gabion terraces on facing banks create a formal entrance to True Creek, extending the gabion terracing of the Community Theatre and providing easy waterfront access. The gabion terraces morph into turf terraces that gradually smooth out into simple turf slopes that connect adjacent turf areas to the shoreline. At the point where True Creek becomes False Brook at the northern Gabion Weir, ethno-botanical collections extend to the shore merging with Sitka Swamp which is treed to the edge.

In this project more direct routes must be provided across the site than in the average urban park or botanical garden. This presents the necessity of crossing the inlet in a safe and efficient manner a number of times along its length. The docks, bridges, weirs and marsh trails all provide different forms of access to a range of experiences of a variety of marsh habitats. Depending on one's age or inclination one could walk out along the dock to rest in the Tide-viewing Pavilion observing the floating emerald green leaves of the eelgrass meadow all around. Or, one could cross above the water by the Trestle Bridge on foot, bicycle or blades and enjoy a view from water to mountain, with the botanical park as foreground. Alternatively, one could clamber across stepping stone-like weirs of gabion baskets that act to retain the inclining grade and the resultant marsh habitats. At low tide, trails provide access within the marsh itself. Walking just above marsh level on the Boardwalk Bridge one could experience the subtle differences between the various monocultures of salt marsh and brackish marsh, as well as a close up view of the wildlife that live within the reeds, rushes and sedges. And the view from the Gabion Bridge as you proceed towards the Sea Mark' Discovery Lookout is over shallow fresh marsh that is the most richly bio-diverse of all these marsh types.

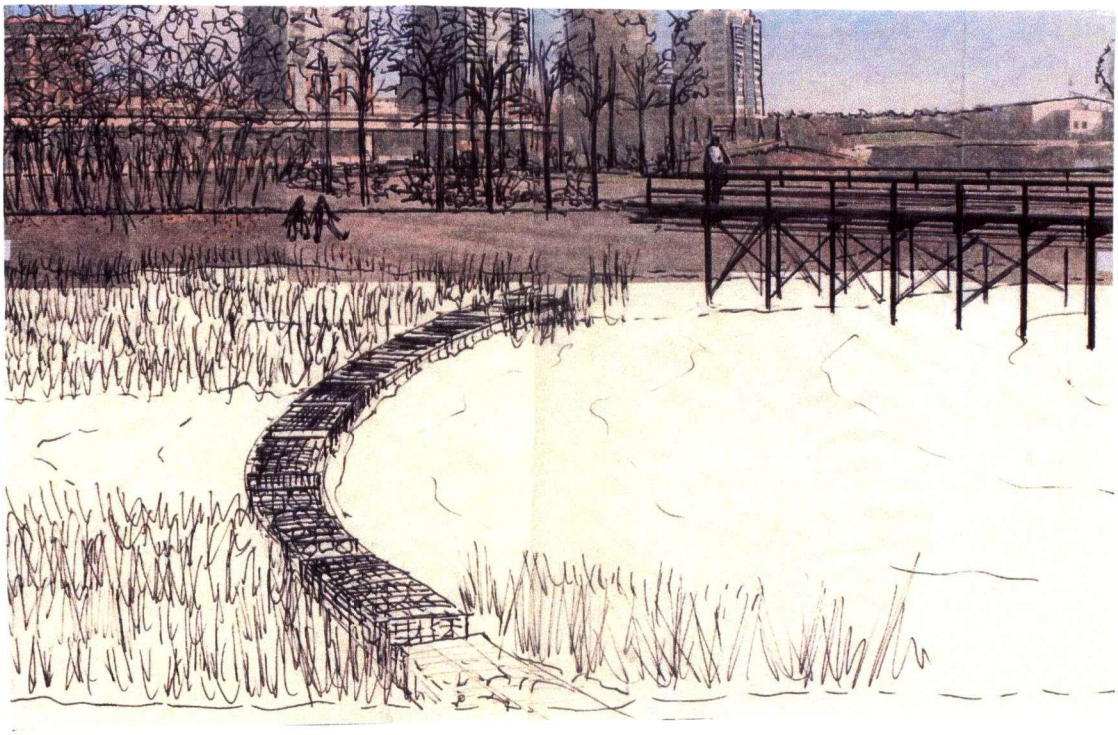


Plate 25. Salt Marsh with Gabion Weir and Trestle Bridge

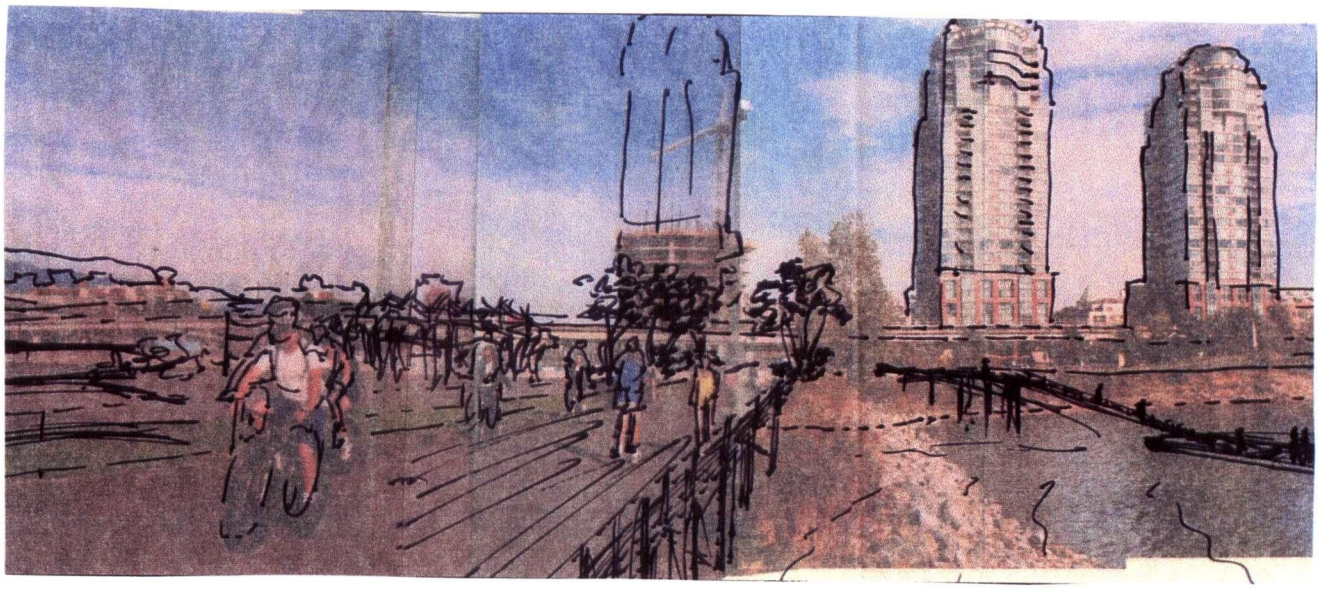


Plate 26. Trestle Bridge spans True Creek

5.2. Structures

5.2.1. Eelgrass Meadow-viewing Docks

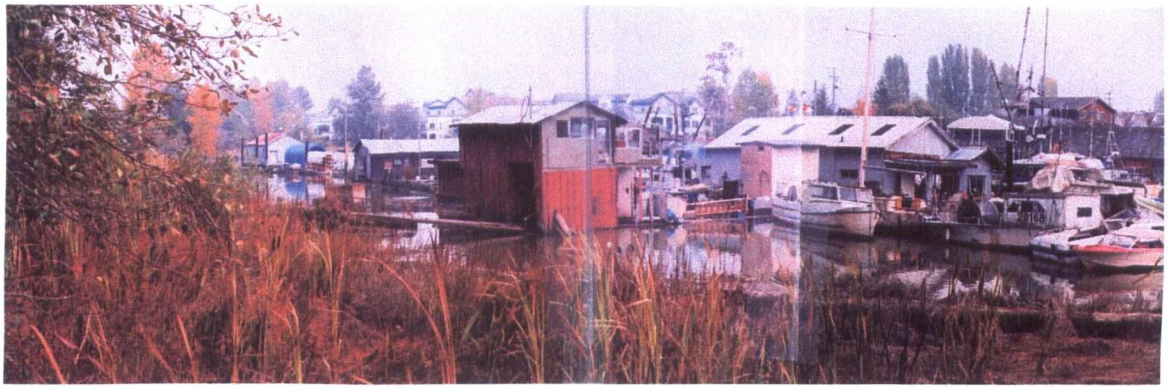
This waterfront site offers a variety of possible marine and wetland experiences. The Eelgrass Meadow-viewing Docks allow visitors to go out on the water by way of two floating docks that are perpendicular to each other and which connect at the Tide-viewing Pavilion. Fixed piers and floating ramps extend from points to the west and east sides of the park's section of the Seaway trail, and provide access to the docks. Benches placed along the dock lengths and at the pavilion provide views over the eelgrass meadows of the botanical park or out over False Creek.

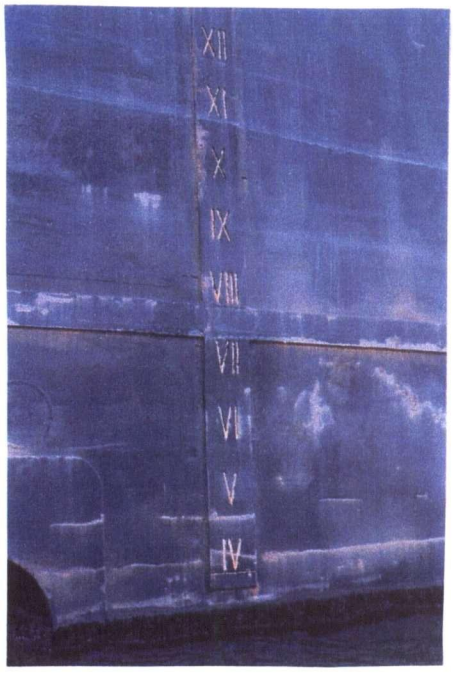
5.2.2. Tide-viewing Pavilion

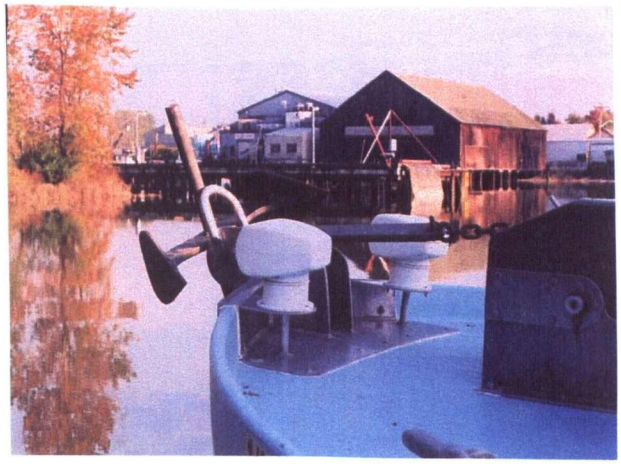
The Tide-viewing Pavilion provides shelter where the two Eelgrass-viewing Docks meet. While the docks (including the pavilion floor) float up and down with the tide, the roof of the pavilion is fixed to supporting pylons. The structure therefore changes its appearance with the tide, appearing taller at low tide than at high tide, making the tide evident to the most casual observer. Numerical notations on the pylons are inspired by the markings on the sides of marine vessels, and together with explanatory signage help reinforce awareness and knowledge of tidal cycles, hydrographic charts and tables and the depths of the marine aquatic environment. The shape of the Pavilion is inspired by the marine vernacular of net sheds and canneries along the Fraser River and coastline of the Burrard Inlet.

5.2.3. Trestle Bridge

The Trestle Bridge is the park's main bridge spanning True Creek allowing for continuous access along the Seaway bike and pedestrian trail. Its form resembles

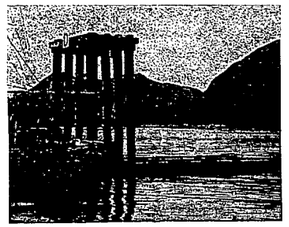






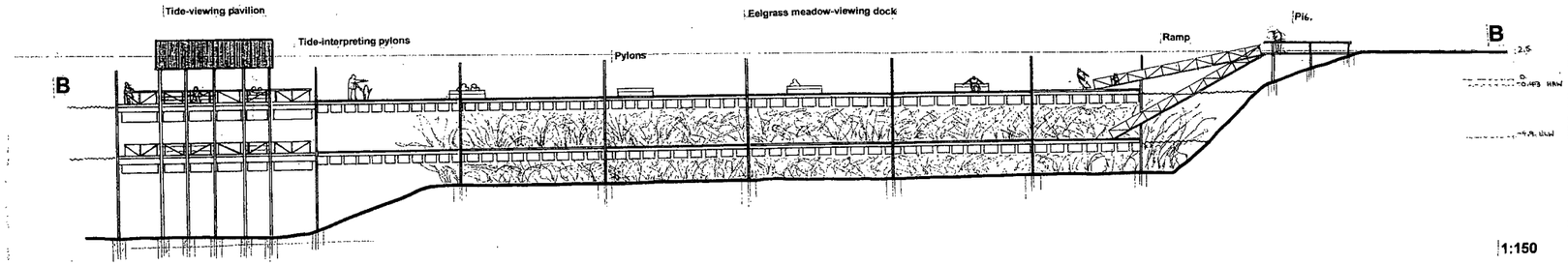
Plates 28-33 Marine and Trail Vernacular

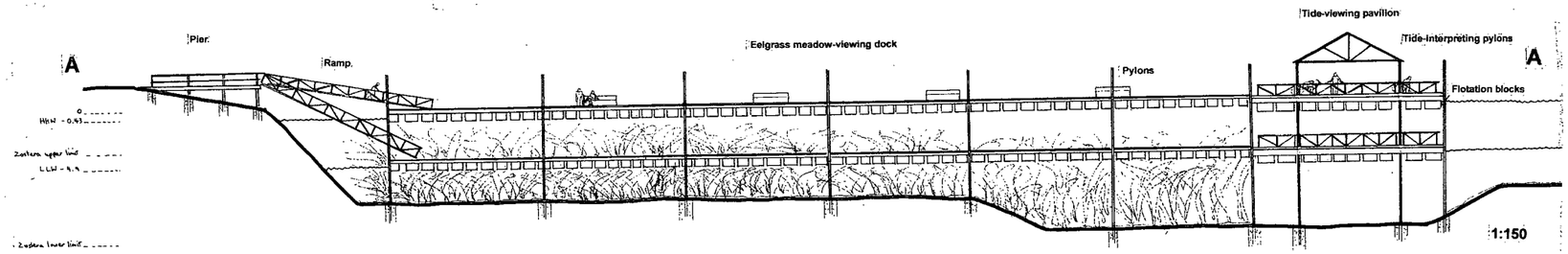
Above and right, marine vernacular, Ladner

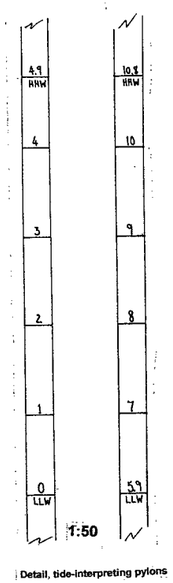


Pylon 'archway', Tofino

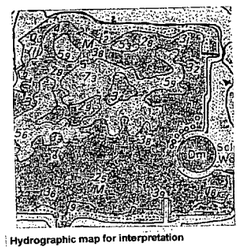
Fishing shed, Ladner





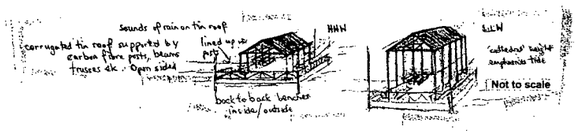


Detail, tide-interpreting pylons

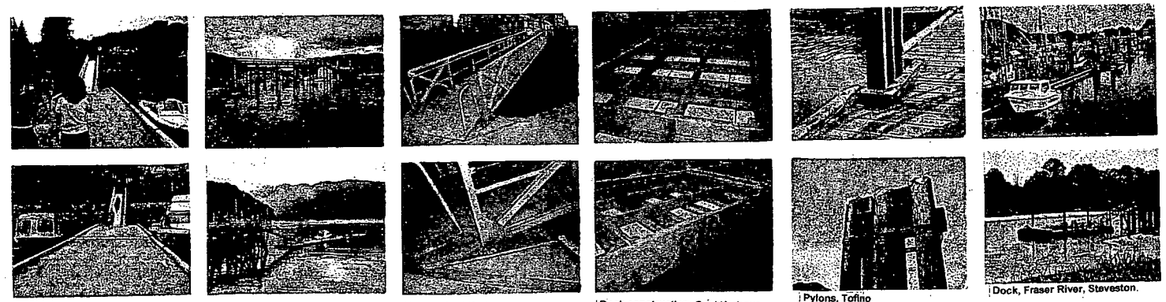


Hydrographic map for interpretation

Flotation marks, barge, False Creek



Tide-viewing Pavilion at higher high tide and lower low tide



Public dock, Deep Cove

Ramp, Coal Harbour

Dock construction, Coal Harbour

Pylons, Tofino

Dock, Fraser River, Steveston

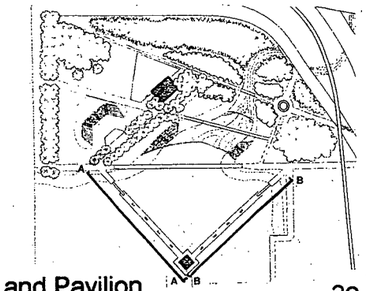


Figure 14. Viewing Docks and Pavilion

True Creek Marsh Botanical Garden	Jill Cherry 25313008	For: LARC 598	Scale: Various	Title: Viewing Docks and Pavilion
		Date: Dec. 2004	Sheet # 8	

5.2.3. Trestle Bridge

The Trestle Bridge is the park's main bridge spanning True Creek allowing for continuous access along the Seaway bike and pedestrian trail. Its form resembles the railway trestles that spanned False Creek in the late nineteenth century.

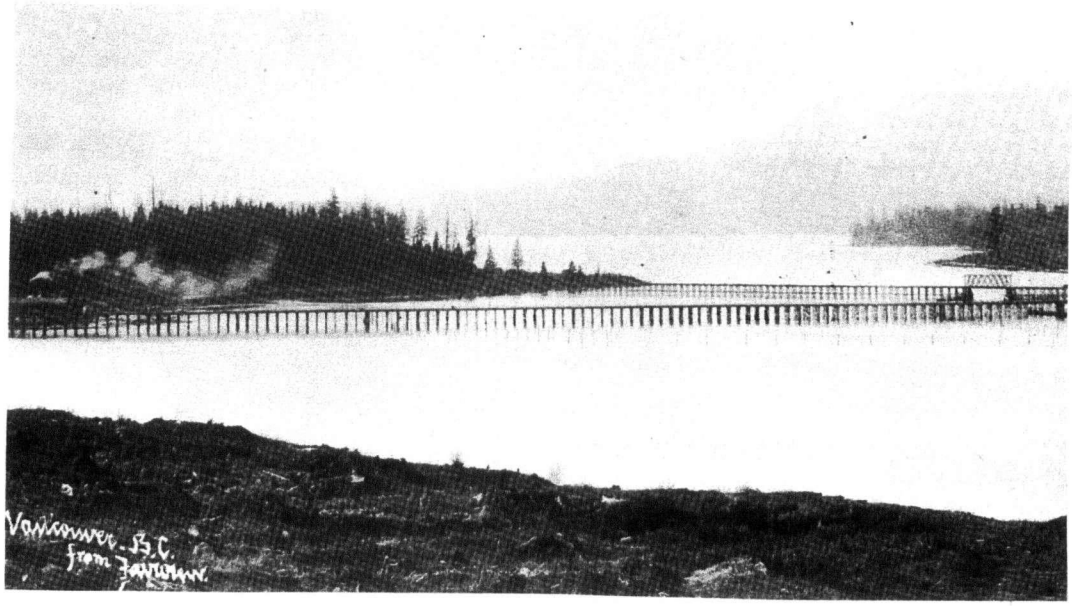


Plate 27. Kitsilano Trestle Bridge and Granville Bridge, 1893

5.2.4. Gabion Weirs

Two gabion weirs provide additional access across the True Creek marshes for the sure-footed and adventurous. They form gabion stepping stones while the gaps between them allow water to flow. They also function as retaining walls as the grade rises from the low to high salt marsh ecosystems and from the brackish to freshwater marsh ecosystems.

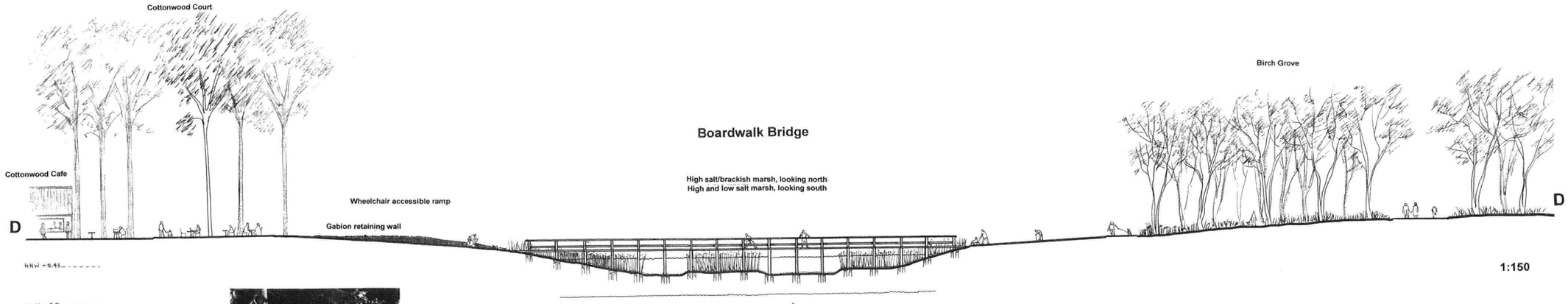
5.2.5. Boardwalk Bridge

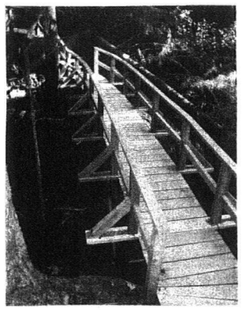
The Boardwalk Bridge provides secondary access across the salt marsh. Universally accessible pathways grade down to the bridge which stands just above higher high water. Modelled on traditional wilderness trail boardwalks, it brings the boardwalk experience into the city. It incorporates a wide rail to allow visitors to lean out comfortably, for close-up views of the marsh.

5.2.6. Gabion Bridge

The Gabion Bridge has a short span over freshwater marsh along one of the main paths leading to the Sea Mark Discovery Lookout.

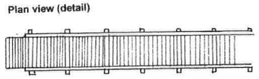
Boardwalk Bridge

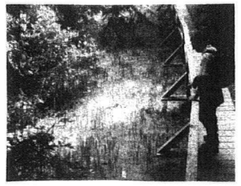


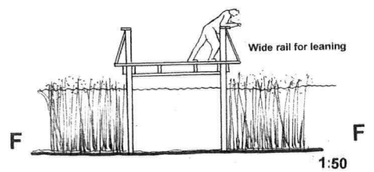


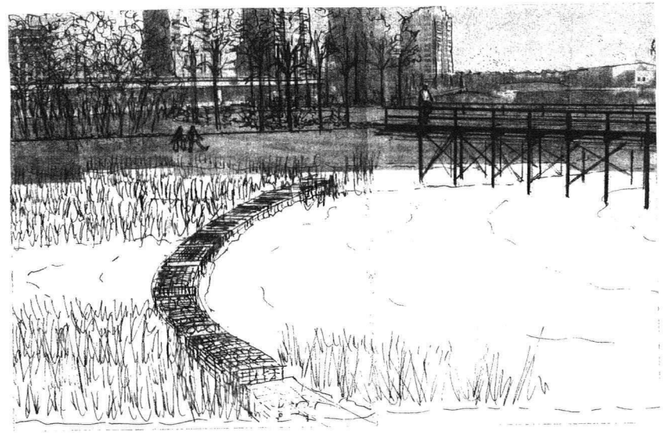
Schooner Trail boardwalk, Long Beach

Plan view (detail)



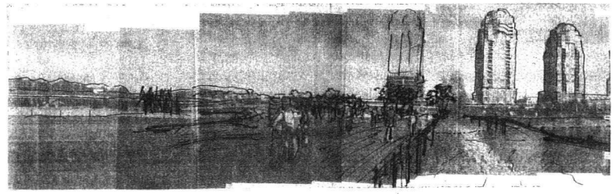






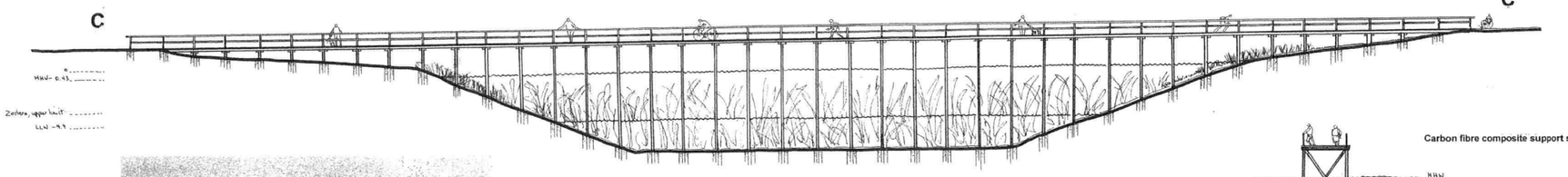
Trestle bridge with gabion weir in foreground

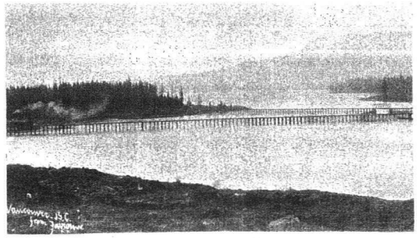
Gabion Bridge



Trestle bridge, Seaway—recreational and commuter trail

Trestle Bridge





Kitsilano Trestle Bridge, CPR (background), Granville Bridge (foreground), 1893

Trestle pier, Tofino

Origins of Carbon Fibre Composites

Carbon fibre composites came of age in the aerospace industry. Their true worth was recognise many years ago when aerospace engineers saw the weight savings that could be made compared with traditional materials like metals. Table 1 illustrate this quite clearly by showing the structural efficiency of a variety of materials that might be used in bending and compression (as in a strut).

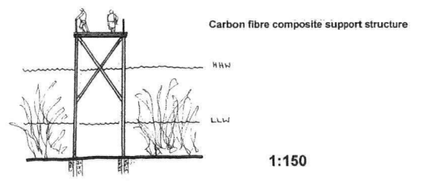
Table 1. The efficiency of various materials in different roles.

Material	Young's Mod E (GN.m⁻²)	Density Ó (g.cm⁻³)	Spec. Stiffness E/Ó	∛E/Ó
Steel	210	7.8	26.9	5.2
Titanium	120	4.5	26.7	5.2
Aluminium	73	2.8	26.0	5.1
High Strength	138	1.6	86	9.3

Why use CFRPs?

It will be noted that for the majority of traditional structural materials - steel, titanium, aluminium the specific stiffness (E/Ó) is constant, whereas CFRPs offer far higher efficiencies for stiffness or deflection critical structures. When carrying a compression load, as in a column, the efficiency of the structure is governed by ∛E/Ó and here again the benefit of using carbon fibre composite materials is demonstrated.

While the basic stiffness of steel is far greater than (CFRP) the massive weight saving that can be made by using the material provides a tremendous driving force to choose (CFRP). No matter which metal is chosen for use, the specific stiffness (Young's modulus divided by specific gravity) of all metals remains stubbornly fixed at 25-26



Carbon fibre composite support structure

1:150

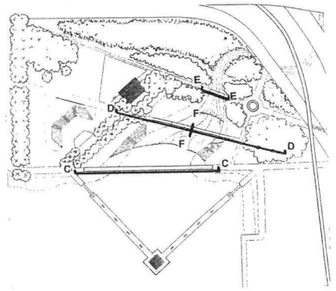


Figure 15. Observation Bridges

True Creek Marsh Botanical Garden	Jill Cherry 25313008	For: LARC 598	Scale: Various	Title: Observation Bridges	
		Date: Dec. 2004	Sheet # 9		

Plate 35. Malmo, Seafront

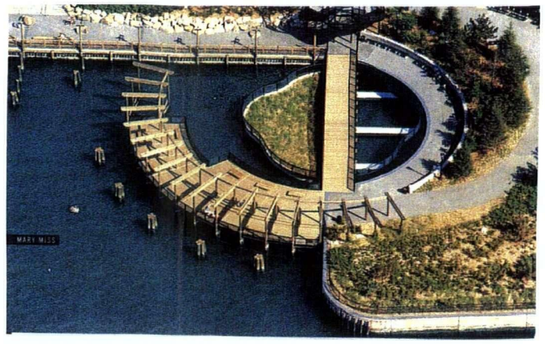


Plate 36. Battery Park, NY, Miss

Plate 37. Sydney Olympic Site, Hargreaves

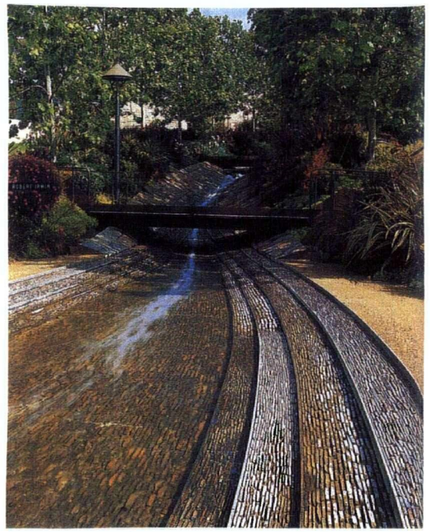


Plate 38. Getty Museum, Irwin

Plate 39. Parque Ecologico de Xochimilco, Grupo de Diseno Urbano

Plate 40. Albufera Seafront, de la Reguera

Plate 41. Emscher Park, Duisberg Nord, Latz

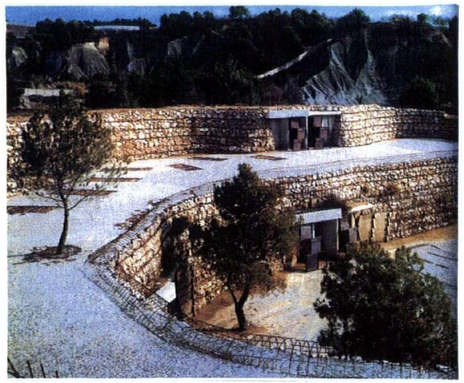


Plate 43. Igualada Cemetary, Miralles

Plate 44. Parc Corbiere, Hannetel

Plate 42. Emscher Park, Duisberg Nord, Latz

5.2.2. Sea Mark Discovery Lookout

The Sea Mark Discovery Lookout is situated more or less where the imposing cylindrical storage tank stood at the B.C. Electric Gas Works. Similarly cylindrical with an outside wrap-around staircase, it is four storeys tall plus a roof deck and provides views in all directions. Stilgoe writes of sea marks as any elevated object used by mariners for direction. Sea Mark Discovery Lookout is prominent in the landscape in size, shape and colour (red) and stands within the curve of the elevated highways and tracks that surround the site. From the water or standing within the site Sea Mark leads the eye over them and out to the mountains beyond.

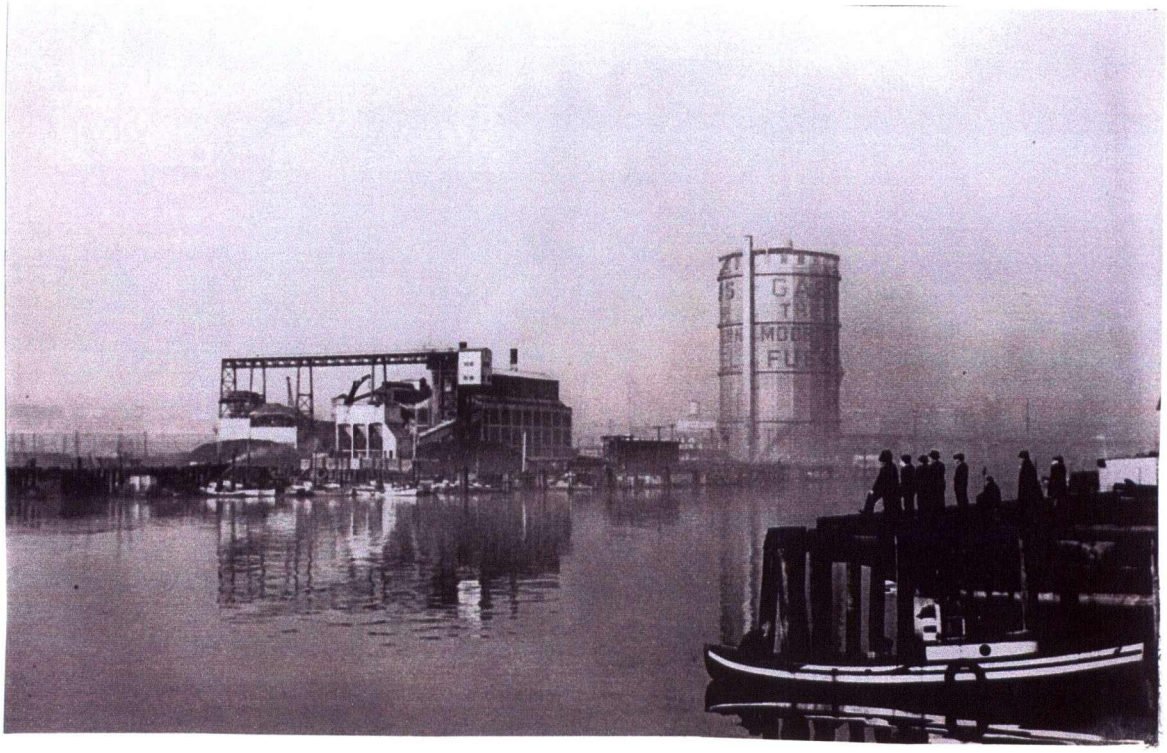
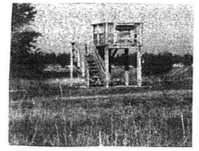
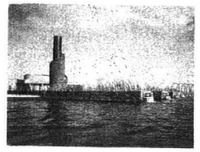


Plate 28. B.C. Electric Gas Works, with Prominent Storage Tank, 1939

There is a long tradition for the use of elevated structures such as belvederes and lookout towers for providing an additional and alternative view of the scene. There are numerous contemporary European precedents on public sites. For example, in France there is an autoroute rest stop where an open cylindrical tower provides views over the marshes of the Somme. Tcshumi's Parc de la Villette is one of the better known projects where lookout towers are treated as follies in a similar fashion to how they were used in romantic landscape gardens in the eighteenth century. Sea Mark has an urban scale in order to fit with the other nearby structures. From an interpretive point of view, each floor focuses on a different aspect of the site and its context as well as associated environmental issues. The information is laid out at a forty-five degree angle at waist height in circular fashion around the outside of the floor. It is reminiscent of the interpretive panels that encircle each floor of the Eiffel Tower in Paris. The visitor looks out at the view and then down for the interpretation of what is being observed. Locally, the Rose Garden, by R. Kim Perry and Associates at the University of British Columbia campus has a similar feature.





Roof Deck—'The Big Picture'

- Context relative to mountains, river and ocean
- Context relative to roads, Skytrain and Science World and neighbourhood, present and future

Fourth Floor—'Habitat Conservation'

- Ecological principles—everything is connected to everything else
- Fragility of natural ecosystems in relation to development

Third Floor—'Raincoast Uplands'

- First Nations food plants
- Coastal rainforest
- Sitka swamp

Second Floor—'Marsh Habitats'

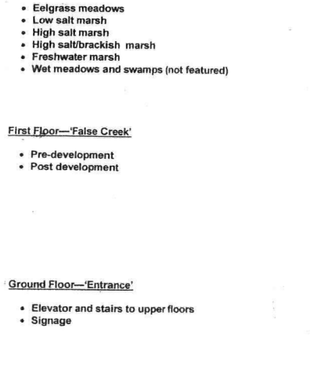
- Eelgrass meadows
- Low salt marsh
- High salt marsh
- High salt/brackish marsh
- Freshwater marsh
- Wet meadows and swamps (not featured)

First Floor—'False Creek'

- Pre-development
- Post development

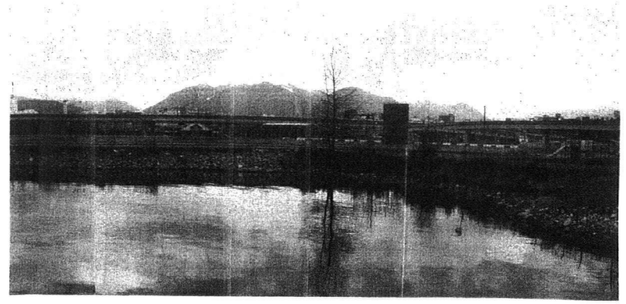
Ground Floor—'Entrance'

- Elevator and stairs to upper floors
- Signage



sea-mark

Creek cruisers lack **sea-marks**, at least as estuary English defines *sea-marks*. The 1852 *Webster's* defines the term as "any elevated object on land which serves for a direction to mariners in entering a harbor, or in sailing along or approaching a coast; a beacon; as a light-house, a mountain, etc." while the 1859 Worcester explains it as "a point of land, or an object on land, as a light-house, to assist mariners in directing their course." Buoys certainly assist mariners, but **buoy** is a word that receives scant attention in the 1859 Worcester but rather more in the 1852 Webster, wherein it is defined, in part, as a "floating mark." A little rummaging makes certain that a sea-mark is always on land, but thereafter may be well-nigh anything, including the land—even a mountain. But the British, at least in Cornwall, use the term to identify the utmost reach of the tide—the point where creek becomes brook, perhaps.



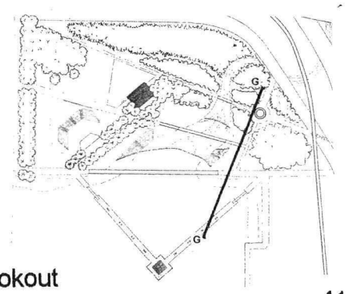


Figure 16. Sea Mark Discovery Lookout

True Creek Marsh Botanical Garden	Jill Cherry 25313008	For: LARC 598	Scale: 1:150	Title: 'Sea Mark' Discovery Lookout
		Date: Dec. 2004	Sheet # 11	

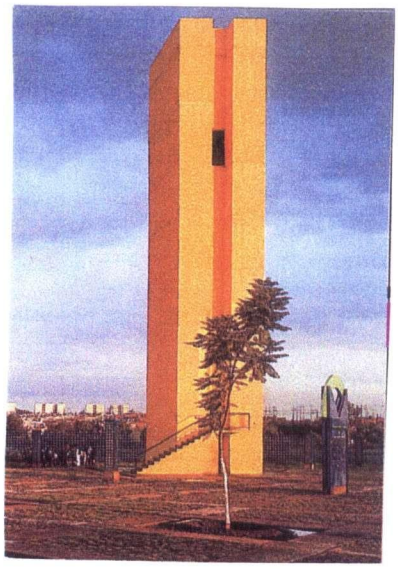


Plate 46. Parque El Cadazo, Grupo de Diseno Urbano

Plate 47. Baie de Somme, Hannetel

Plate 48. Battery Park, Miss

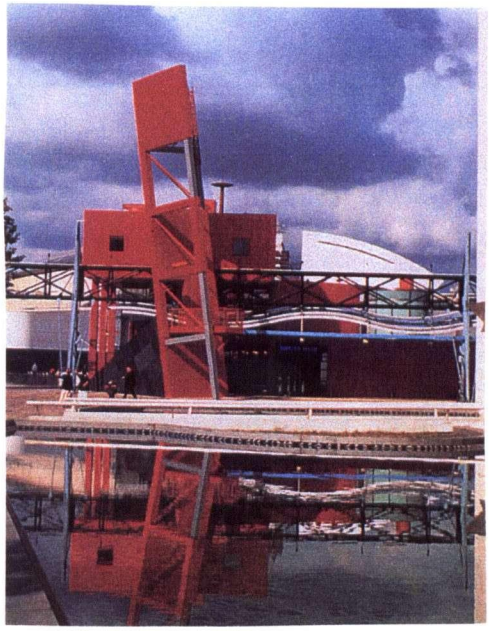


Plate 49. Parc de la Villette, Tschumi

Plate 50. Tour Magne, Lassus

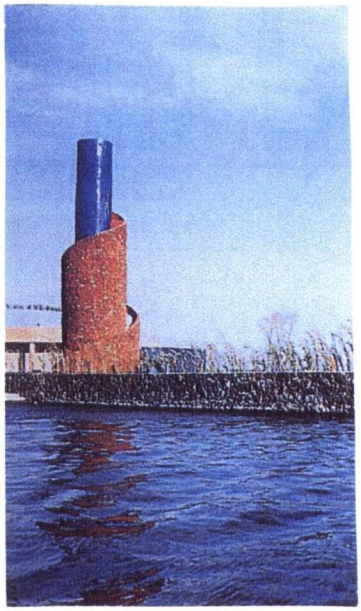


Plate 51. Parque Ecologico de Xochimilco, Grupo de Diseno Urbano

5.2.3. Centre for Environmental Activities and Marsh Plant Nursery

The Centre for Environmental Activities and Marsh Plant Nursery are positioned at the heart of the site. This area is the focus for programmed activities and, together with the plant collections and model ecosystems, provide for a range of different activities relating to the site. The adjacent collection of First Nations Food Plants offers the potential for community programming especially for people of aboriginal descent, many of whom live in areas close to the botanical garden. A community bread oven and cooking pit are envisioned as potential components of such activities. The Marsh Plant Nursery cultivates plant material propagated from the Model Marsh for on-going maintenance of the marsh and for use in ecological restorations in proximity to the Lower Mainland and up and down the coast. Such projects are usually undertaken using plant plugs removed from other natural marshes. Such plant material is in short supply since over harvesting can damage currently healthy marshes so True Creek's Marsh Plant Nursery will alleviate this problem. Community involvement in such efforts is common and work at the nursery will attract volunteers. The Centre is integrated into the daily life at the site since it is adjacent to and uses some of the same facilities as the Cottonwood Café. It is also close to the Community Theatre which will help cross-promote the two facilities and their various offerings.

5.3 Thematic Areas

5.3.1. Raincoast Ridge

Raincoast Ridge is both a botanical collection and a place for active recreation. To the west, there is a thickly wooded area composed of the region's indicator coniferous species including western red cedar, hemlock and Douglas fir at its western end. Typical understorey species such as Saskatoon berry and vine maple grow at the edges where light can penetrate. Mountain bike trails thread through this area and are constructed in such a way as to protect the forest plant life while providing challenging trails for local youth. The trails loop back and are routed so as to prevent bikes from entering Sitka Swamp, which is a small bird sanctuary enclosed on both sides by Sitka spruce, located at the headwaters of False Brook. It references a landscape type characteristic of the Pacific Northwest where Sitka spruce form distinctive stands at the head of inlets or bays. The Ridge in its entirety creates a broad dense buffer between the site and the road, and its elevated berms increase the perceived height of the trees. In time, the trees will mask out the elevated highways and Skytrain tracks creating the illusion of a seamless progression from water and marsh to the mountains.

5.3.2. First Nations Food Plants

Virtually all the plant materials chosen for this project would have been useful in some way to the aboriginal peoples who first inhabited the Pacific Northwest, and can therefore be classified as ethno-botanical. Plants were used for food, medicine, clothing, boats, tools for hunting and fishing, as well as implements for cooking, household and ceremonial needs. It is this collection, however, which highlights the wide variety of shrubs that provided food to supplement the fish and meat that was

the mainstay of their diet. It is widely accepted that one of the reasons that the Haida nation and other northwest aboriginal groups have such a rich artistic heritage was because food was so plentiful in the region that it allowed the time to develop the arts. More than fifty percent of the shrubs in the northwest have fleshy berries, most of them edible. Berries were eaten both fresh and dried into cakes to be stored over winter.

The flowers, fruits, leaves and forms of these shrubs are also ornamental so that this area would attract visitors for its aesthetic attributes. The scent of the flowers in the spring builds on the other fragrances in the air, from the alders and cottonwoods and the fruits attract birds and other animals in the summer and fall. This collection is located adjacent to the Centre for Environmental Activities so that it may be used for programmed activities. It is to be hoped that the First Nations people who live in Vancouver would participate and share their inherited knowledge.

Plate 52. Berry Picking, E.S. Curtis

Plate 53. Fishing Weir

Plate 54. Cedar Bark Harvesting, Haida Gwaii

5.3.3. Allees, Bosques and Groves

Allees, bosques and groves use repetitive placement of a single species for dramatic effect. In the educational context of a botanical park, grouped monocultures of maple, birch, alder and cottonwood emphasize their physical and aesthetic attributes to the visitor who might normally not notice and helps to address the scale problems associated with collections in traditional botanical gardens.

Acer Alley along the western perimeter of the park is a greenway for bicycle and pedestrian commuters and forms a link to Vancouver's larger greenway system. It forms the boundary between the mixed-income residential community to the west and the park, creating a visual filtering screen while allowing for pedestrian traffic flow in, around and out of the park. The big-leaf maples have a bold branching structure and grow to thirty five meters tall. They carry a greater load of mosses and other plants than any other tree species in our region and once they achieve some size the moss-laden branches will create a magical overhanging canopy. The maples line the Alley on both sides along a slightly elevated vegetated berm. At its northern end, the Alley broadens out into the park to create Big Leaf Maple Bosque. With naturalized groundcovers and trails this zone provides shady woodland in the summer months, turning a vibrant gold in the fall. In the winter the leafless limbs stretch wide and create a dramatic network of heavy branching over head.

Alder Avenue is one of the main paths leading from the Seaside trail to the heart of the park. It passes by the Community Theatre and meets Cottonwood Court at the Centre for Environmental Activities. As with all the plantings at the site, red alder is native to this region and with its grey smooth bark is sometimes confused with birch. Common on active river plains, alder has tall stems and a high crown which will eventually meet over the path.

Cottonwood Court surrounds the Centre for Environmental Activities. The black cottonwoods provide filtered sunlight for the patio and sweet scent when they leaf out in the spring. Cottonwoods are tall, reaching up to fifty meters, and their fluffy seeds float in the breeze, true to their name. The leaves of cottonwood are always moving creating a shimmer of light in the canopy and the sound of a soft rustle in the air.

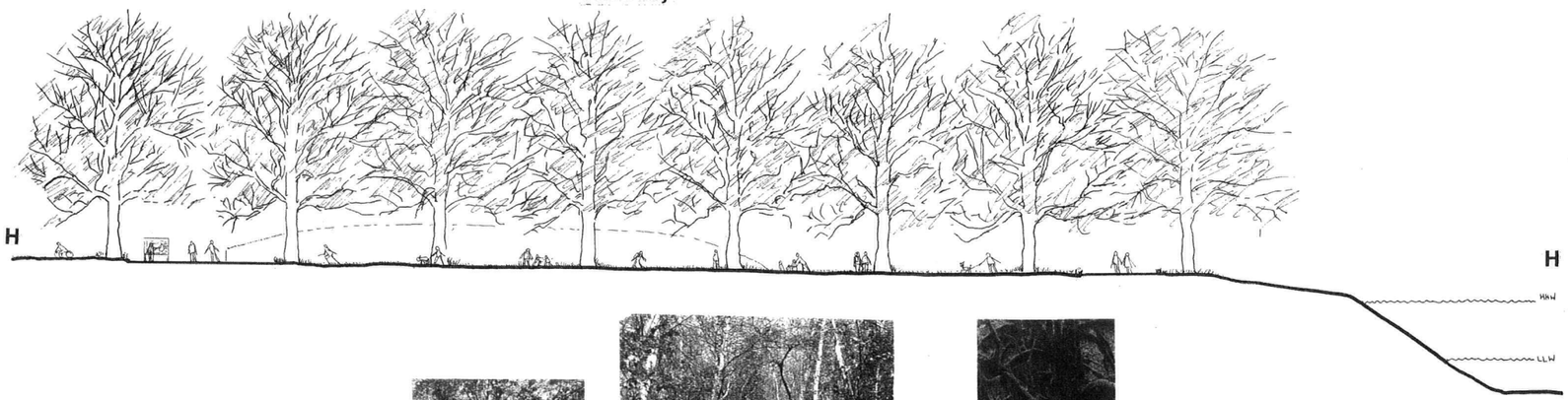
Willow Woods is situated on the north-easterly bank of the inlet at the point where True Creek becomes False Brook, and at the foot of Sea Mark Discovery Lookout. This is a collection of six different native willow species that range from largish shrubs to medium size trees. Like all the plant material on the site, willows were useful trees for the aboriginal population and were used for making ropes and baskets, fishing weirs and other tools.

Finally, Birch Grove, just south of Sea Mark, is a spectacular collection of white birch with a naturalized groundcover and walking trails. The area provides yet another distinctive visual experience as well as a sheltered spot for picnics or just relaxing.

Raincoast Ridge

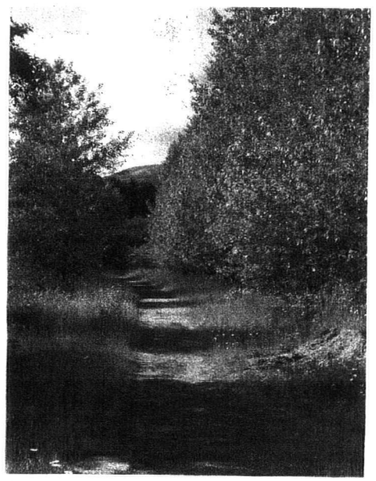
Sitka Swamp

Acer Alley



Plant List

Raincoast Ridge	
Picea sitchensis	Sitka Spruce
Pseudotsuga menziesii	Douglas Fir
Thuja plicata	Western Red Cedar
Tsuga heterophylla	Western Hemlock
Acer circinatum	Vine Maple
Amelanchier alnifolia	Saskatoon Berry
First Nations Food Plants	
Rosa nutkana	Nootka Rose
Mahonia aquifolium	Oregon Grape
Corylus cornuta	Hazelnut
Viburnum edule	High-bush Cranberry
Shepherdia canadensis	Soapberry
Arctostaphylos uva-ursi	Kinnikinnick
Gaultheria shallon	Salal
Ledum groenlandicum	Labrador Tea
Vaccinum alaskense	Alaska Blueberry
V. parvifolium	Red Huckleberry
Rubus parviflorus	Thimbleberry
R. spectabilis	Salmonberry
Willow Woods	
Salix hookeriana	Hooker's Willow
S. scouleriana	Scouler's Willow
S. sitchensis	Sitka Willow
S. commutate	Variable Willow
S. lucida	Pacific Willow
Single Species Woods, Groves and Avenues	
Acer macrophyllum	Big-leaf Maple
Betula papyrifera	White Birch
Alnus rubra	Red Alder
Populus trichocarpa	Black Cottonwood



Avenue formed by species dominance
Maplewood Flats, N. Vancouver

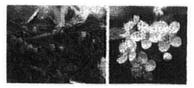
Red Alder, Deering Island

Red Alder, Deering Island

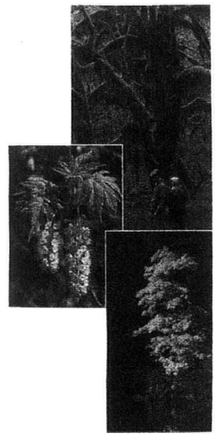
Gaultheria shallon, Salal

Path through Birch woods

Rosa nutkana, Nootka Rose

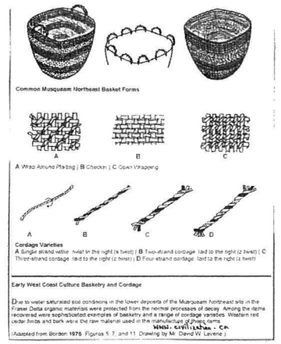


Pyrus fusca, Pacific Crab Apple



Acer macrophyllum, Bigleaf Maple

Vaccinium parvifolium, Red Huckleberry



Hesquiaht woman picking Evergreen Huckleberries, Curtis

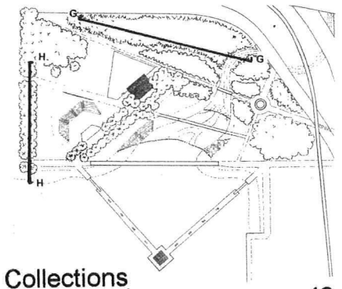


Figure 17. Ethno-botanical Collections

True Creek Marsh Botanical Garden	Jill Cherry 25313008	For: LARC 598	Scale: 1:150	Title: Ethno-botanical Collections
		Date: Dec. 2004	Sheet # 10	

CHAPTER VI MATERIALS

6.1. Plant Materials, Model Marsh

Plants grow in association with each other within the parameters that suit them best. Shade, sun, moisture levels, pH, drainage are some of the specific requirements plants need for optimal growth. In addition, like their counterparts in nature, constructed wetlands, must provide appropriate depth and salinity levels for a sustainable ecosystem. Figure 10 (page 30) shows the grade relationships between the different marsh types and Table 2, below, is a list of plant material selected for True Creek Model Marsh according to indicator plants found in each of these types.

PLANT LIST--MODEL MARSH

EELGRASS MEADOWS	
Zostera marina	Eelgrass
Z. japonica	Narrow Bladed Eelgrass
LOW SALT MARSH	
Jaumea carnosa	Fleshy Jaumea
Salicornia virginica	Pickleweed, Glasswort
Triglochin maritimum	Seaside Arrowgrass
HIGH SALT MARSH	
Aster subspicatus	Douglas Aster
Atriplex patula	Saltweed
Deschampsia caespitosa	Tufted Hairgrass
Distichlis spicata	Saltgrass
Hordeum brachyantherum	Meadow Barley
Potentilla pacifica	Pacific Silverweed
Scirpus maritimus	Saltmarsh Bulrush
Trifolium wormskjoldii	Springbank Clover
HIGH BRACKISH MARSH	
Carex lyngbyei	Lyngby's Sedge
C. obnupta	Slough Sedge
Scirpus americanus	American Threesquare
SHALLOW FRESHWATER MARSH	
Eliocharis spp.	Spike Rush
Epilobium angustifolium	Fireweed
E. watsonii	Marsh Willow-Herb
Scirpus microcarpus	Small-fruited Bulrush
Typha latifolia	Narrow Leafed Cattail
T. angustifolia	Common Cattail
Juncus effuses	Soft Rush
Phalaris arundinacea	Reed Canarygrass

Table 2. Plant List, Model Marsh

6.1.1. Eelgrass Meadows

Eelgrass meadows are intertidal and subtidal wetland and are dominated by eelgrass, Zostera marina and/or Z. japonica. The substrate is usually mud or mixed mud and sand. Z. marina usually grows between 6.6 m below mean lower low water (MLLW) and 1.8 m above MLLW. At its upper limits, Z. marina often intermixes with Z. japonica which usually grows between 1.0 m above MLLW and 2.4 m above MLLW. At its upper limits Z. japonica will intermix with low salt marsh vegetation.

6.1.2. Low Salt Marsh

These wetlands occur in marine areas below mean higher high water (MHHW) and to about 1.8 m above MLLW. Salinities range between 30 to 35 parts per thousand. These marshes are dominated by Jaumea carnosa or Salicornia virginica. There is considerable overlap between low and high salt marsh species.

6.1.3. High Salt Marsh

High salt marshes occur above MHHW, generally when they are inundated on a less than daily frequency. Dominant species are Deschampsia caespitosa and Potentilla pacifica and Hordeum brachyantherum.

6.1.4. High Brackish Marsh

High brackish marsh ranges in salinity from 5 to 29 parts per thousand and occur at the same grade ranges as high salt marsh. Dominant species are Carex lyngbyei and Carex obnupta.

6.1.5. Shallow Freshwater Marsh

Surface water may persist for short periods but water depth in these wetlands are typically less than 16 cm and there is often no standing water in the dry season. It is unlikely that stormwater will enter False Brook very often in the summer months however the spring, fall and winter conditions should provide this marsh with sufficient levels of moisture to sustain itself. Typical dominant species are Typha spp and Phalaris arundicacea.

6.2. Plant Materials, Upland

As with the wetland plants selected for this design, all the upland plant materials are native to this region and could potentially have occurred at or near this site prior to development. Only woody plants have been identified at this stage of design development, however herbaceous and groundcover plants would be selected prior to design implementation. Table 3, below, is the plant list for upland species.

6.2.1. Raincoast Ridge

Dominant stands of Sitka spruce occur at the heads of bays and inlets in the Pacific Northwest and associated wetlands are common. Western red cedar and western

hemlock are often found together and are the pre-dominant species in nearby Stanley Park along with Douglas fir which prefers drier conditions. Vine maple and Saskatoon berry are understorey trees growing in forest openings or in edge conditions. All these trees were and are important to aboriginal people but cedar were extraordinarily useful and played important roles in the development of their culture. From this tree and the yellow-cedar, aboriginal people obtained the materials to provide themselves with shelter, clothing, tools and transportation.

PLANT LIST--UPLAND

RAINCOAST RIDGE	
Picea sitchensis	Sitka Spruce
Pseudotsuga menziesii	Douglas Fir
Thuja plicata	Western Red Cedar
Tsuga heterophylla	Western Hemlock
Acer circinatum	Vine Maple
Amelanchier alnifolia	Saskatoon Berry
FIRST NATIONS FOOD PLANTS	
Rosa nutkana	Nootka Rose
Mahonia aquifolium	Oregon Grape
Corylus cornuta	Hazelnut
Viburnum edule	High-bush Cranberry
Shepherdia Canadensis	Soapberry
Arctostaphylos uva-ursi	Kinnikinnick
Gaultheria shallon	Salal
Ledum groenlandicum	Labrador Tea
Vaccinum alaskense	Alaska Blueberry
V. parvifolium	Red Huckleberry
Rubus parviflorus	Thimbleberry
R. spectabilis	Salmonberry
WILLOW WOODS	
Salix hookeriana	Hooker's Willow
S. scouleriana	Scouler's Willow
S. sitchensis	Sitka Willow
S. commutate	Variable Willow
S. lucida	Pacific Willow
BOSQUES, GROVES AND AVENUES	
Acer macrophyllum	Big-leaf Maple
Betula papyrifera	White Birch
Alnus rubra	Red Alder
Populus trichocarpa	Black Cottonwood

Table 3. Plant List, Upland

6.2.2. First Nations Food Plants

One hundred and thirty different species of plants were known to be used by aboriginal peoples of the Northwest coast, including fruits, green vegetables, root vegetables and the inner bark of several tree species. This collection focuses on the edible fruits of woody shrubs.

6.2.3. Willow Woods

Six species of willow grow in the region and were useful for making baskets, rope, various types of nets, tumplines, slings, harpoon lines and fishing weirs. Willows grow vigorously and are generally tolerant of a wide variety of conditions although they are most often found in moist places.

6.2.4. Bosques, Groves and Avenues

Big-leaf maple, red alder, white birch and black cottonwood have been selected for single species groupings for dramatic effect. Maple provide a home for epiphytic mosses, lichen and ferns and are often found in nature in association with Douglas Fir. Alder fix nitrogen in the soil, are considered to be the best kind of fuel for smoking fish, and its fine-grained wood is useful for carving into eating implements and small objects. Cottonwood are common along the Fraser River and coastal shorelines including False Creek. If you cross Burrard Bridge in the spring as the cottonwoods are leafing out, the sweet perfume in the air is very noticeable. The exfoliating bark of birch is well-known and was useful to aboriginal people from the coast to inland British Columbia.

6.3. Structural Materials

The forms of built structures reflect the history of the site. For example, the Trestle Bridge is inspired by the early railway trestles that at one time spanned False Creek. For pragmatic reasons the framework of wood members was engineered for strength, however it is the beauty of their iconic imagery that stimulates our imagination. In order to capture these essential qualities at a smaller scale it was necessary to experiment with new materials. Carbon fibre composites are suggested as one way to lighten the construction to achieve this.

Sea Mark Discovery Lookout draws on this site's particular industrial heritage. Also constructed with carbon fibre composites to compensate for scale and to be able to retain an open structure, the Lookout is universally accessible by way of a central elevator or can be climbed on the spiral staircase that affords views through 360 degrees. The structure is red for emphasis within the context of elevated structures and its adjacent relationship to Science World and the high rise buildings along Quebec Street.

Historic marine vernacular influenced the architecture of the Tide-viewing Pavilion and the Centre for Environmental Activities. The proportions of the structures drew on precedents found along the Fraser River in the old net-sheds and canneries. Corrugated iron roofs on both structures are found typically on industrial buildings in

the region and will amplify the sound of rain and rust over time, consistent with other process approaches at the site. The Boardwalk Bridge and the Eelgrass-viewing Docks draw their inspiration from their more typical cousins on trails and marinas. New materials might come into play again in these instances as a way to create interest.

Gabion is used for the weirs, retaining walls, terraces, amphitheatre and the upper bridge. Gabion is relatively low cost and with its humble appearance suits the workaday character of the site. For the purposes of this design, the agglomerated pieces of rock in the gabion elements reveal, at least in an abstract or symbolic sense the landfill which allows this land to exist, at the expense of natural process and important ecosystems. It is a versatile building material and also provides a means to tie together various elements . The community theatre is composed of gabion terraces set against a six metre turfed berm. Along the banks of the True Creek inlet, gabion forms the stepped terraces that provide a seating overlook for viewing the saltmarsh. Wherever the grade requires retaining walls, such as where the path cuts alongside the berm of the community theatre or where the grade drops off towards the boardwalk bridge, the face of the gabion is revealed. The porosity of gabion weirs allow the tidal waters to ebb and flow and fully drain at low tide. They reference the weirs of the early aboriginal inhabitants who caught salmon behind open fishing weirs that would allow the salmon to swim up stream with the high tide, stranding them as the water drained away.

CHAPTER VII Conclusion

VanDusen's True Creek Botanical Park brings the botanical garden into everyday urban life. By virtue of its location, numerous opportunities are presented that serve the environmental mission of a contemporary botanical garden. The design takes up the inherent qualities of the site to foreground the beauty of coastal ecosystems and processes and reference its unique history. There is a balance between programmed activities and non programmed spaces for a plan that incorporates and builds on new design trends in parks. As a result this botanical park has the potential to become a model for other sites in the VanDusen network and other botanical gardens.

NOTES

1. Jaan Suurkula, *World-wide Cooperation Required to Prevent Global Crisis.* Available from World Wide Web: (http://www.globalissues.org. 2004).

2. Matthew Potteiger and Jamie Purinton, "Landscape Narratives, (1998)" in *Theory in Landscape Architecture: a Reader*, edited by Simon Swaffield (Philadelphia: University of Pennsylvania Press, 2002), p. 138

3. Tim Smit, *Mission, Eden Project.* Available from World Wide Web: (http://www.edenproject.com. 2002).

4. Stephanie Ross, "Comparing Natural and Artistic Beauty" in *Landscape Beauty and the Arts*, edited by Salim Kemal and Ivan Gaskell (Cambridge: Cambridge University Press, 1993), p. 175

5. Elizabeth K. Meyer, "The Post-Earth Day Conundrum: Translating Environmental Values into Landscape Design" in *Environmentalism in Landscape Architecture*, edited by Michel Conan (Washington, D.C.: Dunbarton Oaks, 2000), p. 188-191

6. (Ross, 1993, p. 177).

7. (Meyer, 2000, p. 196)

8. John Beardsley, *Earthworks and Beyond* (New York: Abbeville Press, 1998), p. 191

9. Susan Herrington, "When Art is a Garden" in *Existence and Experience in Contemporary Garden Design*, edited by Michel Conan (Washington, D.C.: Dunbarton Oaks, 2005)

10. Josephine Donovan, "Everyday Use and Moments of Being: Towards a Nondominative Aesthetic" in *Feminist Perspectives* (Bloomington, IN., Hypatia, 1993) p. 53

11. (Beardsley, 1998, p. 192)

12. (Meyer, 2000, p. 192-3)

13. James Corner, "Eidetic Operations and New Landscapes" in *Recovering Landscape: Essays in Contemporary Landscape Architecture*, edited by James Corner (New York: Princeton Architectural Press, 1999), p. 155

14. Sebastien Marot, "The Reclaiming of Sites" in *Recovering Landscape: Essays in Contemporary Landscape Architecture*, edited by James Corner (New York: Princeton Architectural Press, 1999), p. 50

15. Catherine Howett, "Systems, Signs and Sensibilities (1987)" in *Theory in Landscape Architecture: A Reader*, edited by Simon Swaffield (Philadelphia: University of Pennsylvania Press, 2002), p. 113

PHOTO CREDITS

All archival images are from the City of Vancouver Archives (CVA), including Plate 45. James Crookall photograph.

Other images as follows (see also Bibliography):

Butler, Robert. *The Jade Coast*, plates 15, 16.
Clague, John and Turner, Bob. *Vancouver, City on the Edge*, plates 11,12.

Jourdaa, Frederique. *La Route du Sel*, plates 25, 26

McHarg, Ian L. *Design with Nature*, plate 21.

Pierlugi, Nicolin and Repishti, Francesco. *Dictionary of Today's Landscape Designers*, plates 24, 38, 39, 43, 46, 48, 49, 51,

Spens, Michael. *Modern Landscape*, plates 1, 37, 41, 50.

Verlag, George D. *Wasser Water*, plates 35, 44

Via Arquitectura. Agua Water, plate 40

All other photographs are my own.

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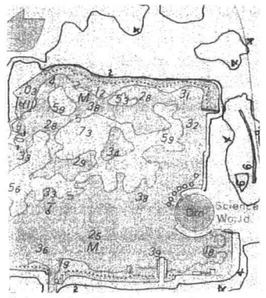


Hydrographic and land datum map of False Creek

chart datum – (or *datum, datum plane, hydrographic datum, plane of reference, reference plane, tidal datum, tidal datum plane*) The permanently established surface from which soundings or tide heights are referenced (usually **low water**). The surface is called a *tidal datum* when referred to a certain phase of the tide. In order to provide a factor of safety, some level lower than **mean sea level** is generally selected, such as **mean low water** or **mean lower low water**.

high water – (abbreviated HW; also called *high tide*). The highest limit of the surface water level reached by the rising tide. High water is caused by the astronomic **tide-producing forces** and/or the effects of meteorological, hydrologic and/or oceanographic conditions.

higher high water – (abbreviated HHW). The higher of two **high waters** occurring during a tidal day where the tide exhibits mixed characteristics. *See* **mixed tide**.

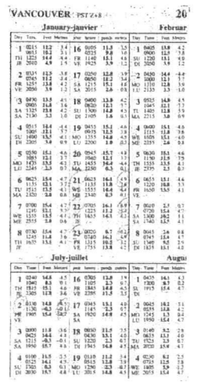
mean higher high water – (abbreviated MHHW). The average height of all the daily **higher high waters** recorded over a 19-year period, or a computed equivalent period. It is usually associated with a tide exhibiting mixed characteristics. *See* **mixed tide**.

low water – (abbreviated LW; or *low tide*). The lowest limit of the surface water level reached by the lowering tide. Low water is caused by the astronomic **tide-producing forces** and/or the effects of meteorological, hydrologic and/or oceanographic conditions.

lower low water – (abbreviated LLW). The lower of two **low waters** of any *tidal day* where the tide exhibits mixed characteristics. *See* **mixed tide**.

mean lower low water – (abbreviated MLLW). The average height of all the lower **low waters** recorded over a 19-year period, or a computed equivalent period. It is usually associated with a tide exhibiting *mixed* characteristics. *See* mixed tide.

Glossary of tide-related terms



Tide Tables, Vancouver, 2004

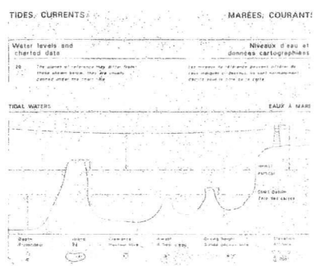
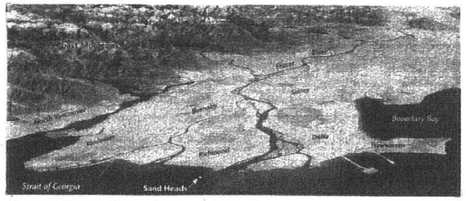
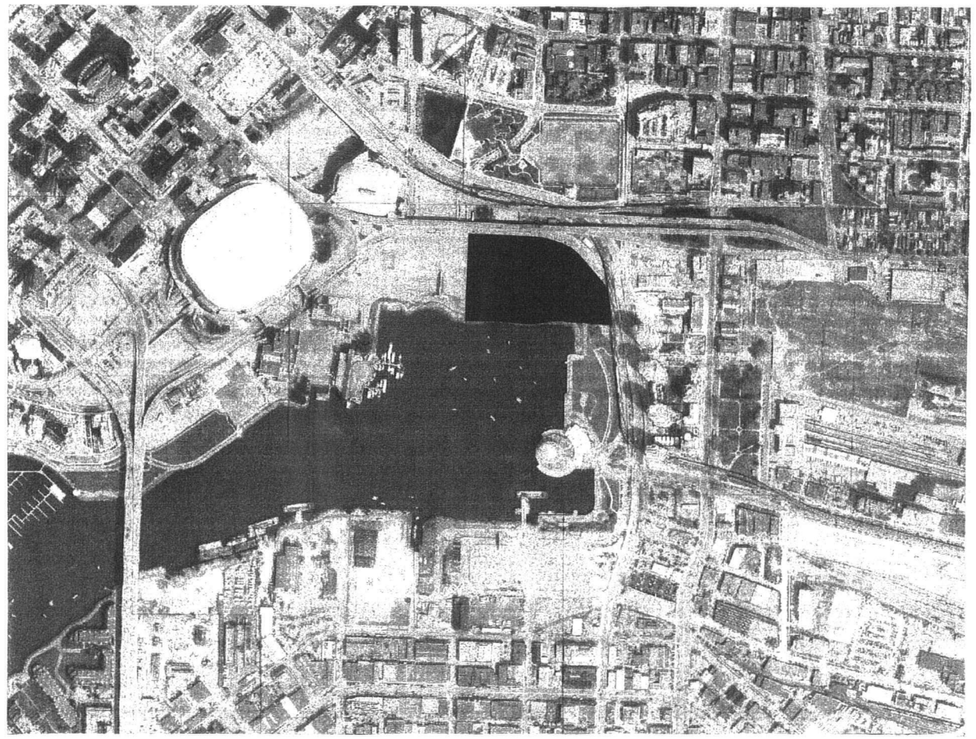


Figure explains how to read hydrographic maps and tide tables



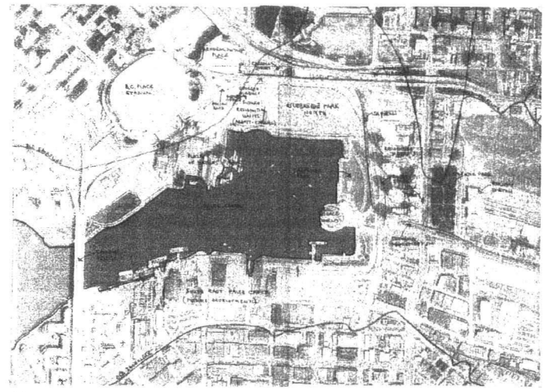
Computer-generated image of the Fraser delta and Fraser Lowland; view to the east.



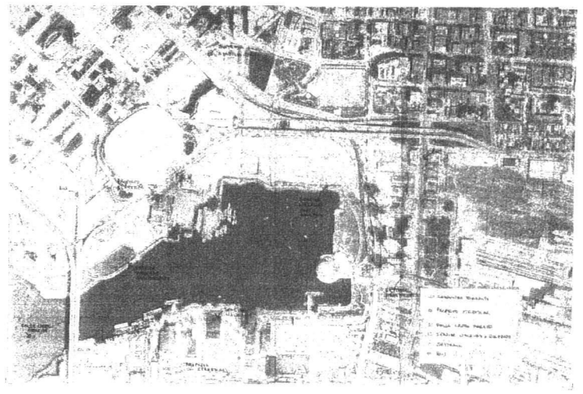
Aerial of False Creek area, east of Cambie Bridge 1:3455

Project Goal

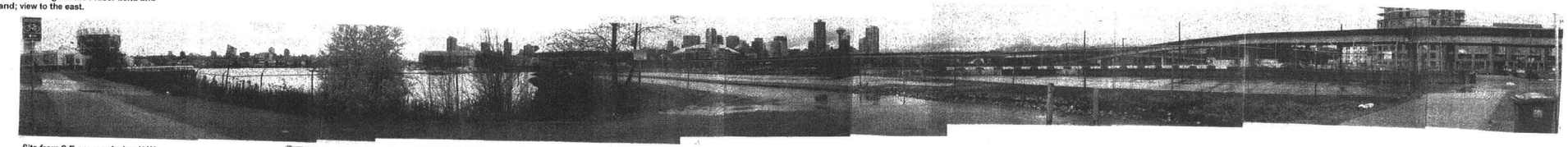
The conceptual goal of this project is to extend VanDusen Botanical Garden into the city through a network of satellite sites. The first of these, and the subject of this thesis, is the undeveloped Creekside Park North at the northeastern end of False Creek. Located in a dense urban area with future residential and office development and on a commuter and recreational route, True Creek Marsh Botanical Garden brings the botanical garden to the community.



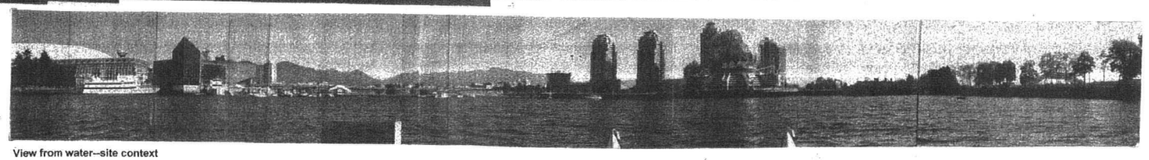
Site adjacencies 1:4000



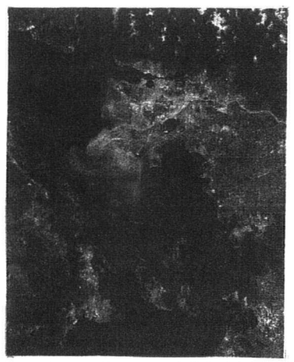
Transportation (present and potential) diagram 1:4000



Site from S.E. corner, facing N.W.



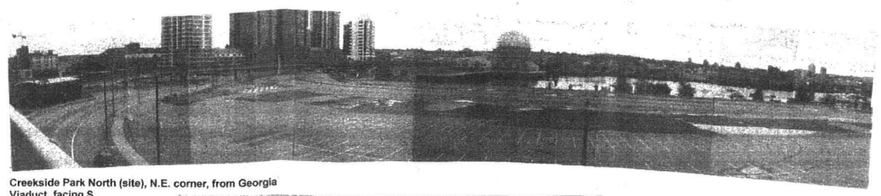
View from water--site context



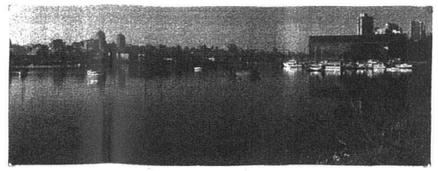
Greater Vancouver from space, with site location (red), 2000, NASA Landsat 7 satellite

Geographical Context

- False Creek is a shallow saltwater inlet of Burrard Inlet, and is therefore tidal.
- Pre-development, 18 salmon rivers discharged into False Creek. It now receives stormwater from several sewer outfalls.
- The Coast Mountain range lies to the North
- Burrard Inlet lies on the northern edge of the Fraser River delta and Fraser Lowland.
- The Fraser River discharges sediment-laden water into the Strait of Georgia where it is dispersed by currents and settles to the seafloor. Silt and sand are deposited on the tidal flats at the river mouth; over time this sediment builds up and the delta front migrates westward.



Creekside Park North (site), N.E. corner, from Georgia Viaduct, facing S.



View from site, facing S.W.

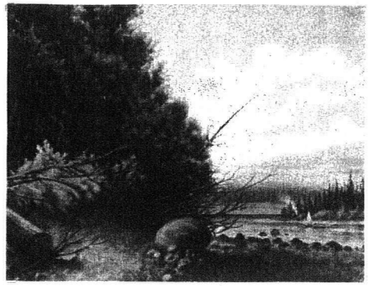
Physical Context

- Creekside Park North is approximately 4ha and is located at the NE end of False Creek.
- It is located at the intersection of 2 street grid systems; diagonally from the NW and horizontally/vertically from the N, S, and E., and is bounded by Pacific Blvd and elevated Georgia Viaduct to the N, and elevated Skytrain tracks to the E.
- Brownfield landfill site: consists of fill materials of varying porosity to a depth in excess of 5m along the shoreline. Site elevations vary from 2 to 4m (geodetic datum) across the site. The site is subject to a soils remediation plan that anticipates retaining and managing most soils on site. *
- Existing shoreline, marine, inter-tidal and riparian habitat: current shoreline consists of rubble and sheet pile. Existing foreshore configuration and structures are to be retained with the exception of the inlet which is to be reconfigured. The project will facilitate a sustainable shoreline with intact and enhanced ecosystems achieved through a blend of mitigation and remediation. *
- New residential and office development, adjacent to Creekside North Park is anticipated after implementation of the False Creek North, Official Development Plan. Building heights, adjacent to the site, are limited to 30 storeys.

* Quoted from Southeast False Creek, Official Development Plan Application, May 2003.

Appendix I Presentation Board, Site Context

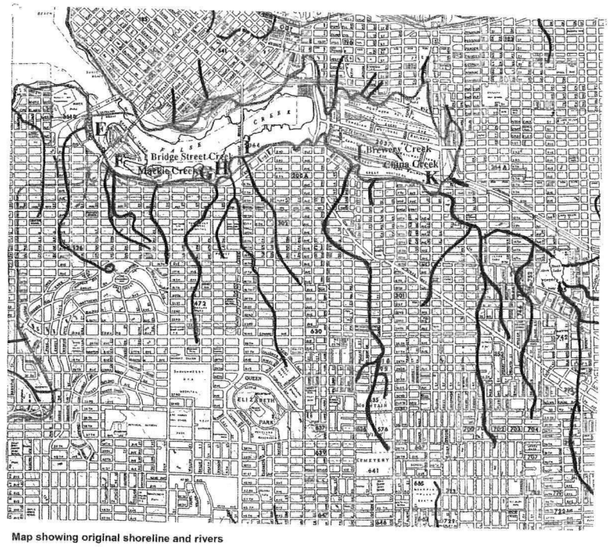
True Creek Marsh Botanical Garden	Jill Cherry 25313008	For: LARC 598	Scale: Various	Title: Site Context	N
		Date: Dec. 2004	Sheet # 1		



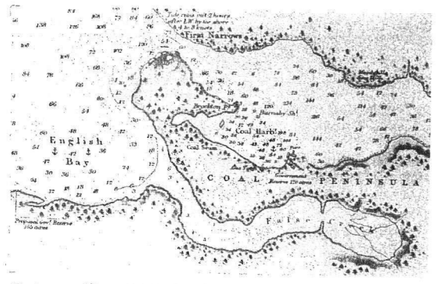
False Creek shoreline, pre-development, painting by William Ferris, 1900

False Creek, head at east end, 1909 - The dump of boulders, probably some sewer or street excavation, is on First Avenue, just east of Glen Drive, and now (1933) spanned by the Dunsmuir Viaduct. The distant bridge appears to be the B.C. Electric interurban trestle which spanned the salt marsh at Venables St. The Great Northern Railway proposed a spur line to the B.H. Dock on Burrard Inlet, and this photograph was probably taken to show the character of the right-of-way. It was proposed to extend Glen Drive by filling in the tide land, then joining the north and south ends, to make a continuous street from Burrard Inlet, and then extend First Ave from the Boulder dump, here shown, to meet Glen Drive. The First Avenue or Dunsmuir Viaduct was finally opened. The exact location of this is the land "Dunsmuir Viaduct". See Goad's Atlas, book 2, Plates 85 and sight, see companion plate to the north. City Archives 1434.

False Creek at Glen Drive (pre-fill)

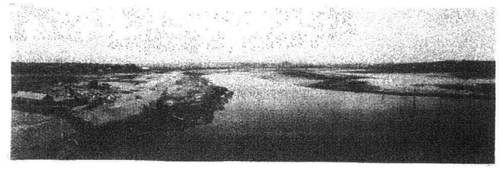


Map showing original shoreline and rivers

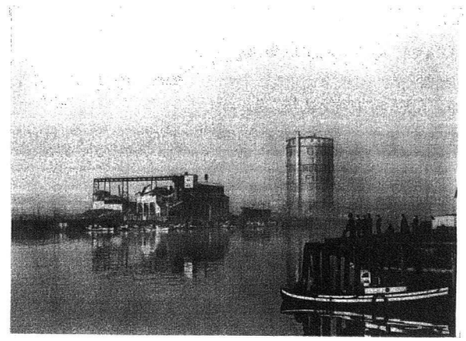


First survey of Burrard Inlet by Capt. George H. Richards, H.M.S. Plumper, 1860

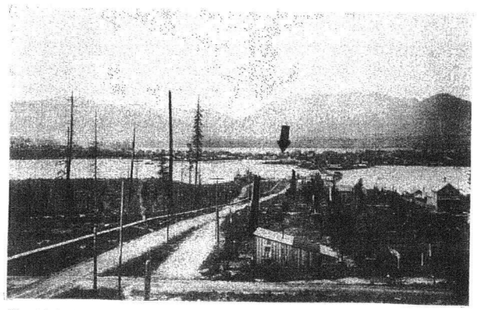
Aerial view showing industrial development on False Creek, 1929



Tidal flats, East of Main Street, undergoing landfill, 1916

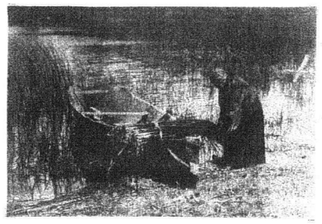


B.C. Electric Gas Works, 1939, photo James Crookall



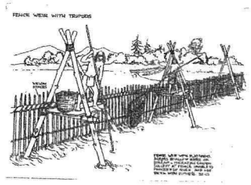
View of site from Mt. Pleasant, after clear cut, 1889

False Creek east from Cambie Bridge, 1978

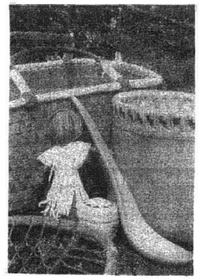


Gathering tules at Cowichan Lake, E.S. Curtis, 1915

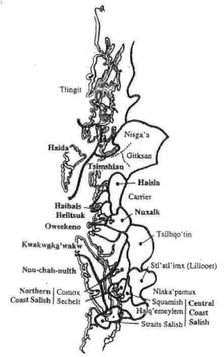
Cedar bark harvesting, Haida Gwali



Tidal fishing weir



Coastal groups used Tule and sedge for baskets



Traditional territories of major linguistic groups of coastal British Columbia

Pre-development

- False Creek was significantly wider and longer than it is today, and East of Main Street were shallow tidal flats.
- Eighteen salmon rivers flowed into it.
- In its natural state it may have supported eelgrass meadows, salt marshes, salt/brackish marshes and fresh water marshes. Globally, eelgrass meadows support fish stocks by providing breeding grounds for herring and many invertebrates and vertebrates which supply the food chain.
- Inhabited by Central Coast Salish, specifically Halq'emeylem.
- First Nations people fished for salmon, hunted deer and waterfowl, and used the plants for food and technology.
- Coast Salish used grasses and sedges for weaving mats, baskets, hats, fishing line and nets.
- Streams and inlet supported coho, chum and pink salmon, rainbow and cutthroat trout and steelhead.

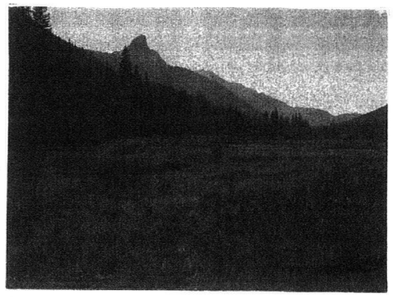
Post-development

- Surveyed by Captain George Richards in 1860. He named False Creek.
- By 1914, what was a quiet marshy inlet was transformed into a busy waterway serving the industrial centre of a large coastal city.
- Most of the land adjacent to False Creek was owned by the Canadian Pacific Railway.
- Encouraged by transportation facilities, False Creek sustained rapid industrial growth.
- After 1900, wood products manufacturing dominated, with iron works, machine shops and metal manufacturing plants also located on False Creek.
- B.C Electric Company's gas works were located on False Creek at the foot of Carroll Street—present day Creekside Park North.

Appendix 2 Presentation Board, Historical Context

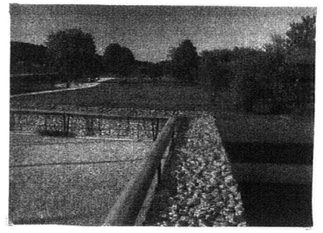
True Creek Marsh Botanical Garden	Jill Cherry 25313008	For: LARC 598	Scale:	Title: Historical Context
		Date: Dec. 2004	Sheet # 2	

South Arm Marine Wildlife Reserve, Fraser River, Ladner

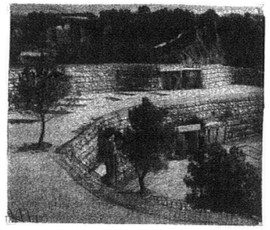


Sitka Spruce marsh

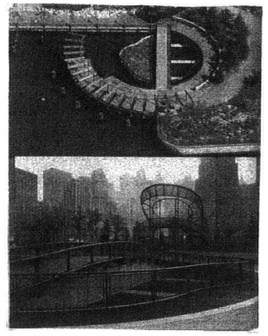
Maplewood Flats, North Vancouver



Gabion walls, Parc Corbiere, Le Pecq, Hannetel

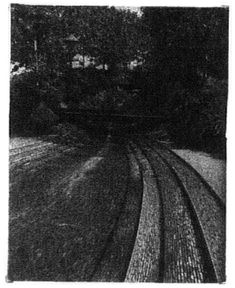


Gabion walls,Igualade Cemetery, Spain, Miralles

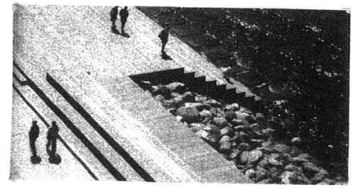


Battery Park, New York City, Mary Miss

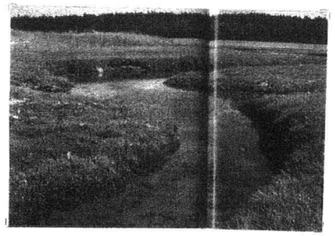
True Creek Marsh Botanical Garden (proposed)



Getty Museum, Robert Irwin



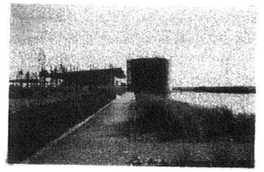
Waterfront promenade, Malmo, Sweden, Andersen



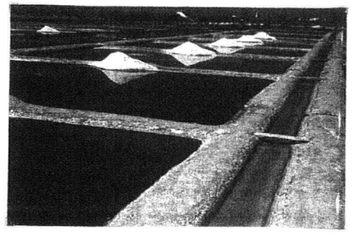
Low salt marsh, Sidney Island, BC

Marsh: form, National Park Service photo

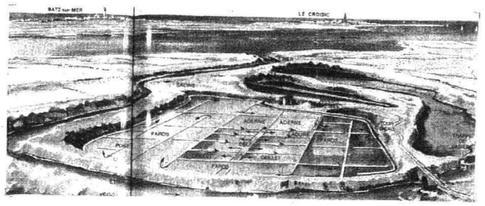
Parque Ecologico de Xochimilco, Mexico City, Grupo de Diseno



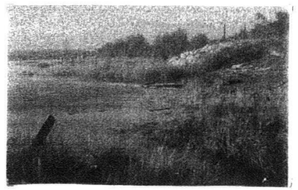
Autoroute rest area on the Bay of the Somme, Hannetel



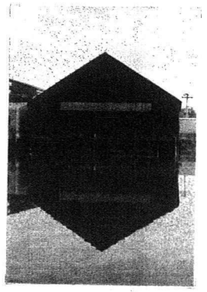
Salt Harvesting, Guerande



Tidal flow diagram of salt harvesting Guerande



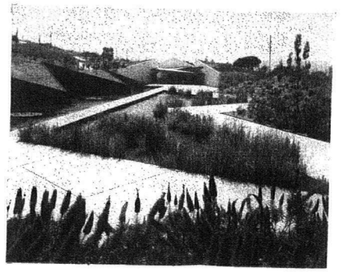
Salt Marsh, False Creek 1909

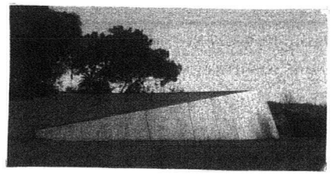


Marine vernacular, Ladner

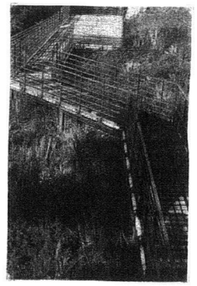
Brackish marsh, Fraser River, Steveston

Sedges, Herman de Vries, 2000

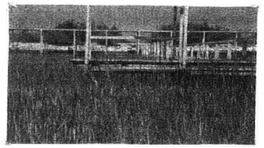




Barcelona Botanical Garden, Figueras



Coteau Augustin Thierry, Blois, Boulcourt



Seafront, Valencia, Spain, de la Reguera

Appendix 3 Presentation Board, Precedents

True Creek Marsh Botanical Garden	Jill Cherry 25313008	For: LARC 598	Scale:	Title: Precedents
		Date: Dec. 2004	Sheet # 4	