

Redesigning the Corner Brook Waterfront

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1.0 Introduction

In recent decades, urban planning has seen a rise in waterfront revitalization. This is important concerning Corner Brook, where the possible permanent closure of the Mill would have devastating consequences for the surrounding area. Corner Brook is located on the West Coast of Newfoundland, Canada, and has a population of 20,083 (www.statcan.ca, 2007). Corner Brook Pulp and Paper Ltd. (CBP&P) dominates the local economy and is located on the city's waterfront.

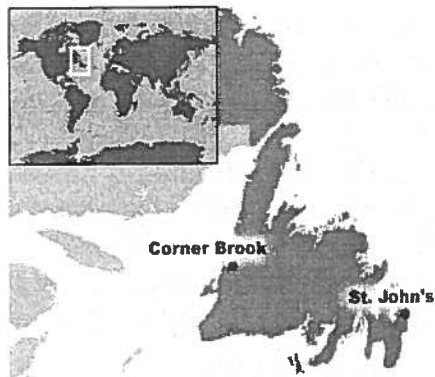


Figure 1. Location of Corner Brook (www.cornerbrookmuseum.com, 2007).

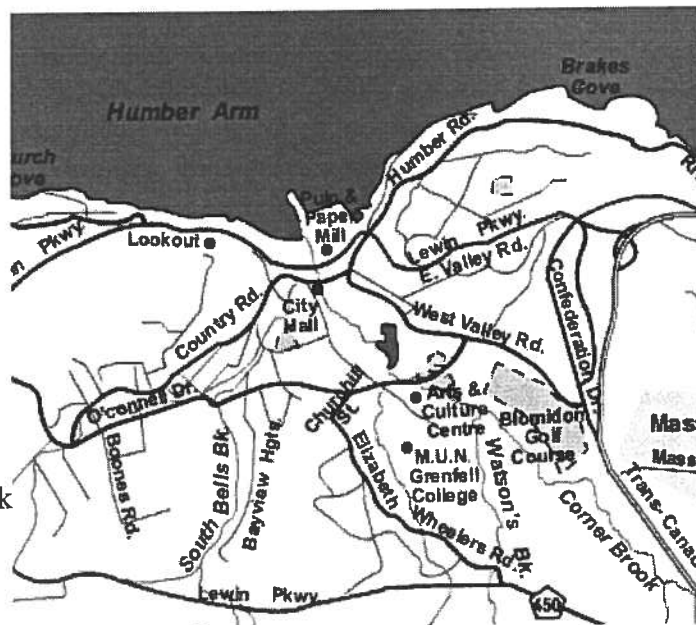


Figure 2. The Mill Site Along the Humber Arm (SWG, 2006).

With the realization that the heart of any city is the waterfront, if there is one present, many cities started a revitalization trend in order to bring life back to the community and restore the local economy (Robertson, 1999). In the past, waterfronts were dominated with industry, shipping, and the navy. Today, the focus has shifted to leisure, recreation, tourism, and residential and commercial activity. Along with economic factors, the visual aspect of the waterfront is also important (Albrecht, Bode, & Evers, 2003; Hoffman, 1999).

Although this trend started out in larger cities, such as Toronto, it has now spread to smaller centers, similar to the size of Corner Brook (Hoyle, 2000). What differs between the

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various sizes of the cities is what the main focus of the waterfront will be following the revitalization. With the tourism economy making a strong foothold in Newfoundland, the waterfront would provide the possibility to extend it even further. Yet, the most important aspects of the new waterfront will be to ensure environmentally safe measures (Slocombe, 1993) and making sure that as many jobs as possible will be generated. The generation of new jobs is especially important considering the loss of the Mill, which has provided the City and surrounding area with high paying employment.

2.0 Research Methodology

One important aspect of waterfront revitalization is to look at already existing projects and trends within the field. From this standpoint, decision making will be made easier concerning what could work for the City. Although it is not guaranteed that similar ideas in Corner Brook will work as they have in other cities, it gives a good indication of what is possible.

During the search for existing documentation on waterfront revitalization, Google Scholar, Google, and the MUN library were utilized, and the following words were used: waterfront revitalization, waterfront development, urban development, urban design, and Ruhr River revitalization. In the search for more specific projects, the following words were used: breweries, sustainable breweries, decommissioning, sewage treatment, pulp and paper mill contamination, marine institutes, urban green spaces, parking lot construction, mixed use planning, and land use planning.

The organizational method used for the Corner Brook Waterfront Revitalization is rational planning. Rational planning is considered the 'ideal' approach to planning, where the planning process is to be made as systematic and rational as possible. This approach has been used for decades and has made tremendous impact, despite criticism that it is impossible to carry it out in the real world (Levy, 1988). The following is an outline of the steps taken during the planning process:

- *Step 1: Identify Problems and Needs*
The need can be broadly addressed or stated specifically. It is the starting point in the planning process (ASCE, 1986; Dzurik, 2003).
- *Step 2: Collect and Analyze Data*
The problem needs to be analyzed with regards to census data and indicators. (ASCE, 1986; Dzurik, 2003).
- *Step 3: Develop Goals and Objectives*
Goals are broad, and general in nature, and "may not be fully attainable" (ASCE, 1986, p. 10). Objectives, on the other hand, are attainable and are more specific. They can be either qualitative or quantitative (ASCE, 1986; Dzurik, 2003).

- *Step 4: Clarify and Diagnose Problems or Issues*
In order to make the ensuing alternatives more responsive to the problems and issues at hand, the problem, as well as the surrounding environment, needs to be clarified and investigated (ASCE, 1986; Dzurik, 2003).
- *Step 5: Identify Possible Alternatives*
Alternatives for the plan are identified, including a *do nothing* option. Several alternatives are identified in order to not come to a conclusion too swiftly without the proper assessment of other possible alternatives (ASCE, 1986; Dzurik, 2003).
- *Step 6: Analyze Alternatives & Assess Impacts*
All the alternatives identified in the previous step will have to be analyzed and their impacts on the surrounding environment assessed (ASCE, 1986; Dzurik, 2003).
- *Step 7: Evaluate and Recommend Alternative for Selection*
The best alternative will be selected with regards to its impact on the surrounding environment (ASCE, 1986; Dzurik, 2003).
- *Step 8: Develop Detailed Implementation Program*
The location, size, etc. of the proposed plan will be established (ASCE, 1986; Dzurik, 2003).

Original results were obtained by generating an original waterfront design as well as key informant interviews, which include the following:

- Dr. Gabriela Sabau (Economist)
- Dr. Bill Iams (Environmental Scientist)
- Dr. Paul Wilson (Sociologist)
- Colleen Humphries (City Planner).

3.0 Identify Problems and Needs

CBP&P has dominated Corner Brook's waterfront since the 1920's. If CBP&P were to cease to exist, what would happen to the waterfront and the city's economy? The City and surrounding area's economy is highly dependant on the Mill. The waterfront would need to be revitalized in order restore the City's economy, clean up environmental degradation, and to allow for public access to the area.

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Figure 3. Oblique View of the Mill (Dept. of Environment and Conservation, n.d.)

4.0 Collect and Analyze Data

The Pulp and Paper Mill industry within the Province of Newfoundland and across Canada has been faltering. There are many documented cases of mill closures, even within the province. There are several reasons for this occurrence. First, one of the main reasons is the expanding competition from the developing world. Developing countries are less expensive to run than mills in the developed world. Second, the short growing season contributes to the less efficient production, especially within Newfoundland. The trees do not have the ability to grow at the rate that trees in warmer climates do. Third, a stronger Canadian dollar, coupled with higher prices for fiber and higher energy costs have also helped to cause a steady decline in the sector. Finally, a strong impact on the sector has been the decline in newspaper reading (Natural Resources Canada, 2006). This is due to the expansion of online media sources. According to Dr. Gabriela Sabau (2007, Pers. Comm.), CBP&P could possibly witness closure within only 5 years. She points to the lack of adaptation by the Mill, especially concerning recycling. “The Mill should have closed a long time ago since...” according to Sabau, as “it is a dying industry”.

5.0 Development of Goals and Objectives

5.1 Goals

- Public access to the waterfront,
- Clean water, land and air
- Reestablishment and growth of economy.

5.2 Objectives

- Development of green spaces on the waterfront.

- Creation of small shops along the waterfront, as well as a museum, microbrewery or Marine Institute, and aquarium to service the local population as well as tourists.
- Access to the waterfront across Lewin Parkway via a skywalk.
- Cleanup of the harbor via a sewage treatment plant.
- Creation of employment so as to counteract the loss of CBP&P job losses to the best ability possible.

6.0 Clarification and Diagnosis of the Problem

6.1 Site cleanup

The first problem that will be faced will be the decommissioning of the site. The problem with this is that no research has been found on the state of the mill site concerning the decommissioning and cleanup of potential contaminants. Therefore, the proper course of action to take is inconclusive.

Cleanup also includes the harbour, which has been severely polluted by not only the Mill but also by raw sewage running directly into it. Extensive amounts of data have been collected regarding sewage in the area, and the need for a treatment plant has been well justified. If the area is to be expanded for tourism, it will be necessary to cleanup the harbor (ACAP, 1996). It is necessary not only for economic but also for environmental and health reasons. Iams (2007, Pers. Comm.) points to the severe environmental degradation of the water in the vicinity of the Mill. The impacts associated with sewage-polluted water include the risk of contracting viral, bacterial, and other diseases (Helmer & Saliba, 1990), as well as problems associated with eutrophication, destroying the natural habitat and adding to the risk of invasive species (Browder & Sklar, 1998). If the sludge, a remnant of mill waste, which is present within several hundred meters of the mill is disturbed, it could have harsh environmental and health impacts.

6.2 Employment/Economy

A prominent problem with the closure of the Mill is the loss of a large number of well paying jobs. In total, the Mill directly employs 1500 plus individuals (CBP&PL, 2007). This is a significant loss. According to city planner C. Humphries (2007, Pers. Comm.), the results of a shut down of the Mill would be devastating. Although it will be difficult to make up for this loss, it is important to generate as much fulltime, well paid employment as possible.

Connected to employment is the economy of the area. Enough business will need to be created to not only maintain the economy but also to attempt to keep the profit within the community. As Wilson (2007, Pers. Comm.) points out, this will be one of the main challenges in the area: it will be difficult to make up for the loss of the Mill not only within the city, but also in the surrounding area.

6.3 Waterfront access

For decades, the public has been cut off from the waterfront by not only the Mill itself, but also by Lewin Parkway, which is four lanes wide and sees heavy traffic, especially during periods of peak intensity. Overcoming the problem of getting safe and easy access to the waterfront is of primary importance.

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Figure 4. Oblique View of the Corner Brook Waterfront (www.kruger.com, n.d.)

7.0 Identify Possible Alternatives

It is necessary to identify several alternatives in order not to rush into an inappropriate solution. The following are the proposed alternatives. Although the first two both make use of mixed zoning and several different land uses, each will have their own focus point.

7.1 Alternative #1

This alternative will contain:

- A microbrewery with a focus on local production. It will also contain a small-scale restaurant with dining that can seat no more than 40 people.
- A museum with a focus on John Cabot, containing a fresh and saltwater aquarium that can hold approximately 10,000 gallons each.
- Condos along the waterfront with small local businesses on the main floor: mixed-use zoning.
- A small marina to service the pleasure boating industry.
- Green spaces throughout the area.
- A walking trail along the shore, with a connection to the docks.
- Several small parking lots. And,
- A skywalk across Lewin Parkway.

7.2 Alternative #2

This alternative will contain:

- Small-scale Marine Institute with a fresh and saltwater aquarium, that can hold approximately 20,000 each, and access to the waterfront for study purposes.
- A museum with a focus on John Cabot.
- Condos with small local businesses on the main floor: mixed zoning.
- A small marina to service the pleasure boating industry.
- A walking trail along the shore.

- Green spaces throughout the area.
- One main parking lot for the Marine Institute and museum, with 2 smaller parking lots to service the rest of the development. And,
- A skywalk across Lewin Parkway.

7.3 Alternative #3

- Do Nothing: the waterfront will remain the way it currently is, with all of the structures of the Mill still intact, although no longer in use.

8.0 Analyze Alternatives & Assess Impacts

The following is an assessment of the impacts of the proposed alternatives. Impacts are assessed concerning natural, social, and economic environments.

8.1 Alternative #1

- One of the main focus points with this alternative is the microbrewery. It will be of a smaller scale, with a focus on production to service its restaurant and the surrounding area. One concern with the microbrewery would also be pollution, yet there has been emerging technology that minimize or even completely eliminate pollution. Also, new technology has helped to make the brewing process more efficient, therefore reducing not only waste, but also source material (Baron & Willaert, 2004). Breweries have offered economic renewal in many communities for decades all across North America. A local brewery would allow for broader tourism development within the area, and studies have shown that breweries also help a community to establish a stronger sense of place. Microbreweries typically tap into the local culture (Reese & Schnell, 2003). This has often resulted in a rise in the public's pride in their own community while contributing to a closer connection within the population.
- An important aspect of waterfront development is the generation of well paying jobs. This is best achieved with government employment. Several, about five to ten, will be created with a public marine museum run by the municipal government. This would not only allow for several well paying jobs, but would also allow individuals to employ their knowledge concerning the surrounding area and its maritime history.
The museum would also create another attraction for the tourists with easy access to the incoming cruise ship population. According to Stevens, museums help to "generate sufficient densities and flows of people to make a visit to the urban waterfront into a worthwhile and varied social experience (2006, p. 193). The same holds for aquariums. Environmental effects would be less of a concern since only minimal waste products would be produced.
- In order to make the best use of limited space while providing several land uses is through mixed zoning. This will allow both commercial and residential land uses to coexist on the same parcel of land (Novakowski, 2007, Class Lecture). Mixed-use zoning has formed an integral part of sustainable development in recent decades, and has been advocated as beneficial by Jane Jacobs (Grant, 2002). According to Grant (2002, p. 72-3), mixed use involves the following benefits:

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- It creates an urban environment active at all hours, making optimum use of the infrastructure.
- Smaller, post-baby-boom households can have a greater range of options (rather than just detached homes).
- Mixing housing types could increase affordability and equity by reducing the premium that exclusive, segregated areas enjoy.
- By providing housing near commercial and civic activities, planners could reduce the dependence of the elderly and children on cars.
- Enabling people to live near places where they can shop, work, or play could reduce car ownership and vehicle trips, increasing pedestrian and transit use, and thus alleviate the environmental consequences associated with automobile use.

There will be several sections on the waterfront that will make use of this planning concept. Typically, it will consist of commercial space on the first floor with residential space above.

- A small marina to service the pleasure boating industry will be located on the waterfront. This will keep boaters from having to go all the way to Curling, and will have the added benefit of providing direct access to the new waterfront and its services.
- An important aspect of any development is to provide for green space. Various spaces between the different developments will be made of gardens, grass, trees, etc. In short, a large proportion of the area will be made up of park space. Providing for green space is crucial for several reasons. One of the main reasons is to provide flood control. One of the problems associated with development is losing land to pavement and other materials that increase the runoff of the area, sometimes causing adjacent flooding. This is also associated with higher rates of pollution ending up in the adjacent water bodies (Abbott, 2006). It is also beneficial concerning the visual aspect of the development in making it more natural. According to Stevens, loose park like settings help to “weave together numerous different zones and facilities, framing opportunities for interactions between people pursuing a wide range of activities, both passive and active; commercial and free; solitary and group” (2006, p. 182).
- A walking trail will be located along the shoreline to provide direct access to the water as well as open up the area to provide for a better view. The promenade will permit both cycling and skating. A trail will also be constructed throughout the green space area. It is important for pathways to weave activity sites together and offer a variety of uses (Stevens, 2006).
- Parking lots will be located on each side of Corner Brook stream to service the waterfront. This is meant to break up the parking space in order to avoid overwhelming the one area.
- A skywalk will be constructed crossing Lewin Parkway. This will allow pedestrians to directly access the waterfront without the danger associated of crossing busy intersections.

8.2 Alternative #2

- A Marine Institute will be located directly on the waterfront to allow for easy access to the water. The Institute will also contain an aquarium. It would provide for an extension to Sir Wilfred Grenfell College, and would allow for many students interested in Marine Science to stay on the west coast of Newfoundland, along with the Bonne Bay Marine Station in Gros Morne National Park (www.bonnebay.mun.ca, 2006). It would also provide for increased

research opportunities. The aquarium would serve both research opportunities and the tourism industry. The Institute would also provide for well-paid employment for instructors, lab assistants, and tour guides.

- The other aspects of this alternative have already been addressed in section 8.1.

8.3 Alternative #3

- This alternative would keep all the structures of mill in the same state as they are currently in. One impact of this alternative would be that the economy would not be renewed with the closure of the Mill. Another impact would be the 'visual pollution' of the Mill. A valuable asset of the city would be left useless while the city would be reminded of its past by looking at the remaining Mill structures.

9.0 Evaluate and Recommend Alternative for Selection

According to the alternatives presented and their associated impacts on the surrounding environment, the best option is alternative #2. The benefits are more varied, and therefore less vulnerable, for this alternative with the inclusion of the Marine Institute. The criteria used to chose this alternative where: employment, sustainability, environmental degradation, and visual appeal. Employment, sustainability, and visual appeal would be maximized, while environmental degradation would be minimized compared to the other two alternatives. Alternative #3 is not feasible, since the long-term costs to society and the economy would be too great.

10.0 Detailed Implementation Program

For this section, the Municipal Plan was consulted in order to follow the planning policies set forth by the municipal government. Also, the public would have to be consulted throughout the entire process from considering alternatives to the implementation of the program. For the design proposal, refer to Appendix B.

The first step in the process will be to change the zoning of the current waterfront from general industrial to commercial, mixed, and residential in order to account for all the proposed developments.

The next step will be the decommissioning of the site. All of the buildings will have to be removed, as well as the pavement in order to remove excess impervious cover of natural areas. Depending on the contamination present, the following clean-up possibilities are available: pump-and-treat, bioreactors, land farming, and in-situ remediation (LEED, 2007). As mentioned, more research will need to be undertaken in order to fully develop the decommissioning plan.

Once the area has been decommissioned, construction can begin:

- The Marine Institute will be located on the western side of Corner Brook Stream, bordering the shoreline of the Bay of Islands. This will allow for easy access to the water. This Institute will make of more solar power, allowing for the generation of renewable energy. It will also contain the aquariums. It will contain local and regional species in order to study the local area. Also, they will also contain exotic species for research purposes. The aquarium will also double as a tourist attraction in the area.

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- The Museum will be located adjacent to the Marine Institute. It will face the waterfront and also make use of solar power for electricity.
- On the most western part of the site, the development will be solely residential lengthways along the shoreline to make the best use of the scenery while allowing the most efficient capture of solar energy (Bart, Shach-Pinsly, & Fisher-Gewirtzman, 2006). They will be two to three levels in height and be of various qualities, from low to high end to service the greater number of the public.
- In between the museum and the residential buildings will be three buildings of mixed use zoning. The first levels will contain cafes, restaurants, and other small businesses. Above will be apartments. All three buildings will have their floors staggered so as to allow them all to gain a view of the waterfront, gain access to solar energy from the south yet not be too crowded. This will also prevent cutting off the shore from areas further behind the buildings. This is crucial, as studies have shown that a view of the water is one of primary importance to individuals (Bart *et al.*, 2006). According to Bart *et al.*, “[v]isual openness to any type of view, especially to water, contributes to the quality of dwelling, to the satisfaction of the residents, and to their willingness to pay for it” (2006, p. 322).
- The marina will be located on the piece of land protruding out from the east of where the Corner Brook Stream meets the ocean. It will also be constructed in such a manner so as to account for the least amount of environmental destruction and to provide erosion control.
- The eastern side of the site will be solely focused on mixed use. The buildings will be set back a bit further to provide for more green space and openness towards the shoreline. The buildings in behind will be taller in order to still take advantage of the view of the water, yet not too close or high to block out the sun in the south. All of the buildings will also be equipped with solar panels.
- Parking lots will be located in several areas. The main parking area will be behind the Marine Institute. It will be accessible through the current access road from Griffin Drive. Other parking lots will be located in the vicinity of the residential and mixed use buildings yet on a smaller scale. One aim of the parking lots is to keep them out of sight from pedestrians along the shoreline. This provides not only a better image, but also safety and comfort for the public. One significant issue faced with the development of the waterfront is water runoff, which increases pollution and erosion (Abbott, 2006). There are various methods available, including a reduction in parking demand. Providing more public transportation can have that effect. It is important that the waterfront will have good access to the public transport system of the city (Arnold Jr., Chester, Gibbons, & James, 1996). Also available are green spaces that help to infiltrate the water into the underlying soil. The parking lots will be broken up with many green spaces to provide for this. Another way to decrease runoff and its consequences is the use of the proper material for parking lot construction. There are several pervious materials available, such as “various mixes of asphalt with larger pore spaces (e.g., “popcorn” mix), and alternative systems such as open-framework concrete pavers filled with sand or gravel, or turf reinforced with plastic rings” (Arnold Jr. *et al.*, 1996, n.d.)
- A promenade will be constructed the entire length of the shoreline to provide easy access, and safety, to the public. They will have to be constructed so as to not interfere with natural ocean cycles, to provide erosion control, and reduce runoff. It will be wide enough to service

pedestrians, cyclists, and skateboarders without causing interference. One way to provide for erosion control along the shoreline is through vegetation. It allows for: absorption of the impact of falling rain; reduction in wind velocity and trapping wind blown sediment; maintaining the soil's absorptive capacity; reduction of frost penetration; and providing wildlife habitats (Ontario MMA, 1987).

- Green space will be located throughout the waterfront in order to break up the development into a more natural space. This will include public parks. As De Sousa points out, providing green space allows for flood control, environmental renewal, economic stimulation, improvement of neighborhood aesthetics, enhancement of the sense of community and place, and preservation of historically-significant buildings and/or landscapes (2002, p.194). Green space will also allow for reduced runoff and erosion. This has already been analyzed previously concerning parking lots. Green space will be designed with indigenous plants so as to reduce/eliminate the need for irrigation (LEED, 2007).
- An important aspect of the development will be the quality of the water. Currently, the water is in poor condition due to the lack of sewage treatment. Aside from solving health problems, benefits will also come to the local economy with an increase in tourism (Handley & Wood, 1999). One way to solve the problem of sewage treatment would be through biomimicry, which is a new science of emulating nature and its processes for the benefit of improved efficiency (du Plessis, 2003). If the community will build a sewage treatment plant, the area will be hooked up to it. If this is not the case, although it is planned, the waterfront could provide for its own sewage treatment system while employing biomimicry. This could be achieved through the construction of an artificial wetland, which will filter out part of the sewage and pollution associated with raw sewage (Fraser, Hansel, & Narayanan, 2002). If a wetland were to be constructed, the best place would be on the right side of Corner Brook Stream where it meets the ocean.
- A skywalk will be built crossing Lewin Parkway to the east of Corner Brook Stream.
- The entire waterfront will also require access to the required utilities, such as water and electricity.
- Throughout the construction process, steps will need to be undertaken in order to reduce the impacts of erosion and sedimentation. The following strategies can be employed: temporary and permanent seeding, earth dikes, mulching, silt fencing, sediment traps, and sediment buildings (LEED, 2007).
- All buildings will be designed with minimal footprints so as to minimize disruption. This includes mixed use (LEED, 2007).
- Bicycle stations will be provided throughout the waterfront in order to promote bike use (LEED, 2007).
- All buildings will make use of garden roofs in order to minimize runoff (LEED, 2007).
- Collection stations for storm water will be located throughout the area. The water will then be used for non-potable uses such as irrigation (LEED, 2007).

11.0 Further Research

In order to better plan the waterfront and reduce environmental impact, more research will be required on the state of the current Mill site and the proper way to clean up the Mill sludge located in the harbor. Also, although the Municipal Plan was consulted, it was not the most recent, since it was still under review. As well, public opinion would be of great benefit to the creation of the waterfront in order to see what they perceive as the best way to proceed. The best way to analyze this would be through a methodologically designed survey.

12.0 Conclusion

With the pulp and paper industry in decline in North America, the City of Corner Brook requires a waterfront revitalization plan in place in case of a permanent shutdown of the Mill. This paper has attempted to give an indication of what is possible given the current situation. Yet, further studies are required in order to better and fully assess the impacts of proposed solutions and which solution would be most appropriate.

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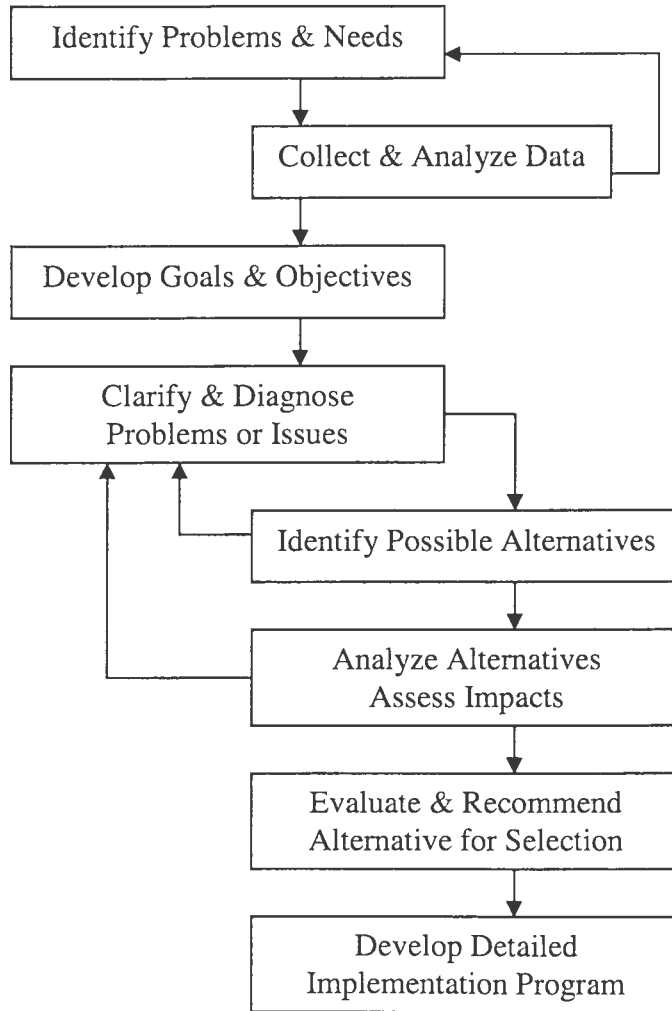
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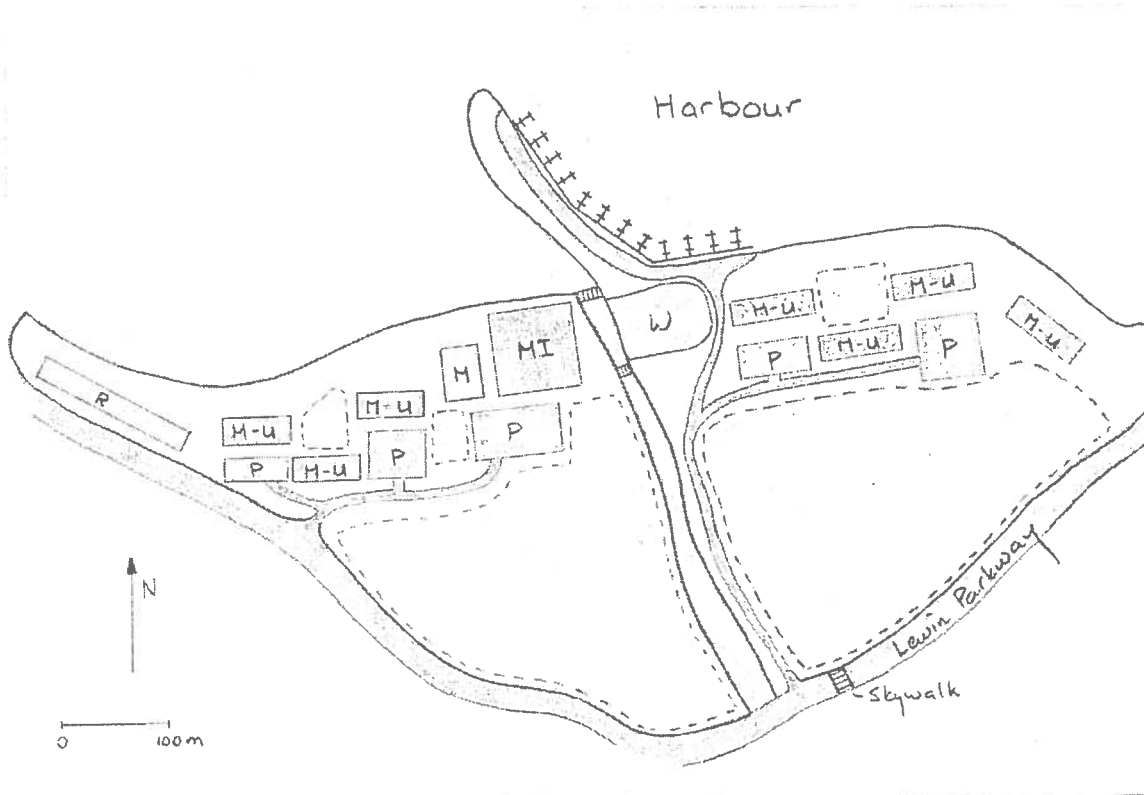
Appendix A

The Planning Process:



Appendix B

Waterfront Design



- P Parking
- R Residential
- M-u Mixed Use
- Water
- M Museum

- MI Marine Institute
- Public Park
- Road
- W Wetland (artificial)