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Identifying Problems in Chapter 91 Database Projects

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Identifying Problems in Chapter 91 Database Projects

An Interactive Qualifying Project Report Submitted to
The Faculty of the WORCESTER POLYTECHNIC INSTITUTE
in partial fulfillment of the requirements for the
Degree of Bachelor of Science

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This report presents an extension of an Interactive Qualifying Project completed at the Boston Project Center in April 2007. The author's IQP consists of this document and the previous project report, which can be found at <http://www.wpi.edu/Pubs/E-project/Available/E-project-042707-091539/>.

Abstract

Two Massachusetts cities, Boston and New Bedford, have created a database with Chapter 91 license information for the use of city planners and the public. This project involves analyzing these Boston and New Bedford projects to identify problems and benefits associated with undergoing a Chapter 91 database creation. In doing this, future database creators could have the opportunity of using this information and applying it to ensure the minimum amount of difficulties throughout database design and implementation within their town.

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1 Introduction

Throughout Massachusetts history, harbors and waterways have been the hub of revenue, benefiting the state's economy through various industries, such as trading, whaling, manufacturing and fishing. Businesses also benefited from the water's beauty and pleasantness by building restaurants and stores along harbor fronts, as well as residences and various commercial buildings. While businesses and agencies wanted to privatize parts of the waterfronts, at the same time the public was demanding use of the waterfronts for personal pleasure.

Since the mid 17th century, Massachusetts government acted to regulate this dilemma between businesses/agencies and the public through the "Public Trust Doctrine", a legal principle set forth by the Massachusetts Bay Colony in the years 1641-1647, which granted the public with complete rights to accessing waterways, for activities such as fishing, fowling and navigation. By 1866 Massachusetts Commonwealth established the Massachusetts General Law Chapter 91 to ensure that this principle is being met through the law. Under this legislation, the Massachusetts Department of Environmental Protection (MassDEP) must approve any potential plan for actions taken in waterways, such as construction, dredging or filling. Once approved, a Chapter 91 license would then be granted, permitting the construction.

Often, an agency or business, the Department of Environmental Protection, or particular authorities within a given Massachusetts city (such as the Boston Redevelopment Authority) will have to reference existing licenses for various reasons. Since 1866 all Chapter 91 licenses have been in hard copy and unorganized within their indexes, until recently when some were converted to a very limited and insufficient database. This makes for a long and arduous process when a specific license needs to be found for referencing.

In an effort to fix this indexing problem, two projects were undertaken, one in New Bedford (*Chapter 91 New Bedford Pilot Project*, June 2001) and one in Boston (*Enhancing Public Waterfront Accessibility in Downtown Boston*, April 2007), that involved putting Chapter 91 licenses into an electronic database for the public to utilize via website. Along with the licenses, interactive maps of the area and pictures of public

amenities were also included in these databases in an effort to ease the difficulties of referencing licenses, as well as to enhance public waterfront accessibility in the areas.

The goal of this project was to identify the problems, as well as benefits, associated with the implementation of the Boston and New Bedford databases. This information is intended to help prospective developers avoid problems that can be encountered when undertaking similar waterways projects. Taking a look into how the New Bedford project was created, noting what technology and technique they used, learning about what aspects of their project worked and which failed, as well as following up with the Boston Redevelopment Authority to see how our project fared, is all vital information that could definitely be helpful to future project undertakers.

2 Background

This background section will give an overview of the history of the Chapter 91 legislation and its licensing process, followed by a more in depth discussion about the New Bedford Pilot Project and the Boston Harborwalk project.

2.1 Chapter 91 History

Dating back to the “Public Trust Doctrine”, a legal principle set forth by the Massachusetts Bay Colony in the years 1641-1647, Massachusetts society at this time saw the air and sea as not belonging to one person, but rather, belonging to the public as a whole and has since granted the public with complete rights to accessing waterways, for activities such as fishing, fowling and navigation. The principle held that waterfront construction should not impair these rights (MassDEP 2007).

In 1866 Massachusetts Commonwealth established the Massachusetts General Law Chapter 91 to ensure that this principle is being met. This piece of legislation determines the extent of public access along the waterfront, as well as rights of landowners between the historic mean high water line and the current mean low water line. According to the Massachusetts Department of Environmental Protection, “Through Chapter 91, the Commonwealth seeks to preserve and protect the rights of the public and to guarantee that private uses of tidelands and waterways serve a proper public purpose... Chapter 91 regulates activities on both coastal and inland waterways, including construction, dredging and filling in tidelands, great ponds and certain rivers and streams” (MassDEP 2007).

The Chapter 91 legislation requires that all proposed plans for dredging, construction, filling and so on, be sent to the Massachusetts Department of Environmental Protection Waterways Regulation Program. This program requires the plan to go through a series of approvals to ensure that the proposed project will not infringe upon existing public rights and regulations, including the regulations ensured by the Chapter 91 law, as well as the regulations associated with the particular city. Once approved, a Chapter 91 license would then be granted by the MassDEP, permitting the construction (MassDEP 2007).

Chapter 91 licenses specifically state the provisions for each project or activity undertaken. These provisions include the licensee name, a license term and date of issuance, plans that show the project or location of the area licensed, as well as details for any special conditions attributed to the area and license (for example, harborwalk width and maintenance information) (MassDEP 2007).

Since 1866, the MassDEP has issued about 20,000 licenses within the state of Massachusetts. Often, an agency or business, the Department of Environmental Protection, or particular authorities within a given Massachusetts city (such as the Boston Redevelopment Authority) will have to cross reference licenses when administering new ones to see what areas of licenses may be overlapping, as well as looking at permits to determine water access within the area owned by the permit holder and so on. Also, should ever a building, fill or drudge change, the license given to this project needs to be reviewed and updated. Since 1866 all Chapter 91 licenses have been in hard copy and unorganized within their indexes, until recently, when some were converted to a very limited and insufficient database, making for a difficult process when a specific license needs to be found for referencing (MassDEP 2007).

2.2 New Bedford Chapter 91 Pilot Project

Similar to our Boston project, The New Bedford Pilot project, conducted through the University of Massachusetts, Boston throughout August 2000 to June 2001 started in response to the Chapter 91 license indexing problem. It was directed by Alberto Giordano, Richard Gelpke and Bill Campbell, and partially financed by federal funds from the Environmental Protection Agency (EPA) to the Massachusetts Department of Environmental Protection (DEP) under the Clean Water Act. The project involved the conversion of Chapter 91 licenses to a digital format, the creation of a geographical database and the design of a prototype website. The prototype is limited to New Bedford and the Pleasant Bay area (Cape Cod). Together, these areas are home to approximately 300 licenses out of the 20,000 in Massachusetts. Almost all 300 licenses are included in the database (Giordano 2002).

The objective of this pilot project was to “show how multimedia cartography and GIS can be integrated to facilitate the exploration of historical, geographic databases on the internet”, and was conducted in five stages: data conversion, quality assurance/quality control, GPS survey, GIS design and implementation and website design and implementation. The Chapter 91 licenses were converted into digital format in two different ways. The written material had to be scanned into a word file so that it can be readily searched by keyword on the database, while the graphics were scanned through readily available flat scanners. All the Chapter 91 licenses were then geo-referenced using GPS, pictures were taken of sites and structures in the area and a GIS database was created containing information on the licensee, dates the permits were issued, activities performed and structures licensed (Giordano 2002).

This database can be viewed at the Pilot Project homepage at:

http://www.geog.umb.edu/alberto/Ch91NewBedford/Homepage_Web.html

Once the website is accessed, the user is able to keyword search for a license by name or, if they know where the license is, they can locate it on a map. Once the desired license is located the user is able to view the entire scanned license online (shown in Figure 1), as well as a list of vital information from this license without having to search for the hard copy. Users are also able to click on a section of the map to view which licenses occupy that area, as well as view photos of sites and amenities in the area (shown in Figure 2). However, it is not clear how much the actual database is being used, as the website was last updated in May of 2002 (Giordano 2002)

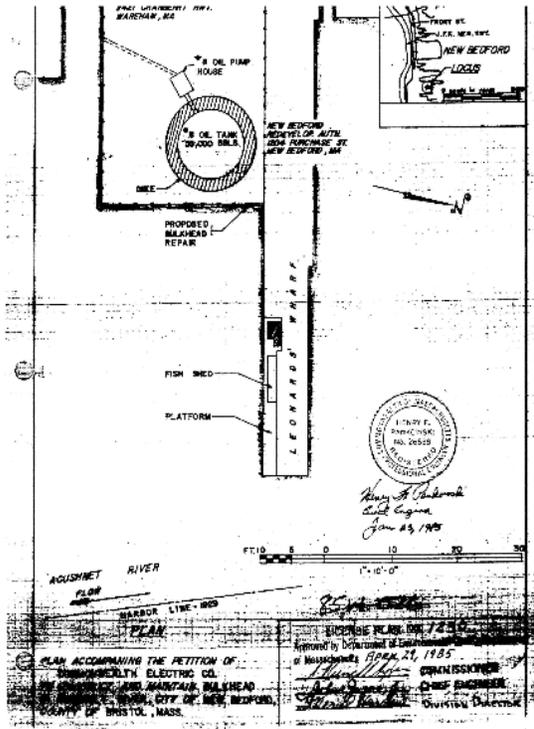


Figure 1 - A scanned New Bedford Chapter 91 license that can be observed in its entirety on the database (Giordano 2002).

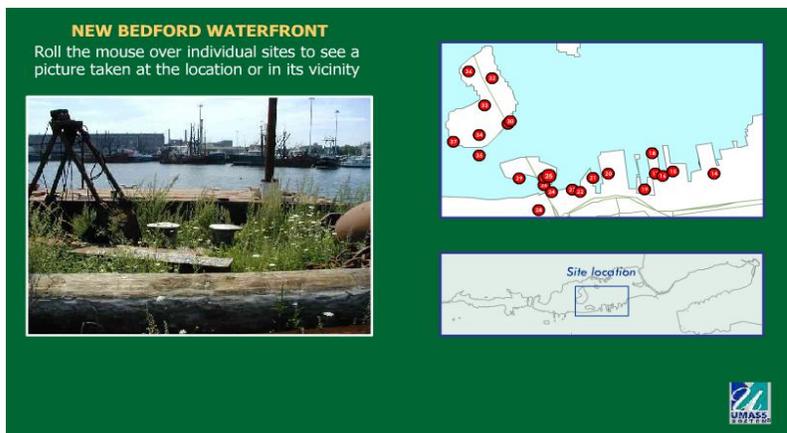


Figure 2 - An interactive map of the New Bedford waterfront and corresponding area photographs. A database user has the ability to move around the Site Location box to the area desired, where they can then click on any red circle to see photographs of the area. This same setup can be used when locating licenses as well (Giordano 2002).

2.3 Enhancing Public Waterfront Accessibility in Downtown Boston

Based in part on the New Bedford example, the city of Boston undertook a similar Chapter 91 database project. Throughout the two months of March and April 2007, a group of students from Worcester Polytechnic Institute, myself included, created an electronic database that includes Chapter 91 licenses in Boston, as well as public amenities and maps in the area.

The Boston Redevelopment Authority, our project sponsor, is responsible for enforcing public access and rights along the harbor front, making Chapter 91 licenses necessary for referencing, as well as making an adequate mapping system necessary to keep the harbor walk fully open and accessible. Before this project was designed, there were many problems with locating Chapter 91 licenses, due to inadequate indexes, as well as some problems with public access to the waterfront, particularly pertaining to underutilized access points. Without easy access to these needed Chapter 91 licenses or a sufficient mapping system, the BRA's job proves difficult and time consuming. Our project's goal was to help the BRA to increase the availability of Chapter 91 license information by creating an electronic database of Chapter 91 licenses, along with mapping public amenities existing along the Harborwalk.

. The benefit of this database is that we make the BRA's job easier and the public (agencies, companies and citizens alike) can now have access to all harbor front information for their reference, making planning much more effective. Our area of concentration for this project was between Burroughs Wharf, which is located at the northeast corner of the North End, and Rows Wharf, which is located near the entrance of Fort Point Channel. This scope was sufficient to populate the database with the licenses in that area, as well as amenities along the Harborwalk. In order to create a sustainable database that could be used by people with limited computer literacy, we consulted with many state and local government agencies. The varying fields within the database can be attributed to the organizations such as the Office of Coastal Zone Management (CZM), the DEP, and the personnel at the BRA. In addition, we contacted representatives of advocacy groups such as the Boston Harbor Association (TBHA) and

Save the Harbor/Save the Bay, to gather some insight about what particular public amenities would be useful to map on a GIS layer. We then mapped these public amenities using a Global Positioning System (GPS) device.

Through meetings with the Management Information Systems department at City Hall, we completed our structure of the database and user interface in five stages: database development and design, mapping public amenities and harbor walk characteristics, converting licenses into electronic form and adding them to the database, creating an interface for entering data, and finally, evaluate database with the BRA to finalize the structure.

Once the database has been accessed, the user can click on a parcel in GIS, which is part of a group of one or more parcels called a project (shown in Figure 3). This action will display all licenses issued for that parcel. Then, the user simply has to click on one of the licenses, which will display all of the license details (shown in Figure 4). A user can also locate and view photographs of public amenities by clicking on sections of a map of the area.



Figure 3 - The “parcels” on the area map in GIS that users can click on to view licenses are in yellow



Figure 4 – The info tool lists the license information for the chosen area

Following the completion of our database project, we came up with a few recommendations for areas that we felt could be improved or needed regular upkeep.

- We recommended that the BRA implement a plan to populate the newly created Chapter 91 database with current licenses in the city of Boston. This entails obtaining the respective licenses at the DEP and digitizing them. Then the information contained in the license can be entered into the database.
- We also recommended that the TBHA use GPS to finish mapping signs and public amenities along the entire Harborwalk. These amenities include, but are not limited to, benches, trash receptacles, restrooms, parks and other descriptive signage.

For my project I was interested in exploring what additional work has been done on the database, whether or not the BRA has implemented any of our recommendations, and what problems the BRA may have run into that may have hindered the implementation.

3 Methodology

The goal of this project was to identify the problems, as well as benefits, associated with the Boston and New Bedford projects. This information is intended to help prospective developers avoid problems that can be encountered when undertaking similar projects as the ones in Boston and New Bedford. Knowledge of problems associated with the Boston and New Bedford databases will help allow for limited problems with future projects. Not to mention, familiarity with the benefits that can come out of undergoing a project like this may stimulate the motivation to improve other cities' waterfronts.

The objectives of this project were to:

- Identify past benefits and problems that have come from the Boston and New Bedford Chapter 91 database projects.
- Analyze these problems and benefits, focusing on the specific actions that were taken to get the Boston and the New Bedford projects to be successful, as well as focusing on the specific actions that were taken that may have hindered the projects.

This chapter will address each objective and discuss the methods of accomplishing the overall goal.

3.1 Interviews

When undergoing a project as large as creating a database that includes all waterway information for an entire city, often there are problems that follow, however minute they may be. At the same time there clearly are benefits associated with undertaking such a project that would drive developers in other cities to start a similar project of their own. To identify these problems and benefits I conducted interviews with the groups and individuals that are currently in charge of the Boston and New Bedford databases.

Since the Boston project was created for the BRA, I obtained information about the database's current progress by contacting Rich McGuiness, our Boston project BRA liaison, to schedule an interview with the Boston Redevelopment Authority. While I had

the names of the three University of Massachusetts professors who directed the New Bedford project, getting in touch with the people in charge of this database and website today proved more difficult. To start, I planned to use the New Bedford City website to contact the New Bedford City Hall License Department to find the correct people I should be interviewing with for the New Bedford project.

Upon finding the correct persons to speak with, I requested a 15 minute interview by email or phone. Then, I to asked three open ended questions with the possibility for follow-up questions (see appendix A). From these interview questions, I expected to gather as much knowledge and background information as possible in a short and efficient amount of time to ensure that the interview was not unnecessarily long and repetitive. The content of the questions would touch upon the challenges and benefits associated with the creation and implementation of the Boston and New Bedford Chapter 91 databases, as well as what progress these databases have had since the projects ended. Finally, I planned to request suggestions that they would give to future database creators.

3.2 Analysis

After recording the information obtained at the interviews I planned to do a qualitative analyses, looking for both commonalities and differences pertaining to problems and benefits associated with the Boston and New Bedford projects. The problems and benefits I was looking for in these interviews pertained to what problems were encountered throughout the creation of the two databases and how they were overcome, as well as how easy or difficult the database is to use today and whether or not people are utilizing it, followed by ways the New Bedford and Boston databases could be improved.

After doing an analysis on both interviews it will be clear what to be cautious about when tracking Chapter 91 Licenses and putting them into a database, putting together a successful database, as well as regulating and mapping out waterfront usage and access points. To ensure that this information is understandable, I will carefully implement evidence from the interviews to back up my findings. I will include in my suggestions what exactly can go wrong and what good can come out of a project like this. Understanding that the New Bedford project and the Boston project have similar goals

pertaining to city waterfronts, summarizing and analyzing each project would provide a living example of what works and what does not in this type of project.

4 Results and Conclusions

Contacting the New Bedford City Hall License Department to learn further about the New Bedford Chapter 91 database was a circular process, resulting in little information regarding the status of the New Bedford project (the email chain of my contact efforts are shown in Figure 5). To start, I contacted David Kennedy, New Bedford's city planner and chairman of New Bedford planning board. He then referred me to Kristen Decas, the executive director of the Harbor Development Commission. After speaking with her, I was then referred to Mitch Ziencina who works for the MassDEP. Having not received any useful information, I then used the Pilot Project website to contact William Campbell, a professor at University of Massachusetts Boston and also one of the directors of the New Bedford project. He referred me to three of the following people: Jack Looney, Alberto Giordano and Richard Gelpke which are also University of Massachusetts Professors, the latter two being directors of the Pilot Project as well. Richard Gelpke noted that a large problem with their project was lack of a competent and knowledgeable project manager from their main contractor (BSC - Boston Survey Consultants, an engineering firm). Aside from this, he did not mention how this problem was overcome and he was unaware of the database's current progress.

Judging by the many times I was referred to new persons to speak with and the extent to which these people were uninformed about the project, particularly Gelpke himself, it seems as though there has been a lack of significant use and progress of the New Bedford database.

Through Richard McGuinness, I was able to follow-up on the Boston database's current progress. McGuinness reported that there have been no significant changes to the database, but it is being used for referencing purposes, particularly when issuing new licenses.

When asked what problems have been encountered with the database, I was informed that the most significant problem is not with the database; rather it is with the licenses themselves. He states that the licenses, "are not detailed enough to determine the extent of the project. You really need a trained eye to look at each license and determine if they are relevant to the project. Unfortunately there are not many people familiar with

this matter that are available to sort through the documents.” For example, The Rowes Wharf license on file is not for the construction of the property it is only for the addition of floats later on, so when a new construction plan is seeking a license in this area the needed information for the current property is not available. To fix this problem McGuinness suggests that all the licenses be pulled and reviewed “on a screen with all stakeholders in the room, City, DEP, CZM Conservation Commission and harbor advocates.” With the combined knowledge of these agencies, there should be enough people in the room to fill in the missing license information. Also, while the BRA acknowledges that there are missing licenses, they do not have the resources to locate them and enter them into the database.

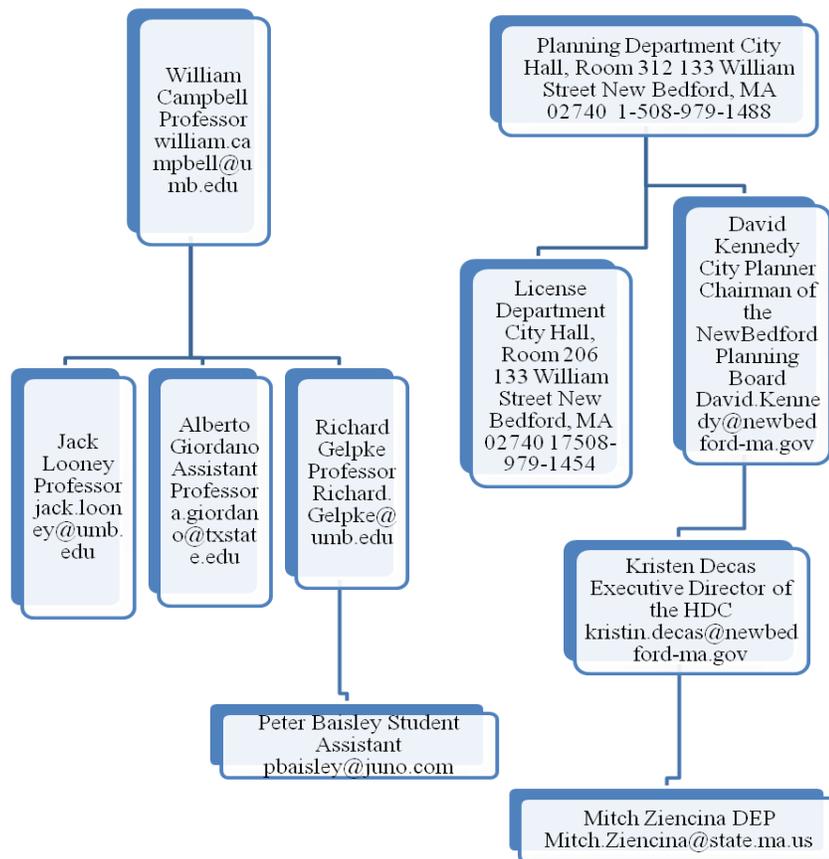


Figure 5 – New Bedford Interview Contact Chain

I was able to identify three reoccurring problems with the Boston and New Bedford database's development: external university groups, resources, and license detail. Both the database projects were done by external university groups. Since universities tend to have more leverage in networking and finding resources, this gives these groups a temporary advantage when creating the database that cannot be sustained once the basic database development is complete and the university is no longer involved. One way to overcome this issue would be for towns to push for non-university related database projects or to require the university group to help the town maintain its connections with needed resources after the database is complete. This includes ensuring that proper resources and man power is available for database upkeep after its completion. Licenses are always changing and new licenses will need to be included in the database in following years. Before a Chapter 91 database is started thought must be put toward how the database will be up kept, including efficient training in license expertise and database usage.

The other problem with the database involves lack of adequate detail within the licenses. Before licenses are scanned and the database created, it is necessary that stakeholders, such as the BRA, DEP, Conservation Commission and various other harbor advocates are called upon to ensure that license information is complete when entered into the database. In order for a Chapter 91 database to be fully utilized it must be complete with every license issued within the town and all license information available.

If a town is equipped with the appropriate resources to keep their database useful after its completion, required means of regular database upkeep is available and all licenses issued within the town are included with complete license information, the database will be more likely to result in success.

6 References

Massachusetts Department of Environmental Protection (2007). *Chapter 91: An Overview and Summary*. Retrieved on November 1, 2007 from <http://www.mass.gov/dep/water/resources/about01.htm>

Campbell, Bill, Gelpke, Richard, Giordano, Alberto (2002). *New Bedford Chapter 91 Pilot Project*. Retrieved on November 2, 2007 from http://www.geog.umb.edu/alberto/Ch91NewBedford/Homepage_Web.html

Appendix A: BRA Interview

1. Have changes been made to the Chapter 91 database since the conclusion of its creation? If so, what?
2. Has anyone made use of the database to access information or make regulatory decisions?
3. What challenges and/or benefits have you encountered in making use of the database? And do you anticipate any challenges and/or benefits in the future?
4. If you could give advice or suggestions to future developers and/or cities about creating a similar database, what would it be?

Appendix B: New Bedford Interview

1. Since 2002, when the New Bedford Chapter 91 Pilot Project was completed, has the database been utilized? If so, what individuals or groups make the most use of it?
2. What challenges and/or benefits have you encountered in making use of this database? Do you anticipate any challenges and/or benefits for the future?
3. Have any alterations been made to the database since 2002? At what stage is the project today?
4. If you could give advice or suggestions to future developers and/or cities about creating a similar database, what would it be?