Greenpoint-Williamsburg

ToxiCity Map

• Kerry Elkins • Ian Knight • Abby Purcell • Pratt Institute • LIS 644

Excecutive Summary

The following report was created to share the results of user testing performed on the NAG Greenpoint-Williamsburg ToxiCity Map website. Spatial Analysis and Visualization Initiative (SAVI) created the interactive map for their client NAG (Neighbors Allied for Good Growth).

The team that created the usability test was made up of three evaluators, each one responsible for carrying out three remote user tests on the interface UserTesting.com and one in-person user test, which was recorded using software Camtasia or LookBack. A total of 12 users have tested the website using our methodology. A more detailed explanation of process is explained in the "Methodology" section of this report. There are three major findings, along with recommendations for how to improve the user experience of the website as a culmination of our testing:

- Expand address search bar to make it more findable
- Move population percentage data to the "Population Density" layer
- Relabel the tab "About The Data" to match content expectations

Table of Contents

Introduction

SAVI is a mapping and data lab that focuses on geographic informational systems at Pratt Institute in Brooklyn, NY. SAVI is a new establishment and one of their core commitments includes providing services to the greater New York City community. One of their first projects was creating an interactive map for their client Neighbors Allied for Good Growth (NAG).

The ToxiCity Map contains open source information from various organizations such as the federal: Environmental Protection Agency, Department of Environmental Conservation; and the local: Mayor's Office of Environmental Coordination. The ToxiCity Map compiles this data and its goal is for the residents of Greenpoint and Williamsburg to have the tools to be knowledgeable about the well-being of their community and its environment.

Therefore the residents of Greenpoint and Williamsburg were the ideal candidates for testing this website and we were able to get two residents who live in Greenpoint, as well as users who are concerned about environmental issues. Our remote testers were not from the area but gave useful feedback about the usability of the site.

Methodology

This evaluation was performed employing the live user testing method, as described by Barnum (2011). This method is performed by an evaluator who leads a test subject through a set of predetermined tasks designed to reflect typical use cases of the website being reviewed. Test subjects are recruited based on attributes that qualify them as potential users of the website. As the test subject performs the defined tasks, the evaluator records the user's reactions, and any potential problems experienced in the course of the test. At the completion of all user tests, the evaluator(s) review the collected data to discern the most significant findings, and to determine any appropriate recommendations based on these findings.

This evaluation method was selected for its ability to generate rich feedback based on actual user experience. It allows the evaluators to not only observe any potential issues with the website but to also gauge the qualitative elements of the user experience, indicating both strengths and weaknesses of the platform. User testing is considered the strongest method for evaluation, yielding reliable usability and experiential feedback with as few as five participants, with additional test subjects yielding only incrementally greater confidence in the results (Barnum, 2011).

Below are presented additional details on the specific methodology employed in this study.

Background

This user testing evaluation was performed by a team of three evaluators, Kerry Elkins, Ian Knight, and Abigail Purcell. It was performed in the course of graduate level studies in user testing and evaluation at the Pratt Institute School of Information.

The website under evaluation was the NAG Greenpoint-Williamsburg ToxiCity Map (http://clhenrick.github.io/greenpoint_williamsburg_toxicity_map/), an interactive map designed to inform residents of the neighborhoods of Greenpoint and Williamsburg in Brooklyn about environmental factors in the area.

Approach

The methods used in this evaluation lend themselves to a formative evaluation of the website. A formative evaluation yields qualitative user feedback on the design of the website, as opposed to a summative evaluation, which is more concerned with testing website performance according to predetermined metrics. Formative evaluations generally require fewer participants to yield valid results, and are well suited to returning design recommendations before a website or platform is in its final state.

Users

This user testing study was conducted with 12 test subjects. Each evaluator worked with four of these subjects—one in person, and three remotely.

The remote testing was accomplished on the user testing website www.usertesting.com. Test participants are selected by the website from among a pool of available users, subject to demographic criteria defined by the tester. In this case, users were required to be 18 years or older, and United States residents.

In-person participants were selected based on residency in Greenpoint or Williamsburg, familiarity with the neighborhood, or interest in environmental impacts.

All tests were administered using the Think Aloud method, whereby the user narrates their experience as they perform the defined tasks, explaining the reasons for their actions, and giving feedback about their experience. This method allows the evaluators to consider implications about the user experience in the user's own words.

Tasks

Before beginning the test, users were guided through the testing process, and asked to sign a consent form. If they were not currently residents of Greenpoint or Williamsburg, they were instructed to proceed under the premise that they were. Test subjects were then asked to perform the following three tasks:

1. You are a resident of the Greenpoint-Williamsburg area. Find out whether your property [using 141 Banker St, Brooklyn, NY 11222 in the case of non-residents] is in danger of flooding or if there are any toxic or polluted sites nearby.
2. You are trying to convince some friends to join you on the Industrial History Walking Tour, but they don't seem interested. To change their minds, find 3 of the most interesting or important highlights (in your own personal opinion) from the tour, starting at N. 11th Street and heading south.
3. You're working for a health-focused local non-profit specializing in asthma prevention and education for Hispanic populations. To help with targeted outreach efforts, you want to identify 3 specific areas in the neighborhood that have both a high asthma rate (>10 per 1000) and a high proportion of Hispanic residents (>25%)

Questionnaires

To collect additional data to inform this evaluation, test subjects were requested to respond to questionnaires at various points in the testing process.

In-person test subjects were asked to fill out a pre-test questionnaire, a post-task questionnaire after completing each individual task, and a post-test questionnaire at the completion of the test. Questions were designed to gather additional background information on the subjects, retrieve usability and experiential feedback from using the site, and gauge their overall experience at the conclusion of the test. The post-test questionnaire was based on the System Usability Scale (SUS), a standard user testing tool of 10 questions, which allows test results to be compared with a history of previous user testing studies (Barnum, 2011).

Remote test subjects were asked to respond to three post-task questions and four post-test questions designed to gauge their usability experience.

The full questionnaires are listed in the Appendices.

Recording

All user tests were recorded, to assist with further evaluation after completion. In-person test subjects were recorded using Lookback, a UX software tool that records the screen as the subject uses it, including where they choose to click, as well as video and audio of the user themselves. This complete recording helps evaluators gauge important points during the test that indicate a user's reactions, both positive and negative.

Remote user tests were recorded using the software available through usertesting.com. This software records the user's on-screen activity, as well as audio of their narration. In this instance, we did not record video of the users themselves.

Findings & Recommendations

Based on the results from the user testings, there were a number of insights about the ToxiCity map that were discovered. For this report, only three findings were highlighted based on the understanding that resources to amend the site are limited. However, a full list of findings is detailed in the appendices.

Recommendation 1:
Expand address search bar to make it more findable

Many users had difficulty looking up a specific address on the map, as they were not able to correctly identify the address search button. As one user put it:

"[There is no] search bar to look up your address where it would take you to it on the map. I had to search around for my address across the map just to see if the area was polluted or not. If a family member is looking up this for someone, they won't know the area as well as somebody who actually lives there, and it would be a problem."

Another user commented:
"No, can't search at all."

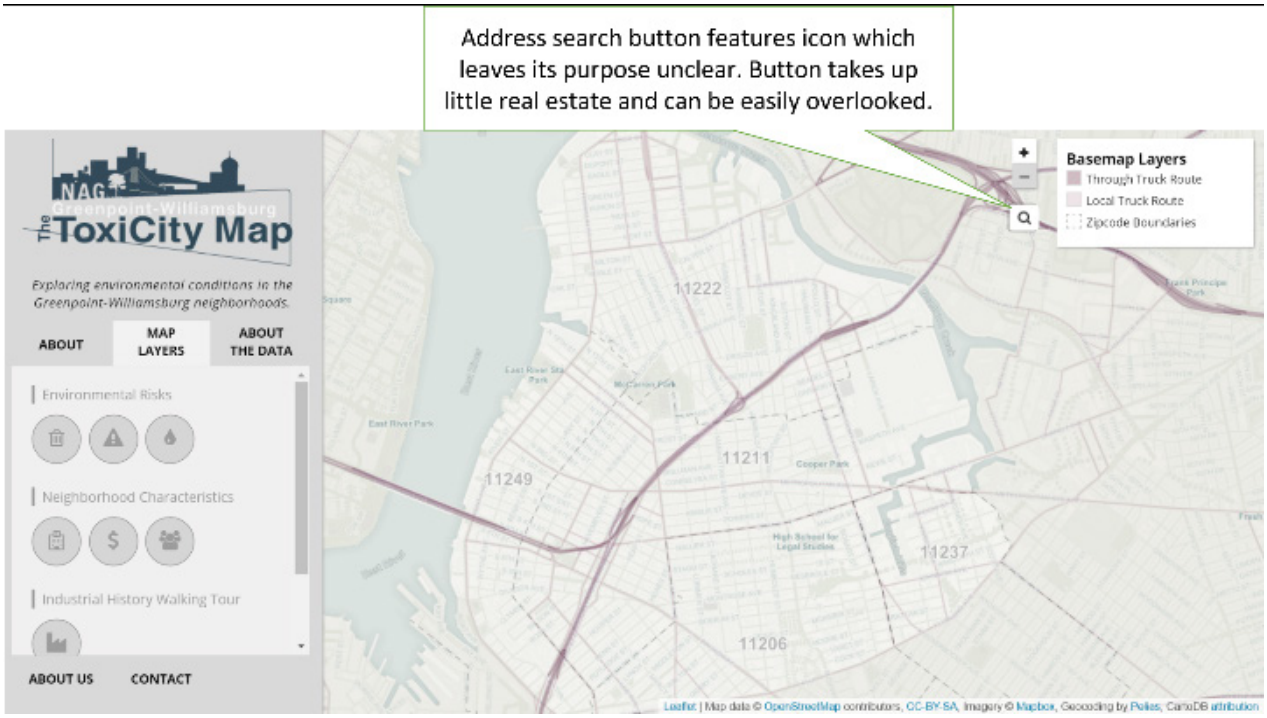


Figure 1

For residents of the area, this did not prevent them from locating their own address, as they were familiar with the streets and simply zoomed in on the map. However, when asked to find a specific address other than their own residence, most users were unable to locate the search feature, and instead tried to find it by looking at the street names on the map.

Recommendation:

To make the search feature more discoverable, we recommend having it appear in the expanded format as it currently appears when clicked on. In this format, it is clearly identifiable as a standard search bar where text can be entered, and also clearly labels its function with the text "Search for an address". The search bar can be moved slightly to the top of the screen to maintain the balanced look of the site, without taking up so much real estate as to interfere with the functionality of the map.

Figure 2

Recommendation 2:
Make population breakdown more visible

When asked to find information regarding population percentages by race and ethnicity, most of the users tested were unable to locate the information (only 2 of 12 users were successful). All of the users first gravitated to the Population Density layer for the information, probably due to the presumption that it correlates it to information about population:

"For me, it made more sense for that to be part of population density than income."

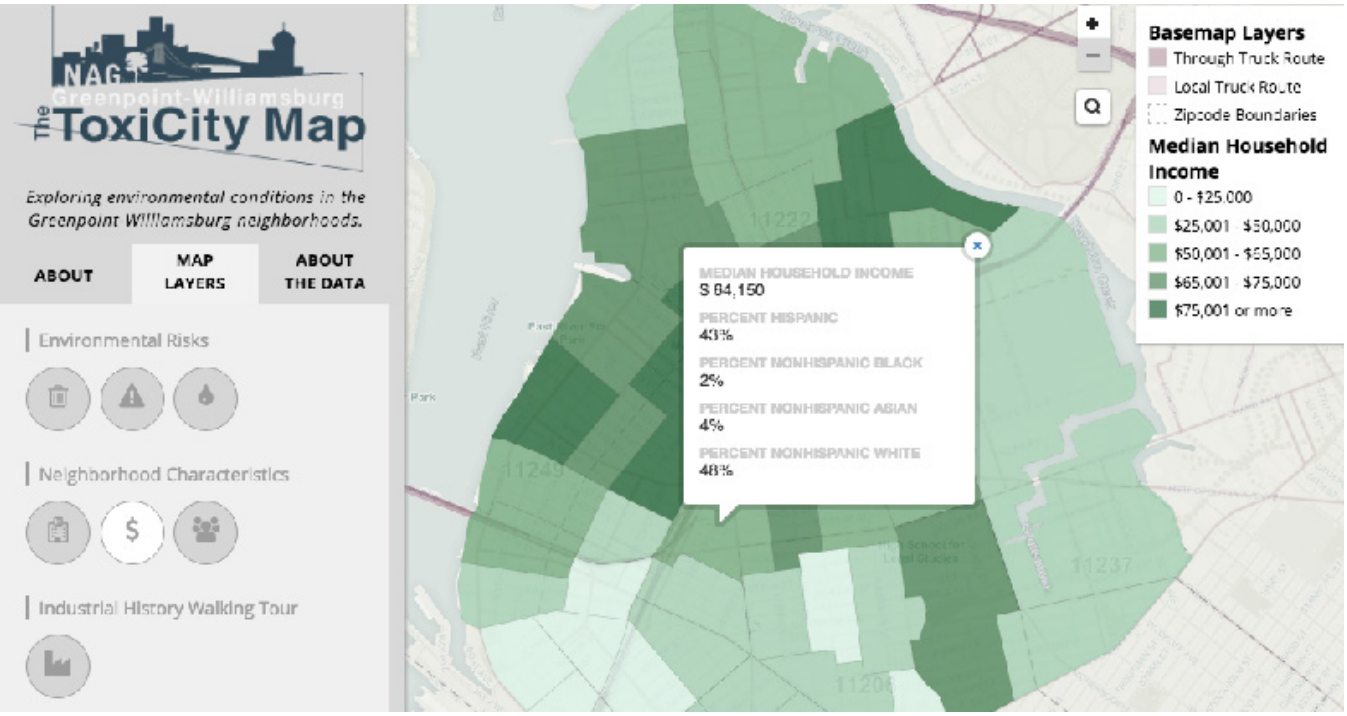


Figure 3: Population percentage by race and ethnicity appears in the Median Household

If they were unsuccessful, users tried multiple layers but did not click shaded areas to see if information would pop up. It quickly became a point of frustration:

"I wasn't sure which layer to put."
"I can tell you where there's a lot of asthma. I can't tell you where there's Hispanics"
"The website did not have the resources I needed to complete my task"

On the other hand, one of the users who did manage to find the information was forced to switch back and forth a lot to understand how the asthma and population layers related to each other. It was only by accident that they discovered that the pop-up box on the Income layer remained in place when switching to another layer.

Thus, it became clear that not only was the information in an unexpected area, but the visibility of that information was not obvious.

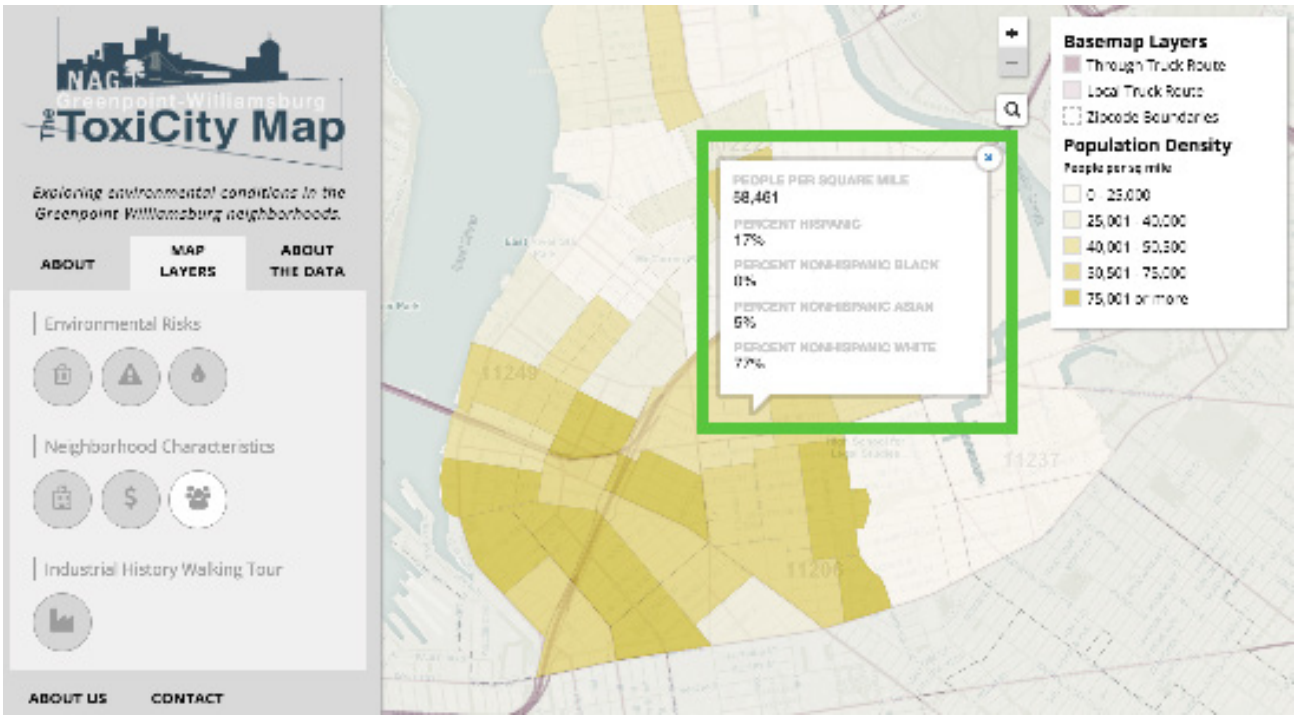


Figure 4: Move information to Population Density layer pop-up window

Recommendation:

With these points in mind, it is suggested that the population breakdown by race and ethnicity is moved from the Median Household Income layer to the Population Density layer, as users expected the information to be found in that layer.
Additionally, layers with pop up boxes may benefit from a concise pop-up hover or an outline around the section of the map that a user's mouse is placed over for better feedback. This also clues the user into the option to click for more information about an area or site.

Recommendation 3:
Relable the tab “About The Data” to match content expectations

The website was visually appealing to many of our users, one user stated:
“Very interesting and informative. The information was presented in a clean and visually appealing way. I learned some new things about my own neighborhood that I’ve lived in for 4 years now.”

Another user said: “I think the overall polluted and flood risk area colorization was good.”

The same user went on to say:
“I didn’t really understand the meaning of the different levels and what kind of an impact that has. Specifically, the polluted section, which I’m not really sure what that means.”

In watching the user testing videos and reading the responses written on our post-tasks and post-test questionnaires, we found that many of our users stated they could not understand the context itself, or the significance of it, when using various map layers or discovering information. We believe there are several possibilities as to why they did not utilize the “About The Data” tab which answers some of their questions.

One of the reasons we concluded this might be so is because the information is simply not in front of them. When you are directed to the landing page of the website or when you type in the URL, the default page of the website is the “Map Layers.” Unfortunately we do not have direct information as to why or how they didn’t use the “About The Data” tab but we concluded that all the other tabs (including the “About” tab) were ignored by our users.

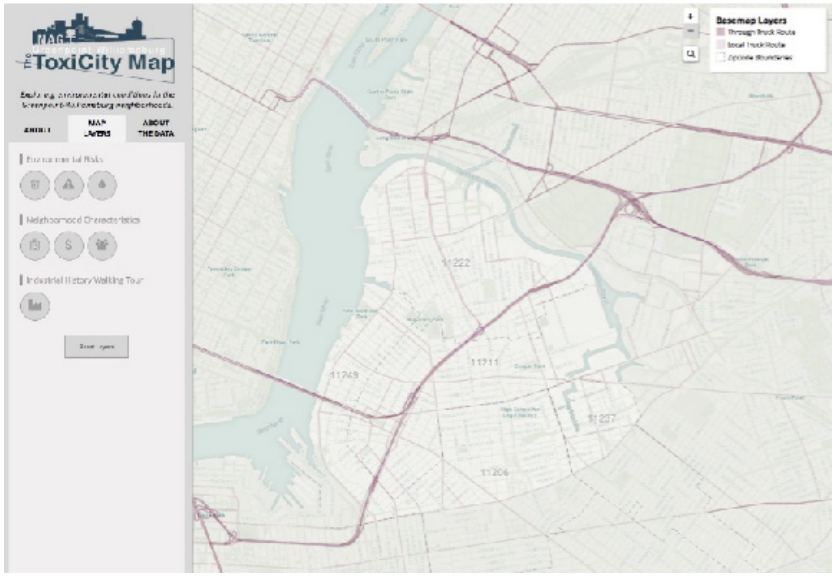


Figure 5: The current landing page of NAG-ToxiCity Map website.

Recommendation:

There are several different ways a solution for this could be approached. One could be a short pop-up message on the site stating to utilizing the tabs to learn more about how this website can be used and where a user could find more information as shown in Figure 6 below.

An additional solution that we believe should be implemented as soon as possible is to change the tab currently titled “About The Data” to a title that portrays what it is, a guide that defines the various terms used and why they are important, while still being user friendly. We recommend changing the title of that tab to “Map Terms” or “Using the Map”, you can see an example on the next image (Figure 6).

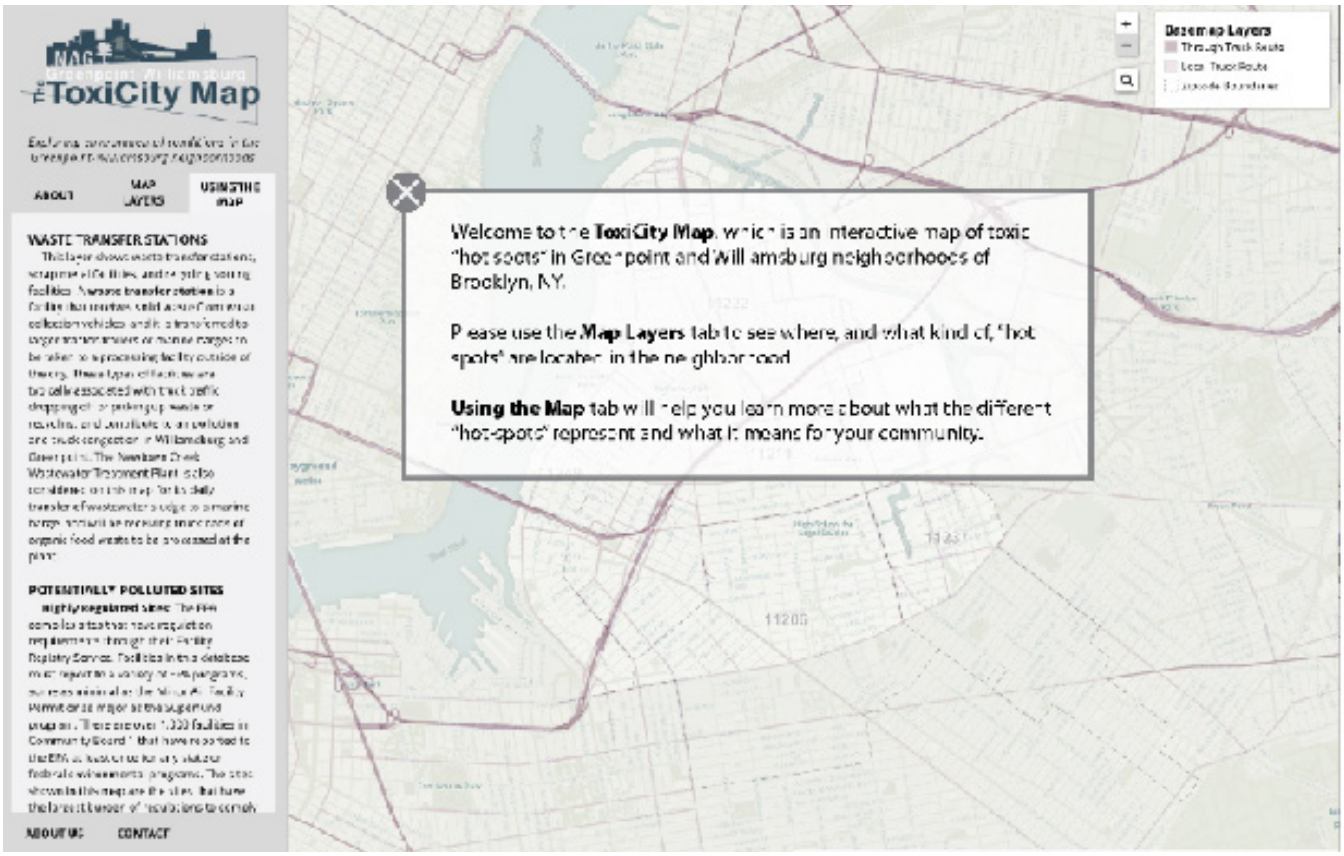


Figure 6: An example of a pop-up message on the NAG-ToxiCity Map website and the new name of the tab “Using The Map” instead of “About The Data”

There may be many other solutions to this finding and we encourage SAVI to keep an open mind to other resolutions that may be suggested by users or user experience experts.

Conclusion

While the ToxiCity Map is a visually appealing and full of useful data, it can be taken to become an even greater source of information for the Greenpoint-Williamsburg current and prospective residents. This can be achieved by:

- Expanding the magnifying glass icon into a search bar so users can easily fill in their addresses and locate it on the map
- Moving the population data into the "Population density" layer to provide an easier way to locate that data due to user expectations
- Changing the wording of a navigation label

It is our hope that these simple changes will help clarify understanding and make a stronger impact for a user looking into the possible environmental impacts affecting the Greenpoint-Williamsburg neighborhood. Furthermore, applying these recommendations and utilizing the spreadsheet of findings can further the goal of empowering NAG's community.

References

Barnum, C. M. (2011). *Usability testing essentials: Ready, set...test!*. Burlington, MA: Morgan Kaufmann.

Appendices

Tasks

1. You are a resident of the Greenpoint/Williamsburg area. Find out whether [141 Banker St, Brooklyn, NY 11222] property is in danger of flooding or if there are any toxic or polluted sites nearby.
2. You are trying to convince some friends to join you on the Industrial History Walking Tour, but they don't seem interested. To change their minds, find 3 of the most interesting or important highlights (in your own personal opinion) from the tour, starting at N. 11th Street and heading south.
3. You're working for a health-focused local non-profit specializing in asthma prevention and education for Hispanic populations. To help with targeted outreach efforts, you want to identify 3 specific areas in the neighborhood that have both a high asthma rate (>10 per 1000) and a high proportion of Hispanic residents (>25%)

Script

Greet your guest
The purpose of this session is we want to test how the website performs; the background of the site (title; interactive map for residents or other individuals interested in the Williamsburg/ Greenpoint area.
Remind them that you're testing the website not how they perform
Go over format and what they can expect (pre-test, 3 tasks to complete, post-task, and post-test questions)
Have them fill out the consent form and briefly explain

Allow them to perform tasks and observe. Remind user that they can go at their own pace. [They don't have to complete tasks if they get too frustrated.]
Encourage user to narrate their experience.
Possible prompting questions for while they perform tasks, especially if they tend to stay quiet during test:
Could you elaborate on that?
What was your thought process on choosing that action/feature?

Pre-Test Questions

1. What is your age
2. What gender do you identify with?
3. What is your highest achieved education level?*
4. Have you lived (or currently live) in the Greenpoint-Williamsburg area? For how long?*
5. If you don't live in the area, do you plan to live there in the future?*
6. Do you have experience working with maps and interactive visualizations?*
7. Are you comfortable working with maps and interactive visualizations?*
8. What level of web expertise do identify as?**

**Answered only by users for face-to-face tests*
***Answered only by users for remote tests*

User	Age	Gender	Ed. Level	Residency	5	6	7	8
1	35-49	Female	Post-graduate	Yes. 4.25 years	No	Yes	Yes	
2	25-34	Female	Post-graduate	No. I live in Brooklyn- Bed Stuy area	No	Yes	Yes	
3	35-49	Female	Bachelor's	yes currently. since 2012	Yes	No	Yes	
4	25-34	Female						Average
5	35-49	Female						Average
6	25-34	Female						Average
7	18-24	Male						Advanced
8	18-24	Male						Average
9	25-34	Female						Advanced
10	18-24	Male						Average
11	25-34	Female						Advanced
12	18-24	Female						Average

Post-Task Questions: In-Person
Questions

Post-Task Questionnaire

* Required

1) Did the website give you enough information to complete the task? *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongle Agree

2) Did the information that was presented make sense to you? *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

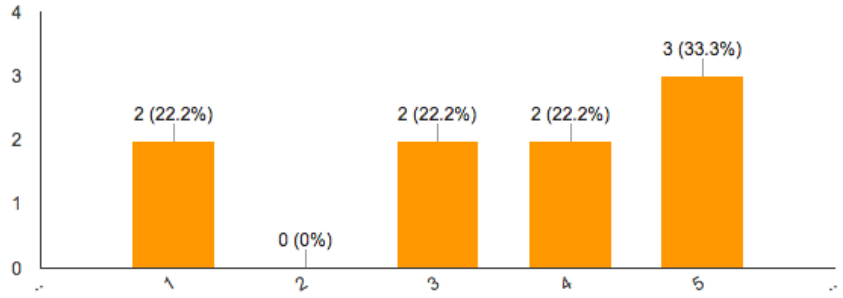
3) After completing this task, which cat do you relate to? *
(see pictures below)

- ○ Excited
- ○ Happy
- ○ I'm meh about it
- ○ Unhappy
- ○ Frustrated

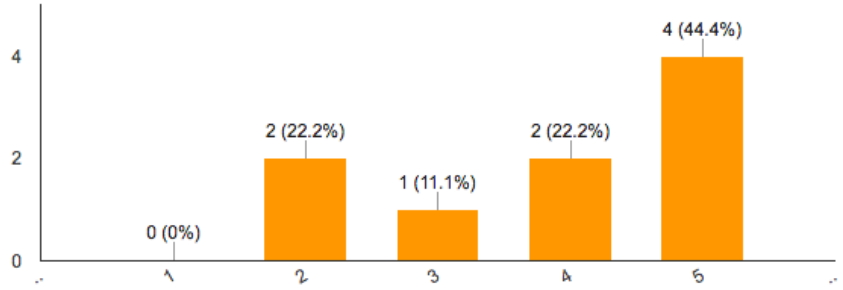
Excited Happy Meh Unhappy Frustrated

Post-Task Questions: In-Person
Results

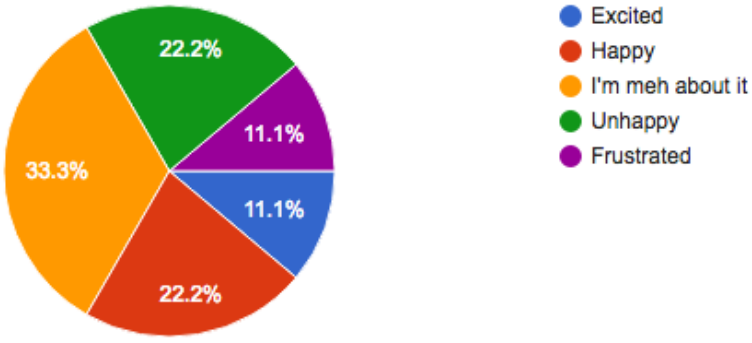
1) Did the website give you enough information to complete the task?
(9 responses)



2) Did the information that was presented make sense to you? (9 responses)



3) After completing this task, which cat do you relate to? (9 responses)



4) Any additional comments? (2 responses)

You need more cats, different per task. Thanks!

I couldn't find the answer to the second 1/2 of the task which was disappointing and made me feel doubtful of myself

Post-Task Questions: Remote

Questions

Please respond to the first two questions with only a response of 1, 2, 3, 4, or 5.
(1 = strongly disagree, 5 = strongly agree).

1. On a scale of 1-5, did the website give you enough information to complete the task?
2. On a scale of 1-5, did the information that was presented make sense to you?
3. Any additional comments?*

**These were verbal responses. Insights are included in the full findings list.*

Results

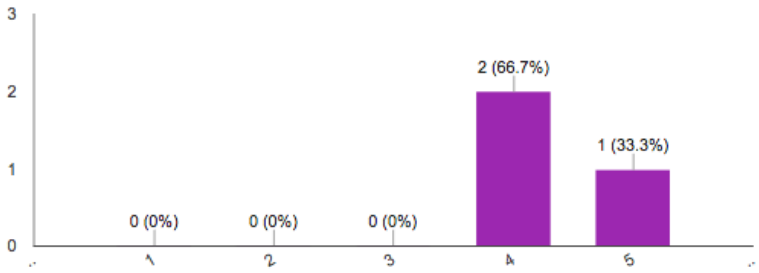
User	Scale 1	Scale 2
4a	3	1
4b	5	4
4c	1	3
5a	5	2
5b	5	3
5c	1	5
6a	5	5
6b	4	4
6c	1	4
7a	2	4
7b	1	1
7c	4	2
8a	3	2
8b	2	5
8c	2	3
9a	3	5
9b	4	4
9c	2	4
10a	5	5
10b	5	5
10c	2	3
11a	5	5
11b	5	5
11c	5	4
12a	3	3
12b	4	4
12c	1	3

Post-Test Questions: In-Person

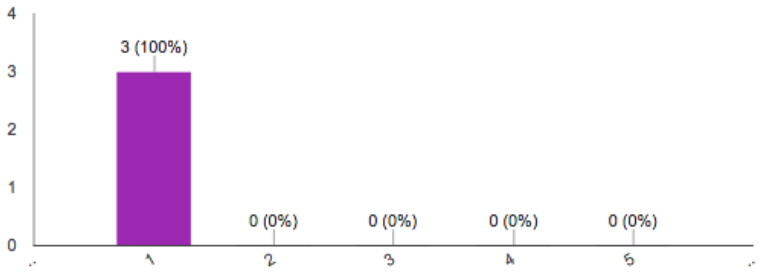
The System Usability Scale (SUS)

Each question was answered on a scale of 1 to 5 (1=strongly disagree, 5=strongly agree)

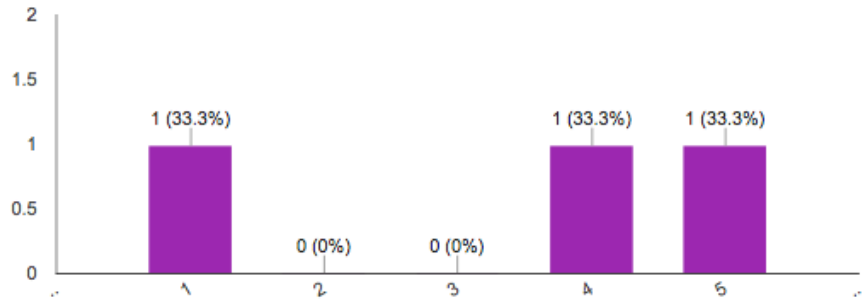
3) I thought the website was easy to use. (3 responses)



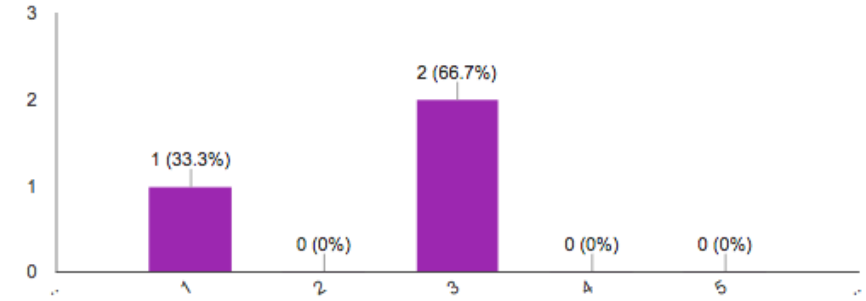
4) I think that I would need the support of a technical person to be able to use this website.
(3 responses)



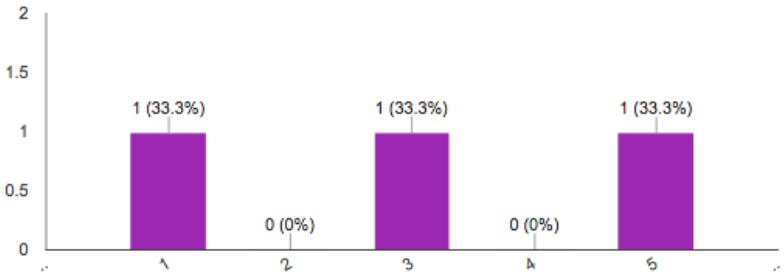
1) I think that I would like to use this website frequently. (3 responses)



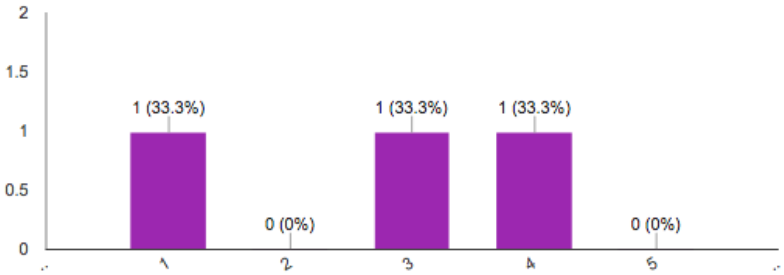
2) I found the website unnecessarily complex. (3 responses)



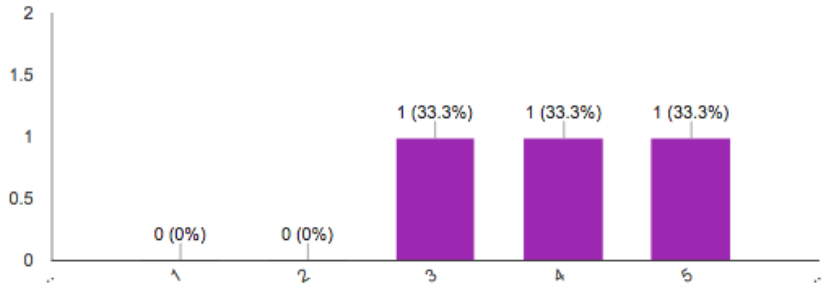
5) I found the various features in this website were well integrated. (3 responses)



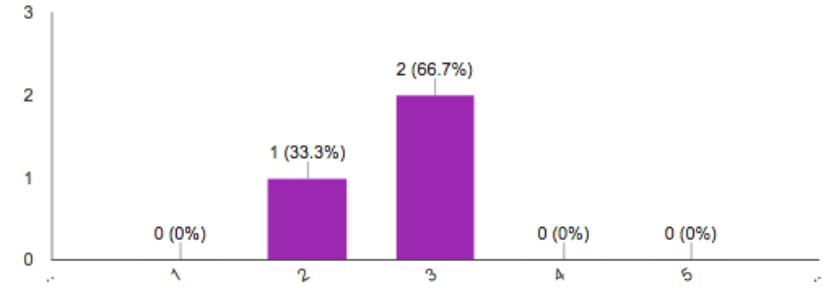
6) I thought there was too much inconsistency in this website. (3 responses)



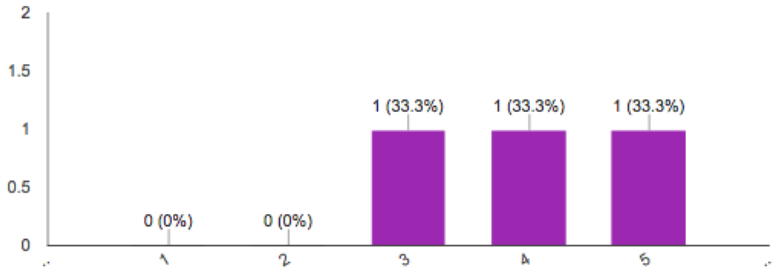
7) I would imagine that most people would learn to use this website very quickly.
(3 responses)



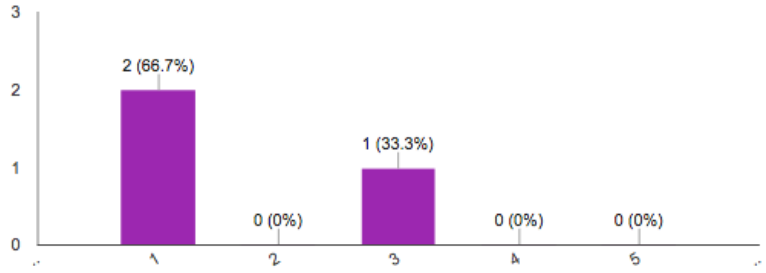
8) I found the website very awkward to use. (3 responses)



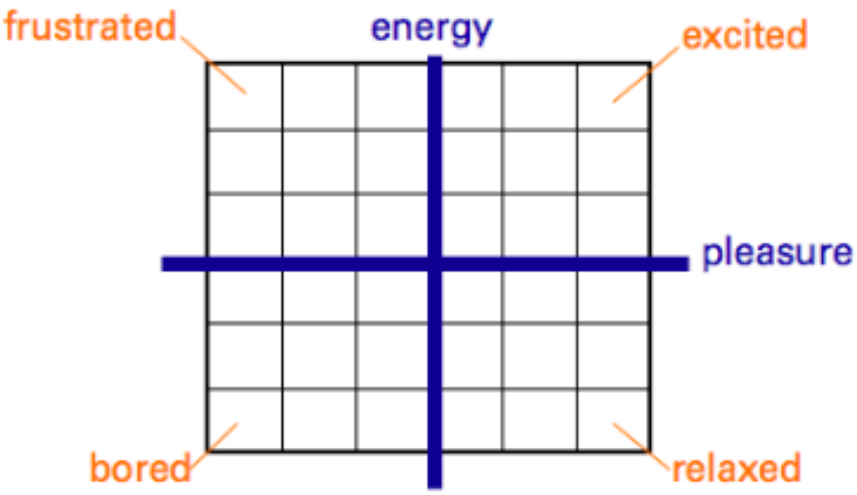
9) I felt very confident using the website. (3 responses)



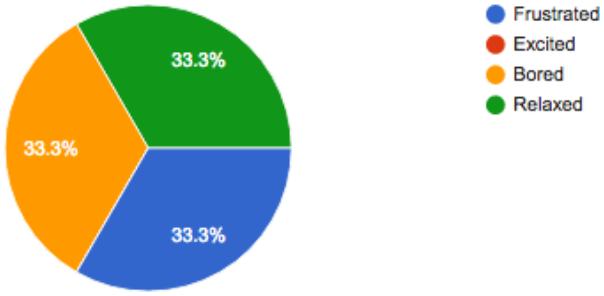
10) I needed to learn a lot of things before I could get going with this website.
(3 responses)



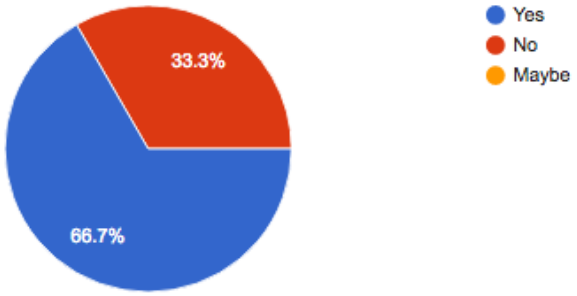
Affect Grid



11) Please choose a quadrant on the grid that you most relate to: (3 responses)



12) Could you see yourself using this interactive map at any point in the future?
(3 responses)



13) Other comments? (1 response)

very interesting and informative. the information was presented in a clean and visually appealing way. i learned some new things about my own neighborhood that i've lived in for 4 years now.

Post-Test Questions: Remote
Questions

1. On a scale of 1 to 5, how easy was the site to use?
2. What frustrated you the most about this site?
3. How would you improve the site?
4. Could you see yourself using this interactive map at any point in the future?

Post-Test Questions: Remote
Results

User 4
On a scale of 1 to 5, how easy was the site to use?
4
What frustrated you the most about this site?
Not being able to type in the specific address I was trying to locate and research
How would you improve the site?
Add the ability to search a specific address and make more filters available and easey to access.
Could you see yourself using this interactive map at any point in the future?
Yes. If I were looking to move to a location this map serviced or was doing a project on environmental factors in a neighborhood listed, it would be a great resource to have.

User 5
On a scale of 1 to 5, how easy was the site to use?
4, easy to use.
What frustrated you the most about this site?
Icons weren't completely clear. I had hover over each to id what they were for.
How would you improve the site?
Captions, more descriptions. More shade differentiation. Purple shades were too similar.
Could you see yourself using this interactive map at any point in the future?
I've never had a reason to look up polluted sites. I do like interesting walking tours.

User 6
On a scale of 1 to 5, how easy was the site to use?
2
What frustrated you the most about this site?
the information was slightly unclear and I was unable to complete the task because there was no information about the density of hispanic population
How would you improve the site?
ability to search for addresses and more information
Could you see yourself using this interactive map at any point in the future?
No

User 7

On a scale of 1 to 5, how easy was the site to use?

Trying to find the hispanic population proportion. I was unable to find that feature on the website and I looked for quite a while. I would give the site a 3. It was extremely easy to use in certain ways, but some specific features were exceedingly difficult to find.

What frustrated you the most about this site?

Not having a search bar to look up your address where it would take you to it on the map. I had to search around for my address across the map just to see if the area was polluted or not. If a family member is looking up this for someone, they won't know the area as well as somebody who actually lives there, and it would be a problem.

How would you improve the site?

I would add a search bar to find your address easier.

Could you see yourself using this interactive map at any point in the future?

I could see myself using it. It is very visual and beautiful to look at. Anybody can get on and look at the map/key and understand what it's talking about.

User 8

What frustrated you most about this site?On a scale of 1 to 5, how easy was the site to use?

When I was looking at the map to find percent of hispanic population in an area for me it made more sense for that to be part of population density than income. Also, the shading of the colors over the street names made it hard to read. Lastly, I was confused as to how to find out about the walking tour.

What frustrated you the most about this site?

Attempting to find out more about the walking tour, my first instinct was to go to the website that was listed as more help, I was not aware that the feature on the map was available and would show me which interesting facts are on the route.

How would you improve the site?

Organization was the main issue, I was confused on where to find things such as the walking tour details or the information about finding hispanics. I thought the way that the different layers overlapped on the map was also a little strange, I wish the buttons on the side would light up or highlight so that I would always be aware of which ones I had activated on were currently on.

Could you see yourself using this interactive map at any point in the future?

I could, I think it would be interesting data, it also would help a lot with buying housing I could see if I was in danger of flooding ahead of time. I found the information on this map to be of value and I think others would as well.

User 9
On a scale of 1 to 5, how easy was the site to use?
the selection area was not very UI friendly, some parts lacked information completely.
What frustrated you the most about this site?
Layout wasn't very visually engaging.
How would you improve the site?
Redesign the UI, make sure all information needed is present, make it more visual and give it more of a story.
Could you see yourself using this interactive map at any point in the future?
no

User 10
On a scale of 1 to 5, how easy was the site to use?
5
What frustrated you the most about this site?
I was looking for a layer to separate and see the hispanic porportions, and I couldn't.
How would you improve the site?
I would change the size of the points of interest of the tour to be larger.
Could you see yourself using this interactive map at any point in the future?
Yes, If I lived in Broklyn and was curious about toxicity, or was preparing to move and was weary about disasters.

User 11
On a scale of 1 to 5, how easy was the site to use?
5
What frustrated you the most about this site?
Nothing
How would you improve the site?
Details about what each layer is showing.
Could you see yourself using this interactive map at any point in the future?
Definitely

User 12
On a scale of 1 to 5, how easy was the site to use?
4
What frustrated you the most about this site?
lack of information
How would you improve the site?
provide information before accessing the map about how to use it
Could you see yourself using this interactive map at any point in the future?
possibly, if it is improved upon a bit

Findings

Severity rating is on scale from 1 to 4 (1=cosmetic problem, 4=catastrophe)

Finding	# of users affected	Severity	Notes
POSITVE REACTIONS			
Positive response to walking tour options	3		
Positive response to walking tour descriptions	1		
Clickability of walking tour sites was clear	1		
Positive response when exploring overall map	3		
Positive reaction to accuracy of flooding map	1		
Icons were intuitive; users understood what they did	1		
OVERALL MAP			
User doesn't find address search	9	4	
Zooming on map is oversensitive	2	2	
Opening map does not appear to show any information	1	1	
Hard to read street names with layers on	2	1	
No compass on map	1	1	
User notes caption "playground water" in area of Lower Manhattan	1	1	
User notes ZIP Code incorrectly listed as "1222" at a particular zoom level	1	1	
Introduction box at open of site, or some sort of tutorial/tips section	3	3	
LEFT SIDEBAR			
Reset layer button not visible to users	4	3	
Icons are not self-explanatory	1	2	
User would like more information about the data	2	1	
LAYERS			
Layers on waterfront don't always match actual map	1	1	
Visibility/feedback issue for dots on walking tour/pollution layer	3	3	
User would like to see flooding in a light storm	1	1	
Walking tour path is invisible with other layers on	1	1	For use on walking tour
User would like print feature for map	1	1	
Difficulty distinguishing shades on map layers	3	3	
User confused by break in walking tour path	2	1	
User says Brooklyn Brewery should be considered for tour as an attractive destination	1	1	
User would like to select individual asthma rate shades from the legend	1	1	
Asthma rate balloon on map remains on after asthma rate filter is turned off	2	1	
Could not locate Hispanic demographics	10	4	
User doesn't understand E-designated	3	3	Some inquired about what info/ activities availeble on walking tour
User feels that most walking tour locations are inaccessible, or private buildings	1	3	
User didn't know to click on polluted sites for more info	1	3	
Walking tour descriptions weren't enough to decide points of interest	3	2	
Starbucks option on walking tour is confusing	3	2	
Meaning of 100-year and 500-year storm unclear	3	2	Use Hurricane Sandy for context?

Finding	# of users affected	Severity	Notes
User would like pictures of walking tour sites	2	2	
User would like to know what products Hekla Iron Works specialized in	1	2	
User confused by 2007 event being listed as point of interest on historic tour	1	2	
Frustration at only being able to select one layer at a time	3	2	Pre-populate map with some info?
Adding dates to pollution layer	1	1	
Put distance between points on walking tour	1	1	perhaps like google map
Ensure colors choices work for those who are color blind	1	3	"don't want to alienate anyone...so much subtlety would be hard"