



# Project Report



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**During Summer 2017,  
Innovation for Youth organized a fun volunteer project for teens!**

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## **The problem we looked at...**

**Our team of volunteers explored how to help people with vision related special needs to even more safely and magically enjoy a Magical Bridge Playground.**

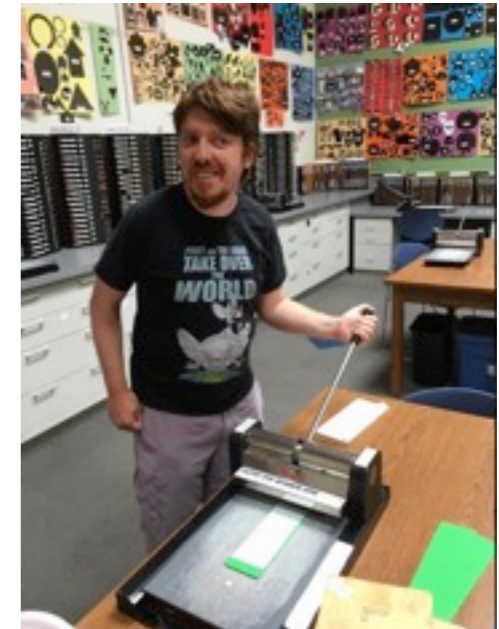
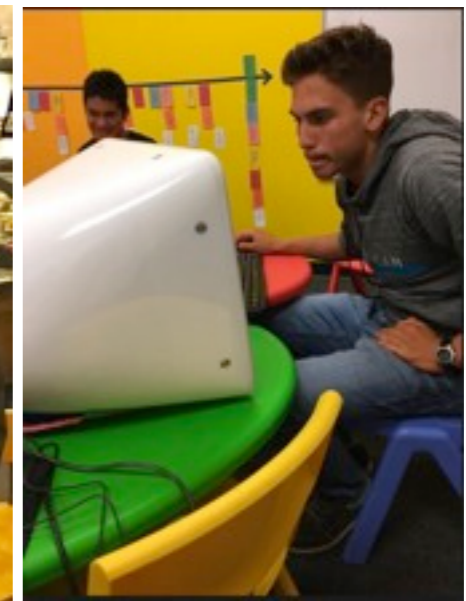


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# Getting youth involved in providing input on a design challenge in their community

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**For this summer's Innovation for Youth Mentorship Project we had teens and young adults work on mini projects and innovations to envision how Magical Bridge Playgrounds could be more accessible to the visually impaired.**





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# The Initial Meeting 4/26/2017

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On April 26th, 2017 Nikki, Yvonne Sullivan (Nikki's Visual Impairment Instructor) and Jay Gluckman from Innovation for Youth met to discuss the possibility of creating a volunteer project around VI accessibility for Magical Bridge Playground.

The big takeaway from the meeting was that we were all excited about this project. We decided to try a small scale test of the project during Summer 2017 and see if it would be feasible for this project to be something that could work long term.



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## About the Mentorship Program Internship

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The internship was an unpaid work experience where teens were given volunteer opportunities themes around helping develop ways to improve the community around them.

This summer's project was themed around exploring how to make Magical Bride Playgrounds more accessible to the visually impaired.

Our interdisciplinary project tried to connect 4 different strands:

- Thoughtfulness and kindness towards those with visual impairment accessibility needs.
  - Use of STEM skills
  - Information Design
  - Communication & Leadership Skills
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# Acknowledgements

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I would like to acknowledge the help of several youth and adult volunteers who helped with this project.

At some point I realized that what I was envisioning for this project I wasn't able to do on my own and I appreciate the many hours people have put in to helping move things forward with helping make things magical at the current and future Magical Bridge Playgrounds for our visitors who are visually impaired.

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Nikki  
Tyler  
Jack  
Riya  
Vyomika  
Justin Steinberg  
Rebecca King  
Mark Coiley  
and many others....

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# Feedback from Nikki

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**Nikki, an incoming freshman in high school, was our one of our usability testers for the project. He was blind at birth. He is fluent in Braille. We wanted to get his input on how to make Magical Bridge Playground even more magical for people that are blind. Here's Nikki's input....**

“When first visiting the Magical Bridge Playground, I was amazed at its clear commitment to inclusion for all, and its commitment to accessibility.

I was happy to see that the different types of playing equipment were in groups (such as the slide mound, swinging zone, spinning zone, etc.)

As a visually impaired person, structure and organization is very important for me to find where what is located, in an organized way.

In my earlier years, when frequenting local parks in my area, it was difficult to distinguish a setup or organized layout.

This park was organized in such a way that I would know what to expect when coming to a specific zone.”

# Feedback from Nikki

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“Poles: As a blind person, whenever going to parks, it is common for me to bump into poles at any given time.

Personally, I would recommend there would be warnings about the poles, or that the poles be padded as well, so that the impact is not as great as it is with metal.

Suggestions: or for a blind person, it may be helpful to have a sort of guide rope between the different areas so that blind people can independently walk between the attractions, with the assistance of a lengthy rope that they can hold on to, with perhaps a braille sign located where the different areas would be. Also, it would be helpful to have tactile arrows pointing towards the areas, with braille labels on them.”



# Feedback from Nikki

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“I was given a tour of each of these areas or zones, and was given an opportunity to enjoy all of the equipment and attractions.

Personally, my favorite place in the playground had to be the slide mound. The different types of slides were very fun, and each type of slide was very different from the others.”



# Feedback from Nikki

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## Safety Concern Regarding the Protruding Stairs Railing



“One safety concern that I would note is how far out the railing for the stairs going up to the slide mound extends out.

When I was sliding down the turf hill, I was towards the right side of that particular hill, and when reaching the bottom, my head bumped against the railing of the staircase, which stuck out a significant amount past the stairs themselves.

I would say that this is a hazzard for people who are blind, and just coming down the slide. I would reccommend that the railing be shortened a small amount to meet the bottom step of the staircase.”



# More about the Protruding Railing

During our “usability test” Nikki unfortunately bumped his head on the railing to the stairs on the Slide Mound.

The circumstances that led to him bumping his head were as follows: In the process of sliding down the turf hill between the roller slide and the stairs he stood up and bumped his head on the railing.

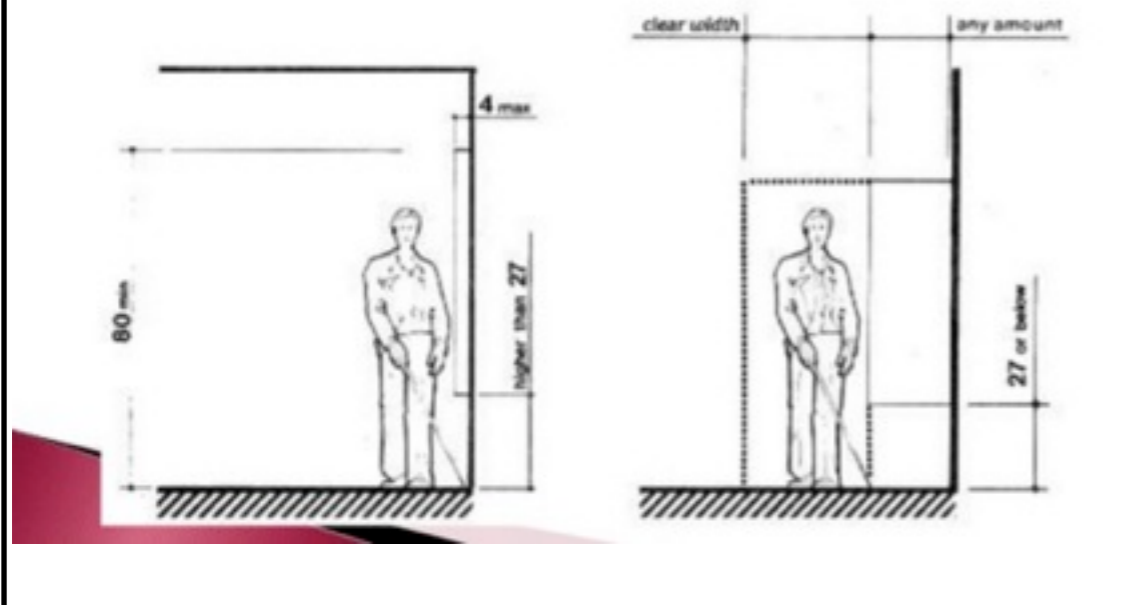
We understand the advantage of having a lower railing on the stairs, but we don’t understand why it is necessary for it to protrude into a highly traveled route like it does.

Not only can people bump their heads on it as they stand up, but for those who use sensing canes, the cane probably won’t catch the bar sticking out and a person with severe VI could walk into it.

We recommend either extending the fencelike barrier or shortening the protrusion of the railing so the handrailing won’t create the problem listed above.

## Travel Routes

- Objects that protrude into the hallways must be avoided.
- Sketch below shows a blind person identifying objects in a hallway.



This illustration was found online which advocates for avoiding protruding objects in travel routes.



# Feedback from Nikki

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## Head bumping risk on the first floor of the playhouse

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Per Nikki--

“As you may know, the first floor of the playhouse supports the second floor, and as a result, there are many horizontal beams spanning the ceiling. I would recommend that these beams be padded so that when a blind person would hit their head, it would have less of an impact. (I am 5 feet 6 inches, and banged my head on beams several times while exploring this area.)”



## Recommendation:

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# Feedback from Nikki

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## Head bumping risk on the first floor of the playhouse

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Per Jay--

“The beams that support the second floor of the playhouse have diagonal braces and arches braces that protrude and can present a head bumping hazard for people that are blind.

I am guessing the braces have a structural function as there aren't any full sheer walls on the first floor of the playhouse, so perhaps it isn't feasible to remove the braces. Perhaps consider labeling somewhere in English text and braille (ie “Low ceiling--be careful not to bump your head”) Also, more padding could be added to the protruding braces and low joists and beams (the beams and joists on the west side of the first floor are below 6 feet).”

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## Recommendation:

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### A World of Caution for Our Friends with VI

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Just like it is often recommended to consult with a doctor before beginning a strenuous workout routine, for our visually impaired visitors I feel that it is prudent to recommend to consult with an Orientation and Mobility Specialist before exploring Magical Bridge Playground and to bring along someone who can be a highly alert assistant and “spotter”.

Because of the nature of the challenges for those with very limited or no seeing ability, it almost inherent in the disability and common to bump into things and other people.

While we want our visually impaired visitors to have a magical time at our playgrounds, the last thing we want to have happen is any one to get hurt.

During one of our usability test of the playground with Nikki who is blind and having our Kindness Ambassadors carefully guide him around, Nikki bumped into a railing on the stairs of the Slide Mound, a pole in the Kinder Zone and two of the wood cross beams when walking around the first floor of the playhouse.

While Nikki wasn't hurt when he bumped into these things, it is highly possible that a person with VI could get badly hurt at the playground, so I don't think it is possible for us to recommend our playground for those with severe visual impairments without several thoughtful and strong words of caution.

For those with severe visual impairments who do decide to visit the playground it is my personal opinion that we recommend going slowly and carefully, using proper technique with sensing canes and using proper technique for protecting the head (or even a helmet) and enlisting the aide of a sighted helper who is prepared to be very effective and able to react awarely in an instant in provide guidance, supervision and “spotting” for potential hazards.

# A Rosetta Stone for our Visitors

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One of the inspirations that I had for making Magical Bridge more magical for our VI visitors was the notion of creating a sort of metaphorical “Rosetta Stone”.

In researching about visual impairment, there is such a wide range of abilities and preferences for folks about how they like to get information about the world. Some like large print text, some like braille, others prefer text to speech and others would just like to click a You Tube link that has information tailored for the visually impaired.

So I thought as a goal it would be great to sort of try to have a little bit for everyone....some braille, some online resources, some tactile maps, and some large print.

Another thing I realized was that there is a real need of public examples of a “gold standard” for accessibility for visual impairment. To build on the phrase “ADA compliance” isn’t enough, it is clear to me that when a public facility is ADA compliant there is more that can and should be done. ADA Braille labels on doorways should just be the beginning. There is still more that can be done to make navigating a unfamiliar public space an effortless and enjoyable experience for a blind person.

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From Wikipedia----

The **Rosetta Stone** is a [granodiorite stele](#), found in 1799, inscribed with three versions of a [decree](#) issued at [Memphis, Egypt](#) in [196 BC](#) during the [Ptolemaic dynasty](#) on behalf of King [Ptolemy V](#). The top and middle texts are in [Ancient Egyptian](#) using [hieroglyphic script](#) and [Demotic](#) script, respectively, while the bottom is in [Ancient Greek](#). As the decree is the same (with some minor differences) in all three versions, the Rosetta Stone proved to be the key to deciphering [Egyptian hieroglyphs](#).sit



# Online Guide for Visually Impaired

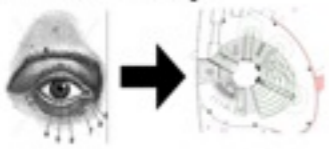
Per Jay --

“I tried to create an text guide to the Slide Mound for Nikki to read before he came to the playground. Nikki’s input was that the text based guide was too detailed and not very interesting or usable.”

Visual Magic Mentorship Project

### A Draft Guide to the Elevated Walk, Tree Deck and the Slide Mound for the Blind and Visually Impaired



last edited: 6/16/2017



Magical Bridge Playground

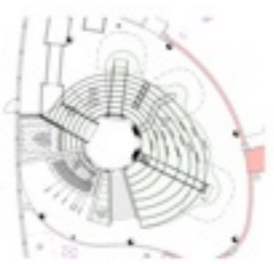
Note: The goal of this guide is to describe a few of the features of Magical Bridge Playground. The goal of this guide is to just describe a few of the features of the playground for a usability study to see if a written guide for the visually impaired would be a practical tool to assist our Visually Impaired visitors have a safe and magical time at our playground.

Only the slide mound, the features of the slide mound, the elevated walkway, and the tree deck are described in the guide.



### The Slide Mound

Our slide mound offers numerous ways to slide down and step, climb or roll back back to the top.



The top of the slide mound is a flat fenced circle that is about 8 feet around. In the center of the circle is a pole that supports a very large umbrella.

Including the path from the elevated walkway, there are 9 openings along the top of the slide mound where a person could enter or exit.

From left side of the elevated walkway and proceeding clockwise the openings lead to the following features on the slide mound:

- The Group Slide
- The Parallel Bar Slide
- The Curved Slide
- Climbing Ladder
- The Roller Slide
- A Turf Hill
- Stairs
- Climbing Net (Note: The Climbing Net entrance from the top of the slide mound may present a falling hazard for blind/visually impaired visitors.)

There is a second turf hill on the slide mound between the elevated walkway and the group slide, but it is only accessible from the base of the slide mound.

As with all playground activities for the blind and perhaps visually impaired as well, be sure to have a sighted friend watch out for those who are blind (or those who are visually impaired who need the assistance) so they don't inadvertently bump into someone or something.

### The Group Slide



The Group Slide is about 4 feet wide, so two or three people can comfortably slide down at once. This slide is perfect for those needing additional assistance or just the added fun of sliding with a friend! The metal slide is about 14 feet long, has a comfortable transfer deck with handholds at the beginning and has a 2 foot flat section at the end. As with all sliding activities for the blind and perhaps visually impaired as well, be sure to have a sighted friend help you make sure you don't slide into someone on the way down.

# QR Scan Codes

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There is precedent for using QR Scan Codes at the park to help direct park visitors to online resources.

The question is how effective would it be to try and prepare some online resources for our visitors with visual impairments?

A second question is how to give tactile references to the existence of these online resources and to help with efficient navigation to those resources.



## Recommendation:

# QR Scan Codes

In our usability test with QR scan codes, there is some potential that these codes could be helpful to some visitors with VI.

In an effort to set a Gold Standard for Accessibility for Visual Impairments, just as there are bumps on the ground to indicate potential hazards, we recommend putting Braille “bumps” around scan codes to indicate the presence of a scan code.

We also recommend putting a url for resource for the visually impaired...writing the url in both English and Braille

Online resources for visitors who are visually impaired can be found at:

[www.magicalbridge.org/vi](http://www.magicalbridge.org/vi)

www.magicalbridge.org/vi

www.magicalbridge.org/vi

Or scan here:

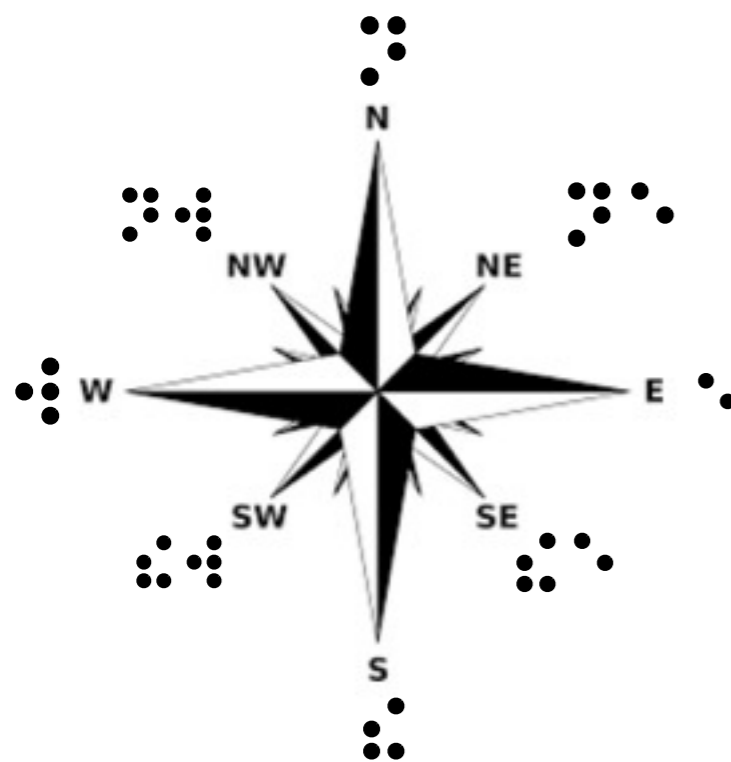




# Cardinal Directions

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Nikki mentioned that orientation and mobility instructors like to teach their clients about Cardinal Directions.



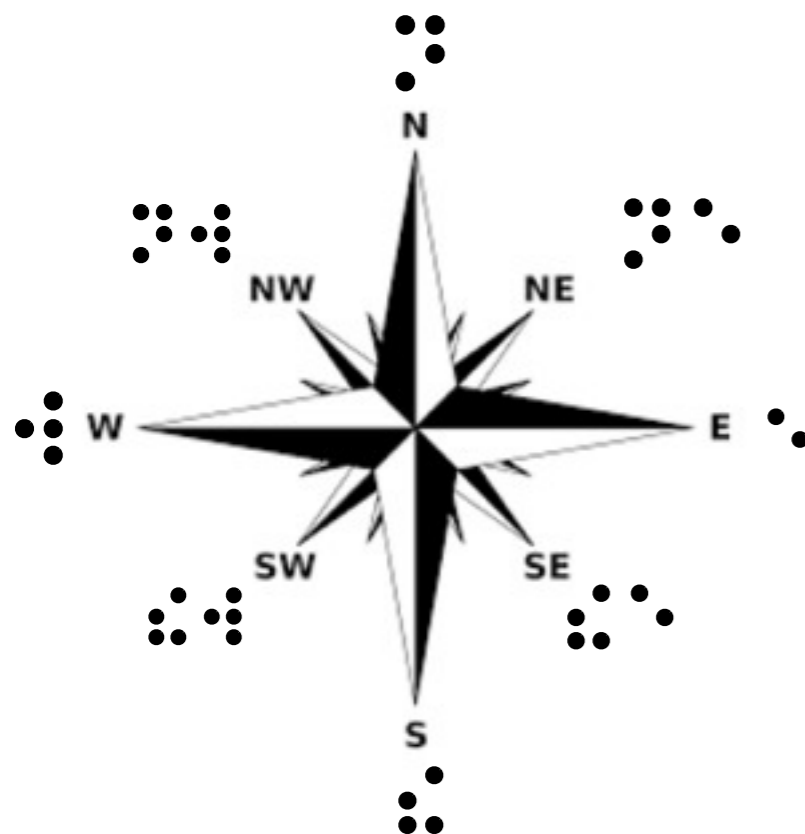
I think it would be helpful to have a few compass roses with braille labels place at various strategic places around the playground including at the pilasters. Some places is might be helpful to have tactile compass roses located at the playground would be: near the entrance gates, the pilasters, the end of Ava’s Bridge at the center of the playground the the top of the slide mound.

Orientation and Mobility speciaists don’t usually spend much of their time working with their clients on getting around playgrounds. It would be interesting to see if Magical Bridge Playgrounds improves the level of wayfaring aids at their playground if the playground could become a sort of outdoor classroom for people with visual impairments to hone their skills in navigating their world.

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# Cardinal Directions

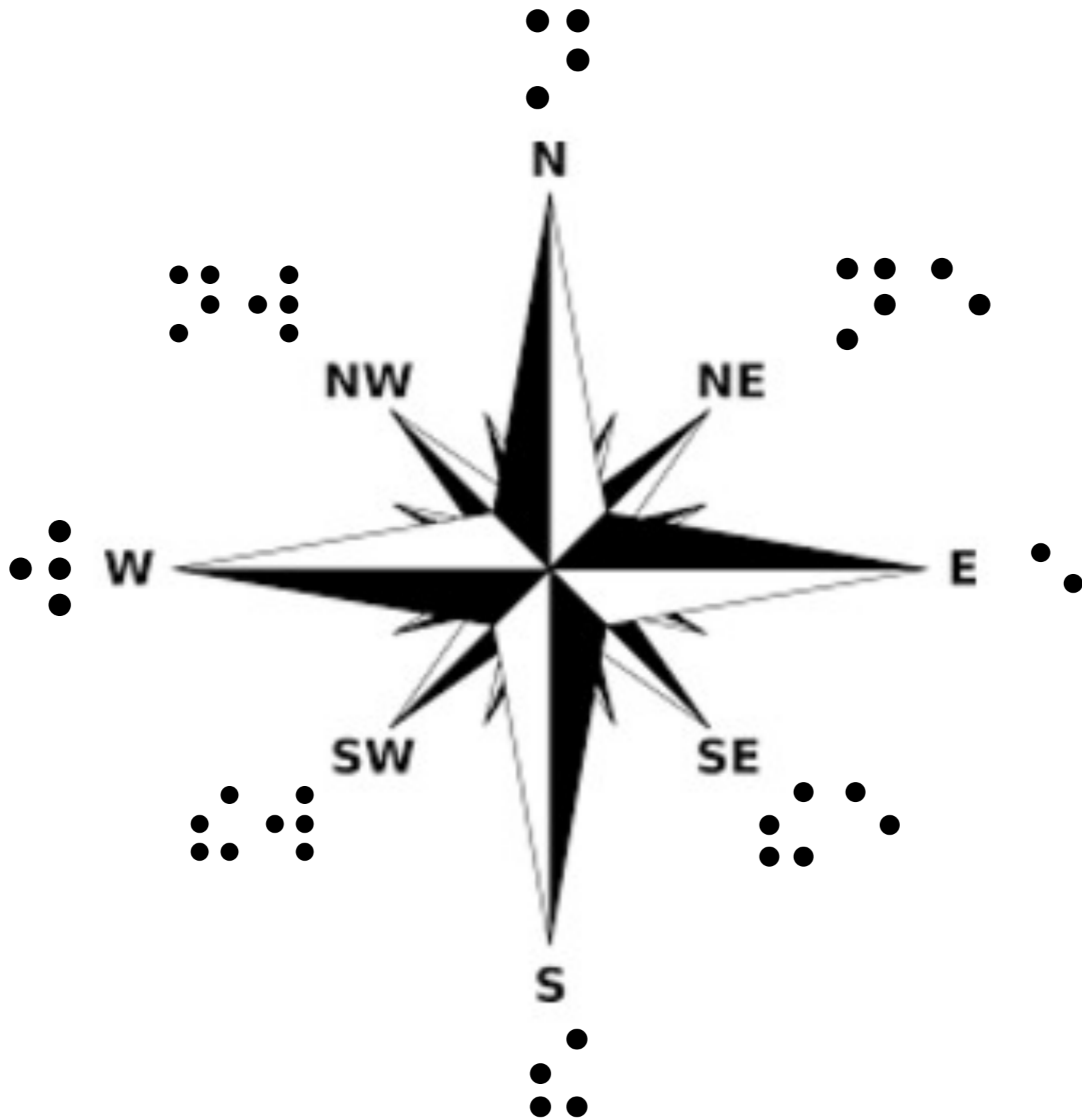
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## Braille Compass Rose

“Knowing whether you are traveling north, south, east, or west can be very useful tools in using directions when you can’t always rely on looking for landmarks like a sighted person would do. . . These directions can also help in areas like schools or businesses to help a blind individual orient him/her self to a place. For example, if you enter a store and you are heading north, you can mentally map which direction you are walking while in the store. Then, when you are ready to exit the store, you know that you have to make your way back to the south to locate the exit. This, along with other environmental cues can be very helpful in traveling in different environments.”

—Exerpt from “Ginger Breadhouse & Cane Travel”  
<https://makingitontheplayground.com/tag/cardinal-directions/>





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# WAYFARING BREADCRUMBS

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We suggest that there be more at the playground to provide wayfaring for the blind and the visually impaired.

This sign gave us some inspiration. The question is how to do something like this in a way that would work for folks with visual impairments.

## Recommendation:

# WAYFARING BREADCRUMBS



The portion of the Hantzel and Gretel story where they left a trail of breadcrumbs in the woods as a way to find their way back home has become a popular concept in website design and software interface design.....might the concept also work as an inspiration for wayfaring for the visually impaired?

We built a prototype that we called breadcumbs....where we placed little bits of Braille with arrows as a way to assist navigation for braille users.



## Recommendation:

# WAYFARING BREADCRUMBS

Slide Mound

Playhouse  
Second Floor

Tree Deck



Play Zones

Ava's Bridge

Mitchell Park  
Library

Bathrooms

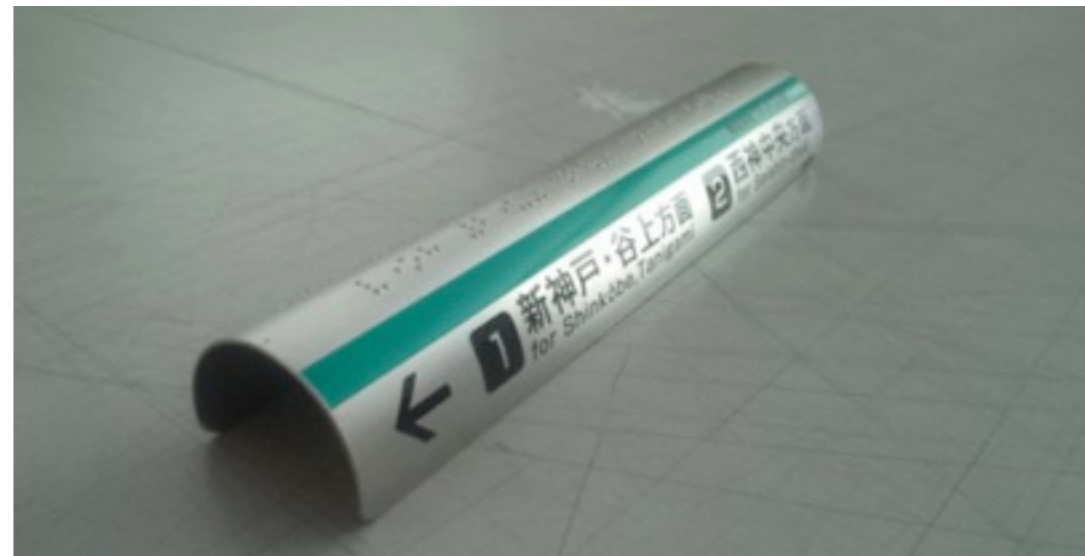
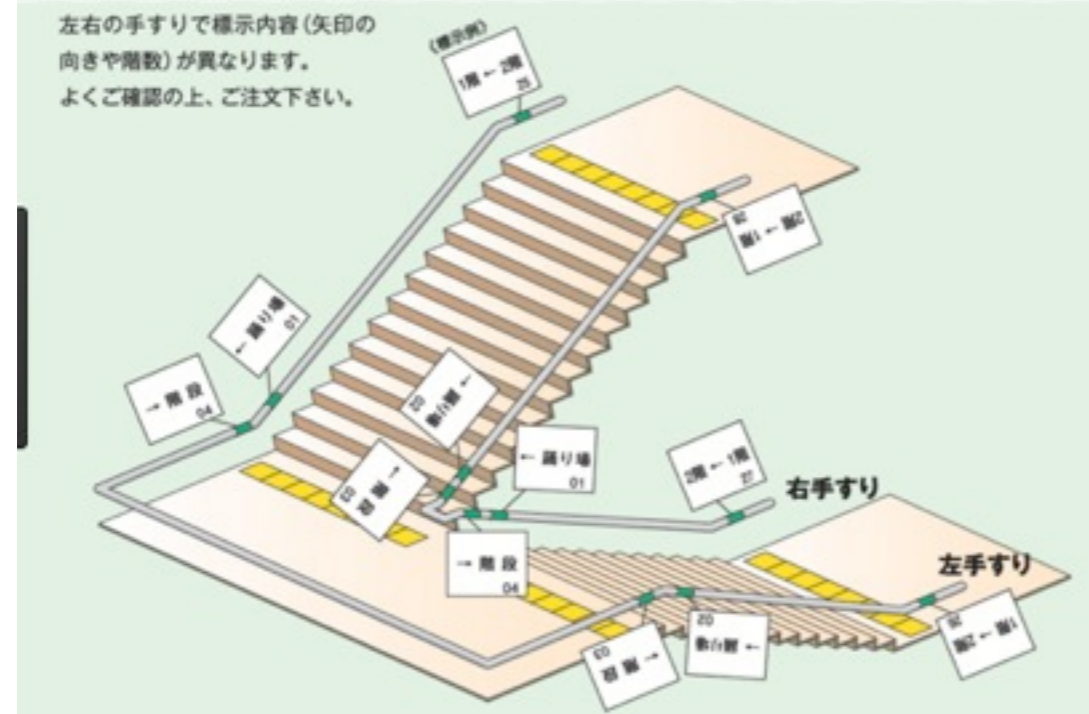
Nikki thought the arrows were cool. His suggestion was to also include “Cardinal Directions” as well. He says many Orientation and Mobility Specialists like to help their clients be competent with orienting themselves using North-South-East-West type directions.



## Recommendation:

# Braille Railing Labeling

### 設置参考図



Braille railing stickers/labeling assist braille users as they are orienting themselves in public spaces that have railings. Note that the stickers are placed on both sides of the railings in the diagram so it doesn't matter which side of the stairs the Braille user is on.

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# Tactile Labeling for the features of the Slide Mound

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One of the ideas our team got very excited about was the idea of creating tactile labeling for each of the features of the slide mound.

The English Text is recessed so that a person can trace the shape of the letters with their fingers (for those that are learning to make their English letters, it can be a very valuable experience to trace their fingers over the contours of properly shaped letters)

Extra printed text can be added in English and braille that tells of some of the safety information for a visitor who is blind.

The Braille text above says. “CLIMBING NET CAUTION FALLING HAZZARD”



## Recommendation:

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# Three Dimensional Tactile Map

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Our 3d tactile map tested really well with Nikki. He seemed to enjoy taking a “micro tour” of the playground with his fingers. As he “walked” around the playground with his fingers, we were able to narrate the tour in a way that was similar to how we give tours to our sighted visitors at the playground.

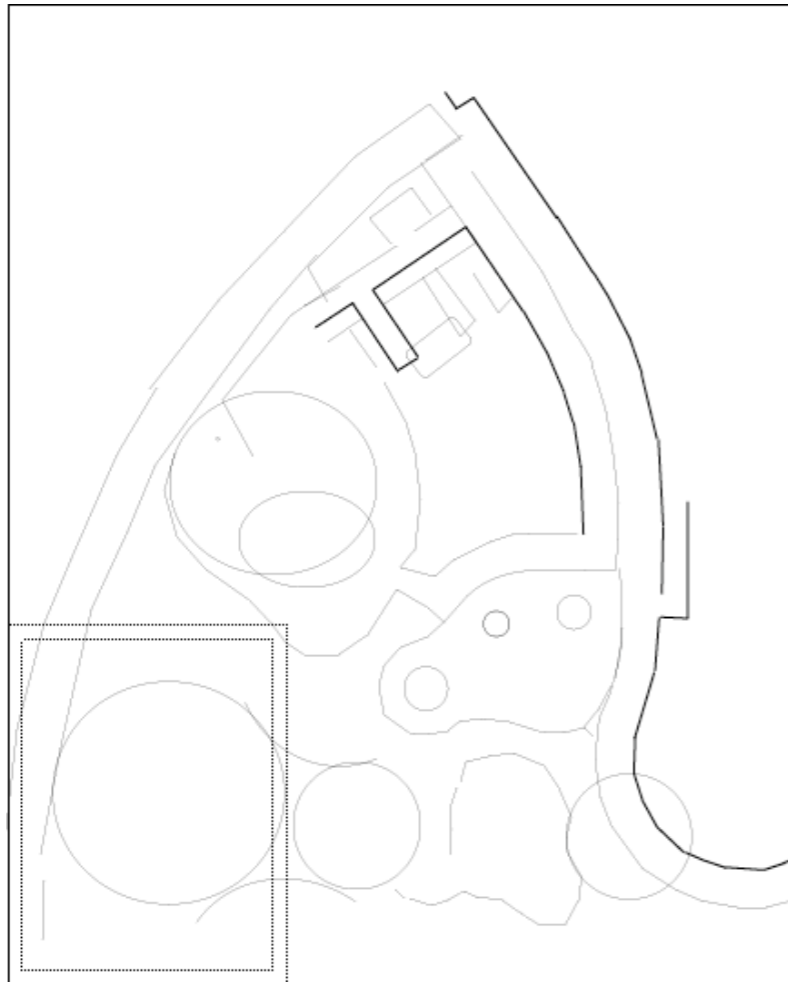
I personally think that a sculpture type look of a tactile map would be cool. 3d printers are interesting, but there is something very sterile about the finished product of materials that are 3d printed. Nikki commented that he doesn't prefer the feel of 3d printed models.

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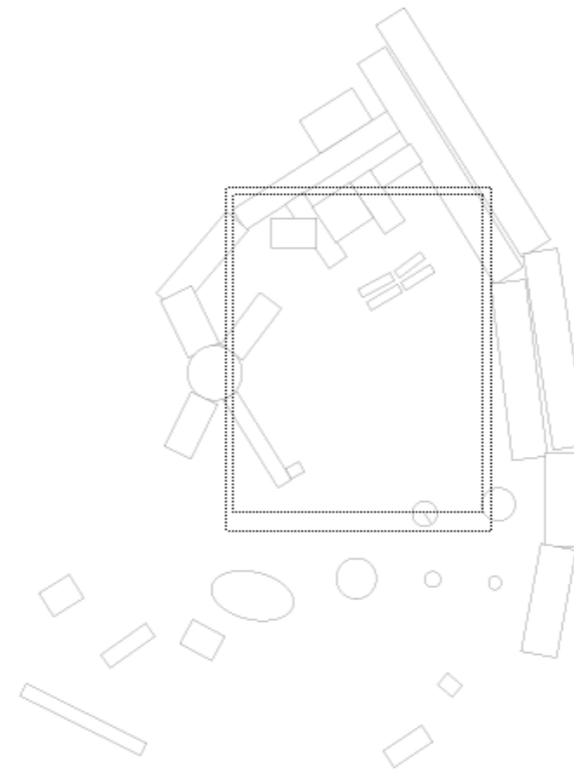


# **Two Dimensional Tactile Map**

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**Prototype Graphics Created by Riya**



**Prototype Graphics Created by Tyler**

Here are the original graphics made in Adobe Illustrator of the 2d tactile map created by two of our teen volunteers. Neither of our youth volunteers had used Illustrator prior to this prototype session.

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## Recommendation:

# Tactile Map with Simple Geometry

### Spin Zone

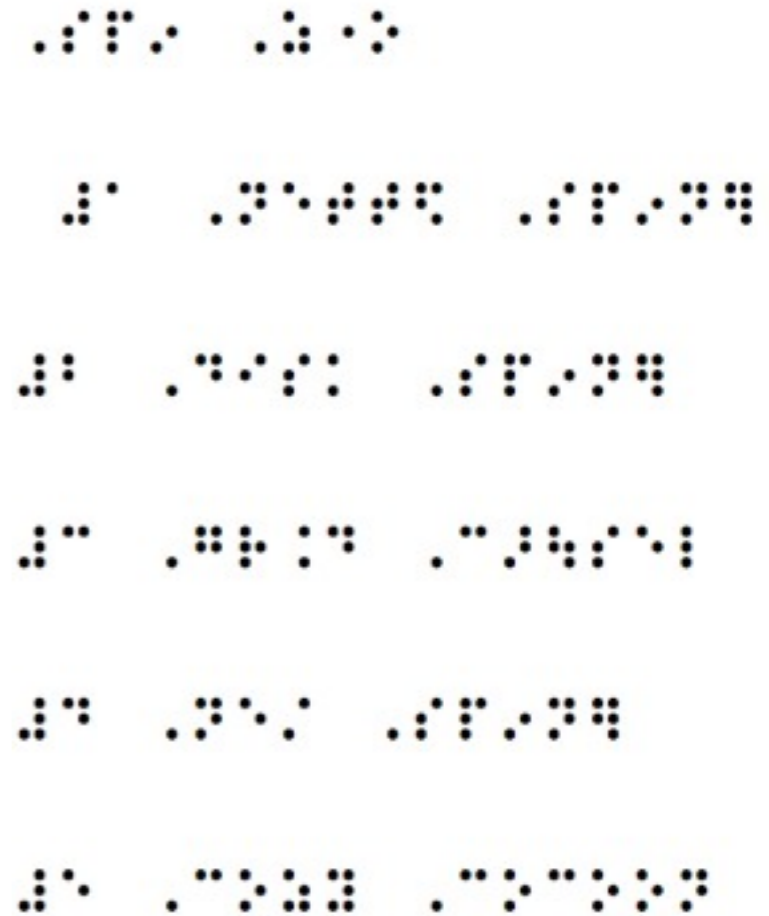
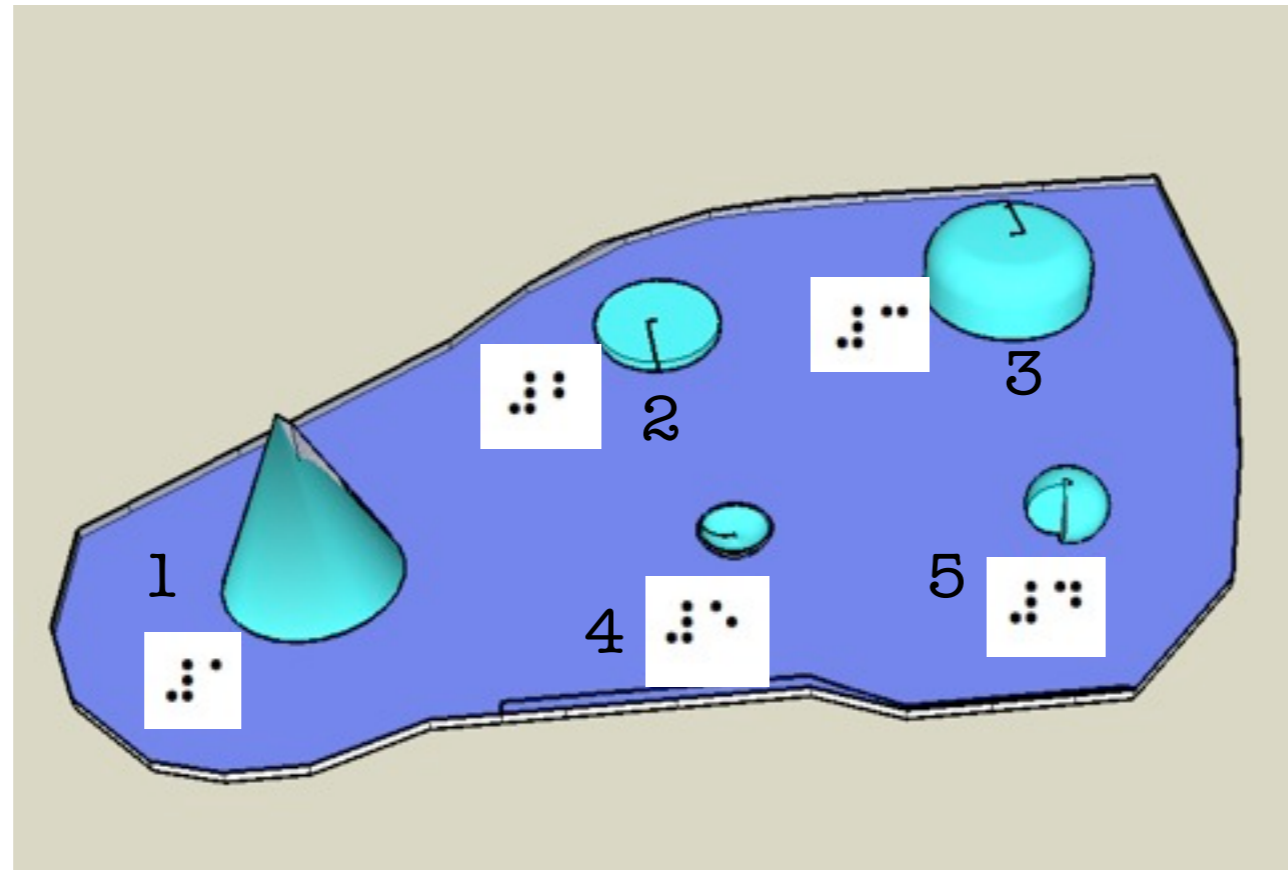
1 Netted Spinner

2 Disk Spinner

3 Ground Carousel

4 Nest Spinner

5 Cozy Cocoon



Although our 3d sculptured tactile map tested really well with Nikki, I think the next prototype that I would suggest to build and test would a tactile map with more simple geometric shapes to indicate the approximate locations and shapes and features of the playground.

# Braille for the Sighted

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Since the percentage of Braille users in the population is very low, we were curious to know if the general public would be interested in learning some braille. Over the summer we developed and refined a way of having sighted visitors explore writing the names in Braille as an encoding exercises.

We brought our “Write Your Name in Braille” Activity to many of the Friday night concerts at Magical Bridge this summer...and it was very popular. Many sighted people really seem to be interested in learning more about how the Braille system works. The question now is how can a similar activity be made into a “brick and mortar” playground feature?

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### Suggestions from Justin Steinberg

# Kindness Wall VI Improvements

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Justin S. gave us the input that the layout of the text on the Kindness Wall could be difficult for some people that are visually impaired.



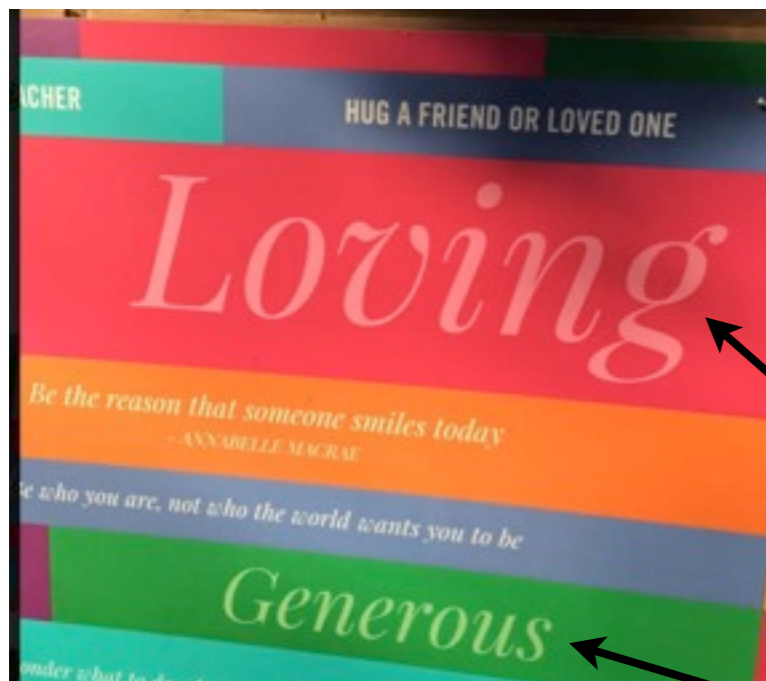
Per Justin --

“The Kindness Wall also needs to have more contrasting backgrounds. For example, the word “kindness” is written in a lighter shade of magenta than the background itself. Instead of using the same color for the word “kindness,” a color that stands out on the magenta background would be better. Also, the italicized fonts can be hard to read and some of the smaller words are hard to read due to their small print size.”

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## Kindness Wall VI Improvements

Justin S. gave us the input that the layout of the text on the Kindness Wall could be difficult for some people that are visually impaired.



**San serif fonts with color chosen with lots of contrast with background is recommended**



**Not recommended to use small italics text**



**Not recommended to use the similar-but-lighter color of text as background color**

# **Kindness Wall Student Redesign**

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**Prototype Graphics Created by Riya**

This mock up of the Kindness Wall tries to improve usability for people that are visually impaired but are able to read text. The design avoids using the same colors in each text box and also avoids italics text.



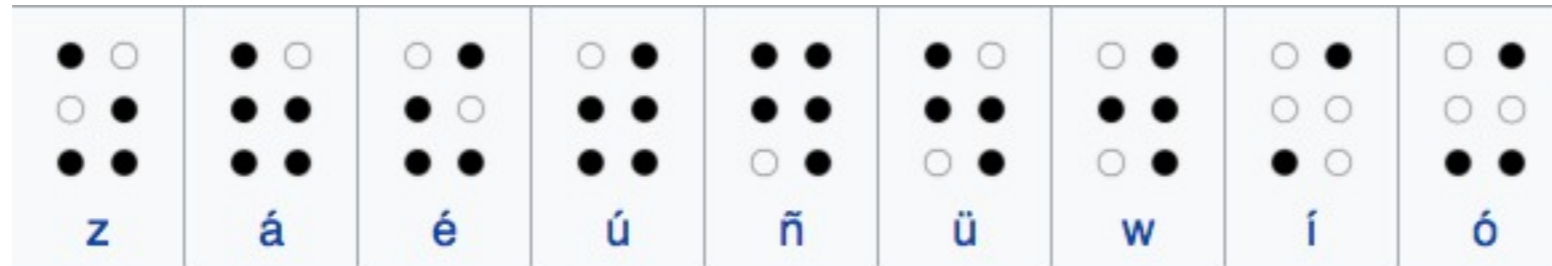
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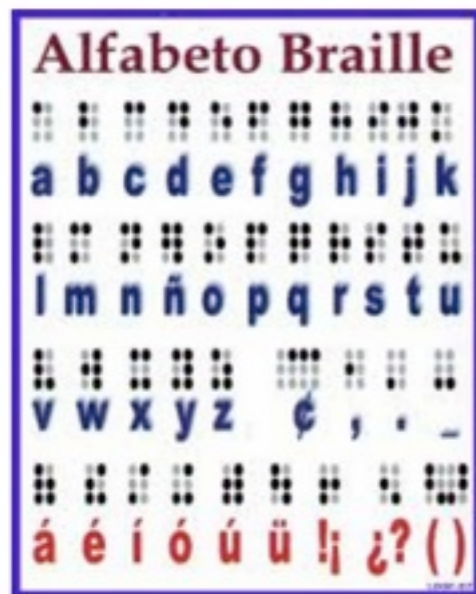
# Spanish Braille

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[-https://en.wikipedia.org/wiki/Spanish\\_Braille](https://en.wikipedia.org/wiki/Spanish_Braille)



It was announced that English, Spanish and Braille will be on the Kindness Wall at the Redwood City Magical Bridge Playground. Considering translating the Spanish into Spanish Braille as well. Consider also using Spanish Braille around the playground. Most of the characters are the same for English and Spanish Braille....there are some differences though, for example, there are different characters for the vowels with accents.



# How to Avoid “Braille Fails”

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In the process of doing research for this report, it was amazing how many “Braille Fails” we came across.

**Of course it is common sense to get input from a person who can read Braille or even better to get input from someone who uses Braille as their primary form of written communication, but it seems like many designers of Braille signage fail to take that important step.**

Have a couple of people who are very versed in Braille help edit the Braille that is proposed to be printed.

The JCC in Palo Alto attempted to do a very thoughtful job in the way they placed ADA complaint Braille signage around their facility.

Unfortunately, they probably depended on a computer program to do the translation and “spell checking” work for them, because there are a couple of rather funny, but glaring braille mistakes at their facility.



An example of a Braille Fail at a Johnson Park in Palo Alto. An emergency call box is centrally located in the park. On the call box the English text says “Emergency” but the braille says “telephone”. The translation fails to indicate that the call box is to be used for emergencies.

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# How to Avoid “Braille Fails”

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An example of a Braille Fail at the Palo Alto Jewish Community Center. On a centrally located bench in the facility the English text says “Karen’s Bench” however the Braille translates to “undefined”.

Our guess is that software was used to do the translation and it had a glitch in translating for this piece of signage.

Again, a Braille reader could have caught this error before it went into production.



**Translated: “undefined”**

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## Conclusion from Nikki

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Overall Impression: This park already goes above and beyond anything I have seen in terms and commitment to accessibility and inclusion for all. There are just a few improvements that should be made to safely have the blind and visually impaired enjoy the park, just like everyone else.