NYU | Ability Project

# DESIGN GUIDELINES
# for
# Hand-held Tactile Maps

For Braille Embosser and Swell Form Machine

**Designed and developed by Ability Project**

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# Designing Tactile Maps

These guidelines are a set of recommendations for designing paper based hand-held tactile maps. The goal is to compile the best practices and lessons learned in the research process and help create a simple design workflow of in-house tactile maps. These tactile maps are a work in progress and were created following the recommendations and feedback from mobility experts and stakeholders.

Tactile Maps is a field that has a lot of history and great examples of fabrication. However, the reproduction of tactile maps often requires outsourcing the creation of maps. Hopefully, with this document, you will be able to create an updated and simple workflow for tactile maps, improve the accessibility and aid in navigating a space.

# Production Methods

The guidelines are for Braille Embosser and Swell Form printers. These methods were chosen to facilitate its in-house reproduction, learnability and its portability. Both methods are designed for letter size paper (8.5 by 11 inches) and use the same design flow.

In the Resources section, there are links to a Workflow Guide and the SVG files to create your own maps.

## Braille Embosser

Braille and Tactile Graphics Embosser is a printer that creates braille text or graphics by pushing dots into a paper. The color brightness creates a different resolution and dot height. The braille embosser printer is connected to a computer as a regular printer. Benefits of this method are the lower cost of paper, and the definition of the printed braille text. However, the level of graphical detail is limited and the dot pattern is not necessarily consistent for small designs. For this reason, it is recommended to use simple geometric designs, as later defined in these guidelines.

## Swell Form Method

Swell Form Machine creates tactile graphics by printing or drawing on the Swell Touch Paper. You insert the paper through the Swell Form Machine to swell the inked areas. For this, you print the design map on the swell touch paper using a laser printer and then pass it through the Swell Form Machine. The Benefit of this method is that it is easy to learn and reproduce. Also, the level of graphical details is greater than in braille embossers. However, the cost of the material is higher and the braille text is less clear, as compared to the Braille Embosser.

## Tactile and Visual Maps: Printing Process

Tactile maps are created in two layers of information: the first layer includes the tactile material and the second includes the visual details.

The first layer requires the use of the Swell Form Machine or Braille Embosser to create map relief information. The second step uses an ink printer that adds solely visual information like color or text.

These customized methods are recommended to improve its usability by avoiding tactile clutter and by adding visual information to the maps.

The Braille Embosser method prints the first version of the tactile map with all the information that needs to be tactile (map, symbols and braille text). An Ink printer is then used to add another layer with the visual information such as the map, letter text or QR Code.

In the Swell Form method you can use a multiple steps process to ink print the letter text and the QR Code without swelling.

# Layout



1 - Header
2 - Body
3 - Margin
4 - Gutter
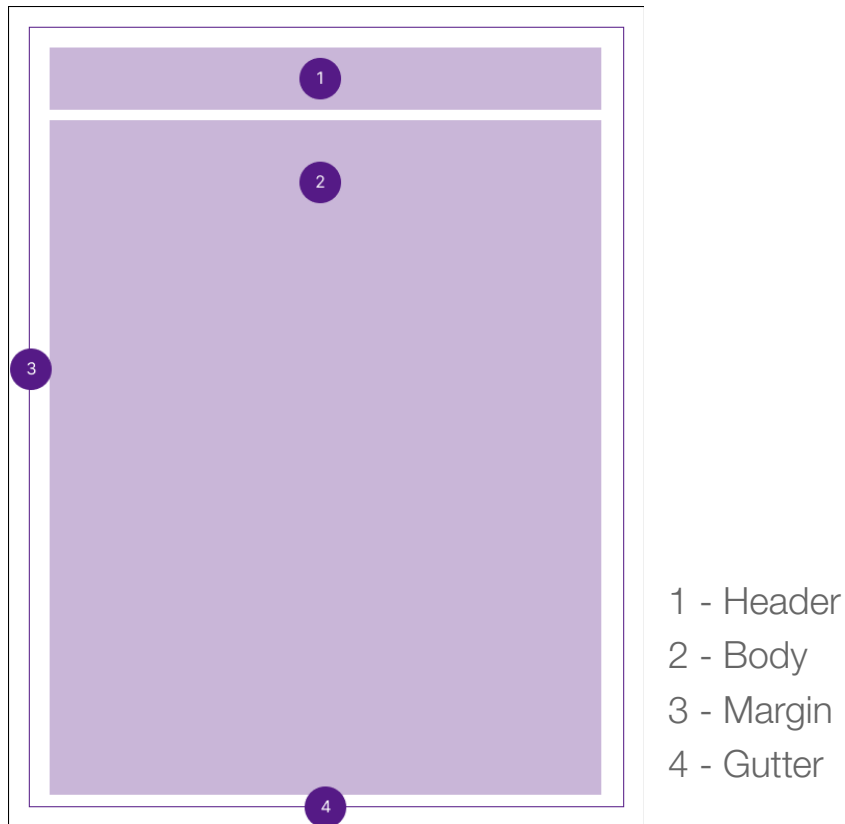
## Page Layout

The main layout of the tactile map consists of the **Header** at the top of the paper, followed by the **Body**. The header and the body are contained within a **Margin** of 40 points (Pts) and a **Gutter** of 20 Pts. The margins and the gutters are recommended so as to allow a negative space or "breathing room" between elements of the maps and binding of the document. The margin also identifies the limits of a "safe" printing area.

# Elements

| Logo | | ┼ |
|------|--|---|
| **Headline 1** | | |

## Header

The header contains the logo, title of the map on the left side and orientation page symbol on the right. The page orientation key helps to position the page correctly and is at the top right corner of the header.

## Header Specs

Height: 532 Pts.
Width: 60 Pts.
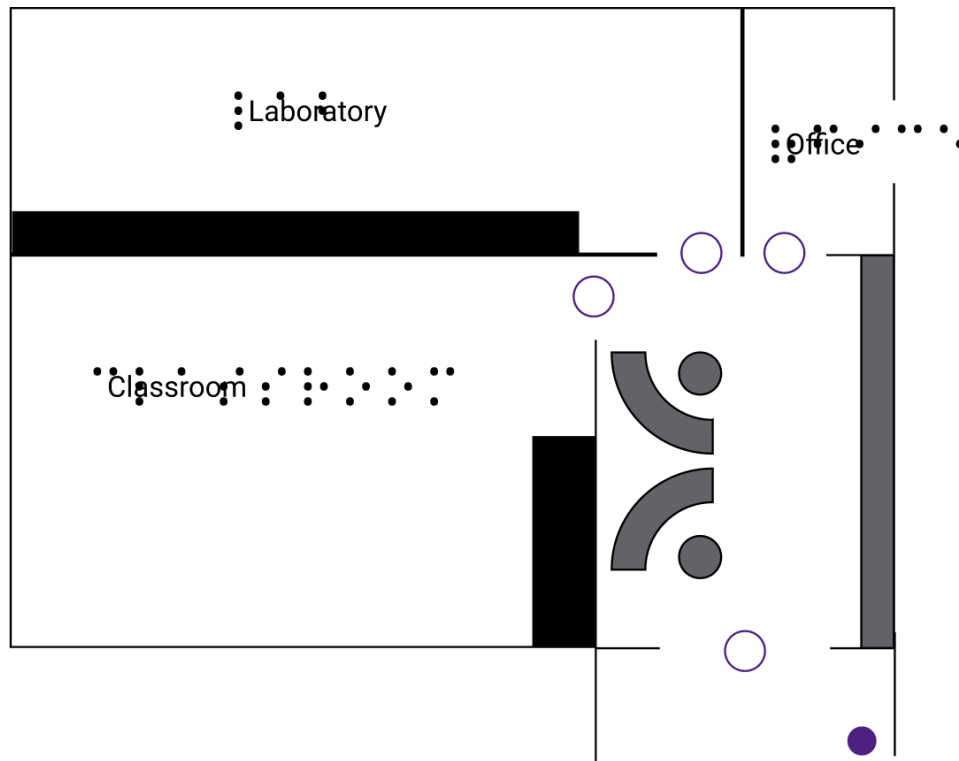
## Map

The shape and size of the map depends on the goals of navigation and interpretation. In this document we provide 4 recommended templates for maps that are organized in a vertical, horizontal or hybrid (mixed) layout.

Details of the space and navigation may change, depending on the goal of the map. Sites may need multiple maps to convey the information of the space as all the information of the space may not be achievable on only one page.

To determine which site needs more than one map, it is important to evaluate the meaningful characteristics of the space and the goal of the navigation.

Position And Scale

When creating a map with a navigation path, position the map on the page as if you were positioned in front of the space, preferably with the path starting point at the bottom of the page. This helps to avoid confusion when using the tactile map.

Try to keep the scale as accurate as possible. However, not all the spaces represented on the map must be to exact scale. If needed, use a legend to represent an accurate scale.
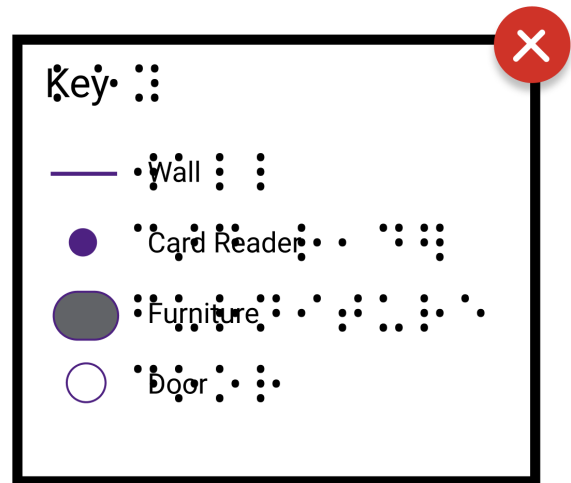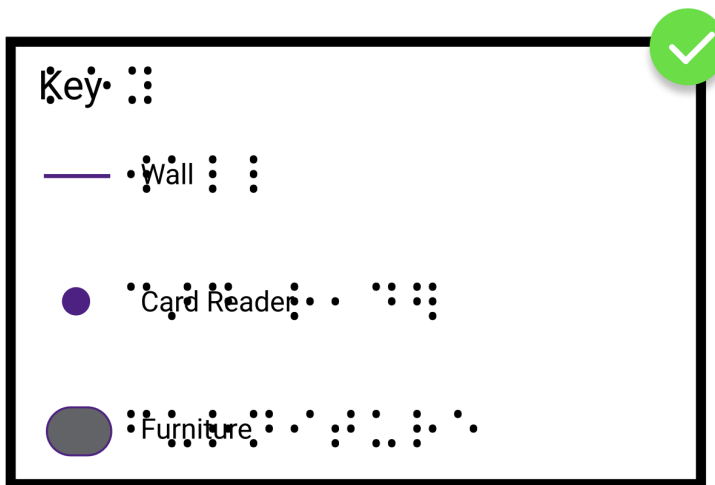
Image of correct white space between Key elements in Key between text versus too tight spacing.

## Key

The key should include all symbols used in the map. If there are a small number of symbols, it's then possible to include them on the same page as the map.

If the number of symbols is too large for positioning on the same page of the map, avoid tactile clutter by positioning the key on another page.
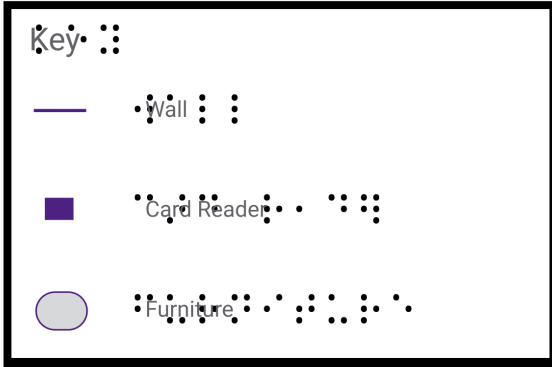
Frame the key information with a stroke of 5 Pts.

Image of Key for Braille Embosser

When using the braille embosser, print the text over the braille text. This helps maximize the use of space.
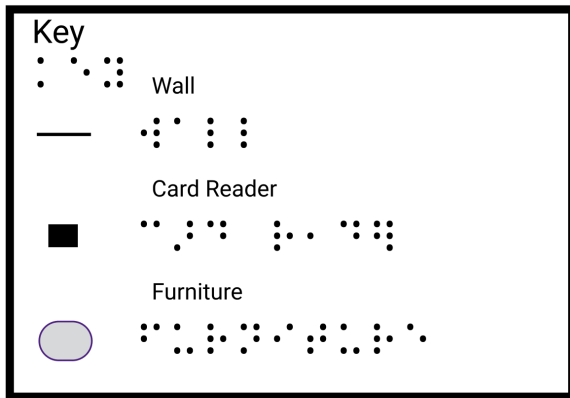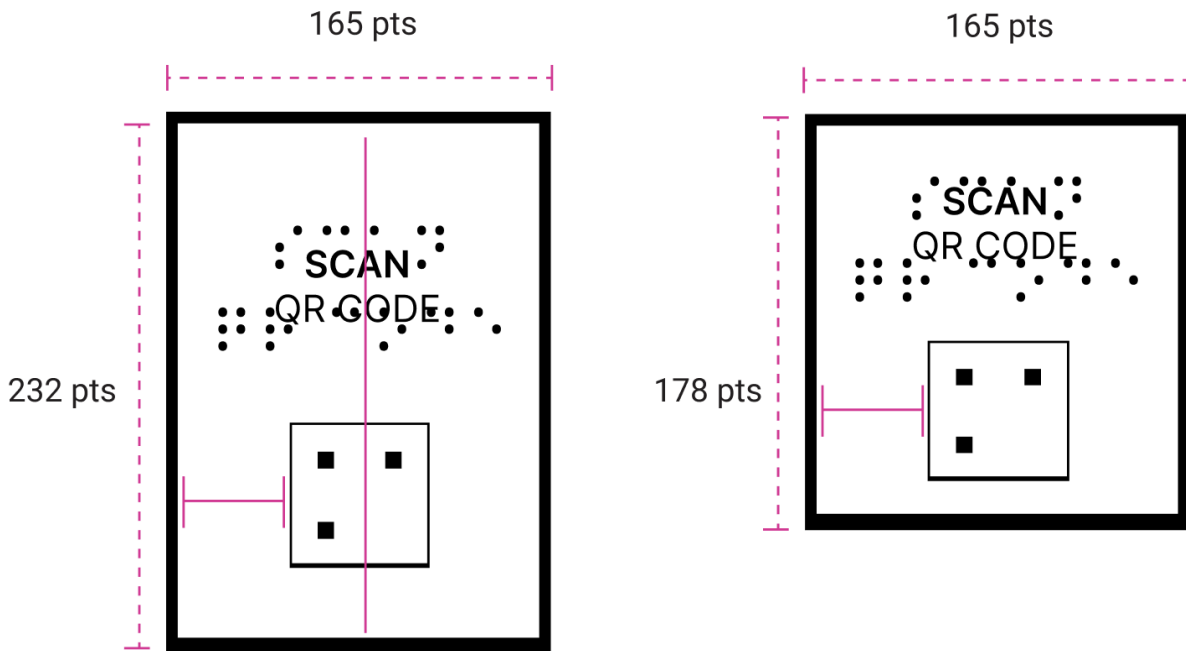


Image of Key for Swell Form Machine

When using the swell form machine, print the text above the braille as both will be visible.

Text details are in the Labeling section of the guidelines.

## Key frame specs

Outline stroke: 5 Pts.
Color: #000000

165 pts



232 pts

165 pts



178 pts

## QR Code

QR Codes are used to access a description of the tactile map on a website using screen reader access on a smart device. Screen Reader technology is chosen over an audio description given that it is more adaptable than a pre-recorded audio.

QR Codes are positioned next to the Key section. A tactile graphical symbol for the QR Code guides the user to where it is located and its size. The "Scan QR Code" text is aligned at the center of the frame. The size of the frame is determined on the map template.

Specs of QR Code frame:

Stroke: 5 Pts.
Color: #000000
Text: Title Case
Braille: Lowercase
Version 1: width: 165 Pts. height: 232 Pts.
Version 2: width: 165 Pts. height: 178 Pts.

# Templates

The templates presented are designed as one or two page tactile maps. Three of the templates include the QR Code and Key areas on the same page. The templates recommend alignments, proportion, consistency and white space between the elements.

Positioning all the key symbols on one page may not fit on the key area. **Avoid tactile clutter**. To make the design more readable, keep "breathing space" between elements of the document and maintain consistency in the use of header and frames.

Consider designing the key on a separate page. However, if you need to keep the design contained on one page, consider either dividing the information or designing the key on a separate page. An example would be creating multiple maps or prioritizing the information that needs to be on the map.
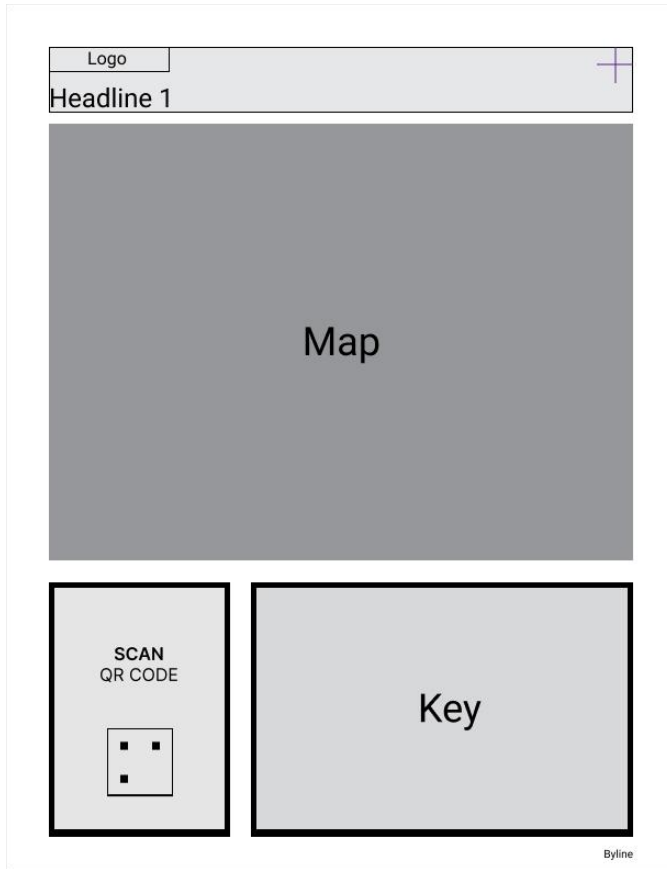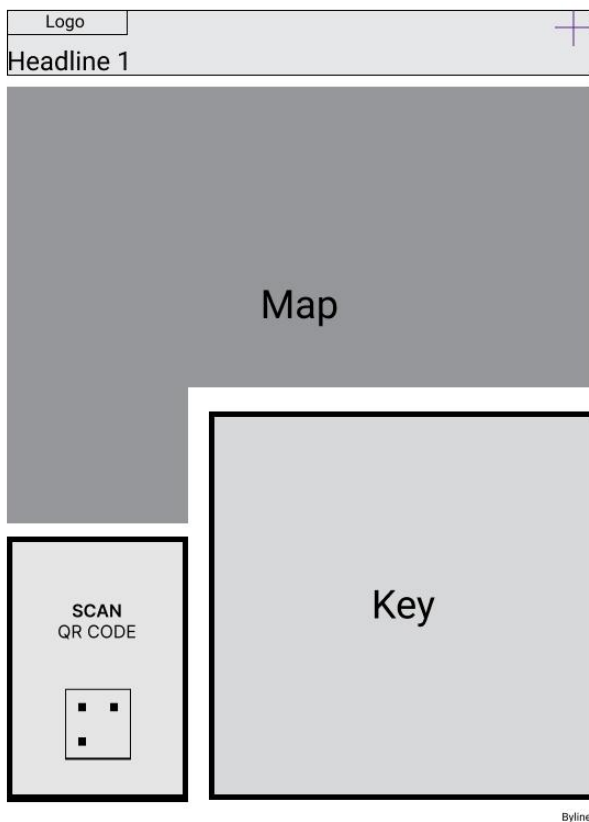
## Horizontal Layout

Horizontal layouts are for maps that are better represented horizontally. The header is on the top, followed by the map. The QR Code and Key areas are at the bottom with a gutter of 20 Pts. between them.
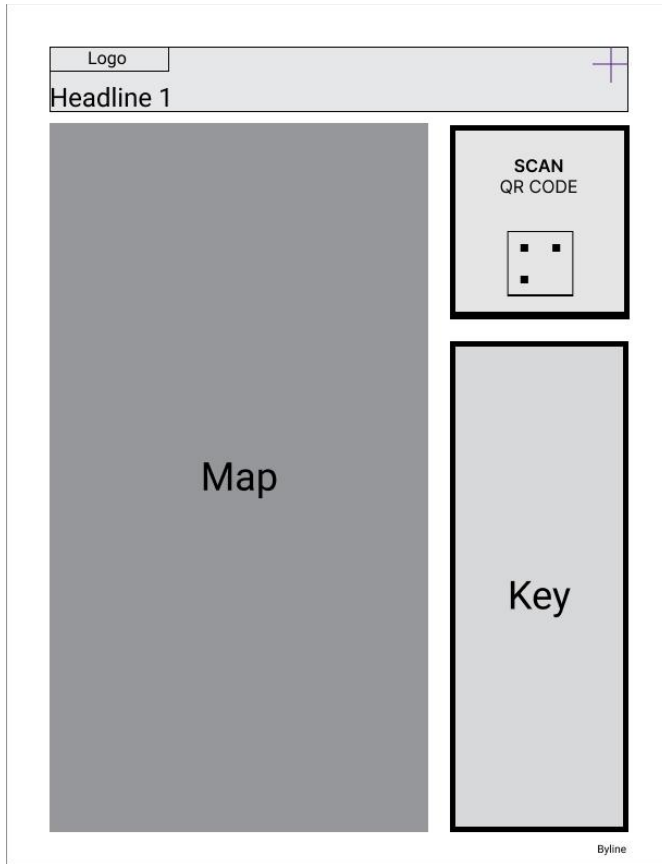
## Vertical Layout

Vertical layouts are used for maps that have a long design. The header is fixed on the top of the page. At the body of the page, the map area is aligned to the left. The QR Code frame is on the right and the Key area is just below.

## Hybrid Layout

The hybrid layout provides more flexibility to the design of the tactile map, prioritizing the map shape. It could be a combination of elements of horizontal and vertical layouts.
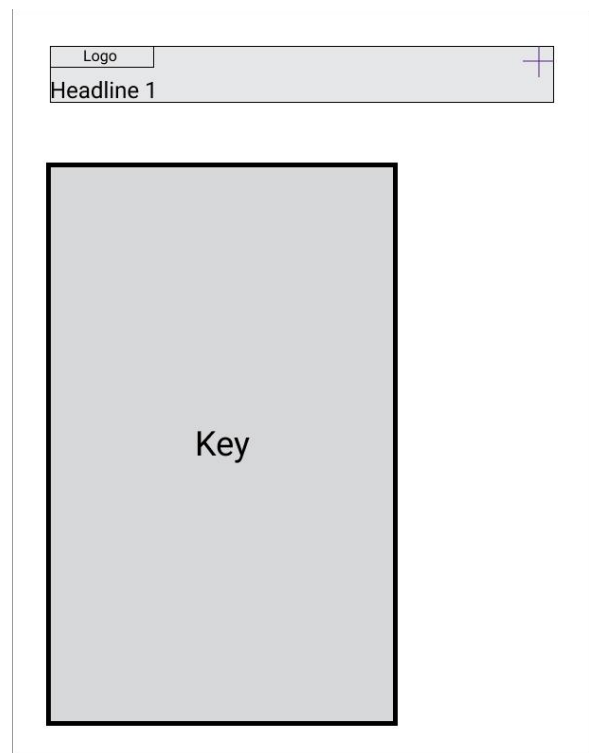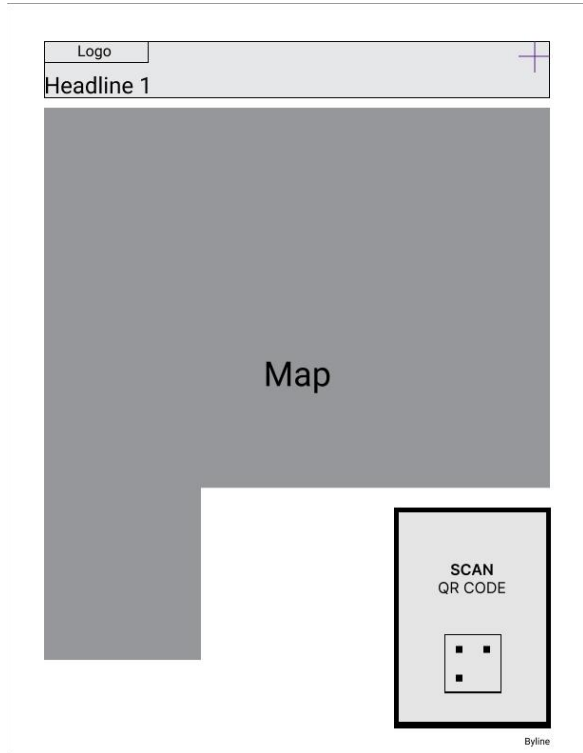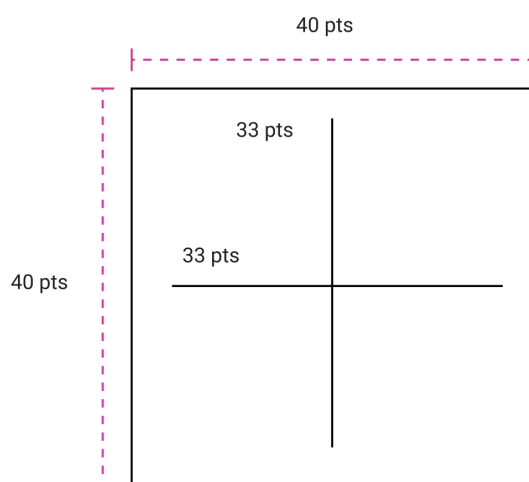
## Two Page Layout

Depending on the goal of the tactile maps and its ease of readability, it is recommended to use a separate page for the Key. Both pages keep the Header.

# Components

## Page Orientation

Page orientation is a symbol that helps the user to position the page in a correct orientation. Typically this symbol is at the top right corner of the page.



## Specs For Braille Embosser

Description of symbol: A cross (two perpendicular lines)
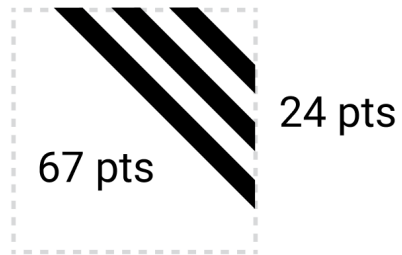Position: Extreme top right of the Header section.
Stroke: 1 Pt.
Horizontal line length: 33 Pts.
Vertical line length: 33 Pts.
Color: #551A86
Alignment: Center

24 pts

67 pts

## Specs For Swell Form

Description of symbol: Three diagonal lines.

Position: Extreme top right of the Header section.

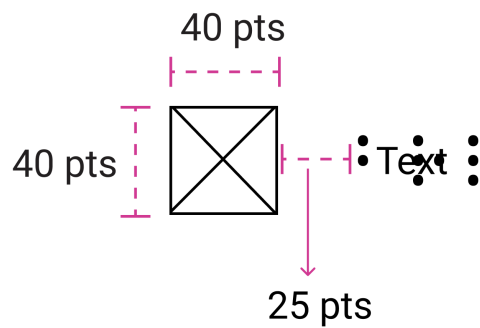Stroke: 5 Pts.

Rotation: 45 degrees

Diagonal line 1 length: 28 Pts.

Diagonal line 2 length: 48 Pts.

Diagonal line 3 length: 67 Pts.

Vertical length: 33 Pts.

Color: #000000

40 pts

40 pts

25 pts

Text

## Key Symbols

We recommend a consistent size of all the symbols used in the map and in the Key. If new symbols are created, we also recommend a design that fits the printing method: braille or swell forms. In these guidelines we create symbols for both braille and swell forms.

Braille Embossers have a limited capacity for details on smaller graphics. For better tactile interpretation, avoid complex and detailed shapes.

Swell form graphics allow a better level of detail as compared to the Braille Embosser. The colors use on Swell Touch Paper can create different intensities of swell and can be used to enrich the design of the map.

General specifications for the Key symbols created for the tactile maps:

Key Specs:

Maximum height: 40 Pts.

Maximum width: 40 Pts.

Stroke: 1Pt.

Stroke color: #000000

Fill color : #616368

Braille Embosser Symbols:

- Wall - Continuous line
- Path -  Dash line
- Card Reader - Embossed texture rectangle
- Stairs - Horizontal line followed by a vertical line pattern, similar to a zig-zag outline
- Elevator - Rectangle outline
- Door - Circle outline
- Ability Project location - Triangle
- Furniture - Items: chair, desks, sofa, etc. Item outline with a medium tactile embossed texture.
- Restroom - Horizontal *S* shaped curve
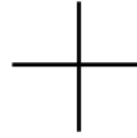- QR Code - Square with three embossed dots at the top two corners and one at the bottom left corner

| Wall | Path | Orientation Page |
|:---:|:---:|:---:|
| — | ▪ ▪ | + |

| Stairs | Restroom | Card Reader |
|:---:|:---:|:---:|
| (stairs symbol) | (wave symbol) | ■ |

| Elevator | Ability Project | Door |
|:---:|:---:|:---:|
| ▭ | ▷ | ○ |

Swell Form **Symbols:**

- Restroom - Oval with a rectangle above and a base line below (toilet shape symbol)
- Elevator - Rectangle with an "X" crossing from corner to corner
- Door - Circle within another circle
- Card Reader - Swell texture rectangle
- Orientation Page - Three diagonal lines



Restroom

Elevator

40 pts

40 pts

Door

Card Reader

Orientation Page
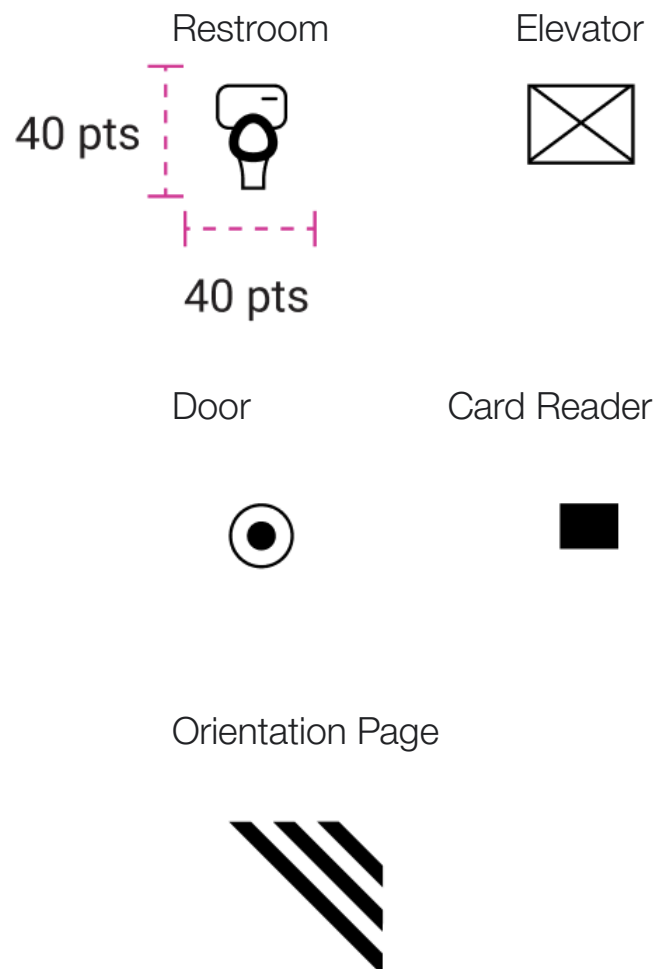
# QR Code

The QR Code connects the user to an online page that describes the tactile map. This description can be accessed by using Screen Reader, with the option of adding audio information.

## QR Code on Braille Embosser
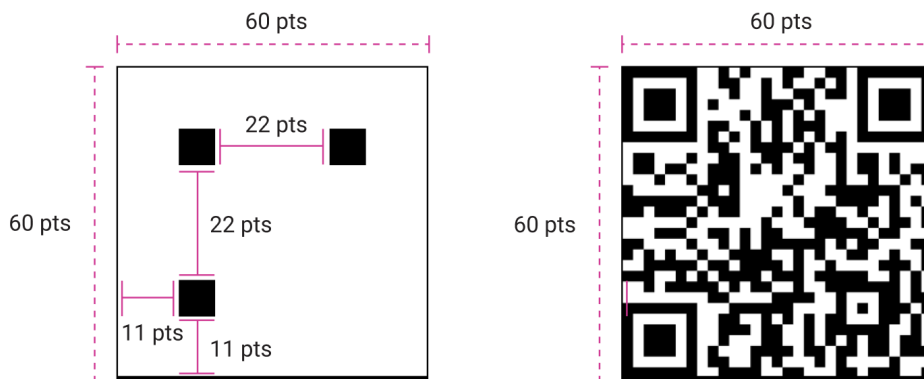


Description - Outline of a square with two embossed dots aligned at the top two corners and one dot at the bottom left corner.
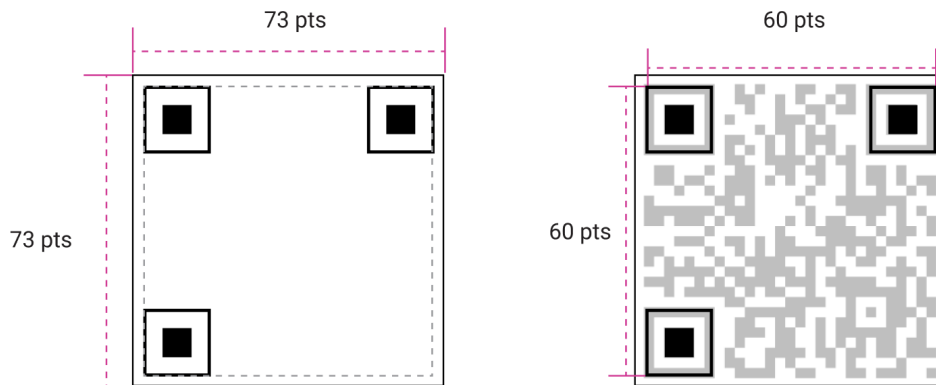
**Specs**

Outline of a square - height 60 Pts. width 60 Pts.
Dot - 7 Pts
Position of dots aligned at the top and bottom 11 Pts

## QR Code on Swell Form



73 pts

73 pts

60 pts

60 pts

Description - Outline of a square with two smaller squares at the top two corners and one at the bottom left corner.

When designing a tactile symbol for the QR Code on Swell Touch Paper, it is important to precisely align the position markers with the image of the QR Code.

Although you can swell the complete image of the QR Code, this would create tactile clutter. Just swell the position markers and ink print the QR Code.

# Labeling

## Color Palette

For Braille Embosser and Swell Form

Braille, text and symbols

#000000

Furniture Symbol

# 616368

For the Braille Embosser printing version, the page is printed in black (Hex color #000000) and gray tones (Hex color #616368).

The gray color is used for the inner part of furniture elements.

## Printer

### Text



#000000

### Key



#551A86

The ink printer is using black (Hex color #000000) for text and line stroke. Purple (Hex color #551A86) is used for the symbol with a contrast ratio of 11.18:1.

## Fonts

## Braille

⠐ ⠖⠐

Font: Unicode Braille Pattern - 6 dot cell
Font size: 29 Pts.
Grade 2 Braille
All Lowercase

## Text

# Headline

Font: Helvetica - Regular
Font size: 24 Pts.
Color: #000000

Body
Font: Helvetica - Regular
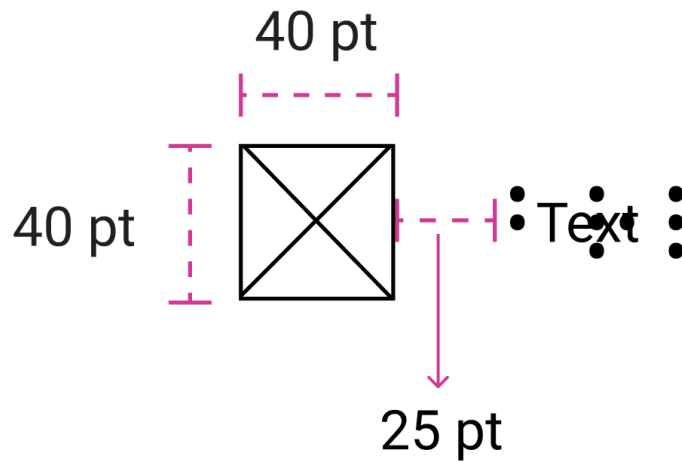Font size: 14 Pts.
Color: #000000

Caption
Font: Helvetica - Regular
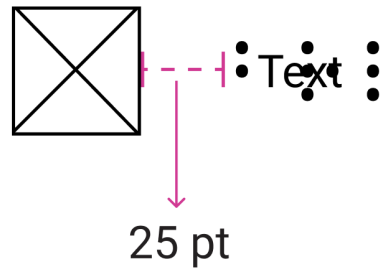Font size: 12 Pts.
Color: #000000

Map Key

40 pt

40 pt

25 pt

:Text:

On the map key, the text is next to the symbol. The symbol keeps the same size used on the map, keeping a height and width of 40 Pts.
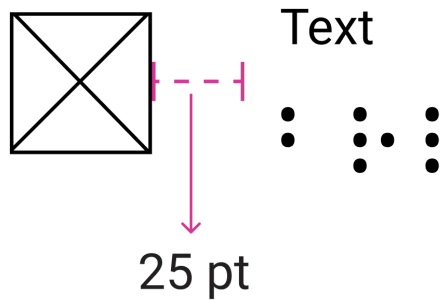There is a spacing of 25 Pts. between the text and the symbols.

Braille Embosser

25 pt

The braille text is embossed separately and the letter text is printed on over the braille text.

Swell Form



In the swell form version, the letter text is above the braille, as both are visible. To avoid tactile clutter, use an ink printer for the letter text after creating the swell graphics generated in the swell form machine.

## Resources

Workflow for Production of Tactile Maps

[Ability Project Tactile Maps](#)

[Swell Form Machine](#)

[Braille and Tactile Graphics Embosser](#)

[Braille translator](#)

Components and Map Templates

      Online Editing Access - [Figma](#)

      [Download Maps](#)

Source Consulted

[Best practice guidelines for the design, production and presentation of vacuum formed tactile maps](#)

 [Labels and Keys for Tactile Graphics](#)

[Overview of Tactile Graphics for Students who are Blind or Visually Impaired | Paths to Literacy](#)

**Questions, comments or feedback, please contact:**

Themis Garcia - themis@nyu.edu
Dr. Amy Hurst - amyhurst@nyu.edu

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