USER GUIDE

E INK GALLERY PALETTE™ 4000 GRAPHICS DESIGN GUIDE USING ADOBE PHOTOSHOP

☐ E Ink's Confirmation

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1 About This User Guide Note

This document is a user guide on how to use Adobe Photoshop CC to generate images for E Ink Gallery Palette™ 4000 displays. Gallery Palette™ panels support seven colors, Red, Green, Blue, Yellow, Orange, Black, and White (RGBYOKW) and this user guide will provide instructions on how to convert images to these palette colors.

2 Overview

E Ink Gallery Palette™ panels support seven palette colors (RGBYOKY) and standard digital color images in RGB space can contain up to 16.7 million colors. Content creators can use the methods in this document to generate or convert content from RGB images into Gallery Palette compatible images.

Three types of image conversion methods are described. The first method is to directly use the seven palette colors (palette color) for graphics that emphasize spot or highlight colors, such as for electronic shelf labels as shown in Figure 1.
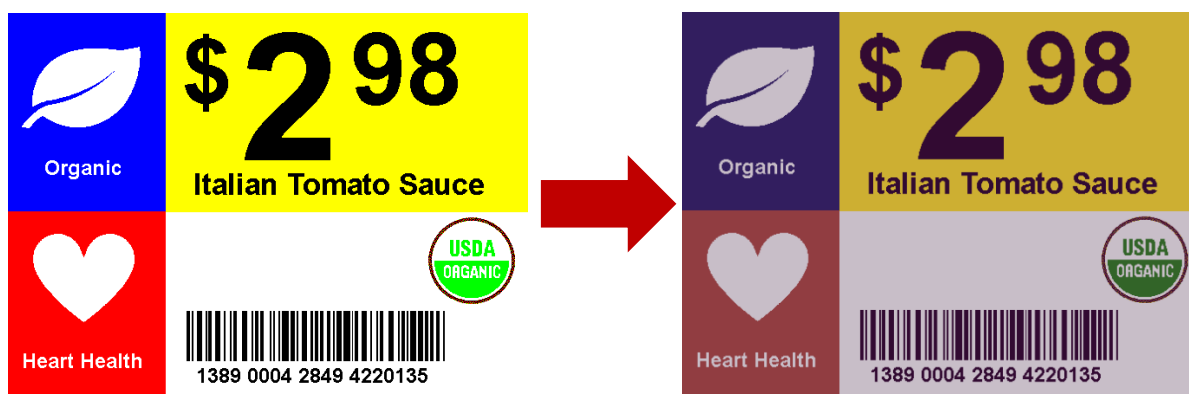

Figure 1 Gallery Palette™ color example

The second method is to generate a full graphical image and utilize a technique called dithering to simulate a wider range of colors shown in Figure 2.

Figure 2 Gallery Palette™ graphics color example

The third option for users is to combine the two techniques that results in an image that has palette color areas and areas with graphics. This is done by combining the two methods shown in Figure 3.

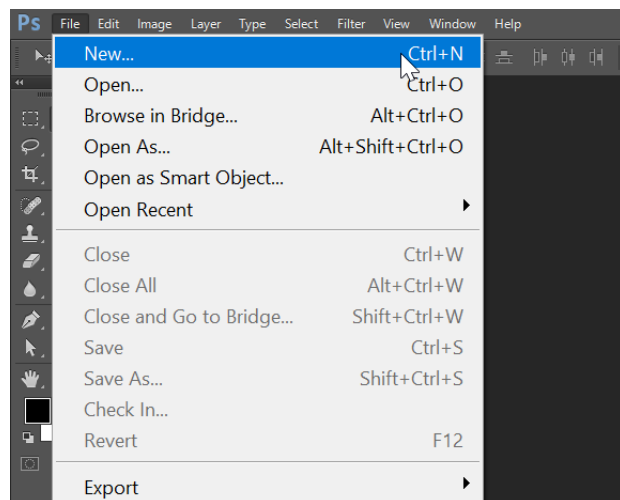**Figure 3 Gallery Palette™ Combined Image**

3 Generating Images

3.1   Palette Color Images

Palette color images are defined as images that utilize the colors in large areas, for example as a background color or font color. Simple shapes and icons can also be used, but not complex graphics.

3.1.1   STARTING A NEW PROJECT
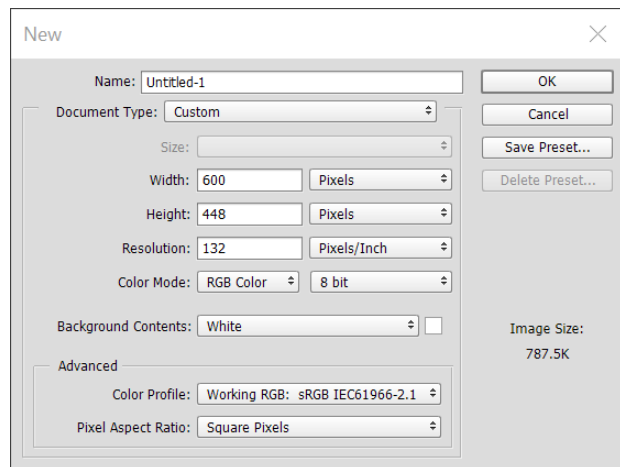
Open Adobe Photoshop and start a new project. *File -> New*	
Enter the canvas details. This information can be found in the panel datasheet. Resolution values are not critical, but entering the correct pixels per inch will allow for accurate size estimations during image generation.	

3.1.2 COMPOSING THE IMAGE

Begin composing the image. For the color palette, only use the seven colors supported by E Ink Gallery Palette™ 4000 EPD display.
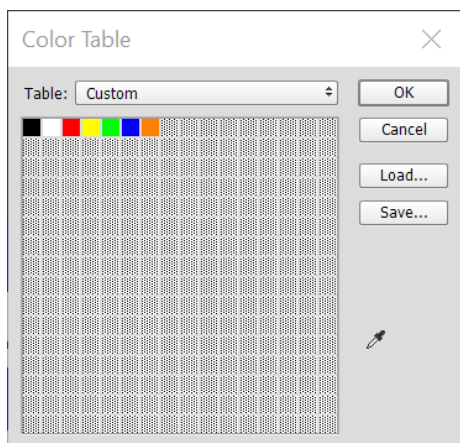
Color name	RGB Value	Hex Value
Red	255, 0, 0	#FF0000
Green	0, 255, 0	#00FF00
Blue	0, 0, 255	#0000FF
Yellow	255, 255, 0	#FFFF00
Orange	255, 128, 0	#FF8000
Black	0, 0, 0	#000000
White	255, 255, 255	#FFFFFF

Figure 4 Gallery Palette™ supported color palette

Figure 5 Composition window in Adobe Photoshop

Detailed use of Adobe Photoshop on generating images is beyond the scope of this document.

3.1.3 FONTS FOR GALLERY PALETTE™

When inserting text, ensure that the anti-aliasing mode is set to "None" as shown in Figure 6. Users are free to choose any font for the text. Arial, Helvetica, Verdana, or other sans serif fonts typically render well on Gallery Palette™ panels.
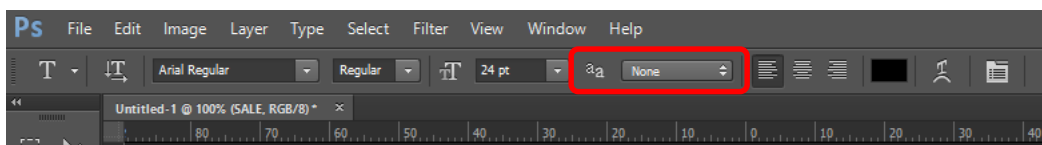
Figure 6 Font selection and options

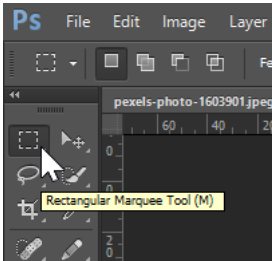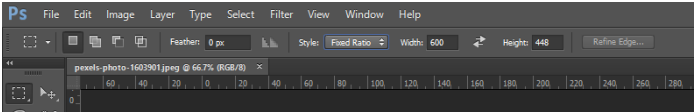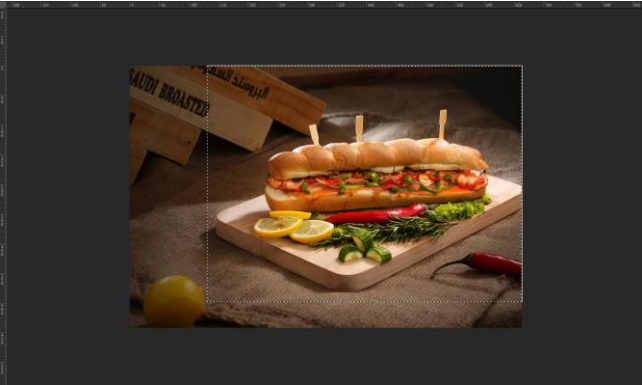After completion of the image, save the image in a lossless format such as BMP or PNG.

Figure 7 Completed Gallery Palette™ image
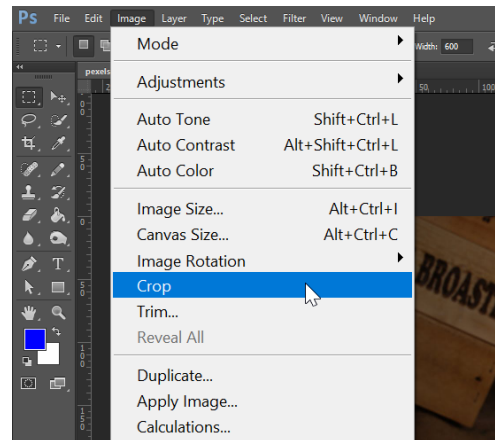
3.2   Generating Graphic Images

There are multiple methods to generate graphical images for E Ink Gallery Palette™ panels. The following steps will walk through how to import an image, crop to the correct aspect ratio, resize, color map and dither.
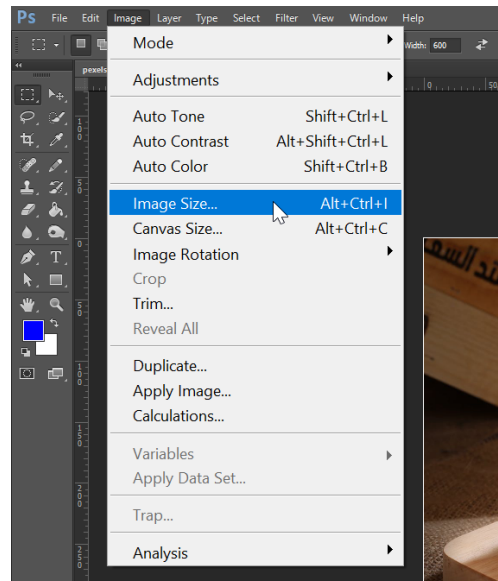
3.2.1   CROPPING AND RESIZING IMAGES

Size and aspect ratios can be found in E Ink datasheets for specific panels.

|	
Open the desired image file Note that the resolution and aspect ratio are not formatted correctly.	
Correct the aspect ratio by cropping using Photoshop's Rectangular Marquee tool.	
Select *Fixed Ratio* from the drop down menu The panel resolution can be used as the *Width* and *Height* fields	
Select the desired crop region	

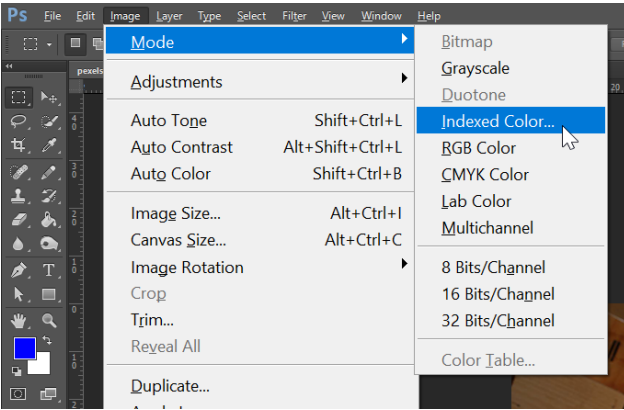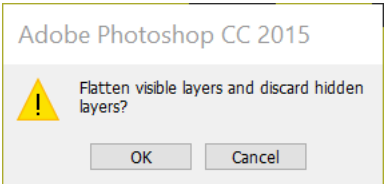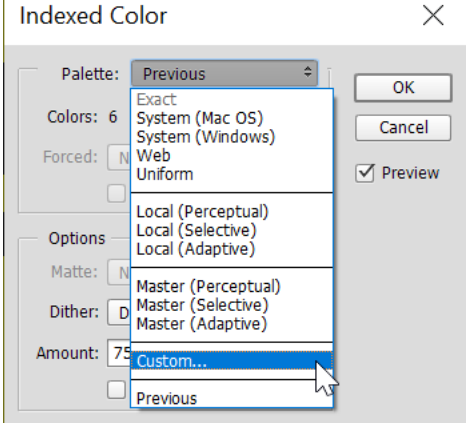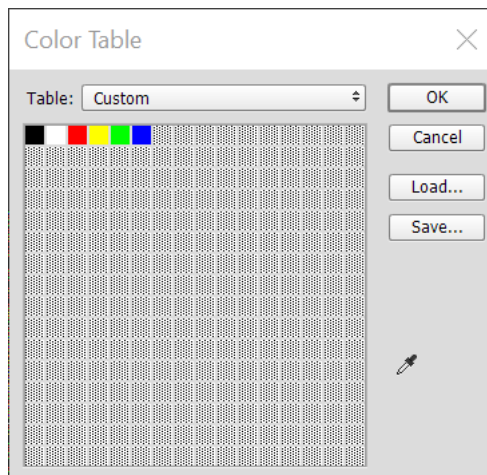|	
Crop the image *Image -> Crop*	
Resize the image *Image -> Image Size*	
Enter the resolution values for the panel. Resample should be set to *Automatic*. Select *OK* to finish	
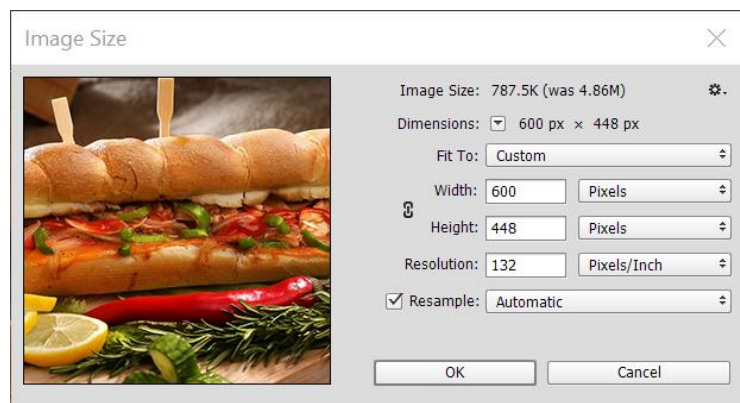
3.2.2 COLOR MAPPING AND DITHERING

Use Photoshop's Indexed Color mode to convert the image to the Gallery Palette™ colors and apply dithering.

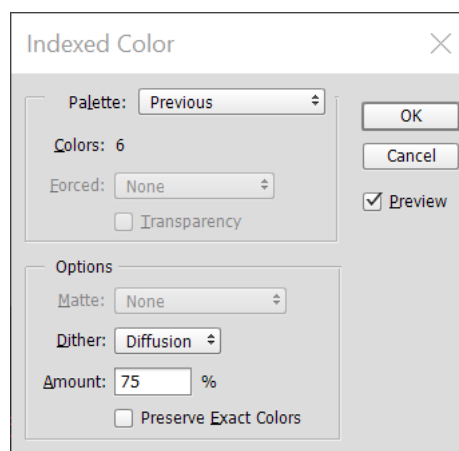|	
Image -> Mode -> Indexed Color	
Select *OK* if asked to flatten the image	
Define the palette by selecting *Custom* in the drop down menu	

|	
Define the palette colors. Omitting the orange color may yield better results (RGBYKW). Including Orange in the palette will sometimes yield perceptually worse results.	
Select *Diffusion* from the Dither drop down menu By default, the dither amount is set to 75%. Increasing this value can improve the amount of details in the final image, but will also increase the amount of grain Select *OK* to finish	
Convert the image back to RGB color mode *Image -> Mode -> RGB Color*	
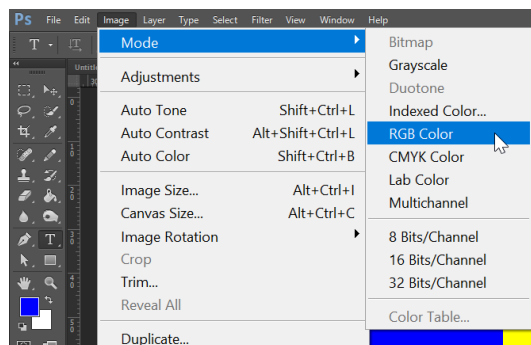
Figure 8 Completed Gallery Palette™ Graphic Image

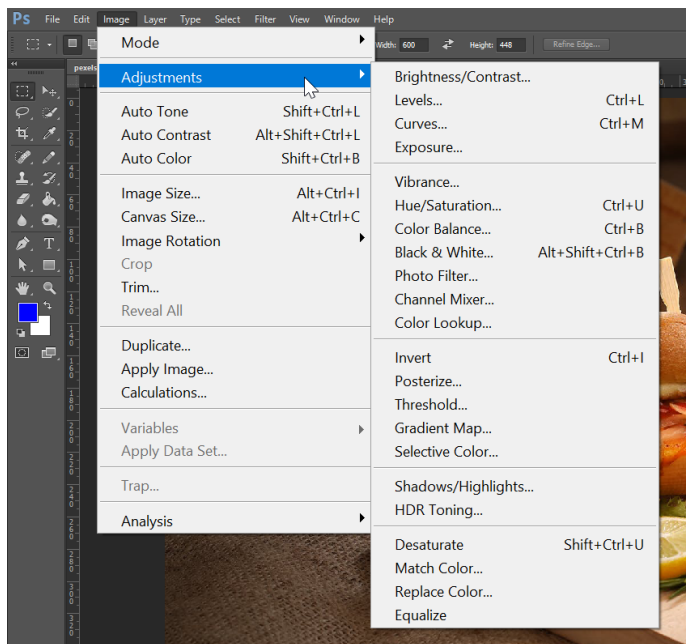Save the file as a PNG or BMP.

3.2.3 ADJUSTING SATURATION, BRIGHTNESS, AND CONTRAST RATIO

It is often beneficial to increase the saturation, brightness, and contrast ratio of the original image before converting the image to Gallery Palette™ colors. The colors shown on a monitor in Photoshop and the actual colors supported by the Gallery Palette™ panel are not calibrated, with the physical panel showing less saturated colors with a slight hue shift. Optimizing and fine tuning the colors used in Photoshop's Indexed Color mode and converting the image back to a compatible image file is beyond the scope of this user guide.
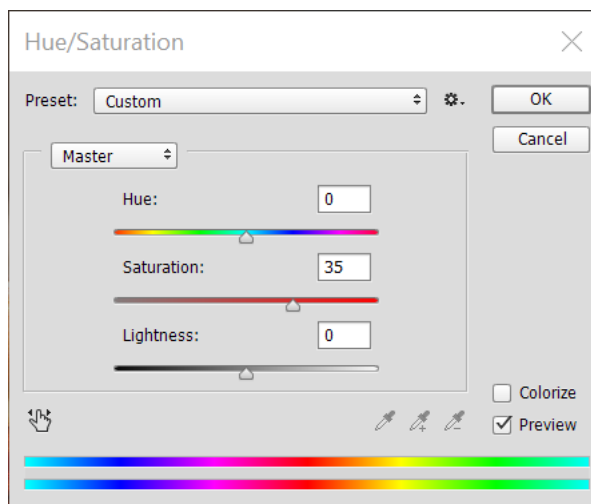
There are many options in Adobe Photoshop to adjust the image quality and users are encouraged to read Adobe's documentation on what each option is used for.

Adjustments to saturation, brightness, or contrast ratio should be done on the original image for optimal results.
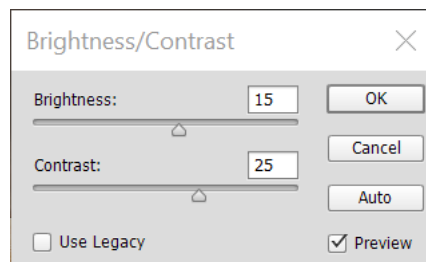
Adjust the saturation of the image *Image -> Adjustments -> Hue/Saturation*	
Enter a value in the *Saturation* box (Saturation: 35 is a reasonable number)	
Adjust the Brightness and Contrast *Image -> Adjustments -> Brightness/Contrast* (Brightness: 15; Contrast: 25 are reasonable numbers)	

3.3   Combined Graphics and Palette Color Images

Images that require graphics and palette color areas can combine the techniques defined in section 3.1 and 3.2.

The simplest method to combine two images in Photoshop is to generate the graphical image and palette color image separately and save them in PNG format. For the palette color image, ensure that areas that do not have content use transparent pixels (as opposed to a white background).

3.3.1   CREATING THE GRAPHICAL IMAGE

Create or load a canvas with the desired graphical image that has been rendered. Detailed steps on how to generate graphical images are in Section 3.2
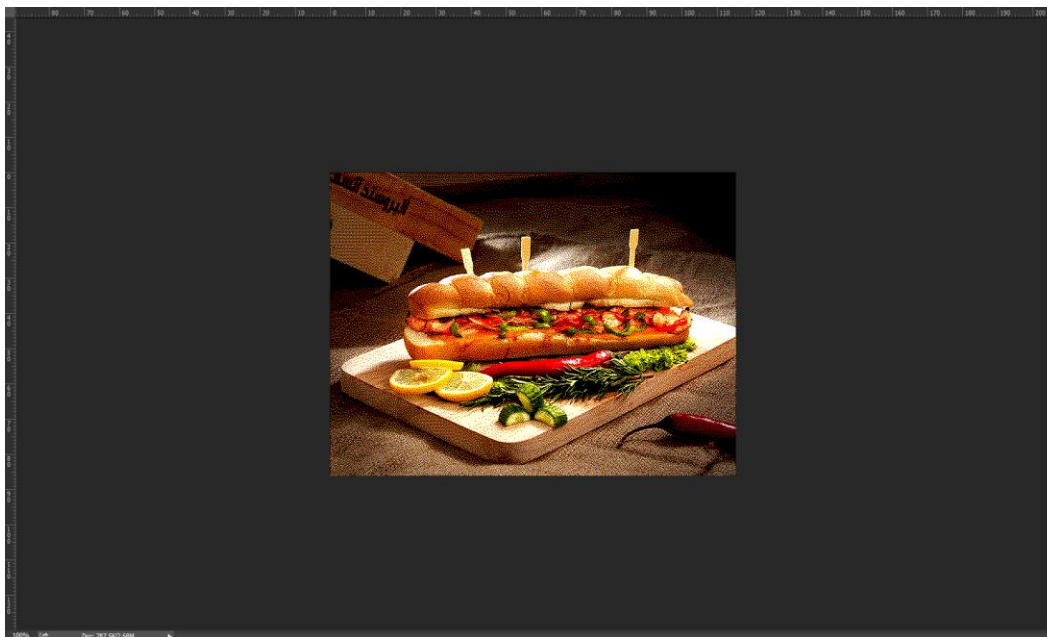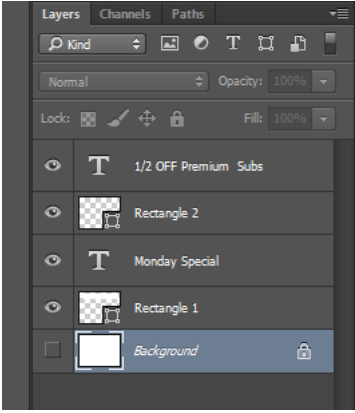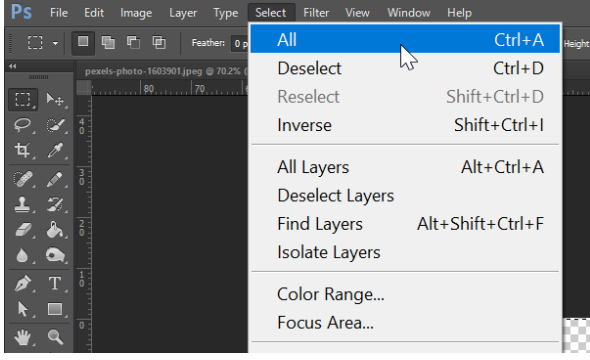

Figure 9 Imported Gallery Palette™ graphical image

3.3.2   CREATING THE PALETTE COLOR IMAGE

Create or load a canvas that contains the palette color image. The palette color image should use transparent pixels in all areas where there is no image content. Mapping the colors listed in Section 4 should not be done at this stage and should be done after combining all the images in the final stage.

There are multiple methods in Adobe Photoshop to create transparent pixels. A common and simple method is to turn off the Background layer which is typically white and this will preview areas that are transparent. In this mode it is easy to check for errors, such a white background that was intended to be transparent.

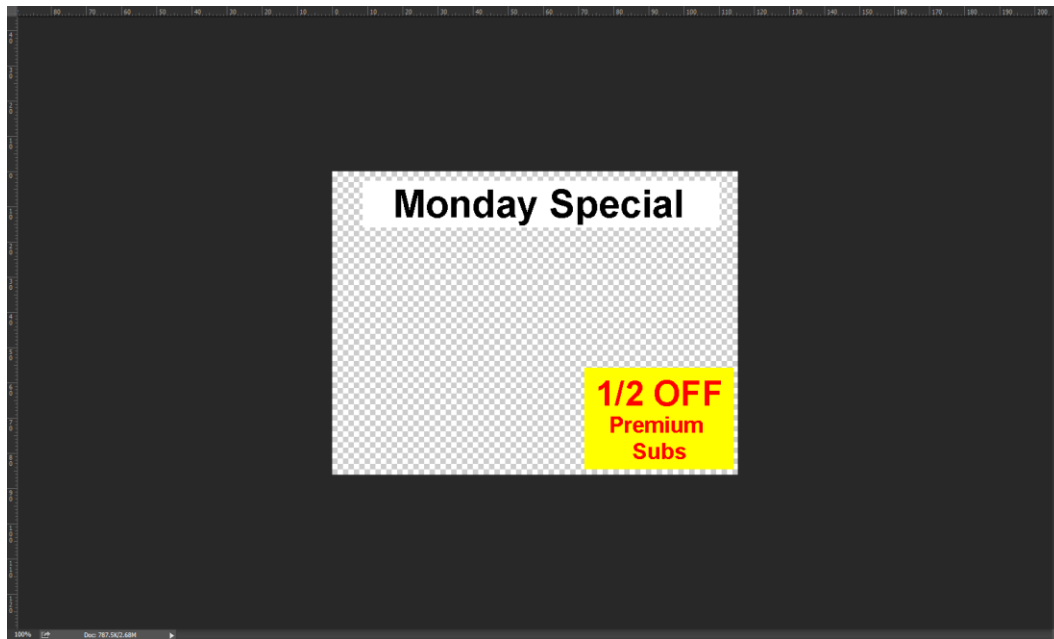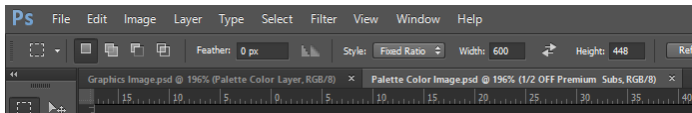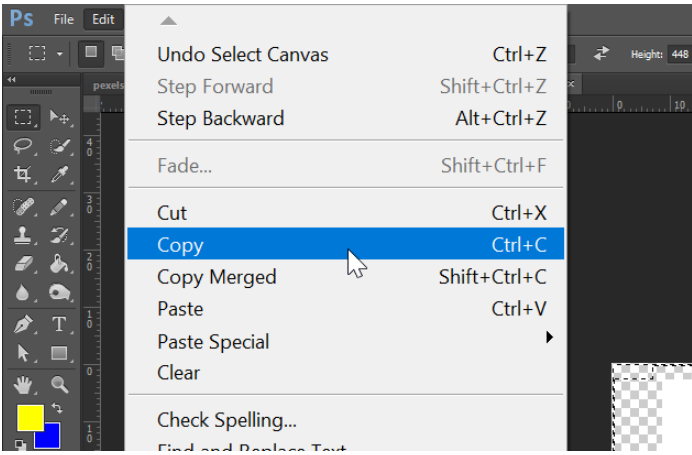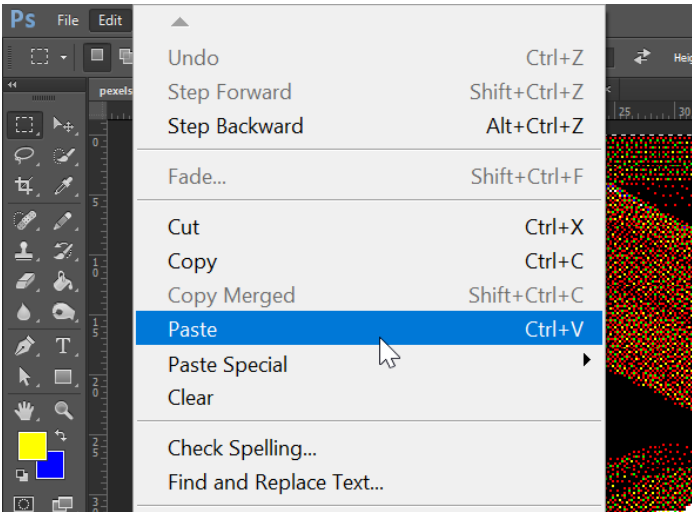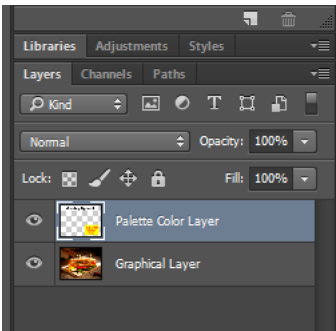|	
Turn off the *Background* layer	
View with *Background* layer visible	
View with *Background* layer turned off Note how "Monday Special" still contains a white background (which is desired in this example)	
Merge visible layers *Layer -> Merge Visible* Please note that this is not the same as Flatten Image	

Figure 10 Completed palette color image with transparent pixels

3.3.3 COMBING GRAPHICAL AND PALETTE COLOR IMAGES

After the palette color and graphical images are complete, combine the two images to create the final image. Generally, the graphical image is the background and the palette color image is in the foreground.

Both workspaces will need to be open when combining images.
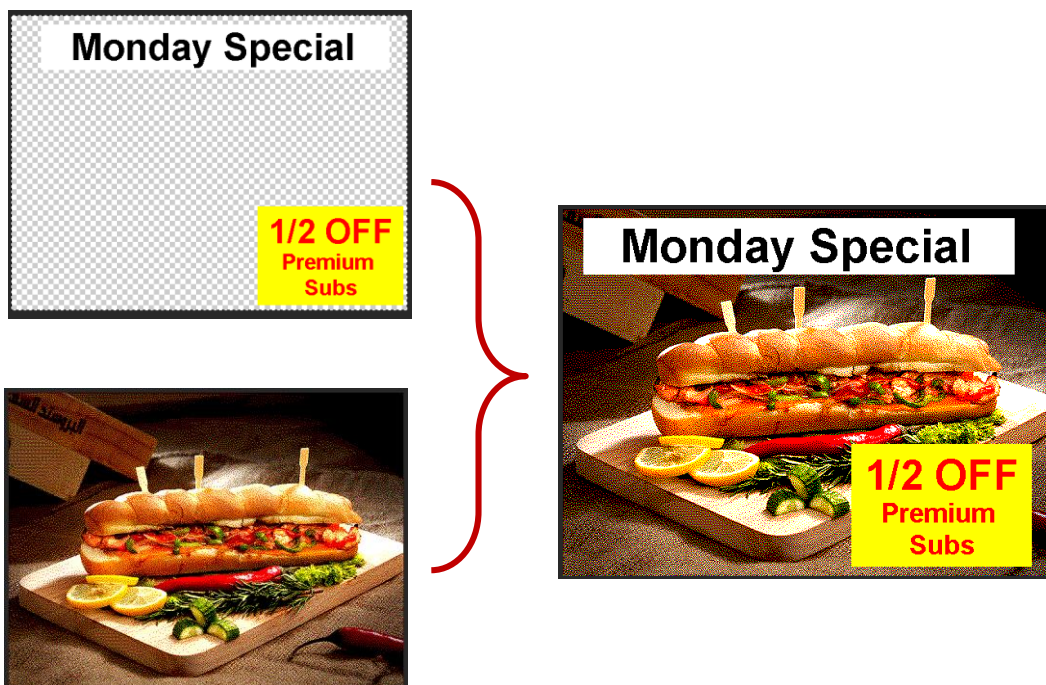
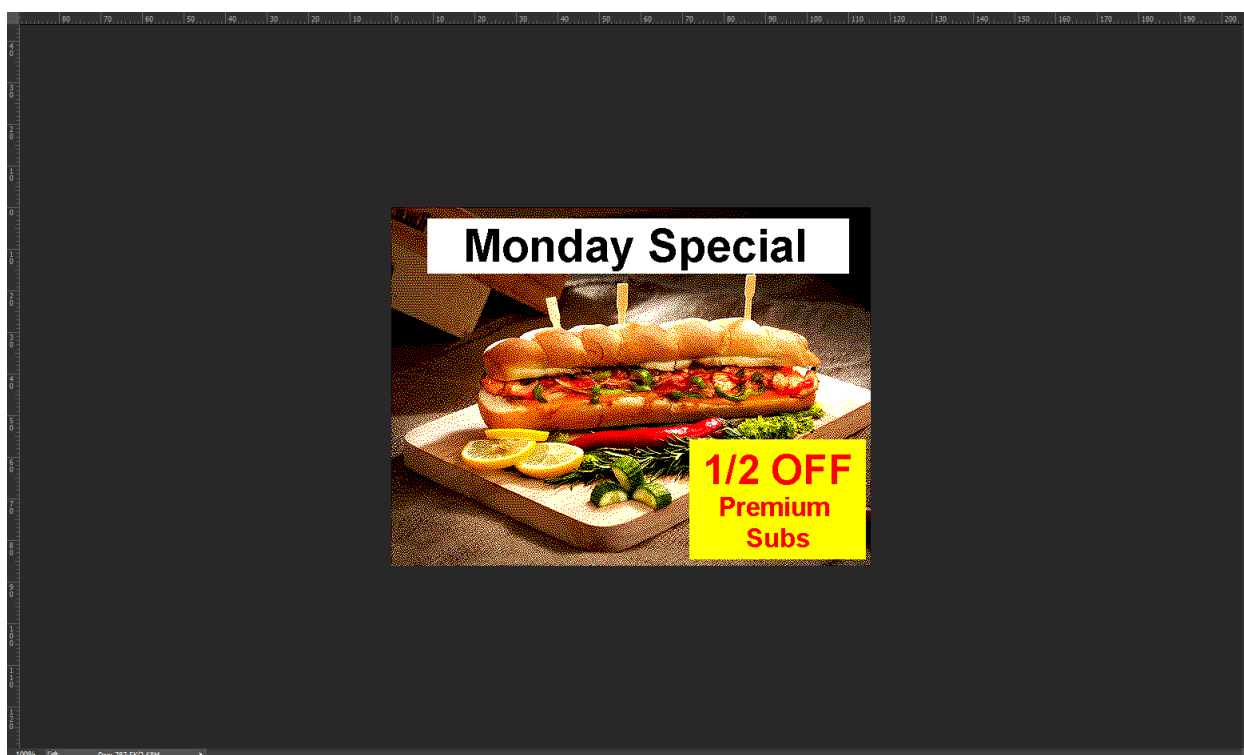|	
Load the graphical image in one workspace and the palette color image in another workspace	
Select the palette color image and copy it to the clipboard. *Select -> All* *Edit -> Copy*	
Switch to the graphical image workspace Paste the copied image on top of the graphic image.	
Ensure that the pasted layer is in front of the background graphic image layer	

Figure 11 Completed combined image

As a final step and quality check, map the pixels to the Gallery Palette™ colors as defined in Section 0 (using Indexed Color) to ensure only supported colors are in the final image.
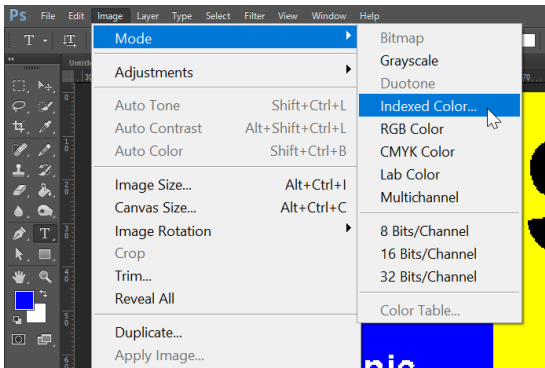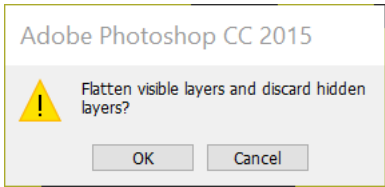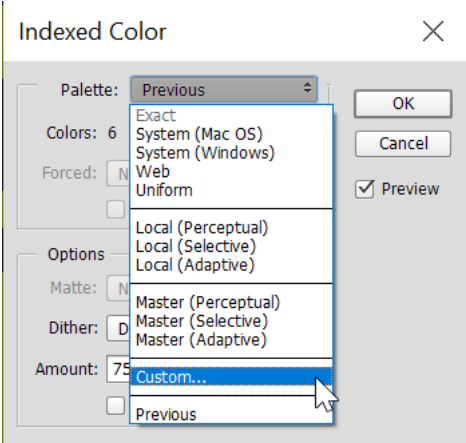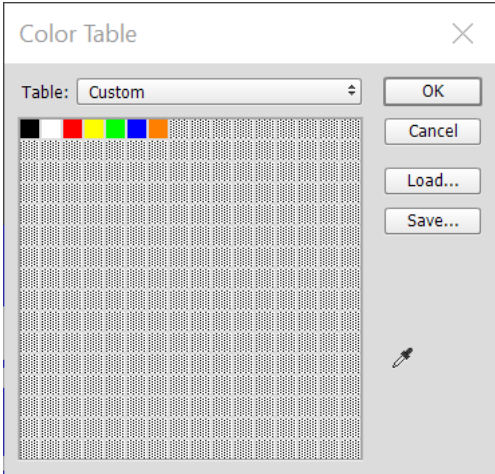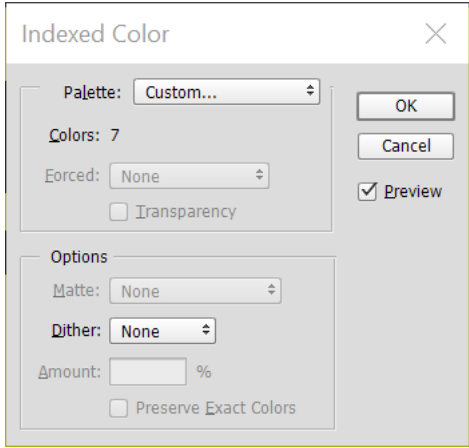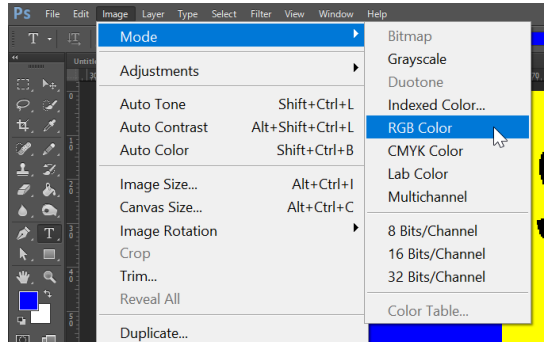
Save the file as a PNG or BMP.

4 Mapping Colors to Gallery Palette™

To ensure the final image contains only the supported colors of the Gallery Palette™ panel, converting the image to Indexed Color mode can be used. This step is optional if the created image was done using only the allowed palette colors, however it is quite common and easy to have non-valid pixels in the image. The most common causes of pixel mismatches can come from the following:

- Anti-aliased text
- Resizing of shapes that result in scaling artifacts
- Importing vector graphics that contain anti-aliased curves and edges
- Importing images that contain colors not supported by Gallery Palette™ panels

Converting the image to Indexed Colors will by default map transparent pixels to white color (#FFFFFF).

1	Convert the image to Indexed Color mode *Image -> Mode -> Indexed Color*	
2	Select *OK* when asked to flatten the image	
3	Define the palette by selecting Custom in the drop down menu	
4	Define the palette colors	

5	Select *None* from the Dither drop down menu Select *OK* to finish	
7	Convert the image back to RGB color mode *Image -> Mode -> RGB Color*	

Save the file as a PNG or BMP.

Revision History

Version	Date	Page	Description	Author
0.1	2019/12/12		Initial	Bryan Chan
0.2	2020/03/21		Corrections and edits	Bryan Chan
0.3	2020/08/18		Updated naming to Gallery Palette™, edits	Bryan Chan
0.4	2020/08/18		Updated naming to E Ink Gallery Palette	Bryan Chan