

The Castle DigBox (Draft)

Overview

During the months of November into December (*Note: project timeline has been modified*), a small class of students at Artisan's Asylum will create and decorate custom artistic newspaper delivery boxes from Dig Boston Magazine as described below.



NEW! Decorate Your Own Dig Box, Tuesdays, October 23 – November 13, 7-8:30pm — Artisan's Asylum has a unique opportunity to create public art for the greater Boston area, and we want to make it easier for you to take part! DigBoston, popular local free online and print news outlet, has partnered up with us to keep our city streets rust-free and art-ful. Every couple of months, Dig staff drops off 5 newspaper boxes pulled off the street for repairs, and five Artisan's Asylum artists each repairs a box and transforms it into a unique yet functional work of art, to be placed again on the streets to continue supplying free copies of DigBoston while entertaining, amusing, and inspiring passers-by. If that seems both exciting and intimidating, this class was made for you! Ecco, professional illustrator, mixed-media artist and sculptor (and one of our previous Dig Box creators), will help you work your way all the way through this complex and exciting project. No previous experience is necessary, just a willingness to get creative and be committed. Participants will have their final work celebrated and published on the Digboston.com website, and installed on the street for the world to see!

Previous DigBoston Boxes (earlier in 2012) for reference

This document serves to layout some of the art construction process for a DigBoston Box newspaper delivery box. The following sections attempt to discuss in detail about goals, team structure, timeline, design, fabrication & construction, documentation, and deployment for a Dig Box.

Project Team

- Scott Janousek (*Team Leader, Project Manger, Designer, Fabricator*)
- Ecco Pierce (*Instructor, Metal Fab Assistance & Advise giver*)

Project Goals

The goal is to give a DigBoston newspaper box a medieval theme, "castle" look and feel. The name of the project will likely be "Griffin" box, given so by the giant Griffin creature embed embossed on a shield which will be one of the highlights of the paint job for the art project.

The following are major goals of the Griffin DigBoston Box:

- Create an artist installation for Dig Boston magazine
- Promote Artisan's Asylum
- Promote and market "Cubical 90" at Artisan's Asylum
- Learn about Physical Fabrication & and the artistic process
- Leverage basic electronics to create the 1st ever "Digital DigBox"
- Have Fun

Not all goals will be meet during this project, but hopefully more than a few will.



Crude rendition of the "Griffin" that is likely to be on the Castle DigBox

Project Phases & Timeline

The 1st phase of the project involves getting the physical work done for the DigBoston Box. This involves restoration, painting, and fabrication of all the analog portions of the project.

The 2nd phase of the project involves adding the interactive elements of the Box, including the possibility of adding LED lighting capability, as well as the pie-in-the-sky capability of having the Box tie into the digital world, via an internet connection.

Phase 1 describes the physical fabrication phase, and Phase 2 lays out plans to attempt to make the box "digital". Phase 3 is the actual deploy of the box out on the street.

The following is a tentative schedule for the design, development, and deployment of the Griffin Boston Dig Box as scoped out within this document.

Estimated Schedule

Date	Activities
November 12, 2012	<i>Prep & Restoration (Alpha) - Phase 1</i>
November 19, 2012	<i>Outside of the Box (Beta) - Phase 1</i>
November 26, 2012	<i>Inside of the Box (Gamma) - Phase 2</i>
December 3, 2012	<i>Deploy (Delta) - Phase 3</i>

Budget

The total budget of the Boston DigBox will not exceed \$500 in materials. Labor and time spent on the box will be tracked using online tools so that future Dig Box class participants will know approximately how long it takes to fabricate a similar project.

Materials

The following are materials to be used on the Griffin Box. This is based off the construction steps laid out later in this document.

Inventory & Order(s)

- Vacuform 10ft x 4 ft Castle Theme ✓ **ordered**, ✓ **received**
- 1-2 qts of automotive Bondo ✓ **received**
- Stone Spray - (pick up locally at Home Depot, Lowes, etc)
- Gray Primer Spray Can for Castle Wall coating
- Black Primer Spray Paint
- Large Vinyl banner flag to hang on back side of castle
- 2 mounts for banner flag on back of box
- SparkFun Audio Player, LiPo battery, wiring

- Metal LockBox
- Wooden or Plastic Flag /Pole
- Vinyl Flag for top of Castle
- Misc Wood from Shop Scraps to make the top of the Castle with turrets
- Concrete, epoxy, or mortar to fill in the vacuform
- Nails and Staples to attach the vacuform, top of box, and misc pieces to the actual box
- Stripping Paint Gel
- Vacuform Piece 10' x 4' molding from RoseBrand.com (competitors tripsixx, vacuformstore, strechlite)
- Latex Paint (if needed)
- Stencils for Logos to be spray painted on
- Small 6V or 12V battery to run the trumpet noise, and other electronics
- 2 metal chains for the drawbridge
- wooden planks for the drawbridge exterior
- Something that looks like stain glass (tentative) for draw bridge

Construction

The Griffin Dig Box is scheduled for construction during November and into December. Here are some of the details surrounding the planned construction of the Dig Box, including Tools, Dimensions, and key elements of the box, and construction processes to follow.

Basic Tools

- Narrow Chisel
- Scraper
- Flat Chisel
- Wire Brush
- Tape Measure
- Bondo Paint
- Orange Hammer/Mallet
- Safety Goggles
- Scissors
- Paint Brush
- Stripping Paint Gel
- Painters Tape
- Respirator
- Black Permanent Marker
- Gloves
- Paper Towels
- Sandpaper
- Grinder in the Metal Shop (with sandpaper & brush attachments)

Dig Box Dimensions

- Top: 16.5" x 16.5"
- Entire Box: 16.5" x 16.5" x 35.5"
- Door: 18" x 15.5"
- "Plexi"/Acrylic Window: 10.5" x 12.5"



DigBox Dimensions for a sample Box

Top Castle Dimensions

- 4 sides at 8" x 16.5" x 4"

The following sections lay out some of the conceptual art and design for the "Griffin" DigBox. This DigBox will be using plastic vacuform pieces to convey the "castle" stone effect, rather than the painstaking process of doing real stone, or attempting to paint an unrealistic looking stone design on the flat metal sides of the box.

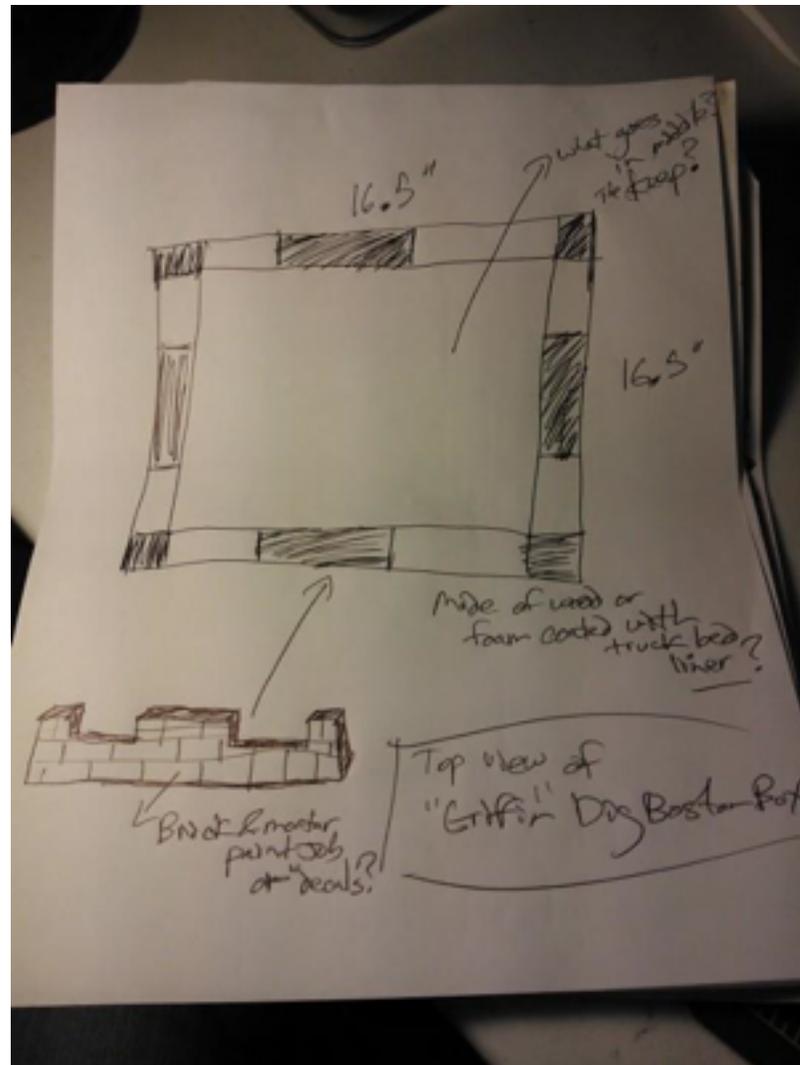
Using vacuform will give depth to the box, but also give it weatherproofing, and allow for quick and easy construction of the outside of the box. This will allow more time given to other details in the project, such as the interior of the box, the top of the box, and the drawbridge feature on the front of the Griffin Box.

Tower and Top Turrets

The follow depiction shows the top view and side view of the Castle DigBox. The material will likely be wood covered with truck bed liner, or possibly vacuform cut specifically to wrap around tightly along the structure.

Note: Some experimentation will be needed to see what method works best to wrap the exterior castle stone feel to the wood base.

To keep the detail of turrets at a minimum, there will be only one or two "steps" on each side. The corners of the DigBox will rise up as turrets giving the vertical look and feel to the castle from any viewing angle.



DigBox Dimensions for a sample Box

The middle of the top of the box will be flat and contain the Castle "Keep". This structure will also be made of wood. It is essentially a mini tower. The Keep will have doors and windows painted on it in black to depict that is in fact different from the rest of the Box.

A flag pole made of wood or plastic will rise from the top of the Keep and a small vinyl or plastic flag will be made for the Box. It will not be made of cloth, since the box will be an outdoor installation and prone to various conditions of weather. The Flag will either have a logo, or text on it. The color scheme of the flag will be highly visible from a far.

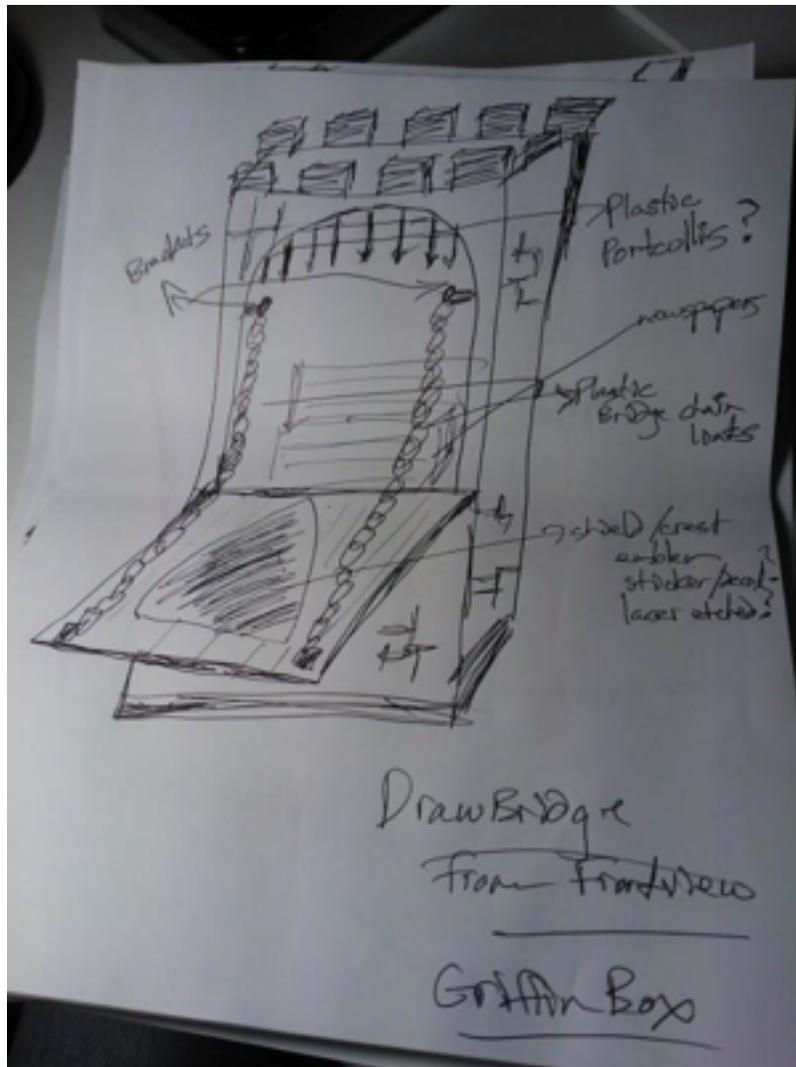


The Top of the DigBox is for the "Keep" Castle structure and Flag

The "Keep" will be secured to the Dig Box using screws and possibly bolts from the underside of the DigBox. This will attempt to prevent the structure from being vandalized from any kind of prying off.

Draw Bridge

One of the key elements of the Castle DigBox is the door. The door will be a drawbridge theme. If at all possible, the current metal door of the DigBox will be modified to look and work like a real drawbridge (*FYI: if this is not possible due to a broken door, a new door will be fabricated from scratch*). The drawbridge will have a few features including: wood panels, metal link chains, raised and lower-able portcullis, at the very least.



Drawbridge (Front View - opened position)

When a user opens the drawbridge, the portcullis will raise and lower inside the box, so users can remove a newspaper from inside the DigBox.

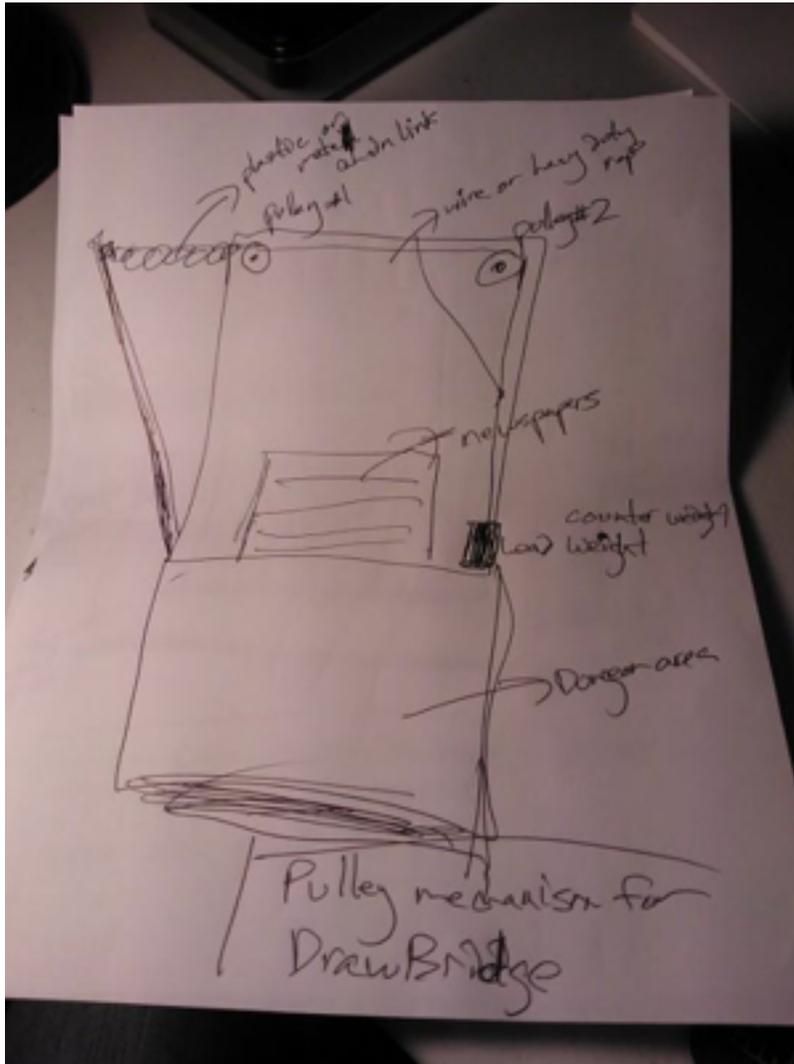
Drawbridge decorations

The metal chains will be secured to the DigBox by either cutting holes in the door, or bolting on some eyeholes through which the chains can attach. Chains are affixed to the interior of the DigBox using a similar method. The draw bridge will still contain the acrylic plastic front so users can look into the Castle and see the current news headlines. The wood panels will surround the outer frame of the drawbridge.

If possible the plexi front will be laser cut with medieval design. If it is at all possible, the plexi glass will be replaced with a stained glass, or something that looks like stained glass. More R&D is needed for this feature at this particular time.

Mechanics of the Drawbridge

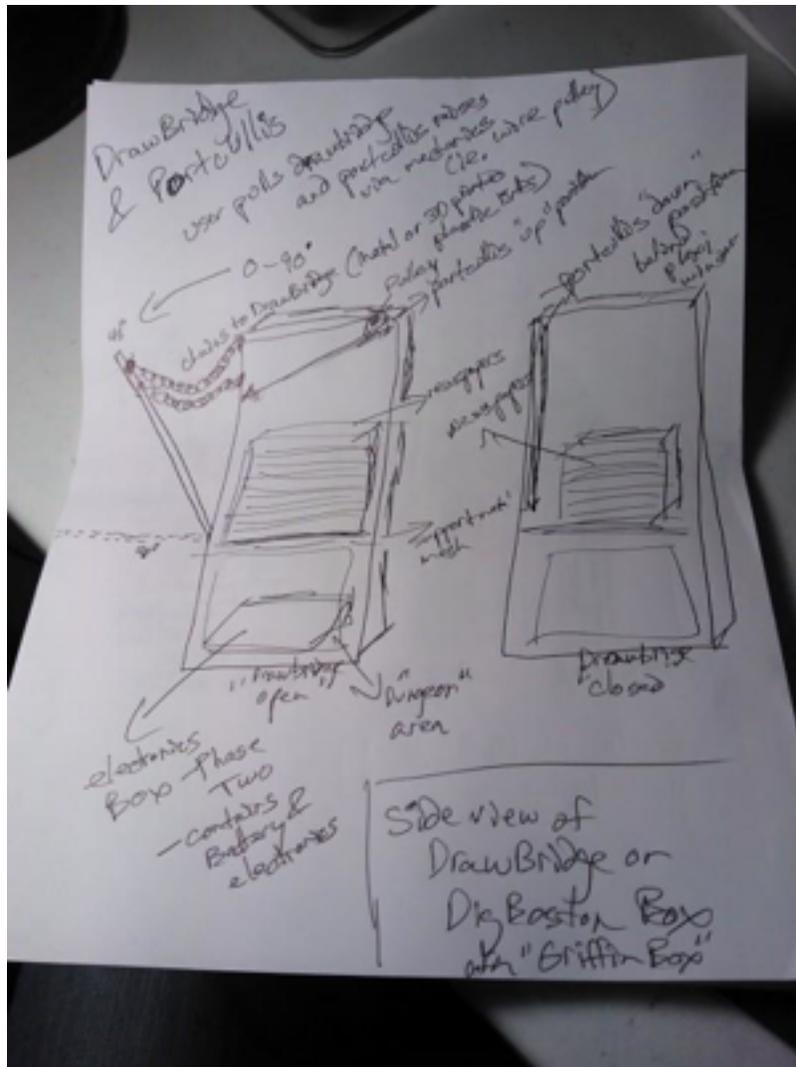
The current door on the DigBox is essentially a metal spring loaded system. This will work for the Castle DigBox. However, if the mechanism on the door is busted, then the schematic below will likely be implemented which involves chains and a counterweight. At this time, the 1st phase will likely be getting the aesthetics of the door completed. If time permits, the custom mechanism for opening/closing the door will be created using a counterweight on the door as depicted below. This will involve a pulley and counterweight system.



The Castle Drawbridge (mechanical view)

Portcullis Mechanism

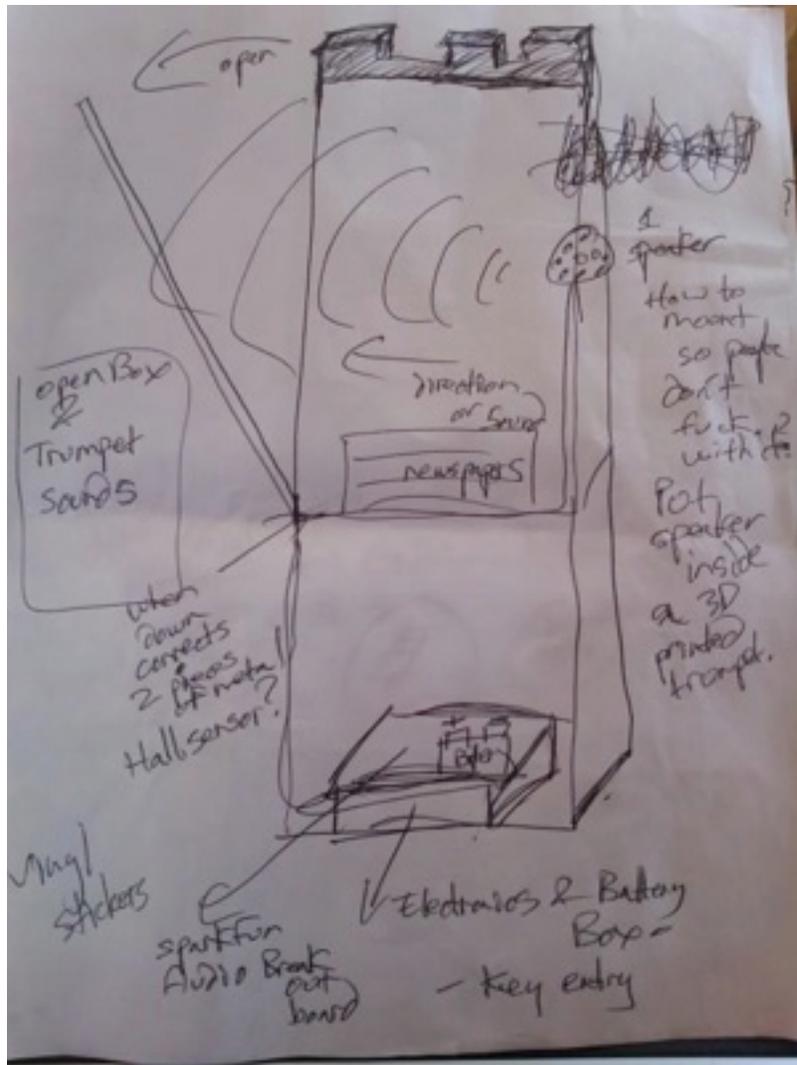
Another defining feature of the Drawbridge is the portcullis, which is a raising and lowering gate behind the door. When a user opens the front drawbridge, the portcullis will rise allowing users to remove a newspaper. When the door is closed, the portcullis will go down. During the entire operation, the portcullis will be visible from the outside of the box through the clear plexi/stainedglass window.



Open/Closed state of the DrawBridge (Side View)

Audio Play Mechanism (aka the audio “Trumpeting” feature)

A SparkFun MP3/WAV audio breakout board powered by a rechargeable LiPo battery will be mounted inside the interior of the DigBox within the lower chamber below the newspapers in the box. Ideally it will be contained within a lockable metal box welded to the bottom frame. When a user opens the drawbridge, a reed or other switching mechanism will be activated, and a trumpet sound will play for a during of time out of a mounted speaker inside the Box.



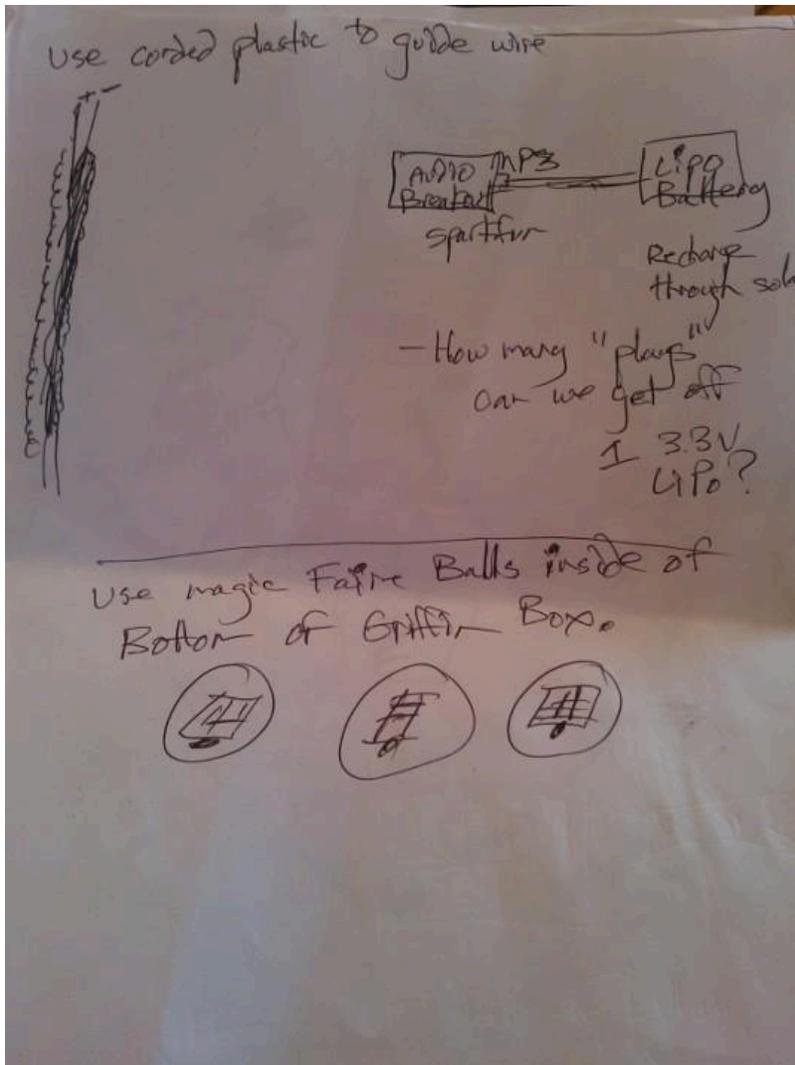
The proposed Digital piece of the Castle DigBox

Further testing is required to figure out the lifetime of the battery with the component, based on number of plays.

NOTE: Another possible avenue might be to modify an existing horn mechanism through a short burst of compressed air. More R&D is needed to see if this is at all a realistic method.

LED interior illumination

Upon opening the Drawbridge it would be very neat to illuminate the interior of the DigBox using an LED Strip. Powering the LED strip would be through a 12V battery located inside the custom metal lockbox underneath the newspapers. The illumination would cycle on/off when the door is opened/closed. A proof of concept will need to be created in order to test how long this feature would last off one 12V battery located in the unit. The LED strip would ideally be mounted directly around or near the plexi/acrylic window on the Box.



Wiring for the Audio Trumpet feature, Proposal for Magic Fairy Balls

Note: Some (modified) magic fairy balls might be interesting for the initial deploy of the Griffin Box. These would illuminate in various internals during the initial launch of box and last for a day or two until they power out. It may be possible to power them off a 12V, if that is within the box.

Internet Capability (*Tentative*)

The idea is power a SparkFun GSM board in the lockbox that posts to twitter and/or facebook when the box is opened/closed. More R&D is needed to figure out if the power requirements would allow for periods of weeks of unattended usage before batteries needed to be replaced. At this time, solar charging would require a redesign of the concept and is probably not viable given the footprint of the DigBox. If it is possible to hook up a DigBox to a power supply through a cable, then this is definitely viable. However, it seems that DigBoxes are outdoor only installations, and there are none which are indoors. This feature is tentative at best.

Stained Glass Window/Laser Etched Acrylic Window

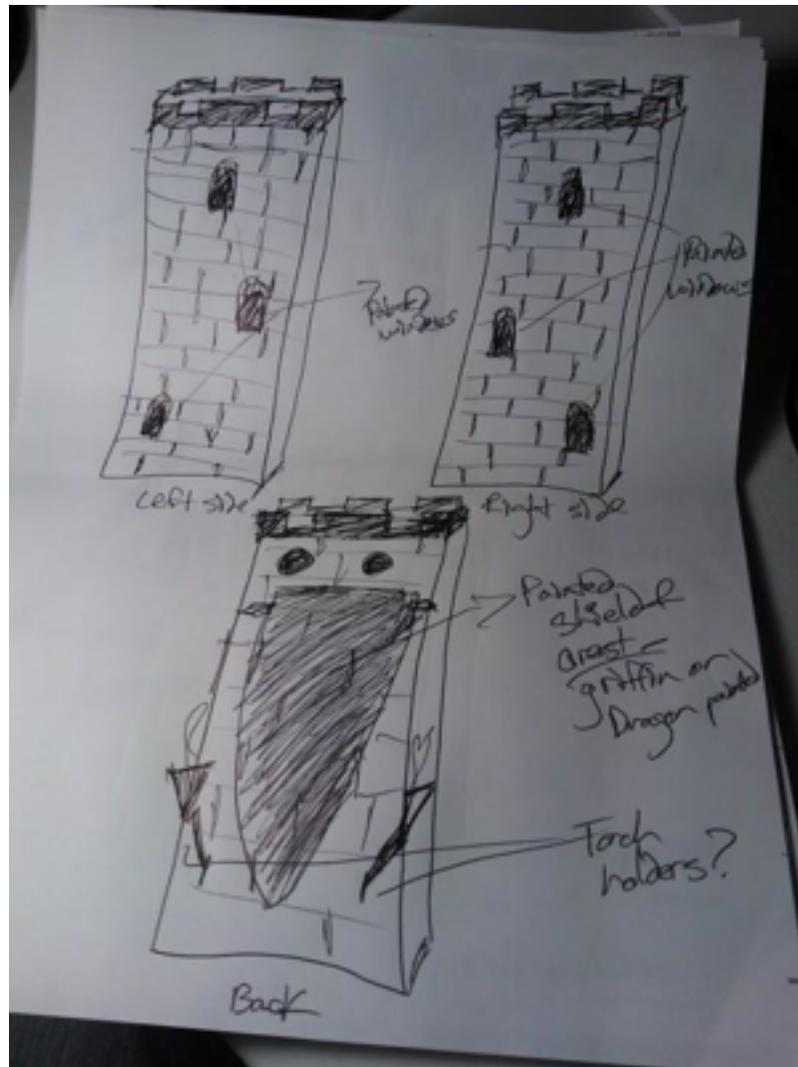
A further feature of the drawbridge is to either replace the plexi with stained glass, or custom laser etched acrylic plastic. The current design calls for a shield, but is TBD. This is an optional feature that will get some attention after main fabrication is complete of the box. The picture below depicts the general concept of the Box feature.



The front of the Castle DigBox (closed position)

Castle Exterior

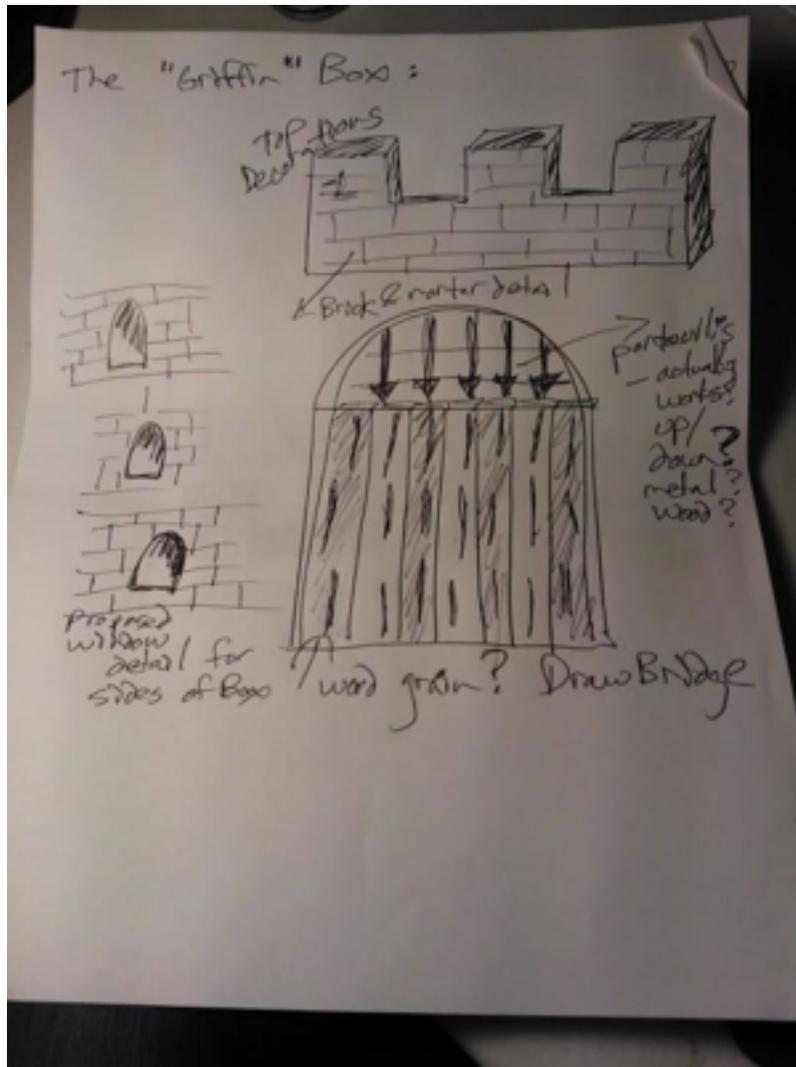
The exterior of the Castle DigBox is a stone look and feel. This is accomplished by using vacuform cut into sheets and wrapped on each side of the DigBoston box. Each side of the castle will have the vacuform attached with both epoxy and nails driven into key, flat locations along the contours of the stone outline. The vacuform will likely have a backing of either mortar, concrete, glue, or crumpled newspapers to give the plastic form a rigidity. This will attempt to keep vandals from poking holes into the structure.



Castle Walls

Castle Windows & Arrow Slits

The Castle wall will have some details, including arrow slits and windows. To minimize the complexity, these will be painted onto some of the flattest of areas on each side of the castle. The windows and arrow slits will be faux. This means that no holes will be cut into the box to allow people to see into the box. These are merely for decoration.



Depiction of the Front Drawbridge, side details, and top turrets

Castle Banner Flag

The back of the castle box is designated to hang a wooden dowel from the two pre-cut holes already in the DigBox. A custom vinyl heraldry shield shaped banner will hang from this dowel, given the back a unique look. The vinyl will extend and hang out from the castle wall as depicted in the drawing below. Two custom (metal) mounts will jet out from the pre-cut holes to hold the dowel in place. They may be welded or screwed into place to prevent basic tampering.

Castle Logos

There are essential logos which need to go on the final DigBox. An Artisan's Asylum logo needs to be placed on the box, a Dig Boston Magazine logo, and a "FREE" logo.

"Free" Logo

The "Free" logo lets customers know that the Dig Magazine is free for taking. This text will be located on the flag at the top of the castle box. It will also be located on the draw bridge in medieval scrollwork below or above the drawbridge. "0 Gold Pieces" will be next to the "FREE" logo as a cute addition to the overall theme.

Artisan's Asylum

The Artisan's Asylum logo (below) will be spray painted in 3 different colored layers on the side of the vacuform castle wall. First the red will go down as the background, then the gray slate piece, and then the remaining black text. Stencils will be created for the spray paint process. The white background will be replaced with the gray primer of the stone wall, unless it is a branding problem, in which case it will be a white layer before the red is applied.



The Artisan's Asylum logo will be on the box, on the front or top ride side.

DigBoston Logo

The most important logo to go on the box, will be the digboston logo. Since this is a branded logo, it will not be in any medieval style front, but remain branded. The digboston logo will be located on the front of the box underneath the drawbridge. This will be spray painted on the vacuform castle using paint or dark gray paint using a custom cut stencil from paper or cardboard.

NOTE: If Dig Logos MUST appear on all sides of the Castle box, then they will be done using a very dark gray to better blend in with the castle stone look and feel.

digboston

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BOSTON'S WEEKLY

A logo will also possibly exist at the very top of the Keep Castle on the flag logo.

Construction Steps

The following steps layout some crucial steps that need to be done in order to construct the Griffin Box.

- Box Restoration & Prep
 - Remove Paint - use Stripping gel to remove outside layers of paint



- Grind All sides of the Box using the wheel grinder & brush to remove remaining paint.



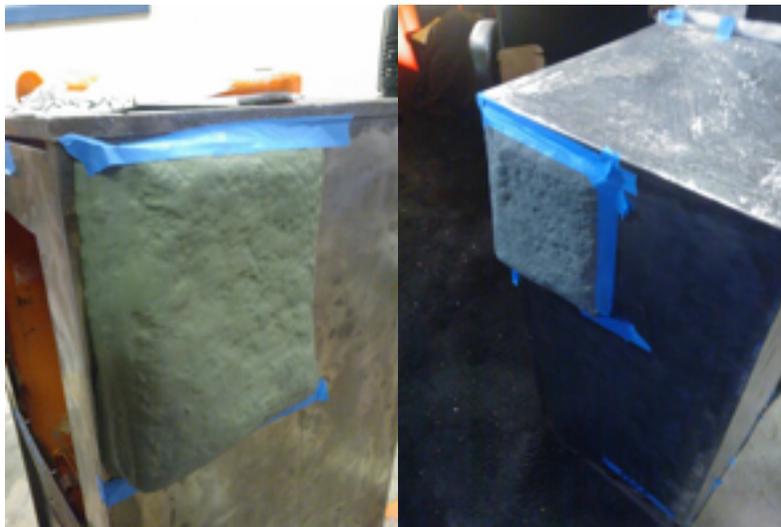
- Top of Box
 - Grind to smooth polish to remove pits, or use bondo to hide the pits for simple primer, make smooth for top of castle to be afixed.
 - Fix any rusted through holes on the Dig Box, and fill with bondo if small enough, or weld metal.
 - Scrap inside of box and remove rust on insides of the Box

Griffin Box After Grinding & Paint Removal			
			
<i>Griffin Box After Restoration (1/4)</i>	<i>Griffin Box After Restoration (2/4)</i>	Griffin Box After Restoration (3/4)	<i>Griffin Box After Restoration (4/4)</i>

- Second Grinding before coat of a primer paint
- Get replacement plexi glass for front of Box. Also get new external plexi holder for newspapers.
- Straighten metal (i.e. fix ding & dents)
- Weather Proof the Box - use caulk to seal any remaining gaps that get at the interior of the box.
- Initial Paint
 - Primer - Exterior of the Box using Gray Spray Paint (this is before the vacuform is attached! assuming the vacuform will attach better to a primer than bare metal surface - needs testing)
 - Primer - Interior of the Box using Gray or Black Spray Paint
 - Let Paint dry before continuing ...
- Fabrication & Secondary Painting
 - 4 Sides of the Box
 - Cut the 4 vacuform sides of the Box to 16.5" x 35.5" dimensions to cover the four sides.
 - Attach the 4 cut vacuform pieces using an epoxy. Also shoot small nails or staples from the outside into the interior to hold in key locations flush with the metal (i.e. these will be hidden from view using epoxy or other material later).



- Hit the vacuform with a Gray Primer 1st. A color that matches a castle exterior.
- Add fine details of the castle wall - shadows, etc to the vacuform pieces as required.



- Stone Spray - use stone spray on the exterior of the Box on all 4 corners to follow up on the castle paint scheme.
- Fill the pockets of air behind the vacuform with insulation foam, or tire sealant. The pockets behind each piece of vacuform need to be filled with a resin that both adheres to the metal, and also makes the exterior of the vacuform fairly resistant to tampering and vandalism like poking with sharp objects, etc.
- Details for the paint scheme might include: Scroll work, Crest & Emblems, Dragon outlines, but is TBD once the main paint is done. Other items might include: Scroll work, Crest & Emblem, Dragon. D&D "Dice"? Shield? Armor? Helmet? Swords? Bow & Arrows?
- Bottom of Box - this will have black primer.

- Moat - an optional piece to the Castle box is to attach a custom moat base to the Castle DigBox. This will be painted to look like water and earth. The moat is still TBD, since it requires having a base fabricated which will not easily be destroyed (i.e. potentially metal).
- Top of Box
 - Tower - the main tower is construction out of wood. It will sit in the middle of the box at the top, and the flag pole will be attached within it.
 - Turrets
 - Fabricate the wood pieces for the top of the castle box. The pieces will be scrap wood from the shop which are cut to make the top. Misc 2x4 might work.
 - Primer the wood pieces with Gray used in the bottom of the box
 - Cover the wood pieces with Bondo or a substance which can be molded to look like the stone on the bottom of the.
 - Primer the pieces of wood.
 - Use truck bed liner to cover and weatherproof the pieces as required.
 - Secure the top turrets to the top of the Box via screws from underneath the top of the box. There should be at least 6 screws in place, but perhaps more to secure the top to the box.
 - Flag & Pole
 - Acquire a piece of flexible antenna, which can be painted wood brown, which acts as the flag pole for the top turret piece.
 - Acquire a vinyl flag, either through purchase or custom order to attach to the top of the flag pole. The design for the flag pole is detailed in the “Design” portion of this document.
- Draw Bridge
 - Metal Chains
 - acquire two metal link chains which secure to the door to the top inside or back of the interior of the Dig Box. The draw bridge will need to have mounts with holes to secure the chain onto. These will either be ordered or fabricated.
 - Wood Panels
 - Ideally the door to the Dig Box will have wood panels attached lengthwise to the door to give a true “draw bridge” look and feel. The wood panels will be secured to the frame of the door using an epoxy or glue. If needed they will be nailed from the inside of the Dig Box outwards into the wood panels.
 - Ballast for Door opening mechanism (*tentative*)
 - The mechanics for this are pending.
- Electronics
 - Electronics Box - this is a metal box tacked into place underneath the magazines. This box will not be fabricated, but it will be a box purchased from Staples, etc. It will have a built in lock on it to prevent theft and tampering. Wiring will head up inside from the box to the top by way of cabling alongside the interior of the Box behind fabric tapestries glued into place.
 - Trumpet - When the door is opened, a trumpet sound will be played. This is accomplished by using a SparkFun MP3/WAV Breakout board attached to a speaker, which runs off a small lipo battery.
 - Li-Po - this battery will live inside the electronics box underneath the newspapers.
 - WAV/MP3 Breakout board - this will live inside the electronics box underneath the newspapers.
- Interior Details of Box
 - The interior of the box will be primed with gray or black spray paint. Some Custom fabric with medieval tapestries will be hang inside the box. They will be secured by nails pounded into the top of the Box. The tapestries will hide the interior walls of the box.
 - Torch holders
 - Tentatively, torch holders will be a fixed to the interior and LEDs will be powered to illuminate the inside of the Castle Box.

Questions

- Can bondo be used for the top piece of the box? The castle turrets? <- TRY
- Where is a good place to buy or have decals ordered & constructed? <- FIND
- What kind of paint to use on DigBoston Box? <- Reordered by Eco. BUY stonemasonry/gray & black primer for vacuform.
- How will the DigBoston Digital portion of the box be powered? <- CREATE PROOF OF CONCEPT AND TEST.
- Possible to do a stain glass window? <- INVESTIGATE
- How would the newspapers appear in the drawbridge once constructed? <- behind plexi/acrlyic glass
- What to use to fill in the pockets behind the vacuform? <- mortar, cement, epoxy & newspapers
- How to make the Drawbridge Spring loaded action, so light does not stay on all the time?
- What to construct the Towers with ... 3D printing parts in ABS? Foam covered in truck line bedding? <-wood
- How to get new plexi/acrlyic parts for Box?
- How to remove stickers off a box?
- Is it required to sand and paint the inside?
- How to best adhere vacuform to metal of box
- Would it be possible to refab the door custom, using wood? easier than trying to stick wood onto metal?
- What kind of paint is best for metal? Latex?
- Is it required to have the Dig Logo on all sides of the art piece?

Delivery

The estimated time of delivery for this project is scheduled for December 2012. At this stage of the project, the box is ready to hit the streets. The restoration is complete, the painting is complete, the fabrication is complete, and the internals are in working order and have been tested.

The following are the last steps before the box inhabits the streets:

- Pictures of the Box in it's "natural habitat" have been taken for marketing purposes
- Test the box with at least 5 people using it.
- Blog about the deploy
- Tell the world about the box through social media channels (i.e. twitter, Facebook, etc)
- Video capture of people using the Box

The Griffin Box Blog will be updated post-delivery with status updates about the Castle Box and it's status at <http://castledigbox.tumblr.com>.

Blog

There will be a blog setup on tumblr or another site which details the progress as well as challenges faced with creating the Griffin Dig Box. Photos and videos will accompany the posts made on the blog to more accurately show the status of the construction of the DigBox.

The blog will potentially be used at a later point in time by a different class of students (& instructor) to assess which areas of the project are most problematic. The following areas will potentially be covered on the blog:

- Restoring

- Planning
- Designing
- Fabricating
- Painting
- Deploying

The blog is currently located at: <http://castledigbox.tumblr.com>

Contacts

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- jim@knizer.com (Jim - classmate)
- scottjanousek@gmail.com
- srinivas.muddana@gmail.com (Srinivas - classmate)

Reference Links

- <http://digboston.com>
- <http://decorateyourdigboxoctobernovember.eventbrite.com>
- <http://en.wikipedia.org/wiki/Portcullis>
- <http://en.wikipedia.org/wiki/Griffin>
- <http://en.wikipedia.org/wiki/Castle>
- <http://digboston.com/experience/2011/11/pimp-my-dig-box/>
- Painting Tips for Brick & Mortar effect - <http://www.decorative-faux-painting.com/faux-stone-wall.htm>

“Rules” from a previous class

DECORATE A DIG BOX

Brought to you by Artisan's Asylum and the Weekly Dig

The Project:



In one month, take a Weekly Dig newspaper box in whatever condition it may be in – scraped, scratched, dinged, dented, what have you – fix it up with our help, decorate it, make it yours, and set it loose on the street again! Artisan's Asylum will provide replacement hardware, materials, and sheet metal repair expertise.

The Rules:

We have a few simple rules to make sure the boxes are as functional and decorative as possible.

1. No puncturing the top of the box
2. Any paint used must be rust-inhibiting (i.e., Rustoleum)
3. Nothing protruding significantly from the sides of the box
4. Nothing lewd, offensive, or reminiscent of graffiti 'tagging' – any of these may cause the boxes to be pulled from the streets by cities
5. No potentially harmful objects or sharp corners that could cut or hurt pedestrians
6. Retain Dig branding and all existing lettering on the sides of the boxes, though exact positioning is not important
7. Brand all boxes with a 6" wide Artisan's Asylum logo on the top of the boxes, near the handle