Past, Present, & Future: An Exploration of Adaptive Reuse in Educational Design

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Past, Present, & Future:
An Exploration of Adaptive Reuse in Educational Design

Langdon Middle School
for Creative Writing & Literature

Catherine Forsythe Stelling

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Abstract

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The preservation and reuse of existing buildings has become more and more prevalent as costs rise, sustainability popularizes, and urban areas continue to grow.¹ These are all important issues in the contemporary design world, but what can the building provide after solving these problems that will make it just as long-lasting and useful as the previous program? Historic buildings are filled with the evidence of old building techniques, materiality and textures, and stories of the past, so why not allow the building to serve as not only a container of learning, but as a learning tool itself.

The program of this thesis, a middle school for creative writing and literature, allows the decaying Old Engine Company 26 in Washington, DC’s Langdon neighborhood to be adaptively reused as part of a contemporary, imaginative education campus. The project explores the connection and balance between new and old and the combination of stories this creates. Old Engine Company 26 began its story in 1908, but the imposed design has been given a story—the story from the childrens’ book, _The Phantom Tollbooth_. The past and present stories will intertwine with the story the future students create by interacting with, learning from, and influencing the school building. The thesis serves as an example of how an adaptive reuse project can provide unique cultural, educational, and sensory facilities while still fulfilling the sustainability, economic, and planning needs of design.

Dedication

This project is dedicated to those who have influenced me throughout this journey. Thank you to my family, friends, and educators for instilling in me a love for experiencing, experimenting, and learning. I am forever appreciative for the undying love and support shown by so many during my educational career.

“You must never feel badly about making mistakes,” explained Reason quietly, “as long as you take the trouble to learn from them. For you often learn more by being wrong for the right reasons than you do by being right for the wrong reasons.”

*The Phantom Tollbooth*
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How to read this book:

existing
Old Engine Company 26:
the site as I found it and the stories it contained, as documented in the National Register of Historic Places.

imagining
The Phantom Tollbooth:
an inspirational stream of consciousness directly from Norton Juster’s *The Phantom Tollbooth*.

creating
The Story of Design:
my interpretation of the three stories and how they were combined to create my final project: a middle school for creative writing and literature.

The story began in our nation's capital, on a plot of land just four miles from the Capitol building. Although this distance may not be far by today's standards, the city water system had not yet made it to this radius at the time this story began. In order to better serve the households in this area, the northeast quadrant neighborhood of Langdon, a chemical-based fire station was necessary. The Mullet brothers (sons of previous Supervising Architect of the Treasury, A.B. Mullet who had just recently committed suicide) were commissioned by the city to design the firehouse and, continuing with their father's eclectic style, built Chemical Company No. 3 in 1908.
“Old Engine Company 26 is a 2-1/2 story, freestanding Tudor Revival-style building located at the height of a hill...”

Chemical Company No. 3 (which became known as Engine Company 26 in 1913 when hydrants and water lines were extended to Langdon) was in use until 1940, when the District of Columbia Fire Department was restructured. Although the structure was built in a residential style and scale, the building still stood out as the largest and most important building of the neighborhood. This importance made the firehouse well-suited for use as a religious landmark. The historically African American community in Langdon obtained the firehouse and began using it as a place of worship and community gathering spot. Engine Company 26 (now Old Engine Company 26), owes its rich history and interesting story to some early pioneers of adaptive reuse.
At some point after the closing of the firehouse, the main level of the building moved from the ground level (where the trucks and equipment would have been stored) to the second level (where the firemen’s bunks were previously located). The ground level was eventually renovated into a reception, church office, and community area, while the second level served as the main sanctuary. The original stairs remained in use, but the pass-through up to the cupola was covered.
It was over sixty years later that I discovered this semi-abandoned building and realized its potential for yet another use. In completing my thesis, my goal was to discover how a historic building can be transformed, adapted, and added onto to create a learning environment. This would permit the existing building to tell its own story and give the addition the potential for a future story. The binding force would be a third story, the story of The Phantom Tollbooth. Children eager to learn about reading and writing could learn from the past and invent their own future, with neither act being more or less important than the other.

Months before these ideas came into fruition, the perfect site had to be found and analyzed. I had several sites in mind, but Old Engine Company 26 stood out as having both the most challenges and the most opportunities for design. Its previous use as something other than an educational building allowed me to veer from its existing configuration and imagine new circulation patterns. The eclectic facades and site-specific conditions forced me to design more intentionally. The complex, symbolic religious and fire-fighting programs added another dimension of what was to be learned from the structure.

The site at 2715 22nd Street Northwest turned out to be the prime location for a school. In order to complement the nearby STEM (Science, Technology, Engineering, and Math) based public education campus, the program for the firehouse site became humanities based. This proposed Middle School for Creative Writing and Literature would sit directly across Franklin Street from the Langdon Recreation Center and just a few blocks away from the newly redesigned Woodridge Regional Library. These nearby amenities allowed for the recreation, assembly, and main library aspects of the program to be located off-site.

“A wood stringcourse and contrasting materials...separate the two principal levels.”

(Below) Prometheus and Vulcan collaged with Phantom Tollbooth map
Upon first arrival, the Old Engine Company 26 appeared to be abandoned. Nature had been given plenty of time to begin taking over the man-made portions of the site. The balance of organic versus inorganic would help inspire the future balance of existing versus added and the realization of materials. The structure and three adjacent lots were in the possession of the Mekane Hiwot Medhane Alem Ethiopian Orthodox Tewaheda Church and was scheduled to be restored back to its previous use as a religious gathering place. This time, the second floor ceiling would be removed to expose the heavy timber trusses and cupola.

But I suppose there’s a lot to see everywhere, if you only keep your eyes open.”
I discovered The Phantom Tollbooth by chance. I had almost given up on finding the perfect third story to complete the design trio, but a friend suggested I take a look. Somehow, I had never crossed paths with the novel as an eager, book-loving youth. I immediately delved into the story and found that it suited my thesis and architecture as a whole almost flawlessly. There was nothing about the sullen-turned-enthusiastic little boy and his adventures that did not scream inspiration, education, and creative design. And so the story begins…

“Domestic in form, the firehouse is characterized by its distinctive half-timbering, its varied use of materials, including brick, wood, stone and stucco, and its projecting window bays and dormers.”
A little boy named Milo was completely uninspired by life. He found nothing interesting and was always bored. One day, Milo came home to find a giant box in his room. Inside this box was a turnstile. He drove his miniature toy car through the turnstile and was immediately transported to what seemed like another world.

"...used in recent years as a church, now sits vacant and is partially boarded up. Although still intact and still maintaining integrity..."

Milo soon arrived in the Doldrums. Everyone was doing absolutely nothing and everything was devoid of color. This land had many rules (complete with an official rule book); laughing and thinking were banned. Just when Milo thought he was going to be stuck in the Doldrums forever, a dog appeared to hurry him along. This dog, a watchdog, was really a large clock. Tock, as he was called, made sure that time was used as it was originally intended: to help keep track of the day and make sure everyone got to places when they should. Milo was happy to have such a good ally, but did not realize how much he would miss the slow pace of the Doldrums later in his journey.

"The steeply pitched roof, clad with slate, has a central ventilator designed as a picturesque cupola..."
Milo and Tock’s journey had only just begun. Their next stop was Dictionopolis, located in the Foothills of Confusion and on the edge of the Sea of Knowledge. Milo knew it was going to be an interesting visit when the gatekeeper refused to let them in without a reason. They noticed some hustle and bustle ahead and discovered that they had stumbled upon a word market. This was a market solely for the selling, buying, trading, and making of words. There were even do-it-yourself booths that allowed patrons to make their own words by choosing their favorite tasting letters!

“...the Municipal Architect and a variety of private firms produced a large number of high-quality buildings in a variety of styles as an expression of civic pride...”

Milo and Tock soon landed themselves in a bit of trouble. A fight broke out between the Spelling Bee and the Humbug which caused all of the words in the market to get mixed up. Since Milo and Tock seemed to be in the middle of this ruckus, they were “sentenced” for mixing up words and sent to a dungeon. Terrified, Milo and Tock thought they would never be released from the dark, scary basement. Little did they know, another character had been in the dungeon far longer. A witch (named Which) had been sentenced long ago for being so miserly with dispensing which words the citizens used. She was still in the dungeon and gave the duo the full story of the mysterious lands surrounding them.

“I didn’t know that words grew on trees,” said Milo timidly. “Where did you think they grew?”

“...designed in one of the earliest academic expressions of the Tudor Revival style in Washington.”
Milo and Tock watched a symphony conduct the sunset, with each instrument playing a different color. In the morning, Milo took the place of the conductor, Chroma the Great, and mixed up all the colors of the day. Before anyone could blame them, they sped away and bumped into Kakofonous A. Dischord, Doctor of Dissonance. This was not just any doctor. Doctor Dischord cured “lack of noise” along with his annoying assistant, DYNNE. The Soundkeeper in the Valley of Sound banished all sounds after people stopped listening, so Doctor Dischord did not have much of a job anymore. The sounds were kept catalog as a library of sounds with each sound being a physical object. The most magical sound, music, was woven on looms.

On their journey, the pair ran into yet another interesting character. Alec Bings seemed to be floating in the air, and that he was. Alec and his family grew down, instead of up, because then they would always have the same point of view! The cities of Illusions and Reality were visible in the distance. Illusions was easier to see, while Reality was much less visible because everyone was always in a hurry.

...a result of a petition by the Northeastern Citizens’ Suburban Association for better fire protection service...”

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Thankfully, the Mathemagician agreed to let Milo and Tock rescue Rhyme and Reason, but only if they could think of something that he and Azaz agreed on. Milo cleverly realized that the brothers both agreed to disagree, outsmarting the smug king. Milo is given a pencil as a magic staff and sent off with the promise for a bit of secret information with them return.

After jumping to the Island of Conclusions and swimming back to shore, the boy and dog met the Dodecahedron with twelve faces—one for each emotion. The Dodecahedron mined numbers for Digitopolis, with the broken numbers being fractions. They moved on to the Mathemagician’s office, a six-sided room oriented to the compass and fully dimensioned. A stairwell supposedly led to infinity but Milo did not make it very far up without giving up. A peculiar looking child explained that he was .58 of a child (the national average was 2.58, so he got stuck being the .58).

“The city then proposed to adapt the “old” Engine Company 26 firehouse for use as a library, while the Rhode Island Avenue Citizens’ Association pushed for its use as a community center.”

“...but just because you can never reach it doesn’t mean it’s not worth looking for.”

(The right) Welcome to Dictionopolis

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“After his brother’s death in 1924, Thomas had an active career designing several hotels and many private residences.”
Sadly, it was time for Milo to say goodbye to all his new friends. He drove his little car back through the tollbooth and arrived back in his bedroom. Somehow, only one hour had passed. The next morning, Milo awoke in hopes of another adventure but looked around to see that the tollbooth was missing. With only a letter where the tollbooth once stood, Milo thought to himself how fun it would be to imagine things right in his own backyard.

The two friends traveled through many terrifying places. Just as demons, giants, and darkness were closing in on them, they reached the Castle in the Air. Before they could cross the bridge, the Senses Taker had to take their senses, a very tedious task. Just before the demons could crash the spiral staircase, though, the characters were flying on Tock’s back. Rhyme and Reason were swiftly rescued and the Army of Wisdom saved the day by stopping the demons in their tracks. A festival between Dictionopolis and Digitopolis awaited the heroes, but first, they had to hear the special news from the Mathemagician. As it turned out, the journey was impossible all along. They all learned the lesson that anything is possible as long as you don’t know it’s impossible!
Milo’s adventures inspired seven distinct spaces in this thesis. The spaces began as abstract ideas but transformed into concrete building elements as the project progressed. The seven types of spaces are comprised of:

- tollbooth
- transition spaces
- foothills of confusion
- sensory spaces
- doldrums
- administration
- dictionopolis
- reading & writing
- digitopolis
- math & science
- stairs to infinity
- circulation journey
- castle in the air
- the unknown destination

"...or you’ll never know how far you’ve gone or whether or not you’ve ever gotten there.”
Program Precedent: School Without Walls

The School Without Walls (SWW) is a public Washington, DC high school with a different way of doing things. The school is housed in the historic Grant School building with a renovation and addition by Perkins Eastman. Unlike the existing building on my site, the Grant School building was indeed built for the use as a public school. This eliminated certain issues like circulation and entryways, but required the same analysis regarding the residential scale of the building, the punched openings, and just how to go about creating an addition. The main draw of studying the SWW was the programming. The building size was not an issue when the students essentially used the city as their classroom. The District of Columbia has much to offer in public green space, museums, and history, and students are able to take advantage of that. Organized sports are offered outside the school grounds and college courses can be taken at nearby George Washington University. The SWW allows students to participate in the capital’s innovative, urban environment both inside the 19th century school building and on the city streets.

Both the educational and adaptive reuse aspects of this thesis allowed me to find unique ways to design. Three existing projects inspired the program, methods of adaptive reuse, and materiality. Following the research phase of the project, the analysis and design phases moved the project from its early chapters to the final story it became.
Adaptive Reuse Precedent: Castelvecchio Museum

Carlo Scarpa’s Castelvecchio Museum in Verona, Italy was an obvious choice when thinking about how I wanted to approach adaptive reuse. Although the age of Old Engine Company 26 hardly compares to the medieval castle in Scarpa’s project, the attention to detail is something that can be applied to buildings of any age. One of the biggest hurdles in my thesis design was deciding how the new and old buildings would meet. Castelvecchio’s understated, but beautifully constructed connections for everything from roofs to mullions create a new architectural presence while allowing the old building to stand on its own. The heavy formed concrete elements blend in with the existing stone walls and the thin metal gates and window frames seem as if they were always there. Upon closer observation you will see that even the sculpture pedestals and displays are part of Scarpa’s design. The openness between inside and out allows museum patrons to feel like they are at the same time nestled away in a medieval courtyard, bustling through the city streets, and meandering along the Adige river.

(Top) Castelvecchio connection (Bottom) Castelvecchio window (Right) Castelvecchio stair
Materiality Precedent: Chicken Point Cabin

Tom Kundig’s Chicken Point Cabin was a project I discovered later in the design process as the materiality of my thesis came to the forefront. Although this particular project is extremely rural and the Middle School for Creative Writing is sited in an urban residential area, I was searching for materials that created a simple, clean palette for the learning environment and that did not compete with the other half of my project, the firehouse. The typical cement blocks (as often seen in school construction) are reimagined as smooth, precisely cut units. Whimsical elements, such as mechanical rotating doors and hidden stairs, tie back to the imaginative story in *The Phantom Tollbooth*. The native wood is used in unique ways and reminds me of the heavy timbers and reclaimed wood floors I want to expose in the firehouse. The cabin announces steel as its structure—there is no guess as to what is holding everything up. The dark coloring of the metal contrasts with the bare, light-colored wood and masonry. These materials play in harmony and create a relationship with the outside world. There are definite boundaries of enclosure, but openness and transparency are also present.
Thesis research is a continuous process. There was never a point (and never will be) when the research and analysis ended and the designing began. I was always stumbling upon new facts about the old building or thinking of a new design implementation that required further analysis of the site.

This same timeline occurred between the combining of the stories and the combining of the two buildings. There was never a point where I had fully reached a solution for the combination of the stories and could work solely on combining the buildings--the two solutions happened in tandem, intertwining in their own story-like way.
...the strange circular room, whose sixteen tiny arched windows corresponded exactly to the sixteen points...
To one side was a gigantic note pad set on an artist's easel, and from hooks and strings hung a collection...

(Upper left) Stitching together old and new (Lower left) Differences of old and new (Above) Connecting spaces
“Where could you keep anything so tiny?” Milo asked, trying very hard to imagine such a thing.
“Just follow that line forever,” said the Mathemagician, “and when you reach the end, turn left.

(Left) Relation to site (Above) New structure
“...but it’s not just learning things that’s important. It’s learning what to do with what you learn and learning why you learn the things at all that matters.”
There was once a boy named Milo who didn’t know what to do with himself—not just sometimes, but always. When he was in...

Once upon a time, this land was a barren and frightening wilderness whose high rocky mountains sheltered the evil winds...

“Once upon a time, this land was a barren and frightening wilderness whose high rocky mountains sheltered the evil winds..."
(Above) Bearing walls in model (Right) Ground Level Floor Plan
(Above) Model in construction (Right) Second Level Floor Plan
The boy had been sitting with his hands clasped nervously the whole ride there. Even though he was still safely nestled in the passenger’s seat, the anxiety of transitioning from the fun of summer to the seriousness of a new school and grade level was setting in. As the car came to a halt, the little boy grabbed his backpack and slowly said goodbye to his mom. Dozens of other kids his age were filing toward the big glass doors under the towering overhang. Some kids looked overjoyed—running to say hello to old friends, eager to show off their new shoes. Others looked just the same as he—trying to take in every last second of the warm summer air.

As he entered the school, the three-story space took his breath away. It felt like a castle that he would dream up in the stories he liked to write. He filed through the rows of lockers and followed the signs to the sixth grade hallway. Thank goodness he didn’t have to navigate the stairs up to the third floor! His name was listed on the homeroom sheet for the first classroom he saw. The boy found his seat and took some time to look around.

He couldn’t remember ever being in

Characters
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He couldn’t remember ever being in
a classroom without the tile floors and cinderblock walls of his old elementary school. He immediately felt grown up—especially when he saw a bookshelf with his very own name on it! The teacher explained the syllabus and how each class would incorporate reading and writing. She told them how to find the bathroom at the end of each hall and where the secret shortcut stairs were. Then they were allowed to explore the building and write about what they saw.

The boy saw smiling faces everywhere he looked. The people in the hanging glass box looked busy. The librarian walked from catwalk to catwalk showing kids how to find their favorite books. His stomach rumbled. The smell of lunch was already wafting in from an opening that seemed to lead to nowhere. He walked through the opening, now hearing the scraping of chairs and tables being set up in what must be a very big room. He followed the echoes past an art display cabinet until he was occupying the space just on the other side of the wall from where he had been. Heavy wood trusses soared overhead and secret locations that the teacher hadn’t mentioned yet popped into his vision.

He followed a fellow classmate in a wheelchair around another wall and they found themselves watching pizzas bake. Just as they caught a glimpse of an outdoor glass elevator that would have taken them to the upper levels, the teacher called everyone back to class. Seventh graders were filing down from the upper floors and it was time for his grade to continue with the rest of the day. Lunch, gym, and chorus awaited him that afternoon, but math and science came first. Large rooms with movable walls and laboratory counters actually made it fun to do the assignment. The science teacher slid the chalkboard and Smartboard panels along a track, even sliding open the exterior glass wall at one point!

The remainder of the day was even better than he could have imagined. The weather had cleared up, so lunch was held in the two courtyards. He met a new friend who agreed to be his reading buddy and help him explore the upper catwalk. Although they had no idea what happened when you took the main elevator to the top, they wanted to try! Gym class meant a short walk down to the recreation center where he found out they even had a swim team that met after school. The day ended with history class, where they looked at the history of the city on the electronic panels and the teacher announced
future field trips just a bus ride away.

The boy’s mom arrived at the school and waited in line behind the buses. She didn’t know what to expect, as he had been so sullen that morning. She let out a huge sigh of relief when she spied her son sitting on the edge of the terrace surrounded by friends. Everyone had a book in their hands and some student council members were already stringing up banners along the roof garden handrail that announced the upcoming class elections. The first thing the boy said as he hopped into the car was, “Guess what we did at school today!?”


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1&2  Map of Brookland  
Baist’s Surveys of Washington 1919, Library of Congress

4  Chemical 3 Reappears  
Historic Photo of (Old) Engine Company 16 (circa 1908), National Register of Historic Places, from the collection of Jackson Gearhart

7&8  Collage by author using “Prometheus Being Chained By Vulcan”  
Dirck van Baburen. Prometheus Being Chained By Vulcan, Oil Painting.

7&8  Collage by author using The Phantom Tollbooth Map  

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27  School Without Walls Connection  

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32  Chicken Point Cabin Stairs  
Online, http://www.olsonkundigarchitects.com/Projects/101/Chicken-Point-Cabin

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