Geomorphic Changes of Burlington, Vermont

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Abstract

Searching though historic photographs and maps revealed many geomorphic changes in Burlington Vermont. This report looks into the past 200 years of change. Analysis of the College Street Gully and other related features that changed the way Burlington evolved over time.

Introduction –

Burlington is a city in Vermont that has undergone many changes over the last 200 years. Walking up College Street today or driving along Pearl Street, it is hard to imagine the geomorphic evolution that has taken place. Today's skyline blends the features of the landscape which makes first hand analysis of Burlington's geomorphic impossible. Even with historical documents such as maps and photographs, it is difficult to completely depict the history of changes in Burlington's landscape and how it once differed from its current physical makeup.

The most prominent feature that has faded over time as a result of increased urbanization was the "College Street Gully". Through history, the feature has also been referred to, or characterized as a "Ravine" (figure 1), the "Vermont Central Rail Line" (figure 2), a "River Tributary" (figure 3), a "Gully" (figure 4), and even the confines of a sewer network (figure 5). Using the chronological culmination of historical maps and photos, a historical narrative can be told. Assembly of the historical pieces can serve as a research tool, as well as a strong geomorphic tool for further research.

Methods –

After looking at figure 1, it is obvious that Burlington has changed a great deal since the early 1800s. We decided to try and quantify the gully and distinguish where it would be today, as well as quantify how large an area and volume the gully would encompass. The best tool available to do this, was a map that was created as a US Coastal

Survey (figure 3). Using the contours provided on the map, we were able to calculate a volume for part of the gully.

After quantifying the gully using the Coastal Survey Map, we reviewed other historical documents to see if we could find any other evidence of the gully. We hoped we would be able to find photographs that would help us quantify its extent. We were unable to find any solid evidence for quantifying the gully; only a few historical photographs verified its presence. Through mapped documentation, we were able to piece together a cartographic chronology of the geomorphic changes that occurred in association with the College Street Gully.

Data –

Presented below is a compilation of historical and present documentation that solidifies our investigation of the College Street Gully. These maps and photos provide evidence that supports our geomorphic analysis and help quantify the significance this feature has on Burlington's landscape.

Figure 1 A Ravine that cut through Burlington around 1812. This Artist's rendition shows its location.

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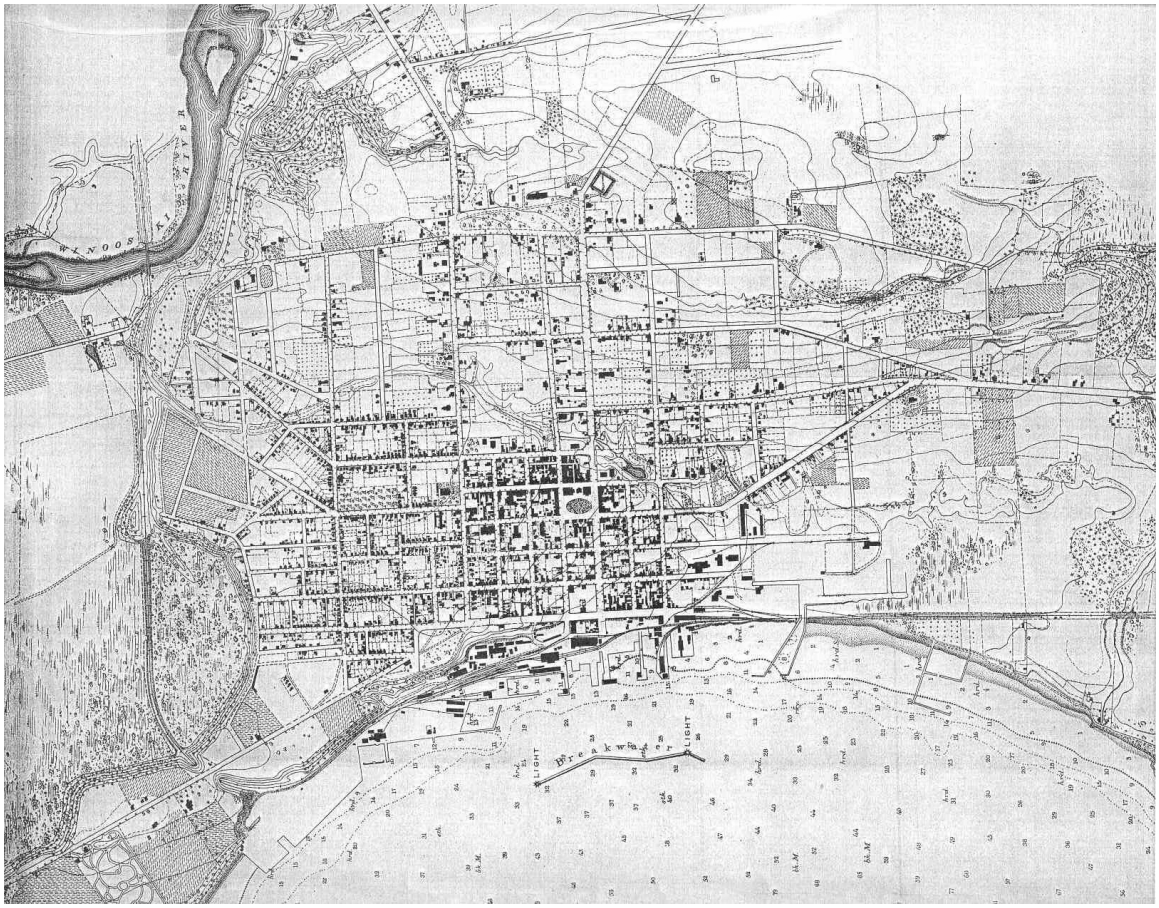

Figure 3a Topographic Map of Burlington Vermont in 1872

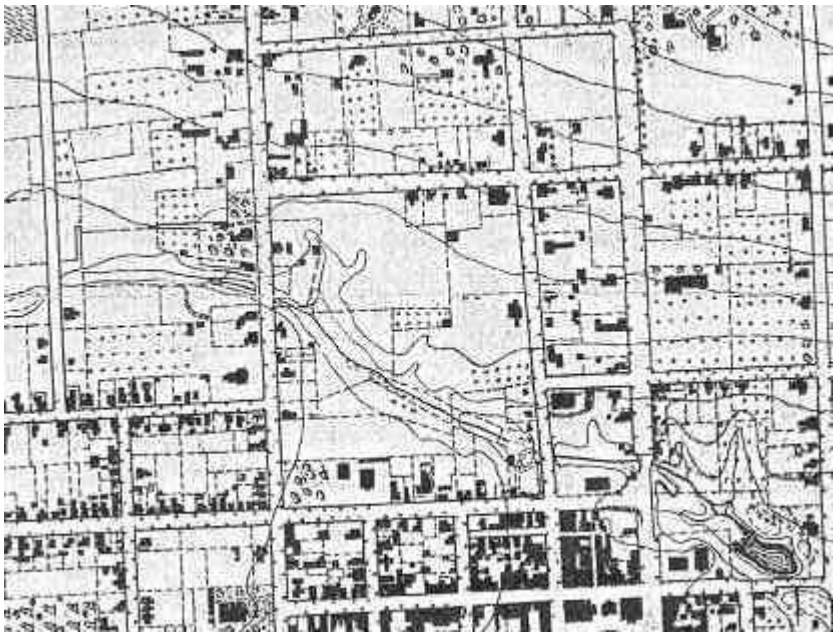

Figure 3b

Figure 4 A Birds Eye View of Burlington in 1877. Note the Gully between Willard and Union Street

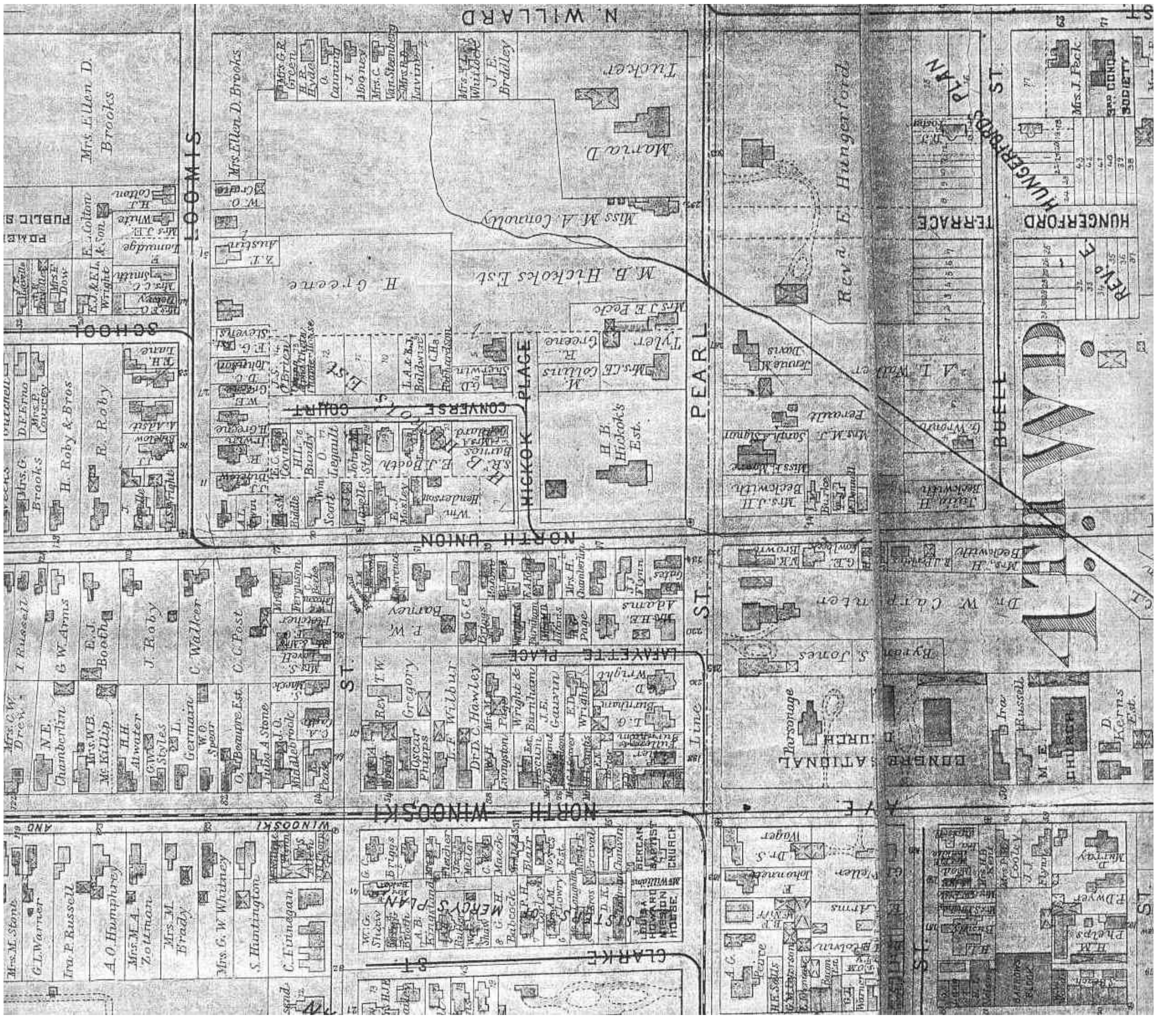

Figure 5a Shows Burlington in 1890. The stream flows down into a streamline pipe that leads all the way to Lake Champlain

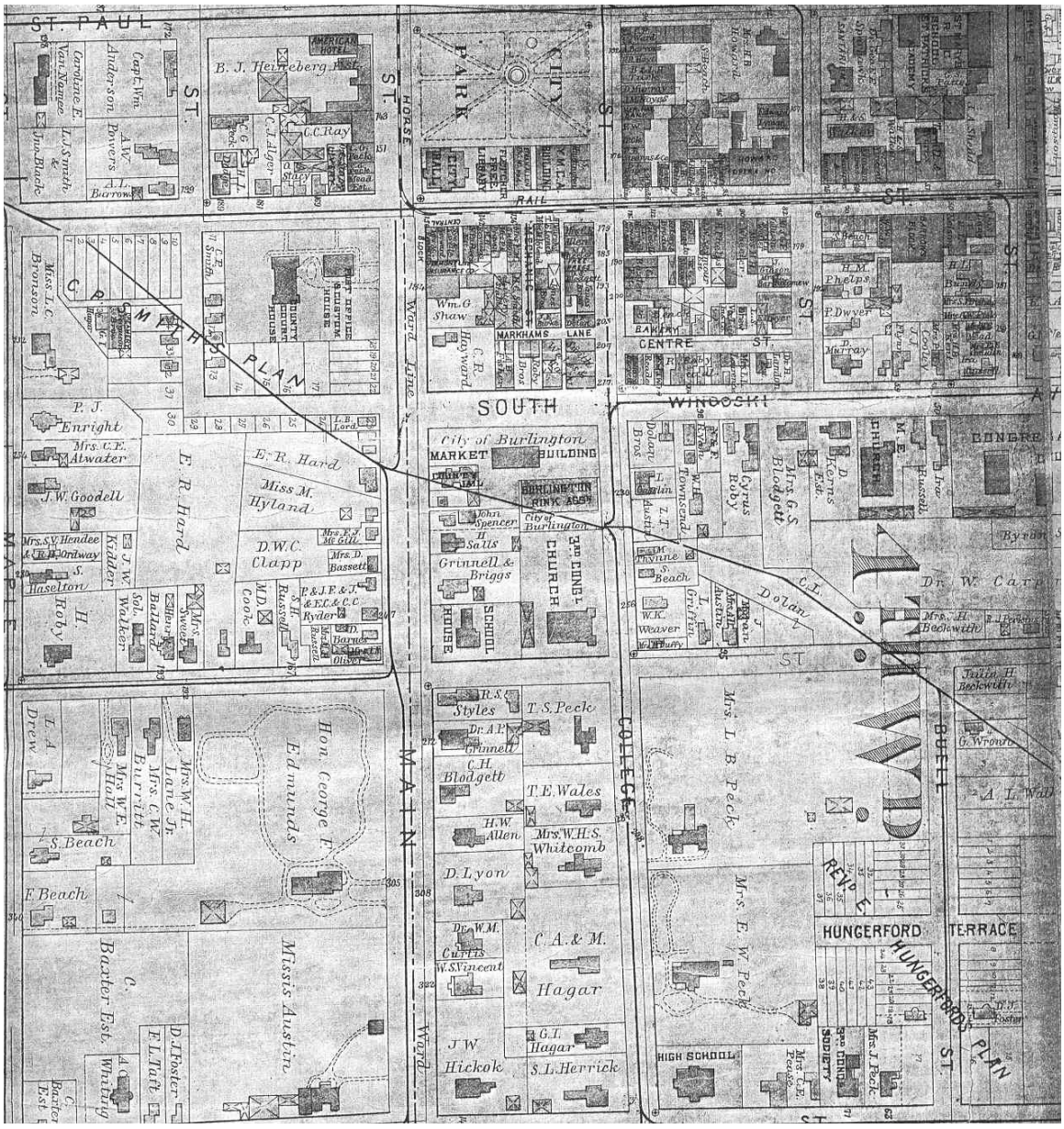

Figure 5b Shows the continuation of the streamlined sewer line in 1890

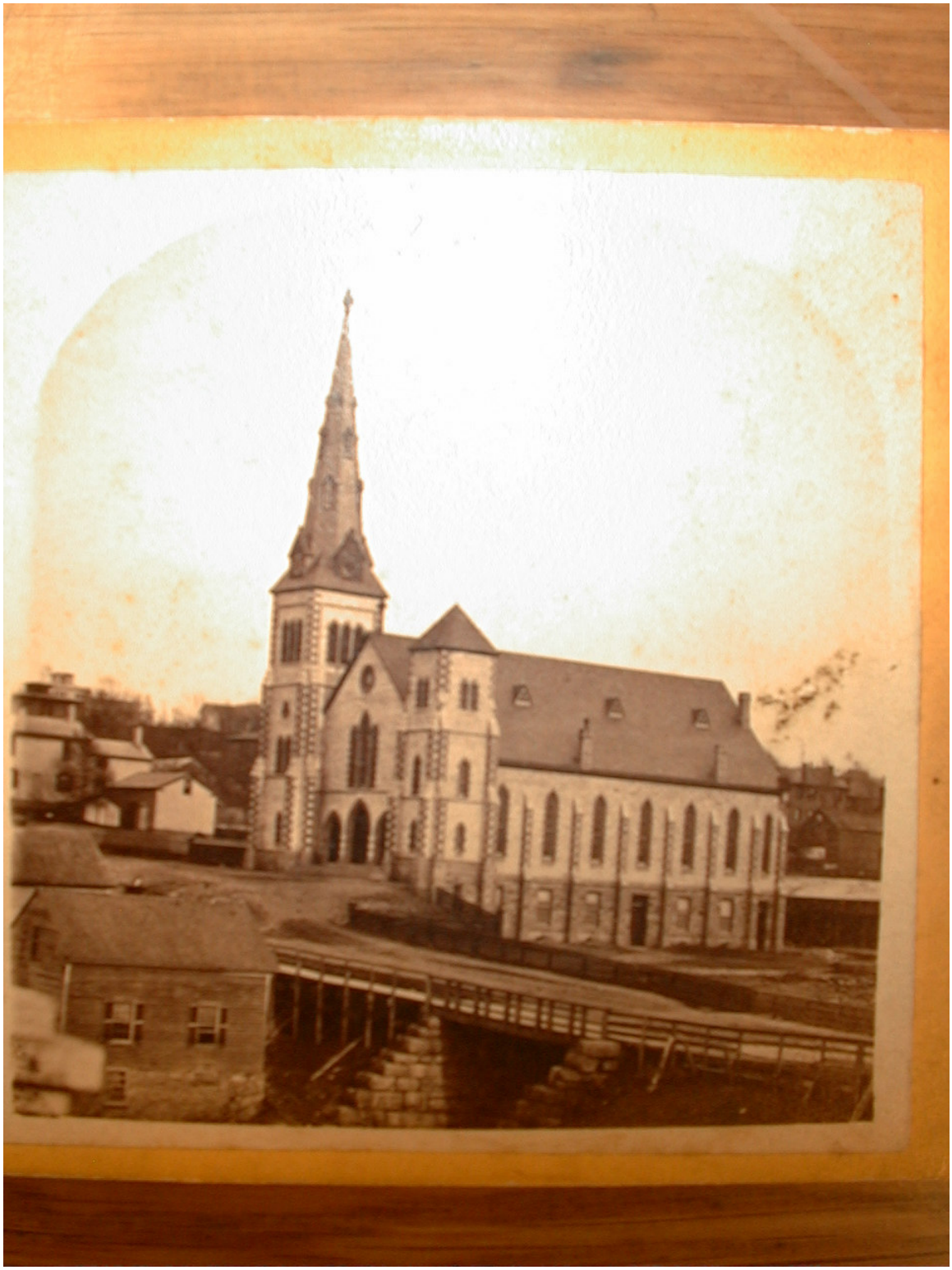

Figure 6 Shows the Church, note the train bridge going under College Street. This Stereo-view was taken in 1866

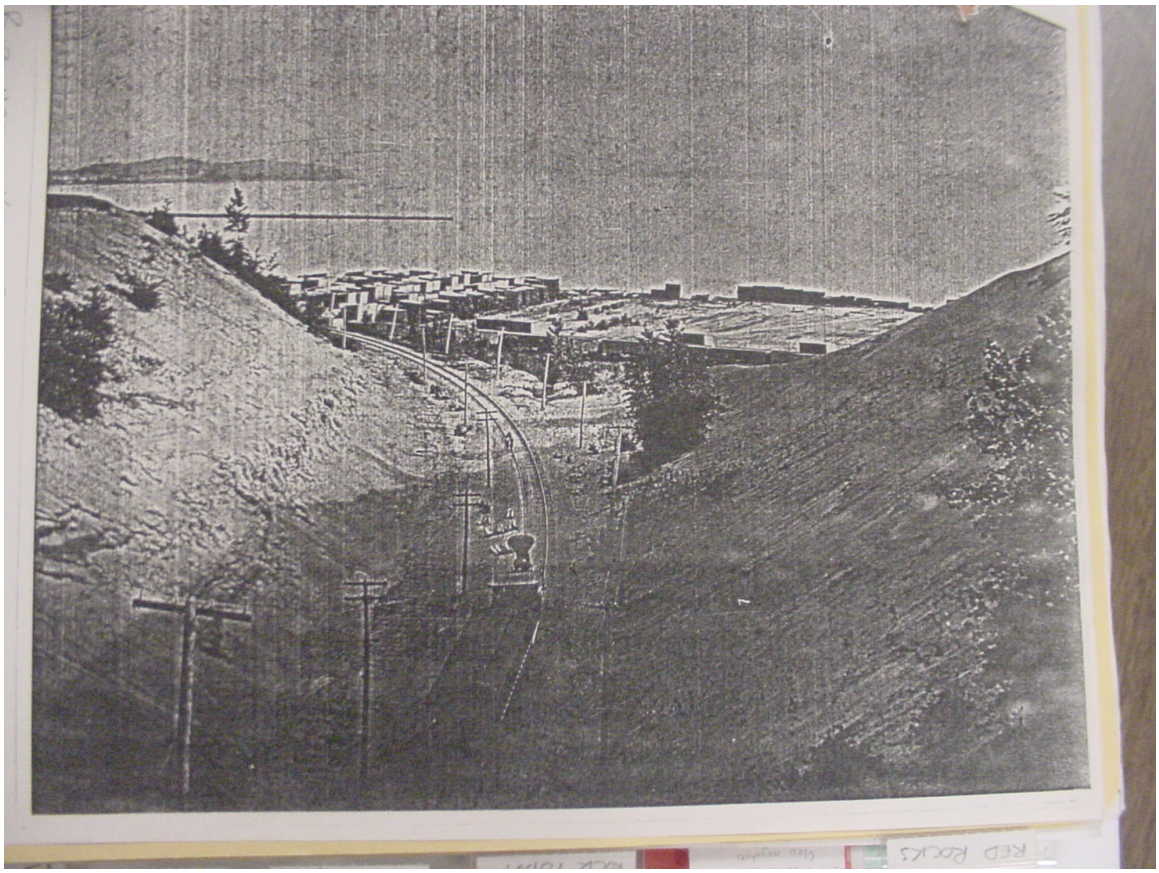

Figure 7a Shows the view towards the lake sometime near the completion of the train tunnel.

Figure 7b Shows the same view from above the tunnel shown in 7a as it stands today

Figure 7c Shows the tunnel that stands today and is still used by trains.

Discussion –

The main focus of this project was the College Street Gully. Walking in the field, it was hard to believe that a feature as large as the gully has been filled for development. Quantifying the amount of fill that would have leveled the landscape enough for development was accomplished by counting contours and measuring the distance across the map (Figure 3b). A rough estimate implies that 1.8×10^7 cubic feet of fill would have been needed to level the gully between the southeast corner of South Union Street to just below the northwest corner of Willard Street. Though this is a small portion of the gully, this data can be used to approximate how much fill would have been needed to level this

particular section. According to Figure 3, the gully actually extends northeast towards the Winooski River.

With the size of the gully now roughly quantified, there had to be an explanation of how the gully formed and of the events that led up to its leveling around 1890 (Figure 5). Figure 1 is an artistic rendition of a thematic map that shows an approximate location of where the ravine ran through the city. The caption for "10" on Figure 1 states

"Samuel & Ephraim Mills' house, now the Wilson Hotel. It was built above the bank of a ravine (later crossed by the Vermont Central Railroad), the gap was filled in and the ground cut away, which gives the hotel its sloping look today."

An interesting feature that was added circa 1853 was the Vermont Central Railroad (Figure 2). The most significant characteristic of the railroad is the location in which the track was laid. The same markings which indicate the gully's walls are included on this map. Using Figure 3 as a reference, one can see the railroad must have been laid within the gully. This may have been done to avoid buildings and physical features. Sometime between 1866 and 1872 the railroad stopped service through the gully and continued across the Winooski River. Figure 6 shows the 3rd Congressional Church. This stereo-view shows a bridge across College Street where the Vermont Central Railroad once ran. This was taken circa 1866. The 1872 map (Figure 3) shows the rerouting of the railroad through a tunnel (Figure 7) which continues to meet up at approximately the same bridge that was used previously. The only difference in this case is the railroad no longer has service through the heart of the city, but instead runs around the city.

The question remaining is, "How did the gully get where it was?" The US Coastal Survey map is the most concrete pieces of evidence confirming the gully's existence

(Figure 3). If the length of the gully is traced, it leads to a bend in the Winooski River. One interpretation is that as the Champlain Sea Delta retreated, a tributary of the Winooski was formed. This tributary was the gully that ran through College Street. The gully continued through a large depression near the Hood milk factory (at the intersection near Maple Street and College Street) and emptied into Lake Champlain. Later (at a date unknown) the Winooski River was captured and this tributary (which was the gully) did not flow with water anymore.

The first form of evidence that the gully was actually filled is a map made in 1890 (Figure 5). A key feature within this map is a streamlined feature that ran southwest to the lake. At first glance, this feature appears to be a natural stream; when looking more closely it becomes apparent that this feature could not have been a stream because it ran directly through buildings. This feature could also be the formation of a sewer line that ran directly to the lake. It is important to note the location and directionality of the feature, because if one looks carefully, it appears as though it runs along the inside of what was once the gully. We are led to believe the sewer line was laid as the gully was once opened and then filled to keep the sewer line underground. Although the railroad is not portrayed in the map (Figure 5), the sewer line may have been constructed directly over the existing train tracks and then buried to level the land.

Summary

In the case of the College Street Gully, the landscape needed to be filled to allow for further expansion of the city and for the basis of an underground sewer infrastructure. Access to the historical records in the special collections of the Bailey Howe Library allowed us to create a story that was both historic and geomorphic**.** Through further

analysis, we could investigate city records which pertain to the underground infrastructure. Obtaining the construction records of the Vermont Central Railroad might also contain some specific information pertaining to the physical characteristics of the gully and specific reasons as to why the railroad was rerouted.

With more time and further investigation, the gully's timeline could be narrowed down to a few years, ranging from the 1800s to the 1900s.

Sources

1812- Artist's Rendition – David Blow and Lenny Scopes

1853 map of Burlington – Presdee and Edwards

1872 – US Coastal Survey Map – Benjamin Pierce

1890 –Map of Burlington – C. M. Hopkins