

## **Part II: Archaeological Resources of the Quincy Smelting Works**

### ***A. Introduction***

This section identifies and explains the archaeological features of the QSW. Archaeological features consist of historic man-made objects, structures, and any modifications or additions to the natural environment that contribute to the overall historic character of the smelting works and its operations. Although the focus is placed on identifying and explaining the physical remains, it is also paramount to determine the relationship between them and how they fit into time in order to understand the historic function and technological context of the site as a whole. This develops our understanding of how the land was used over time. Like all industrial operations, smelting consisted of receiving raw materials from another location, running the materials through a technological process, and then shipping the transformed product to another location or market. This entire process required contributions of energy and labor, and also generated waste material primarily in the form of slag.

The physical remains of this process are now archaeological resources. While it is easiest to identify what is still visible in terms of transportation systems, waste piles, structures, landscape modifications, and artifacts, sub-surface and ephemeral remains are also important features to be considered. The location of many invisible or missing remains can be identified in a number of ways: by identifying visible topographic anomalies such as depressions or mounds, by looking at the character and patterns of surface artifact scatters such as brick or mortar, by identifying the probable location of missing features in historic photographs and documents, and finally by a method of systematic test excavation.

The archaeological features of the QSW are presented in table format for easy reference and are organized into the following categories: landscape features, shoreline features, currently standing structures and their associated artifacts, and sub-surface features. Structures are presented in the chronological order in which they were constructed. The tables give the letter assigned to each feature so that they can be easily identified on one of two locator maps (A or B) found at the end of Appendix C: Historic Maps.

## ***B. Landscape features***

### **1. Transportation systems: rail grades, tram lines & trestles**

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#### **Description:**

**Main line rail grades & spurs:** A circa 1898 historic map “Quincy Smelting Works” (QD 1076) shows that one main rail grade of the Hancock and Calumet Railroad passed by the smelter in the same area as the later grades of the Copper Range and Mineral Range Railroads shown on the 1907 “Map of Quincy Smelting Works and Vicinity” (QD 2025). It is likely that the Mineral Range grade shown on this map is the same as the Hancock and Calumet grade on the earlier map because the Hancock and Calumet Railroad was bought by the Mineral Range Railroad in 1886 and their names were often used interchangeably.<sup>27</sup> The Copper Range Railroad laid track on the north side of Portage Lake and began service in 1903.<sup>28</sup> The 1907 map also shows a spur from the Mineral Range grade leading across the east portion of the smelter complex that ended adjacent to the dockside warehouse (feature A on locator map A). There is little visible evidence of this spur today.

Another spur from the Mineral Range main line led into the large railroad warehouse adjacent to the south side of the main line in front of the reverberatory furnace building (feature C on locator map A). It was probably installed in 1901 when the building was constructed. Mineral from Quincy’s stamp mills at Torch Lake was off loaded and stored here to await smelting. In 1904 the mineral building was constructed to serve this function. It is likely that the two steam locomotives that sit in front of the smelter today are on a portion of this spur, although the majority of the railroad warehouse is gone or collapsed.

Another spur off of the Mineral Range grade that is still extant leads to the upper level of the mineral building (feature B on locator map A). This 460 ft. elevated spur (also called an “approach”) was most likely installed in 1904 at the time the mineral building was constructed.<sup>29</sup> An historic photo (3) of the north side of the complex clearly shows the character of this long approach, consisting of many closely placed wooden trestles. Large, interlocked wooden cribbing at the highest end of the approach near the mineral building is still visible although all of the wooden trestles are buried beneath the spilled mineral that covers the approach today.

**Tram lines & trestles:** On-site materials handling required installation of a two-foot gauge industrial rail system from the initial construction of the smelter.

Transportation of coal, mineral, slag, castings, moulds, and other equipment between buildings, docks, and main line railroads was manually trammed. There is documentary evidence in the Monday Letters and in the 1906 annual report that by 1906 a certain portion of tram operations was electrified. The tram system was modified in 1910-1911 with about one mile of additional track,<sup>30</sup> and greatly expanded in conjunction with the 1920 development period. The planned location of the tram lines on the ground and inside the buildings at that time can easily be seen

on 1919 map “Quincy Smelting Works Track System” (QD 2032).

A 1907 historic photo (8) of the south side of the briquetting building shows the elevated tram’s steel trestle (D) between that building and the cupola furnace building. This trestle was erected at the same time as the briquetting building in 1906. It was expanded to connect to the reverberatory furnace building during the 1920 expansion period. Another historic photo (3) taken after 1905 shows a 156 ft. long and twenty–seven ft. high steel trestle (E) leading from the third floor of the north side of the cupola furnace building across the main line railroad tracks to the northern slag dump. “This was done to facilitate the handling of slag over the railroad tracks, and to provide a slag dump for years to come.”<sup>31</sup> The addition of the casting shed and a remelting furnace in 1920 called for an elevated charging system, and the American Bridge Company erected the casting shed and the elevated trestle on the south side of the mineral building. They also performed the modifications to other trestles listed above by the end of 1920.<sup>32</sup> The elevated tram line into the casting shed called for an earthen approach to be constructed on the east side of the complex passing above the main line spur that was at the ground. It is probable that it was used to bring in coal to both the cupola furnace and the remelting furnace for overhead charging. All three of these trestles are standing today. A fourth steel trestle in the vicinity of the loading dock is discussed in the shoreline feature sub–section.

**Locator map A number:** Main line spurs: A, B, C Trestles: D, E, F

**Year of construction:** Main line rail grades and spurs: prior to 1898–1904  
Tram lines: 1898-1920 Trestles: modified in 1920

**Historic function:** To provide internal materials and waste transportation, and to bring in mineral and materials from main line railroads.

**Associated artifacts:** Although all trackage has been removed, there are number of side dump tram cars, flat cars, and slag cars still on site.

**Current conditions:** Two of the main line rail grades passing between the smelter and the north slag pile are still prominent and are used as walking and snowmobile trails. The approach to the mineral building is partially intact, but most of its wooden trestles are missing or buried. What remains visible is but a small portion of a much longer approach. Main line spurs are no longer prominent. Most of the wooden ties associated with the tram lines are no longer evident on the ground surface, but some are visible north of the assay office, on the shoreline slag pile, and on the northern slag pile. All three steel trestles described above still stand, but trackage is deteriorated or missing.

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## 2. Slag piles

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### Description:

There are three waste slag areas on the site: on the north side between the main line railroad grades and the current roadway, Rt. M-26, on the east side of the complex, and east of the dockside warehouse along the shoreline between the raised berm and the eastern shoreline. The majority of the slag in these areas is basically the same: black in color with the consistency and size of gravel, with a glass-like texture. A smaller portion of the slag deposits is reddish brown in color and is probably from the most recent processing period, as late as the 1960s. A smaller portion of the slag deposits is in the form of large rectangular blocks, taking the shape of the slag cars in which they solidified before they were dumped. Slag is the primary waste product of the smelting process: the molten rock matrix left behind after the copper was removed.

The **north slag pile** (feature G on locator map A) is flat on top with nearly vertical sides forming a rectangular shape. The top of the pile is at level with the elevated tram trestle from the cupola furnace building. Slag from the cupola furnace and possibly from the reverberatory furnaces was trammed here while still molten. This slag pile was begun in 1905 with the installation of an elevated steel trestle from the top floor of the cupola furnace building northward to “the vacant lot.”<sup>33</sup> Historic photo (3) of the north side of the complex shows its beginnings.

The **east slag pile** (feature H on locator map A) is not structured like the north pile. It is more widely distributed and slopes in height from west to east, with the highest point on the east side. It also appears that it was distributed by bulldozers. Some of the slag is mixed with construction debris such as brick, fire brick, metal objects, and stamp sand. Historic records do not indicate when this slag was actually deposited. There is an important note to make about this slag area concerning land use. The 1898 historic map “Quincy Smelting Works” (QD 1076) shows the smelter’s eastern property boundary as approximately 100 ft. east of the reverberatory furnace building, and less than fifty feet east of the dockside warehouse. It is marked clearly as “boundary line with Franklin.” The 1909 “Map of Smelter and Vicinity” (QD 1056) shows the same boundary line and a “ball ground” in the area that the slag pile now occupies. A 1910 historic photo (4) shows this fenced in ball ground clearly the and that there was no slag dump there at the time. However, the 1920 historic “Map of the Quincy Smelting Works” (QD 1083) shows that the expanded tram system extended east of the Franklin boundary. Quincy acquired control of this land in 1908.<sup>34</sup> Quincy began to deposit slag in this area after 1920 as suspected by the variability of the slag’s shape and color, and by the debris deposits there. A 1923 sketch map of this area from the Monday Letters shows the area was beginning to be used for depositing slag and ash (see last page of oversize historic map book, QD 1153). A more recent 1942 map “Smelter” (QD 1153) shows this deposit was quite large by this time. This surveyor’s map shows the smelter plot as approximately 1450 ft. east to west, and 750 ft. from the north boundary (north quarter post of Sec. 36, T55N, R34W) to the shoreline.

The **east shoreline slag pile** (feature I on locator map A) is located east of the dockside warehouse on the north side of the elevated steel tram trestle in that location. This is the smallest of the three piles. The slag was deposited to provide the raised approach of the tram line running between the casting shed and the elevated dockside trestle. Although the rail is gone, several wood ties remain in place today, and the curved shape and slope of the pile is evident. This pile also contains other forms of industrial debris including fire brick, structural brick, coal ash, and many unidentified iron artifacts. The pile was probably used as a debris dump area in recent times. This slag deposit extends up to the shoreline. It is unknown when this slag was deposited, but it is assumed that it began with the expansion of the tram system in 1920.

**Locator map A number:** G, H, I

**Year of construction:** North slag pile: begun in 1898 East slag pile: after 1920  
East shoreline slag pile: c. 1920s.

**Historic function:** Dump areas for slag, the primary smelting waste product. The east pile area was originally noted as a ball ground.

**Associated artifacts:** The remains of the electric tramway coming from the cupola furnace building to the top of the slag pile are visible, consisting of wooden ties and a number of collapsed iron stanchions that probably held lights or wire. Rail is missing, and these artifacts are badly deteriorated.

**Current conditions:** These slag piles are important historic features. The north pile is highly intact; the east pile was most likely redistributed and disturbed; the east shoreline pile is mixed with other industrial debris and artifacts.

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### 3. Open spaces

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**Description:**

There are four open spaces on the smelter complex today that require explanation. The **northern open space J** lies east of the north slag pile and between Rt. M-26 and the main line railroad grades. There is no indication in historic photos or maps that this area was used for other than an anticipated eastern expansion area for the slag pile.

The **second open area K** lies between the south side of the elevated trestle approach to the mineral building and the shore line. This area was occupied by the semicircular elevated approach of the tram line (F) as well as two structures that are currently missing. The foot prints of these structures are evident and they are described in the

sub– section below. The tram line approach has been almost completely removed from this area. The south side of this open area near the shore line is occupied by the east shoreline slag pile.

The **third open area L** lies between the shore line and the south side of the east slag dump. The stamp sand surface was stripped back from the shore line to create a large flat area. A large circular patch of asphalt was laid here, approximately 125 meters in diameter. The center of this asphalt patch is usually filled with water, indicating that it is lower in the middle than on the edges, forming the shape of a bowl. This area was used in the 1980s by the Houghton County Highway Commission to receive road sand that was unloaded from barges by conveyor.<sup>35</sup>

The **fourth open area M** is located on the west side of the works between the shoreline and all of the buildings. This area is primarily associated with the large coal dock, tram lines, slag shed, and scale house, features described in the “Ephemeral Features” section below.

**Locator map number:** J, K, L, M

**Year of construction:** N/A

**Historic function:** Open space J was historically unoccupied to allow for eastern expansion of the north slag pile. Open space K was previously occupied by an tram line elevated approach as well as several ephemeral structures. The function of open space L was to receive road salt from barges on the Portage. Open space M is primarily associated with the coal dock and other ephemeral structures.

**Associated artifacts:** The remains of a horse drawn wagon is located in space K. Open space K is also associated with several ephemeral structures and the remains of the tram line approach.

**Current conditions:** For more detail on the ephemeral buildings in space K and M, see the sub–section for that category.

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#### 4. Description of soil deposits & soil composition of site

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**Description:**

It is documented that the ground on which the entire smelting complex sits is fill (see introduction, *site location*). This means that the piece of land is man–made and not part of the original shoreline. It was formed by the deposit of stamp sand from the Franklin and the Pewabic Mining Company’s stamp mills. The soil is therefore primarily a hard packed sand that was deposited in a southward progression from the original shoreline into the water over a 40 year period between 1860 and 1898 before Quincy acquired the land. At the surface this soil throughout the site is mixed with a

considerable amount of waste and smelting process materials such as: finely crushed slag, coal and coal ashes, limestone, iron ore, mould sand, and structural debris such as wood, mortar and fire brick. Portions of the shoreline were expanded at different times using slag with a cover of stamp sand. The soil is loose on and close to the surface, and becomes more hard packed with depth. It is uncertain what water table is present today, but in 1913 all underground steam pipes at the smelter were elevated above ground because the water table at that time was less than two feet below the surface, making pipe maintenance difficult and expensive.<sup>36</sup> There is likely to be little or no clay layer, and no bedrock for a considerable depth. Historic documents pertaining to the initial 1899 dredging contract for the smelter's shipping dock indicate that the stamp sand was sixty feet deep to the bottom of Portage Lake.<sup>37</sup> Because this deposited soil is stamp sand, it is possible that artifacts from the stamp mill period are buried in the soil. These artifacts may include wooden launders, trestles, and tram tracks. Historic map 6 from 1886 shows that there were docks constructed on the shoreline of the stamp sand deposit. It is possible that some portion of these are also buried.

**Locator map number:** N/A

**Year of construction:** Stamp sands deposited between 1860 and 1898 from the nearby Franklin and Pewabic mills.

**Historic function:** N/A

**Associated artifacts:** Wood launders, tram trestles, and trackage from the stamp mill period may be buried in the fill. Artifacts, loose material, and waste such as slag from the smelter period are closer to surface.

**Current conditions:** N/A

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## C. Shoreline Features

### 1. Overview & current remains

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#### Description:

**Historic shoreline overview:** The earliest map “Quincy Smelting Works” circa 1898 (QD 1076) shows the west side was defined by a narrow dock, approximately 110 ft. long, running NW–SE. A much wider dock ran E–W approximately 500 ft. along the full extent of the smelter’s shoreline to the “boundary with Franklin.” Construction of this original dock began in May 1898 and is one of the first features erected at the site. This was necessary because building the dock outright allowed for it to be used to unload other smelter construction materials.<sup>38</sup> According to this early map, the western boundary of QMC’s smelter borders Franklin Mining Company property approximately along the boundary of the south quarter of section 25 (see historic map QD 1056).

The 1906 map “Quincy Smelting Works and Vicinity” (QD 2045) shows that the west portion of the dock is situated away from the shoreline. In other words, it was accessible by water from two sides. A small structure is shown on the shoreline north of this dock. This is named as a boat house on the 1907 map (QD 2025), and continues to appear until the 1920 map (QD 1083). Also, the smelter’s property line was extended eastward by 249 ft. into the parcel shown on the 1898 map (QD 1076) as Franklin property. Two shoreline buildings are included in this area, both named as boathouses on later maps. The smaller of the two is indicated as still standing as late as 1942 (QD 1153). The other was either removed or moved by 1909. The 1909 “Map of Smelter and Vicinity” (QD 1056) shows a similar size structure situated close to the same location, but the long sides of the structure run E-W instead of N-S as shown on the 1906 map. Both of these structures are shown on later maps as actually being in the water due to a recession of the shoreline in this area, but then the 1942 map (QD 1153) shows them both again on the shoreline, indicating that the shoreline changed again.

Just east of the Quincy–Franklin property line shown in the 1906 map (QD 2045) was a large frame structured Franklin warehouse and loading dock. These structures appear on all subsequent historic maps except for the 1942 map (QD 1153). Historic panoramic photo (4) shows these structures.

**Note for reference that this 1906 map gives the location of the original shoreline before the deposit of stamp sands, indicated by a dashed line near the top of the map.**

The 1907 “Map of Quincy Smelting Works and Vicinity” (QD 2025) shows the west side shoreline changed with the addition of a large coal dock and an approximate 50–



100 ft. westward expansion of the shoreline with slag and stamp sand fill. The portion of the dock that was accessible on two sides by water was filled in on its north side to accommodate the coal dock. There were no other apparent changes to the eastern shoreline.

The 1909 “Map of Smelter and Vicinity” (QD 1056) shows a better outline of the slag filled area of the western shoreline mentioned above. No other shoreline changes are apparent except for the move of the east most boat house described previously.

The 1916 map “Sketch of Waterfront and Docks, Quincy Smelting Works” (QD 1497) shows a substantial change to the eastern shoreline in that it apparently receded. The two boat houses in this area are shown off shore, in the water. The smaller of the two is shown with a pier or gangway out to it from the shore. The dock of the Franklin warehouse is named the “old dock” on this map, indicating that it may not have been in use by this time. The shoreline west of the coal dock is also drawn slightly different than on the 1909 map.

The 1919 map “Quincy Smelting Works Track System” (QD 2032) shows some slight differences to the eastern shoreline. The Franklin dock named as the “old dock” in the 1916 map (QD 1497) was apparently removed. The east most boat house is shown as entirely in the water whereas before it was accessible by the Franklin dock. The other east side boat house touches the shoreline here as opposed to being off shore as in the 1916 map.

The 1920 “Map of the Quincy Smelting Works” (QD 1083) shows one significant change to the western shoreline with the addition of three structures: the carpenter shop, lumber shed, and a third unidentified structure that may have been a boat house. The carpenter shop and the lumber shed were moved to this location from the east side of the complex in order to accommodate the tramway expansion and the construction of the casting shed in 1920.

The 1942 “Smelter” map (QD 1153) indicates that not all structures or the shoreline were located by actual survey. However, the east side boat houses are shown as on the shore and no longer in the water as on previous maps. This map shows that the area previously occupied by the ball field and the Franklin warehouse building was covered with slag by this time.

***Current shoreline overview:*** The smelter’s current shoreline extends from the inlet near the eastern slag pile to the inlet west and behind the carpenter and machine shops. It is strewn with the remains of historic features and artifacts. None of the boat houses described above or the Franklin warehouse still stand. It is difficult to ascertain the exact relationship between today’s shoreline and historic one because as seen in the historic overview, the shoreline was in a state of change throughout the smelter’s early operation and was disturbed in its later years. By comparison with historic maps and relative to the dockside warehouse, it is estimated that the current shoreline east of the warehouse has receded up to 15 meters (about 50 ft.). The current eastern shoreline is

characterized by a variety of industrial debris including slag, structural and fire brick, large wood timbers, coal ash and metal artifacts. Except for the slag pile that reaches the shoreline, the debris is not associated with specific historic shoreline structures, although all of it comes from somewhere on the smelter complex, or was a waste product. From an integrity standpoint, the shoreline east of the smelter's dockside warehouse has little historic integrity, but its artifacts are significant. There is one historic feature of the eastern shoreline that defines the shoreline of the eastern inlet (feature 1 on locator map A). This is the remains of what may have been a boat house or pier. Its closely fitted wooden boards jut vertically upward from the water. This historic feature is not associated with the smelter, however.

The shoreline in front of the elevated steel trestle just east of the dockside warehouse consists of slag fill. Then, beginning with the dockside warehouse and to the west of it, the shoreline and its historic features exhibit substantial historic integrity. Pilings from the smelter's original loading dock remain in the water just off shore, running the length of the western shoreline (feature 2 on locator map A). A below ground water adit and its gate is still intact, located on the shoreline between the charcoal house and the assay office (feature 3 on locator map A). This adit runs directly toward the smelter's pump house where water from the Portage Lake was taken in and pumped up to the mines and housing areas on top of Quincy hill in Hancock. This portion of the shoreline is also strewn with industrial debris and artifacts similar to the eastern shoreline, but not to the same extent or concentration. This debris was most likely deposited over time. These deposits are not associated with specific shoreline structures other than possibly the dock itself. At the point where the shoreline turns sharply from its E-W direction toward the northwest to form the edge of the western inlet, there is a possible feature. This is a ditch or gully that may have been the end of the 1898 water intake adit (feature 4 on locator map A) shown on the 1898 historic map "Quincy Smelting Works" (QD 1076). It is not clear if this adit was abandoned at some point in favor of the other previously described.

Finally, the western inlet shoreline is defined by a substantial deposit of slag fill added circa 1907 to accommodate the coal dock as well as the carpenter shop and lumber warehouse later in 1920. At the point where this slag meets the E-W shoreline again to form a corner, there are structural wood remains sticking up from water line that may be the remains of the boat house in this location (feature 5 on locator map A) indicated on the 1907 "Map of Quincy Smelting Works and Vicinity" (QD 2025). The historic pilings that are in the water running west of this feature are probably not associated with the smelter.

**Locator map A number:** 1, 2, 3, 4, 5 / the length of the smelter's entire shoreline.

**Year of construction:** The shoreline was in a state of continuous change beginning with initial construction of the complex in 1898.

**Historic function:** Primarily shipping purposes.

**Associated artifacts:** A variety of industrial artifacts, debris, and waste material such as slag.

**Current conditions:** See explanation above.

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## 2. Coal Dock & Trestle

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### **Description:**

The coal dock was initially constructed in 1898 at the west end of the smelter shoreline.<sup>39</sup> It began where the 355 ft. loading dock running E–W ended and turned to run NW. The 1907 “Map of Quincy Smelting Works and Vicinity” (QD 2025) shows that this area was filled in at that time and the shoreline was expanded to the west in order to accommodate the construction of a large elevated trestle system for efficient coal unloading, storage, and distribution. The 1916 map “Sketch of Waterfront and Docks, Quincy Smelting Works” (QD 1497) gives the dimension of the coal dock as 200 ft. in length. Historic photo (5) shows the detail of the trestle, and photo (6) shows a ship docked in front of it.

**Locator map A number:** 6

**Year of construction:** 1898, fill and trestles added in 1907.

**Historic function:** Coal handling and storage.

**Associated artifacts:** The dock’s wood pilings still exist offshore.

**Current conditions:** No above ground remains.

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## 3. Loading Dock

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### **Description:**

The loading dock was constructed in 1898 after the shoreline was dredged and the support piles driven.<sup>40</sup> This was one of the first structures built because of the necessity to use the dock to receive the smelter’s construction supplies. The 1916 historic map “Sketch of Waterfront and Docks, Quincy Smelting Works” (QD 1497) gives the dimensions of the dock as 355 ft. long, 50 ft. wide, and 4.5 ft. above the water line. The width includes the concrete portion of the dock on the shoreline. In 1909, the concrete portion of the dock was laid.<sup>41</sup> Only the portion of the dock over the water was wood planked. Historic photos (5, 6, 7) show the detail of the dock.

**Locator map A number:** 7

**Year of construction:** 1898.

**Historic function:** Shipping purposes; loading and unloading of ships on Portage Lake.

**Associated artifacts:** The dock's wood pilings still exist offshore, as does a portion of the dock's planking.

**Current conditions:** The concrete portion of the dock along the shoreline is intact, as are the original pilings in the water. A small portion of the wood planking remains in front of the dockside warehouse.

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#### 4. Reverberatory Slag Trestle

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**Description:**

The reverberatory slag trestle was constructed during 1920 as part of the tramway expansion plan. The 1919 map "Quincy Smelting Works Track System" (QD 2032) shows this trestle and plan clearly. The trestle is of steel, approximately 150 x 10 x 15 ft. No information about its exact use is given in historic documents, however its name on the map provides a clue, as does the ground below it, which is a large deposit of molten slag up to the shoreline. This deposit defines the shoreline in this area. The track leading up to this trestle originated at the reverberatory furnace building and inclined on a three percent grade to end at the trestle (as shown in map QD 2032). Another track at ground level near the trestle leads along the dock and turns back north toward the complex just past the assay office. From here the track moves around the complex and eventually reaches the cupola furnace building. Because the smelting process required that reverberatory slag be reprocessed in the cupola furnace, one possible explanation is that the trestle was used to facilitate the transfer of reverberatory slag into cars that then brought it to the upper level of the cupola furnace building where it was then charged into the cupola furnace. A 1978 HAER photo (10) shows the detail of the trestle.

**Locator map A number:** 8

**Year of construction:** 1920.

**Historic function:** Possibly to facilitate the transportation of molten slag from the reverberatory furnace building to the cupola furnace building for reprocessing.

**Associated artifacts:** The approach to the trestle and the nearby slag pile, described above as the **east shoreline slag pile**.

**Current conditions:** The trestle is highly intact except that the eastern end of it is collapsed and lies on the slag pile nearby. The trestle's track is missing.

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## ***D. Currently standing structures & artifact overview***

### **1. Reverberatory Furnace Building, No. 3 Furnace & 300 h.p. Boiler, No. 5 Furnace Building & the By-pass Smoke Stack**

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#### **Description:**

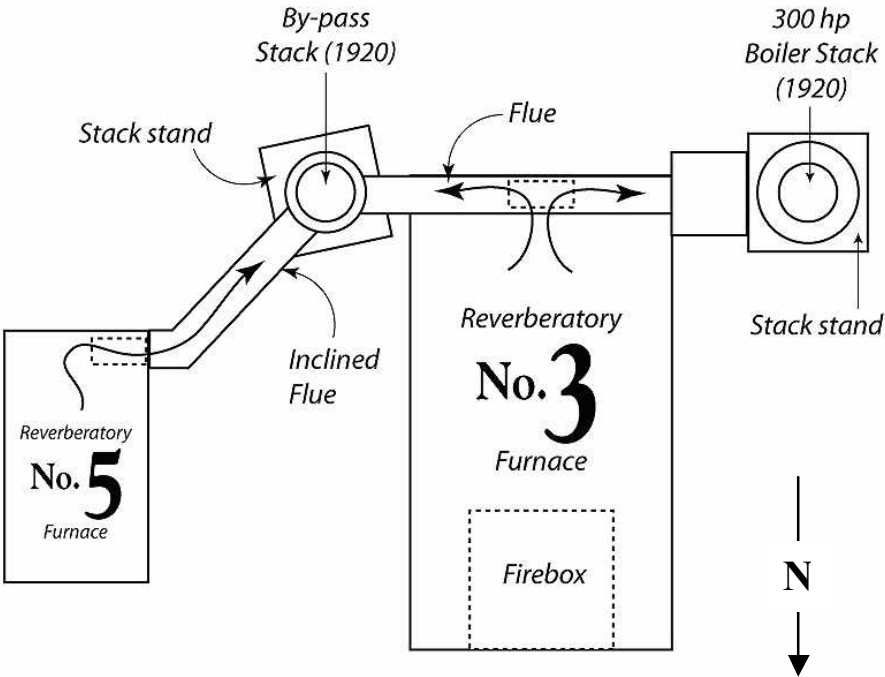
The sandstone 144x84 ft. **reverberatory furnace building** was constructed during 1898, and was one of the first buildings constructed.<sup>42</sup> It housed four large reverberatory furnaces located at each of its corners, each with a 75 ft. square, tapered smoke stack (see photos 5, 6, 7). Crushed copper bearing rock brought in from Quincy's Torch Lake stamp mills was charged into the firebrick lined furnaces and melted. The molten copper was tapped from the furnaces and the remaining slag was transported to the cupola furnace building to be reprocessed. Two major modifications were made to the building in 1904. The roof of the building was raised and extended, and a portion of the NE wall of the building was removed to join it with the 1904 addition of the No. 5 furnace building.

The 50x78 ft. steel frame **No. 5 furnace building** was constructed in 1904 to house an additional larger furnace that could produce more volume in a single heat using low grade (No. 3) mineral.<sup>43</sup> QMC was pressured by increased mine production and contract work to increase its smelting capability.<sup>44</sup> The No. 5 furnace was rebuilt in 1911.<sup>45</sup> The furnace could be charged with 60,000 pounds of mineral as opposed to the smaller furnaces that could take 35,000 pounds in one heat.<sup>46</sup> The addition of the briquetting process in 1906 for the treatment of low grade mineral supplanted this furnace to some extent, but it was found that the No. 5 could handle the low grade more efficiently by way of volume than by running smaller heats of briquettes in the cupola furnace. Because of drastic decreases in orders following WWI with a crash in the copper market, a smaller 16x32 ft. furnace was installed to run in conjunction with the subsequent installation of the Walker Automatic Casting Machine.<sup>47</sup> This furnace was rebuilt in 1968 and it was converted to natural gas firing.<sup>48</sup> It was used until operations ceased in 1971.

The QMC annual report of 1919 reports that a 300 horse power boiler and a 100 ft. "**by-pass stack**" was installed at the works. The purpose of such a boiler is to create steam by using the exhaust gases from the smelting furnace itself to heat water, rather than by building a separate boiler just for this purpose. It was an efficient way to make use of otherwise wasted heat that would just go up the stack, and in fact this steam was piped to the pump room where it ran the steam powered water pumps.<sup>49</sup> The annual report does not give the location of this new boiler and by-pass stack, but lists the addition of a new small furnace as well. By looking at the smoke stacks that exist today, a possible explanation is given. There is a large stack boiler situated in the reverberatory furnace building, but its stack is missing. The brick boiler portion remains however, and it is likely that this is the 1919 boiler stack mentioned in the annual report. There is another smaller stack situated in the No. 5 furnace building,

which is the by-pass stack. This intact stack sits on a steel stand and its flue is directly connected to the smaller furnace. Although this furnace is recently reconstructed and unused, it is likely that it sits in the same location as the 16x32 ft. furnace reported in the 1919 annual report. The current furnace also measures 16x32 ft. What is most interesting is that there is another collapsed firebrick flue leaving the by-pass stack and connecting it with the large boiler stack mentioned earlier. This flue also serves the larger furnace (No.3). Details of this system are clearly documented in blueprints of the Quincy Drawing Collection. *Appendix A gives a review of these drawings and their numbers.*

Apparently the same system was used historically, then it worked as follows:<sup>50</sup> the smaller furnace constructed in 1919 (No. 5) was connected to the smaller stack that was also constructed at the time. This “by-pass” stack was then connected to the larger boiler stack via a flue. The boiler stack could be by-passed when desired to allow for the furnace’s exhaust gases to enter smaller by-pass stack the instead. When the boiler stack was not to be used, such as for boiler maintenance, it was by-passed by shutting down the second flue leading to it, and the exhaust gases went directly up the smaller stack.<sup>51</sup>



**Locator map B number:** 1

**Year of construction:** Reverberatory furnace building: 1898; modified in 1920  
 No. 5 furnace building: 1904 smoke stack: 1920

**Historic function:** These were the smelter's main buildings where the smelting process began in five reverberatory furnaces.

**Associated artifacts:** This building has been used in recent times for storage of road maintenance equipment such as a backhoe and trailers. There is also a forklift and four large electrical transformers. Few of the building's historic artifacts remain, save for two furnaces, a vertical conveyor and crushing system, an overhead electrical crane used to service the large furnace, and a boiler smoke stack.

**Current conditions:** The corrugated iron roof on the building today is not original. The original roof was pitched with a central monitor. It is not clear what happened to the original roof, but there is evidence of major burn damage inside the building. Only one of the original furnaces remains today, located in the SW corner. It is not clear when this furnace was decommissioned. The larger, intact furnace occupying the NE portion of the building may have been used in the 1940s during QMC's reclamation period for processing reground mineral. Both furnaces remain in a modified condition as used when the smelter closed in the late 1960s. The west side sandstone wall is badly eroded on the outside. The intact smoke stack (by-pass stack) is in poor shape and warrants immediate attention.

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## 2. Cupola Furnace Building

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### **Description:**

The sandstone cupola furnace building constructed late in 1898 following the completion of the reverberatory furnace building.<sup>52</sup> The T-shape of the building was divided into four separate rooms: the engine room, pump room, blacksmith shop, and the cupola furnace. The other three rooms are described separately. The 50x40 ft. three story cupola furnace room housed a cupola furnace that operated like a blast furnace. In the original smelting process, it was used to reprocess slag from the first melt in the reverberatory furnaces. More copper could be extracted from the ore by melting it a second time in the hotter blast (cupola) furnace. The furnace was charged from the above on the second floor where bins held coal, limestone, and iron ore that was added to the slag from the reverberatory furnaces. These bins were filled from above where tram cars entered the third floor. The cupola slag was lifted in the elevator on the south side of the building to the top floor and trammed out of the building, across the elevated steel trestle to the north slag pile.

**Locator map B number:** 2



**Year of construction:** 1898.

**Historic function:** The cupola furnace was used to extract more copper from the molten slag taken from the reverberatory furnaces.

**Associated artifacts:** The cupola furnace is missing. The ground floor of this area was used as a storage area. It is packed with large artifacts not associated with the process, such as: ventilator fans, a small steam engine, a cement mixer, tram cars, tanks, etc. It is most probable that none of these artifacts was directly associated with the cupola furnace process. These artifacts were moved to the reverberatory furnace building in 2002 due to the unsatble roof on the cupola building.

**Current conditions:** The roof and walls of the top floor of this building are collapsed. Structural debris covers the top floor. The second floor's ore bins are intact, but the sheet iron floor is considerably rotted and falling through. The exterior sandstone walls are considerably eroded. In all, the building is still standing and most of it is intact, but it is in imminent danger of collapse into itself.

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### 3. Engine Room

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**Description:**

The 50x30 ft. single story engine room is located on the north side of the cupola furnace building. It houses the smelter's original (1898) Corliss Allis–Chalmers steam engine (12" bore, 36" stroke) that provided electrical power to the works. The original wood frame roof over both the engine room and the pump room was replaced by steel truss, brick and concrete supported corrugated metal roof in 1909, due to fire damage to the wood roof caused by the passing of the slag cars over the elevated trestle to the north slag pile.<sup>53</sup> The location of the original boiler that fired this engine is unknown. A second Corliss Murray Iron Works steam engine was added in 1919 to power a 200 kilowatt General Electric generator to provide for additional electrical requirements of the works.

**Locator map B number:** 3

**Year of construction:** 1898.

**Historic function:** To house the smelter's power plants (steam engines) for the purpose of generating electricity for the works.

**Associated artifacts:** The two steam engines, electrical generators, transformers, electrical distribution panel. The machine in the NE corner of the room that is enclosed by wood planking is a water pump. Debris and artifacts in the NW corner is probably not associated with the engine room.

**Current conditions:** The machine room is intact with all of its associated artifacts in place. The west wall is severely deteriorated by water damage, but its steel truss roof is in good shape.

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#### 4. **Blacksmith Shop**

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**Description:**

The sandstone 23x28 ft. blacksmith shop occupies the NW corner of the cupola furnace building and was constructed in 1898. It is first noted on the c.1898 map “Quincy Smelting Works” (QD 1076), and continues to be noted on all subsequent historic maps.

**Locator map B number:** 4

**Year of construction:** 1898.

**Historic function:** The blacksmith shop was used to fabricate or repair iron tools and hardware used at the smelter.

**Associated artifacts:** There are hundreds of artifacts located in the shop today, some of which include: a small forge, its electric blower motor, metal working floor tools and a few hand tools, a work bench covered with small parts, storage bins with their contents, a coal bin, remnants of the wood floor and the anvil base, etc.

**Current conditions:** The blacksmith shop is remarkably intact with many of its associated artifacts in place. It is probable that it was used during recent times, so not all of its artifacts are original. The north wall is severely deteriorated, leaning, and somewhat collapsed by water damage and requires immediate attention.

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#### 5. **Dockside Warehouse**

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**Description:**

This wood frame 80x50ft. warehouse building was one of the first structures constructed in 1898. Its long sloping roof allowed for a second story loft area on the

south side. Sliding doors on the east side gave access to a main line rail spur that was constructed by 1906 (map QD 2045) . Access to the dock on the south side was also provided by sliding doors. A concrete floor for the building was completed in 1910.<sup>54</sup> Finished copper castings ready for shipment were also stored in the fenced open area west of the dockside warehouse (see photo 9). The dockside warehouse can be seen clearly in photos (4, 5, 7).

**Locator map B number:** 5

**Year of construction:** 1898.

**Historic function:** This building was used primarily to store finished copper products until they were shipped by rail or by ship. A dry house (changing room) for workers was added in 1916.<sup>55</sup>

**Associated artifacts:** The warehouse contains hundreds of artifacts, most of which are historic and others that are not. Based on historic use of the building, these artifacts are not directly associated with it. Machine tools from the machine shop are stored here, a large shipment of refractory brick probably from the 1960s, a modern forklift, office equipment, and other recent items occupy the ground floor. A room in the loft area stores hundreds of smelter artifacts including gears, scales, line shaft pulleys, wood patterns, and a variety of unidentified metal apparatus.

**Current conditions:** The warehouse is in very good condition considering its age, but the roof of the east side addition has recently collapsed in 2001, leaving that portion of the building exposed to the elements. The loft area is in good shape and is currently used as a storage area for hundreds of smelter artifacts.

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## 6. Assay Office

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### **Description:**

The single story 20x30 ft. wood frame assay office was constructed in the latter part of 1898.<sup>56</sup> An addition was made to it in 1908-09.<sup>57</sup> In 1915, gas furnaces and lamps were installed.<sup>58</sup> Assaying was a very important part of the smelting process in that it provided the control measures for all production. Incoming mineral and slag from the furnaces was tested, and the quality standards required of the final product were measured, such as electrical conductivity and tensile strength. A full metallurgical report of each lot of refined copper was produced here.<sup>59</sup> See HAER photo (11).

**Locator map B number:** 6

**Year of construction:** 1898, addition made in 1908-09.

**Historic function:** This building housed a laboratory and office where a variety of testing procedures were carried out to monitor the smelting processes, determine the appropriate treatment of the ore shipments, and control the quality of the final product.

**Associated artifacts:** Much of the equipment used in assaying is still intact: jaw crushers, sampling machine, a drill press, small furnaces, and a variety of laboratory appliances. Some of these artifacts are clearly original, such as in the case of the machinery, but lab ware, chemicals, manuals and notebooks are from as late as the 1960s. Most of the artifacts in this building are associated with its use. The line shafting central power train and drive belting are also still intact. All of the machinery was driven by a single electric motor in the building.

**Current conditions:** The assay office is in very good condition considering its age, and because it was used in recent times, it offers an excellent opportunity to investigate equipment used in this process.

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## 7. Charcoal House

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### **Description:**

The original charcoal house was a single story 30x40 ft. frame structure constructed in the latter part of 1898.<sup>60</sup> It was rebuilt in sandstone in c.1908. See HAER photo (11), and historic photos (5, 6, 7).

**Locator map B number:** 7

**Year of construction:** 1898.

**Historic function:** This building stored charcoal used in the assay office. Any further function of this building is unknown.

**Associated artifacts:** The collapsed state of this structure's roof makes it very difficult to see the artifacts contained in the building, but there are some visible artifacts such as barrels and benches that indicate that this building may have been adapted for a different use in later years, but it is not clear if it was simply used for storage or for a different purpose.

**Current conditions:** The interior and roof of this building burned sometime during the 1980s. It was intact at the time of the 1987 HAER survey (see photo 11). The roof and its timbers show substantial burn and are collapsed inward, and cover artifacts on the floor of the building. The artifacts that are in view appear to be recoverable.

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## 8. Carpenter Shop

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**Description:**

The single story 42x26 ft. wood frame carpenter shop was constructed in the latter part of 1898.<sup>61</sup> This building was originally built as the cooper shop where barrels for transporting copper mineral were made and maintained. This building was moved in 1919 from its original location on the east side of the complex to make room for the construction of the mineral building and its trestle. The idea of eliminating the use of barrels for transporting mineral was introduced in 1904, which made the cooper shop obsolete.

**Locator map B number:** 8

**Year of construction:** 1898.

**Historic function:** This building was originally used as the cooper shop and was located on the east side of the works. It was moved to the west side of the works in 1919 and used as a carpenter shop, because barrels were no longer used for transportation of copper mineral.

**Associated artifacts:** This building has been used in recent times (as late as the 1980s) as a modern carpenter shop. It contains a variety of carpenter's hand tools both historic and modern, but most are modern. The loft of the building contains some historic tools and woodworking stock and supplies such as window frames, lathe, and pane glass.

**Current conditions:** The carpenter shop is in excellent condition both inside and out, showing little sign of deterioration.

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## 9. Parts & Supplies Storage Barn

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**Description:**

The two story, wood frame parts & supply barn is indicated as such on the 1920 "Map of the Quincy Smelting Works" (QD 1083). This structure was originally the cooper stock building constructed in 1898 on the east side of the works. It was moved in

1920 together with the cooper shop to accommodate the addition of the casting shed and elevated tram trestle in that area.

**Locator map B number:** 9

**Year of construction:** 1898 as the cooper stock building.

**Historic function:** This building was readapted to store repair parts for the smelter's machinery and standing equipment.

**Associated artifacts:** This building contains thousands of parts and supplies artifacts, to name a few: ladle heads, nuts, bolts, washers, hardware in bins, pipe, hose, furnace packing material, hand tools, etc.

**Current conditions:** The parts & supply storage barn is in very good condition both inside and out.

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## 10. Maintenance Barns & Garage

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### **Description:**

The two story wood frame storage barn was constructed in 1898.<sup>62</sup> The other smaller single story barn north of the 1898 barn does not appear on historic maps until 1920 "Map of the Quincy Smelting Works" (QD 1083). On the same map appears a garage west of the barns.

**Locator map B number:** 10

**Year of construction:** Two story barn: 1898 Single story barn & garage: c. 1920.

**Historic function:** These storage barns may have been used for animal boarding and other general storage. The function of the garage is unknown.

**Associated artifacts:** None.

**Current conditions:** The barns are in fair condition. Although they are both standing, many of the planks are rotted at the ground line. The garage is missing except for its concrete floor.

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## 11. Main Office Building

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### **Description:**

The two story 20x40 ft. wood frame main office building was completed 1899.<sup>63</sup> The original location of the building was near the cupola furnace building as shown on the

c. 1898 map “Quincy Smelting Works” (QD 1076). It was moved to its present location close to Rt. M-26 in 1905 to make room for the pump room addition to the cupola furnace building.<sup>64</sup>

**Locator map B number:** 11

**Year of construction:** 1898–99.

**Historic function:** The office building was used by the superintendent and his clerk to run the business concerns of the smelter.

**Associated artifacts:** None.

**Current conditions:** The main office is in very good condition considering its age, and because it was used as recently as 2001. It is uncertain if any original furnishings remain.

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## 12. Iron House & Time Office

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### **Description:**

The 8x10 ft. single story wood frame **iron house** was constructed in 1898.<sup>65</sup> It is unknown when it was moved to its present location east and adjacent to the oil house. Although there is a documentary record of this structure, it does not appear on historic maps. There is also the possibility that the current structure is not original.

The single story wood frame **time office** first appears on the 1907 “Map of Quincy Smelting Works and Vicinity” (QD 2025). The 1909 “Map of Smelter and Vicinity” (QD 1056) shows that it was moved from its location near the pump room addition to presumably near the oil house. Although it is not labeled as such on this map, the size of the structure near the oil house is suggestive. It appears labeled again on the 1920 “Map of the Quincy Smelting Works” (QD 1083) in place of the oil house that was moved to the east. It is presumed that the structure located adjacent to the limestone bins today is the same time office.

**Locator map B number:** 12

**Year of construction:** Iron house: 1898      Time office: c. 1907

**Historic function:** This office was probably used to keep track of employee time cards. This is probably where they checked in and out of their shifts.

**Associated artifacts:** None.

**Current conditions:** The iron house and the time office are in very good condition considering their age, however there is a question as to whether or not these are the original structures.

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### 13. Oil House

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**Description:**

The single story 8x8 ft. sandstone oil house was constructed in 1898.<sup>66</sup> The original location of the building was in the NW corner of the works, as shown on the c. 1898 map “Quincy Smelting Works” (QD 1076). It was moved to its present location on the east side of the smelter’s main gate around 1920 (undocumented).

**Locator map B number:** 13

**Year of construction:** 1898.

**Historic function:** The oil house was probably used to store flammables, but what kind is unknown.

**Associated artifacts:** None.

**Current conditions:** The oil house is in excellent condition.

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### 14. Ice House

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**Description:**

The wood frame 20x30 ice house was constructed in 1899.<sup>67</sup>

**Locator map B number:** 14

**Year of construction:** 1899.

**Historic function:** This building was used to store ice , probably for the comfort of the workers during the summer months when work in the furnace buildings was unbearably hot. This was a rather common practice on industrial sites of this period.

**Associated artifacts:** None. Today the ice house contains a shipment of an unidentified white substance that is extremely eroded by water damage.

**Current conditions:** The ice house is extremely poor condition and is likely to collapse. The structure is not in its original location today.

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## 15. Railroad Storage Shed (collapsed)

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### **Description:**

The single story 50x248 ft. wood frame railroad storage shed was constructed in 1902.<sup>68</sup> An addition to its east end was made in 1920. See historic photo (3) for detail.

**Locator map B number:** 15

**Year of construction:** 1902. addition made in 1920.

**Historic function:** To store both incoming mineral and refined copper.<sup>69</sup> See description of the mineral building for more information on the change of mineral handling that took place in 1904.

**Associated artifacts:** The piece of track that remains from this building is where the steam locomotives are located today. The concrete floor of this building and a scale house, with scale, also remain.

**Current conditions:** This building is missing today, save for a small wood structure that was attached to the east end of the main building (see historic map QD 1083) This small structure collapsed during 2000-2001, and remains as a pile of timbers and plank siding.

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## 16. Mineral Building

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### **Description:**

The two story 40 x 95 ft. sandstone mineral building and its elevated 460 ft. train trestle approach was constructed in 1904.<sup>70</sup> Iron truss work supports the second floor where train cars loaded with stamped ore from Quincy's Torch Lake stamp mills was brought into the building and dumped into bins below on the ground floor. The ore was then charged into tram cars by ore bin chutes and trammed to the reverberatory furnace building Previous to 1904 mineral and refined copper was unloaded and stored in the nearby railroad warehouse building<sup>71</sup> The construction of the mineral building in 1904 "for the temporary storage and more economical handling of the mineral, the intention being to use cars instead of barrels for the transportation of all mineral from our stamp mills."<sup>72</sup>

**Locator map B number:** 16

**Year of construction:** 1904.

**Historic function:** To facilitate the unloading of stamped mineral that arrived for processing. Previously the mineral was stored and unloaded in the 1902 railroad building it was laborious to reload the mineral into tram cars for transportation to the reverberatory furnace building. The design of the mineral bld streamlined this process.

**Associated artifacts:** Two tram cars are inside the building.

**Current conditions:** The slate roof and roof framework is in good shape. Water damage has eroded the sandstone at the roofline. Some of this damage was stabilized with concrete fill. The original main doors of the building are missing. Most of the ore bin's wood siding is missing. A plank floor was added to the top floor at some point, however it only covers the east half of the building

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## 17. Cook Boiler House

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### **Description:**

The 28x34 ft. three story steel frame boiler house was installed in 1905.<sup>73</sup> It houses a Cook 150 horse power vertical boiler, a tall brick structure with a central smoke stack.

**Locator map B number:** 17

**Year of construction:** 1905.

**Historic function:** This boiler was installed to replace the original boiler powering the steam engine at the works. The location of the original boiler is unknown.

**Associated artifacts:** The Cook vertical boiler is intact, but its central stack is missing. The boiler's suspended coal storage bin is intact. The space on the boiler's south side contains a large iron stand holding long pipes and timbers that is not associated with this room. There was a tram line in this space originally. The firing shed in front of the boiler's fire box is also strewn with large artifacts and debris not associated with the boiler.

**Current conditions:** The roof of this building is partially collapsed and leaves the interior in front of the boiler's fire box exposed to the elements. There is significant erosion to the exterior sandstone wall in this area, as well as on the east wall where water has seeped down from the roofline. This wall is in extremely poor condition. The wooden service stairway and platform at the top of the boiler is intact but is also in poor, unstable condition.

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## 18. Briquetting Building & Crushing Plant

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### Description:

The 40x45 ft. three story **briquetting building** was constructed in 1906 and was operating by April 1907.<sup>74</sup> It is an interesting structure in that its exterior walls are of solid concrete block, while its interior support is provided by heavy timber framing. The briquetting process was first considered in 1902 as a better method for smelting low grade, finely ground mineral, designated as No. 3 grade by the Quincy system. It was discovered early on that charging this fine mineral directly into the reverberatory furnaces for melting was inefficient. Because of its fine texture, the mineral was carried directly up the smoke stack by the draft's pull and spewed out into the air. Also, because it packed tightly like sand in the furnace, it did not melt efficiently.<sup>75</sup> In 1905, several barrels of Quincy's No. 3 mineral was sent out for testing using the briquetting process, and in early 1906 the briquetting machinery was ordered.<sup>76</sup> The contract called for "one improved mineral briquetting machine equipped with a mold disc having two rows of mold holes for making 4" diameter briquettes. . .one (1) conveyor mixer. . .one (1) automatic ore feeder and measuring device."<sup>77</sup> The process consisted of mixing the mineral with burnt lime, pressing it into briquettes, and then exposing them to steam for about ten hours. The lime and silica combined to bind the mixture into hard cakes, which were smelted in the cupola furnace.<sup>78</sup> After the briquetting plant operated for a few years, it was found that it was not as cost effective as hoped, and the procedure of smelting richer No. 3 mineral in the reverberatory furnaces was adapted again.<sup>79</sup> The briquetting plant was used sporadically thereafter, usually to supplement increased production demands, but sometimes remained idle for years at a time.<sup>80</sup>

The three story, wood frame **crushing plant** is a small addition to the briquetting building added in 1919–20.<sup>81</sup> It was first used to crush silica brickbats to sand the furnaces.<sup>82</sup> The plant consists of a somewhat elaborate vertical conveyor, sizing, and crushing system utilizing crushers, one Blake style jaw crusher and a rotary style. Beginning in 1922, consideration was given to how copper rich slags on the slag piles could be reprocessed. The method of chemical leaching was discussed but promptly discarded in favor of crushing. The Monday Letters of 1922 follows the discussion for a year before a suitable crushing system was tried using crushers from the mine installed in the crushing plant. This method proved suitable enough, and rich slogs were reprocessed.<sup>83</sup>

**Locator map B number:** 18

**Year of construction:** Briquetting building: 1906-1907 Crushing plant: 1919–20.

**Historic function:** To create briquettes of low grade No. 3 mineral for efficient smelting in the cupola furnace. The crushing plant was installed to crush silica sand for the furnaces, and was later used to crush copper rich slag for resmelting.

**Associated artifacts:** All briquetting machinery is missing. The line shafting and an electric drive motor are intact. There are few artifacts in this building associated with its function. A number of two-handed dipping ladles are located here, but were not used in this building. The crushing plant is virtually intact, consisting of a Blake jaw crusher, a rotary crusher, rotating screen grizzly, and all chutes and belting.

**Current conditions:** The roof of the briquetting building is partially collapsed inward, exposing the interior to significant deterioration. Most of the upper floor is still intact, but one portion of it in the NW corner is collapsed. The ground floor and supporting timbers are in good shape, as is the building's exterior. None of the briquetting machinery remains, which gives this structure an emptiness uncommon to the other buildings of the complex. The crushing plant and its machinery is intact and provides an excellent opportunity to examine the crushing process.

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## 19. Limestone Bins

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### **Description:**

The 20x55 ft. 300 ton capacity wood limestone bins were constructed adjacent to the briquetting building in 1906.<sup>84</sup> The bins were loaded from above via a tram line connected to the nearby mineral building, and were discharged into tram cars by chutes at the bottom of the bins. The limestone was used both the smelting and briquetting processes.

**Locator map B number:** 19

**Year of construction:** 1906.

**Historic function:** To store limestone used in the smelting and briquetting processes. Lime shipments received by rail could easily be handled via a trestle connecting the bins with the nearby mineral building.

**Associated artifacts:** None.

**Current conditions:** The bins are intact, but are in poor condition. The bins still contain some limestone, which has poured out onto the ground because many of the deteriorated chutes at the bottom of the bins have rotted and collapsed.

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## 20. Pump Room

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### **Description:**

The 40x25 ft. sandstone pump room is located in the NE wing of the cupola furnace building. This wing was enlarged from the original cupola furnace building's structure. The original wood frame roof over both the engine room and the pump room was replaced by steel truss, brick and concrete supported corrugated metal roof in 1909, due to fire damage to the wood roof caused by the passing of the slag cars over the elevated trestle to the north slag pile.<sup>85</sup> In 1906 an eight inch water line was laid between the No. 6 water tank on Quincy hill to the smelter to replace the worn out line running to the previous pumping station near its original stamp mill just west of the bridge (see 1906 map QD 2045).<sup>86</sup> Three water pumps were installed, presumably taken from Quincy's previous pump house on Portage Lake. These steam pumps drew water from the Portage and pumped it up to the mines and housing areas on top of Quincy hill. The smelter charged the mine for this service.

**Locator map B number:** 20

**Year of construction:** 1906.

**Historic function:** To house the steam pumps used to pump water from the Portage Lake up to the Quincy mines and housing areas.

**Associated artifacts:** All three pumps and a Rand Ingersol compressor are intact in this room. Other artifacts consist of pump maintenance parts.

**Current conditions:** The pump room and its artifacts is intact, although the sandstone structure is badly eroded.

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## 21. Machine Shop

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### **Description:**

The concrete block single story machine shop was constructed in 1907.<sup>87</sup> An addition was made to it in 1920.

**Locator map B number:** 21

**Year of construction:** 1907; extended in 1920.

**Historic function:** The machine shop fabricated and repaired machine parts to keep the smelter operational. Its function differs from the blacksmith shop in that the machine tools

**Associated artifacts:** This building is inaccessible, because currently it is privately rented. A brief look inside revealed that a number of original machine tools are still intact, including lathes and drill presses. Other smaller original tools have been removed and are stored in the dockside warehouse building.

**Current conditions:** The machine shop is in excellent condition inside and out.

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## 22. Scale Houses

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### **Description:**

There are currently three scales still extant. One is located adjacent to the mineral building near where the railroad warehouse stood. Although this scale house is made of modern materials, it is located approximately in the same spot as the original built in 1898, shown on the c.1898 map “Quincy Smelting Works” (QD 1076). The second is a concrete block addition to the south entrance to the reverberatory furnace building, installed c. 1907. The third is located in the open space between the cupola furnace building and the assay office, although it is uncertain if this is the original scale house that was located in this vicinity c.1920 as seen on the “Map of the Quincy Smelting Works” (QD 1083).

**Locator map B number:** 22

**Year of construction:** c.1907 and c. 1920.

**Historic function:** Scales were used to weigh incoming mineral, coal and flux as it was loaded onto tram cars to be charged into the furnaces.

**Associated artifacts:** Two of the three scale houses contain their scales. There is no access to the third scale house, it is unknown what is contained inside.

**Current conditions:** The scale house adjacent to the mineral building is collapsing, but it is still standing. It is constructed of modern materials, and its scale has been destroyed by vandalism. The scale house at the reverberatory furnace building is in good condition, and its scale is intact. The third scale house is wood framed with corrugated siding and is in very good repair. It is uncertain if this is the original scale house in this location as of 1920.

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## 23. Lumber Shed

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**Description:**

The single story 20x30 ft. wood frame lumber shed was constructed in 1917 to store lumber nearby the carpenter shop.

**Locator map B number:** 23

**Year of construction:** 1917

**Historic function:** Used for lumber storage.

**Associated artifacts:** The contents of the lumber shed today are modern lumber and building materials.

**Current conditions:** The lumber shed is in excellent condition both inside and out, showing little sign of deterioration.

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## 24. Casting Shed

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**Description:**

The casting shed was added in 1920 to accommodate the Walker Automatic Casting machine that replaced the process of hand ladling the molten copper into moulds. This steel frame structure was added to the east side of the No. 5 furnace building, also a steel frame structure. These two buildings together formed one open space. A refining furnace was constructed in the place of the original No. 5 furnace. Using the casting machine, a single operator poured molten copper directly from the refining furnace into prepared casting moulds that he rotated around the base of the machine. The castings were dropped into a water filled pit at the back of the machine for cooling. They were brought up from the pit by a large electric conveyor, and then further conveyed to a jib crane. Here they were lifted and placed onto tram cars and brought out to the dockside warehouse or shipping yard. Historic photo (12) shows one of these machines in operation at the Calumet & Hecla smelter.

**Locator map B number:** 24

**Year of construction:** 1920.

**Historic function:** The casting shed housed the Walker Automatic Casting Machine that replaced the labor intensive process of hand ladling of molten copper into moulds.

**Associated artifacts:** The casting shed is strewn with artifacts pertinent to the casting and smelting process. The two largest ones are the refining furnace and the remains of the automatic casting machine. There are also casting machine moulds, tram cars, a large number of hand ladles, rabblers, and paddles. There is an enclosed scale room with scale at the east end of the building, and a casting sand bin in the opposite corner. There are also worker's gloves and some hand tools scattered throughout. There is also a large amount of structural debris and general trash. The placement of the larger artifacts and remains in this building reflect the smelter's last operational period in the late 1960s. It is apparent that the Walker Casting Machine was in use at that time in conjunction with the intact refining furnace. The furnace had been newly rebuilt but not used when operations ceased. This is obvious because of the intact wood bracings still inside of the furnace that were used to hold the new fire bricks together while the furnace was reconstructed. This furnace was fired by four natural gas blowers which are still intact. The furnace was charged by overhead bins situated directly over it. The age and condition of these bins indicate that they were probably originally used to charge the No. 5 furnace that stood in the same area as the current furnace. Artifacts at the east end of the casting shed indicate that sand molds for the casting machine were being made in the building during this time. Originally they were probably not. These include the casting sand bin, a newly made mold, hand tools, and work table. Other artifacts such as the hand rabblers and skimming paddles were also probably used during this period.

**Current conditions:** The casting shed is in an advanced state of deterioration, primarily because a large portion of the corrugated roof has collapsed, leaving the interior exposed to the elements. All of the windows in the building are gone as well, which adds to this condition. This building exhibits a high level of integrity and the large number of remains and artifacts tell much about the smelter's final operations.



## 25. **Badenhausen Boiler House**

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### **Description:**

The two story poured concrete structure and its 125 ft. smoke stack was added in 1920 to house the Badenhausen boiler.

**Locator map B number:** 25

**Year of construction:** 1920.

**Historic function:** This boiler was needed to fire the new corliss steam engine installed during the same year. This was necessary to provide for the additional electrical power requirements of the works.

**Associated artifacts:** There are few artifacts in this area save for timbers and pipes that were probably placed for storage.

**Current conditions:** The structure, boiler, flu, and smoke stack are intact. Water damage has deteriorated the boiler's heat resistant covering material, which may be asbestos. It covers the floor of the structure.

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## 26. **Steel Trestles & Tramway Remnants**

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### **Description:**

A detailed description of the smelter's tram lines and trestles is given in the "Landscape Features" section above.

## 27. **Steam Locomotives No. 29 & No. 175**

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### **Description:**

The two steam locomotives located on the north side of the works are owned by Trans Northern, Inc. This is a company of individuals who purchased the locomotives for the purpose of restoring them to working order. Trans Northern bought locomotive No. 175 in the early 1960s from private owners who had bought it from the Chicago & Northwestern Railroad. No. 175 was built in 1908 and did not run in the Keweenaw, but it did run in the Upper Peninsula.

Trans Northern purchased locomotive No. 29 from the Copper Range Railroad in 1967. No. 29 ran a passenger excursion service between Lake Linden and Calumet between 1967–72, but had been out of service prior to this since 1953. No. 29 is one of seven identical locomotives, #23-30, purchased by the Copper Range. The locomotive was built in 1907. It is the only steam locomotive remaining from the Copper Range

fleet. No. 29 worked in the Keweenaw and probably serviced the smelter at some point.

Both locomotives were stored in the railroad storage shed at the smelter beginning in the early 1970s by permission of the current QMC superintendent Louis G. Koepel. Since then the locomotives have remained while the railroad shed was removed from around them during the late 1980s.<sup>88</sup>

**Locator map B number:** 27

**Year of construction:** Locomotive No. 29: 1907 Locomotive No. 175: 1908

**Historic function:** Main line rail freight transportation. No. 29 was a Copper Range locomotive that probably serviced the smelter at some point.

**Associated artifacts:** N/A

**Current conditions:** These locomotives are in very good, restorable condition although they have been exposed to the elements for many years and have been damaged because of it.

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## 28. Pump House

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### **Description:**

This is a small wood frame shed located behind the engine room and east of the cupola furnace room. It has a below ground level poured concrete foundation to house a diesel engine that powers a water pump. When this pump house was constructed is unknown, but it appears to be a recent addition judging by the construction materials and the pumping machinery itself.

**Locator map B number:** 28

**Year of construction:** Unknown.

**Historic function:** The diesel engine in this pump house indicates that it may have been installed as a back up or emergency water pump that could be used temporarily instead of the steam powered pumps in the pump room.

**Associated artifacts:** None.

**Current conditions:** This structure is intact as are its contents, however it is only in fair condition.

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## ***E. Ephemeral historic structures & areas of sub-surface archaeological sensitivity***

### **1. Pewabic & Franklin Stamp Mill launders, trestles, & features**

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#### **Description:**

It is documented that the ground on which the entire smelting complex sits is fill (see introduction, *site location*). This means that the piece of land is man-made and not part of the original shoreline. It was formed by the deposit of stamp sand from the Franklin and the Pewabic Mining Company's stamp mills. The sand was deposited in a southward progression from the original shoreline into the water over a 40 year period between 1860 and 1898 before Quincy acquired the land. Depositing the sands required the construction of trestles, launders, and possibly structures to carry the sands to the appropriate locations. Some idea of the location of such features that crossed through the smelter site can be found on maps 4 and 7 in Appendix C: Historic Maps. These give the plan view of the Pewabic and Franklin stamp mills and their relationship to the lake. Some of the features associated with the stamp sands area can be seen on these maps.

**Locator map number:** N/A

**Year of construction:** between 1860 and 1898.

**Historic function:** Artifacts associated with tailings deposits were used to carry tailings away from the mill to the furthest extent of the tailings pile at the time.

**Associated artifacts:** Wood launders, tram trestles, and trackage from the stamp mill period may be buried in the fill.

**Current conditions:** There are no known areas or artifacts associated with features related to the Pewabic & Franklin stamp mill period, however it is important to note that future ground excavation on the smelter site should be monitored for the possibility of uncovering such artifacts.

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### **2. Mould Shed**

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#### **Description:**

There was no documentation found on the initial construction of this structure, but it first appears on the 1906 "Map of Quincy Smelting Works and Vicinity" (QD 2045)

The earlier map c.1898 (QD 1076) shows the Cooper Shop and Cooper Stock buildings in the same location, but in a different orientation. Because the use of barrels for transportation was eliminated with the construction of the mineral building in 1906, it is possible that the cooper shop was reused as the mould shed. Its orientation was changed as seen in the 1906 map and in the 1907 “Map of the Quincy Smelting Works” (QD 2025) in order to accommodate the construction of the elevated trestle approach to the mineral building in 1906. The mold shed was moved again during the 1920 expansion of the works to make way for the construction of the tram line trestle to the casting shed, as seen in the 1920 “Map of the Quincy Smelting Works” (QD 1083). It was a still standing structure c. 1972 as shown on a property map filed at the Houghton County Tax Office (see final page of oversized map book, where the structure is shown as still intact).

**Locator map B number:** A

**Year of construction:** Unknown. Possibly this building was originally the cooper shop constructed in 1898.

**Historic function:** To build and prepare sand casting moulds, or for the storage of moulds and mould patterns.

**Associated artifacts:** None.

**Current conditions:** When this structure was razed is unknown, but it appears in a 1978 HAER photograph (11). The area where it stood is a large open space today, and should be treated as an archaeologically sensitive area because of the potential for subsurface remains.

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### 3. Coal Dock

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**Description:**

A detailed description of the coal dock is given in the “Shoreline Features” section above.

**Locator map B number:** B

**Year of construction:** Initially constructed in 1898, filled and trestles added in 1907.

**Historic function:** Coal handling and storage.

**Associated artifacts:** The dock’s wood pilings still exist offshore.

**Current conditions:** There are no above ground remains of the coal dock, its trestles, tram lines, or fences. It is unknown when these structures were razed. The area where it stood is a large open space today, and should be treated as an archaeologically sensitive area because of the potential for subsurface remains.

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#### 4. Sand House

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**Description:**

The 30x36 ft. single story wood frame sand house was first constructed in 1898.<sup>89</sup> it was located near the coal dock on and charcoal house on the west side of the works. The QMC annual report of 1915 indicates the construction of “a new sand house,” which implies that this original building was replaced, for no other sand house is listed as such on later historic maps. See historic photos (5, 6).

**Locator map B number:** C

**Year of construction:** 1898.

**Historic function:** The sand house was used to store fire sand used for lining the reverberatory furnaces.

**Associated artifacts:** None.

**Current conditions:** There are no above ground remains of the sand house. The area where it stood is a large open space today associated with the coal dock, and should be treated as an archaeologically sensitive area because of the potential for subsurface remains.

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#### 5. Cooper, Cooper Stock, & Carpenter Shops original locations

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**Description:**

Both the 42x26 ft. wood frame, single story **cooper shop** and **cooper stock** building were constructed in 1898.<sup>90</sup> They are located at the NE portion of the works, as seen in the 1906 “Map of Quincy Smelting Works and Vicinity” (QD 2045). Because the use of barrels for transportation of mineral was eliminated with the construction of the mineral building in 1906, it is possible that the cooper shop was reused as the mould shed, and the cooper stock building was reused as the carpenter shop. The orientation of these buildings was changed as seen in the 1906 “Map of Quincy Smelting Works and Vicinity” (QD 2045) and in the 1907 “Map of the Quincy Smelting Works” (QD 2025). They were situated side by side at this time. In order to accommodate the expansion of the tram system in 1920, these buildings were moved

again to the west side of the works.<sup>91</sup> The carpenter shop retained its function, and it is possible that the cooper stock building was reused for parts and supply storage.

**Locator map B number:** D

**Year of construction:** 1898.

**Historic function:** The cooper shop and cooper stock building were used for the construction and maintenance of barrels used for mineral shipping between 1898 and 1904.

**Associated artifacts:** None associated with their original locations.

**Current conditions:** The area where these buildings originally stood was redeveloped during the 1920 tram line expansion and although there are no above ground remains in this area, it should be treated as an archaeologically sensitive area because of the potential for subsurface remains.

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## 6. Slag Shed

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### **Description:**

There was no documentation found on the initial construction of this structure, but it first appears on the 1906 “Map of Quincy Smelting Works and Vicinity” (QD 2045), and on subsequent historic maps until 1920. It was most likely removed to accommodate the tram system expansion in 1920. Historic photo (8) shows a view of the slag shed.

**Locator map B number:** E

**Year of construction:** c.1906 or earlier.

**Historic function:** Possible function of the slag shed was to shelter slag, buggies and pots from snow and rain to await charging into the cupola furnace.

**Associated artifacts:** None.

**Current conditions:** There are no above ground remains of the slag shed. It is probable that this structure was removed from the site or dismantled and its lumber reused. The area where it stood is a large open space today, and should be treated as an archaeologically sensitive area because of the potential for subsurface remains.

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## 7. Water Pumping Adits

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### **Description:**

The c.1898 map “Quincy Smelting Works” (QD 1076) shows the existence of an underground water adit on the west side of the works. With the construction of the pump room in 1906, an addition to the cupola furnace building, the smelter began pumping water from the Portage Lake up to the Quincy mines. Although it is not documented, it is probable that a new water adit was constructed at that time. The mouth of a water adit is located on the shoreline between the charcoal house and the assay office. This may be the end of the 1906 adit, and it is likely that it leads straight northward to the pump room from this point.

**Locator map B number:** F

**Year of construction:** 1898, 1906.

**Historic function:** To bring in water to the pump room for pumping up to the Quincy mines.

**Associated artifacts:** None.

**Current conditions:** There are no above ground remains of the earlier adit, however the opening and gate of the later adit is exposed at the shoreline. The areas where these adits ran underground are large open spaces today, and should be treated as an archaeologically sensitive area because of the potential for subsurface remains.

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## 8. Clay Shed

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### **Description:**

The clay shed is a structure on the east side of the works that first appears on the 1907 “Map of the Quincy Smelting Works and Vicinity” (QD 2025). This structure was moved to accommodate the tram system expansion in 1920. Although its new location after the move is not noted on the 1920 “Map of the Quincy Smelting Works” (QD 1083), it is possible that it is the structure located on the north corner of the shoreline of the west inlet. At that time it may have been reused as a warehouse or boathouse.

**Locator map B number:** G

**Year of construction:** c. 1907.

**Historic function:** The clay shed was probably used for the preparation of casting mould and furnace clays, and possibly for its storage after shipping.

**Associated artifacts:** None.

**Current conditions:** There are no above ground remains at the original location of the clay shed. The area where it stood is a large open space today, and should be treated as an archaeologically sensitive area because of the potential for subsurface remains.

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## 9. Tram lines & covered gangways

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### **Description:**

A detailed description of the smelter's tram lines is given in the "Landscape Features" section above. Parts of the tram lines were covered with wooden gangways in order to keep the tracks clear of snow and ice. These gangways were over lines connecting the casting shed and reverberatory furnace building to the dockside warehouse, as seen in the 1920 "Map of the Quincy Smelting Works" (QD 1083).

**Locator map B number:** H

**Year of construction:** Tram lines: 1898-1920. Gangways: c.1920.

**Historic function:** To provide internal materials and waste transportation, and to bring in mineral and materials from main line railroads.

**Associated artifacts:** Although all trackage has been removed, there are number of side dump tram cars, flat cars, and slag cars still on site.

**Current conditions:** Most of the wooden ties associated with the tram lines are no longer evident on the ground surface, but some are visible north of the assay office, on the shoreline slag pile, and on the northern slag pile. All gangways are missing. The paths of the tram lines should be treated as an archaeologically sensitive areas because of the potential for subsurface remains. This also applies to their associated trestles. These are important historic features associated with the smelter's operation. The 1919 map "Quincy Smelting Works Track System" (QD 2032) is the best reference for the location of the tram lines.

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## 10. Unknown Structures

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### **Description:**

These two features appear on an aerial photo c.1980s (photo reference unknown: see historic map QD 1153 page of oversized map book) of the smelting works. The two are in a proximity with each other that they may be associated, however this is uncertain. Neither of these two appear on historic maps, therefore their function is unknown, but a structure in this location does appear on a c. 1972 property map filed at the Houghton County Tax Office (see final page of oversized map book, where the structure is shown as still intact). One feature is clearly a concrete slab, possibly a floor, with a concrete curb defining its boundaries. The other consists of three horizontal concrete footings parallel to each other.

**Locator map B number:** I

**Year of construction:** Unknown.

**Historic function:** Unknown.

**Associated artifacts:** There is a surface deposit of slag, mould sand, and possibly broken firebrick on the surface. There are also mass slag blocks in the form of slag pots on the surface in this area.

**Current conditions:** The major portion of these features is buried in the sand, but their surface outline is evident both on the aerial photograph and on the surface.

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