"SHEEP IN THE TUNNEL"
A GOLD RUSH-ERA SHIP BENEATH YOUR FEET

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ABSTRACT

In December, 1994, during tunnel excavation for San Francisco's Muni Metro Turnback Project (MMTP), a Gold Rush-era ship was encountered 30 feet beneath San Francisco's Justin Herman Plaza. The pressurized, tightly-confined environment within the tunnel and the safety requirement that the tunnel construction proceed without interruption precluded typical archaeological controls and documentation as the tunnel excavation proceeded thorough the ship's hull. Despite these constraints, and as a result of pre-construction planning by archaeological consultant William Self Associates, data recovered were sufficient to enable documentation of the ship's orientation, condition, identity, and associated artifacts. This paper will briefly describe the circumstances of the excavation, the methods used to document the vessel's remains, and the archival research conducted to determine the ship's identity.

In November, 1993 construction commenced on the Muni Metro Turnback project in downtown San Francisco. The project is designed to connect the existing Muni Metro subway's Embarcadero station with the planned expansion of the system to 6th Street, by extending the existing subway terminus in the Embarcadero BART station eastward underground toward the foot of Market Street.

Beneath Justin Herman Plaza, the alignment curves to the south and continues beneath The Embarcadero roadway, returning to the surface at Folsom and Steuart Streets. The Turnback alignment was constructed in four segments: an 840 foot tunnel, an 1100 foot cut-and-cover section, a 380 foot U-Wall section rising to grade at Folsom Street, and a 160 foot at-grade segment connecting to surface tracks at Steuart and Folsom Streets (Figure 1).

The tunnel, cut-and-cover, and U-Wall excavation passed through the extremely dense deposits of historic fill that comprise the substrate of today's financial district and waterfront. William Self Associates of Orinda California conducted archaeological monitoring and data recovery during all phases of construction excavation. Cultural material recovered during archaeological monitoring and excavation spans the period of San Francisco's transformation from sleepy hamlet to major city, spawned by the discovery of gold in 1848, to the catastrophe of the 1906 earthquake and fire.

Nestled among huge sand dunes and surrounded on three sides by water, the burgeoning City of San Francisco expanded in the mid-19th century by leveling the dunes and filling the shallow waters of the bay. Yerba Buena Cove and Mission Bay were quickly filled in. Various strategies were employed in this filling process, but most commonly rubble, dune sand, and all the other detritus of a rapidly expanding city were simply dumped into the bay. In other parts of the city, sand dunes were topped and used as a base to support new streets. In addition to rock, sand, and rubble, Yerba Buena Cove and Mission Bay were filled with commercial and household refuse as well. Broken, outdated, and worn-out household items ranging from chamber pots to tiny porcelain dolls were dumped into the landfill. Structural features such as wharves, sidewalks, and wood pilings were frequently incorporated

into the fill material (Pastron, et al. 1981:74-79; William Self Associates 1996).

In 1847, and again in 1850, Yerba Buena Cove was surveyed and subdivided into "water lots" which were subsequently sold at public auctions in 1847, 1850, and 1852 (Dow 1967; Figure 2). The city extended its streets into the waters of the cove by leasing its submerged lands to private individuals who built wharves across the cove and extended commercial enterprise into the deeper anchorage of the bay (William Self Associates 1996:7-9). Cross-connecting piers or streets on piles were built between the wharves, and the owners of the enclosed water lots subsequently filled their holdings with sand, rubble, and whatever other materials they could conveniently obtain. Abandoned ships were sometimes scuttled to establish property rights and demonstrate title to water lots. Of particular relevance to this paper are the activities of Captain Fred Lawson, who scuttled numerous ships specifically for this purpose. Lawson's actions account for several of the Gold Rush-era ship hulks that reside in the fill beneath today's San Francisco streets.

The population explosion of Gold Rush-era San Francisco created an unprecedented demand for buildings, structures, homes, and warehouses. One of the quickest ways to acquire a "building" was to dismast one of the numerous ships that had been abandoned in the harbor and relocate it in the shallow waters of the bay. These "buildings" were particularly useful as hotels, restaurants and warehouses. As the fill material created new land for the City of San Francisco, it frequently surrounded these floating "buildings," and made them landlocked. They were gradually incorporated into the bay fill and eventually entombed beneath the city streets.

Two of these Gold Rush-era ships, the *Othello* and the *Rome*, had been identified in preconstruction research as potentially lying in the project alignment. The *Alta California* newspaper of January 5, 1852 contains a notice regarding the improper moorage of the *Othello* near what is now Steuart and Market Streets, and threatened action on the part of the harbormaster if the ship was not moved. Unlike the abandoned *Rome*, the *Othello* was a working storeship and, as it is not mentioned again in the historic literature, it is probable that it was moved from its moorage either by its owner or the harbormaster.

In the *San Francisco Examiner* of August 31, 1890, Captain Fred Lawson recounted the story of how, when, and where he scuttled several abandoned ships in the shallows of San Francisco Bay. In his story, Lawson described the 1852 sinking of the ship *Rome*, one of the historic ships identified in the pre-excavation research as possibly lying in the project alignment:

> The ship *Rome* was a big Russian hulk that cost me about $1,000. She was used for a coal ship and sunk by me at the southwest corner of Market and East (now Embarcadero) streets, under where the Ensign saloon was. Her bow touches the edge of Market street. I sank her for Joseph Galloway, and I had to do it in a hurry. Galloway bought a block of Smith [sic]. One morning he came running up to me and excitedly asked if I had a ship. I told him yes, that I had the *Rome*. He told me an injunction was to be served to prevent him having any more piles driven, but that if he could have the ship scuttled before 1 o'clock he would be all right. Before 1 o'clock my tow-boat took the *Rome* in to where he wanted it and down she went. I got $5,000 for that job (*San Francisco Examiner* 1890).

As might be expected in relating a story some thirty-eight years after the fact, Lawson's account of the sinking of the *Rome* contains a few minor factual errors which will be discussed below.

For documentation and access purposes during the MMTP project, it was hoped any encounter with one of the abandoned ships would occur in the cut-and-cover section of the excavation. By the fall of 1994, the cut-and-cover excavation in the western half of the alignment was complete and no ships had been encountered. The tunneling phase of excavation then commenced.

The tunnel is composed of twin 18.5' bores that were driven from the bulkhead at the end of the cut-and-cover section towards the southwest. The presence of bay mud, unclassified, highly

permeable fill, and high groundwater levels required extensive soil stabilization and the constant application of compressed air at the face of the tunnel excavation to keep water and fill out of the tunnel. This necessitated the use of an open face tunnel shield equipped with breast jacks, rather than a closed-face tunneling machine. The open face tunnel shield and associated airlock system was erected at the bulkhead wall of the cut and cover section.

The body of the shield was a cylindrical steel plate stiffened with circular ribs and vertical and horizontal framing members (Bechtel 1991:7). To stabilize the tunnel face within the shield during excavation, breast boards measuring approximately 3 in. thick x 10 in. wide x 5 ft. long were held in place across the tunnel face with hydraulic breast jacks attached to the tunnel shield. These prevented the unconsolidated fill and bay mud from flowing into the shield.

Excavation of the tunnel face occurred in cyclical fashion with the sequential removal of a breast board, manual excavation of the soil to a depth equal to that of the tunnel shield, and replacement of the board prior to removal of another. In this manner, the tunnel was advanced while the tunnel face was breasted at all times, except for the 10 in. x 5 ft. portion being excavated. When the entire tunnel face had been excavated, the tunnel shield was advanced into the soil matrix, around the breast boards, and the excavation cycle was repeated. This open face shield approach to tunneling required that all soil and encountered materials, including cultural resources, be removed through the relatively small openings created during excavation (MMTP AMDRP 1992).

Access to the pressurized tunnel environment was through an airlock and communication with the surface was maintained through a radio-telephone system. Spoils from the tunnel excavation were loaded by conveyor belt into small mining cars that were transported to an equipment air lock at the tunnel entrance. Through the air lock, the mining cars were removed from the pressurized tunnel environment, lifted by crane to the surface, and emptied into a "muck bin" prior to their removal from the site to a contract landfill site. As the tunnel shield advanced into the fill and bay mud, segments of steel tunnel lining rings were assembled in the tail of the shield. As the shield advanced, the rings were bolted onto sections previously erected to form the cylindrical tunnel walls.

On December 2, 1994, Bechtel's on-site tunnel engineer, a Russian emigrant whose English is heavily flavored with the accents of his native tongue, radioed a message to the surface which was dutifully recorded in the radio log as follows: "Tell Greg we have sheep in the tunnel"

The tunnel excavation had encountered a buried ship near its waterline, which allowed for the complete removal of all breastboards, since the hull of the vessel filled the tunnel face. This would be the only time the full extent of the hull was exposed. Once excavation resumed and the the hull was breached, it was necessary to reinstall the breastboard configuration to prevent the unconsolidated fill within the ship from flowing into the tunnel. The pattern of copper sheathing on the exterior of the hull indicated that the bow was to the left of the tunnel face, which illustrated one of the discrepancies in Lawson's account of the scuttling of the *Rome*. In his recollection of the event, he had stated that the bow was touching Market Street, which lay to the right of the tunnel.

Prior to the resumption of excavation, project surveyors were requested to map the exposed hull surface in order to determine its curvature at the point of its exposure (Figure 3). As mentioned, once excavation resumed and the hull was breached, all breastboards were reinstalled, which meant the only view of the hull and its interior was that provided by the removal of individual breastboards. The lack of exposure this created, the pressurized environment required to maintain positive pressure at the tunnel face, and the tightly-confined work space at the tunnel face previously had precluded the presence of an archaeological monitor in the tunnel, in accordance with the project's Programmatic Agreement and Archaeological Monitoring and Data Recovery Plan. With the exposure of the ship, however, this restriction was relaxed and monitoring occurred on a daily basis during the excavation through the ship from a perch on the side of the tunnel face. Despite the presence of a

monitor, however, interpretation of the vessel's structure, and the position of the tunnel relative to the vessel, was only possible after the fact.

The description of the piece illustrated in Figure 4, for example, was made only after it had been removed from the ship. It was the illustration of this piece in the archaeological monitor's daily log that gave the first indication the tunnel had encountered the ship near the bow.

The tunnel was advanced through the ship by hand. Prior to encountering the hull, tunnel progress was measured at roughly 12 -15 feet per day. Once excavation through the ship resumed, progress was measured in inches per day. Chainsaws, handaxes, and a specially constructed grinder were used to remove elements of the ship's structure, which, naturally, destroyed any possibility the vessel's structural members could be coherently assessed on the surface after removal from the pressurized tunnel environment.

Once the centerline of the ship was reached, excavation halted long enough to allow archaeologists to enter the tunnel face to document the keelson, maststep, limberboard, and mast chock, and to determine the angle of the keelson relative to the tunnel face (Figures 5 and 6). The extrapolation of this angle with the measured curvature of the hull indicated that the vessel's stem lay outside the tunnel wall, north of the south tunnel.

Research conducted by the Peabody Essex Museum on the ship *Rome*, described by Captain Lawson as being scuttled in this location, revealed that the 3-masted ship was built in 1829 in Salem MA by Elijah Briggs in the shipyard of his cousin, Enos Briggs. It was not a Russian collier as described by Lawson. The ship made several trading voyages to the Far East, Guam, and the South Seas and departed on its final voyage to San Francisco in 1849. The *Rome* arrived on Feb 28, 1850 210 days from New York, carrying a load of passengers headed for the gold fields, as well as a cargo of dried apples, 100 dz bottles of ale, 100 dz bottles of brown stout, barrels of beans, salted pork, cement, 50 cots, and 200 boxes of window glass.

Lawson's recollection that the *Rome* was sunk, ". . . at the southwest corner of Market and East Streets, under where the Ensign saloon was . . ." is also slightly inaccurate. Through careful examination of historic documents, maps, photographs, and line drawings, Olmsted, Olmsted and Pastron (1977:287-291) ascertained that if the *Rome* was sunk where Lawson says it was, it would have been ". . . lying right at the head of the slip alongside the Market Street wharf, where she would have been an obstruction" (Olmsted et al. 1977:288). Lawson's reference to the *Rome* being sunk ". . . where the Ensign saloon was" places the ship's location too far to the east. An 1894 line drawing depicting the south side of Market Street shows that the *Rome*'s remains lie beneath the former location of either the Alameda Exchange or the L. Foard Ship Chandlery. Finally, as discussed above, examination of the hull's orientation indicates that the stern of the ship, and not the bow, would have been touching Market Street when the *Rome* was scuttled. Despite these minor discrepancies, Lawson's recollection that the *Rome* was sunk at the corner of Market and East Streets coincides almost exactly with the location of the ship encountered in the tunnel and provides compelling testimony to its identification; the physical remains are also consistent with those of a ship the size of the *Rome* (Figure 7).

Wood analysis indicates the keel, framesets, and hull planking were fabricated from a species of white oak native to the northeast US, locale of the Salem shipyard. Both the *Rome* and the ship in the tunnel were three masted vessels, as indicated by the position of the foremast illustrated earlier. The ship in the tunnel had a depth of hold of 12 ft. as measured in the cramped confines near the foremast. The *Rome*'s depth of hold was recorded as 12.3 ft., measured at the midship frame. Extrapolated measurements of the ship in the tunnel indicate a beam of 25', the *Rome* had a recorded beam of 25.7'

The ship appears to have been empty when it was scuttled. Its foredeck had been removed and the lower portion of the hull had been filled with sand. What few artifacts that were recovered appear to be intrusive and of little help in identifying the ship. The most interesting of these were several olive jars of a type ubiquitous in

Spanish colonial sites of the 15th to 19th centuries. Their presence in mid-19th century Yankee California is noteworthy, possibly pointing up a shortage of materials on the frontier, a lack of cooperage, and a consequent need to recycle containers.

In 1996, the ship and its surrounding matrix of historic artifact-laden fill was determined eligible for listing on National Register of Historic Places. The documentation of the various ship parts recovered on the surface forms the bulk of archaeological interpretation of this historic resource. It was originally hoped that portions of the hull structure could be recovered on the surface, conserved, and reassembled to form a public interpretation in the park above the ship's resting place. The nature of the excavation through the ship and its impact on those portions of the vessel that were removed, however precluded that possibility. Despite this, however, significant values in this historic find exist in several different dimensions. These may be discovered in the fact that we now know the location and history of a Gold Rush-era ship and that artifacts recovered from it, while not directly associated, are nonetheless dateable to the seminal period in California's history. These artifacts will provide an important glimpse of the 19th century's material culture and will provide meaningful interpretation to any number of public displays in museums, libraries, or schools. Another value in the discovery lies in the documentation of early 19th century ship construction methods, limited as that documentation may have been. Perhaps the greatest value this archaeological resource brings to the general public, however, is one that may be easily grasped by anyone visiting San Francisco today. With proper interpretation, the coincidental intersection of the *Rome* and the tunnel of the Muni Metro System that passes through it, will provide a tangible metaphor in which a state-of-the-art 20th century transportation system is forever linked with the state-of-the art 19th century transportation system that brought the builders of San Francisco to the shores of Yerba Buena Cove and later formed the substrate upon which that City was built.

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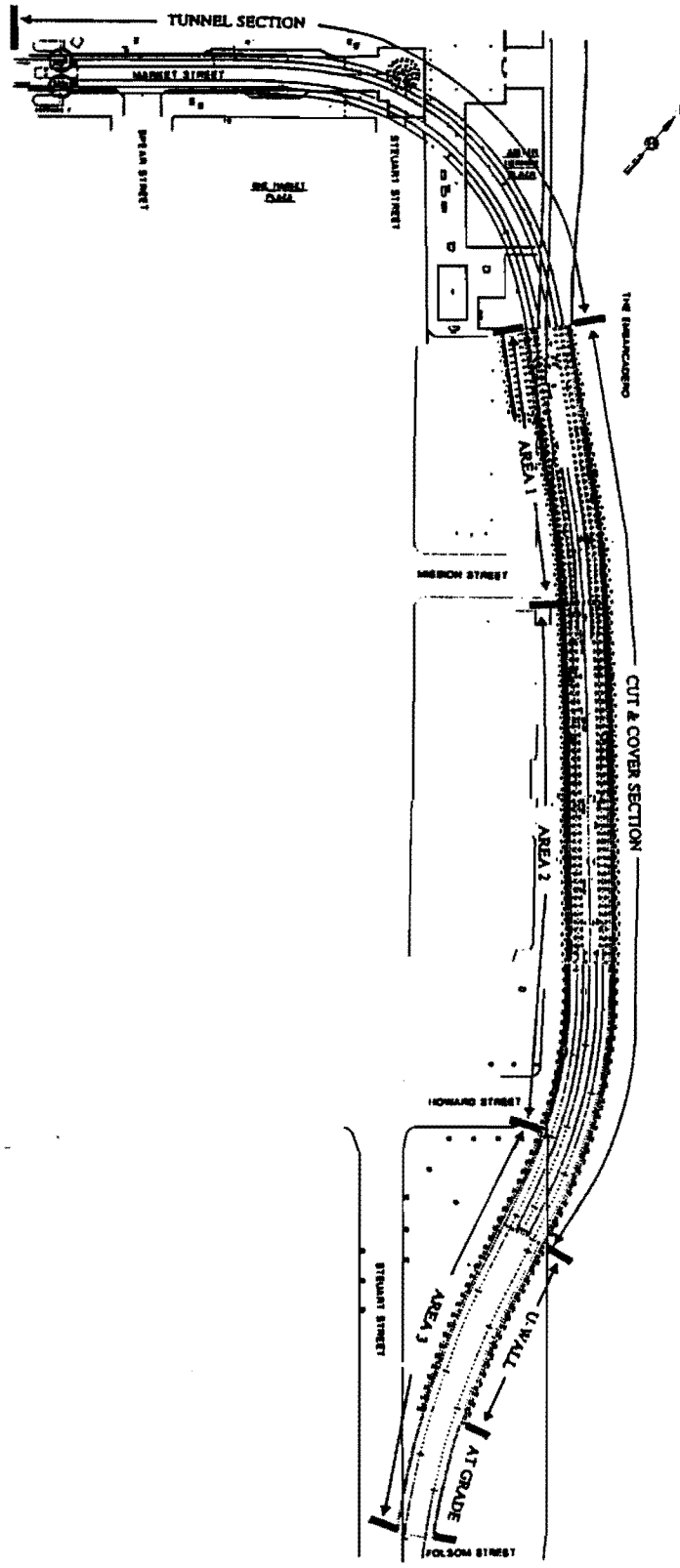


Figure 1. MMTP Project Alignment

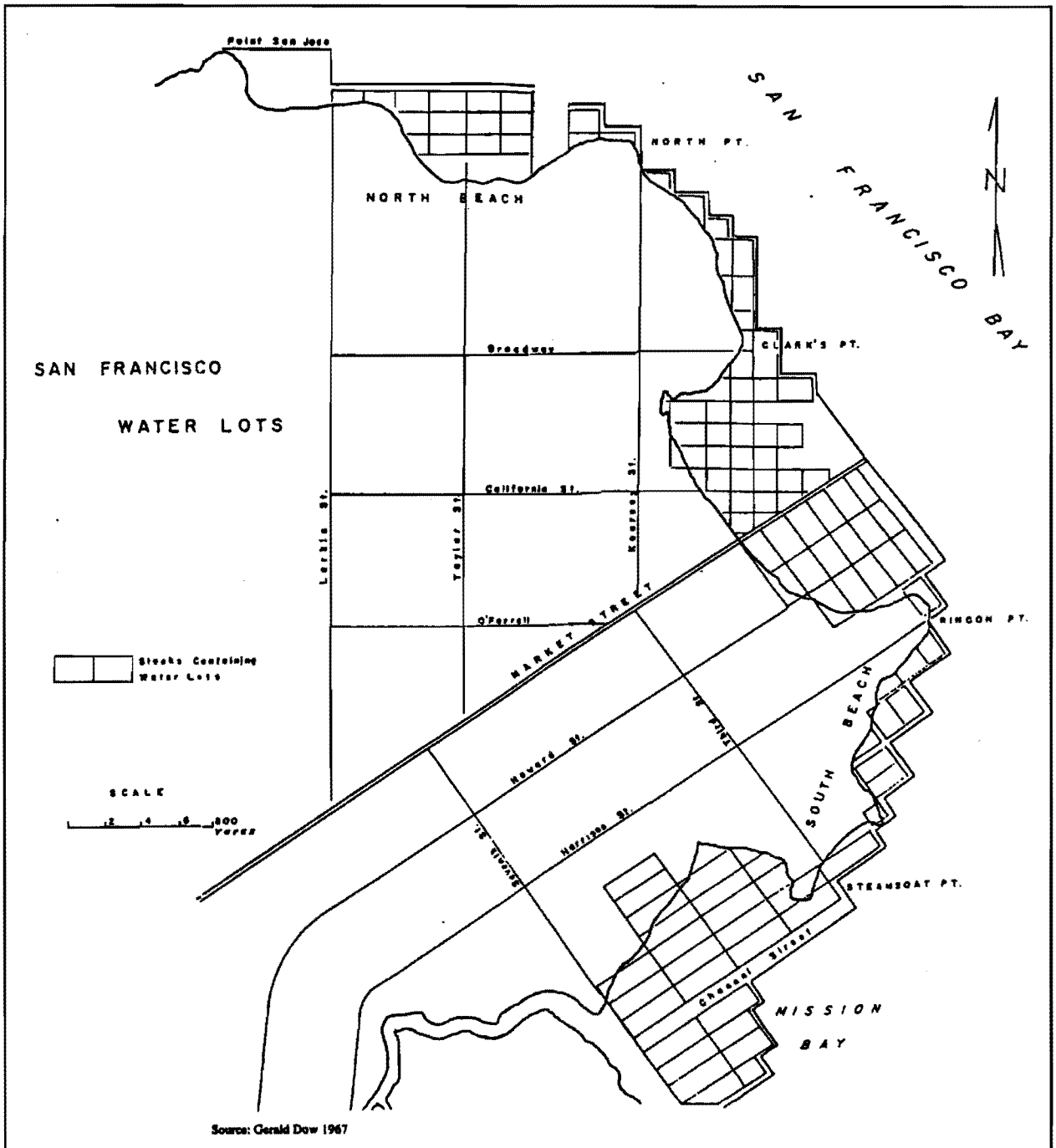
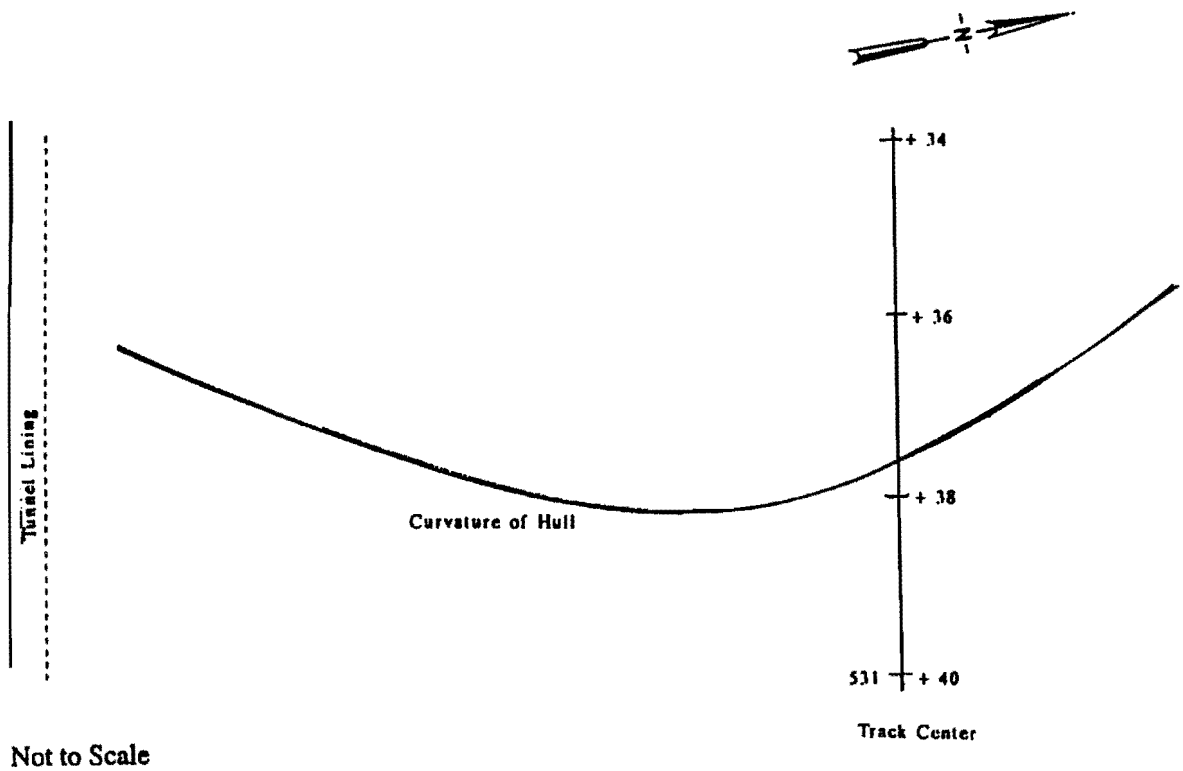


Figure 2. Water Lots, 1847 and 1850 (Source: Dow 1967)



Not to Scale

Figure 3. Curvature of Hull (Plan View)

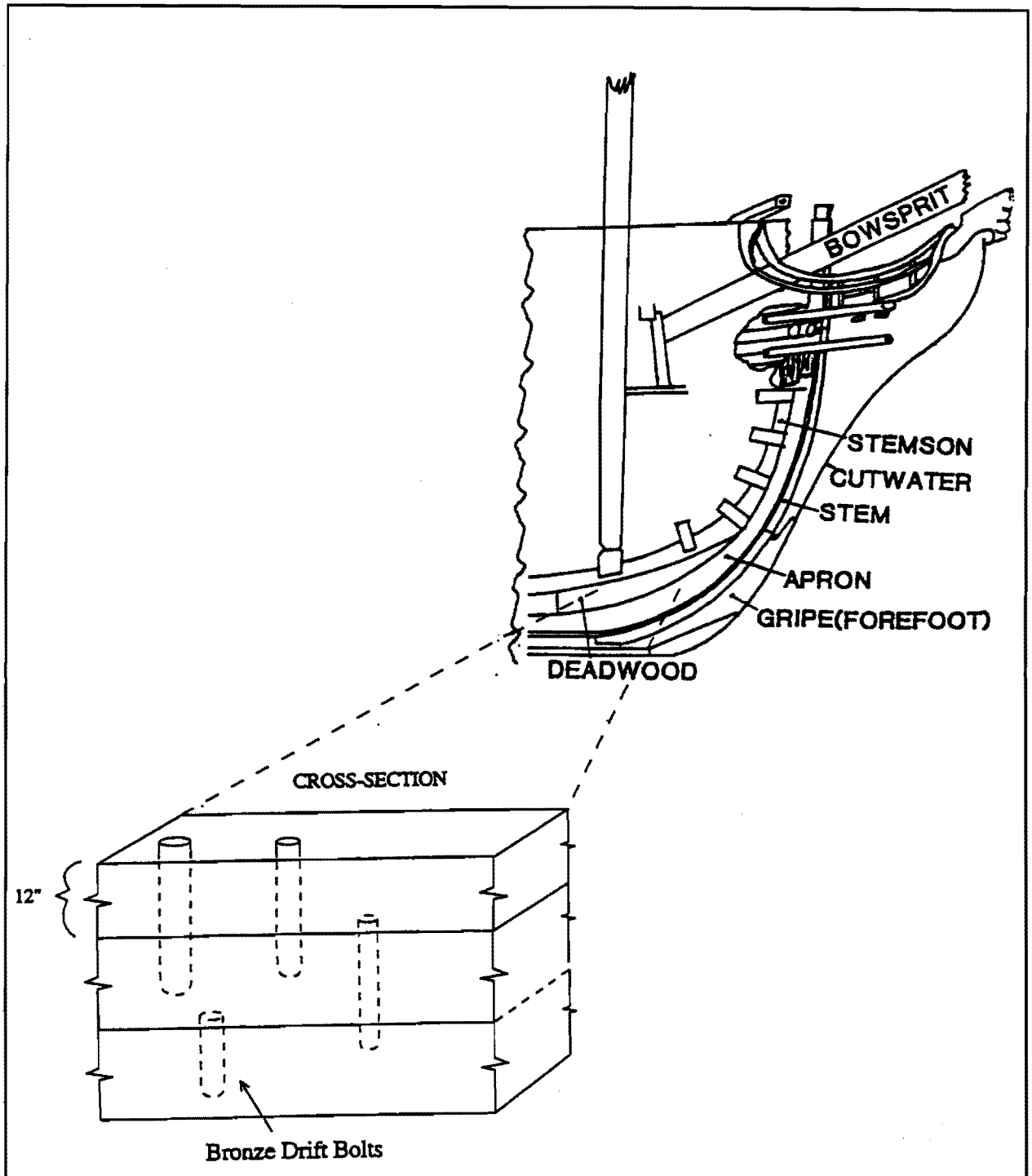


Figure 4. Composite Timbers (Presumed portion of apron, forefoot, and deadwood)

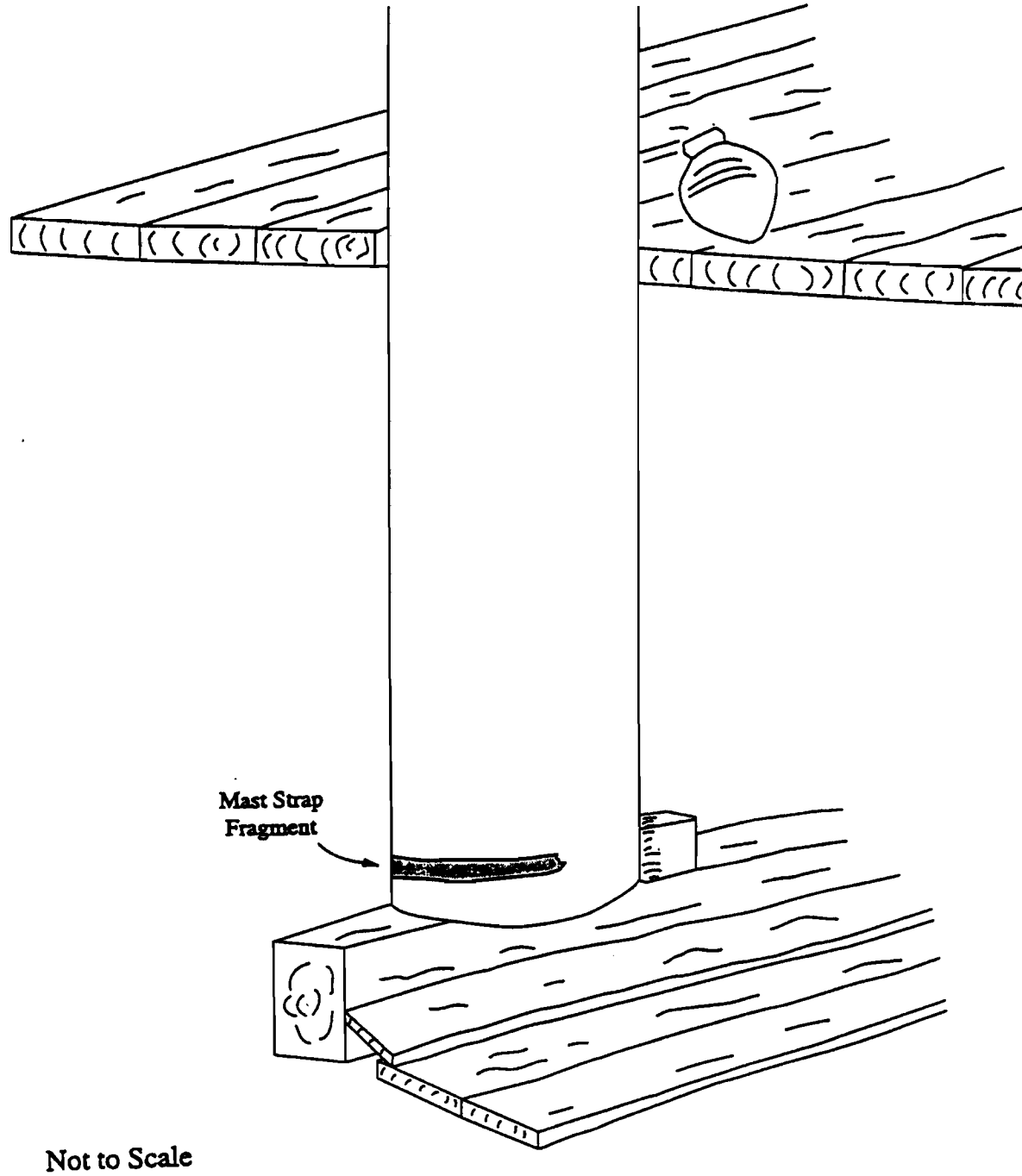


Figure 5. Mast, Keelson, Garboard Strake, and Deck

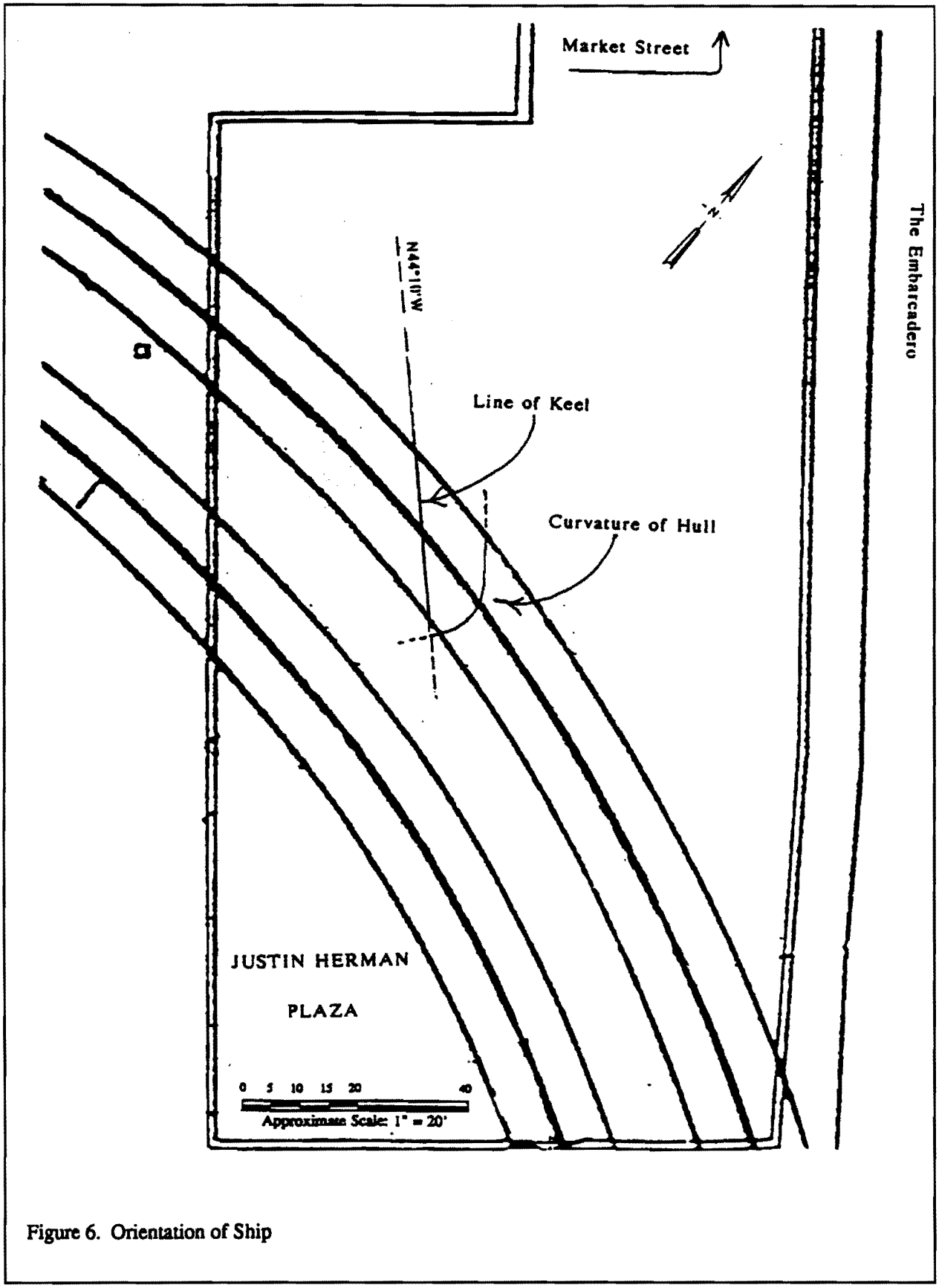


Figure 6. Orientation of Ship

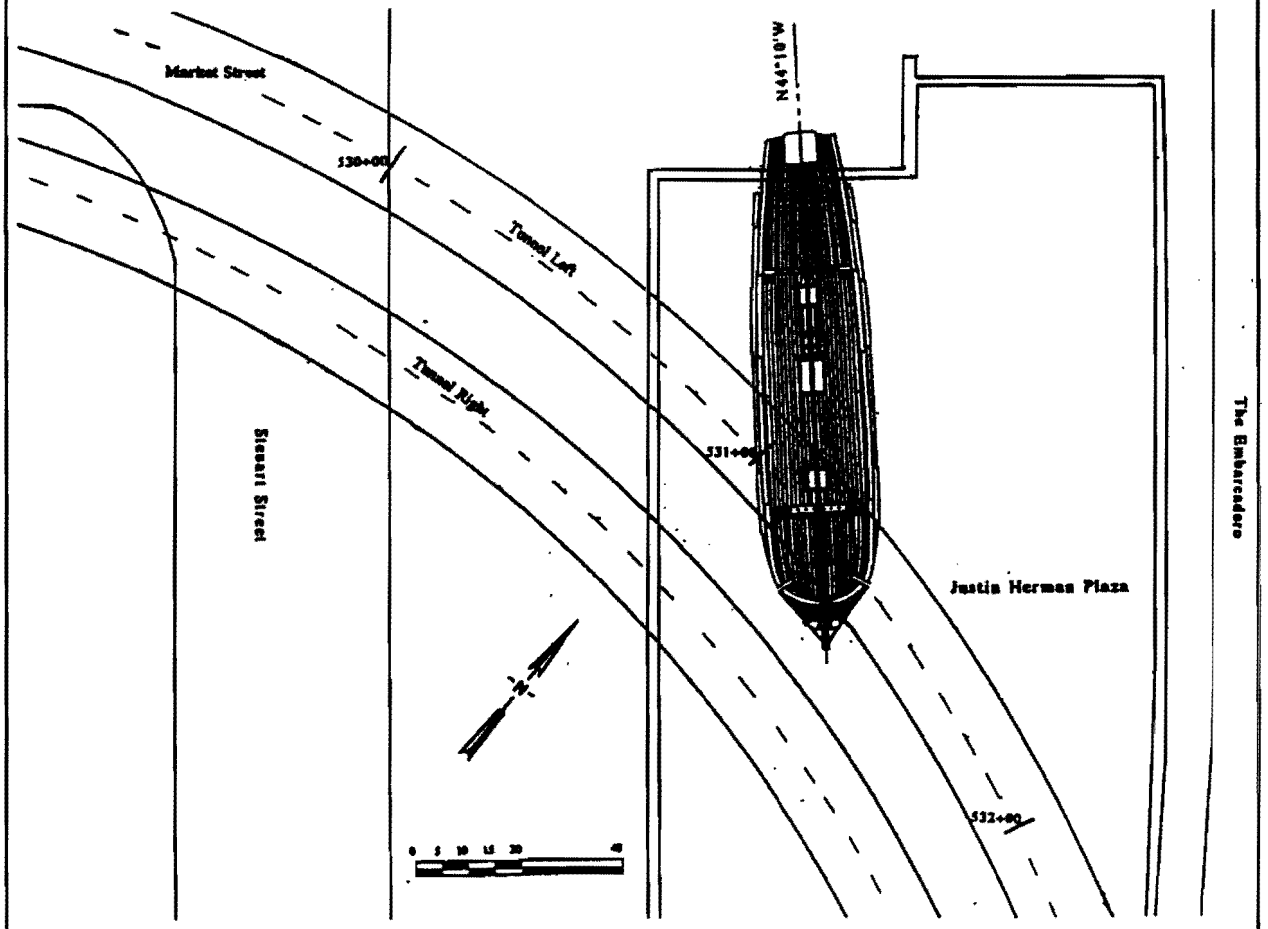


Figure 7. Location and Orientation of Ship *Rome*