Archaeological and Forensic Research in Support of the 1921 Tulsa Race Massacre Graves Investigation:

The 2022-2023 Field Seasons at Oaklawn Cemetery

compiled by

Kary L. Stackelbeck
Phoebe R. Stubblefield
Amanda Regnier

Volume II,
Apppendices

Report submitted to the City of Tulsa
by the
Oklahoma Archeological Survey,
University of Oklahoma,
and the
C.A. Pound Human Identification Laboratory,
University of Florida

ARCHAEOLOGICAL AND FORENSIC RESEARCH IN SUPPORT OF THE 1921 TULSA RACE MASSACRE GRAVES INVESTIGATION:

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the Oklahoma Archeological Survey and the C. A. Pound Human Identi ication Laboratory

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APPENDIX A

2022/2023 BURIAL DESCRIPTIONS AND SITE HARDWARE TYPOLOGY

Tulsa Race Massacre Investigations

2022/2023 Burial Descriptions and Site Hardware Typology

(Redacted)

Brooke L. Drew

Stantec

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Burial 036

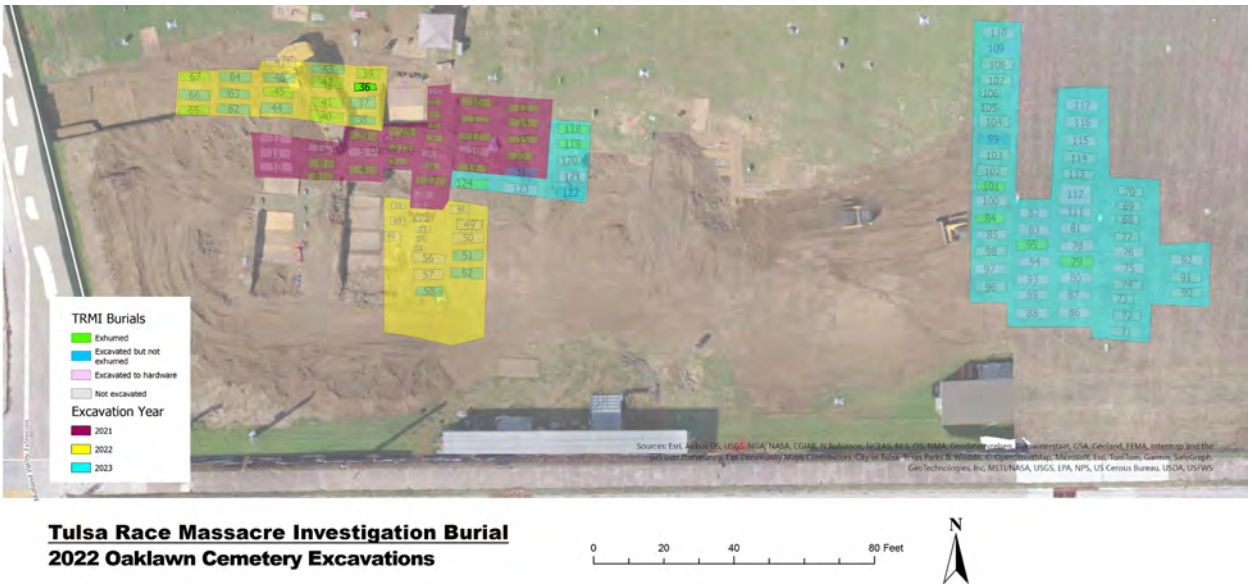

Figure 1 TRMI site map showing location of Burial 036

Final Excavation Status	Exhumed
Started	11/9/2022
Completed	11/17/2022
Excavators	Armando Anzellini, Michael Loughlin
NW starting elevation	99.0990
NW ending elevation	98.8493

Burial 036 is located in the first row to the west in the 2022 west excavation expansion (Figure 1). The individual burial shaft measured 165 cm long and 53 cm wide.

This individual was interred with the head oriented to the west. The body was found to be in a supine, partially flexed position. The right lower leg was extended, however, the left knee was bent approximately 30°. The individual also appeared to be laying slightly to their right; this may be because they were placed in the coffin on their side or the body shifted when lowered into the burial shaft.

Skeletal preservation was poor with cortical flaking noted. Taphonomic damage resulted in the absence of much of the axial skeleton as well as the hands and feet. The cranium was also crushed and fragmentary.

Burial container wood preservation was also poor, though one sample was collected for further analysis. Nail location as well as soil staining indicated a plain, rectangular casket measuring 145 cm long and 45 cm wide. No coffin hardware was found other than wire nails. Excavators noted a small green staining near the remains, possibly evidence for a cuprous shroud pin that had fully deteriorated. No personal items or other grave good were recovered.

Due to the sparse nature of the material culture directly associated with Burial 036, it was difficult to assign a precise date of interment; however, what was observed is consistent with an early to mid-1920s interment. This individual was interred in an unadorned rectangular casket consistent with the expected burial treatment for massacre victims (Figure 2). The remains were exhumed and taken to the forensic laboratory for examination and were designated Oaklawn Unknown #25

Burial 036 (continued)

Figure 2 Burial 036 photogrammetry model illustrating condition of burial with skeletal remains fully exposed (application of Butvar to stabilize skeletal remains for forensic analysis causes white discoloration where applied)

Burial 037

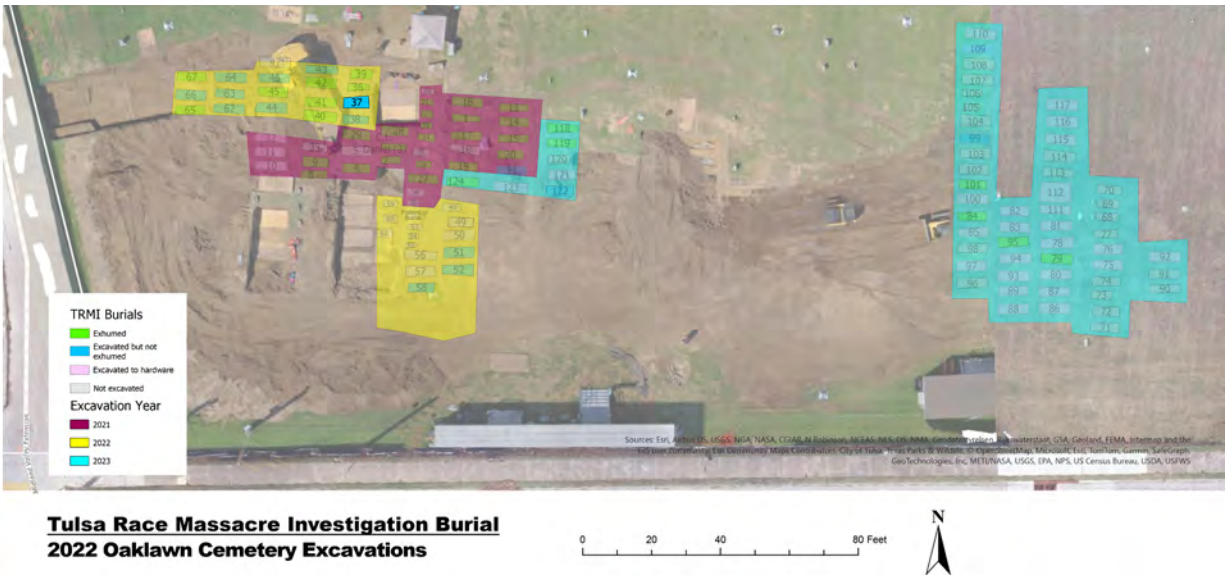

Figure 3 TRMI site map showing location of Burial 037

Final Excavation Status	Excavated but not exhumed
Started	11/3/2022
Completed	11/5/2022
Excavators	Armando Anzellini, Michael Loughlin
NW starting elevation	99.0990
NW ending elevation	98.8493

Burial 037 is located in the first row to the west in the 2022 west excavation expansion (Figure 3). The individual burial shaft measured 218 cm long and 74 cm wide.

This individual was interred with their head oriented to the west. The body was found to be in an extended supine position with the right arm straight along the decedent's side and the left flexed approximately 90° so the left hand was laying over the right hip. The left leg was extended straight, however, the right lower limb was positioned so the ankles were crossed (Figure 5).

Skeletal preservation was poor with cortical flaking noted. Taphonomic damage resulted in the absence of much of the axial skeleton as well as many of the hand and foot phalanges. The cranium was also crushed and fragmentary.

Wood preservation was moderate with one sample taken from the remnants of the coffin lid (Figure 4). Evidence indicated a rectangular casket and several wire nails were recovered; the casket measured 200 cm long and 62 cm wide. Other non-decorative utilitarian hardware included ferrous internal casket lid closures located at the four corners of the burial container, suggesting a commercially manufactured burial case. Decorative hardware was present (Figure 4) and included six Oaklawn Type 10 ferrous double lug swingbail handles, six Oaklawn Type 04 triangular ferrous thumbscrews, and one ferrous coffin plaque located in the central portion of the feature, tentatively identified as a Oaklawn Plaque Type 08 (Stackelbeck et al., 2024: Appendix A).

Several personal adornment and clothing items were found with the individual interred in Burial 037. These included a cuprous ovoid belt plate located above the abdomen; the exact form or decorative detail on the plate was indeterminate due to poor preservation (Figure 6). Two cuprous stamped star-shaped pins—possibly epaulettes—were uncovered over each shoulder (Figure 7). Additionally, two cinch-type celluloid hair pins were found on the right and left sides of the cranium (Figure 8).

Burial 037 (continued)

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. This burial was left *in situ*.

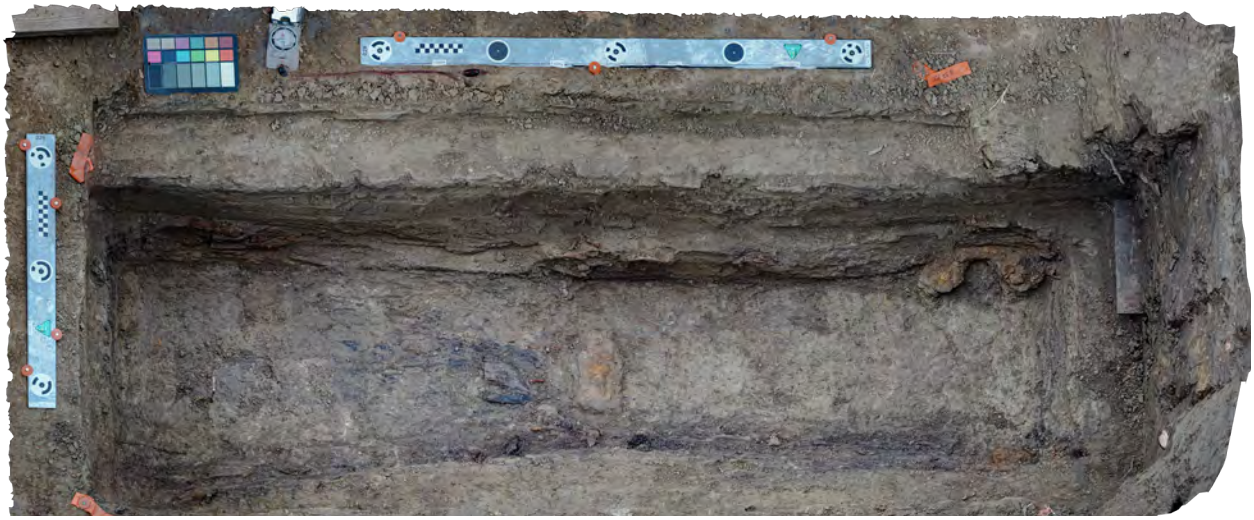

Figure 4 Burial 037 photogrammetry model illustrating preserved coffin wood and decorative hardware

Figure 5 Burial 037 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

Figure 6 Remnants of cuprous belt plate found over Burial 037 abdomen

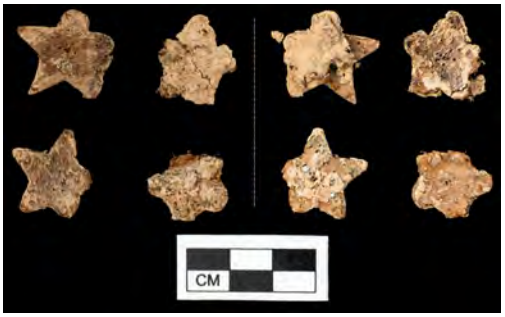

Figure 7 Decorative pins recovered from the shoulders of Burial 037

Figure 8 Celluloid cinch type hair pin recovered Burial 037 cranium

Burial 038

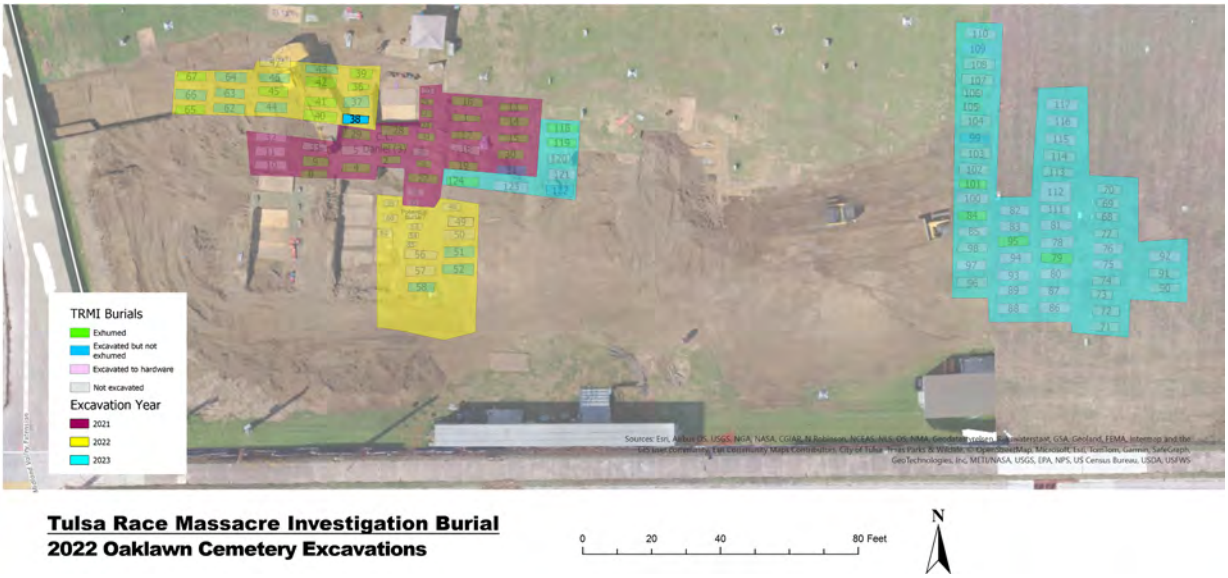

Figure 9 TRMI site map showing location of Burial 038

Final Excavation Status	Excavated but not exhumed
Started	11/09/2022
Completed	11/11/2022
Excavators	Armando Anzellini, Michael Loughlin, Jeremy Wilson
NW starting elevation	99.1087
NW ending elevation	98.6982

Burial 038 is located in the first row to the west in the 2022 west excavation expansion (Figure 9). The individual burial shaft measured 210 cm long and 66 cm wide.

This individual was placed with the head oriented to the west. The body was found to be in an extended supine position. Original placement of the arms, hands, legs, and feet were indeterminate due to post-depositional shifting of the extremities; in particular, the right leg was significantly displaced towards the left lower portion of the burial feature (Figure 10).

Skeletal preservation was poor with cortical flaking noted. Taphonomic damage resulted in the absence of much of the axial skeleton. The cranium was also crushed and fragmentary.

Wood preservation was moderate with one sample taken from the remnants of the west wall and one from the east wall. Evidence indicated a rectangular casket and several wire nails were recovered; the casket dimensions were 184 cm long and 48 cm wide. Other non-decorative utilitarian hardware included ferrous internal casket lid closures located at the four corners of the burial container, suggesting a commercially manufactured burial case. Decorative hardware was present and included six Oaklawn Type 09 ferrous double lug swingbail handles and one ferrous coffin plaque of indeterminate type located in the central portion of the feature (Stackelbeck et al., 2024: Appendix A).

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. This burial was left *in situ*.

Figure 10 Burial 038 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

Burial 039

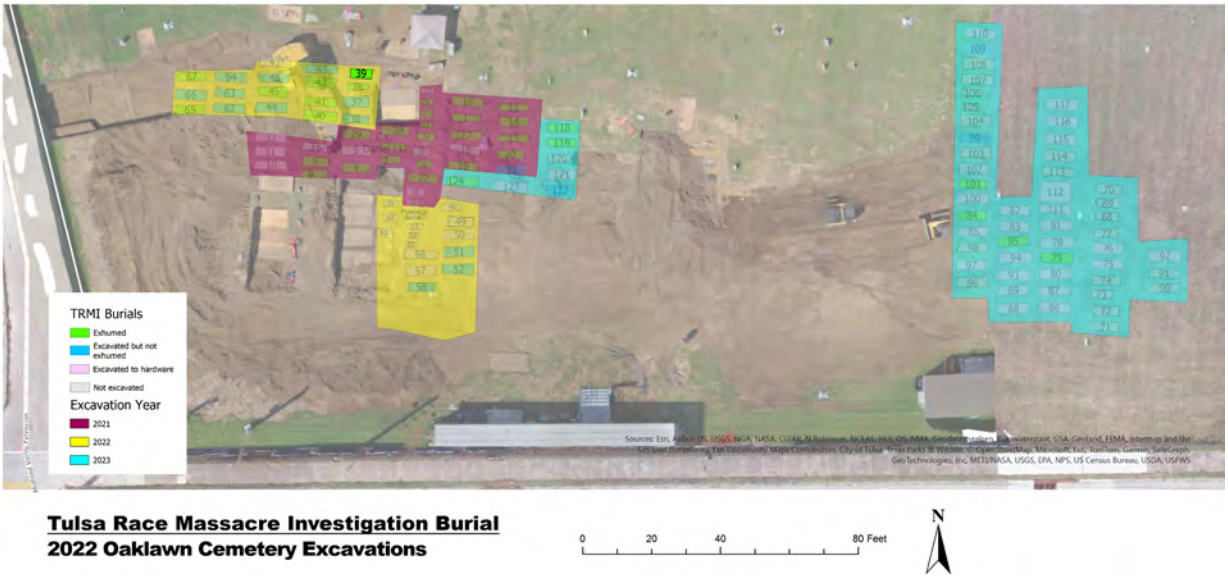

Figure 11 TRMI site map showing location of Burial 039

Final Excavation Status	Exhumed
Started	11/2/2022
Completed	11/3/2022
Excavators	Jeremy Wilson, Gretchen Zoeller
NW starting elevation	99.1268
NW ending elevation	98.7163

Burial 039 is located in the first row to the west in the 2022 west excavation expansion (Figure 11). The individual burial shaft was initially measured as 170 cm long and 64 cm wide, but as excavation continued the dimensions were adjusted to 200 cm long.

This individual was interred with the head oriented to the west. The body was found to be in an extended supine position with arms placed directly at the sides; the leg were also straight with the ankles uncrossed (Figure 12).

Excavators noted that skeletal preservation was poor, with the skull, thorax, and pelvis severely fragmented. While long bone epiphyses preservation was also poor, long bone shafts were more intact. Burial container wood was affixed to several elements, causing some trabecular bone to be affected during excavation.

Burial container wood preservation was fair and one sample was collected from a wall for further analysis. Nail location as well as soil staining indicated a plain, rectangular casket measuring 196 cm long and 60 cm wide. No coffin hardware was found other than wire nails. No personal items or other grave good were recovered, though excavators initially misidentified three fragments of undiagnostic ferrous metal as clothing fasteners.

Due to the sparse nature of the material culture directly associated with Burial 039, it was difficult to assign a precise date of interment; however, what was observed is consistent with an early to mid-1920s interment. This individual was interred in an unadorned rectangular casket consistent with the expected burial treatment for massacre victims. The remains were exhumed and taken to the forensic laboratory for examination and were designated Oaklawn Unknown #22.

Burial 039 (continued)

Figure 12 Burial 039 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

Burial 040

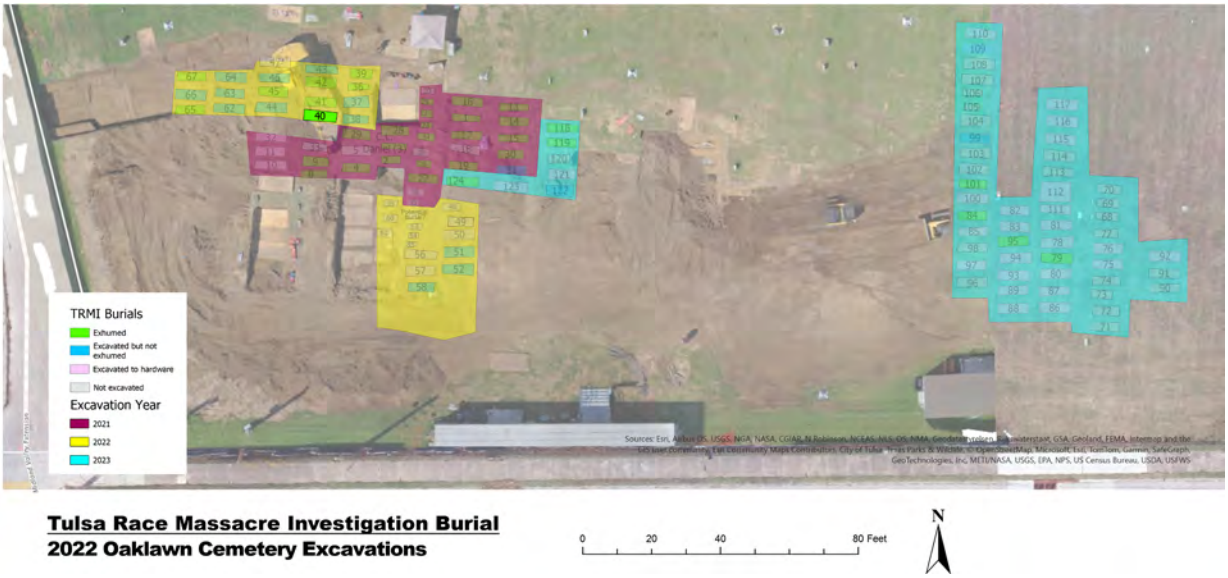

Figure 13 TRMI site map showing location of Burial 040

Final Excavation Status	Exhumed
Started	10/31/2022
Completed	11/2/2022
Excavators	Armando Anzellini, Michael Loughlin
NW starting elevation	99.1033
NW ending elevation	98.6326

Burial 040 is located in the second row to the west in the 2022 west excavation expansion (Figure 13). The individual burial shaft measured 231 cm long and 66 cm wide.

This individual was interred with the head oriented to the west. The body was found to be in an extended supine position with arms placed directly at the sides; the legs were straight with the ankles uncrossed (Figure 14).

Skeletal preservation was poor with significant cortical flaking noted. Taphonomic damage resulted in the absence of much of the axial skeleton as well as the hands and feet. The cranium was also crushed and fragmentary, though one gold crown was observed among the surviving dentition.

Burial container wood preservation was fair, with three samples taken from the south wall, north wall, and bOrttom. Nail location as well as soil staining indicated a plain, rectangular casket measuring 118 cm long and 47 cm wide. No coffin hardware was found other than wire nails. No personal items or other grave good were recovered.

Due to the sparse nature of the material culture directly associated with Burial 040, it was difficult to assign a precise date of interment; however, what was observed is consistent with an early to mid-1920s interment. This individual was interred in an unadorned rectangular casket consistent with the expected burial treatment for massacre victims. The remains were exhumed and taken to the forensic laboratory for examination and were designated Oaklawn Unknown #20.

Burial 040 (continued)

Figure 14 Burial 040 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

Burial 041

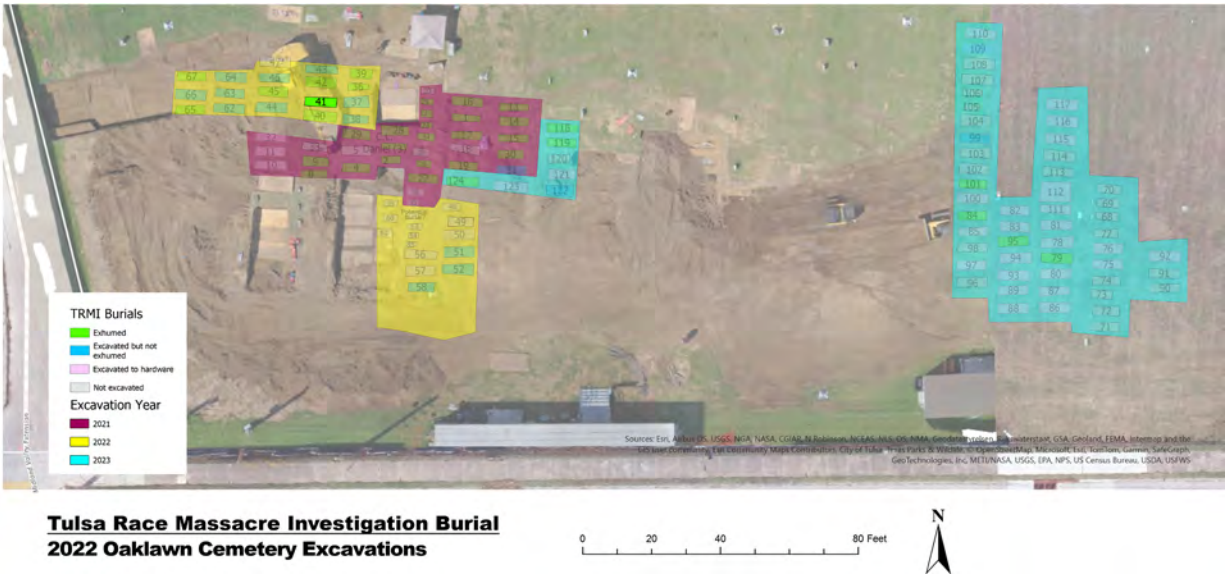

Figure 15 TRMI site map showing location of Burial 041

Final Excavation Status	Exhumed
Started	11/9/2022
Completed	11/11/2022
Excavators	Kelsey Kreiser, Eric Prendergast
NW starting elevation	99.1685
NW ending elevation	98.5163

Burial 041 is located in the second row to the west in the 2022 west excavation expansion (Figure 15). The individual burial shaft measured 233 cm long and 61 cm wide.

This individual was interred with the head oriented to the west. The body was found to be in an extended supine position with arms placed directly at the sides and the legs straight with ankles uncrossed. The right hand was resting under the right pelvis and femur. The skull was turned towards the south; it was unknown if the decedent was placed in to the internment in this manner or if this positioning was the result of post-depositional processes (Figure 16).

Skeletal preservation was poor to fair. Taphonomic damage resulted in highly fragmentary axial, hand, and foot elements. Long bone epiphyses were mostly crushed, however, shafts were slightly better preserved. The cranium, in comparison, was complete and had suffered significantly less post-depositional damage than the post-cranial remains.

Burial container wood preservation was fair, with two samples taken for further analysis. Nail location as well as soil staining indicated a plain, rectangular casket measuring 196 cm long and 50 cm wide. No coffin hardware was found other than wire nails. No personal items or other grave good were recovered.

Due to the sparse nature of the material culture directly associated with Burial 041, it was difficult to assign a precise date of interment; however, what was observed is consistent with an early to mid-1920s interment. This individual was interred in an unadorned rectangular casket consistent with the expected burial treatment for massacre victims. The remains were exhumed and taken to the forensic laboratory for examination and were designated Oaklawn Unknown #23.

Burial 041 (continued)

Figure 16 Burial 041 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

Burial 042

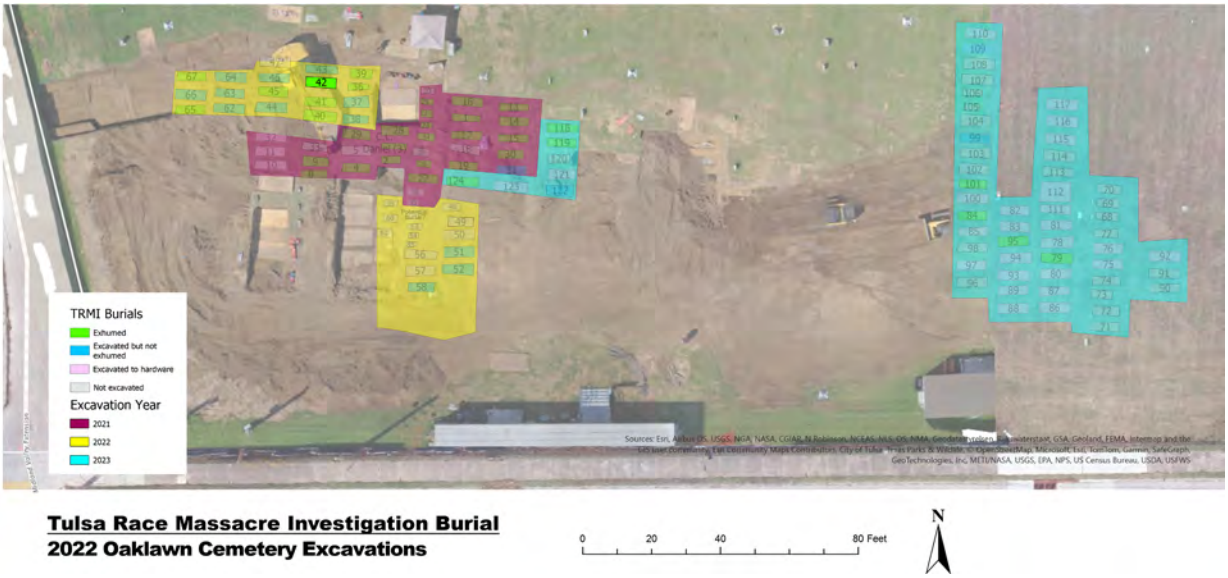

Figure 17 TRMI site map showing location of Burial 042

Final Excavation Status	Exhumed
Started	10/31/2022
Completed	11/3/2022
Excavators	Kelsey Kreiser, Eric Prendergast
NW starting elevation	99.1788
NW ending elevation	98.6363

Burial 042 is located in the second row to the west in the 2022 west excavation expansion (Figure 17). The individual burial shaft measured 210 cm long and 77 cm wide.

This individual was interred with the head oriented to the west. The body was found to be in an extended supine position with arms placed directly at the sides and legs straight with ankles uncrossed. Both the arms and legs were unusually flared away from the body, and excavators noted this was consistent with a decedent who was in an advanced state of decomposition when placed in their burial container. The skull was tilted back to an extreme degree, but it is unknown if this positioning was how the individual was intentionally placed or if it was the result of post-depositional changes (Figure 18).

Skeletal preservation was poor. Taphonomic damage resulted in highly friable remains and fragmentary axial, hand, and foot elements; long bone epiphyses were mostly crushed, however, shafts were slightly better preserved. The cranium had also suffered significant post-depositional damage though much of the dentition was intact.

Burial container wood preservation was fair, with three samples taken for further analysis. Measuring 192 cm long and 71 cm wide, this rectangular container was thought to be shipping crate re-purposed as a casket, further evidence for a corpse at an advanced state of decomposition. No coffin hardware was found other than wire nails.

Several personal and clothing items were recovered with the individual interred in Burial 042. Clothing items included small textile fragments adhering to the remains and metallic artifacts including a cuprous fastener similar to an overall button (Figure 19) and a non-ferrous metal cuff or collar closure (Figure 20); the latter two were found near the lower right arm. A relatively well preserved shoe or boot was uncovered *in situ* on the left foot (Figure 21). Many of the other personal items were found on or beneath the pelvis, indicating they were likely in the decedent's pockets at the time of

Burial 042 (continued)

burial and can be classified as incidental items[1]; all were initially identified in the forensic lab through x-rays after the pelvic remains were exhumed in block. These artifacts included a number of keys and a pocket knife held together in a ferrous concretion (Figure 22 and Figure 23), a money clip, and a fragmentary lighter (Figure 24). All were subjected to electrolysis cleaning after the 2022 field season concluded, the results of which are discussed further in Appendix C. Additionally, pXRF analysis of the items is included in Appendix D, and analysis of the keys can be found in Appendix E.

Unfortunately, none of the artifacts discussed above were of a robust diagnostic nature, therefore, a potential date of burial is not possible. However, this individual was interred in an unadorned rectangular shipping crate or similar re-purposed container. This burial treatment, the presence of clothing and incidental personal items, and the likely condition of the remains when buried are consistent with the expected burial treatment for massacre victims. The remains were exhumed and taken to the forensic laboratory for examination and were designated Oaklawn Unknown #21.

Figure 18 Burial 042 photogrammetry model illustrating condition of burial with skeletal remains fully exposed; note the flared position of arms and legs

Figure 19 Probable cuprous overall fastener recovered from Burial 042

Figure 20 White metal cuff or collar closure recovered from Burial 042

1 Incidental personal items are those that were likely not *intentionally* placed with the decedent but were normal everyday objects the individual had on their person at the time of death. For more discussion about incidental personal items and their significance, see report on file for the Milwaukee County Poor Farm Cemetery Project excavations (Richards et al. 2016).

Burial 042 (continued)

Figure 21 *In situ* detail of shoe or boot remnant found on the left foot in Burial 042

Figure 22 Ferrous concretion found under pelvis from Burial 042 prior to preliminary lab cleaning and electrolysis cleaning; several keys and a pocket knife were identified encased

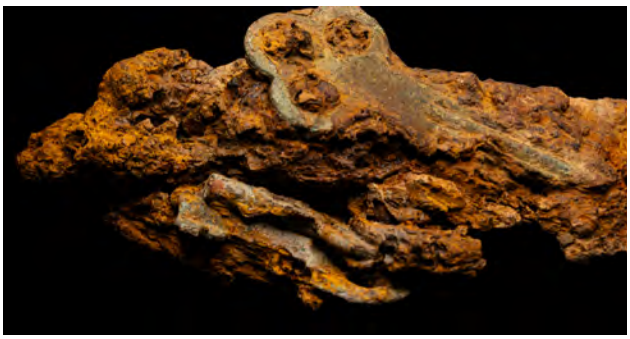

Figure 23 Left and top, detail of keys from ferrous concretion after preliminary lab cleaning

Burial 042 (continued)

Figure 24 Fragmentary lighter found among the Burial 042 personal items; (left) prior to preliminary lab cleaning, and (right) after lab processing

Burial 043

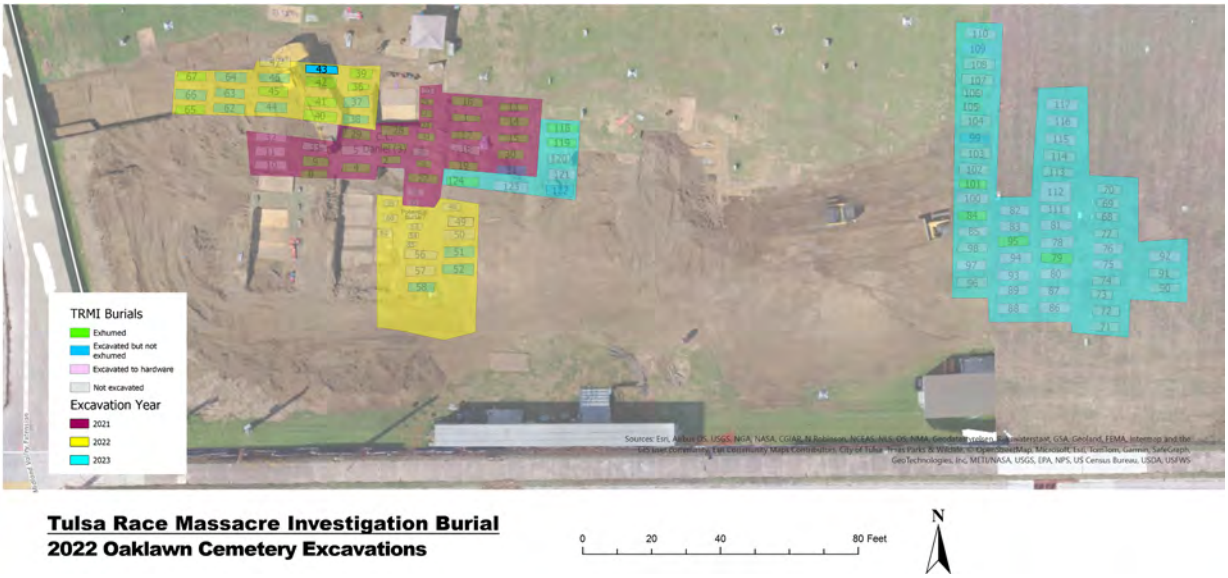

Figure 25 TRMI site map showing location of Burial 043

Final Excavation Status	Excavated but not exhumed
Started	11/7/2022
Completed	11/8/2022
Excavators	Kelsey Kreiser, Eric Prendergast
NW starting elevation	99.2062
NW ending elevation	98.8708

Burial 043 is located in the second row to the west in the 2022 west excavation expansion (Figure 25). The individual burial shaft measured 220 cm long and 55 cm wide.

This individual was placed with the head oriented to the west. The body was found to be in an extended supine position. The left arm was slightly flexed so the hand was resting above the pelvis and proximal femur; both legs were straight with the ankles uncrossed (Figure 26).

Skeletal preservation was poor. Taphonomic damage resulted in much of the axial skeleton being crushed. While the epiphyses were similarly fragmented, long bone shaft degradation was somewhat less severe. The condition of the cranium was indeterminate due to the excavation being suspended before being fully exposed.

Wood preservation was poor with only one sample taken for further analysis. Excavation revealed a rectangular casket measuring 184 cm long and 48 cm wide. Several wire nails were recovered, and decorative hardware was present; these included six Oaklawn Type 10 ferrous double lug swingbail handles, one Oaklawn Type 07 white metal coffin plaque that was located in the central portion of the feature. Additionally one third generation Oaklawn Type 05 thumbscrew and three different escutcheons were recovered—Oaklawn Type 03, 04, and 05; two of the former were associated with the west end of the casket, while the latter two were represented by only one example each and were more centrally located within the feature (Stackelbeck et al., 2024: Appendix A). This type of mismatched hardware likely indicated a less expensive casket.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment This burial was left *in situ*..

Burial 043 (continued)

Figure 26 Burial 043 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

Burial 044

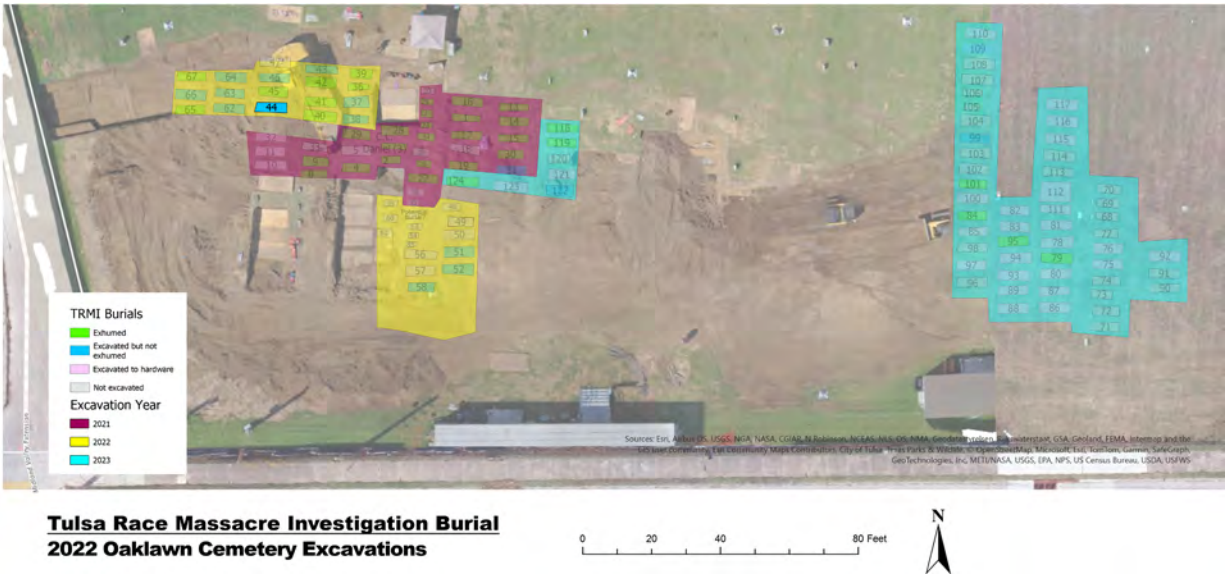

Figure 27 TRMI site map showing location of Burial 044

Final Excavation Status	Excavated but not exhumed
Started	10/31/2022
Completed	11/3/2022
Excavators	Erin McKendry, Kathleen Settle
NW starting elevation	98.9404
NW ending elevation	98.5320

Burial 044 is located in the third row to the west in the 2022 west excavation expansion (Figure 27). The individual burial shaft measured 213 cm long and 71 cm wide.

This individual was placed with the head oriented to the west. The body was found to be in an extended supine position. The left arm was slightly flexed so the hand was resting above the pelvis and proximal femur. Original placement of the legs was indeterminate due to post-depositional shifting of the lower limbs. The skull was turned towards the north, though, it could not be determined if it was intentionally positioned or the result of post-depositional processes (Figure 28).

Skeletal preservation was fair. Taphonomic damage resulted in axial element deterioration. Long bone epiphyses were more intact than those from other burials, and the long bone shafts were similarly well preserved. The cranium was moderately well preserved with some post-depositional fracturing of the right parietal and occiput.

Wood preservation was moderate; two samples were taken for further analysis. Excavators noted the presence of an outer crate measuring 209 cm long and 76 cm wide. The internal rectangular casket measured 183 cm long and 47 cm wide. Numerous wire nails were recovered; other non-decorative utilitarian hardware included ferrous internal casket lid closures located at the four corners of the burial container, suggesting a commercially manufactured burial case. Decorative hardware was also present including six Oaklawn Type 04B ferrous double lug short bar handles and one Oaklawn Type 03 ferrous coffin plaque (Stackelbeck et al., 2024: Appendix A).

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. This burial was left *in situ*.

Burial 044 (continued)

Figure 28 Burial 044 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

Burial 045

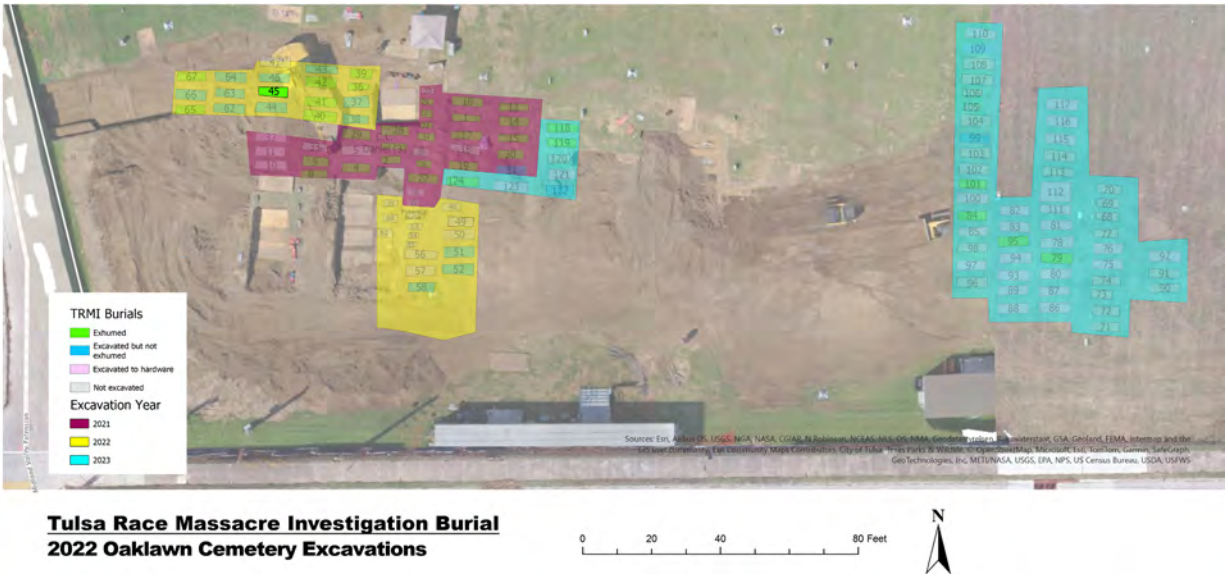

Figure 29 TRMI site map showing location of Burial 045

Final Excavation Status	Exhumed
Started	11/10/2022
Completed	11/15/2022
Excavators	Michael Loughlin, Erin McKendry
NW starting elevation	98.9958
NW ending elevation	98.5368

Burial 045 is located in the third row to the west in the 2022 west excavation expansion (Figure 29). The individual burial shaft measured 221 cm long and 89 cm wide.

This individual was interred with the head oriented to the west. The body—which appeared to be significantly too tall for the burial container dimensions—was found to be in an extended supine position. The left arm was slightly flexed, resulting in the left hand resting over the proximal femur; the right arm displayed a more acute flexion so the right hand was higher on the abdomen. The legs were straight, however, the feet were fully articulated up and appear to have been wedged against the east end of the casket. Similarly, the decedent's cervical vertebral column was sharply oriented to the left, indicating the head and neck had been intentionally bent to fit the individual's remains into the too small container (Figure 30).

Skeletal preservation was fair to good. Taphonomic damage resulted in axial element deterioration. Long bone epiphyses were more intact than those from other burials, and the long bone shafts were similarly well preserved. The cranium was also relatively complete despite the positioning mentioned above. Most dentition was intact and one gold incisor was observed; this was extracted and transferred to the forensic team prior to photogrammetric documentation.

Burial container wood preservation was fair, with two samples taken for further analysis. Nail location as well as soil staining indicated a plain, rectangular casket measuring 196 cm long and 50 cm wide. No coffin hardware was found other than wire nails. No personal items or other grave good were recovered.

Due to the sparse nature of the material culture directly associated with Burial 044 it was difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. This individual was interred in an unadorned rectangular casket too small for their remains, consistent with the expected burial treatment for massacre victims. The remains were exhumed and taken to the forensic laboratory for examination and were designated Oaklawn Unknown #24.

Burial 045 (continued)

Figure 30 Burial 045 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

Burial 046

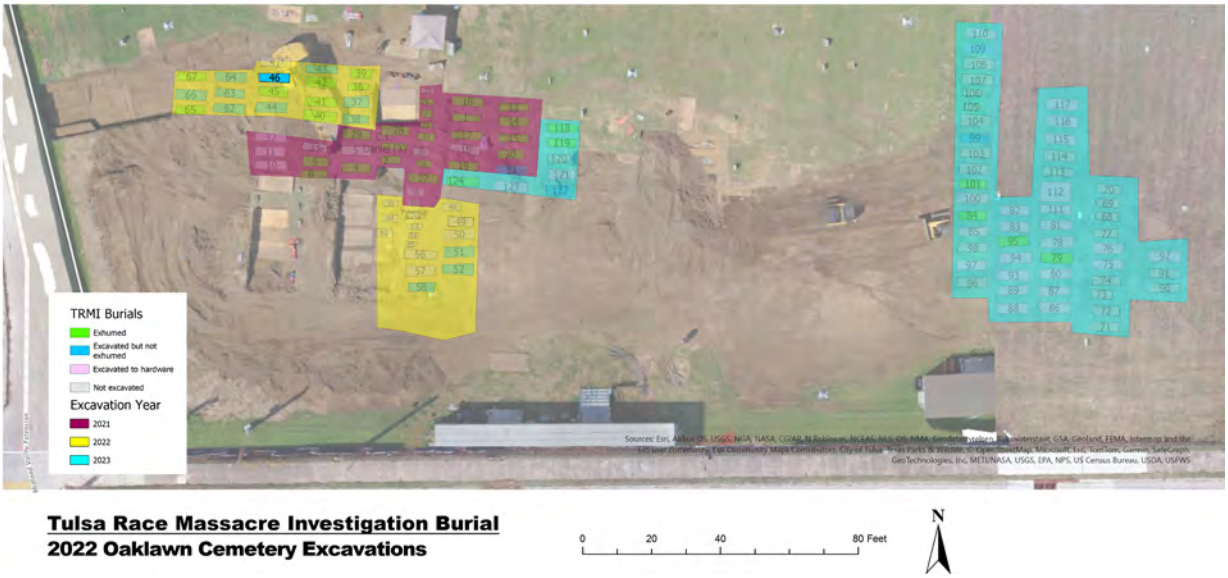

Figure 31 TRMI site map showing location of Burial 046

Final Excavation Status	Excavated but not exhumed
Started	10/31/2022
Completed	11/2/2022
Excavators	Jeremy Wilson, Gretchen Zoeller
NW starting elevation	99.0068
NW ending elevation	98.6033

Burial 046 is located in the third row to the west in the 2022 west excavation expansion (Figure 31). The individual burial shaft measured 214 cm long and 63 cm wide.

This individual was placed with the head oriented to the west. The body was found to be in an extended supine position. The left arm was very slightly flexed; the right arm had a more acute flexion resulting in the right hand resting over the right proximal femur. Both legs were straight with the ankles uncrossed; they also appeared to have been somewhat bowed or flared outward. The skull was turned towards the south, though, this appears to have been caused by post-depositional processes as the intact mandible was more centrally located among the remains (Figure 32).

Skeletal preservation was fair. Taphonomic damage resulted in axial element deterioration. While excavators noted most elements were highly friable, long bone epiphyses were more intact than those from other burials, and the long bone shafts were similarly well preserved. The skull was moderately well preserved with some post-depositional fracturing on the left cranial bones.

Wood preservation was fair with one sample taken for further analysis. The rectangular casket measured 200 cm long and 54 cm wide. Numerous wire nails were recovered; other non-decorative utilitarian hardware included ferrous internal casket lid closures located at the four corners of the burial container, suggesting a commercially manufactured burial case. Decorative hardware was also present including six Oaklawn Type 10 ferrous double lug swingbail handles and one Oaklawn Type 03 ferrous coffin plaque (Stackelbeck et al., 2024: Appendix A). Clothing items recovered with the decedent from Burial 046 included a non-ferrous metal fastener (Figure 33) and relatively well preserved natural fiber textile fragments (Figure 34); all were located just west of the left clavicle.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. This burial was left *in situ*.

Burial 046 (continued)

Figure 32 Burial 046 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

Figure 33 Clothing fastener recovered from Burial 046

Figure 34 Natural fiber textile fragments recovered from Burial 046

Burial 047

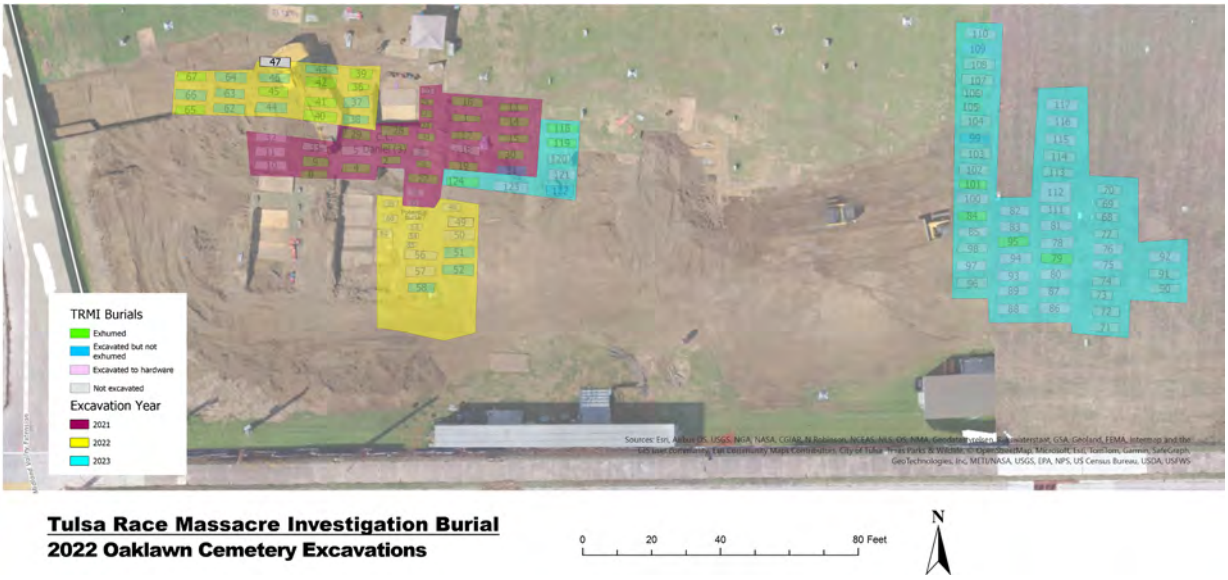

Figure 35 TRMI site map showing location of Burial 047

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
SW starting elevation	99.0362
SW ending elevation	n/a

The Burial 047 shaft was not excavated as the majority of the feature was under the north trench wall.

Burial 048

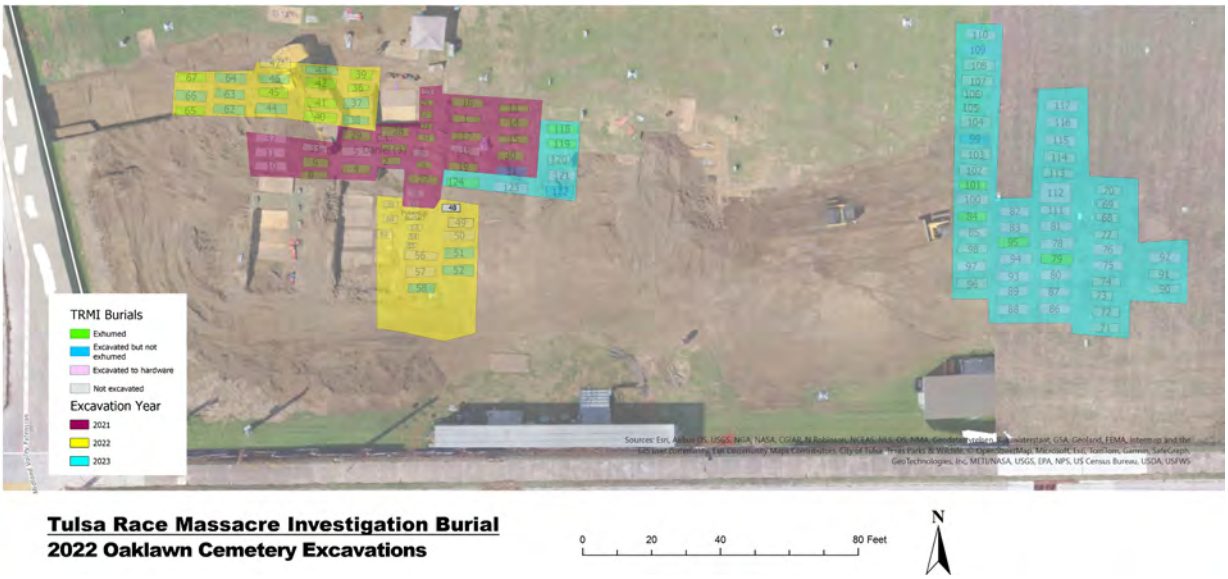

Figure 36 TRMI site map showing location of Burial 048

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.1369
NW ending elevation	n/a

Burial 048 is located in the first row to the west in the 2022 south excavation expansion (Figure 36). The individual shaft measured 161 cm long and 66 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 049

Figure 37 TRMI site map showing location of Burial 049

Final Excavation Status	Empty shaft
Started	11/7/2022
Completed	n/a
Excavators	Ryan Peterson
NW starting elevation	99.1989
NW ending elevation	98.3150

Burial 049 is located in the first row to the west in the 2022 south excavation expansion (Figure 37). The burial shaft was thought to measure 178 cm long and 67 cm wide, however, after extensive digging that included a deep exploration unit in the western portion of the feature, no hardware or human remains were found. Whether this was a misidentified feature or an interment that had been previously removed was inconclusive (Figure 38).

Figure 38 Burial 049 photogrammetry model illustrating the empty shaft and western exploration unit

Burial 050

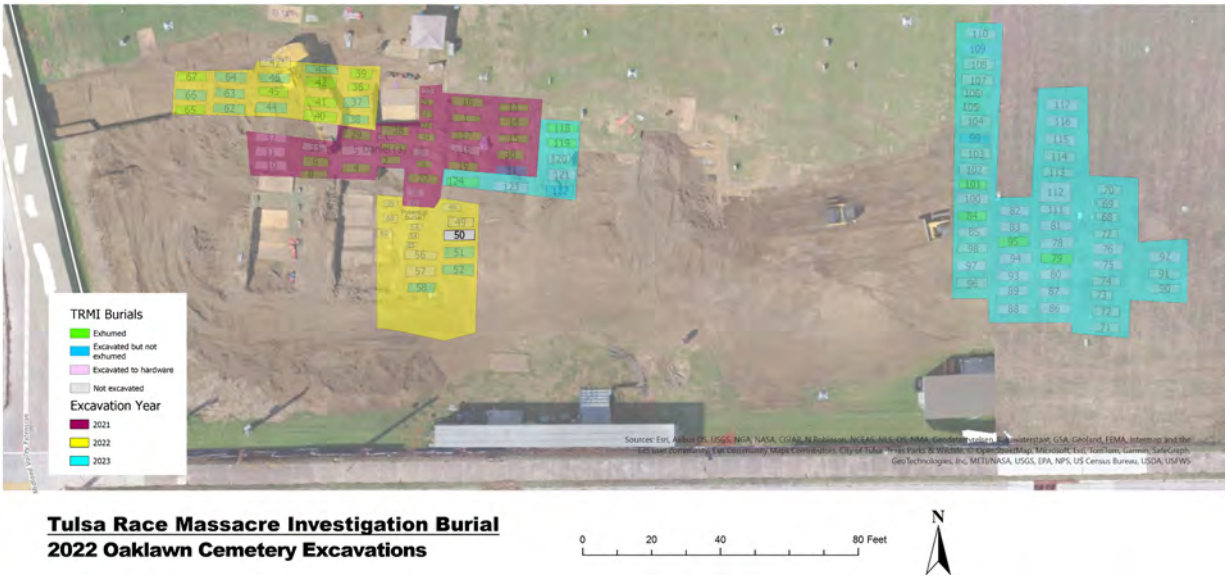

Figure 39 TRMI site map showing location of Burial 050

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.2406
NW ending elevation	n/a

Burial 050 is located in the first row to the west in the 2022 south excavation expansion (Figure 39). The individual burial shaft measured 273 cm long and 86 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. This burial was associated with a buried marker and no futher investigation was conducted.

Burial 051

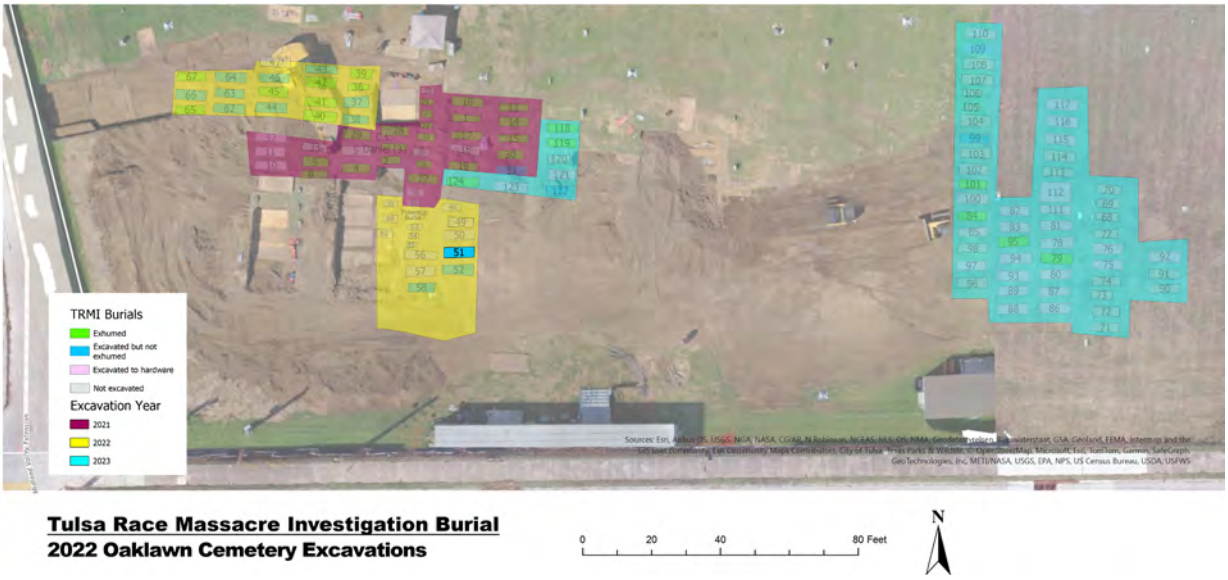

Figure 40 TRMI site map showing location of Burial 051

Final Excavation Status	Excavated but not exhumed
Started	11/7/2022
Completed	11/10/2022
Excavators	Erin McKendry, Kathleen Settle
NW starting elevation	99.3241
NW ending elevation	98.7720

Burial 051 is located in the first row to the west in the 2022 south excavation expansion (Figure 40). The individual burial shaft measured 221 cm long and 74 cm wide.

This individual was placed with the head oriented to the west. The body was found to be in an extended supine position with both arms slightly flexed with the hands resting on the pelvis and proximal femurs. Both legs were straight with the ankles uncrossed. The skull was turned towards the south, though, this appears to have been caused by post-depositional processes as the intact mandible was in a natural anatomical position (Figure 42).

Skeletal preservation was excellent. Taphonomic damage resulted in only some axial element deterioration. Both long bone epiphyses and shafts were significantly better preserved than remains in the 2022 west excavation expansion. The cranium was completely intact with almost no discernible post-depositional damage.

Wood preservation was also excellent with the casket lid nearly completely intact (Figure 41). Several wood samples were taken from various components of the rectangular burial container, which measured 193 cm long and 50 cm wide. Numerous wire nails were recovered; other non-decorative utilitarian hardware included ferrous internal casket lid closures located at the four corners of the burial container, suggesting a commercially manufactured burial case. Decorative hardware was also present including six Oaklawn Type 11 ferrous double lug swingbail handles and one Oaklawn Type 08 ferrous coffin plaque (Stackelbeck et al., 2024: Appendix A). Potential clothing items included small textile fragments, however, they were too small and friable to be extracted for further analysis.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. This burial was left *in situ*.

Burial 051 (continued)

Figure 41 Burial 051 photogrammetry model illustrating intact casket lid with *in situ* coffin plaque

Figure 42 Burial 051 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

Burial 052

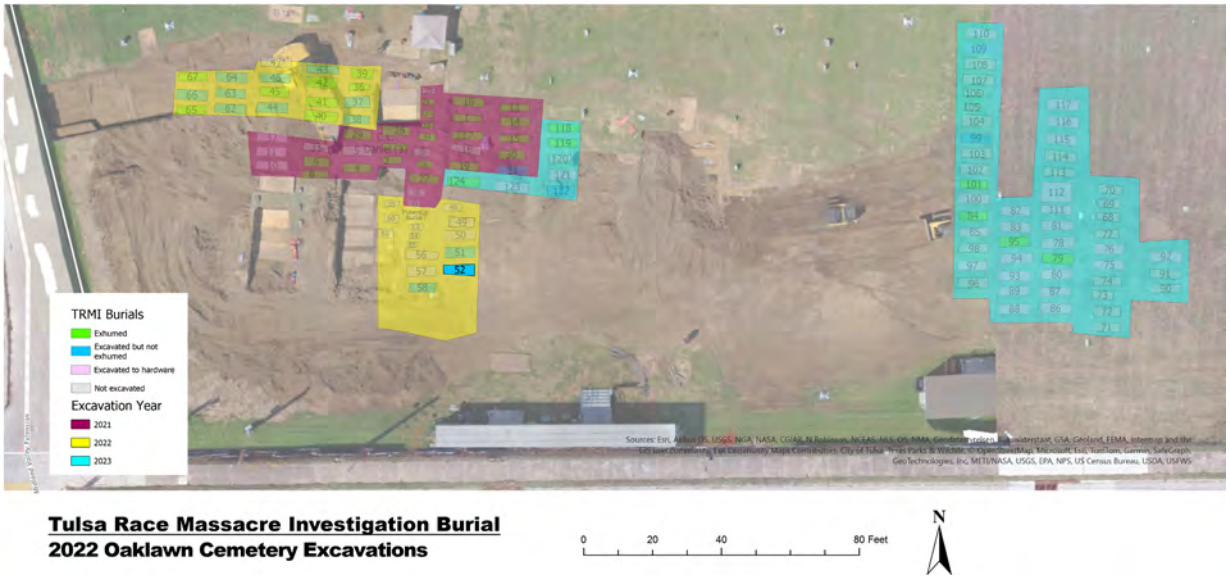

Figure 43 TRMI site map showing location of Burial 052

Final Excavation Status	Excavated but not exhumed
Started	11/9/2022
Completed	11/11/2022
Excavators	Jeremy Wilson, Gretchen Zoeller
NW starting elevation	99.4222
NW ending elevation	98.7596

Burial 052 is located in the first row to the west in the 2022 south excavation expansion (Figure 43). The individual burial shaft measured 204 cm long and 63 cm wide.

This individual was placed with the head oriented to the west. The body was found to be in an extended supine position. The exact positioning of the arms and hands was indeterminate due to this portion of the remains not being fully exposed; both legs were straight with the ankles uncrossed. The skull was turned towards the south, though, this appears to have been caused by post-depositional processes and not intentional (Figure 44).

Skeletal preservation was excellent. Unlike all other TRMI burials with the exception of Burial 058 (below), axial elements displayed little deterioration. Both long bone epiphyses and shafts were significantly better preserved than remains in the 2022 west excavation expansion. The cranium was completely intact with no discernible post-depositional damage. The decedent was laid to rest towards the western portion of the burial container which appeared to be too large for their stature; preliminary in field osteological assessment—unerupted 3rd molars with complete crowns and partially fused medial clavicles—indicated an older adolescent individual.

Wood preservation was also excellent. Several samples were taken from various components of the rectangular burial container, which measured 193 cm long and 52 cm wide. Numerous wire nails were recovered; other non-decorative utilitarian hardware included ferrous internal casket lid closures located at the four corners of the burial container, suggesting a commercially manufactured burial case. Decorative hardware was also present including two Oaklawn Type 12 ferrous single double arm lug extension bar handles and one Oaklawn Type 03 ferrous coffin plaque (Stackelbeck et al., 2024: Appendix A). Personal adornment items recorded included the remnants of what appeared a decorative pin or ribbon affixed to the decedent's left chest; the cuprous and organic elements of this pin were too friable to be extracted for further analysis (Figure 45).

Burial 052 (continued)

No clothing items were recovered in direct association with the remains. However, a shoe heel and leather fragment with cuprous eyelets was found on what appeared to be the casket lid (Figure 46). This artifact may have been part of the refuse found within the shaft fill or may have been deliberately set on the casket lid as part of a mortuary ritual (Davidson 2012). Other

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. This burial was left *in situ*.

Figure 44 Burial 052 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

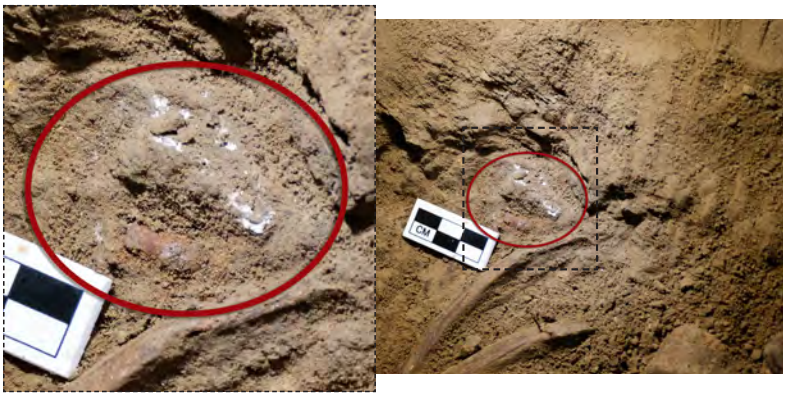

Figure 45 *In situ* image of decorative pin or ribbon found with Burial 052; (left) close up detail

Figure 46 Shoe fragment and heel recovered from Burial 052 casket lid

Burial 053

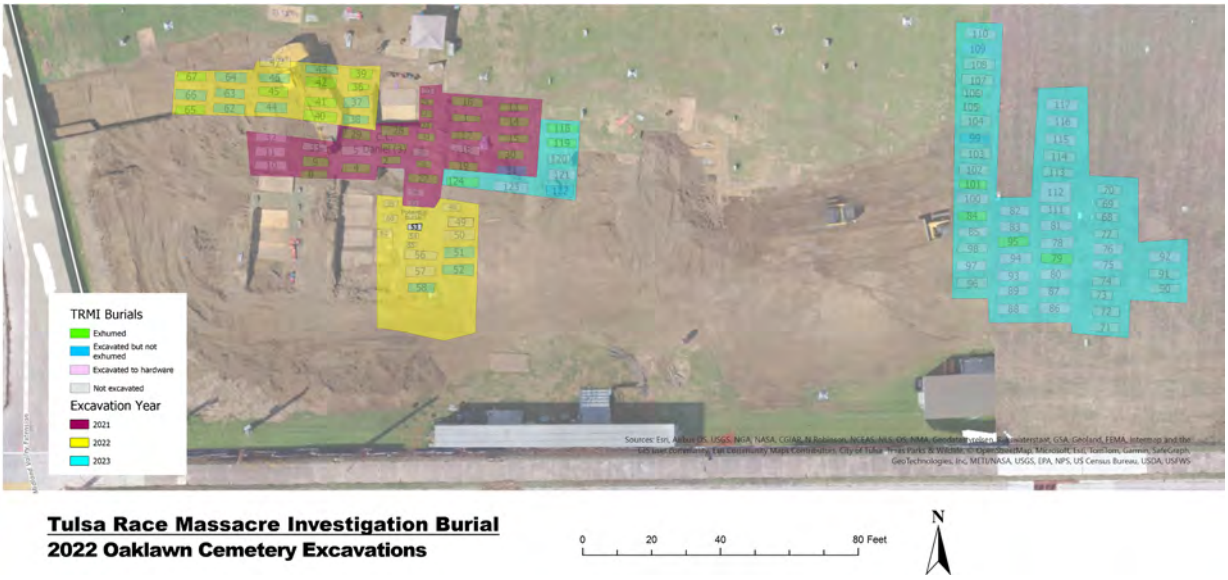

Figure 47 TRMI site map showing location of Burial 053

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.3434
NW ending elevation	n/a

Burial 053 is located in the second row to the west in the 2022 south excavation expansion (Figure 47). The individual shaft measured 118 cm long and 50 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 054

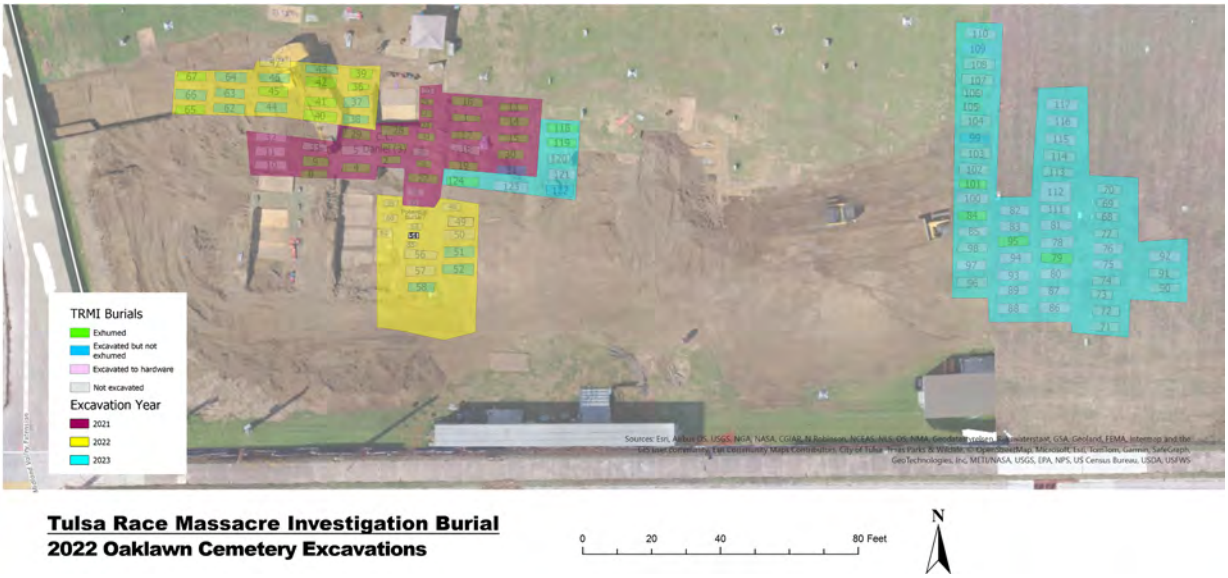

Figure 48 TRMI site map showing location of Burial 054

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.3512
NW ending elevation	n/a

Burial 054 is located in the second row to the west in the 2022 south excavation expansion (Figure 48). The individual shaft measured 89 cm long and 48 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 055

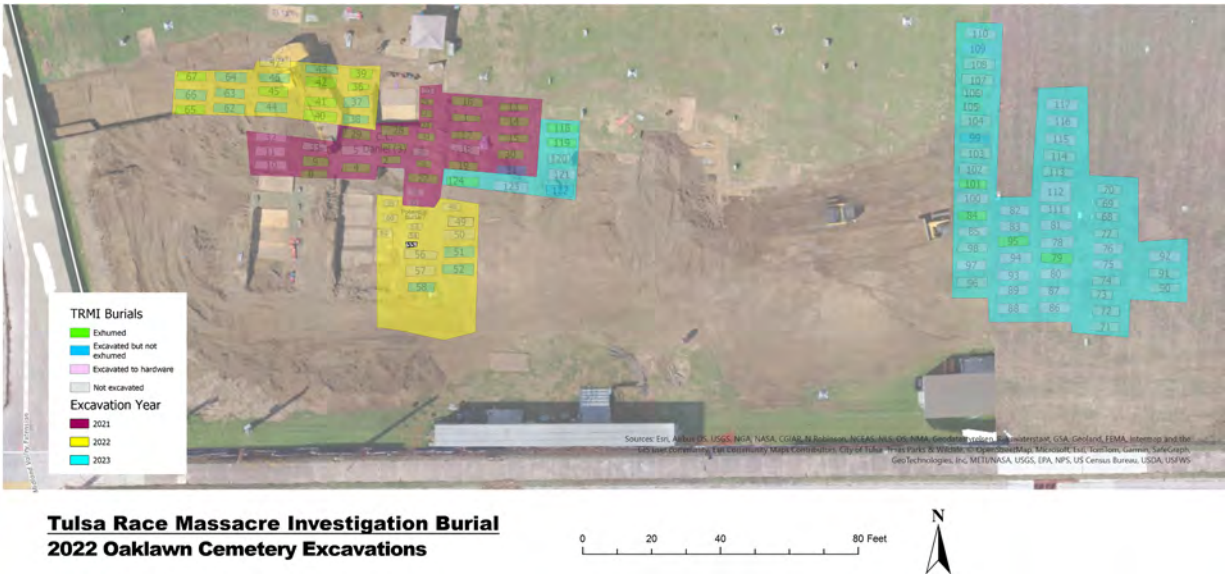

Figure 49 TRMI site map showing location of Burial 055

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.3668
NW ending elevation	n/a

Burial 055 is located in the second row to the west in the 2022 south excavation expansion (Figure 49). The individual shaft measured 90 cm long and 42 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 056

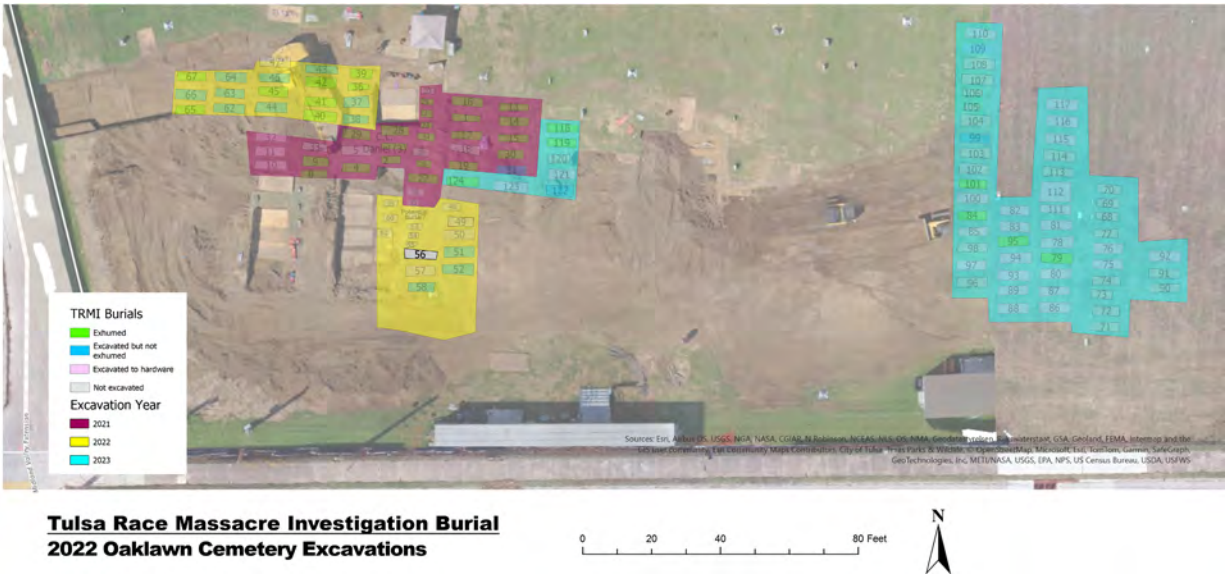

Figure 50 TRMI site map showing location of Burial 056

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.4425
NW ending elevation	n/a

Burial 056 is located in the second row to the west in the 2022 south excavation expansion (Figure 50). The individual shaft measured 285 cm long and 75 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 057

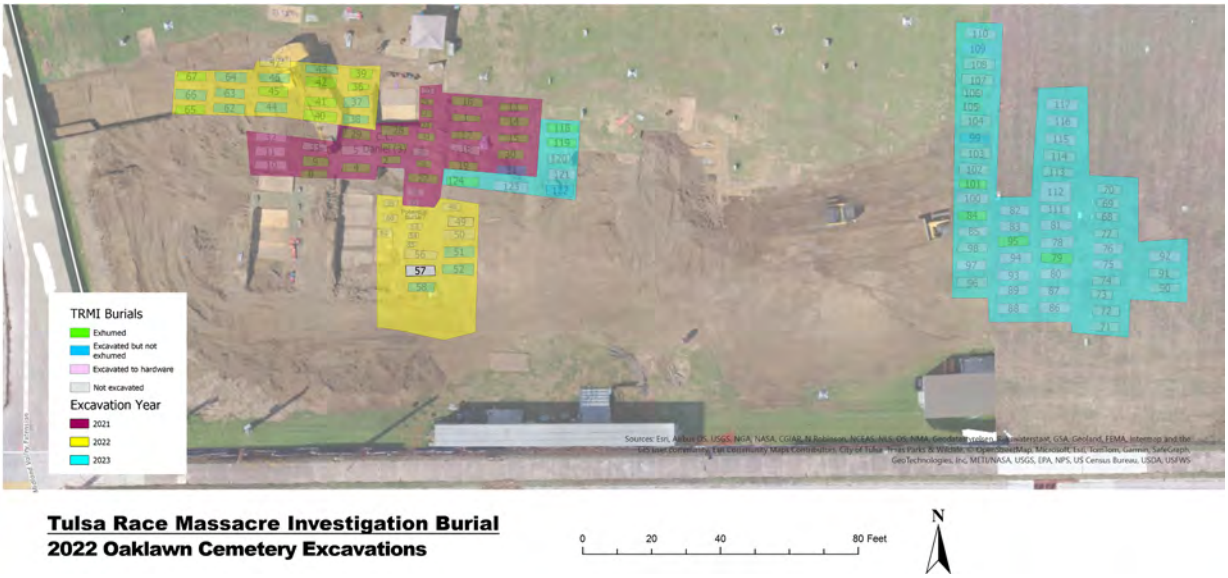

Figure 51 TRMI site map showing location of Burial 057

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.5698
NW ending elevation	n/a

Burial 057 is located in the second row to the west in the 2022 south excavation expansion (Figure 51). The individual shaft measured 257 cm long and 90 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 058

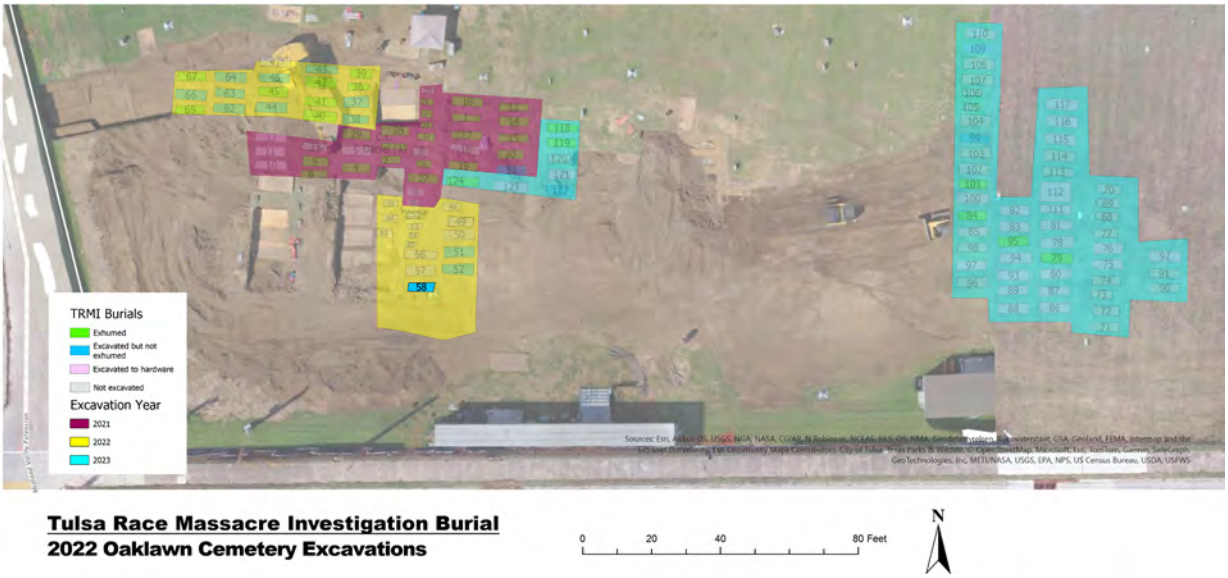

Figure 52 TRMI site map showing location of Burial 058

Final Excavation Status	Excavated but not exhumed
Started	11/9/2022
Completed	11/10/2022
Excavators	Jeremy Wilson, Gretchen Zoeller
NW starting elevation	99.6142
NW ending elevation	98.7812

Burial 058 is located in the second row to the west in the 2022 south excavation expansion (Figure 52). The individual burial shaft measured 219 cm long and 66 cm wide.

This individual was placed with the head oriented to the west. The body was found to be in an extended supine position. The exact positioning of the arms, legs, hands and feet were indeterminate due to the eastern half of this feature not being fully exposed. The skull was turned towards the south, though, this appears to have been caused by post-depositional processes and not intentional (Figure 53).

Skeletal preservation was excellent. Unlike all other TRMI burials with the exception of Burial 052 (above), axial elements displayed little deterioration. The exposed long bone epiphyses and shafts were significantly better preserved than remains in the 2022 west excavation expansion. The cranium was completely intact with no discernible post-depositional damage. One gold tooth was observed.

Wood preservation was also excellent. Several wood samples were taken from various components of the rectangular burial container, which measured 203 cm long and 41 cm wide. Numerous wire nails were recovered; other non-decorative utilitarian hardware included ferrous internal casket lid closures located at the four corners of the burial container, suggesting a commercially manufactured burial case. Decorative hardware was also present including two Oaklawn Type 13 white metal single double arm lug extension bar handles and one Oaklawn Type 03 ferrous coffin plaque (Stackelbeck et al., 2024: Appendix A). Personal adornment items uncovered with the decedent included a vulcanized rubber hair comb affixed the left side of the cranium (Figure 54).

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. This burial was left *in situ*.

Burial 058 (continued)

Figure 53 Burial 058 photogrammetry model illustrating condition of burial with skeletal remains partially exposed

Figure 54 *In situ* image of vulcanized rubber hair comb found with Burial 058

Burial 059

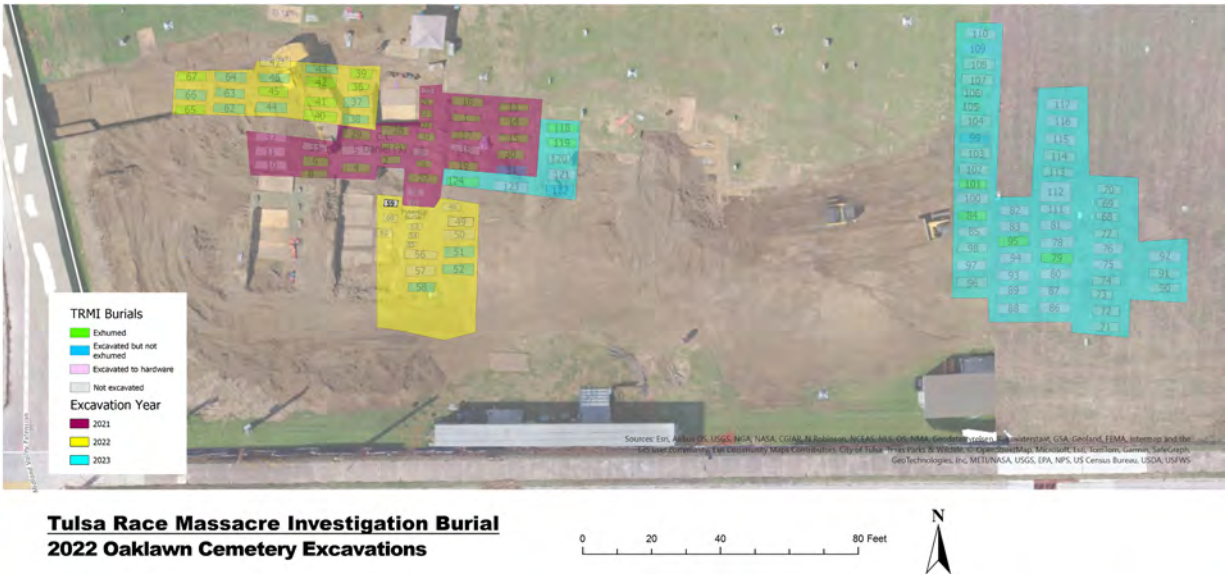

Figure 55 TRMI site map showing location of Burial 059

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.3182
NW ending elevation	n/a

Burial 059 is located in the third row to the west in the 2022 south excavation expansion (Figure 55). The individual shaft measured 117 cm long and 55 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 060

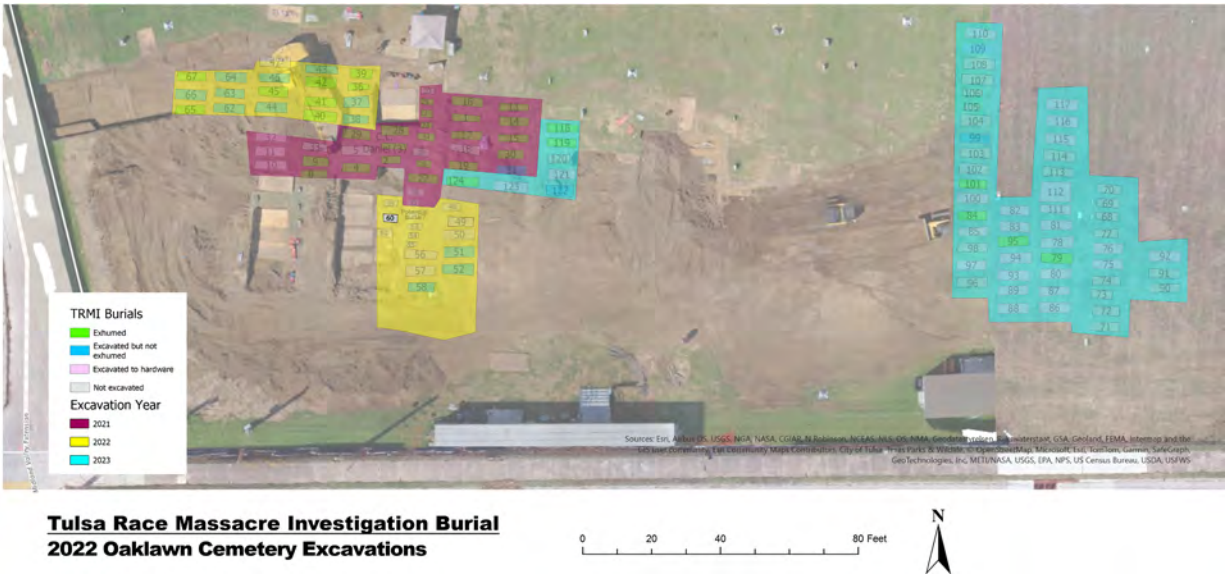

Figure 56 TRMI site map showing location of Burial 060

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.3021
NW ending elevation	n/a

Burial 060 is located in the third row to the west in the 2022 south excavation expansion (Figure 56). The individual shaft measured 123 cm long and 68 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 061

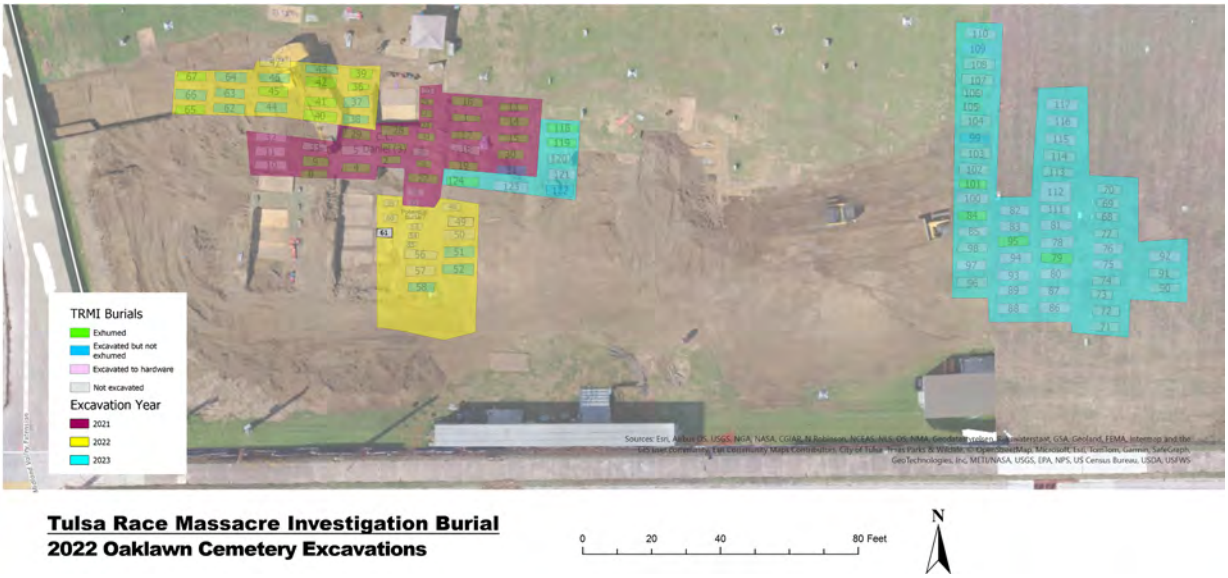

Figure 57 TRMI site map showing location of Burial 061

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.3330
NW ending elevation	n/a

Burial 061 is located in the third row to the west in the 2022 south excavation expansion (Figure 57). The individual shaft measured 135 cm long and 77 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 062

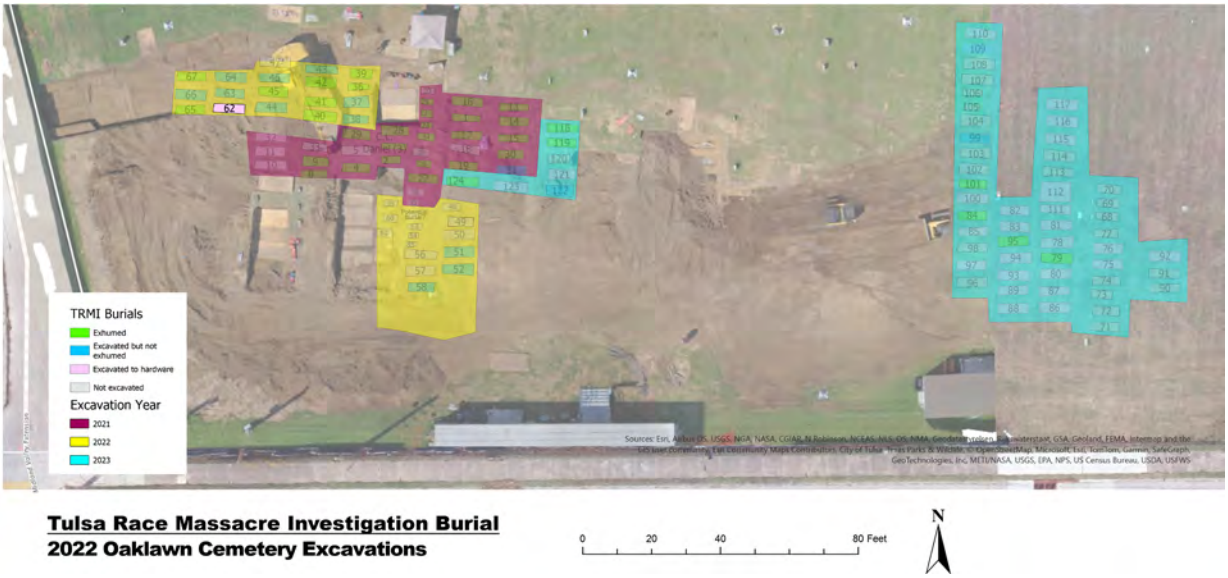

Figure 58 TRMI site map showing location of Burial 062

Final Excavation Status	Excavated to hardware
Started	11/15/2022
Completed	11/18/2022
Excavators	Kelsey Kreiser, Eric Prendergast
NW starting elevation	98.9048
NW ending elevation	98.5305

Burial 062 is located in the fourth row to the west in the 2022 west excavation expansion (Figure 58). The individual burial shaft measured 226 cm long and 92 cm wide.

The exposed portions of the burial container displayed fair wood preservation; two samples were taken for further analysis. Evidence indicated an outer crate with an internal rectangular casket and numerous wire nails were recovered; the casket measured 185 cm long and 57 cm wide. Other non-decorative utilitarian hardware included ferrous internal casket lid closures, suggesting a commercially manufactured burial case. Not all handles were fully uncovered, but those exposed were identified as Oaklawn Type 03 ferrous single double arm lug extension bars (Stackelbeck et al., 2024: Appendix A). One ferrous coffin plaque located in the central portion of the feature, but the exact form and type were indeterminate.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 063

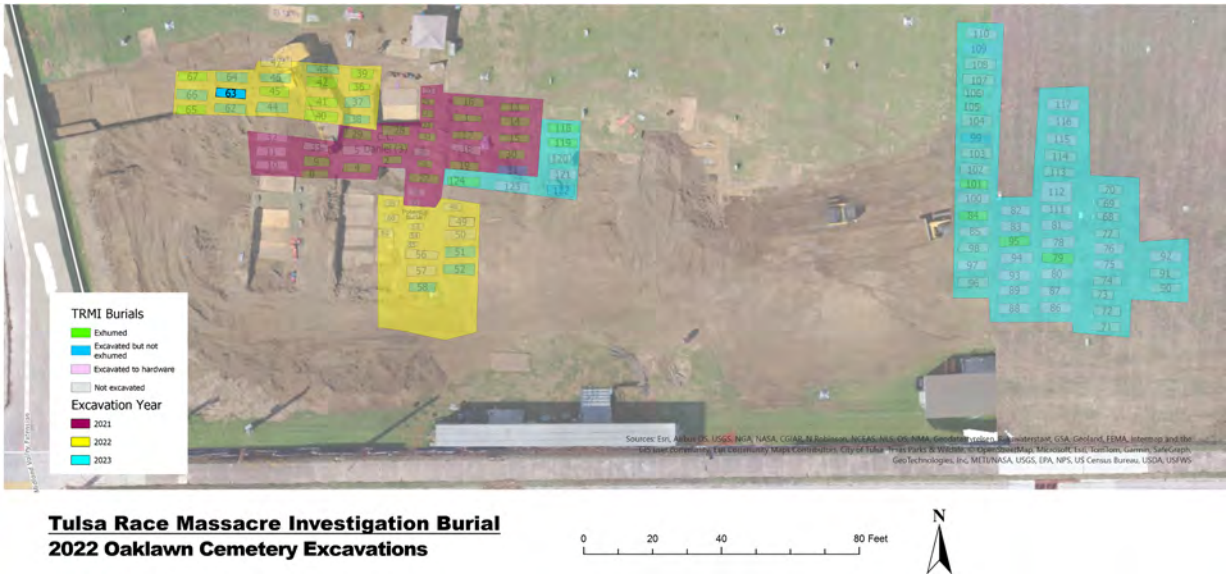

Figure 59 TRMI site map showing location of Burial 063

Final Excavation Status	Excavated but not exhumed
Started	11/17/2022
Completed	11/18/2022
Excavators	Jeremy Wilson, Gretchen Zoeller
NW starting elevation	98.9175
NW ending elevation	98.4514

Burial 063 is located in the fourth row to the west in the 2022 west excavation expansion (Figure 59). The individual shaft measured 250 cm wide and 80 cm long.

The primary individual was laid with the head oriented to the west; fetal remains were uncovered within the pelvic region indicating the decedent was pregnant and likely in the last trimester at the time of death. The adult was found to be in an extended supine position. The left arm appears to have been placed straight along the side while the right arm was slightly flexed so the right hand rested on the lower abdomen; both arms were somewhat flared away from the body, consistent with a late stage pregnancy. Both legs were straight with the ankles uncrossed. Post-depositional processes had caused the skull to roll backward (Figure 53).

Skeletal preservation was poor. The skull and axial elements were severely fragmented. While long bone epiphyses preservation was also poor, long bone shafts were more intact. The fetal remains were also noted to be in extremely poor condition and were represented by only a handful of long bones and petrous processes.

Wood preservation was poor; no samples were taken for further analysis. The rectangular burial container measured 185 cm long and 42 cm wide. Numerous wire nails were recovered; no internal casket lid closures were found, suggesting this was a less expensive or handcrafted burial case. Decorative hardware included six Oaklawn Type 07 ferrous double lug short bar handles; an indeterminate type ferrous coffin plaque was partially uncovered (Stackelbeck et al., 2024: Appendix A). Personal adornment items included a vulcanized rubber hair clip found near the right the side of the cranium (Figure 61).

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. This burial was left *in situ*.

Burial 063 (continued)

Figure 60 Burial 063 photogrammetry model illustrating condition of burial with skeletal remains partially exposed

Figure 61 Hair clip recovered from Burial 063

Burial 064

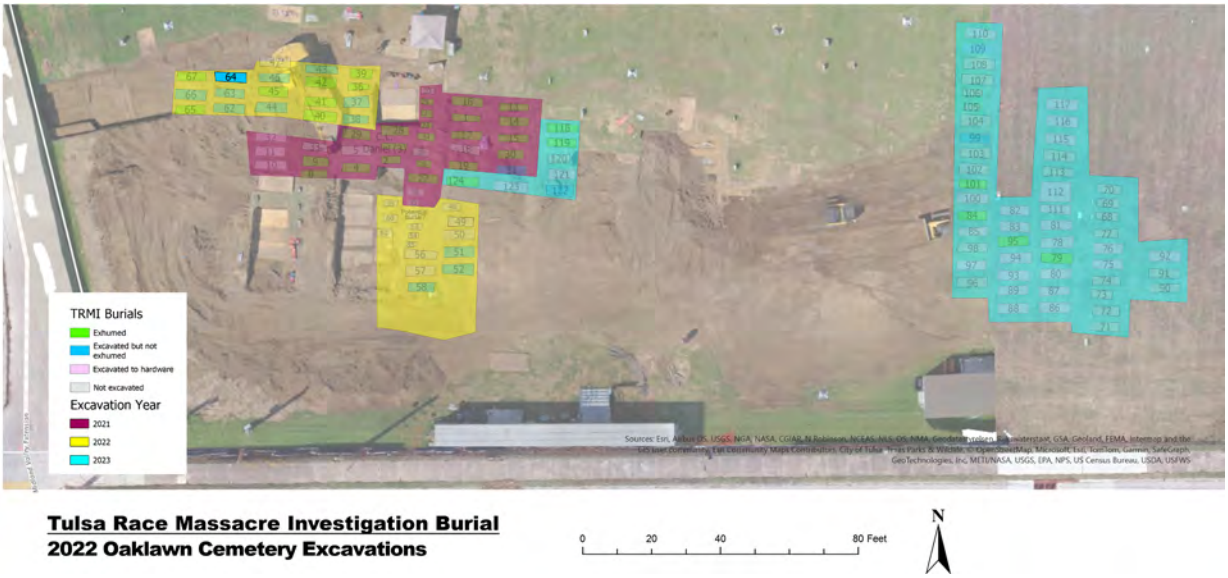

Figure 62 TRMI site map showing location of Burial 064

Final Excavation Status	Excavated but not exhumed
Started	11/17/2022
Completed	11/18/2022
Excavators	Jeremy Wilson, Gretchen Zoeller
NW starting elevation	98.8723
NW ending elevation	98.4576

Burial 064 is located in the fourth row to the west in the 2022 west excavation expansion (Figure 62). The individual burial shaft measured 201 cm long and 46 cm wide.

This individual was laid with the head oriented to the west. The body was found to be in an extended supine position. The exact positioning of the arms, legs, hands and feet were indeterminate due to the remains not being fully exposed; the legs appeared to be straight with ankles uncrossed. The skull was turned towards the south, though, this appears to have been caused by post-depositional processes and not intentional (Figure 63).

Skeletal preservation was poor. The skull was mostly intact with some fracturing , however, exposed axial elements were severely damaged. While long bone epiphyses preservation was also poor, long bone shafts were more intact.

Wood preservation was poor with one sample taken for further analysis. The rectangular casket measured 201 cm long and 46 cm wide. Numerous wire nails were recovered; other non-decorative utilitarian hardware included ferrous internal casket lid closures located at the four corners of the burial container, suggesting a commercially manufactured burial case. Decorative hardware included Oaklawn Type 10 ferrous double lug swingbail handles and one ferrous coffin plaque of indeterminate type (Stackelbeck et al., 2024: Appendix A). No clothing or personal items were found.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. This burial was left *in situ*.

Burial 064 (continued)

Figure 63 Burial 064 photogrammetry model illustrating condition of burial with skeletal remains partially exposed

Burial 065

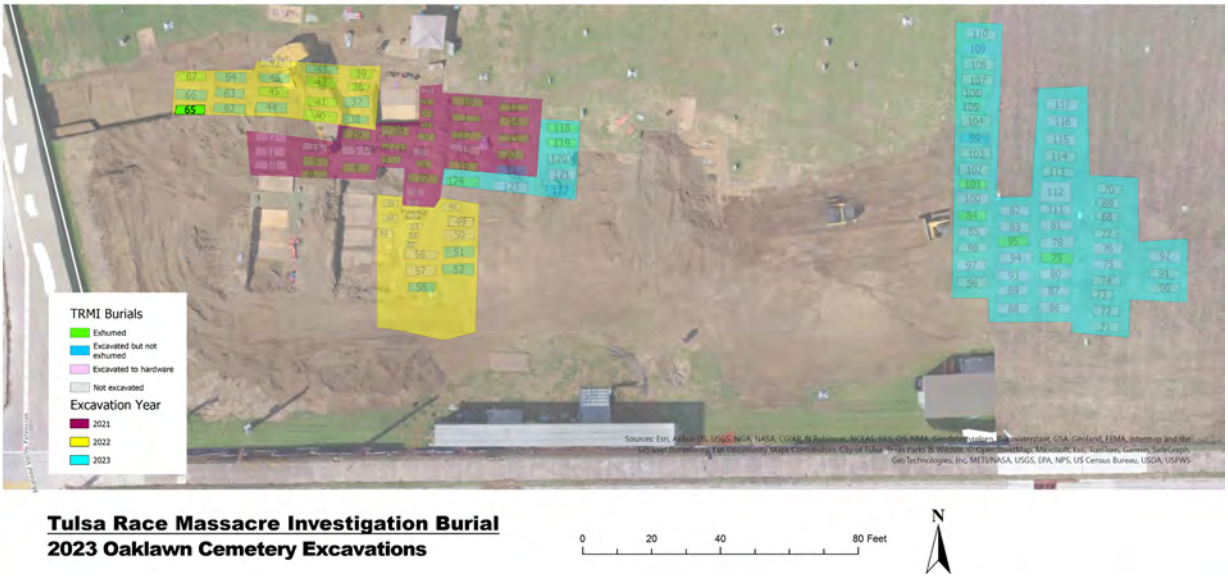

Figure 64 TRMI site map showing location of Burial 065

Final Excavation Status	Exhumed
Started	11/16/2022
Completed	11/14/2022
Excavators	Kelsey Kreiser, Eric Prendergast
NW starting elevation	98.8447
NW ending elevation	98.2185

Burial 065 is located in the fifth row to the west in the 2022 west excavation expansion (Figure 64). The individual burial shaft measured 191 cm long and 60 cm wide.

This individual was interred with the head oriented to the west. The body was found to be in an extended supine position. The left arm was flexed, resulting in the left hand resting over the upper abdomen; the right arm appeared to lay straight at the side, but the ulna and radius were displaced. The legs were straight with the ankles uncrossed. The skull was turned towards the south, though, this appears to have been caused by post-depositional processes and not intentional (Figure 65).

Skeletal preservation was poor to fair. Taphonomic damage resulted in axial element deterioration though the vertebral column was somewhat more intact. Long bone epiphyses were more intact than those from other burials, and the long bone shafts were similarly well preserved. The cranium was fragmented, especially on the left side.

Burial container wood preservation was fair, with three samples taken for further analysis. Nail location as well as soil staining indicated a plain, rectangular casket measuring 169 cm long and 49 cm wide; it should be noted this length is somewhat shorter than most adorned and unadorned adult burial containers. No coffin hardware was found other than wire nails. No personal items or other grave good were recovered.

Due to the sparse nature of the material culture directly associated with Burial 065, it was difficult to assign a precise date of interment; however, what was observed is consistent with an early to mid-1920s interment. This individual was interred in an unadorned rectangular casket consistent with the expected burial treatment for massacre victims. The remains were exhumed and taken to the forensic laboratory for examination and were designated Oaklawn Unknown #27.

Burial 065 (continued)

Figure 65 Burial 065 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

Burial 066

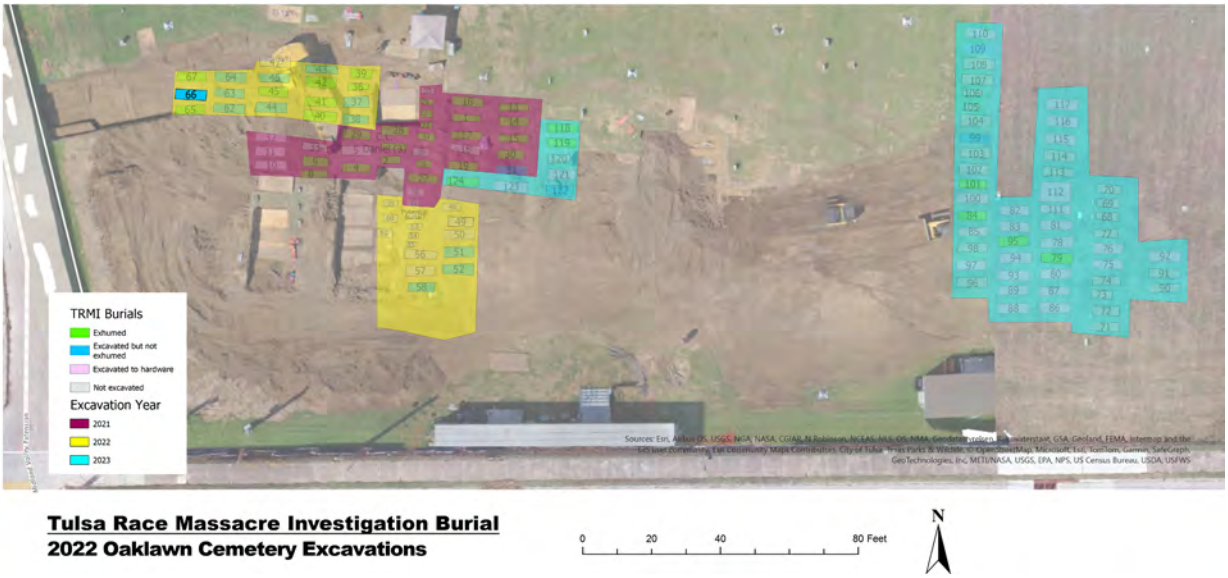

Figure 66 TRMI site map showing location of Burial 066

Final Excavation Status	Excavated but not exhumed
Started	11/16/2022
Completed	11/18/2022
Excavators	Jeremy Wilson, Gretchen Zoeller
NW starting elevation	98.4740
NW ending elevation	98.2800

Burial 066 is located in the fifth row to the west in the 2022 west excavation expansion (Figure 66). The individual burial shaft measured 212 cm long and 68 cm wide.

This individual was laid with the head oriented to the west. The body was found to be in an extended supine position. The exact positioning of the arms, legs, hands and feet were indeterminate due to the remains not being fully exposed; the legs appeared to be straight with ankles uncrossed. The skull was turned towards the south, though, this appears to have been caused by post-depositional processes and not intentional (Figure 67).

Skeletal preservation was poor. The portion of the skull uncovered was severely damaged by casket lid collapse.

Wood preservation was poor; no samples were taken for further analysis. The rectangular casket measured 210 cm long and 66 cm wide. Numerous wire nails were recovered; other non-decorative utilitarian hardware included ferrous internal casket lid closures, suggesting a commercially manufactured burial case. Decorative hardware included Oaklawn Type 03 ferrous single double arm lug extension bar handles and one Oaklawn Type 09 white metal coffin plaque (Stackelbeck et al., 2024: Appendix A). No clothing or personal items were found.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. This burial was left *in situ*.

Burial 066 (continued)

Figure 67 Burial 066 photogrammetry model illustrating condition of burial with skeletal remains partially exposed

Burial 067

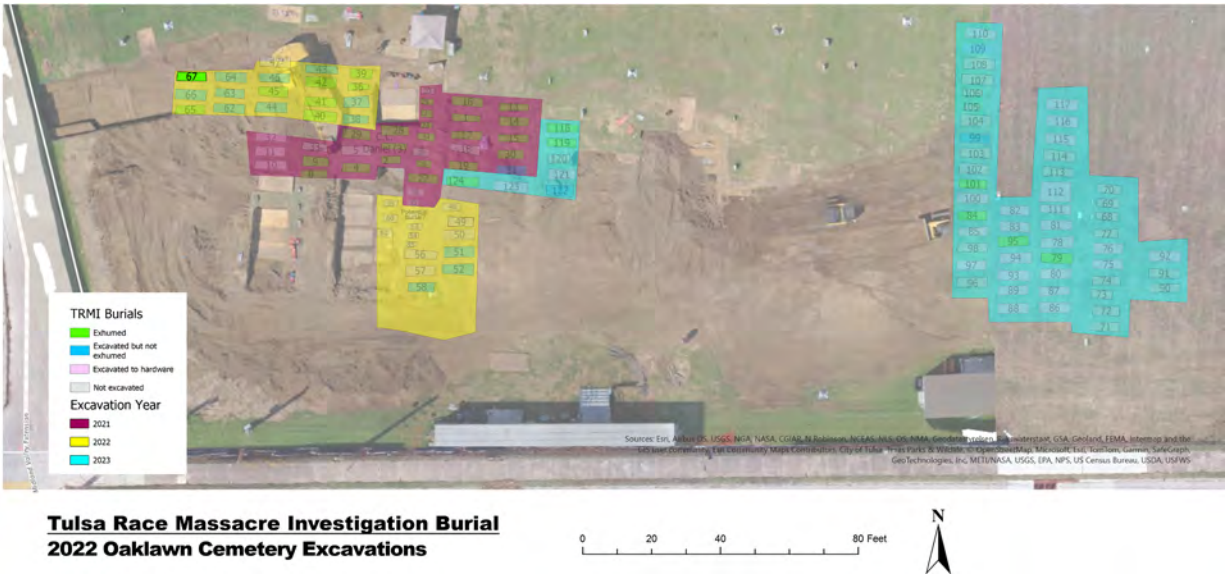

Figure 68 TRMI site map showing location of Burial 067

Final Excavation Status	Exhumed
Started	11/16/2022
Completed	11/17/2022
Excavators	Erin McKendry, Kathleen Settle
NW starting elevation	98.7279
NW ending elevation	98.3087

Burial 067 is located in the fifth row to the west in the 2022 west excavation expansion (Figure 68). The individual burial shaft measured 203 cm long and 79 cm wide.

This individual was interred with the head oriented to the west. The body was found to be in an extended supine position. The left arm was flexed so the left hand was resting over the pelvis; the right arm displayed a more acute flexion with the right hand higher on the abdomen. The legs were straight with the ankles uncrossed. Despite significant post-depositional damage (see below), the skull appeared to be in a normal anatomical position (Figure 69).

Skeletal preservation was fair. Taphonomic damage resulted in some axial element deterioration, however, they were in slightly better condition than surrounding interments. Long bone epiphyses were poorly preserved, but long bone shafts were mostly intact, if displaced. The cranium was heavily damaged with all cranial and facial bones fragmented.

Burial container wood preservation was poor, with one sample taken for further analysis. Nail location as well as soil staining indicated a plain, rectangular casket measuring 183 cm long and 72 cm wide. No coffin hardware was found other than wire nails. No personal items or other grave good were recovered. A rectangular stone sat below the right arm, extending underneath the lumbar vertebrae; excavators noted this was most likely a fill artifact that was in the burial shaft when the casket was lowered into the ground. Other

Due to the sparse nature of the material culture directly associated with Burial 067, it was difficult to assign a precise date of interment; however, what was observed is consistent with an early to mid-1920s interment. This individual was interred in an unadorned rectangular casket consistent with the expected burial treatment for massacre victims. The remains were exhumed and taken to the forensic laboratory for examination and were designated Oaklawn Unknown #26.

Burial 067 (continued)

Figure 69 Burial 067 photogrammetry model illustrating condition of burial with skeletal remains fully exposed (application of Butvar to stabilize skeletal remains for forensic analysis causes white discoloration where applied)

Burial 068

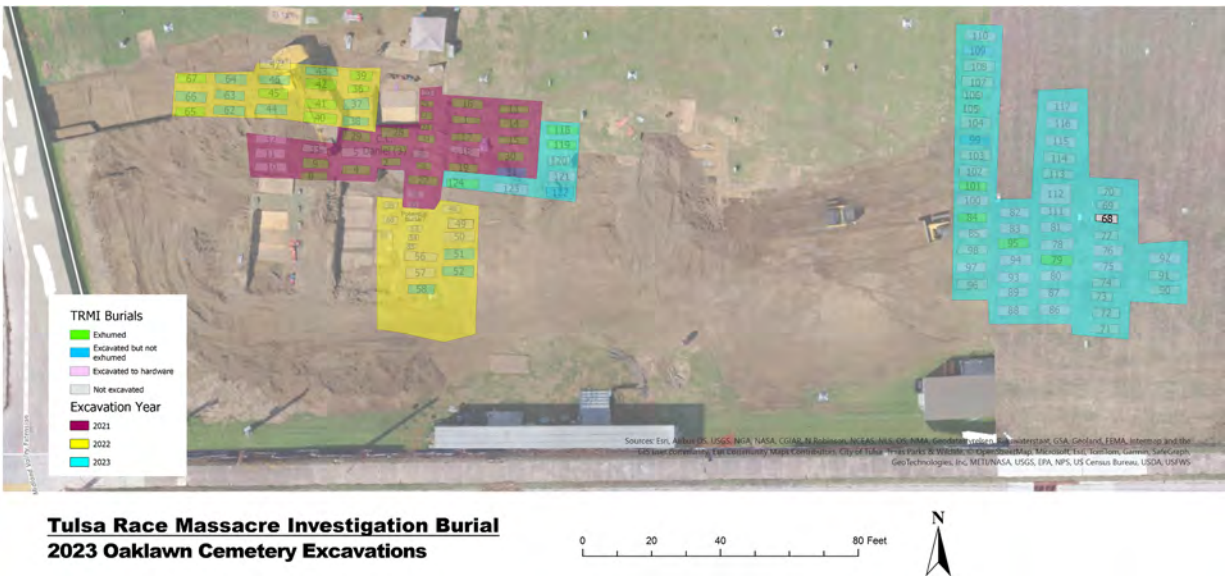

Figure 70 TRMI site map showing location of Burial 068

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	100.7131
NW ending elevation	n/a

Burial 068 is located in the second row to the west in the 2023 east excavation trench (Figure 70). The individual shaft measured 193 cm long and 69 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. This burial was associated with the grave marker for Johny WHITMORE who died in July of 1922. No further investigation was conducted.

Burial 069

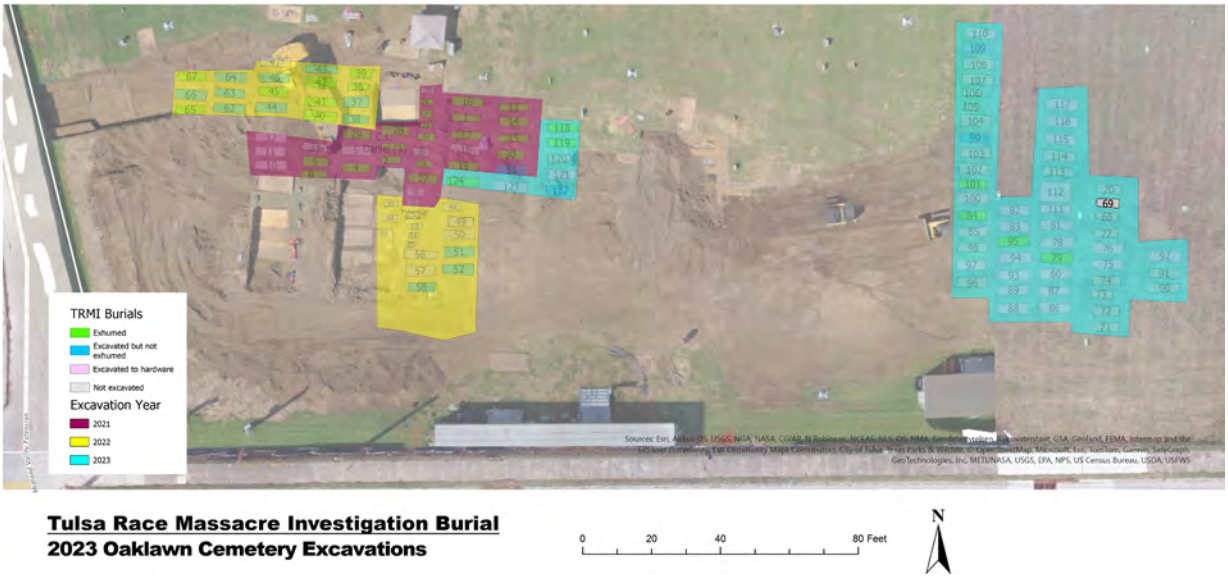

Figure 71 TRMI site map showing location of Burial 069

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	100.7210
NW ending elevation	n/a

Burial 069 is located in the second row to the west in the 2023 east excavation trench (Figure 71). The individual shaft measured 197 cm long and 76 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. This burial was associated with the grave marker for O. D. VAUGHN who died in September of 1921. No further investigation was conducted.

Burial 070

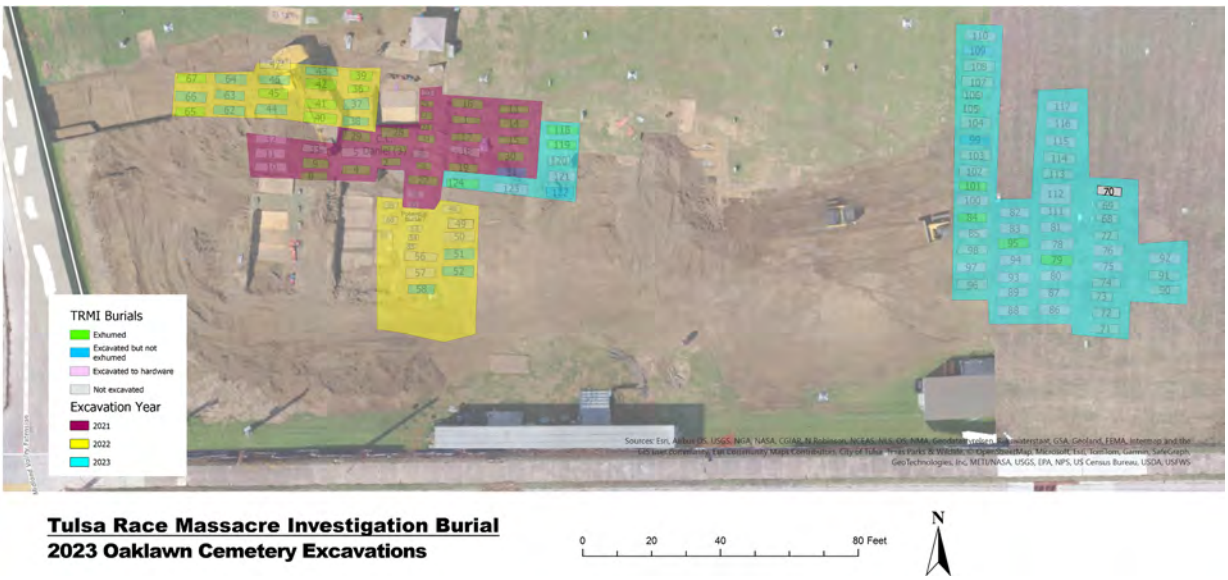

Figure 72 TRMI site map showing location of Burial 070

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	100.7613
NW ending elevation	n/a

Burial 070 is located in the second row to the west in the 2023 east excavation trench (Figure 72). The individual shaft measured 215 cm long and 77 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 071

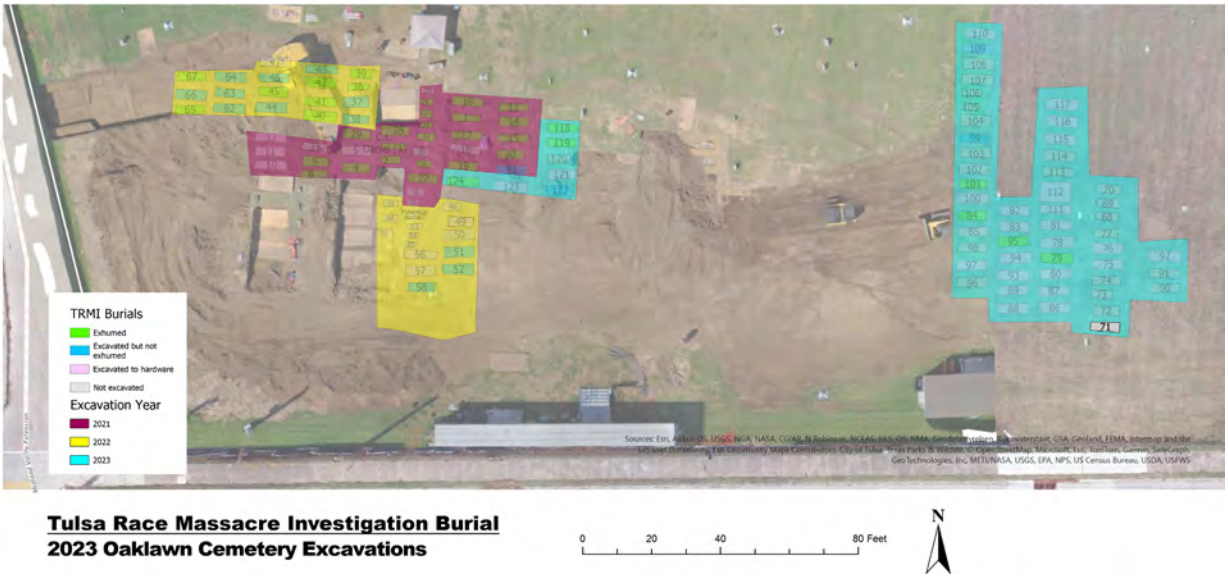

Figure 73 TRMI site map showing location of Burial 071

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.7798
NW ending elevation	n/a

Burial 071 is located in the second row to the west in the 2023 east excavation trench (Figure 73). The individual shaft measured 259 cm long and 81 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 072

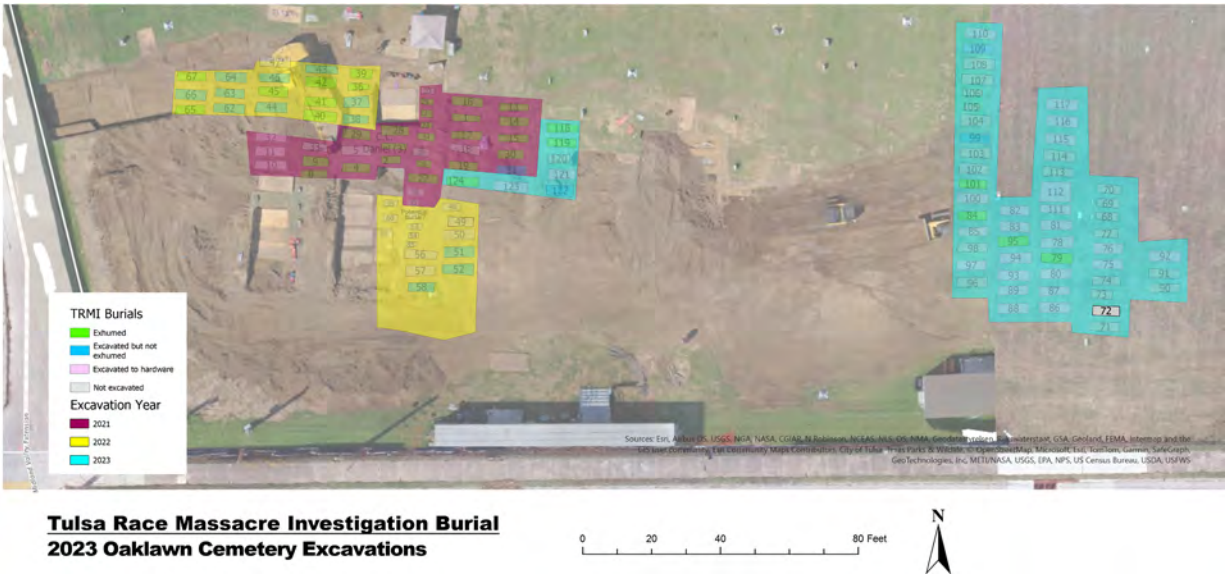

Figure 74 TRMI site map showing location of Burial 072

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.8152
NW ending elevation	n/a

Burial 072 is located in the second row to the west in the 2023 east excavation trench (Figure 74). The individual shaft measured 238 cm long and 85 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 073

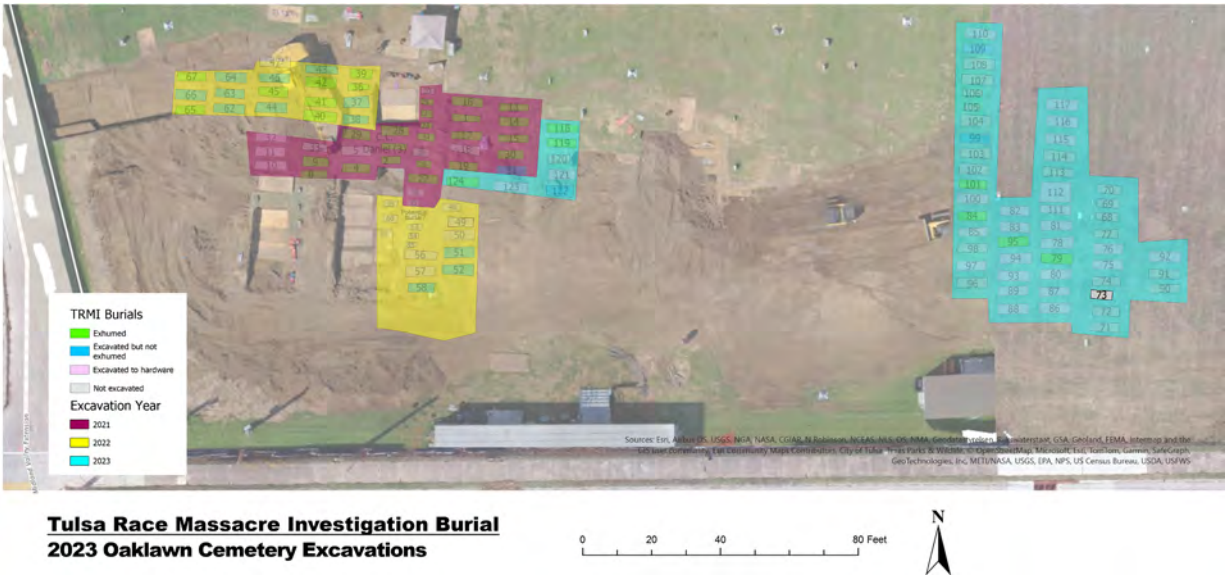

Figure 75 TRMI site map showing location of Burial 073

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.9204
NW ending elevation	n/a

Burial 073 is located in the second row to the west in the 2023 east excavation trench (Figure 75). The individual shaft measured 190 cm long and 77 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 074

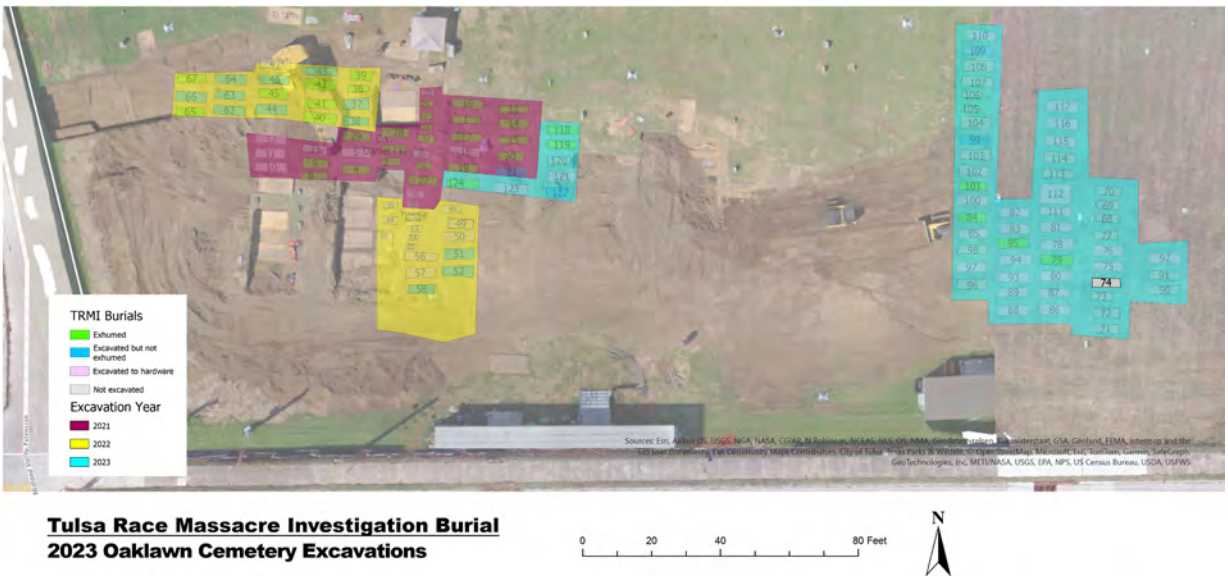

Figure 76 TRMI site map showing location of Burial 074

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.9204
NW ending elevation	n/a

Burial 074 is located in the second row to the west in the 2023 east excavation trench (Figure 76). The individual shaft measured 250 cm long and 80 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 075

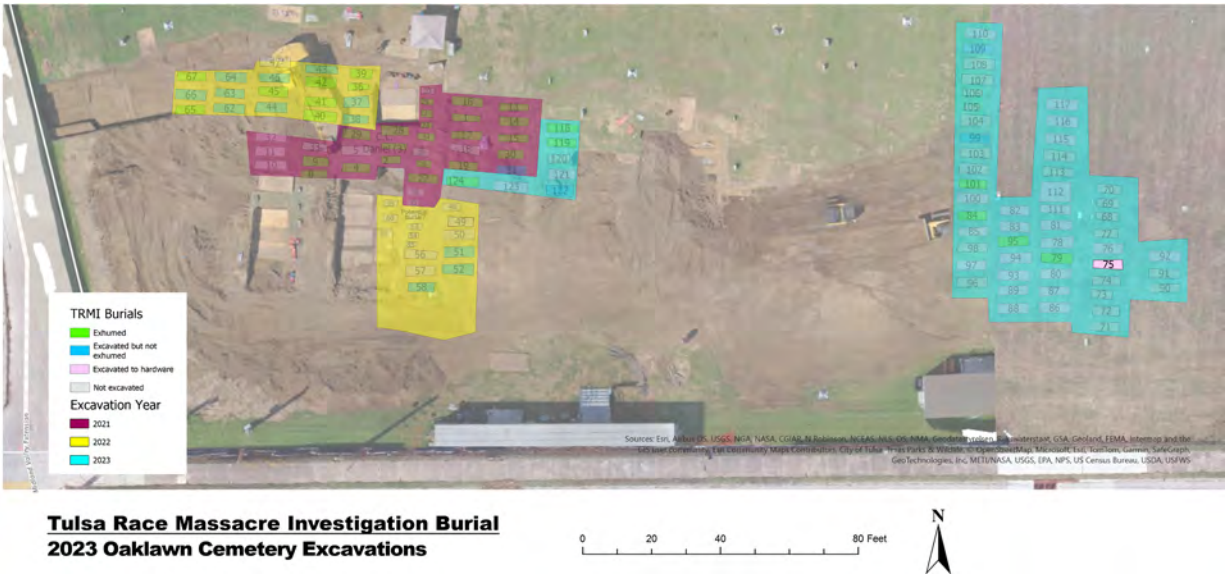

Figure 77 TRMI site map showing location of Burial 075

Final Excavation Status	Excavated to hardware
Started	9/14/2023
Completed	9/14/2023
Excavators	Armando Anzellini, Michael Loughlin, Izzy Ortt
NW starting elevation	99.2417
NW ending elevation	98.9520

Burial 075 is located in the second row to the west in the 2023 east excavation trench (Figure 77). The individual burial shaft measured 261 cm long and 88 cm wide.

Evidence indicated a rectangular casket constructed with wire nails; the casket measured 204 cm long and 58 cm wide. Other non-decorative utilitarian hardware included ferrous internal casket lid closures located at the four corners of the burial container, suggesting a commercially manufactured burial case. Decorative hardware included Oaklawn Type 14 white metal double lug short bar handles (Stackelbeck et al., 2024: Appendix A); no coffin plaque was found.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 076

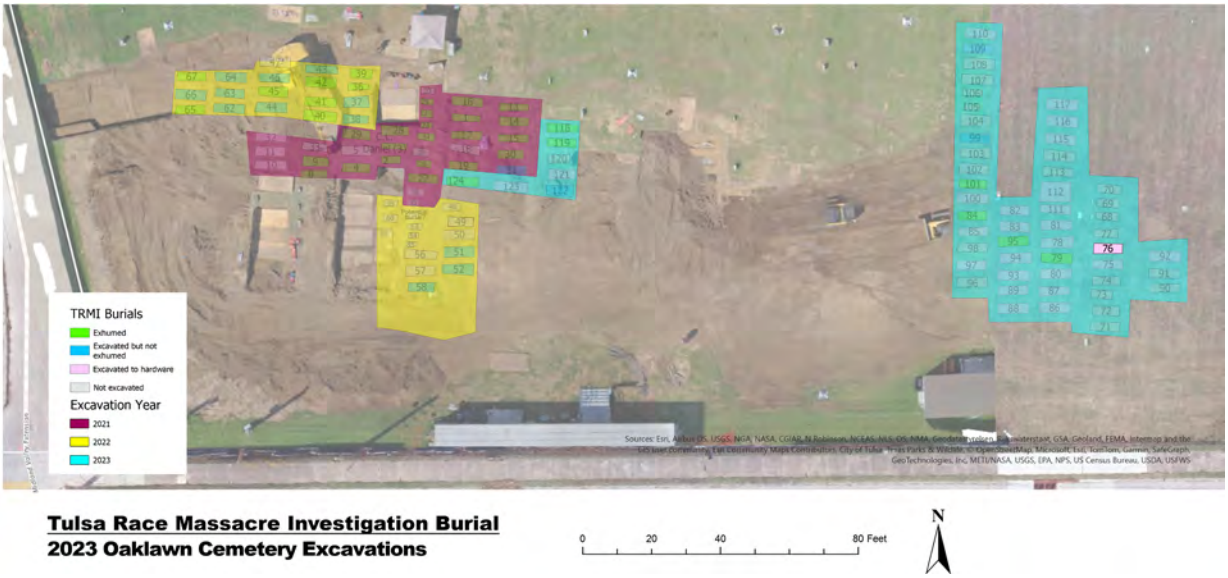

Figure 78 TRMI site map showing location of Burial 076

Final Excavation Status	Excavated to hardware
Started	9/14/2023
Completed	9/14/2023
Excavators	Kelsey Kreiser, Eric Prendergast
NW starting elevation	99.2364
NW ending elevation	99.2000

Burial 076 is located in the second row to the west in the 2023 east excavation trench (Figure 78). The individual burial shaft measured 219 cm long and 46 cm wide.

The exposed portions of the burial container displayed fair wood preservation; one sample was taken for further analysis. Evidence indicated a rectangular casket and several wire nails were recovered; the casket measured 202 cm long and 74 cm wide. Decorative hardware included six Oaklawn Type 15 white metal double lug short bar handles (Stackelbeck et al., 2024: Appendix A); no coffin plaque was found.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 077

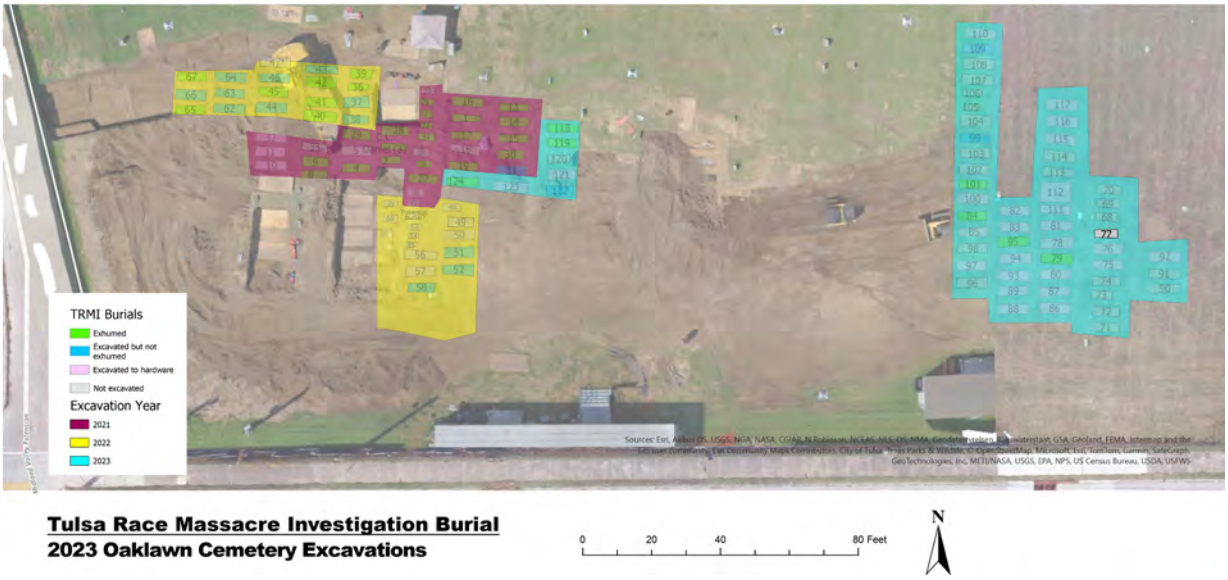

Figure 79 TRMI site map showing location of Burial 077

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	100.2351
NW ending elevation	n/a

Burial 077 is located in the second row to the west in the 2023 east excavation trench (Figure 79). The individual shaft measured 202 cm long and 74 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 078

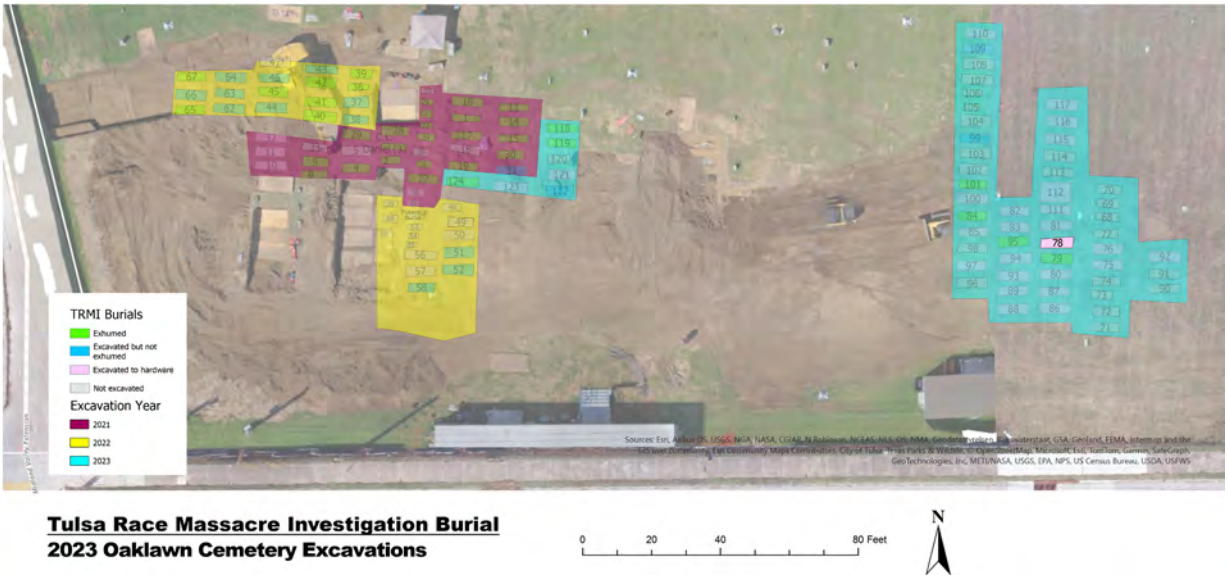

Figure 80 TRMI site map showing location of Burial 078

Final Excavation Status	Excavated to hardware
Started	9/14/2023
Completed	9/14/2023
Excavators	Tyler Donaldson, Allie Powell, Jeremy Wilson
NW starting elevation	99.5901
NW ending elevation	99.3036

Burial 078 is located in the third row to the west in the 2023 east excavation trench (Figure 80). The individual burial shaft measured 266 cm long and 60 cm wide.

The exposed portions of the burial container displayed fair wood preservation; one sample was taken for further analysis. Evidence indicated a rectangular casket and several wire nails were recovered; the casket measured 195 cm long and 45 cm wide. Decorative hardware included six Oaklawn Type 10 ferrous double lug swingbail handles (Stackelbeck et al., 2024: Appendix A); no coffin plaque was found.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 079

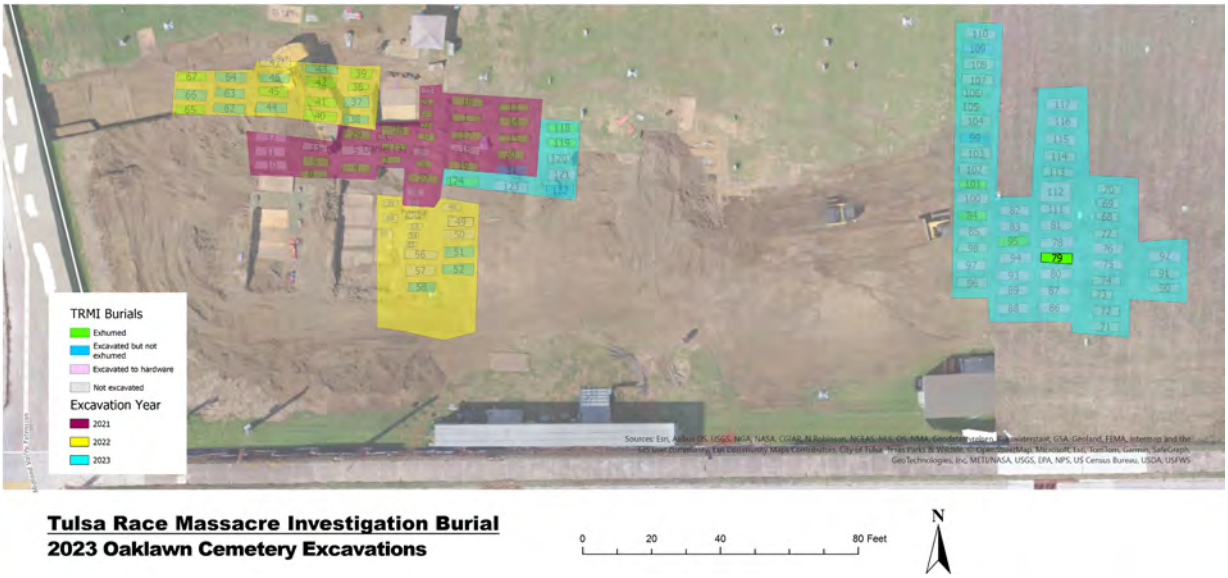

Figure 81 TRMI site map showing location of Burial 079

Final Excavation Status	Exhumed
Started	9/11/2023
Completed	9/14/2023
Excavators	Tyler Donaldson, Allie Powell, Jeremy Wilson
NW starting elevation	99.4675
NW ending elevation	99.0791

Burial 079 is located in the third row to the west in the 2023 east excavation trench (Figure 81). The individual burial shaft measured 223 cm long and 60 cm wide.

This individual was interred with the head oriented to the west. The body was found to be in an extended supine position. Both arms were placed straight along the decedent's sides; the legs were straight with the ankles uncrossed. The skull was turned towards the south, though, this appears to have been caused by post-depositional processes and not intentional (Figure 82).

Skeletal preservation was fair. Taphonomic damage resulted in axial element deterioration. Long bone epiphyses were generally in poor condition, however, long bone shafts were better preserved. The cranium was also relatively complete with some fragmentation.

Burial container wood preservation was fair, with one sample taken for further analysis. Nail location as well as soil staining indicated a plain, rectangular casket measuring 187 cm long and 53 cm wide. No coffin hardware was found other than wire nails. No personal items or other grave good were recovered.

Due to the sparse nature of the material culture directly associated with Burial 079, it was difficult to assign a precise date of interment; however, what was observed is consistent with an early to mid-1920s interment. This individual was interred in an unadorned rectangular casket consistent with the expected burial treatment for massacre victims. The remains were exhumed and taken to the forensic laboratory for examination and were designated Oaklawn Unknown #28.

Burial 079 (continued)

Figure 82 Burial 079 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

Burial 080

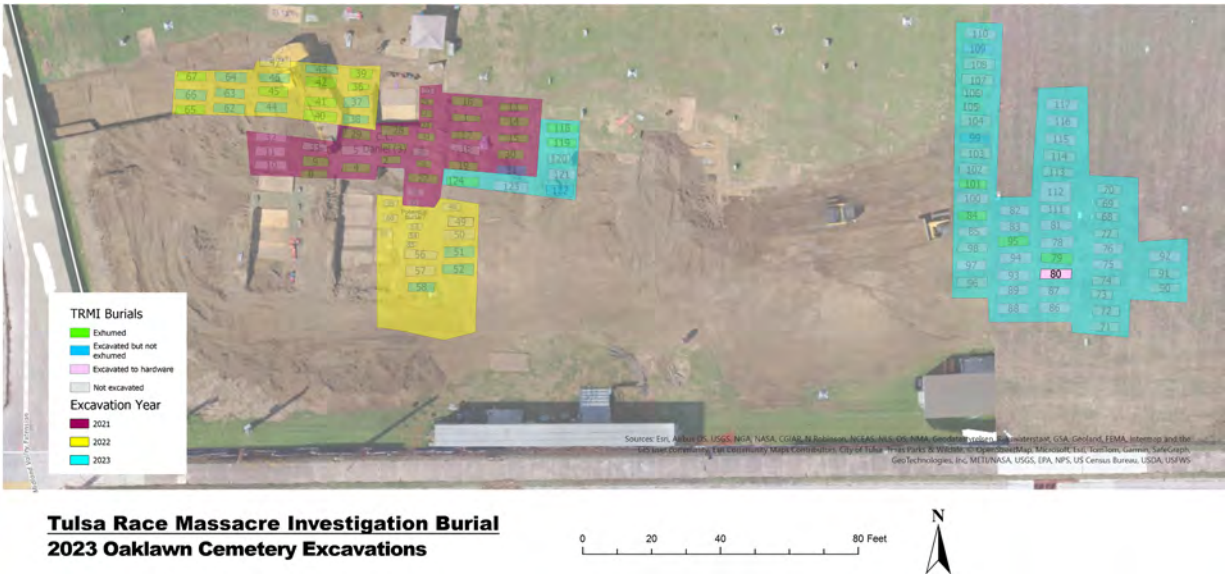

Figure 83 TRMI site map showing location of Burial 080

Final Excavation Status	Excavated to hardware
Started	9/14/2023
Completed	9/15/2023
Excavators	Tyler Donaldson, Allie Powell, Jeremy Wilson
NW starting elevation	99.2873
NW ending elevation	98.9870

Burial 080 is located in the third row to the west in the 2023 east excavation trench (Figure 83). The individual burial shaft measured 225 cm long and 88 cm wide.

The exposed portions of the burial container displayed fair wood preservation; one sample was taken for further analysis. Soul staining indicated an octagonal casket and several wire nails were recovered; the casket measured 207 cm long and 61 cm wide. Other non-decorative utilitarian hardware included ferrous internal casket lid closures located at four corners of the burial container, suggesting a commercially manufactured burial case. Six Oaklawn Type 15 ferrous double lug swingbail handles (Stackelbeck et al., 2024: Appendix A); no coffin plaque was uncovered.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 081

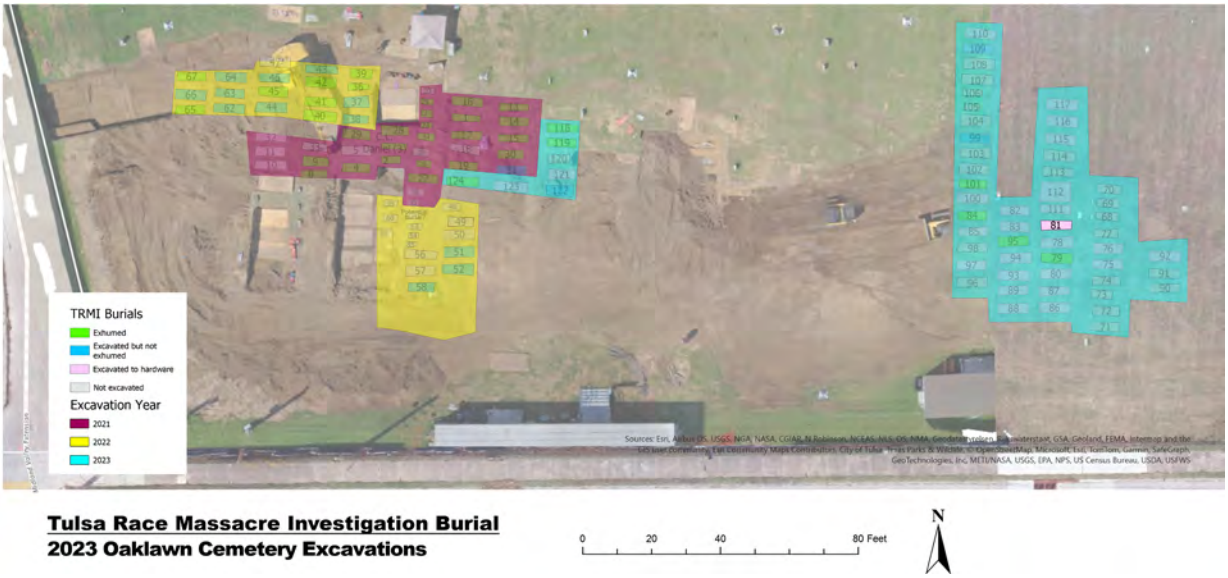

Figure 84 TRMI site map showing location of Burial 081

Final Excavation Status	Excavated to hardware
Started	9/11/2023
Completed	9/12/2023
Excavators	Erin McKendry, Izzy Ortt, Kathleen Settle
NW starting elevation	99.6162
NW ending elevation	99.3154

Burial 081 is located in the third row to the west in the 2023 east excavation trench (Figure 84). The individual burial shaft measured 227 cm long and 71 cm wide.

The exposed portions of the burial container displayed fair wood preservation; one sample was taken for further analysis. Evidence indicated a rectangular casket and several wire nails were recovered; the casket measured 202 cm long and 67 cm wide. Other non-decorative utilitarian hardware included ferrous internal casket lid closures located at the four corners of the burial container, suggesting a commercially manufactured burial case. Decorative hardware included two Oaklawn Type 16 white metal single double arm lug extension bar handles (Stackelbeck et al., 2024: Appendix A); no coffin plaque was uncovered.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 082

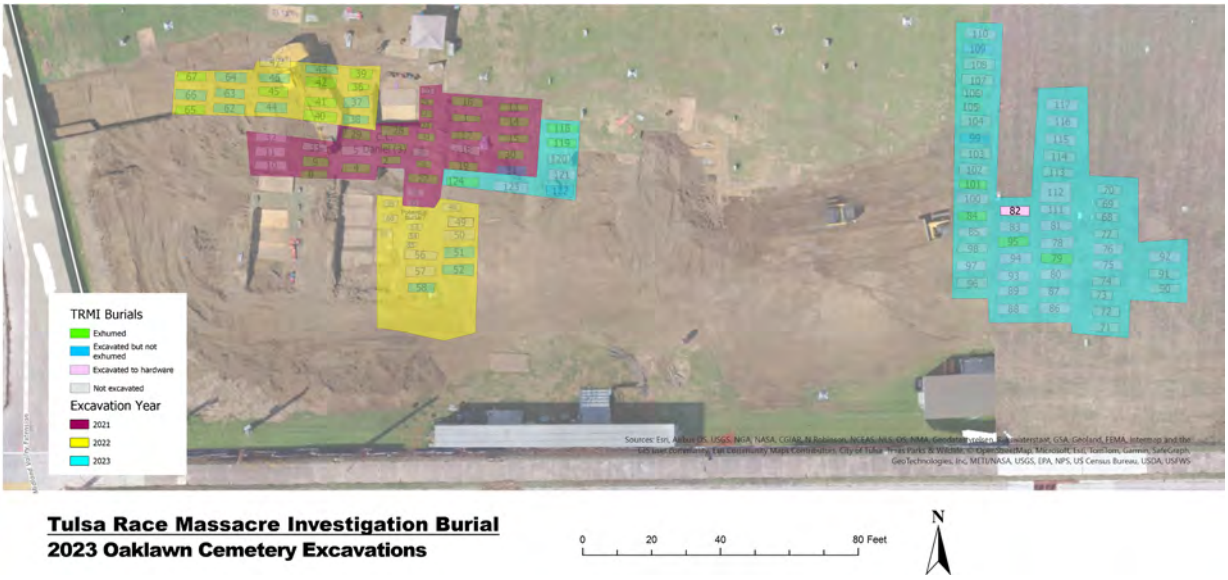

Figure 85 TRMI site map showing location of Burial 082

Final Excavation Status	Excavated to hardware
Started	9/11/2023
Completed	9/13/2023
Excavators	Kelsey Kreiser, Eric Prendergast
NW starting elevation	99.6114
NW ending elevation	99.4410

Burial 082 is located in the fourth row to the west in the 2023 east excavation trench (Figure 85). The individual burial shaft measured 257 cm long and 84 cm wide.

The exposed portions of the burial container displayed fair wood preservation; no samples were taken for further analysis. Evidence indicated a rectangular casket and several wire nails were recovered; exact coffin dimensions were indeterminate due incomplete exposure. Other non-decorative utilitarian hardware included ferrous internal casket lid closures, suggesting a commercially manufactured burial case. Decorative hardware included six Oaklawn Type 04B ferrous double lug short bar handles, and one Oaklawn Type 10 white metal coffin plaque (Stackelbeck et al., 2024: Appendix A).

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 083

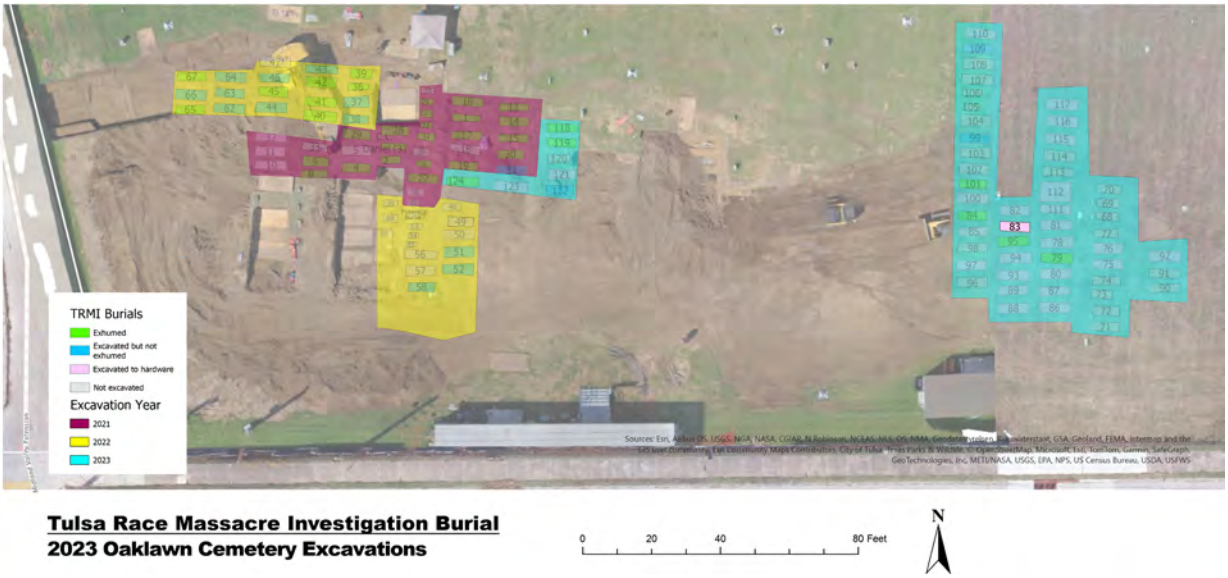

Figure 86 TRMI site map showing location of Burial 083

Final Excavation Status	Excavated to hardware
Started	9/13/2023
Completed	9/13/2023
Excavators	Kelsey Kreiser, Eric Prendergast
NW starting elevation	99.6259
NW ending elevation	99.4690

Burial 083 is located in the fourth row to the west in the 2023 east excavation trench (Figure 86). The individual burial shaft measured 209 cm long and 76 cm wide.

The exposed portions of the burial container displayed fair wood preservation; no samples were taken for further analysis. Evidence indicated a rectangular casket and several wire nails were recovered; the casket measured 193 cm long and 54 cm wide. Other non-decorative utilitarian hardware included ferrous internal casket lid closures, suggesting a commercially manufactured burial case. Decorative hardware included six Oaklawn Type 10 ferrous double lug swingbail handles (Stackelbeck et al., 2024: Appendix A); no coffin plaque was uncovered.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 084

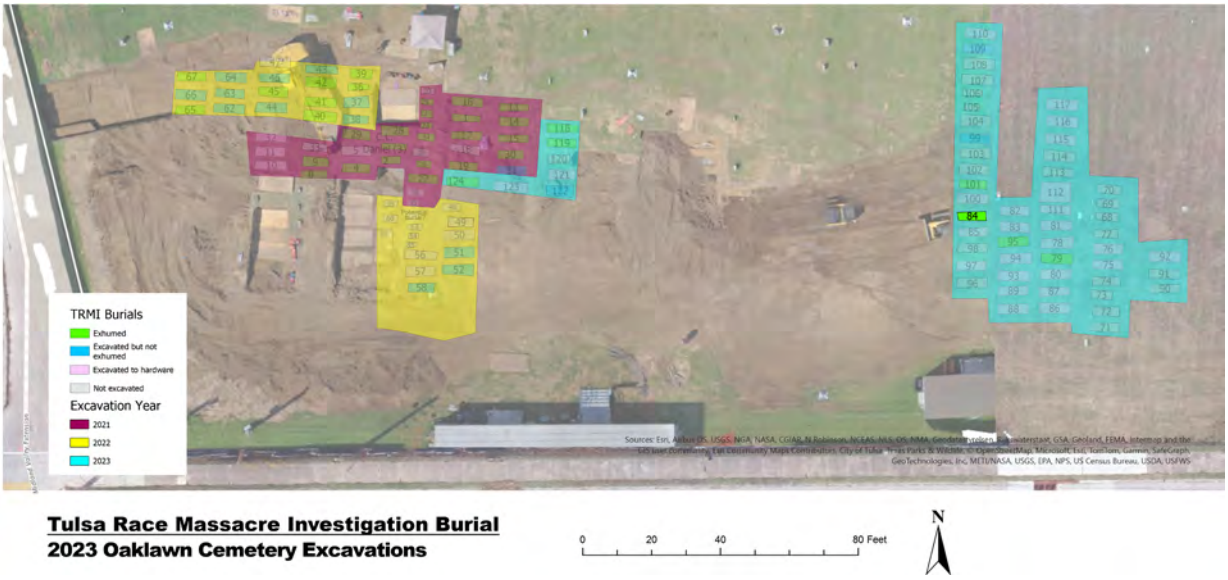

Figure 87 TRMI site map showing location of Burial 084

Final Excavation Status	Exhumed
Started	9/11/2023
Completed	9/14/2023
Excavators	Armando Anzellini, Michael Loughlin , Izzy Ortt
NW starting elevation	99.7653
NW ending elevation	99.2914

Burial 084 is located in the fifth row to the west in the 2023 east excavation trench (Figure 87). The individual burial shaft measured 198 cm long and 60 cm wide.

This individual was interred with the head oriented to the west. The body was found to be in an extended supine position. Both arms were slightly flexed so that the hands were resting on the outer edges of the pelvis. The legs were straight with the ankles uncrossed. The skull was turned towards the south, though, this appears to have been caused by post-depositional processes and not intentional (Figure 88).

Skeletal preservation was fair to good. Taphonomic damage resulted in axial element deterioration. Long bone epiphyses were more intact than those from other burials, and the long bone shafts were similarly well preserved. The cranium was also relatively complete with some fragmentation on the left side. The cervical vertebral column was also bent significantly towards the right, with the skull facing the south. Most dentition was intact and two gold maxillary teeth were observed.

Burial container wood preservation was fair, with two samples taken for further analysis. Nail location as well as soil staining indicated a plain, rectangular casket measuring 181 cm long and 54 cm wide. No coffin hardware was found other than wire nails. No personal items or other grave good were recovered. Excavators initially identified what they believed to be a cuprous belt located above the pelvis, however, after preliminary lab processing the item was found to be a gas lantern base and was likely refuse from the shaft fill (Figure 89). The other

Due to the sparse nature of the material culture directly associated with Burial 084, it was difficult to assign a precise date of interment; however, what was observed is consistent with an early to mid-1920s interment. This individual was interred in an unadorned rectangular casket consistent with the expected burial treatment for massacre victims. The remains were exhumed and taken to the forensic laboratory for examination and were designated Oaklawn Unknown #29.

Burial 084 (continued)

Figure 88 Burial 084 photogrammetry model illustrating condition of burial when excavation was suspended

Figure 89 Lantern base found in Burial 084 shaft fill

Burial 085

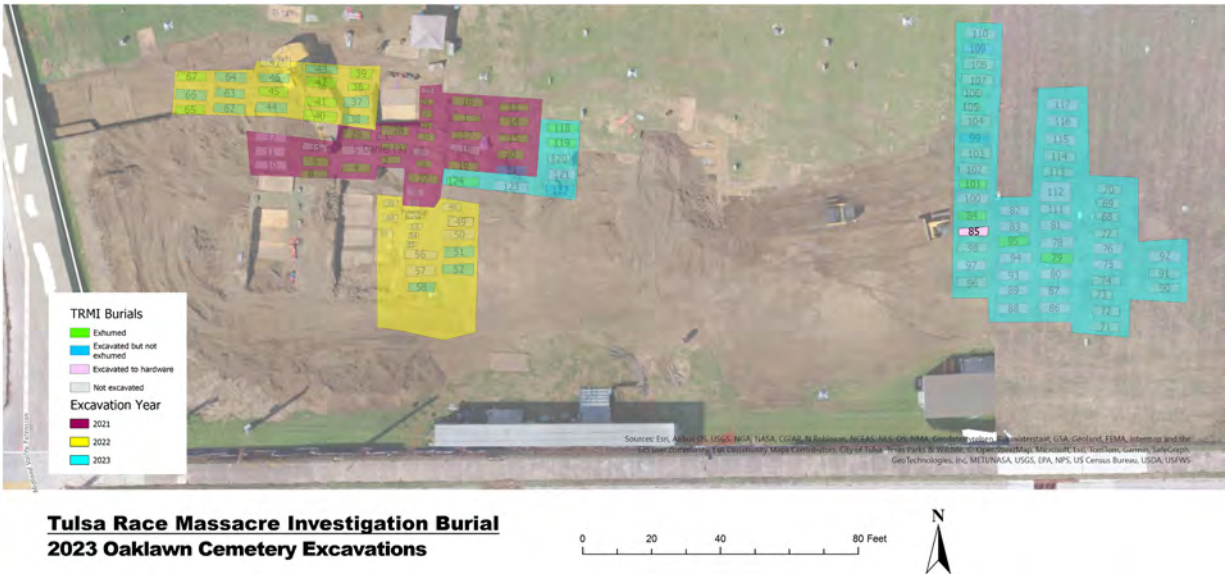

Figure 90 TRMI site map showing location of Burial 085

Final Excavation Status	Excavated to hardware
Started	9/15/2023
Completed	9/15/2023
Excavators	Armando Anzellini, Michael Loughlin , Izzy Ortt
NW starting elevation	99.8475
NW ending elevation	99.2990

Burial 085 is located in the fifth row to the west in the 2023 east excavation trench (Figure 90). The individual burial shaft measured 204 cm long and 61 cm wide.

The exposed portions of the burial container displayed fair wood preservation; no samples were taken for further analysis. Evidence indicated a rectangular casket and several wire nails were recovered; the casket measured 204 cm long and 61 cm wide. Other non-decorative utilitarian hardware included ferrous internal casket lid closures , suggesting a commercially manufactured burial case. Decorative hardware included six Oaklawn Type 10 ferrous double lug swingbail handles (Stackelbeck et al., 2024: Appendix A); no coffin plaque was uncovered.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 086

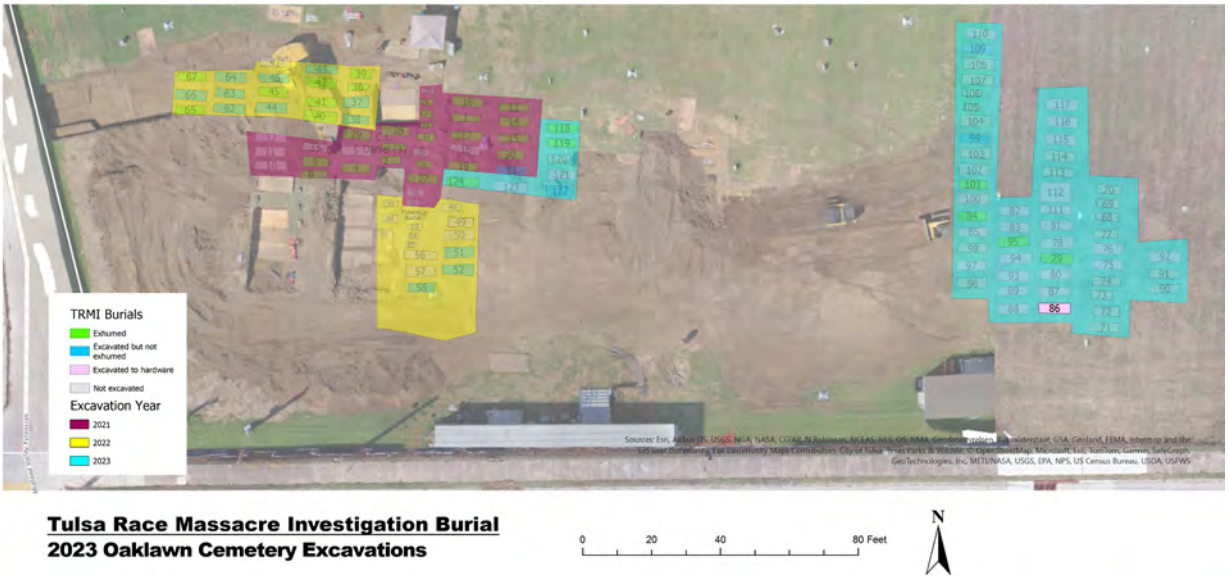

Figure 91 TRMI site map showing location of Burial 086

Final Excavation Status	Excavated to hardware
Started	9/14/2023
Completed	9/14/2023
Excavators	Erin McKendry, Kathleen Settle
NW starting elevation	99.7096
NW ending elevation	99.5970

Burial 086 is located in the third row to the west in the 2023 east excavation trench (Figure 91). The individual burial shaft measured 225 cm long and 82 cm wide.

The exposed portions of the burial container displayed excellent wood preservation; two samples were taken for further analysis. Evidence indicated an outer crate and interior rectangular casket; several wire nails were recovered; the casket measured 214 cm long and 75 cm wide. Decorative hardware included two Oaklawn Type 18 elaborate single double arm lug extension bar handles, and one Oaklawn Type 11 ferrous coffin plaque with associated decorative plaque screw (Stackelbeck et al., 2024: Appendix A).

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 087

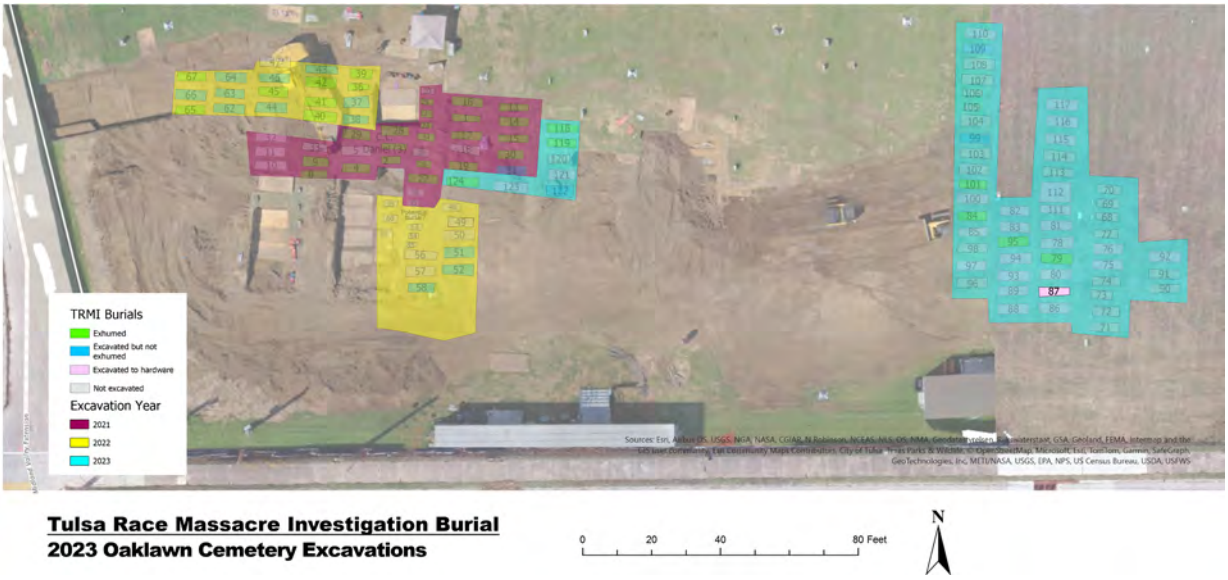

Figure 92 TRMI site map showing location of Burial 087

Final Excavation Status	Excavated to hardware
Started	9/13/2023
Completed	9/13/2023
Excavators	Erin McKendry, Kathleen Settle
NW starting elevation	99.5854
NW ending elevation	99.4950

Burial 087 is located in the third row to the west in the 2023 east excavation trench (Figure 92). The individual burial shaft measured 224 cm long and 52 cm wide.

The exposed portions of the burial container displayed excellent wood preservation; one sample was taken for further analysis. Evidence indicated an outer crate with an interior rectangular casket and several wire nails were recovered; the casket measured 191 cm long and 51 cm wide. Decorative hardware included two Oaklawn Type 03 ferrous single double arm lug extension bar handles (Stackelbeck et al., 2024: Appendix A); no coffin plaque was uncovered.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 088

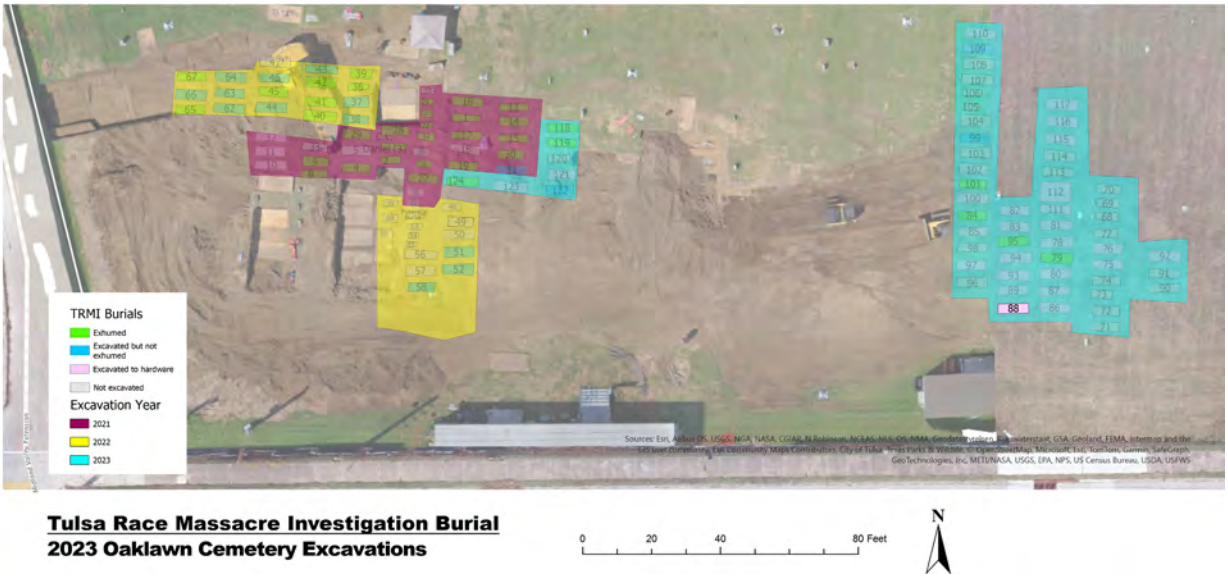

Figure 93 TRMI site map showing location of Burial 088

Final Excavation Status	Excavated to hardware
Started	9/13/2022
Completed	9/13/2022
Excavators	Ryan Peterson
NW starting elevation	99.7747
NW ending elevation	na

Burial 088 is located in the fourth row to the west in the 2023 east excavation trench (Figure 93). The individual burial shaft measured 271 cm long and 88 cm wide.

No intact coffin wood was exposed. Soil staining and limited wire nail distribution indicated a rectangular casket; the exact measurements for this container were indeterminate. Decorative hardware included Oaklawn Type 09 ferrous double lug swingbail handles (Stackelbeck et al., 2024: Appendix A); no coffin plaque was uncovered.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 089

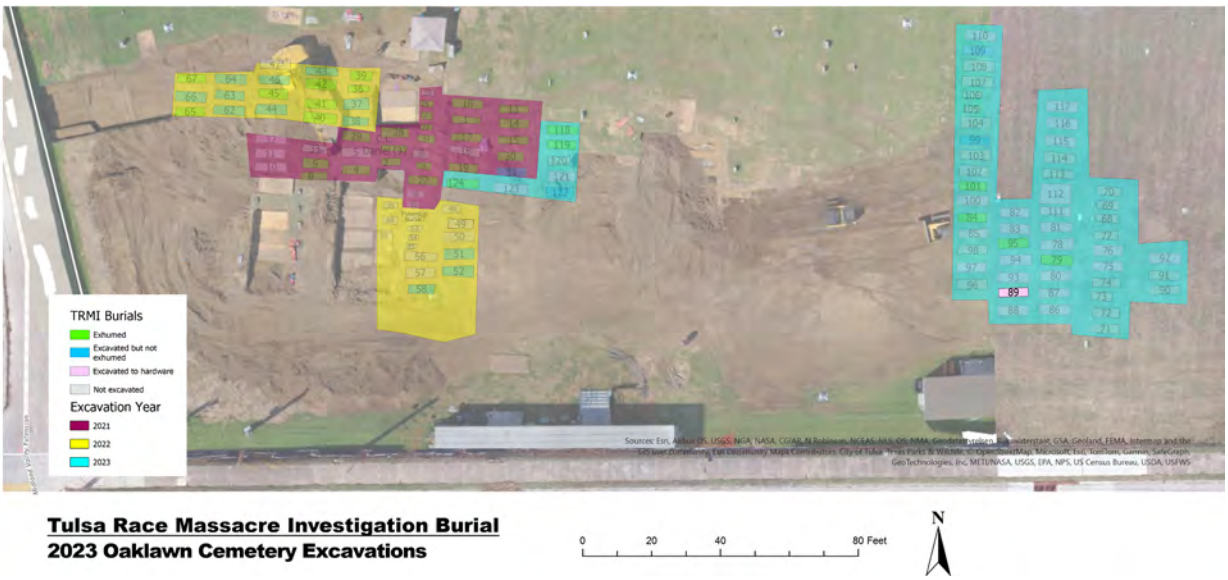

Figure 94 TRMI site map showing location of Burial 089

Final Excavation Status	Excavated to hardware
Started	9/13/2023
Completed	9/14/2023
Excavators	Erin McKendry, Kathleen Settle
NW starting elevation	99.7170
NW ending elevation	99.6730

Burial 089 is located in the fourth row to the west in the 2023 east excavation trench (Figure 94). The individual burial shaft measured 214 cm long and 63 cm wide.

The exposed portions of the burial container displayed some wood preservation; no samples were taken for further analysis. Evidence indicated an outer crate with an interior octagonal casket; the casket measured 200 cm long and 54 cm wide. Decorative hardware included Oaklawn Type 09 ferrous double lug swingbail handles (Stackelbeck et al., 2024: Appendix A); no coffin plaque was uncovered.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 090

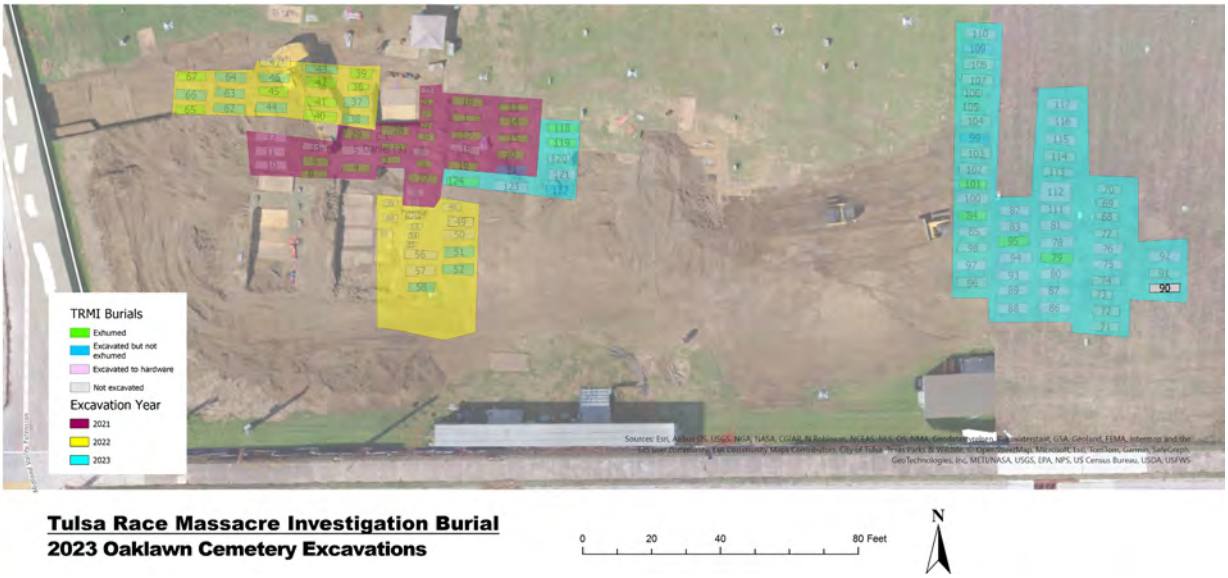

Figure 95 TRMI site map showing location of Burial 090

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.9196
NW ending elevation	n/a

Burial 090 is located in the first row to the west in the 2023 east excavation trench (Figure 95). The individual shaft measured 273 cm long and 78 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 091

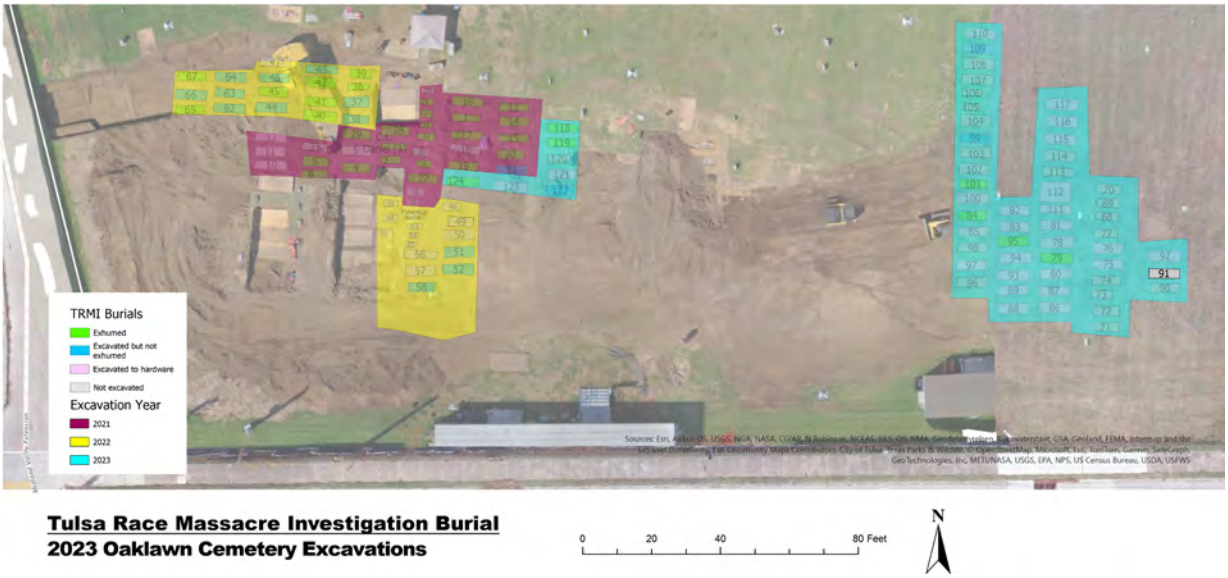

Figure 96 TRMI site map showing location of Burial 091

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.9115
NW ending elevation	n/a

Burial 091 is located in the first row to the west in the 2023 east excavation trench (Figure 96). The individual shaft measured 275 cm long and 81 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 092

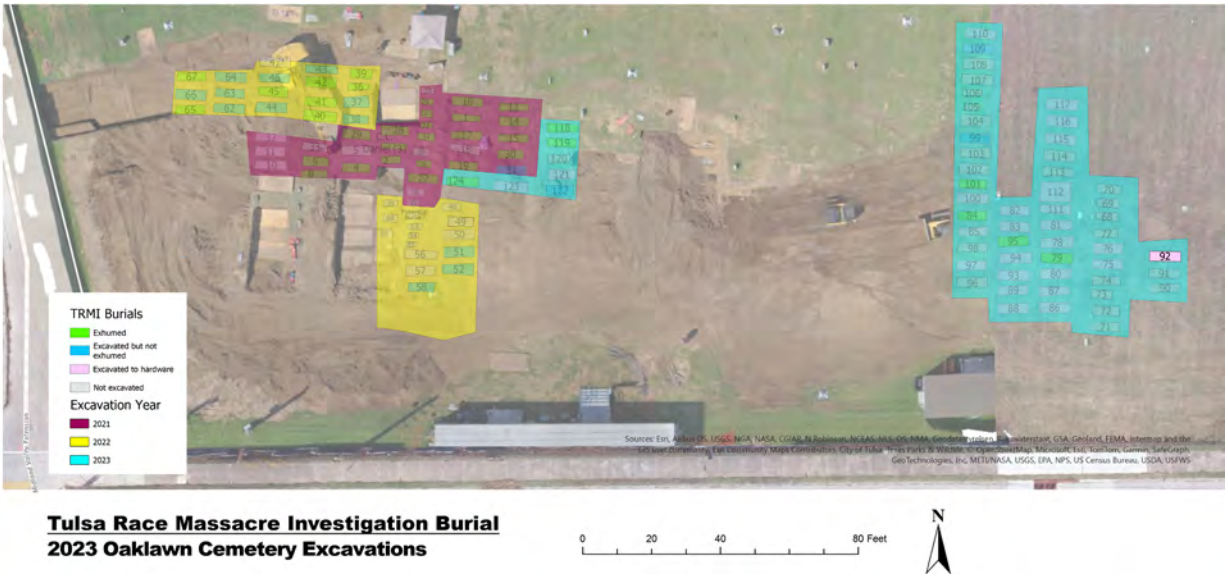

Figure 97 TRMI site map showing location of Burial 092

Final Excavation Status	Excavated to hardware
Started	9/14/2023
Completed	9/15/2023
Excavators	Kelsey Kreiser, Eric Prendergast
NW starting elevation	100.0568
NW ending elevation	99.9180

Burial 092 is located in the first row to the west in the 2023 east excavation trench (Figure 97). The individual burial shaft measured 220 cm long and 69 cm wide.

The exposed portions of the burial container displayed fair wood preservation; four samples were taken for further analysis. Evidence indicated a rectangular casket and several wire nails were recovered; the casket measured 172 cm long and 25 cm wide. Other non-decorative utilitarian hardware included ferrous internal casket lid closures, suggesting a commercially manufactured burial case. Decorative hardware included two Oaklawn Type 19 ferrous single double arm lug extension bar handles (Stackelbeck et al., 2024: Appendix A); no coffin plaque was uncovered.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 093

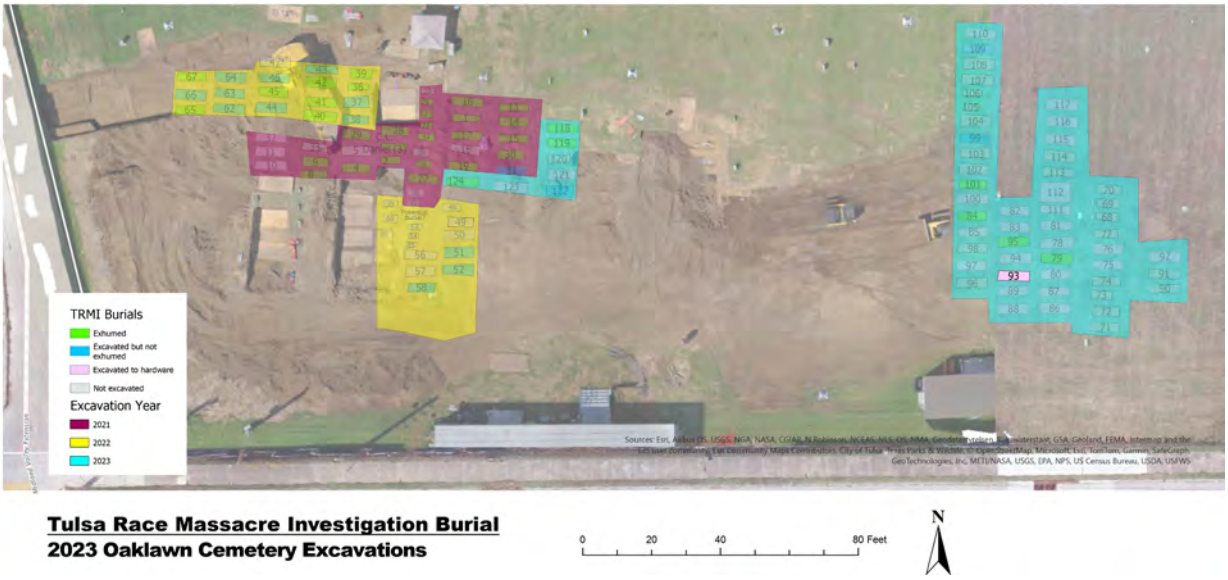

Figure 98 TRMI site map showing location of Burial 093

Final Excavation Status	Excavated to hardware
Started	9/15/2023
Completed	9/15/2023
Excavators	Tyler Donaldson, Allie Powell, Jeremy Wilson
NW starting elevation	99.3447
NW ending elevation	99.1740

Burial 093 is located in the fourth row to the west in the 2023 east excavation trench (Figure 98). The individual burial shaft measured 230 cm long and 80 cm wide.

The exposed portions of the burial container displayed fair wood preservation; one sample was taken for further analysis. Evidence indicated a rectangular casket and several wire nails were recovered; the casket measured 200 cm long and 55 cm wide. Decorative hardware included two Oaklawn Type 13 white metal single double arm lug extension bar handles with matching short bar variations located at the west and east ends (Stackelbeck et al., 2024: Appendix A); no coffin plaque was uncovered.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 094

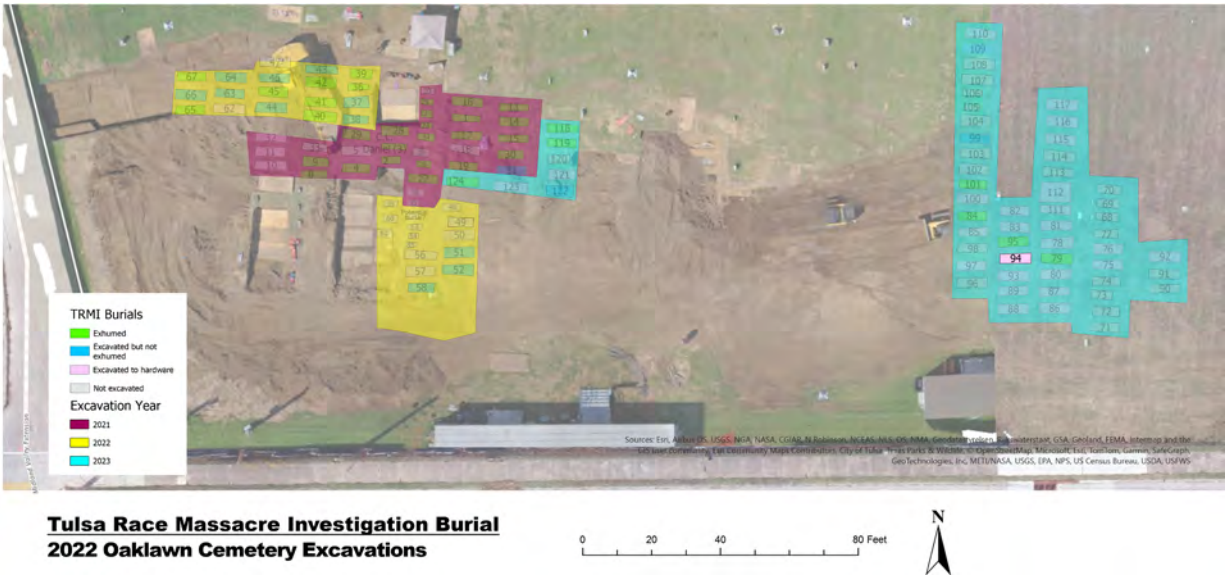

Figure 99 TRMI site map showing location of Burial 094

Final Excavation Status	Excavated to hardware
Started	9/21/2023
Completed	9/22/2023
Excavators	Erin McKendry, Kathleen Settle
NW starting elevation	99.3518
NW ending elevation	99.0660

Burial 094 is located in the fourth row to the west in the 2023 east excavation trench (Figure 99). The individual burial shaft measured 223 cm long and 64 cm wide.

The exposed portions of the burial container displayed poor wood preservation; one sample was taken for further analysis. Evidence indicated a rectangular casket and several wire nails were recovered; the exact measurements of the casket were indeterminate. A ferrous metal star-shaped wreath stand was uncovered on what was left of the casket lid; most likely this dropped into the burial shaft after a funeral service (Figure 100). A similar type of stand—Design No. 22—was advertised in the 1908 Mound Coffin Company catalog (Figure 101). Decorative hardware included Oaklawn Type 04B ferrous double lug short bar handles (Stackelbeck et al., 2024: Appendix A); no coffin plaque was uncovered.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 094 (continued)

Figure 100 Burial 094 photogrammetry model illustrating condition of burial when excavation was suspended

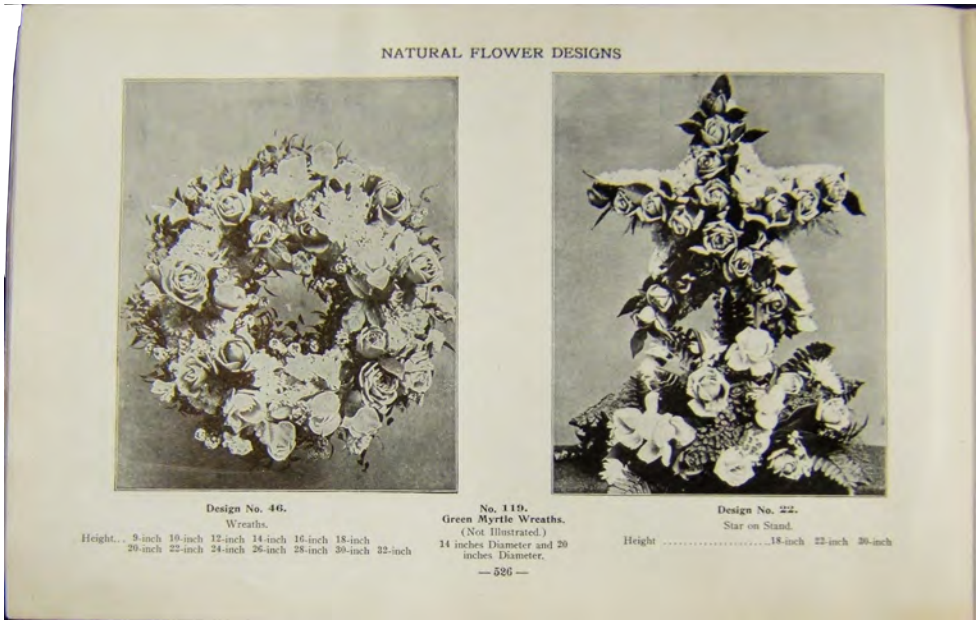

Figure 101 Star-shaped natural flower wreath with stand advertised in the 1908 Mound Coffin Company catalog (p. 526)

Burial 095

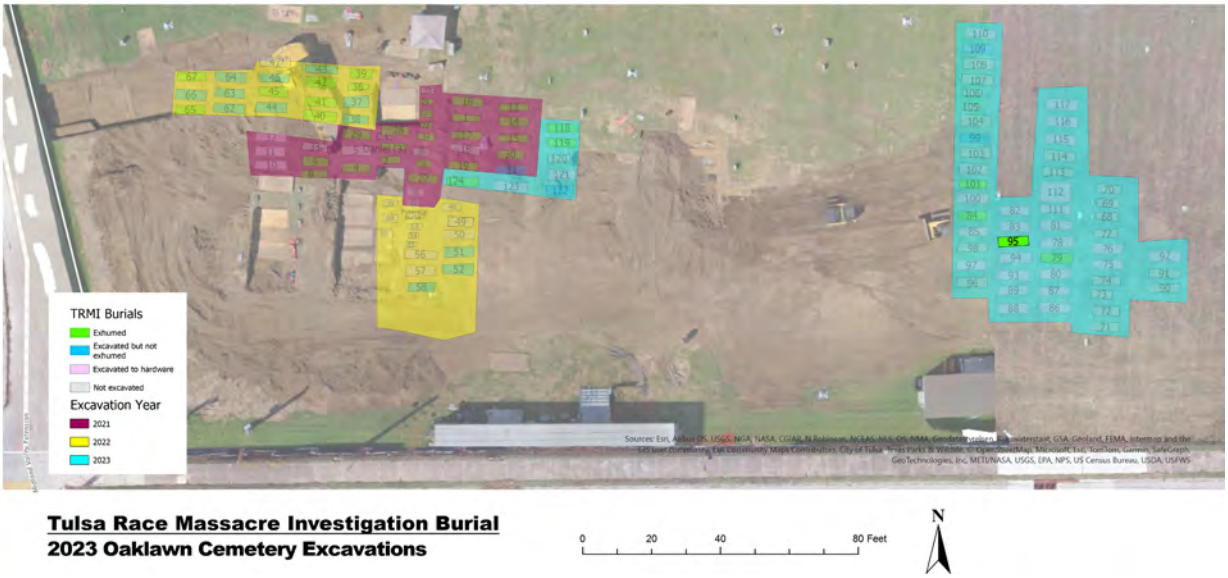

Figure 102 TRMI site map showing location of Burial 095

Final Excavation Status	Exhumed
Started	9/15/2023
Completed	9/21/2023
Excavators	Erin McKendry, Kathleen Settle
NW starting elevation	99.4034
NW ending elevation	99.1290

Burial 095 is located in the fourth row to the west in the 2023 east excavation trench (Figure 102). The individual burial shaft measured 218 cm long and 63 cm wide.

This individual was interred with the head oriented to the west. The body was found to be in an extended supine position. The left arm was straight to the side while the right arm was slightly flexed so the right hand was resting on the pelvis. The legs were straight with the ankles uncrossed. The skull was in a natural anatomical position (Figure 103).

Skeletal preservation was poor to fair. Taphonomic damage resulted in axial element deterioration. Long bone epiphyses were crushed, but long bone shafts were moderately more well preserved. The cranium was relatively complete with some fragmentation.

Burial container wood preservation was fair, with one sample taken for further analysis. Excavators noted several large timber knots distributed through out the central and norther sections of the remnant casket lid. Nail location as well as soil staining indicated a plain, rectangular casket measuring 182 cm long and 35 cm wide. No coffin hardware was found other than wire nails. No personal items or other grave good were recovered.

Due to the sparse nature of the material culture directly associated with Burial 095, it was difficult to assign a precise date of interment; however, what was observed is consistent with an early to mid-1920s interment. This individual was interred in an unadorned rectangular casket consistent with the expected burial treatment for massacre victims. The remains were exhumed and taken to the forensic laboratory for examination and were designated Oaklawn Unknown #30.

Burial 095 (continued)

Figure 103 Burial 095 photogrammetry model illustrating condition of burial with skeletal remains fully exposed (application of Butvar to stabilize skeletal remains for forensic analysis causes white discoloration where applied)

Burial 096

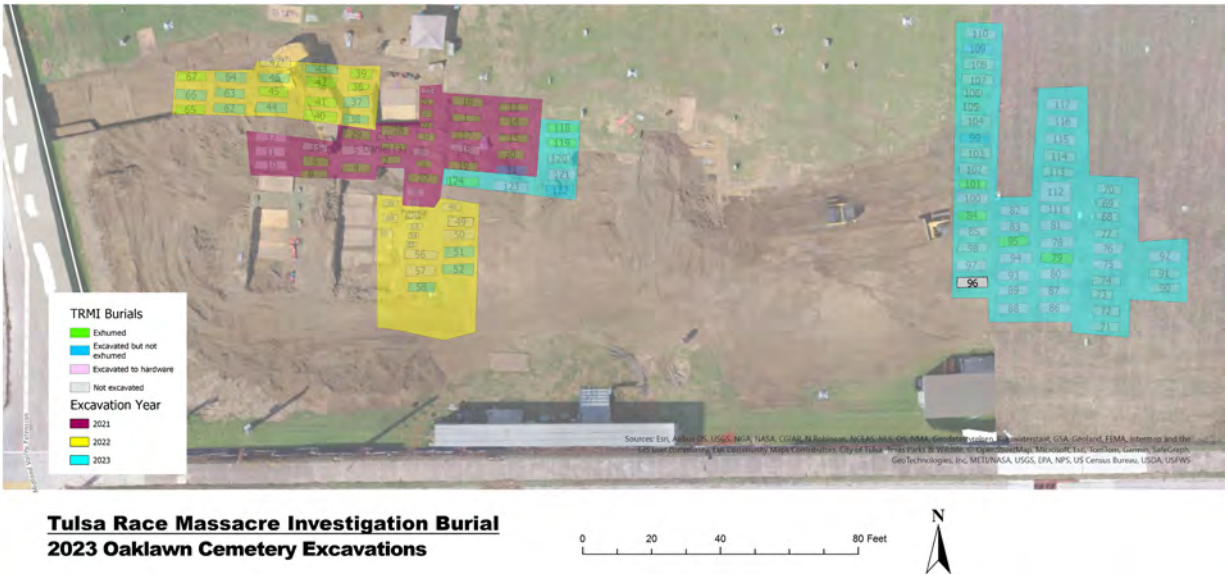

Figure 104 TRMI site map showing location of Burial 096

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.3389
NW ending elevation	n/a

Burial 096 is located in the fifth row to the west in the 2023 east excavation trench (Figure 104). The individual shaft measured 270 cm long and 89 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 097

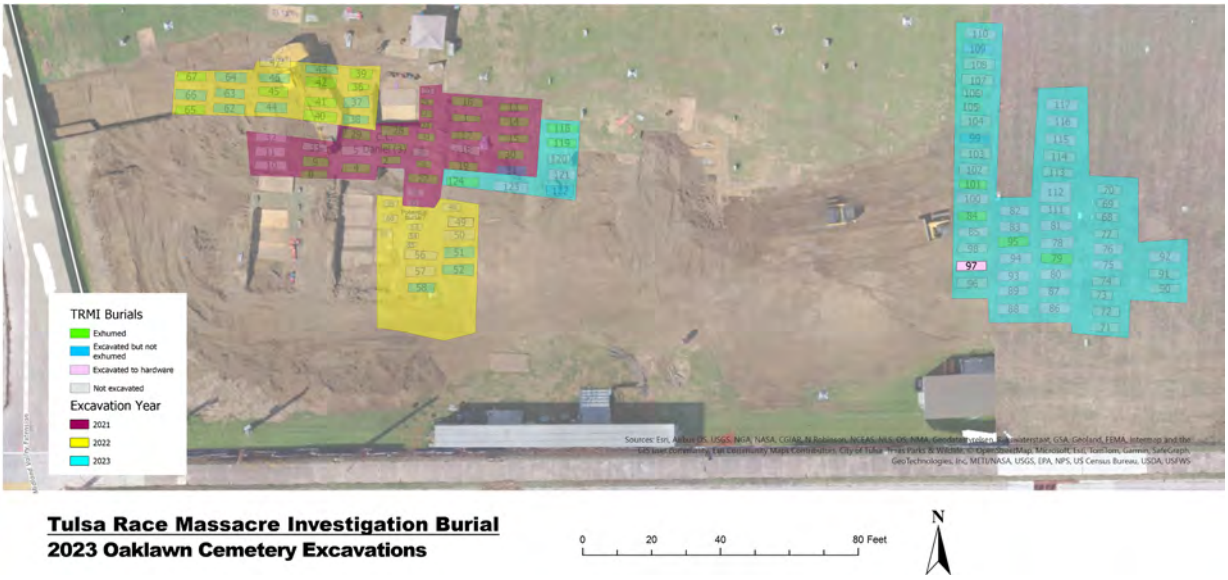

Figure 105 TRMI site map showing location of Burial 097

Final Excavation Status	Excavated to hardware
Started	9/18/2023
Completed	9/18/2023
Excavators	Armando Anzellini, Izzy Ortt
NW starting elevation	99.3424
NW ending elevation	n/a

Burial 097 is located in the fifth row to the west in the 2023 east excavation trench (Figure 105). The individual burial shaft measured 212 cm long and 59 cm wide..

The exposed portions of the burial container displayed poor wood preservation; no samples were taken for further analysis. Evidence indicated a rectangular casket and several wire nails were recovered; the exact casket measurements were indeterminate. Decorative hardware included two Oaklawn Type 17 elaborate white metal single double arm lug extension bar handles (Stackelbeck et al., 2024: Appendix A); no coffin plaque was recovered.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 098

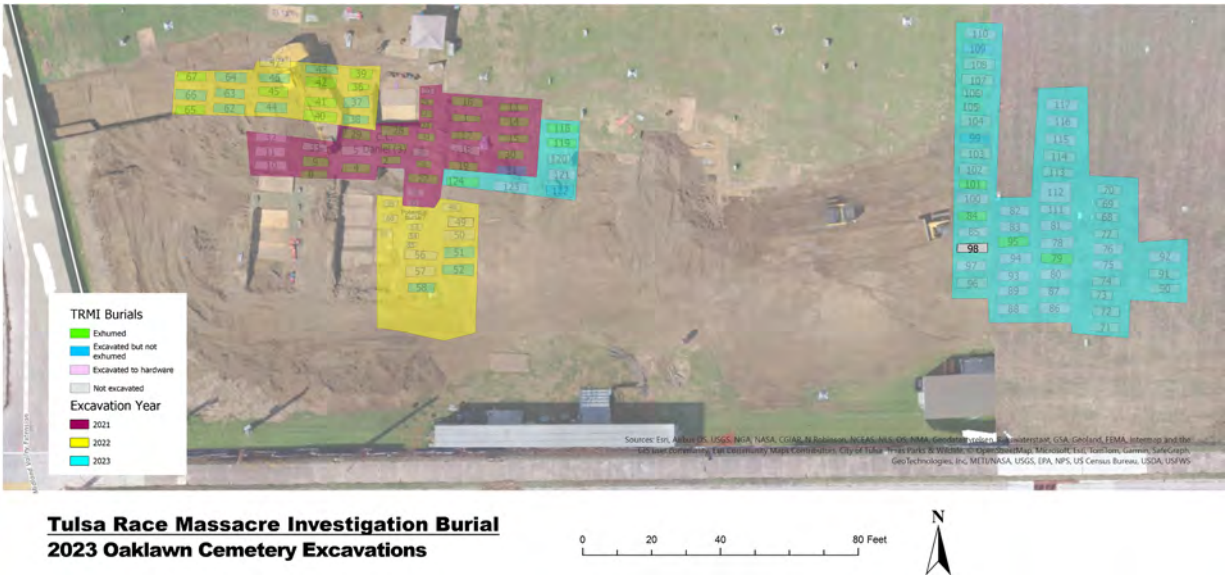

Figure 106 TRMI site map showing location of Burial 098

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.4160
NW ending elevation	n/a

Burial 098 is located in the fifth row to the west in the 2023 east excavation trench (Figure 106).

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 099

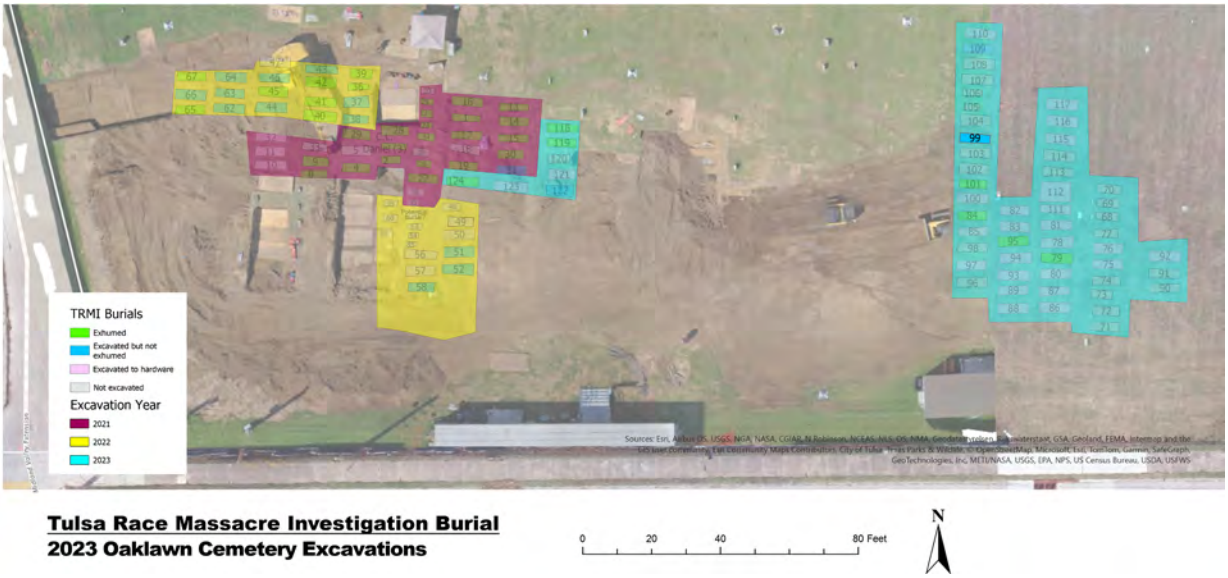

Figure 107 TRMI site map showing location of Burial 099

Final Excavation Status	Excavated but not exhumed
Started	9/18/2023
Completed	9/21/2023
Excavators	Kelsey Kreiser, Eric Prendergast
NW starting elevation	100.0532
NW ending elevation	99.8180

Burial 099 is located in the fifth row to the west in the 2023 east excavation trench (Figure 107). The individual burial shaft measured 222 cm long and 69 cm wide.

This individual was interred with the head oriented to the west. The body was found to be in an extended supine position. The remains were not fully exposed due to extremely poor preservation (see below), therefore, placement of the arms was indeterminate. The legs appeared to be placed straight with ankles uncrossed. Positioning of the cranium was also difficult to discern (Figure 108).

Skeletal preservation was exceptionally poor. Taphonomic damage resulted in extreme degradation of all elements. The fragmentary cranium was temporarily removed for preliminary analysis at the forensic laboratory and rejoined with the burial prior to backfilling.

Burial container wood preservation was equally poor; no samples were taken for further analysis. Nail location as well as soil staining indicated a plain, rectangular casket measuring 180 cm long and 44 cm wide. No coffin hardware was found other than wire nails. No personal items or other grave good were recovered.

Due to the sparse nature of the material culture directly associated with Burial 099, it was difficult to assign a precise date of interment; however, what was observed is consistent with an early to mid-1920s interment. This burial was left *in situ*.

Burial 099 (continued)

Figure 108 Burial 099 photogrammetry model illustrating condition of burial with skeletal remains fully exposed (application of Butvar to stabilize skeletal remains for forensic analysis causes white discoloration where applied)

Burial 100

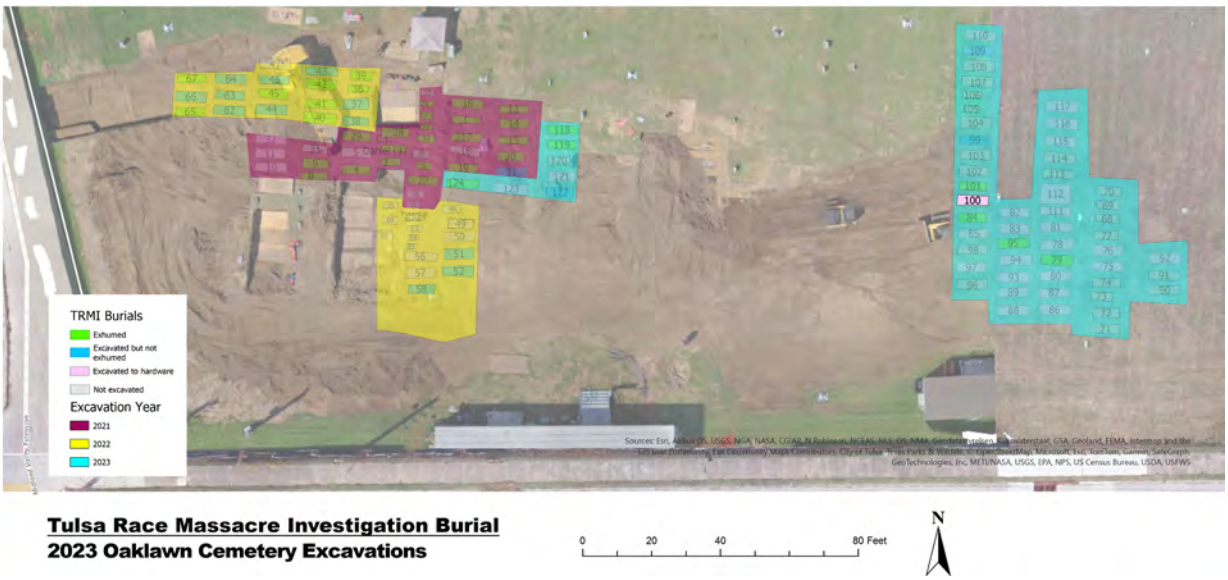

Figure 109 TRMI site map showing location of Burial 100

Final Excavation Status	Excavated to hardware
Started	9/15/2023
Completed	9/18/2023
Excavators	Tyler Donaldson, Allie Powell, Jeremy Wilson
NW starting elevation	99.7087
NW ending elevation	99.4550

Burial 100 is located in the fifth row to the west in the 2023 east excavation trench (Figure 109). The individual burial shaft measured 220 cm long and 66 cm wide.

The exposed portions of the burial container displayed poor wood preservation; no samples were taken for further analysis. Evidence indicated a rectangular casket and several wire nails were recovered; the casket measured 201 cm long and 59 cm wide. Decorative hardware included six Oaklawn Type 10 ferrous double lug swingbail handles (Stackelbeck et al., 2024: Appendix A); no coffin plaque was recovered.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 101

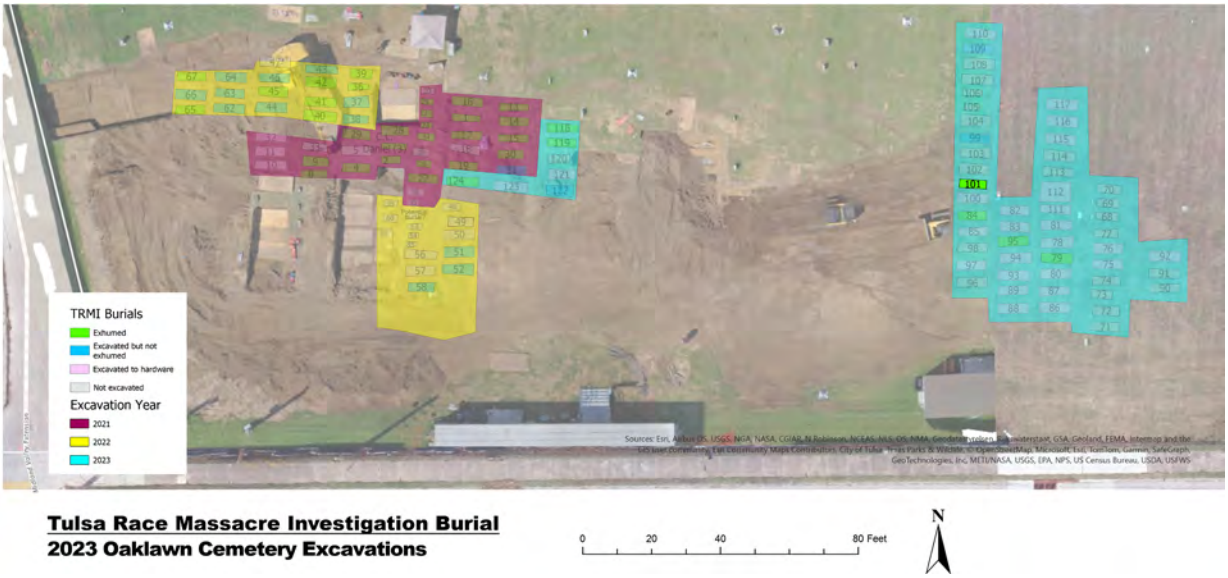

Figure 110 TRMI site map showing location of Burial 101

Final Excavation Status	Exhumed
Started	9/18/2023
Completed	9/21/2023
Excavators	Tyler Donaldson, Allie Powell, Jeremy Wilson
NW starting elevation	99.7788
NW ending elevation	99.5430

Burial 101 is located in the fifth row to the west in the 2023 east excavation trench (Figure 110). The individual burial shaft measured 201 cm long and 55 cm wide.

This individual was interred with the head oriented to the west. The body was found to be in an extended supine position. Both arms were placed straight at the sides; the legs were straight with ankles uncrossed. The skull was resting in a natural anatomical position (Figure 111).

Skeletal preservation was poor. Taphonomic damage resulted in axial element deterioration and significant cortical flaking throughout. Long bone epiphyses were degraded and long bone shafts were only moderately better preserved. The cranium was heavily damaged and fragmented.

Burial container wood preservation was poor; no samples were taken for further analysis. Nail location as well as soil staining indicated a plain, rectangular casket measuring 199 cm long and 50 cm wide. No coffin hardware was found other than wire nails. No personal items or other grave good were recovered.

Due to the sparse nature of the material culture directly associated with Burial 101, it was difficult to assign a precise date of interment; however, what was observed is consistent with an early to mid-1920s interment. This individual was interred in an unadorned rectangular casket consistent with the expected burial treatment for massacre victims. The remains were exhumed and taken to the forensic laboratory for examination and were designated Oaklawn Unknown #31.

Burial 101 (continued)

Figure 111 Burial 101 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

Burial 102

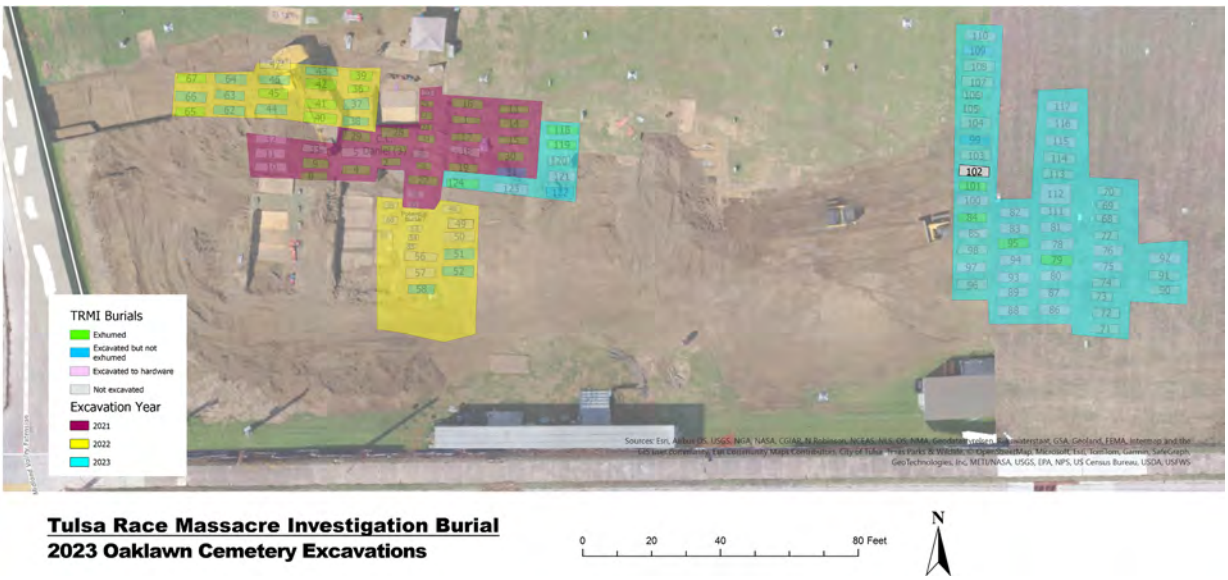

Figure 112 TRMI site map showing location of Burial 102

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.8774
NW ending elevation	n/a

Burial 102 is located in the fifth row to the west in the 2023 east excavation trench (Figure 112). The individual shaft measured 267 cm long and 88 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 103

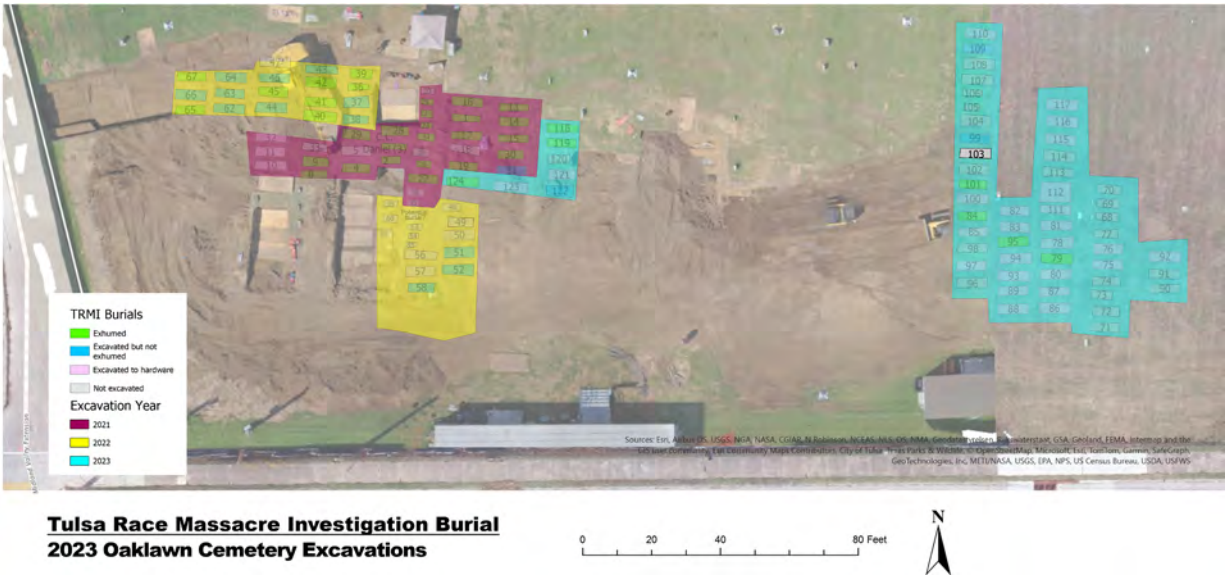

Figure 113 TRMI site map showing location of Burial 103

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	99.9296
NW ending elevation	n/a

Burial 103 is located in the fifth row to the west in the 2023 east excavation trench (Figure 113). The individual shaft measured 276 cm long and 84 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 104

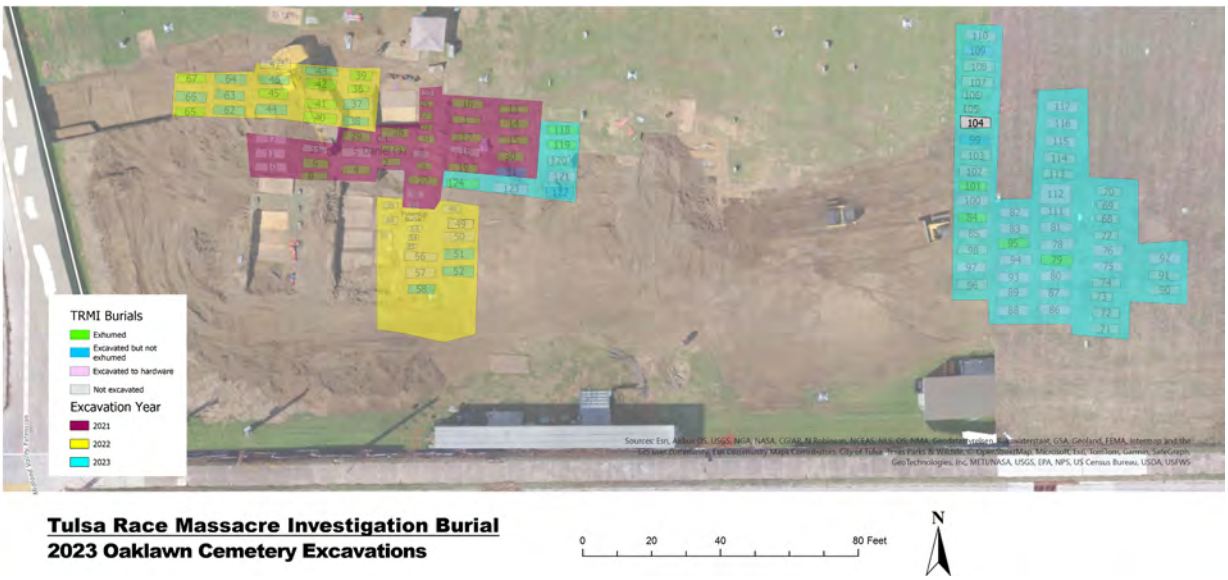

Figure 114 TRMI site map showing location of Burial 104

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	100.1190
NW ending elevation	n/a

Burial 104 is located in the fifth row to the west in the 2023 east excavation trench (Figure 114). The individual shaft measured 267 cm long and 96 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 105

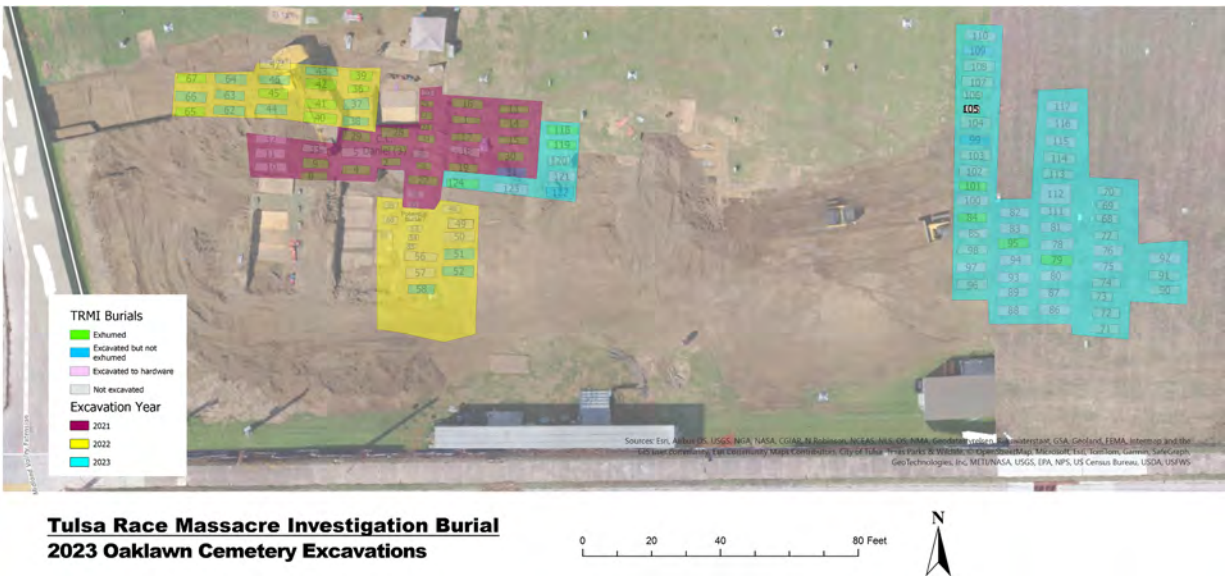

Figure 115 TRMI site map showing location of Burial 105

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	100.2192
NW ending elevation	n/a

Burial 105 is located in the fifth row to the west in the 2023 east excavation trench (Figure 115). The individual shaft measured 136 long and 61 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 106

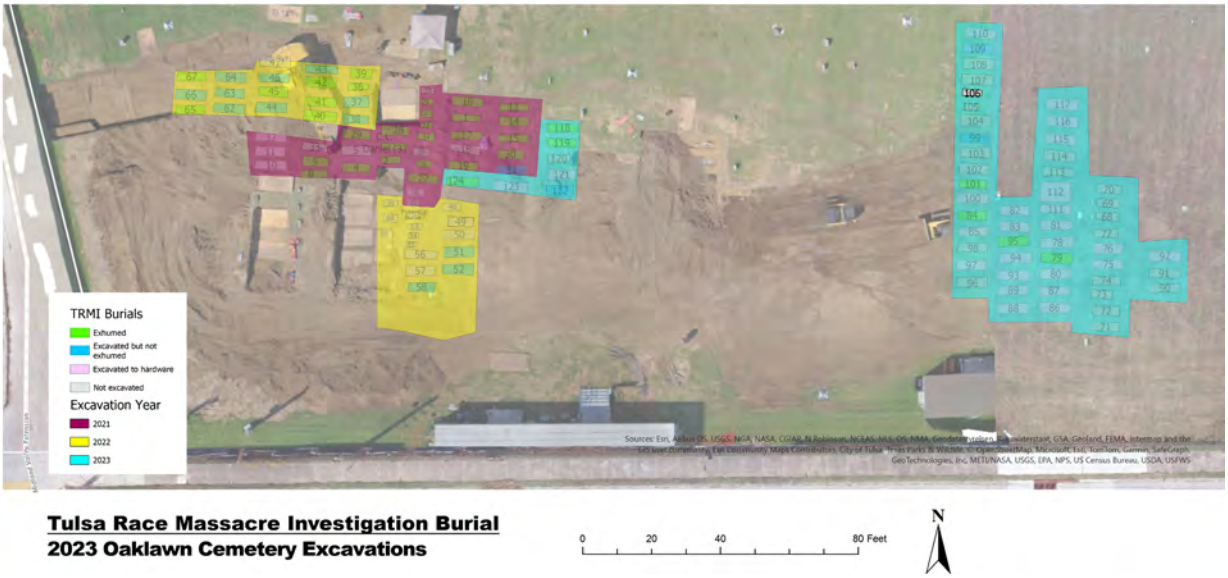

Figure 116 TRMI site map showing location of Burial 106

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	100.3057
NW ending elevation	n/a

Burial 106 is located in the fifth row to the west in the 2023 east excavation trench (Figure 116). The individual shaft measured 168 cm long and 57 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 107

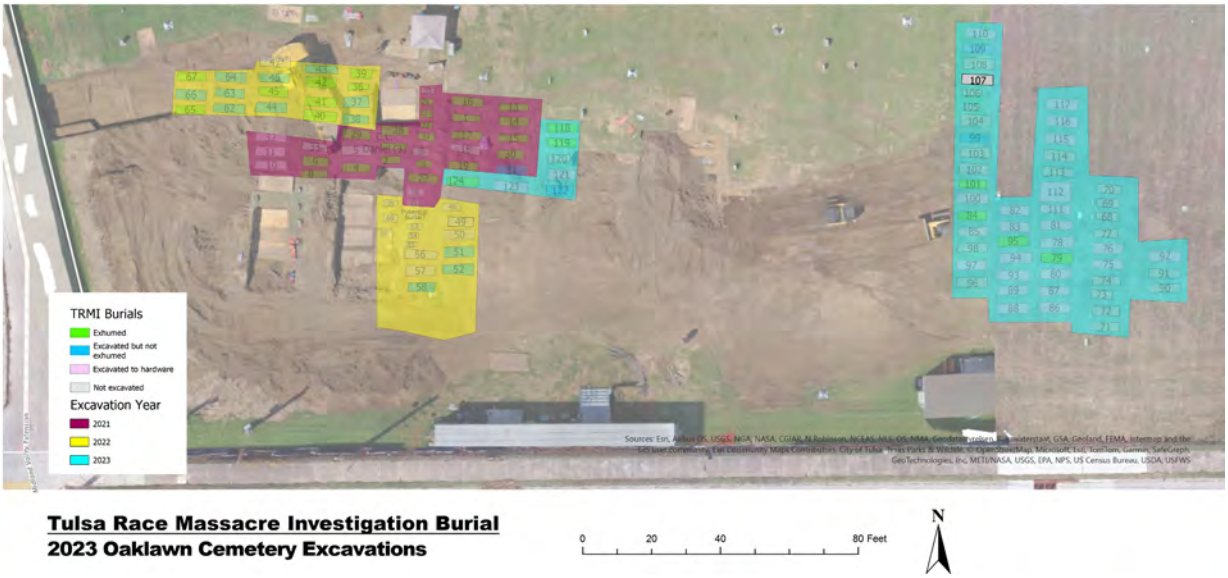

Figure 117 TRMI site map showing location of Burial 107

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	100.3924
NW ending elevation	n/a

Burial 107 is located in the fifth row to the west in the 2023 east excavation trench (Figure 117). The individual shaft measured 277 cm long by 88 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 108

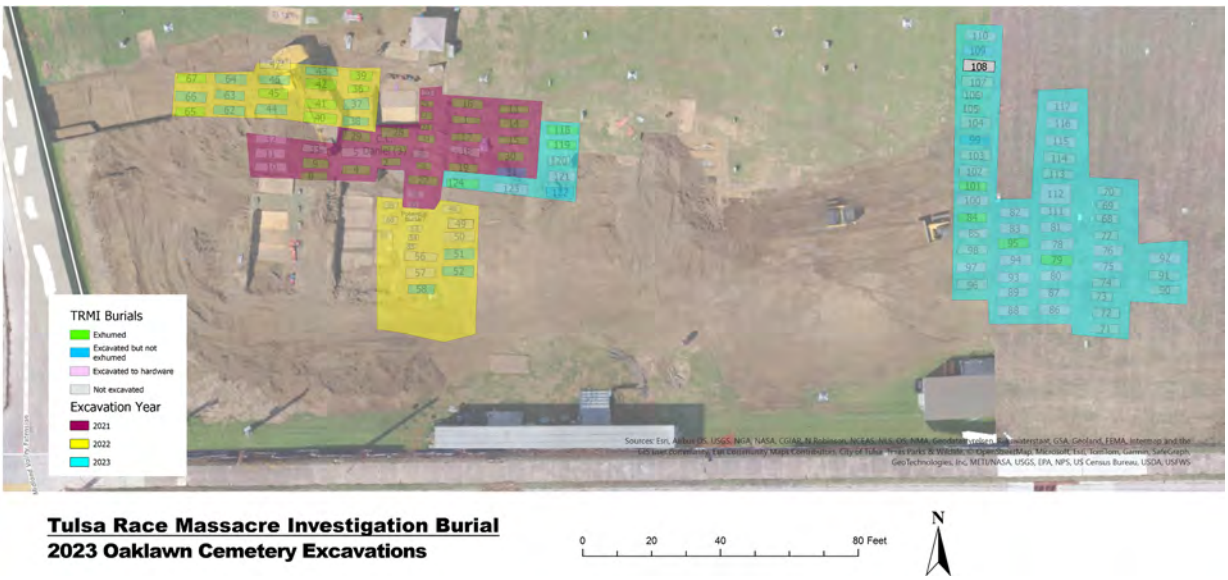

Figure 118 TRMI site map showing location of Burial 108

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	100.6272
NW ending elevation	n/a

Burial 108 is located in the fifth row to the west in the 2023 east excavation trench (Figure 118). The individual shaft measured 278 cm long and 96 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 109

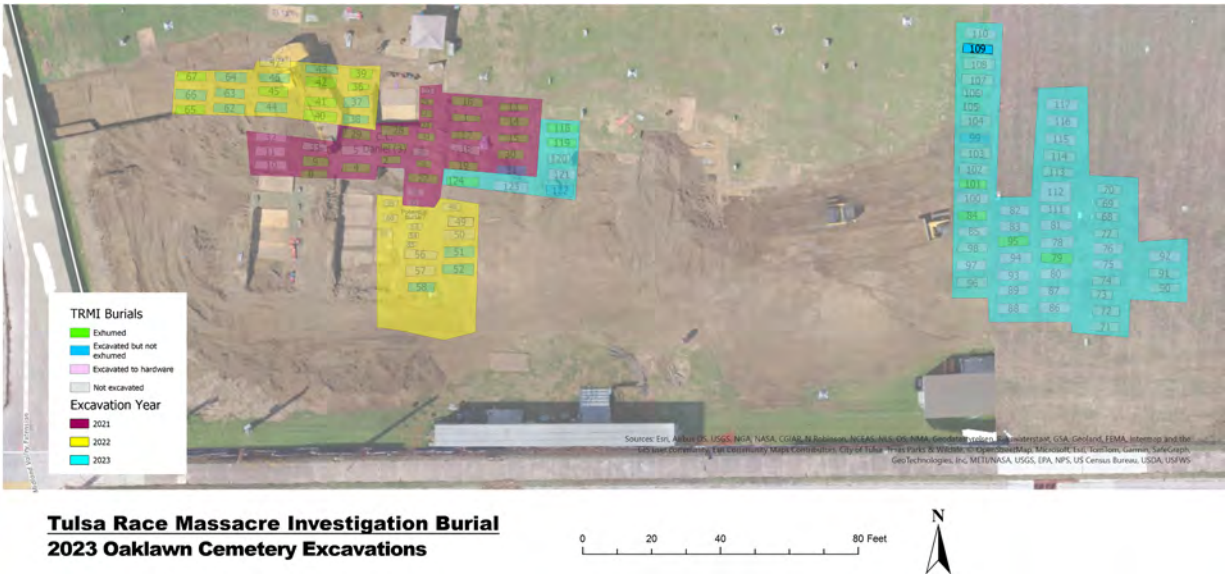

Figure 119 TRMI site map showing location of Burial 109

Final Excavation Status	Excavated but not exhumed
Started	9/25/2023
Completed	9/28/2023
Excavators	Armando Anzellini, Erin McKendry, Izzy Ortt
NW starting elevation	100.7006
NW ending elevation	100.3860

Burial 109 is located in the fifth row to the west in the 2023 east excavation trench (Figure 119). The individual burial shaft measured 212 cm long and 74 cm wide.

This individual was interred with the head oriented to the east. The body was found to be in an extended supine position. Preservation was so poor (see below), placement of the arms was indeterminate; the legs appeared to be straight with ankles uncrossed. What remained of the skull was turned towards the south; it was unclear if this was or was not the result of post-depositional processes. The decedent was pressed directly against the southern wall of the internment (Figure 120).

Skeletal preservation was exceptionally poor. Taphonomic damage resulted in extreme degradation all elements; this may have been partially the result of the extreme shallow nature of the burial shaft and significant root damage. The remains were not exhumed and the feature was covered and backfilled.

Burial container wood preservation was also very poor; no samples were taken for further analysis. Nail location as well as soil staining indicated a plain, rectangular casket measuring 181 cm long and 58 cm wide. It should be noted this burial case was much larger than necessary for the small stature of the interred individual. No coffin hardware was found other than wire nails. No personal items or other grave good were recovered.

Due to the sparse nature of the material culture directly associated with Burial 109, it was difficult to assign a precise date of interment; however, what was observed is consistent with an early to mid-1920s interment. This burial was left *in situ*.

Burial 109 (continued)

Figure 120 Burial 109 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

Burial 110

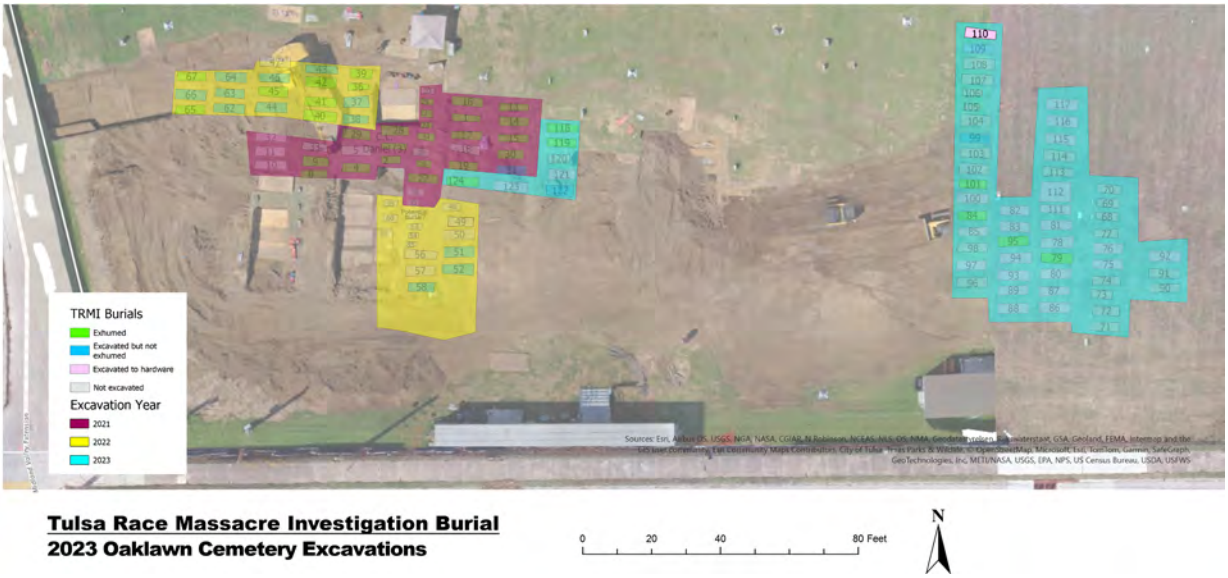

Figure 121 TRMI site map showing location of Burial 110

Final Excavation Status	Excavated to hardware
Started	9/18/2023
Completed	9/20/2023
Excavators	Armando Anzellini, Izzy Ortt
NW starting elevation	100.7235
NW ending elevation	100.6560

Burial 110 is located in the fifth row to the west in the 2023 east excavation trench (Figure 121). The individual burial shaft measured 213 cm long and 72 cm wide.

No preserved coffin wood was uncovered. Soil staining and wire nail placement indicated a rectangular casket; exact measurements were indeterminate. Decorative hardware included Oaklawn Type 08 white metal double lug short bar handles (Stackelbeck et al., 2024: Appendix A); no coffin plaque was uncovered.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 111

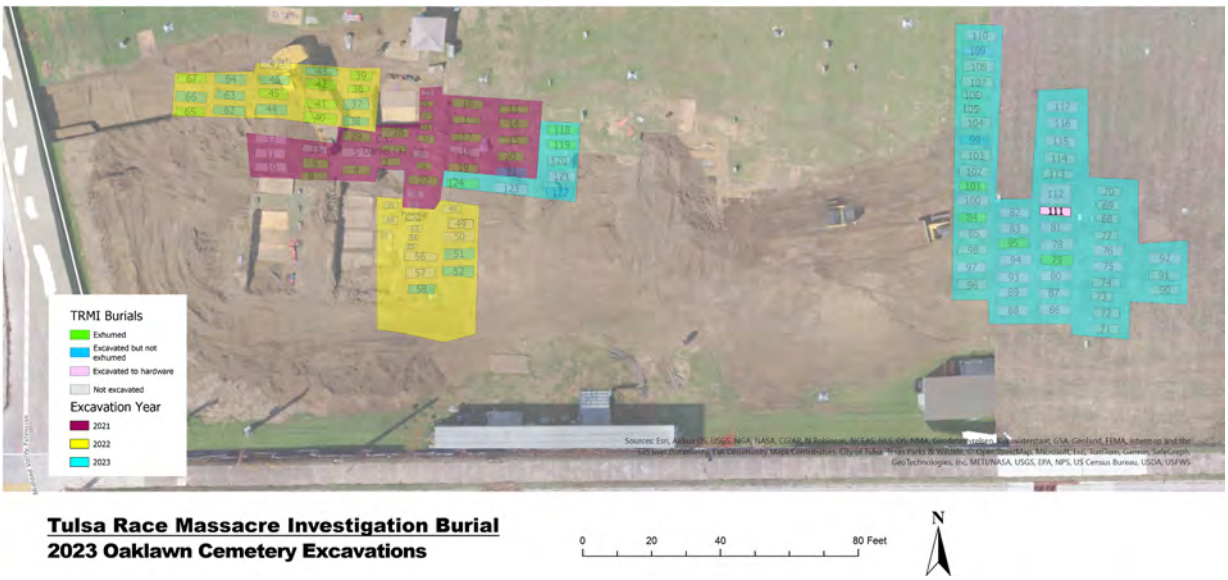

Figure 122 TRMI site map showing location of Burial 111

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	100.0595
NW ending elevation	n/a

Burial 111 is located in the third row to the west in the 2023 east excavation trench (Figure 122). The individual burial shaft measured 213 cm long and 54 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 112

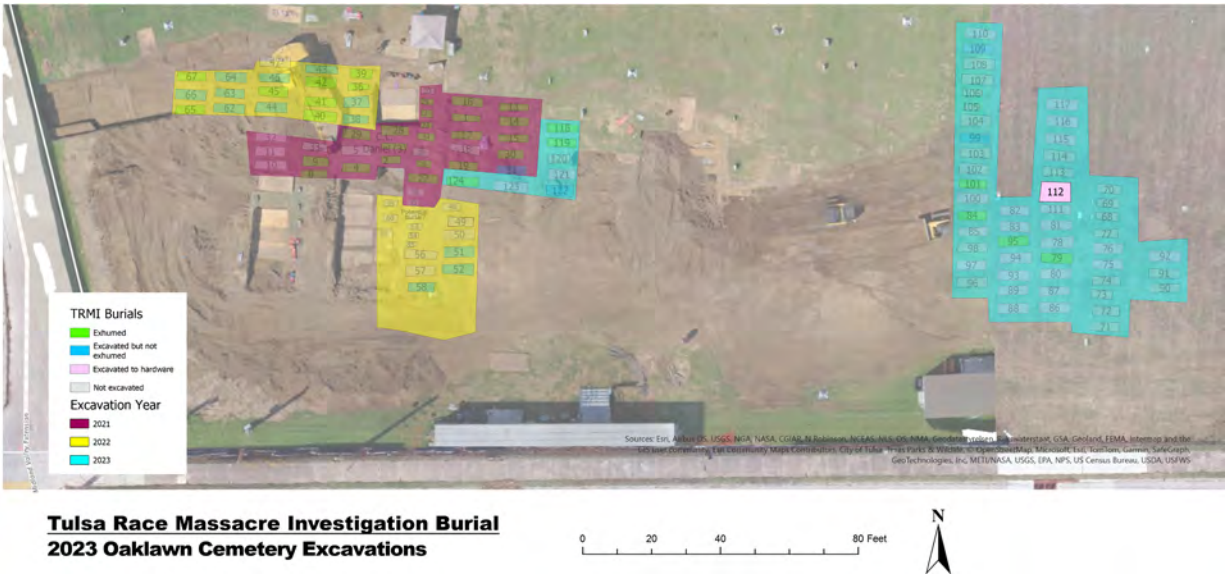

Figure 123 TRMI site map showing location of Burial 112

Final Excavation Status	Excavated to hardware
Started	9/20/2023
Completed	9/28/2023
Excavators	Armando Anzellini, Izzy Ortt, Ryan Peterson
NW starting elevation	100.0301
NW ending elevation	99.4860

Figure 124 Burial 112 photogrammetry model illustrating condition of burial when excavation was suspended

Burial 112 is located in the third row to the west in the 2023 east excavation trench (Figure 123). The double burial shaft measured 230 cm long and 140 cm wide.

No human remains or coffin hardware were encountered during the exploration of this feature that, based on soil staining and wire nail distribution, contained an adult rectangular casket on the north and a subadult rectangular casket directly to the south. The former measured 180 cm long and 50 cm wide while the latter was 70 cm long and 40 cm wide (Figure 124 and Figure 125).

No further investigation was conducted.

Burial 112 (continued)

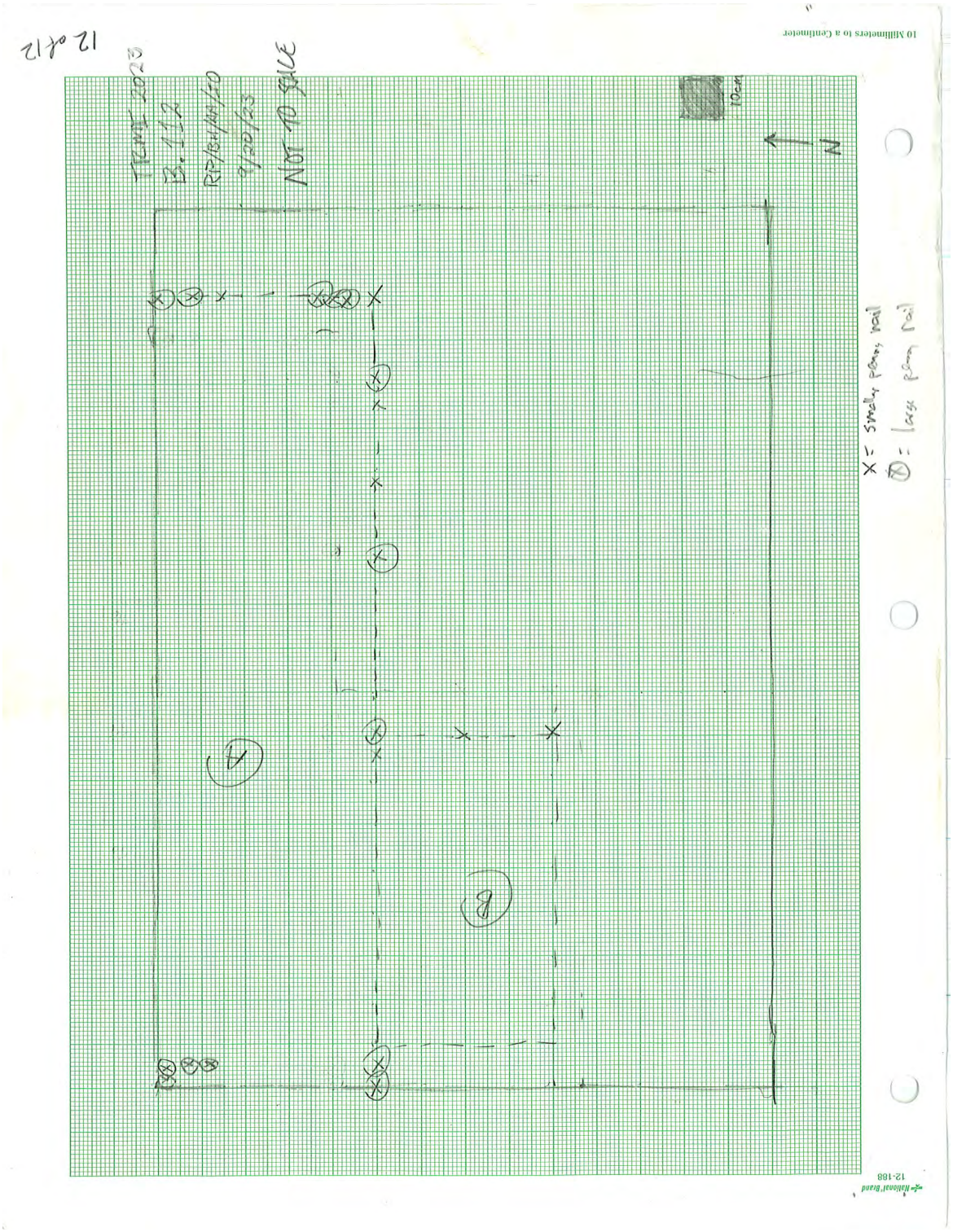

Figure 125 Burial 112 field map (to scale) illustrating the dimensions and relative placement of the two caskets identified within the large double shaft

Burial 113

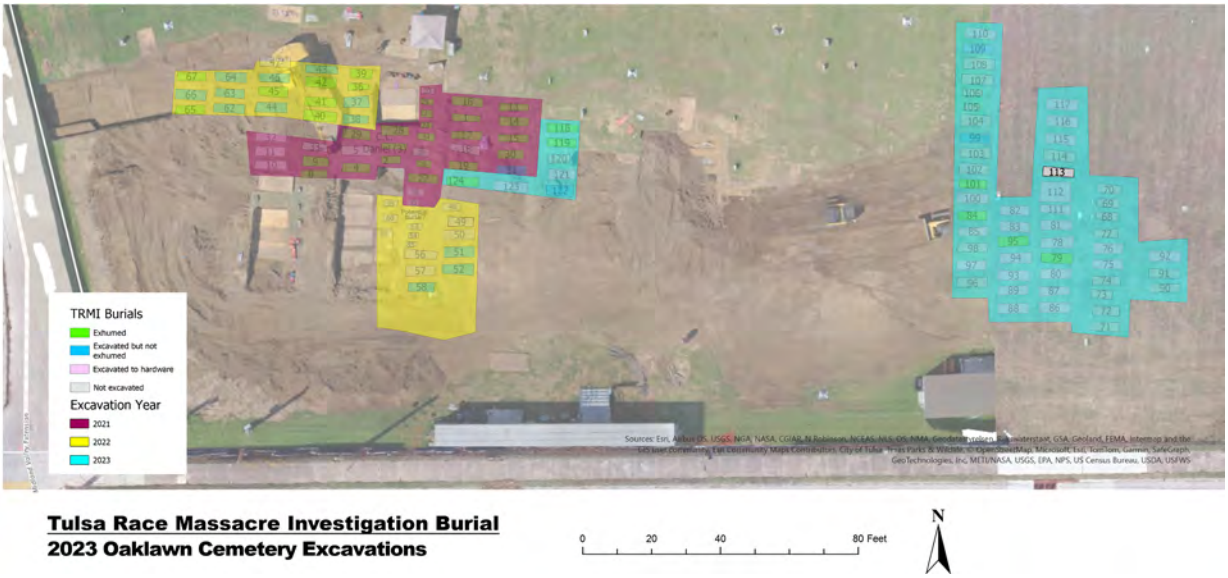

Figure 126 TRMI site map showing location of Burial 113

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	100.0255
NW ending elevation	n/a

Burial 113 is located in the third row to the west in the 2023 east excavation trench (Figure 126). The individual shaft measured 275 cm long and 77 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 114

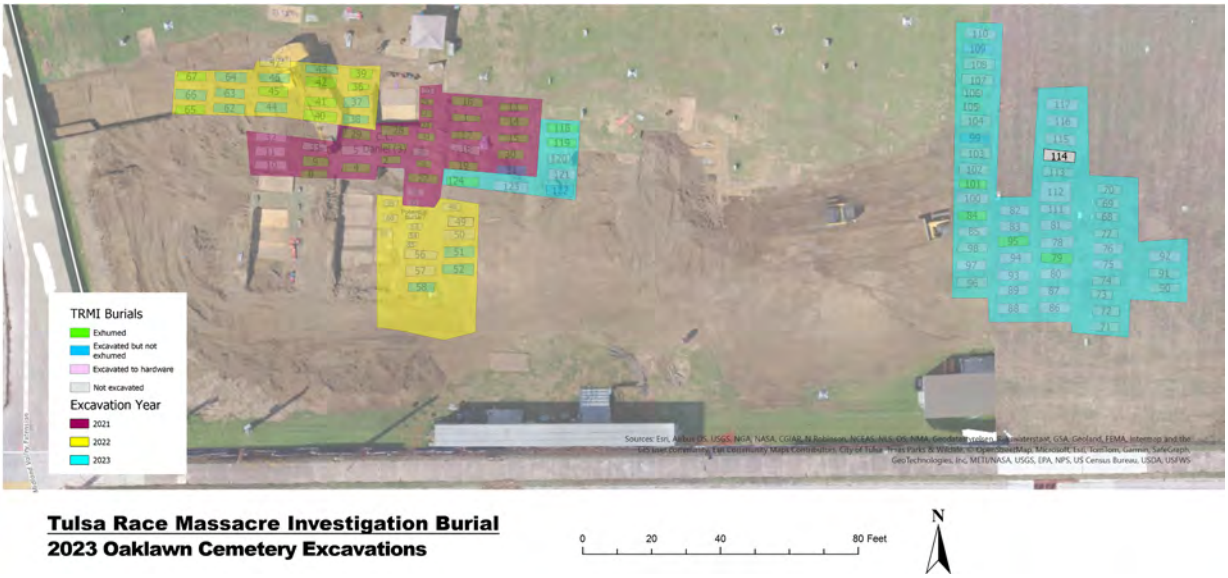

Figure 127 TRMI site map showing location of Burial 114

Final Excavation Status	Not excavated
Started	9/22/2023
Completed	9/28/2023
Excavators	n/a
NW starting elevation	100.1619
NW ending elevation	n/a

Burial 114 is located in the third row to the west in the 2023 east excavation trench (Figure 127). The individual shaft measured 277 cm long and 94 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. A small test pit was dug into the southeast corner of the feature to assess the presence of decorative casket hardware. No further investigation was conducted.

Burial 115

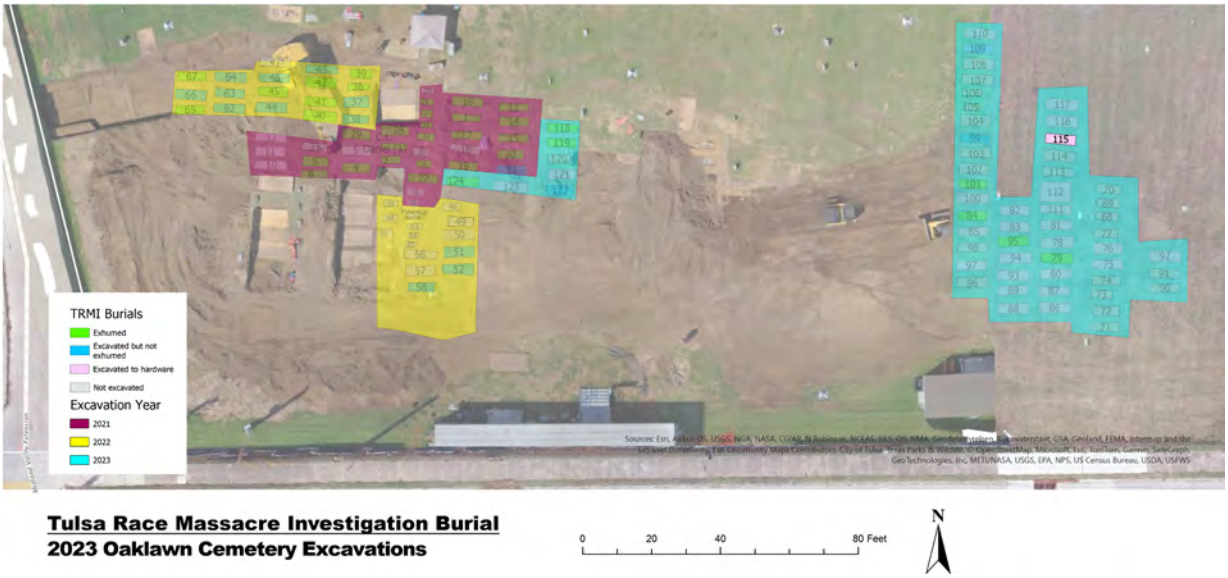

Figure 128 TRMI site map showing location of Burial 115

Final Excavation Status	Excavated to hardware
Started	9/22/2023
Completed	9/22/2023
Excavators	Armando Anzellini, Erin McKendry, Kathleen Settle
NW starting elevation	100.2331
NW ending elevation	n/a

Burial 115 is located in the third row to the west in the 2023 east excavation trench (Figure 128). The individual burial shaft measured 267 cm long and 88 cm wide.

No preserved coffin wood was detected. Soil staining indicated a rectangular casket. A 50 cm by 50 cm test hole was dug into the southeast corner of the feature; an Oaklawn Type 15 white metal double lug short bar handle was exposed (Stackelbeck et al., 2024: Appendix A). No *in situ* photos were taken or photogrammetric modeling conducted.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 116

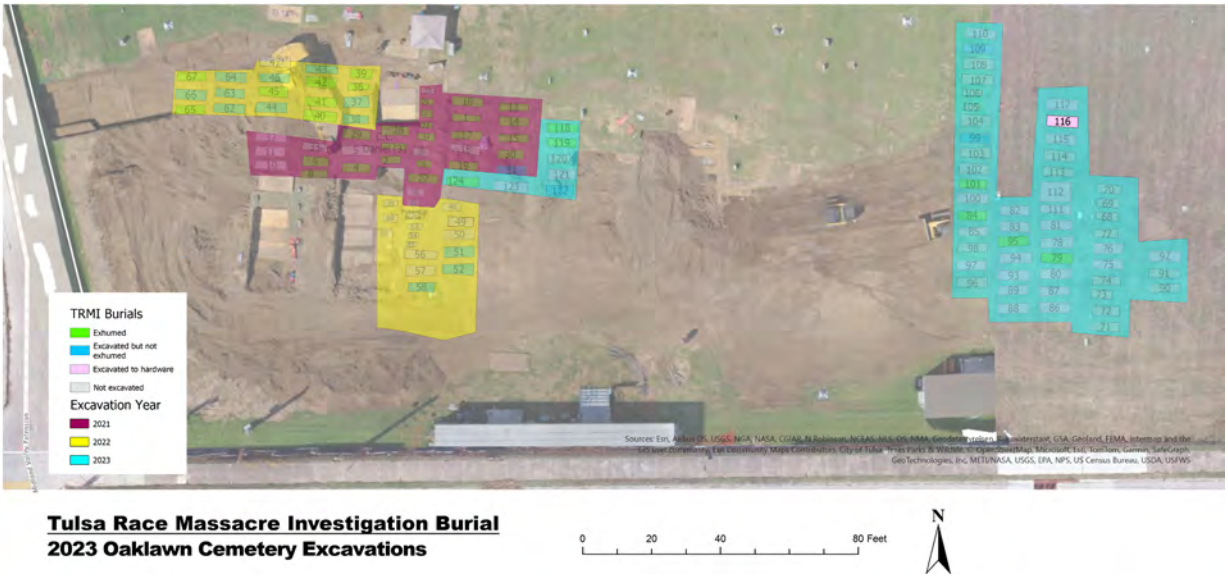

Figure 129 TRMI site map showing location of Burial 116

Final Excavation Status	Excavated to hardware
Started	9/22/2023
Completed	9/22/2023
Excavators	Armando Anzellini, Erin McKendry, Kathleen Settle
NW starting elevation	100.1010
NW ending elevation	n/a

Burial 116 is located in the third row to the west in the 2023 east excavation trench (Figure 129). The individual burial shaft measured 276 cm long and 98 cm wide.

No preserved coffin wood was detected. Soil staining indicated a rectangular casket. A 50 cm by 50 cm test hole was dug into the southeast corner of the feature; an Oaklawn Type 04B ferrous metal double lug short bar handle was exposed (Stackelbeck et al., 2024: Appendix A). No *in situ* photos were taken or photogrammetric modeling conducted.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 117

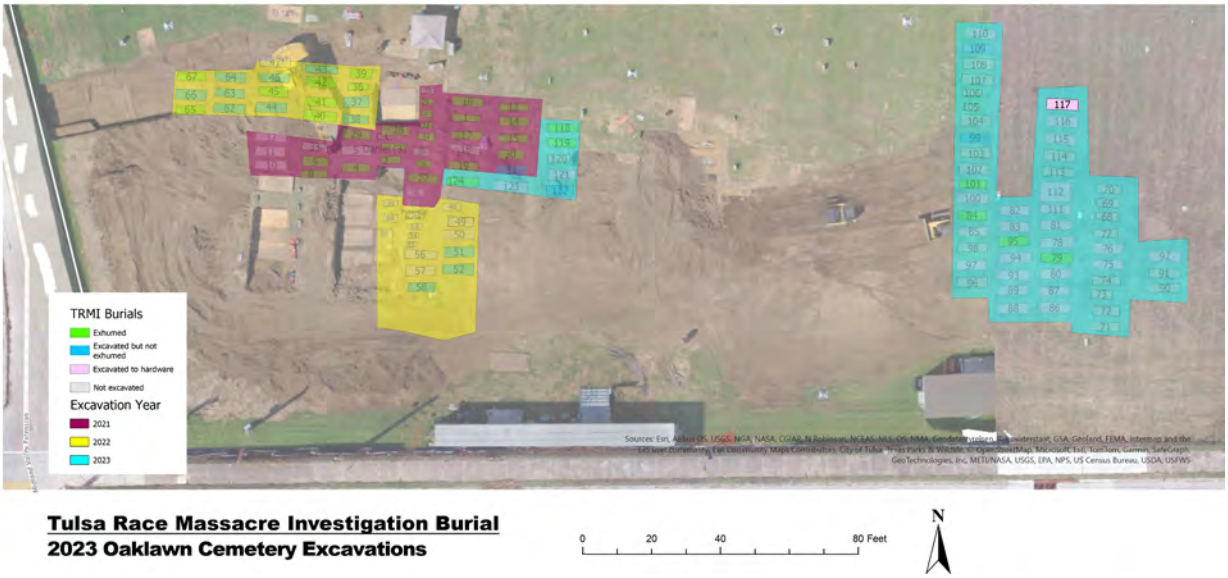

Figure 130 TRMI site map showing location of Burial 117

Final Excavation Status	Excavated to hardware
Started	9/22/2023
Completed	9/22/2023
Excavators	Armando Anzellini, Erin McKendry, Kathleen Settle
NW starting elevation	100.6130
NW ending elevation	n/a

Burial 117 is located in the third row to the west in the 2023 east excavation trench (Figure 130). The individual burial shaft measured 279 cm long and 97 cm wide.

Little preserved coffin wood was detected; one sample was taken for further analysis. Soil staining indicated a rectangular casket. A 50 cm by 50 cm test hole was dug into the southeast corner of the feature; an Oaklawn Type 06 white escutcheon was exposed (Stackelbeck et al., 2024: Appendix A). No *in situ* photos were taken or photogrammetric modeling conducted.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 118

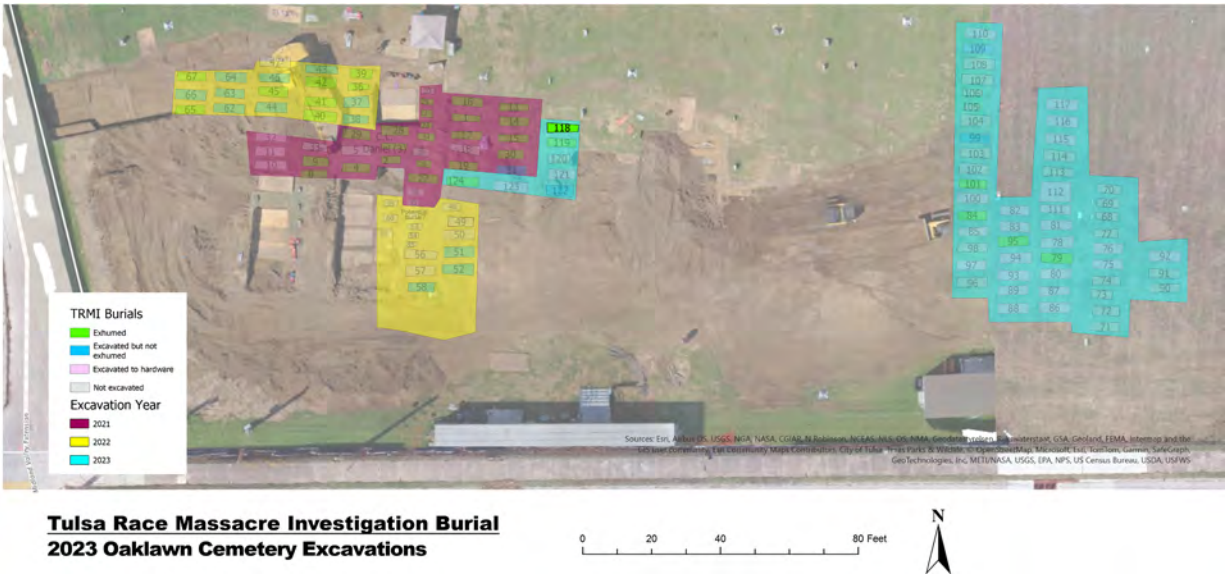

Figure 131 TRMI site map showing location of Burial 118

Final Excavation Status	Exhumed
Started	9/22/2023
Completed	9/26/2023
Excavators	Tyler Donaldson, Allie Powell, Jeremy Wilson
NW starting elevation	98.7159
NW ending elevation	98.5032

Burial 118 is located in the first row to the west in the 2023 west excavation expansion (Figure 131). The individual burial shaft measured 215 cm long and 65 cm wide.

This individual was interred with the head oriented to the west. The body was found to be in an extended supine position. Both arms were extended straight to the sides, and the legs were straight with the ankles uncrossed. The skull appeared to be a natural anatomical position (Figure 31).

Skeletal preservation was good. Taphonomic damage was mainly limited to moderate degradation of axial elements. Long bone epiphyses were more intact than those from other burials, and the long bone shafts were similarly well preserved. Excavators did note there was a period of extensive rain while the remains were still *in situ*, and this may have caused increased cortical flaking and a softening of the bone prior to exhumation. Many of the cranial and facial bones were heavily fragmented.

Burial container wood preservation was excellent, with almost entire side planks intact; several of these were removed for further analysis. This was rectangular casket measuring 198 cm long and 49 cm wide. Wire type nails were recovered as was other utilitarian hardware related to the construction of the burial container. At the end and in the middle of the intact casket plank, highly corroded ferrous objects were embedded in the wood (Figure 133); the exact function of these pieces has yet to be determined, though, they were likely hardware meant to join various casket wood components. No decorative casket hardware or handles were found. Two safety pins were identified associated with the pelvis via x-ray in the forensic laboratory (Figure 135). These were identified as being similar to the Bethel Cemetery Safety Pin Type 06F (Drew and Peterson 2023:415), which had a 1881 TPQ based on the pin's coil shield (Field 1881; Pierce 1878) (Figure 134); one pin with attached textile fragments was also observed *in situ* exterior to the individual's left shoulder. These pins may have been associated with the decedent's clothing or may have been used to secure a shroud around the remains at the time of burial. One personal item—a fragmented lead pencil—was also recovered just medial to the right femur and could have been in the individual's pants pocket when they were interred.

Burial 118 (continued)

Due to the sparse nature of the material culture directly associated with Burial 118, it was difficult to assign a precise date of interment, however; what was observed is consistent with an early to mid-1920s interment. This individual was interred in an unadorned rectangular casket consistent with the expected burial treatment for massacre victims. The remains were exhumed and taken to the forensic laboratory for examination and were designated Oaklawn Unknown #32

Figure 132 Burial 118 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

Figure 133 Ferrous casket construction hardware recovered from Burial 118 intact wooden south wall plank; (top), hardware on the top exterior of the plank and (right), hardware affixed to the east end of the plank

Figure 134 Detail of safety pin found with Burial 118 after extraction from matrix surrounding the pelvis

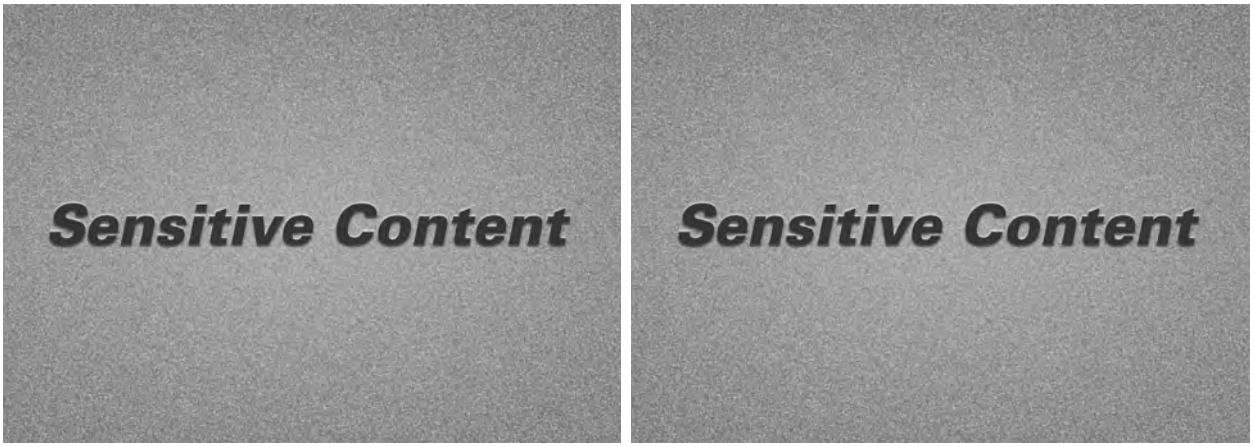

Figure 135 Forensic laboratory x-rays of safety pins found in association with Burial 118

Burial 119

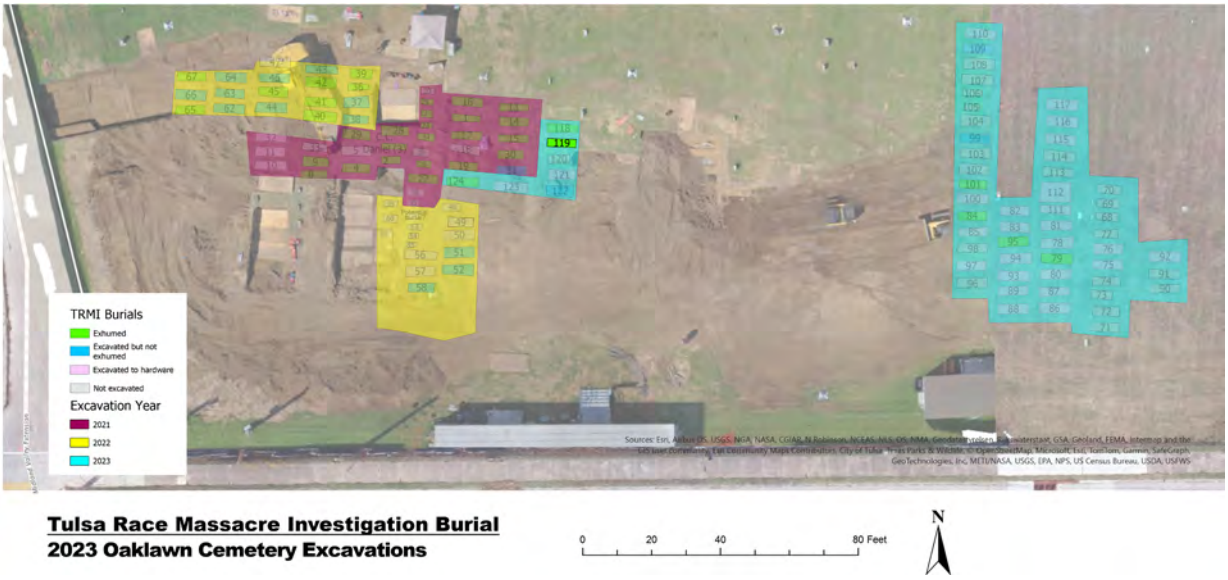

Figure 136 TRMI site map showing location of Burial 119

Final Excavation Status	Exhumed
Started	9/26/2023
Completed	9/28/2023
Excavators	Armando Anzellini, Tyler Donaldson, Allie Powell
NW starting elevation	98.7110
NW ending elevation	99.4460

Burial 119 is located in the first row to the west in the 2023 west excavation expansion (Figure 136). The individual burial shaft measured 222 cm long and 65 cm wide.

This individual was interred with the head oriented to the east. The body was found to be in an extended supine position. The left arm was flexed so that the left hand was resting over the lower abdomen; the right arm was relatively straight to the side, though, it appears the right had may have been resting on the outer right hip. The legs were straight with the ankles uncrossed, however, the positioning of the lower limbs and intact foot bones suggested the decedent's knees had been slightly bent and their feet turned inward to ensure they fit in the burial container. The skull was turned somewhat towards the south, though, this appears to have been caused by post-depositional processes and not intentional (Figure 137).

Skeletal preservation was good. Taphonomic damage was mainly limited to degradation of the axial elements. Long bone epiphyses were more intact than those from other burials, and the long bone shafts were similarly well preserved. The cranium was only partially fragmented.

Burial container wood preservation was poor, with one sample taken for further analysis. Wire nail location as well as soil staining indicated a plain, rectangular casket measuring 176 cm long and 50 cm wide It should be noted this length dimension is somewhat shorter than many of the surrounding burial containers, which may explain the positioning of the remains mentioned above. No coffin hardware was found other than nails. Personal items included two celluloid cinch-type hair pins found near the cranium (Figure 138).

Due to the sparse nature of the material culture directly associated with Burial 119, it was difficult to assign a precise date of interment; however, what was observed is consistent with an early to mid-1920s interment. This individual was interred with their head to the east and in an unadorned rectangular casket consistent with the expected burial treatment for massacre victims. The remains were exhumed and taken to the forensic laboratory for examination and were designated Oaklawn Unknown #33.

Burial 119 (continued)

Figure 137 Burial 119 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

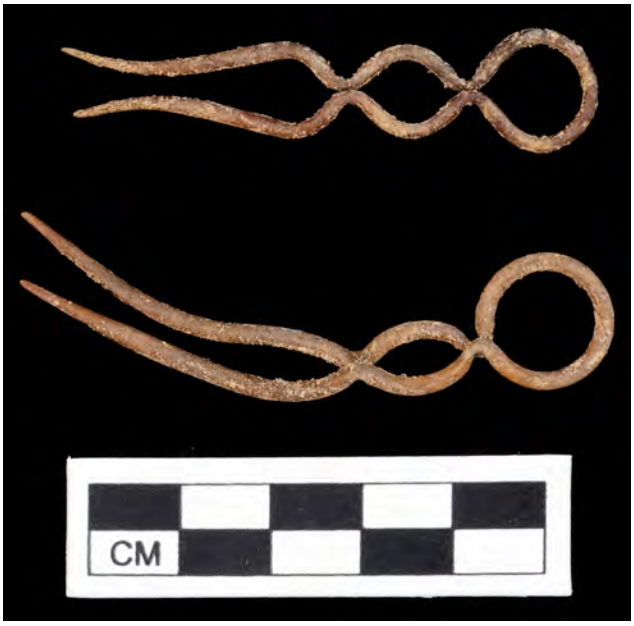

Figure 138 Cinch-type celluloid hair pins found near Burial 119 cranium

Burial 120

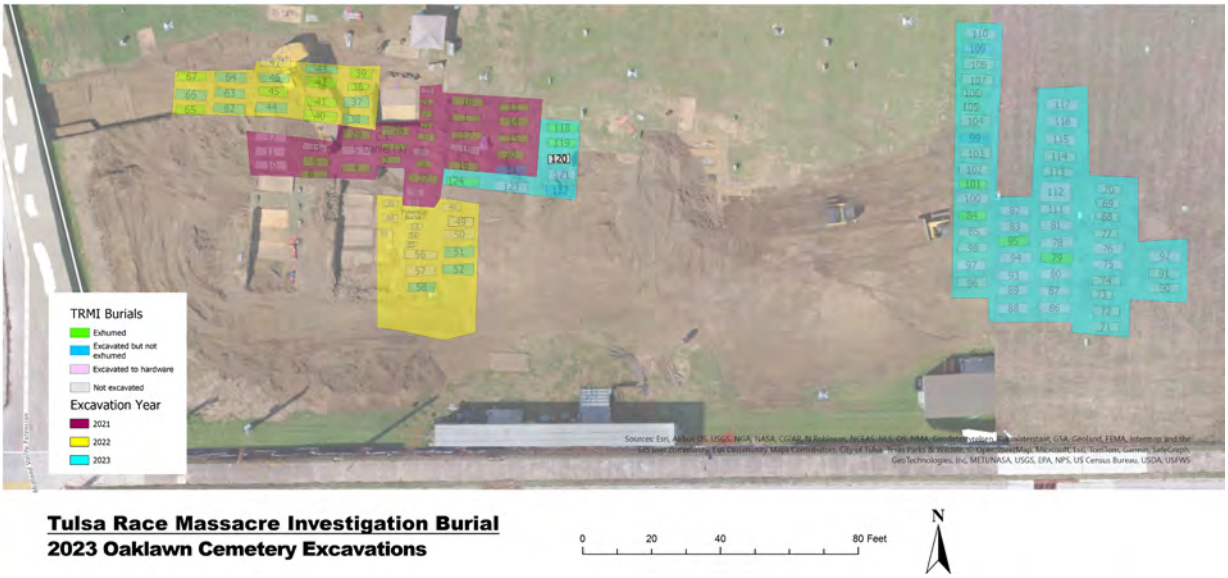

Figure 139 TRMI site map showing location of Burial 120

Final Excavation Status	Not excavated
Started	n/a
Completed	n/a
Excavators	n/a
NW starting elevation	98.7574
NW ending elevation	n/a

Burial 120 is located in the first row to the west in the 2023 west excavation expansion (Figure 139). The individual burial shaft measured 192 cm long and 75 cm wide.

This burial shaft was exposed during initial mechanical stripping of the excavation area. No further investigation was conducted.

Burial 121

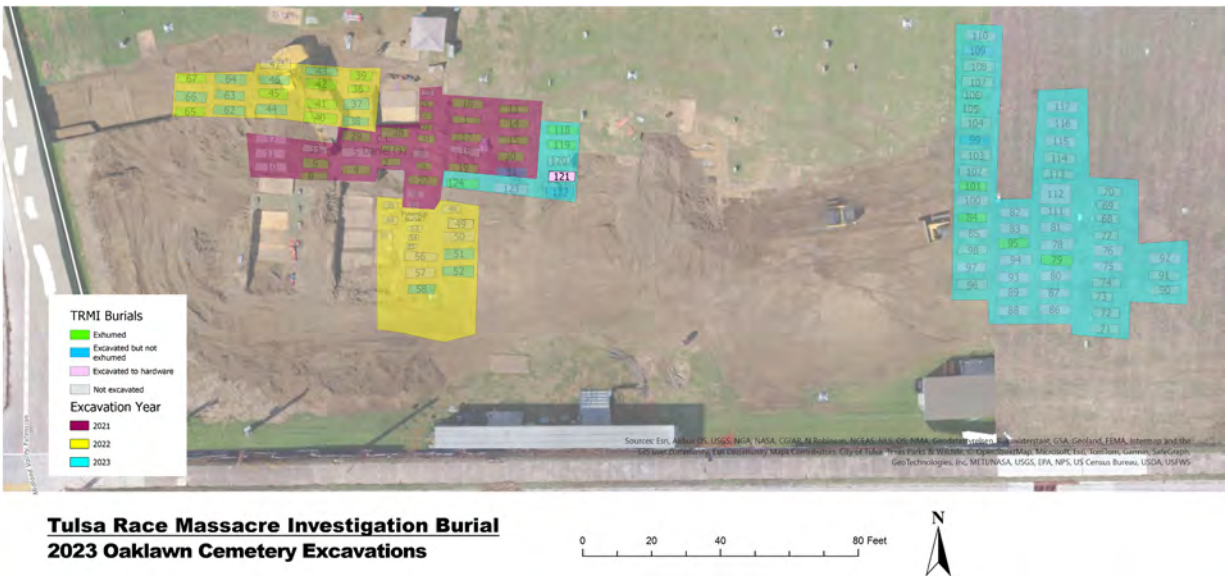

Figure 140 TRMI site map showing location of Burial 121

Final Excavation Status	Excavated to hardware
Started	9/25/2023
Completed	9/26/2023
Excavators	Kelsey Kreiser, Eric Prendergast
NW starting elevation	98.6428
NW ending elevation	98.3360

Burial 121 is located in the first row to the west in the 2023 west excavation expansion (Figure 140). The individual burial shaft measured 190 cm long and 89 cm wide.

The exposed portions of the burial container displayed poor wood preservation; no samples were taken for further analysis. Evidence indicated a rectangular casket and several wire nails were recovered; the casket measured 174 cm long and 51 cm wide. Decorative hardware included Oaklawn Type 04B ferrous double lug short bar handles (Stackelbeck et al., 2024: Appendix A), and one ferrous indeterminate type coffin plaque located in the central portion of the feature.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 122

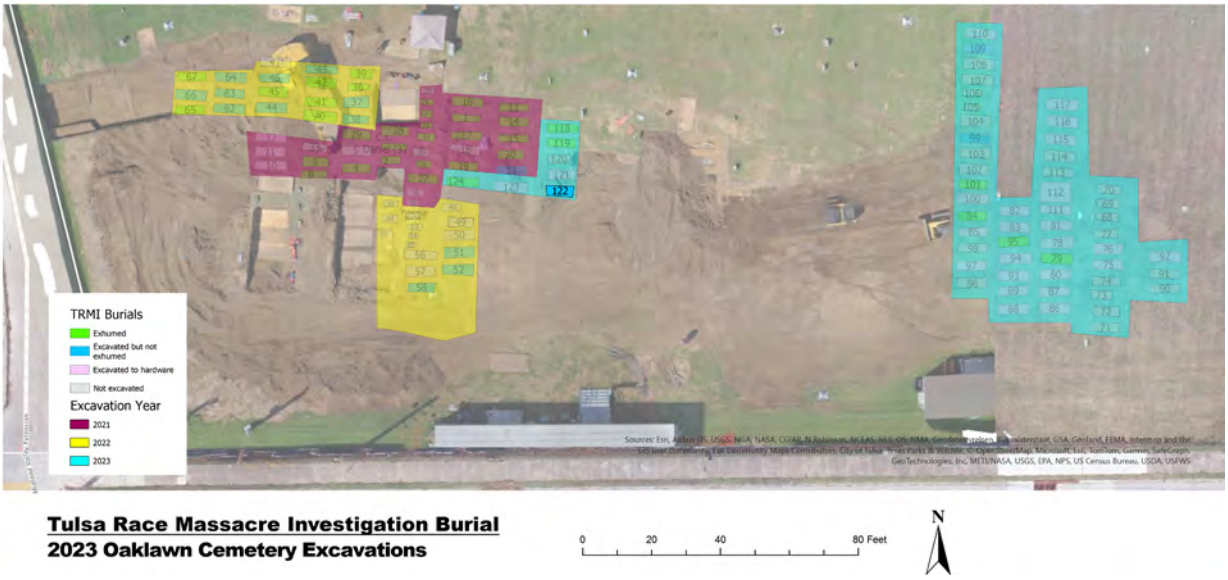

Figure 141 TRMI site map showing location of Burial 122

Final Excavation Status	Excavated but not exhumed
Started	9/25/2023
Completed	9/28/2023
Excavators	Kelsey Kreiser, Eric Prendergast
NW starting elevation	98.6428
NW ending elevation	98.3360

Burial 122 is located in the first row to the west in the 2023 west excavation expansion (Figure 141). The individual burial shaft measured 221 cm long and 64 cm wide.

This individual was interred with the head oriented to the west. The body was found to be in an extended supine position. The left arm was slightly flexed, resulting in the left hand resting over the upper pelvis; the right arm was placed straight along the side. The legs were straight with the ankles uncrossed. The skull appeared to be in a natural anatomical position (Figure 144).

Skeletal preservation was poor. Taphonomic damage resulted in axial element deterioration. Long bone epiphyses were in moderately poor condition, however, long bone shafts were better preserved. The cranial and facial bones were highly fragmented.

Burial container wood preservation was poor, with one sample taken for further analysis. Nail location as well as soil staining indicated a plain, relatively small rectangular casket measuring 168 cm long and 42 cm wide. No coffin hardware was found other than wire nails. Personal items included two celluloid cinch-type hair pins found interlocked next to the right side of the cranium (Figure 142). Additionally, an indeterminate number of spherical clear, blown glass beads were exposed throughout the northwestern portion of the burial (Figure 143); while no thread or string survived, their *in situ* placement from the clavicle down to the upper pelvis suggested these were the remains of a long rope style beaded necklace.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. This burial was left *in situ*.

Burial 122 (continued)

Figure 144 Burial 122 photogrammetry model illustrating condition of burial with skeletal remains fully exposed

Figure 142 Cinch-type celluloid hair pins found interlocked near Burial 122 cranium

Figure 143 Spherical blown clear glass bead from the rope-style necklace found with Burial 122

Burial 123

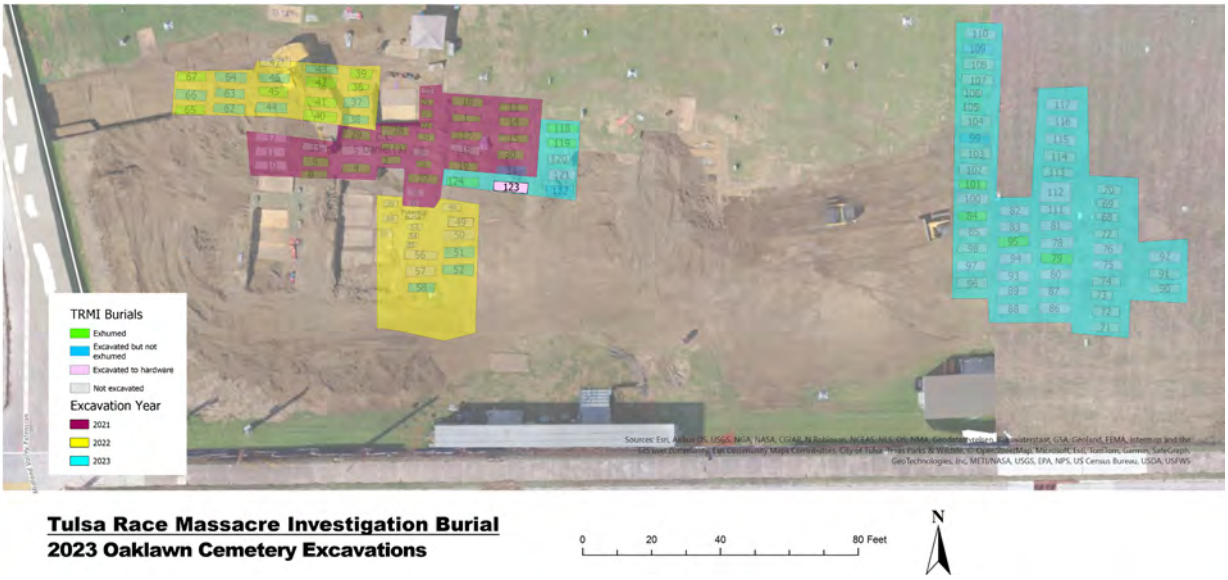

Figure 145 TRMI site map showing location of Burial 123

Final Excavation Status	Excavated to hardware
Started	9/26/2023
Completed	9/26/2023
Excavators	Erin McKendry, Kathleen Settle
NW starting elevation	98.6157
NW ending elevation	98.4180

Burial 123 is located in the second row to the west in the 2023 west excavation expansion (Figure 145). The individual burial shaft measured 244 cm long and 77 cm wide.

The exposed portions of the burial container displayed excellent wood preservation; one sample was taken for further analysis. Evidence indicated an outer crate with an interior rectangular casket; several wire nails were recovered. The crate measured 214 cm long and 72 cm wide. Decorative hardware included Oaklawn Type 19 ferrous single double arm lug extension bar handles (Stackelbeck et al., 2024: Appendix A); no coffin plaque was uncovered.

The lack of a robust TPQ for the coffin hardware made it difficult to assign a precise date of interment, however, what was observed is consistent with an early to mid-1920s interment. Excavation of this burial was terminated upon discovery of decorative casket hardware.

Burial 124

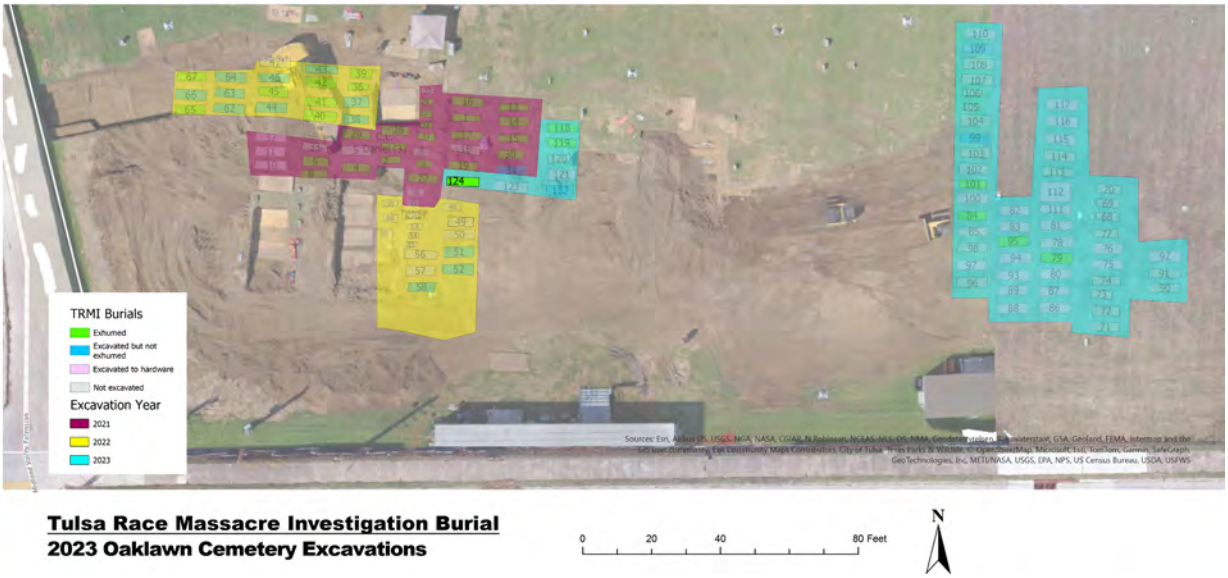

Figure 146 TRMI site map showing location of Burial 124

Final Excavation Status	Exhumed
Started	9/27/2023
Completed	9/29/2023
Excavators	Erin McKendry, Kathleen Settle
NW starting elevation	98.3630
NW ending elevation	98.2210

Burial 124 is located in the third row to the west in the 2023 west excavation expansion (Figure 146). The individual burial shaft measured 228 cm long and 61 cm wide.

The primary individual was interred with the head oriented to the west. The body was found to be in an extended supine position. The left arm was straight at the side, while the right arm was flexed so that the right hand was laying across the body, resting over the left hip and lower arm. The legs were straight with the ankles uncrossed, however, they appeared to be somewhat flared and laterally rotated. The skull was turned up and towards the north, though, this appears to have been caused by post-depositional processes and not intentional. A secondary fetal individual was also identified in the burial. The intact remains were limited to long bones and petrous processes and were located between the lower legs of the adult decedent; this incomplete skeleton is not unusual given then fragile nature of perinate remains (Figure 31).

Skeletal preservation for the adult was fair. Taphonomic damage resulted in some axial element degradation. Long bone epiphyses were more intact than those from other burials, and the long bone shafts were similarly well preserved. The cranium was fragmented heavily on the right side. The extant fetal remains were also relatively well preserved.

Burial container wood preservation was fair, with two samples taken for further analysis. Nail location as well as soil staining indicated a plain, rectangular casket measuring 182 cm long and 43 cm wide. No coffin hardware was found other than wire nails. No personal items or other grave good were recovered.

Due to the sparse nature of the material culture directly associated with Burial 124, it was difficult to assign a precise date of interment; however, what was observed is consistent with an early to mid-1920s interment. These individuals were interred in an unadorned rectangular consistent with the expected burial treatment for massacre victims. The remains were exhumed and taken to the forensic laboratory for examination and were designated Oaklawn Unknown #34.

Burial 124 (continued)

Figure 147 Burial 124 photogrammetry model illustrating condition of burial with skeletal remains fully exposed with the *in situ* fetal remains (circled in red)

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APPENDIX B

2023 GROUND-PENETRATING RADAR SURVEY IN OAKLAWN CEMETERY

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2023 GROUND-PENETRATING RADAR SURVEY IN OAKLAWN CEMETERY

Scott W. Hammerstedt

On May 9 and June 6, 2023, the Oklahoma Archeological Survey surveyed approximately 4805 m^2 (1.19 acre) of Oaklawn Cemetery using a Geophysical Survey Systems, Inc. (GSSI) UtilityScan ground-penetrating radar (GPR) system (Figure 1). Grid corner stakes were positioned using a laser total station for accurate measuring. Standardized ropes 20 meters in length and marked at 50 cm intervals were then used to guide the GPR operators. Grids were placed to extend coverage past previously surveyed areas (Hammerstedt and Regnier 2019; Stackelbeck and Stubblefield 2022) and to fill gaps between existing grids.

Geophysics

Geophysics has become a common tool in archaeology and consists of a number of non-invasive methods to find and analyze subsurface features (Clark 1996; Conyers 2012; Kvamme 2001; Weymouth 1986). Cultural features are usually recognized by contrasts or other differences between the feature and undisturbed surrounding soils. Human activities alter soil texture in many ways, including compaction, stratigraphy, moisture retention, and burning, among others. Geophysical technologies allow us to measure and locate variations of the physical characteristics of the soil. These instruments operate near or at ground surface. The use of the ropes described above allow for spatial control and the subsequent accurate location of soil anomalies detected with geophysical

Figure 1. *Ground-penetrating radar survey grids from in this portion of Oaklawn Cemetery. The 2023 survey area is in black and the areas surveyed in 2019 are in white.*

technologies. In many cases, the use of multiple geophysical techniques on the same project has proven useful (e.g., Clay 2001; Hammerstedt et al. 2017; Levine et al. 2021).

Ground-penetrating radar (GPR).

GPR is commonly used in cemeteries (Conyers 2006). It is an active technology, meaning it introduces an artificial field to measure response. GPR works by sending pulses of radar into the ground, which are reflected, absorbed, or otherwise deflected by these buried features. The return time of these pulses indicates the depth to the anomaly. Data is collected in sequential profiles, which can then be combined in proprietary software (in this case, RADAN 7) to create three-dimensional views. Data can then be viewed vertically and horizontally to search for anomalies.

Soil properties and the frequency of the GPR antenna determine both the depth that the radar pulse will penetrate and its resolution. Higher frequencies will not go particularly deep but can detect smaller objects. Lower frequencies will go deeper and can detect larger objects (Conyers 2004). The speed of the pulse depends on the composition and moisture levels of the soil through which the signal travels (Conyers 2004, 2012).

Graves appear in the data as multiple types of anomalies. These are generally caused by the deflection/reflection of the radar pulse created by the contrast between a grave and the surrounding soil (Bevan 1991; Conyers 2004, 2012). Hyperbola-shaped anomalies often appear directly over archaeological features. These can mark burial vaults, air pockets created by coffins, coffin furniture, or buried foundations such as headstones and stone outlines (Bevan 1991; Conyers 2004, 2006, 2012; Gaffney and Gater 2003). However, tree roots, rocks, and rodent burrows can cause similar hyperbolas, thus requiring careful mapping of the survey area and care in interpretation of the data. Generally, if an anomaly appears in the same place in multiple sequential profiles, it is more likely to be a grave than a naturally occurring feature.

A GSSI Utility Scan with a 350 MHz antenna was used for this project (Figure 2). It was moved in a sequential zigzag pattern across the survey area and the antenna constantly remained on the ground surface during

Figure 2. *Scott Hammerstedt and Brenda Nails Alford conduct ground-penetrating radar survey in Oaklawn Cemetery (foreground) while Kary Stackelbeck draws a map of headstones (background) in May 2023.*

data collection. Data was collected at 100 readings per meter with 0.5 meter spacing between transects. The signal penetrated to a depth of 2 meters, but below 1 meter the signal was attenuated and scattered by highly conductive soils. Data were downloaded into RADAN 7 for processing.

Results

The GPR survey was hampered by the very conductive soils (Kamie series) at Oaklawn. This meant that the signal was only able to effectively penetrate to a depth of roughly one meter (Figure 3), an issue also noted by previous surveyors (Hammerstedt 2021; Hammerstedt and Regnier 2019; Maki and Jones 1998; Witten et al. 2001). This means that the lower portions of each profile were largely unreadable. In many cases, even marked graves were not visible.

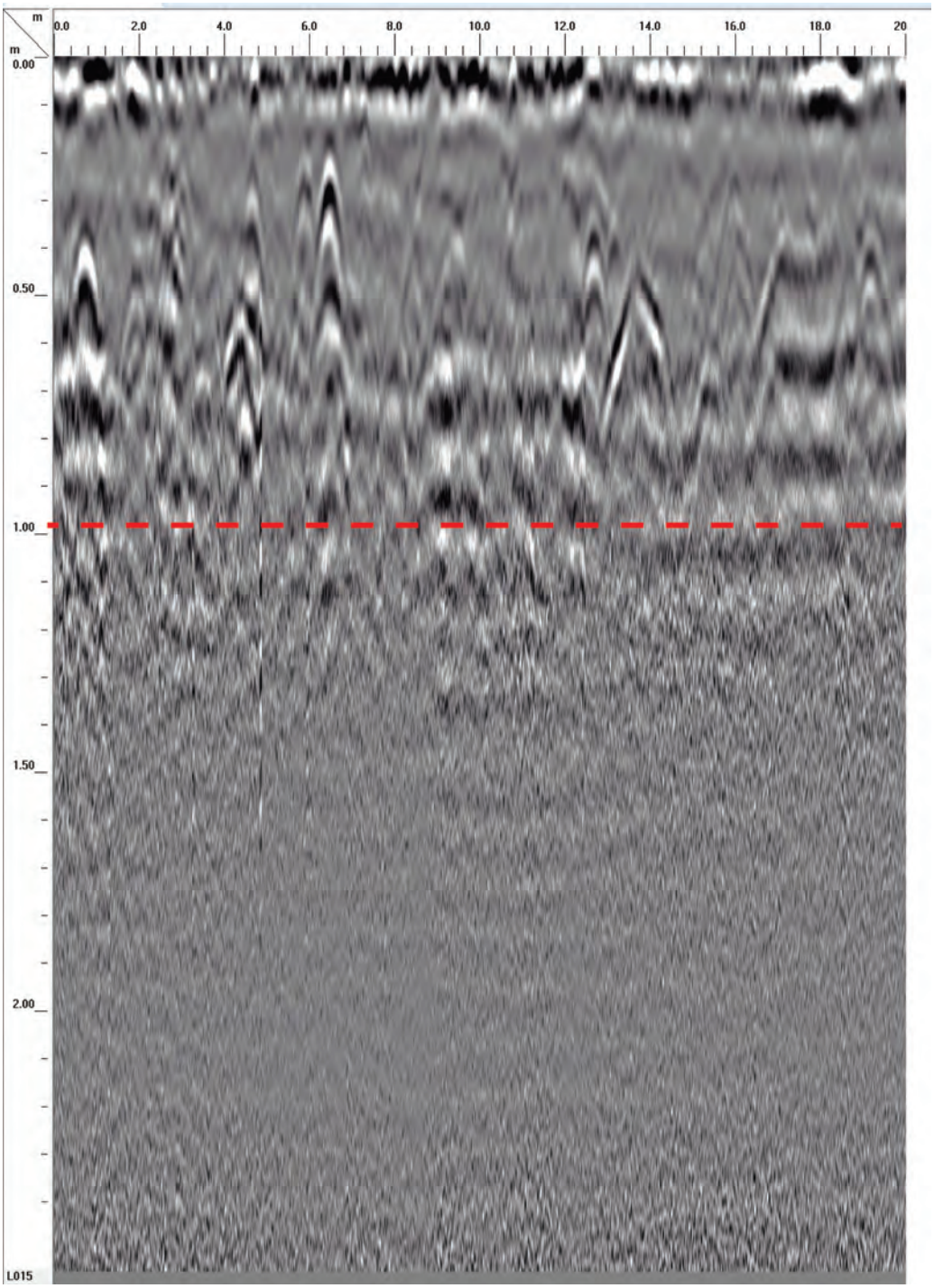

Figure 3. *Sample GPR profile showing signal attenuation at a depth of roughly 1 meter. Data from grid square N955 E1075, line 15.*

The excavations described elsewhere in this report show that numerous graves were in the areas covered by the GPR survey but were not detected. This is in some cases due to the deep layer of fill deposited over the stream in the southern part of the area and in other cases due to the extremely hard and compact soils to the north. These soil conditions did not allow the development of the contrasts between grave shafts and the surrounding soil. Excavation showed that in most cases grave shafts were also not visible to the naked eye until the backhoe trench was nearly down to the depths of the coffins; much deeper than one meter. This meant that the shafts at this depth were not visible to GPR since this is deeper than the effective signal penetration. It is likely that other graves are present within the unexcavated portion of 2023 survey area but are likewise undetectable by GPR.

Despite this, one large anomaly of interest was identified (Figures 4 and 5). It measured roughly 5x8 m, was most clearly visible at a depth of 26 cm below the current ground surface and extended roughly 50 cm below surface. The general location of the anomaly matched well with eyewitness Clyde Eddy's description of the location of several large boxes containing bodies a few days after the massacre. Therefore, it was recommended that this area be excavated as described elsewhere in this report. After excavation, it was determined that this area was a large layer of fill that did not represent a grave.

Given the relative lack of success with GPR over the past few field seasons, I do not recommend further GPR survey in Oaklawn Cemetery. It was thought that advancements in GPR technology since the previous surveys (that were over 20 years ago) could lead to improved results, but this was clearly not the case.

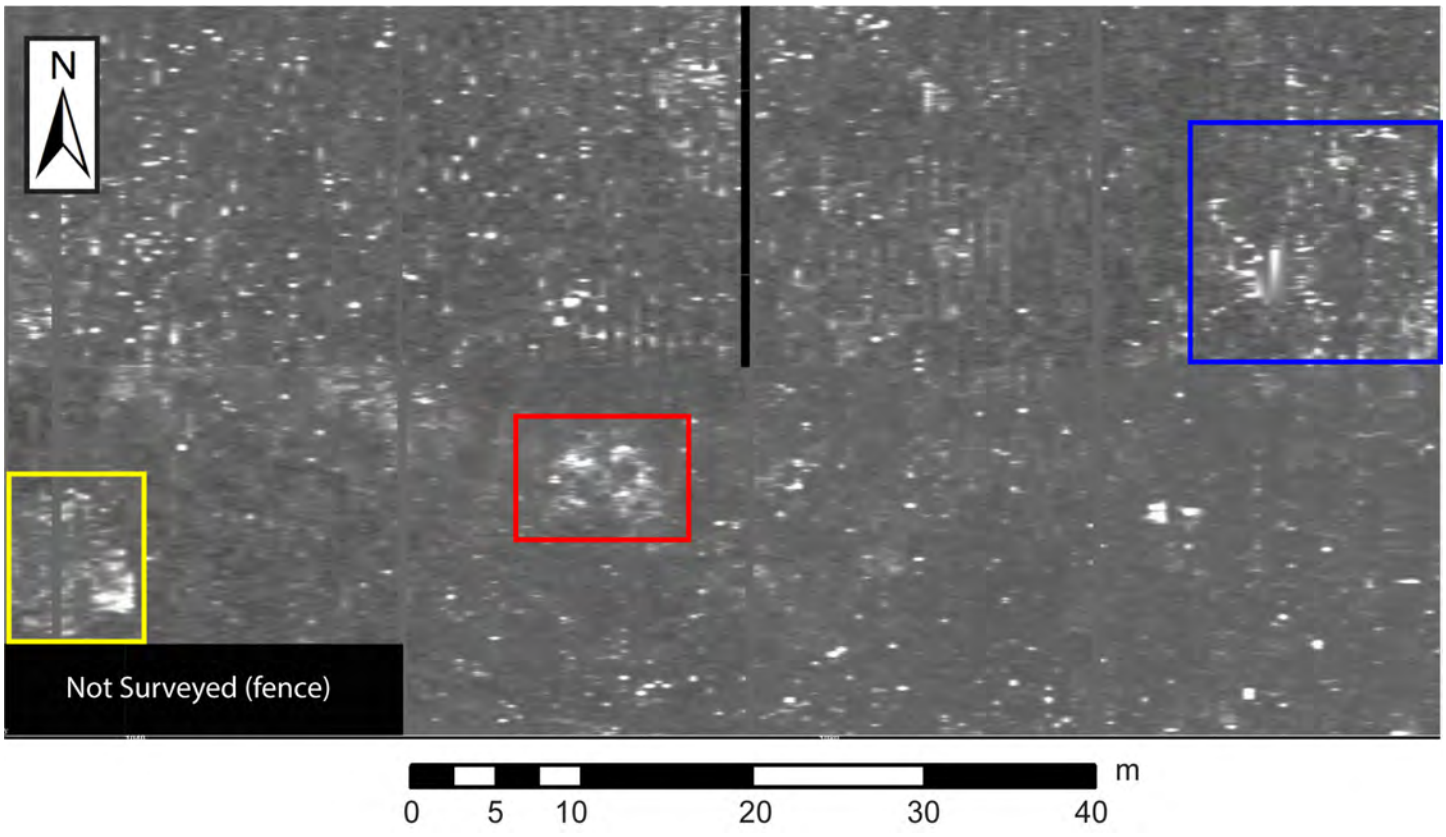

Figure 4. *All ground-penetrating radar data at a depth of 33 cm below surface. The yellow square surrounds an area of compacted backfill from 2022. The red square demarcates the anomaly in N955 E1056 (see also Figure 5), and the blue surrounds a cluster of tree roots. Small white reflections are likely tree roots or rocks, but in some cases are caused by pushing the GPR over a flat or partially buried headstone.*

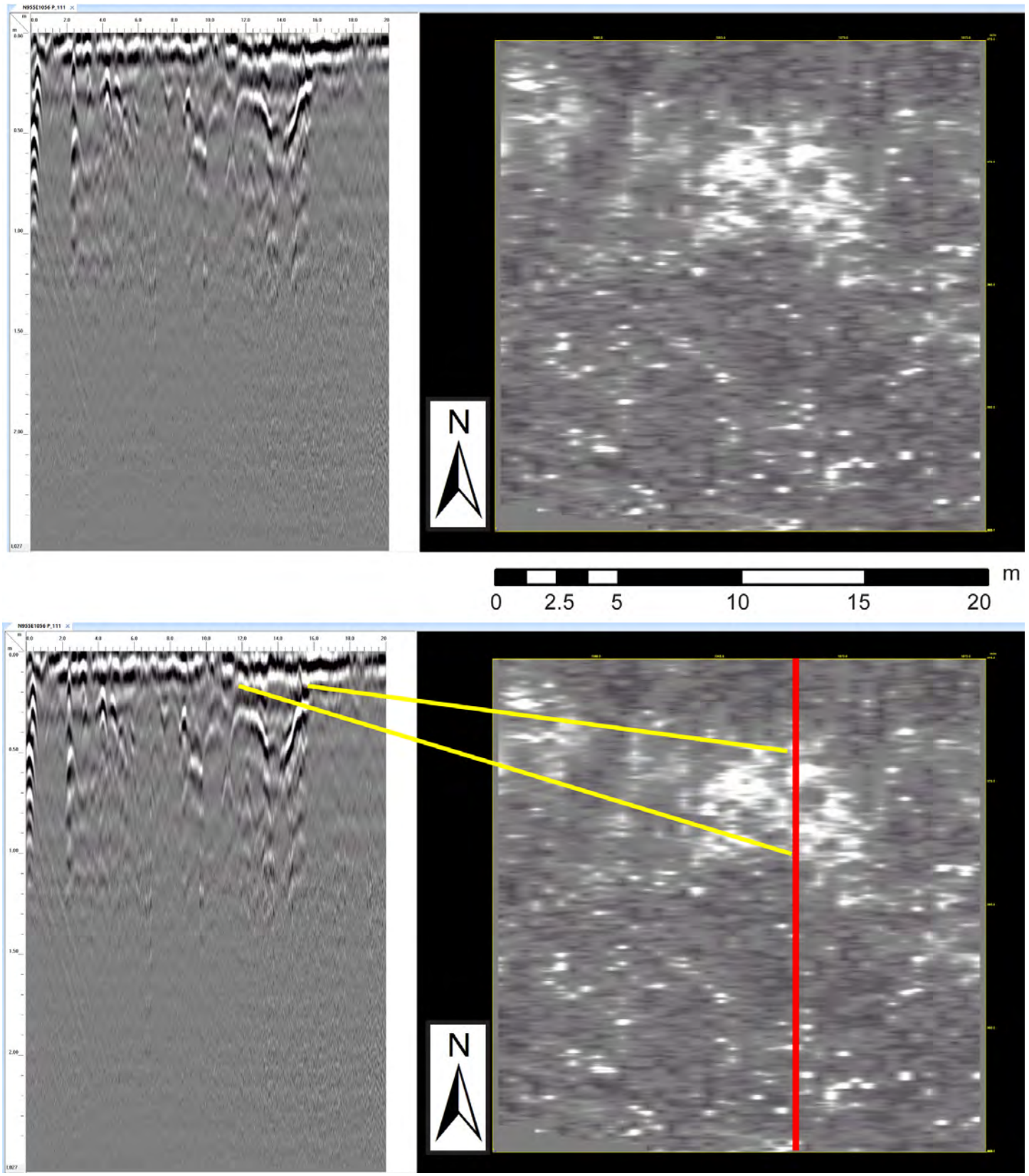

Figure 5. *Anomaly recorded in N955 E1056. The left shows the profile and the right shows the depth slice at 26 cm below surface. The red line at bottom right shows the location of profile on the slice and the yellow lines at bottom show the location of the anomaly as seen in profile on the slice.*

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APPENDIX C

ELECTROLYTE AND ELECTROLYSIS TREATMENT OF METAL OBJECTS FROM BURIAL 42

ELECTROLYTE AND ELECTROLYSIS TREATMENT OF METAL OBJECTS FROM BURIAL 42

By Gabriel LeBlanc, Ph.D.

Overall summary

Samples recovered from Burial 42 were found to have significant sediment and rust formation. Several of these samples were treated at The University of Tulsa by Professor Gabriel LeBlanc in order to remove some of the sediment and/or rust to both help separate artifacts that were fused together and potentially attain greater resolution of the individual pieces. Four large samples were treated with mixed results. The best results were obtained on a sample of keys that had fused together. Electrolysis treatment was able to isolate and clean three keys from the original specimen. Specimens that had a higher degree of rust fractured after extended electrolysis treatment. Specimens with a high percentage of sediment quickly fractured or deteriorated in the electrolyte solution.

General procedure and set-up

An electrolyte solution was prepared by mixing 5.3 grams of sodium carbonate (washing soda) in 1 liter of water (5mM concentration). Samples were slowly lowered into the electrolyte using a rinse basket to support the sample. After full immersion samples were lowered into high purity water to remove electrolyte. For samples undergoing electrolysis treatment, electrical contact was made to the most exposed metal contact of the specimen using a stainless steel alligator clip. Additional alligator clips were then used to prevent the point of contact from being submerged in the electrolyte solution. This electrical connection from the specimen was then attached to a DC power supply (TekPower, TP3005P) at the negative terminal (black lead). The anode used to complete the circuit was a platinum mesh electrode connected to the positive terminal (red lead), which was placed as close as possible to the specimen without making direct contact. An example of this set-up can be seen in Figure 1.

Current was then run through the system, beginning at 0.10 Amps and then slowly increasing to approximately 0.25 Amps. Voltages varied based on the size and resistance of the individual specimens, but was typically in the range of 5-20 volts. Electrolysis typically lasted for 3-5 days, with the process generating significant bubbles on the surface of the specimens wherever exposed metal was visible. Following electrolysis treatment, samples were immersed in high purity water to remove salts from the electrolyte solution and allow to dry in air.

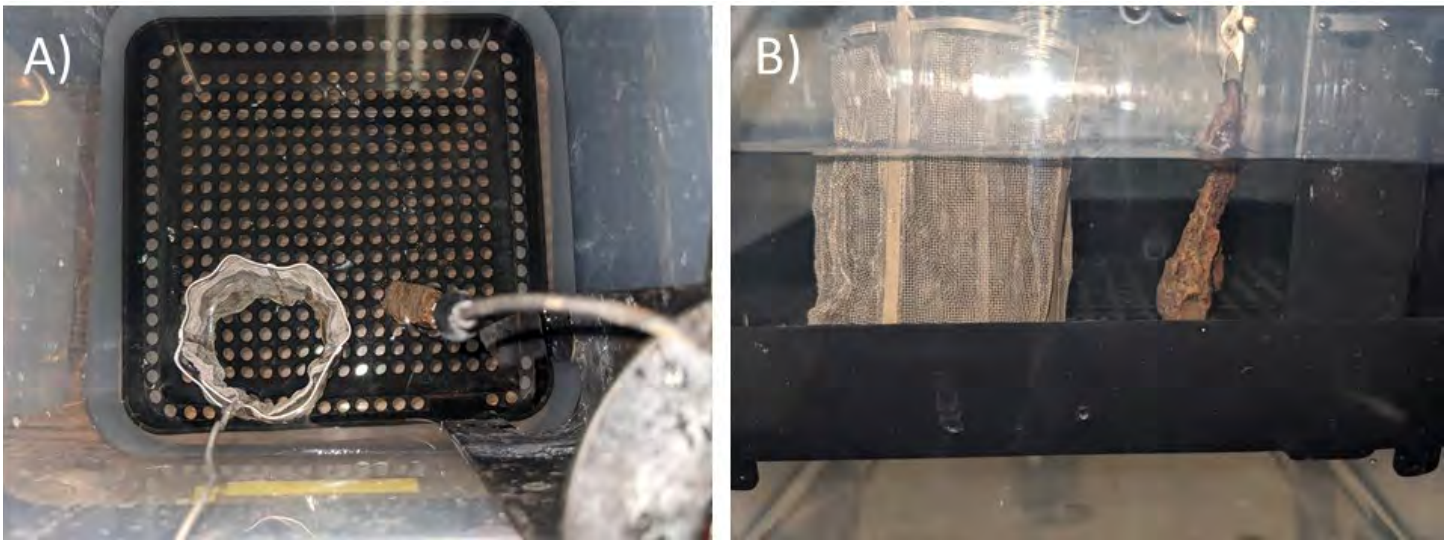

Figure 1. *Photographs of the general set-up for electrolysis treatment of specimens. A) top-down view and B) side-on view.*

Individual specimen results and further recommendations

The most successful electrolysis treatment was on a specimen that included 3 visible keys rusted together (Figure 2A). The initial connection for electrolysis treatment was with the largest key (containing 3 rings at the top), Followed by the most exposed smaller key. Once the keys were isolated from the original sample (approximately 4 days of treatment), the individual keys were further treated with electrolysis to remove the remaining rust on the surface (approximately 2.5 days per key). The final status of each key can be seen in Figure 2B-D alongside a ruler for reference. Further treatment of these keys through physical abrasion (high grit number sandpaper) could help to remove the black residue that remained on the surface, which is common in metal samples treated by electrolysis. Further electrolysis treatment on the remaining bulk sample did isolate an additional item (Figure 2E), but the remaining portion (Figure 2F) of the original specimen was not treated as no obvious contact could be made to an exposed metal portion.

Three additional samples were exposed to electrolysis treatment with minimal success. These included a presumed skeleton key, money clip, and belt buckle (Figure 3). In all three cases, the extent of rusting was much more advanced, with little exposed metal available to make the connection. While current was able to flow through the electrochemical apparatus, the bubbling primarily occurred close to the electrical connection. Following the electrolysis treatment of these samples, they became very fragile and fragmented. Further treatment of these specimens (and others showing similar levels of rusting) using physical abrasion is recommended over electrolysis treatment.

Finally, a large specimen that contained a significant amount of sediment was placed in the electrolyte bath (Figure 4). Upon exposure to the electrolyte solution, the majority of the sediment dissolved and only

Figure 2. *Photographs of the bulk keys specimens A) before electrolysis treatment and B-F) after electrolysis treatment.*

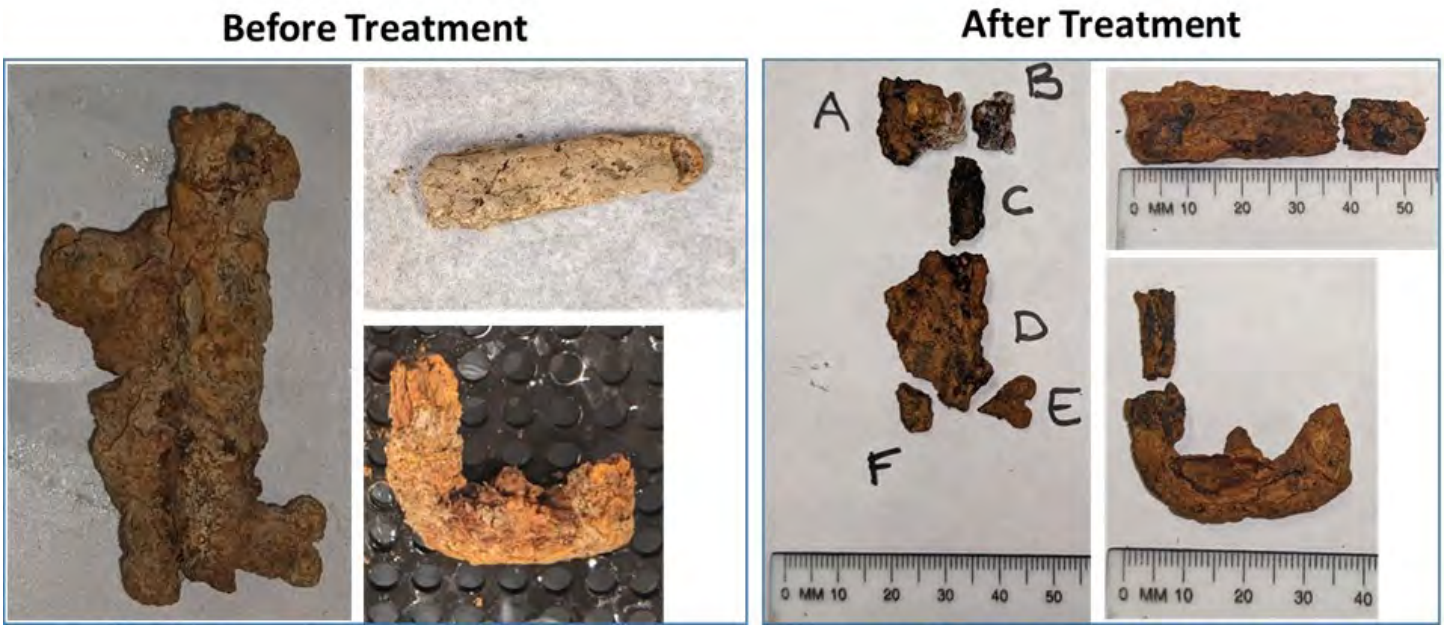

Figure 3. *Photos of specimens before (left) and after (right) electrolysis treatment. The presumed skeleton key is on the left side, the money clip on the top right, and the belt buckle on the bottom right of each panel.*

Figure 4. *Photos of sediment rich specimen before (left) and after (right images) exposure to the electrolyte solution.*

three small components of the original specimen were recovered. These samples were not further treated with electrolysis. Based on this result, it is recommended that other samples containing large amounts of sediment be first treated more gently with water, then electrolyte and physical abrasion to remove the majority of sediment before attempting electrolysis treatment.

APPENDIX D

REPORT ON PORTABLE X-RAY FLUORESCENCE (PXRF) ANALYSIS OF FOUR NON-FERROUS KEYS, ONE FERROUS KEY, AND TWO FERROUS OBJECTS FROM BURIAL 42, TULSA, OK

REPORT ON PORTABLE X-RAY FLUORESCENCE (PXRF) ANALYSIS OF FOUR NON-FERROUS KEYS, ONE FERROUS KEY, AND TWO FERROUS OBJECTS FROM BURIAL 42, TULSA, OK

Thomas R. Fenn and Ella Brewer-Jensen

Introduction

A total of five keys and two other ferrous-based metal objects from Burial 42 were submitted for evaluation and examination using portable X-Ray Fluorescence (pXRF) analysis as a method for determining potential compositions. The pXRF instrument works by generating primary X-rays which interact with the surface of the object being examined. These interactions cause secondary X-rays to be generated and fluoresce from atoms of elemental constituents comprising the object material. The energies of these secondary X-rays are characteristic of the type of atom they originated from, therefore allowing us to determine which elements are present in the object and at what approximate proportions. This method was chosen for this project due to its non-destructive nature. Although limited in sensitivity and precision compared to other chemical analysis methods, for this project pXRF was effective in quickly identifying major and minor elements and their relative proportions, thus assessing the alloy types of these keys and metal objects and subsequently informing anthropological interpretations of the keys' historic significance.

The limitations of pXRF as a chemical analysis method include its relatively shallow analytical depth (although this varies with material density). As such, the data reflect the compositions of the surface and very near-surface material of each key. While the objects were cleaned via electrolysis prior to pXRF analysis, any corrosion effects still present near the surface of the metal, such as decuprification[1] or dezincification[2] in the case of brasses, are reflected in the results. This could cause bias in data collection since the present near-surface composition is not necessarily representative of the original bulk composition of the metal, as the surface has been preferentially affected by corrosion processes. Furthermore, the presence of any plating on the surface, if preserved, could also affect the results. Despite these limitations, pXRF can be a highly useful method in the analysis of archaeological metals, especially copper alloys, due to its ability to quickly determine alloy types and detect a wide range of metallic elements at concentrations as low as 10ppm.

Analytical Procedure

The instrument used in this study is a Bruker TRACER 5g hand-held portable X-ray fluorescence (pXRF) unit, with a rhodium (Rh) thin window X-ray source tube (see conditions and specifications in Table 1). For analysis, the instrument was placed in a tabletop stand on a flat, steady surface with the X-ray aperture pointing straight upwards. Each object was placed directly on top of the aperture and then covered with a protective steel cap to prevent any X-rays from escaping.

The objects of interest in this analysis include four non-ferrous keys and one ferrous key recovered from Burial 42. Two other corroded ferrous objects that were found in close proximity to the keys also were analyzed as a reference point and to confirm that they were primarily made of iron. Three spots were analyzed on each of the four non-ferrous objects in order to compare and average the results and thus determine more accurate compositional estimates for each key. Only two spots were analyzed on each of the 3 ferrous objects to confirm that they are composed of iron. An acquisition time of 30s was used for all analyses.

[1] *Decuprification* is defined here: as the selective removal of copper from a metal due to corrosive processes, leaving behind a copper-depleted metallurgical structure.

[2] *Dezincification* is defined here: as the selective removal of zinc from an alloy due to corrosive processes, leaving behind a porous, copper-rich metallurgical structure.

Table 1. Operating Conditions and Specification Details for the pXRF instrument.

Category	Condition/Specification
Manufacturer	Bruker
Model	TRACER 5g
Voltage (keV)	40
Current (μA)	25
Collimator size (mm)	8
Acquisition time (s)	30
Air or Vacuum	Air
Gas purge	No
Filters used and which	Yes, #3 (75 μm Cu, 25 μm Ti, 200 μm Al)
Analytical Mode	Spectrometer Mode
Software Package	Artax-Spectra, Ver. 8.0.0.476

Three standards, or certified reference materials (CRMs), were similarly analyzed for comparison and subsequent quantification of the measured intensities. The standards were selected from a non-ferrous metals set, produced by MBH Analytical LTD, based on how closely they matched the anticipated measured compositions in the unknown objects. The equivalent peak intensities from the three spots analyzed on each CRM were averaged, and the intensity of each element present in the CRMs were used to calculate the concentration in weight percent (wt%) of each element present in the keys based on the known wt% present in the standard. The CRMs used were 31X 7835.8 (batch A), 31X 7835.9 (batch A), both leaded brasses, and 33X GM4 (batch AB), a gunmetal (a copper-based alloy including lead, tin and zinc). All three CRMs contained the elements we expected to identify within the unknown objects in varying concentrations.

When analyzing the spots on the keys, we attempted to find the flattest possible surfaces, since the best signal is received from flat, smooth and/or polished surfaces. However, this was not always possible to achieve perfectly with these unknown samples, since the keys had rounded shafts and somewhat rough, corroded surfaces, despite having been cleaned beforehand. These convex and/or rough surfaces caused an increase in scattering of incident and escaping X-rays, which reduced the X-ray signal that reached the detector. Therefore, the measured counts for each analysis are lower than is typical for an ideal measurement, especially when compared to the standard reference materials, which had flat, highly polished surfaces. Due to surface geometry of the unknown samples, we were not able to achieve the optimal count rates for each element, and the associated errors are reflected in our results. All pXRF data from this study were viewed and analyzed using Artax-Spectra software for the Bruker TRACER handheld pXRF and Microsoft Excel.

Results & Discussion

After all spots were analyzed on the unknown objects and certified reference materials, the intensity (in counts per second) vs. the energy (keV) were plotted and viewed as spectrograms, and ARTAX allowed for easy identification of which element corresponded to each intensity peak. The corresponding energy and intensity values from all three analyses on each CRM were averaged to achieve the most accurate possible peak intensity values for each standard. For the unknown archaeological objects, it is important to note that the measured

intensities are influenced by the effects of corrosion processes, which are often heterogeneously distributed across the surface of the object. We hope to minimize the bias caused by this heterogeneity by averaging multiple spots from each sample and using a larger spot size to encompass different corrosion phases in the material. However, some corrosion bias is still expected.

The spectrograph illustrated in Figure 1, for key 676.002, shows one spot analysis, represented by the red line, yielding lower copper intensity for both its K-alpha and K-beta peaks compared to the other two spot analyses (pink and green). Conversely, the red line shows a significantly higher zinc intensity. In an uncorroded brass alloy, Cu and Zn should be nearly homogenously mixed. As brass corrodes, copper and zinc can corrode, mobilize and re-precipitate as copper-rich and more zinc-rich phases. Here, the lower copper and higher zinc intensities on the red spectrum indicate that this analysis spot was in an area of a different corrosion phase, where copper was depleted resulting in a zinc-rich phase or microstructure. Keys 676.003 and 676.004 showed similar results, with one spot demonstrating inversely proportional intensities of Cu and Zn compared to the other two.

Once the averages for the unknown samples' intensity peaks were calculated, the average intensity for each corresponding peak on the CRMs were identified. The known weight percent concentration of each element present in the CRM was divided by its measured average intensity to determine the calibration factor needed to convert the intensities measured in the archaeological objects into wt% values. By choosing the CRM that most closely matched the measured intensity from the sample, we used these calibration factors to determine the wt% of that element present in the archaeological sample. This was done by multiplying the calibration factor by the intensity of that peak in the sample (in counts per second, or cps). This calibration process is shown in the formula below:

$$Av.wt\%_{Sample} = (Av.wt\%_{CRM}/Av.Counts_{CRM}) * Av.Counts_{Sample}$$

Using this formula, we were able to calculate the weight percent concentrations of each element present in each key. The calculated wt% values for each element in each sample are reported in the Table 2.

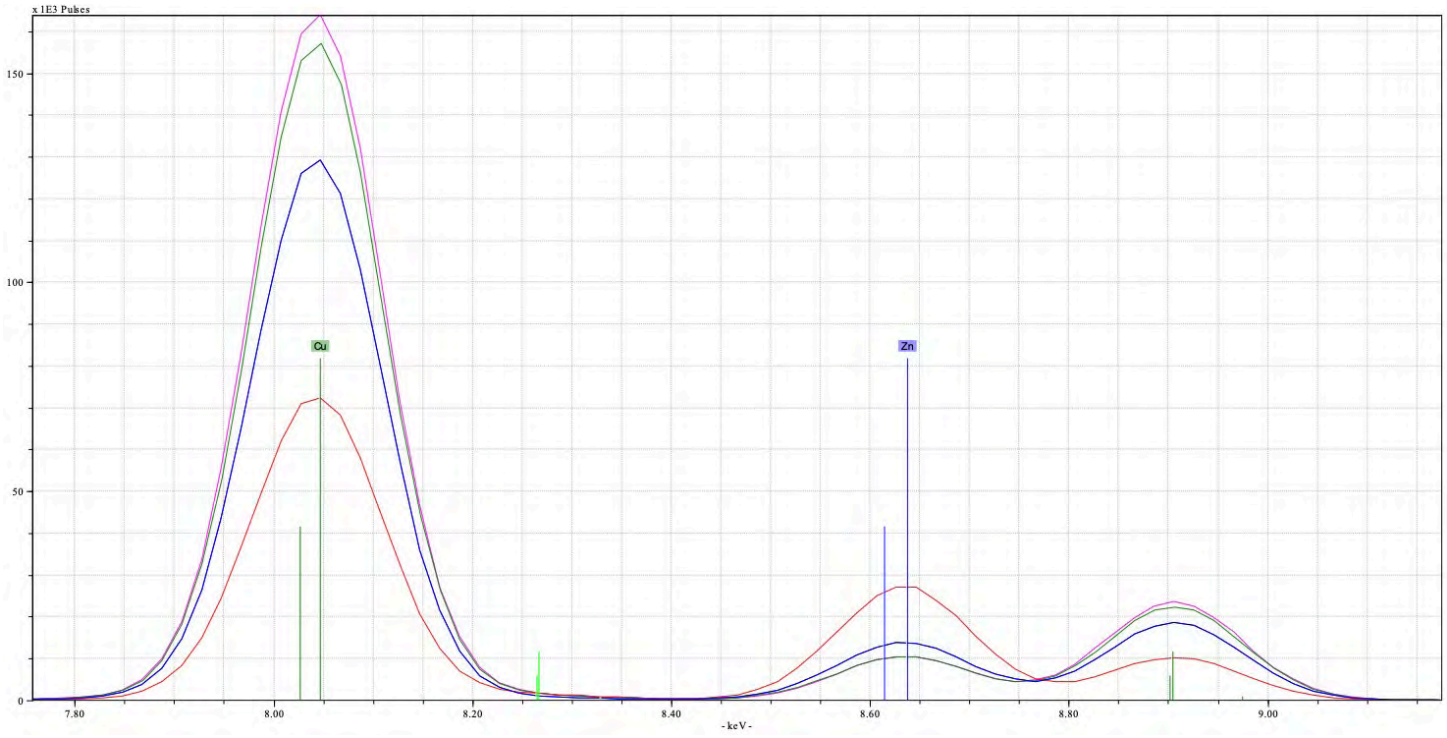

Figure 1. *Spectrograph showing inversely related copper and zinc peak intensities in three spots (pink, green, and red lines) analyzed on key 676.002. Shown for comparison is CRM GM4 (blue line) black and the areas surveyed in 2019 are in white.*

Table 2. Calculated elemental concentrations in wt% and associated analytical error (or relative standard error), also represented as a percentage, for the five keys.

Element	wt% 676.002	Error1	wt% 676.003	Error2	wt% 676.004	Error3	wt% 676.007A	Error4	wt% 676.001E	Error5
Al	0.0008	7.38	0.0635	7.57	0.0696	6.65	0.0594	6.65	0.0519	6.65
S	0.1429	7.28	0.0134	16.98	0.0114	8.28	0.0145	8.28	0.0078	8.28
Mn	0.0015	6.31	0.0012	1.98	0.0013	8.18	0.0021	8.18	0.0025	8.18
Fe	1.9955	3.44	2.5117	3.66	1.4796	1.03	26.8132	1.03	30.1647	1.03
Co	0.1008	2.59	0.0530	1.60	0.0444	0.57	0.3396	0.57	0.4109	0.57
Ni	2.6690	0.66	0.0278	3.69	0.0399	1.47	0.1615	1.47	0.0060	1.47
Cu	70.6445	0.34	54.3669	0.25	66.3880	0.10	4.2029	0.10	0.0905	0.10
Zn	7.1472	0.71	15.5283	0.47	18.1119	0.43	1.7029	0.43	0.1652	0.43
Pb	2.8379	0.97	0.3972	1.69	0.3898	4.65	0.8523	4.65	0.0374	4.65
Ag	0.0232	2.16	0.0711	5.82	0.0344	1.16	0.0559	1.16	0.0656	1.16
Cd	0.0000	5.59	0.0393	2.29	0.0399	7.53	0.0407	7.53	0.0517	7.53
Sn	0.1382	1.21	0.1364	0.86	0.1311	1.42	0.1679	1.42	0.1977	1.42
Tot. wt%	**85.7014**		**73.2099**		**86.7412**		**34.4129**		**31.2520**	

Grayed out cells represent cases where there were no intensity peaks emerging above the background X-rays at the characteristic energies, therefore we conclude these elements, if present, were at levels below detection limits for the instrument and conditions. NOTE: Totals do not equal 100% due to the high levels of corrosion products still preset in the analysis areas, resulting in the likely scenario that most if not all remaining missing elements adding up to 100% were oxygen, carbon and hydrogen combined with the corroded metals to various corrosion mineral phases.

The analytical error associated with each calculated weight percent value (or relative standard error) was determined using the following formula based on the certified reference material (CRM) values of each element used for calibration:

$$Relative\ Standard\ Error\ (\%) = \frac{\left[\frac{Standard\ Deviation}{Sqrt(3)}\right]}{(Average\ CPS)} * 100$$

Since we analyzed three spots for each CRM and averaged the three counts per second (cps) intensity values at each given energy peak, we used the square root of 3 for all error calculations. This analytical error is connected to the calibration factor ($\frac{wt\%_{CRM}}{Av.Counts_{CRM}}$) used to calculate the weight percent values of each element present in the keys, and therefore must be associated with these calculated wt% values in the keys themselves.

These results can be visually represented by their corresponding spectrographs, generated in Artax-Spectra. For example, see an overview of the major elements present in Key 676.002 (Figure 2). The peaks in this spectrograph correspond to the calculated wt% concentrations shown in the second column of Table 2. As you can see, the most prominent peak is that of copper, which we calculated to make up 70.64 wt% of the key, with an associated analytical error margin of 0.34%. Zinc, our next most prominent peak, we calculated at a 7.15 wt%. The remaining elemental wt% concentrations we calculated correspond with the remaining spectrograph peaks accordingly. The iron presence is likely a product of environmental corrosion due to this key's depositional proximity to corroding iron objects. Nickel, present in 2.67 wt% concentration, distinguishes the brass used to make this key as an alloy called "German silver" (also called nickel silver). Lead is present at 2.84 wt%. Although we analyzed for both lead and arsenic, whose primary peaks overlap, we attributed this peak mainly to lead, since it also showed distinct secondary peaks, whereas arsenic did not produce any perceptible secondary peak. However, the wt% concentration for Pb was calculated based on the secondary (L-beta) peak to avoid any possible influence from arsenic.

Some of the minor and trace elements (present in concentrations less than 1 wt%) had peaks too small to be seen at this level of magnification, so we had to zoom in further to the spectrograph to locate and identify them. For example, silver and tin, calculated at 0.023 wt% and 0.138 wt% respectively, are barely perceptible above the background radiation, but when we zoom in, their characteristic X-ray peaks, though small, are unmistakably present (Figure 3).

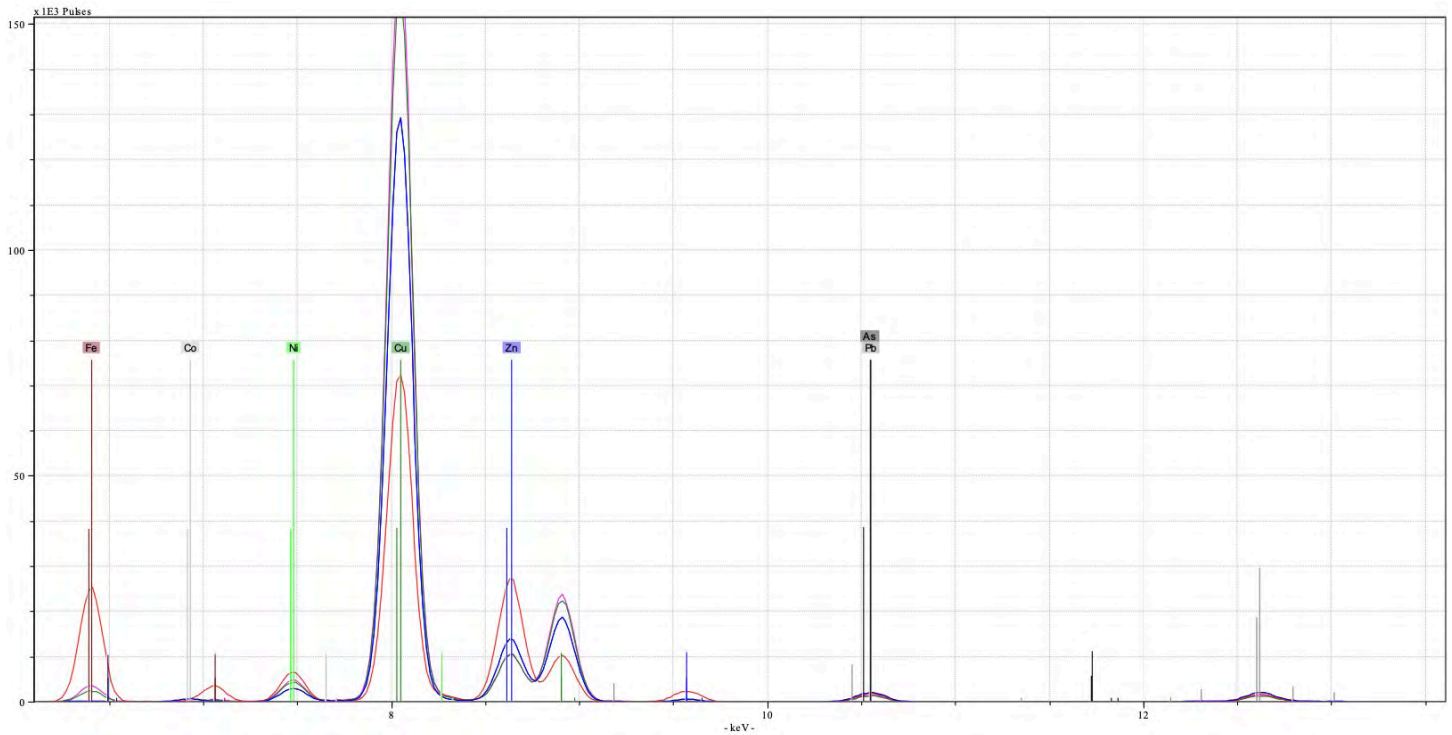

Figure 2. *Spectrograph of Key 676.002, plotting the intensity (cps) vs. energy (keV). Spectral lines produced by characteristic X-rays from Fe, Ni, Cu, Zn, and Pb are prominent. (CRM GM4 in blue).*

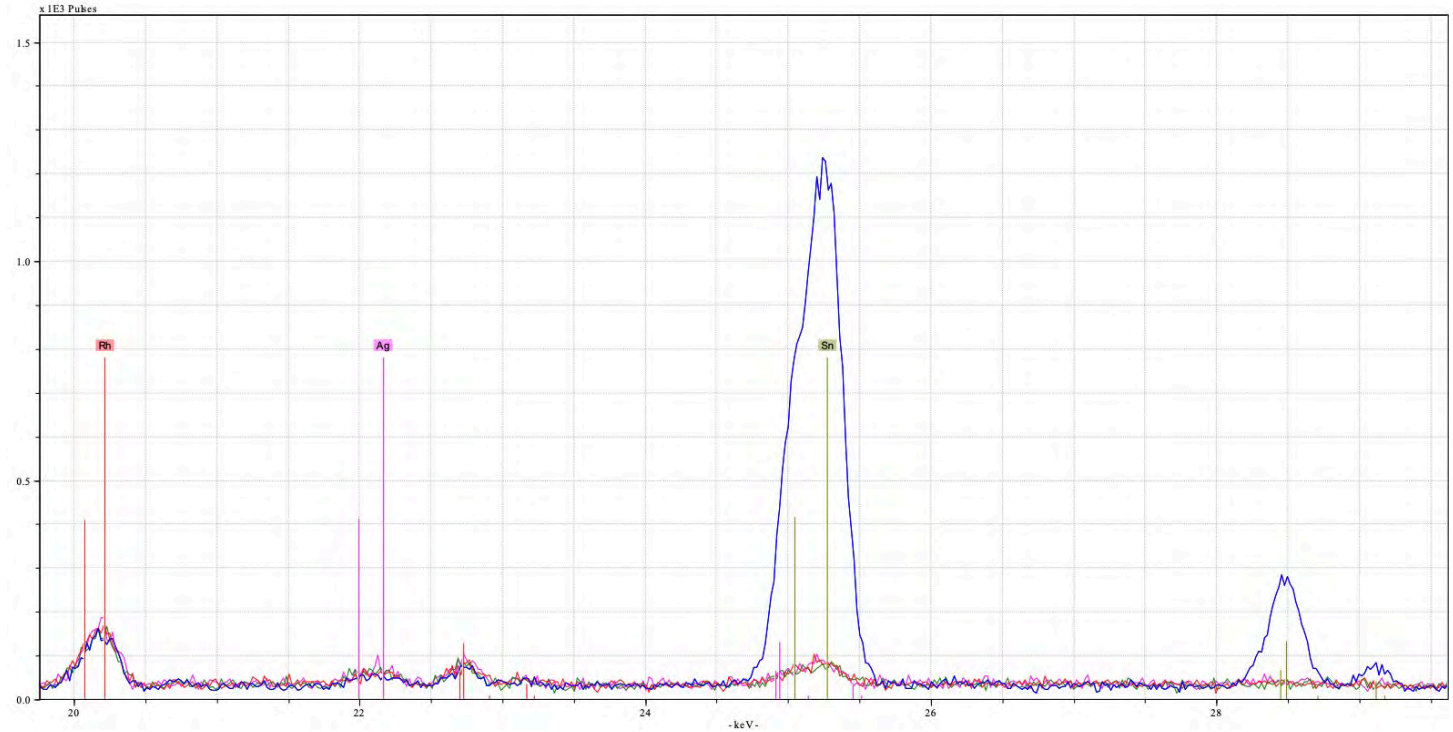

Figure 3. *Key 676.002 spectrograph detailing the 20-30 keV range providing data for trace and minor elements silver (Ag) and tin (Sn). The blue spectrum line is from CRM GM4. Note: the rhodium (Rh) peak in the figure is a product of the pXRF instrument, which has a rhodium X-ray tube, not the sample.*

The remaining keys were analyzed the same way and show similar results. The spectra shown in Figures 1-8 detail major and some minor elements detected in each key and demonstrate how alloy types were identified and quantified. Table 3 details our averaged compositional results as weight percent concentrations to inform the following interpretations of the compositions of these archaeological objects. Spectra for the two ferrous objects from Burial 42 that were not keys (not shown) confirmed they were iron in composition.

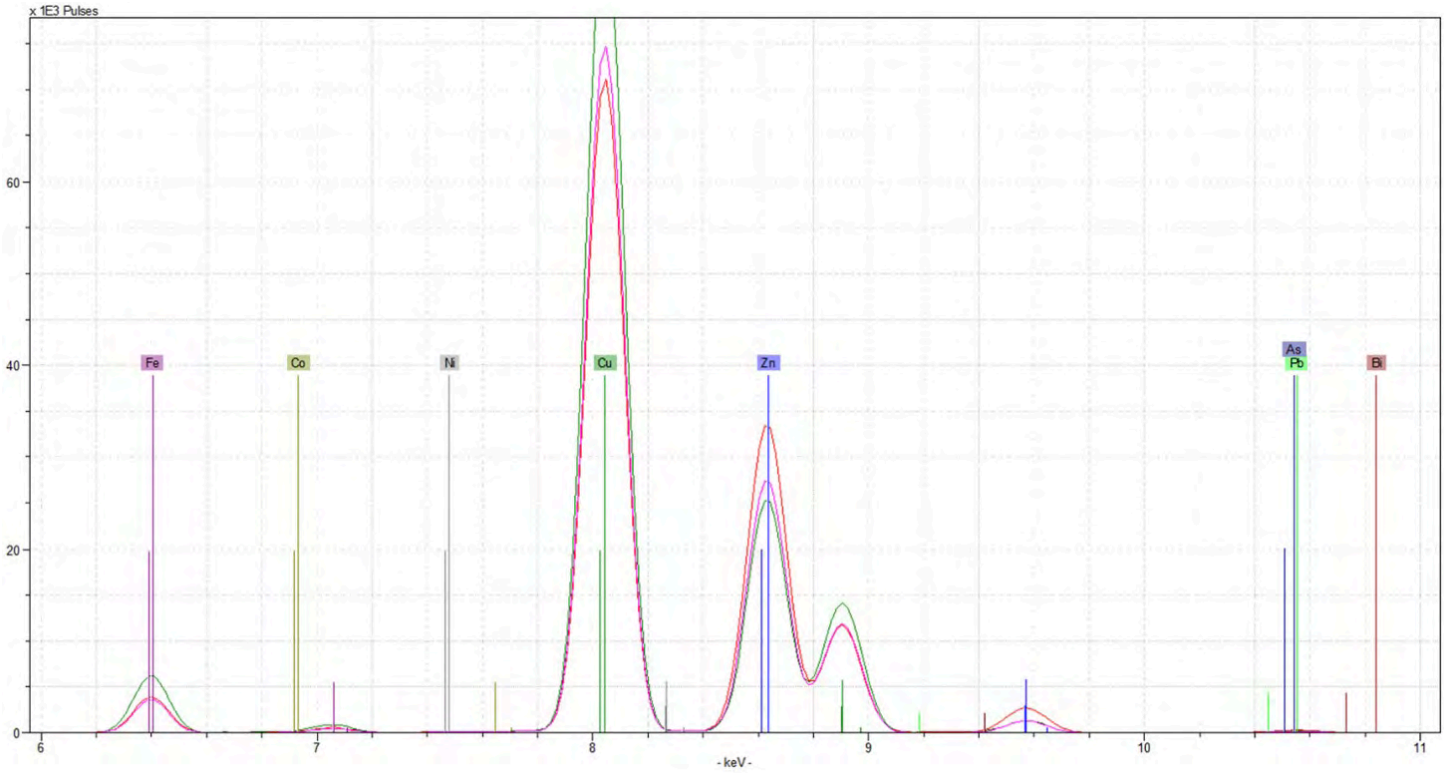

Figure 4. *Key 676.003 spectrograph of major elements. Spectral lines from characteristic X-rays for Cu, Zn, Fe, and Pb are apparent, denoting this key as a brass with some iron corrosion from nearby iron objects.*

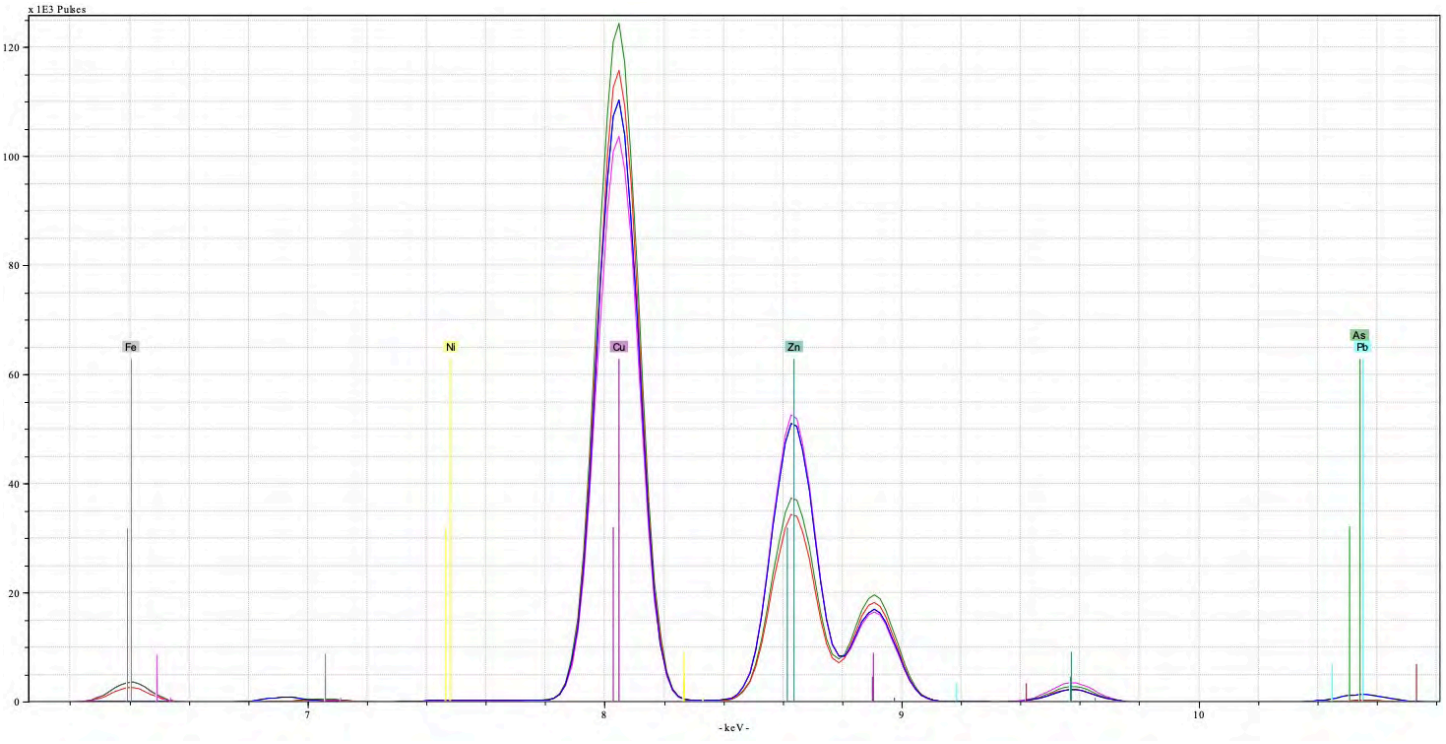

Figure 5. *Key 676.004 three analyses (green, red, and pink lines) compared to CRM 7835.8 (blue line). Major elements Cu, Zn, and Fe are shown at this magnification, with an indication of minor element Pb -another brass key.*

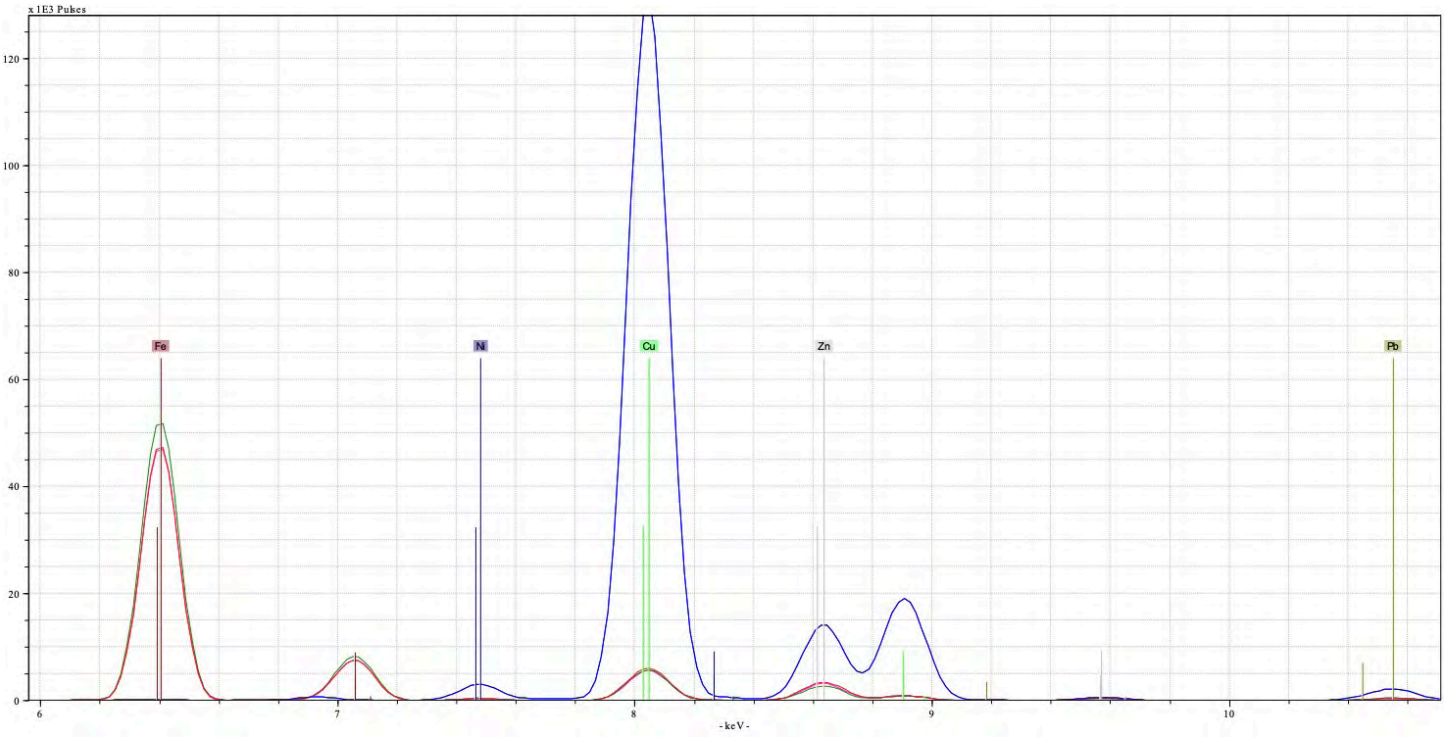

Figure 6. *Key 676.007-A spectrograph (compared to CRM, shown in blue). This key is still attached to a mass of corroded iron material, reflected in the intensity of the Fe peak here.*

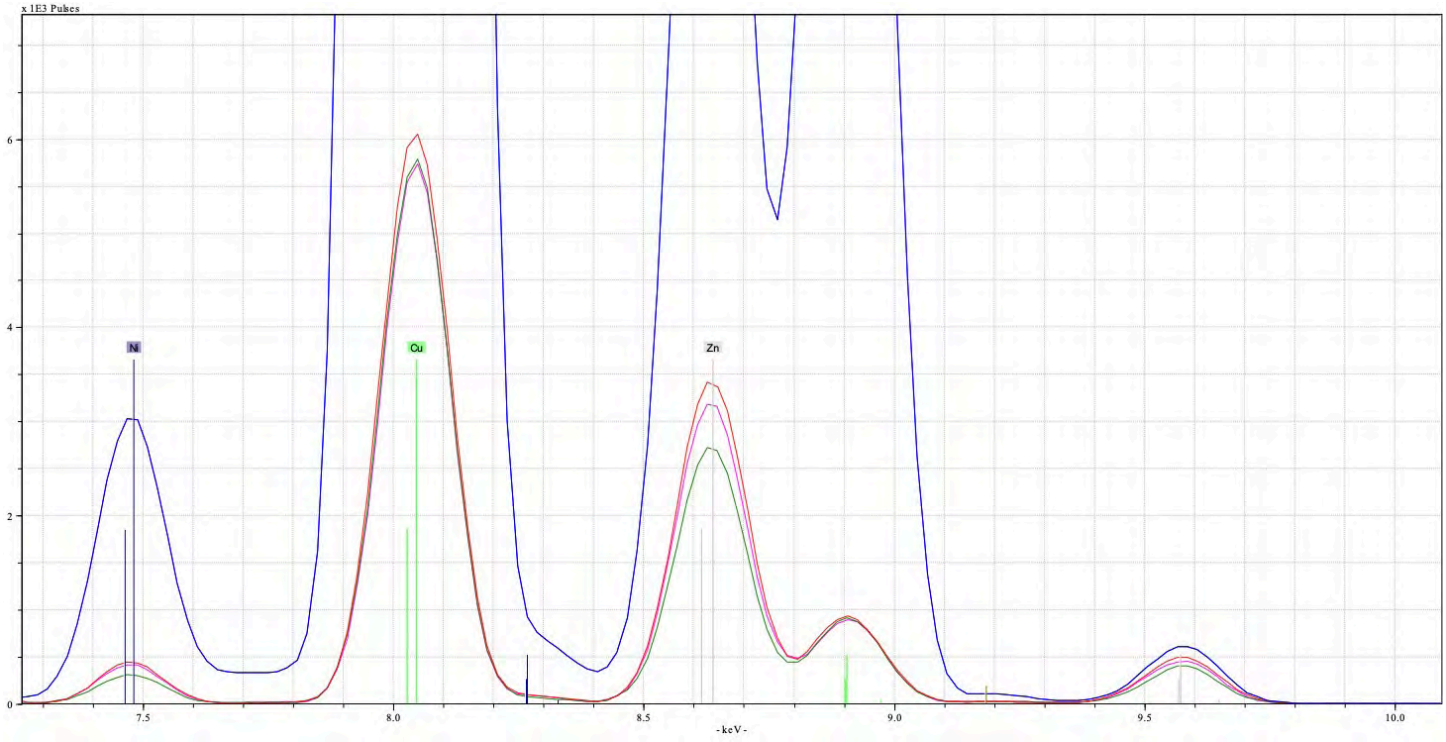

Figure 7. *Key 676.007-A, magnified spectrograph to feature constituent element peaks under the iron corrosion. It appears that this key was a German Silver with a proportionally significant concentration of nickel, similar to Key 676.002.*

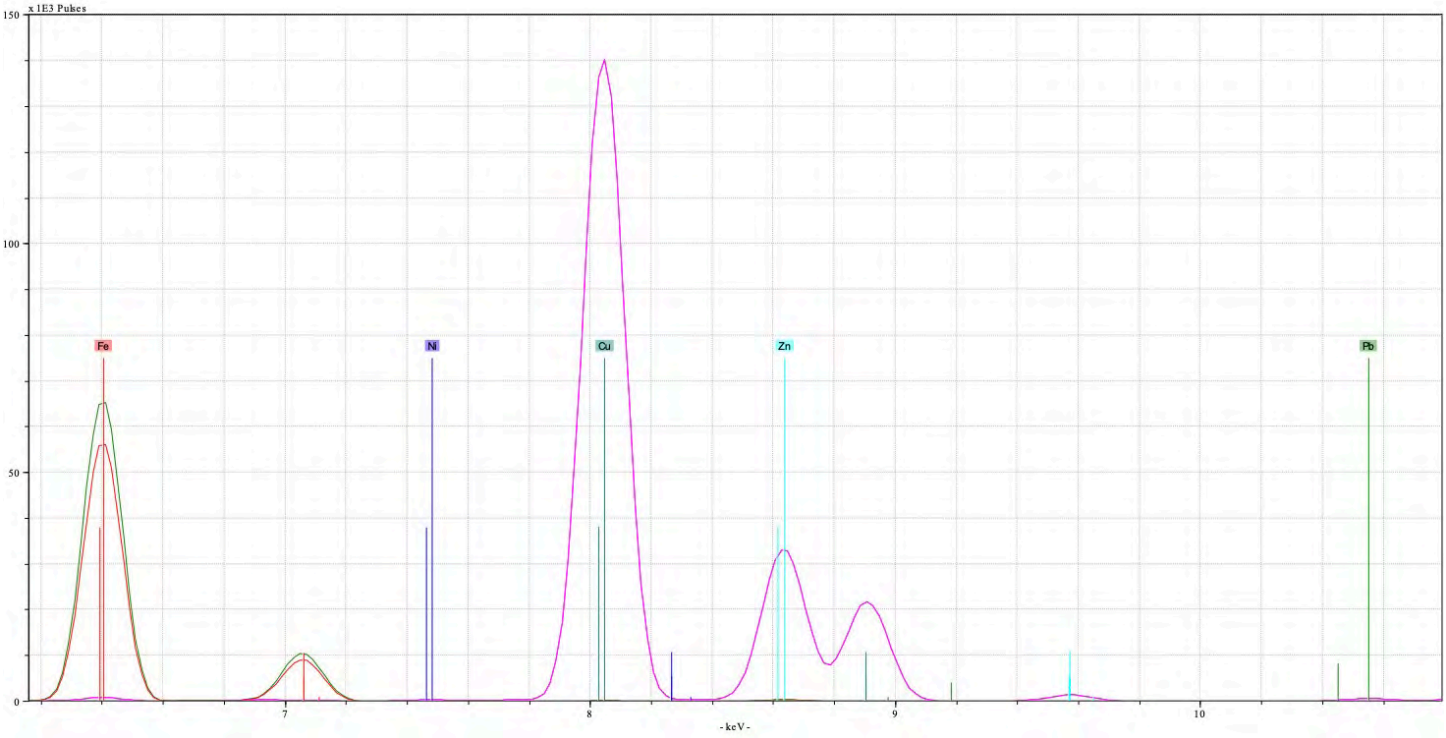

Figure 8. *Key 676.001-E was analyzed in two spots (red and green spectra) and compared to CRM 7835.9 (pink spectrum), showing that this key is primarily iron in composition.*

Table 3. Major, minor and trace metals in the seven unknown objects from Burial 42, and interpretation of the former alloy.

Object	Analyses	Major Metal(s)	Minor/Trace Metals	Interpretation
Key 676.001-E	21-22	Fe	Cu, Zn, Ni, Sn	Iron key with corrosion from "German Silver" keys
Key, 676.002	6-8	Cu, Zn, Ni	Pb, Fe, Sn, Ag	"German Silver"
Key, 676.003	3-5	Cu, Zn	Fe, Pb, Sn, Ag	Brass
Key, 676.004	9-11	Cu, Zn	Fe, Pb, Sn, Mn	Brass
Key, 676.007-A	12-14	Fe, Cu, Zn, Ni	Fe, Pb, Ag, Sn?	"German Silver"; corroded within corroded iron mass
676.007-B – Ferrous mass	15-16	Fe	Several trace	Ferrous mass around Key 676.007-A; trace elements due to nearby keys
676.005 – Knife blade	17-20	Fe	Several trace	Trace elements due to nearby keys

The depositional environment of Burial 42 likely was impacted by issues of rainwater influx, freezing, thawing, heat, dryness, and fluctuating groundwater tables, to mention a few, resulting in an active corrosion environment which significantly impacted the conditions of metal objects from the burial. Even considering all of these issues, it was still possible to identify and quantify elements in the materials used in the manufacture

of five keys and two other objects recovered from Burial 42 (see Table 3), and those data provides the means to reconstruct and interpret the objects original materials. Of the five keys examined, two were composed of "German Silver", while two were composed of brass, and the final key appears to have been made of iron.

German Silver, or nickel-silver, is actually an alloy of copper (Cu), nickel (Ni) and zinc (Zn), typically at the ratios of 60:20:20, known for its silver color, bell-like resonance, and hardness. Originally known from Chinese metal (called *baitong* or *pai-t'un*, literally "white copper") produced from naturally occurring ore deposits containing the requisite copper-nickel-zinc in similar ratios, with Europeans first mentioning this metal in the late 16th-century CE. However, by the mid-eighteenth century, Europeans, particularly Germans, began producing the metal, and the German process of manufacture was adopted in England by the 1830s (Mei and Ko 1989). Key 676.002 still retains significant amounts of all three metals (Cu, Ni, & Zn), and in about the right proportions, although as indicated, corrosion has depleted and enriched some elements. Likewise, Key 676.007-A also retains evidence of all three metals in notable concentrations and proportions, but this key was much more dramatically impacted by the corrosion process, and iron has become cemented and incorporated into corrosion on much of the surface of the key, while significant loss of the three key metals (Cu, Ni, & Zn) also is apparent.

The elemental concentrations of two keys (676.003 and 676.004) also are consistent with brass (an alloy of copper and zinc) as the material of manufacture. Brass is a very common metal and was in regular use by the Romans, and continued in popularity into the modern era. There is little unusual about the brass keys, although the presence of lead (Pb), tin (Sn) and silver (Ag) as trace elements suggests that this brass was not as "clean" as most, and possibly could suggest that the brass metal was recycled before it was used to produce the two brass keys. Furthermore, the compositions of both brass keys do not match typical ratios of Cu-Zn in brasses of the era (the current analyses indicate a higher proportion of zinc than is usual), suggesting that there has been surface enrichment of zinc and surface depletion in copper. The final key was made of iron, although traces of elements typically found in German Silver also were recorded, although at very low levels. This suggests that the key is in fact made of iron, but that the iron corrosion on that key also incorporated some of the elements of a nearby German Silver key. The two other ferrous metals did not reveal any unusual or obvious patterns in the elemental data, and so can only be described as likely having been made of iron, but with elemental contamination in its corrosion from nearby objects made of other materials (i.e., the German Silver and brass keys).

Conclusions

An analysis was conducted of five metal keys and two other ferrous-based objects from Burial 42. The results of that analysis confirmed that two of the keys were likely manufactured from "German Silver", a popular 19th and early 20th century metal alloy of copper-nickel-zinc, while two other keys were made of brass. The exact Cu-Zn ratios of the brasses cannot be determined due to corrosion, but the metals are definitely brass, although some trace elements observed might suggest the brass metal was recycled for use as keys. The final key was of iron with little else to remark on due to extensive corrosion. The two ferrous-based objects likewise have unremarkable compositions and would be at home as materials for knifes of other common objects in the 19th and 20th centuries CE.

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APPENDIX E

ANALYSIS OF THE KEYS RECOVERED FROM BURIAL 42

ANALYSIS OF THE KEYS RECOVERED FROM BURIAL 42

Tommas Pace, MA

Summary

This appendix presents the analysis of keys recovered from Burial 42. The analysis was conducted at facilities on the University of Oklahoma Campus by Tommas Pace, MA. Each artifact was assigned a special catalogue number under catalogue #676. Artifacts were photo-documented with a 50 megapixel camera and each artifact was also examined and photographed with a *Keyence VHX-E2500 Ultra* microscope between *20x - 80x* magnification with the assistance of Jennifer Haney, Ph.D. Each artifact was measured with digital calipers and weighed by scale. The artifacts in this analysis were processed through electrolysis treatment prior to examination at the University of Tulsa by Gabriel LeBlanc, Ph.D. (Appendix C). A compositional analysis was conducted by Thomas Fenn, Ph.D. and Ella Brewer-Jensen, BS, using Portable X-ray Fluorescence Analysis (pXRF) at the University of Oklahoma. The results of the pXRF testing are incorporated into this analysis, but may also be found in Appendix D.

Methods

Each artifact was individually inspected for diagnostic attributes of key morphology. The artifacts were compared to available archived catalogues accessible to the author at the time of analysis. A total of 96 different lock and key manufacturers operated across the United States from 1831 – 1921 (Hennessey 1976:Appendix). Archived digital catalogues were available and examined for the following manufacturers and distributers: P. F. Corbin, Buhl Sons & Company (Co.), J. B. Shannon & Sons, Chicago Hardware Manufacturing (Mfg.) Co., Yale & Towne Mfg. Co., Brittan-Graham-Mathes, Hopkins & Dickinson Mfg. Co., Reading Hardware Co., Belleville Hardware & Lock Mfg. Co., Sager Lock Co., Barrows Lock Works, Clinton Lock Co., The Springer Lock Mfg. Co., Eagle Lock Company, Nashua Lock Company, and Chantrell Hardware and Tool Co. The morphology of locks and keys and glossary of terms used throughout this analysis is derived from a combination of Albert Hopkins, *The Lure of the Lock* (1928:13-21) and Henry R. Towne's, *Locks and Builders Hardware: A Handbook for Architects* (1904:11-32B). Terms used from the glossary to discuss the morphology of the specimens are italicized in the analysis below.

Historical Background

The earliest locks and keys used pin-tumbler technology in ancient Egypt and Mesopotamia. The pin-tumbler technology was replaced by rotary keys for warded lock technology in the time period contemporaneous with the early Roman Republic (Pace 2014; Price 1854). In the mid- to late-nineteenth century, the need for improved locking mechanisms drove innovation in the security industry to produce better technologies less susceptible to lockpicking in America and abroad (Hennessey 1976:122; Price:1854; Tempest 2009:13-16;). Linus Yale Sr., the founder of what would become the Yale & Towne Manufacturing Company, filed a patent for the first pin-tumbler cylinder lock in 1844 (Hennessey 1976:85) and Linus Yale Jr. would improve upon his father's patent to create a pin-tumbler cylinder lock in 1865, reviving ancient technology by incorporating modernized manufacturing in machining parts (Hennessey 1976:124; Hopkins 1928:64). By the end of the nineteenth century, most major lock and key manufacturers in America had begun selling and marketing their own version of the pin-tumbler cylinder lock (Hennessey 1976).

The warded lock, lever-tumbler, and the pin-tumbler cylinder lock were manufactured and used contemporaneously on doors, chests, cabinets, and padlocks from the late-nineteenth century to the mid-twentieth century. Warded locks and lever-tumblers were eventually phased out of major manufacturing by the mid-twentieth century in favor of the pin-tumbler cylinder lock, a smaller locking mechanism that could be mass produced with machined internal components, including pin-tumblers that were interchangeable (Figure 1). This allowed for a greater combination of key creations to ensure each key was unique to its owner and was less likely to be interchangeably used on another lock, a common problem with the rotary keys of warded lock technology (Figure 2). Rotary keys could unintentionally open a variety of ordinary warded locks and even the most complex of warded locks and their escutcheons could be bypassed with a crudely fashioned skeleton key as a lockpick (Hopkins 1928:39-40). The invention of the pin-tumbler cylinder lock increased the overall security of locking mechanisms. Rotary keys typically only had between four to 36 different possible bittings for keys, but between 27,000 and 100,000 combinations of bittings are possible for pin-tumbler keys, based on the number of pin-tumblers installed within the

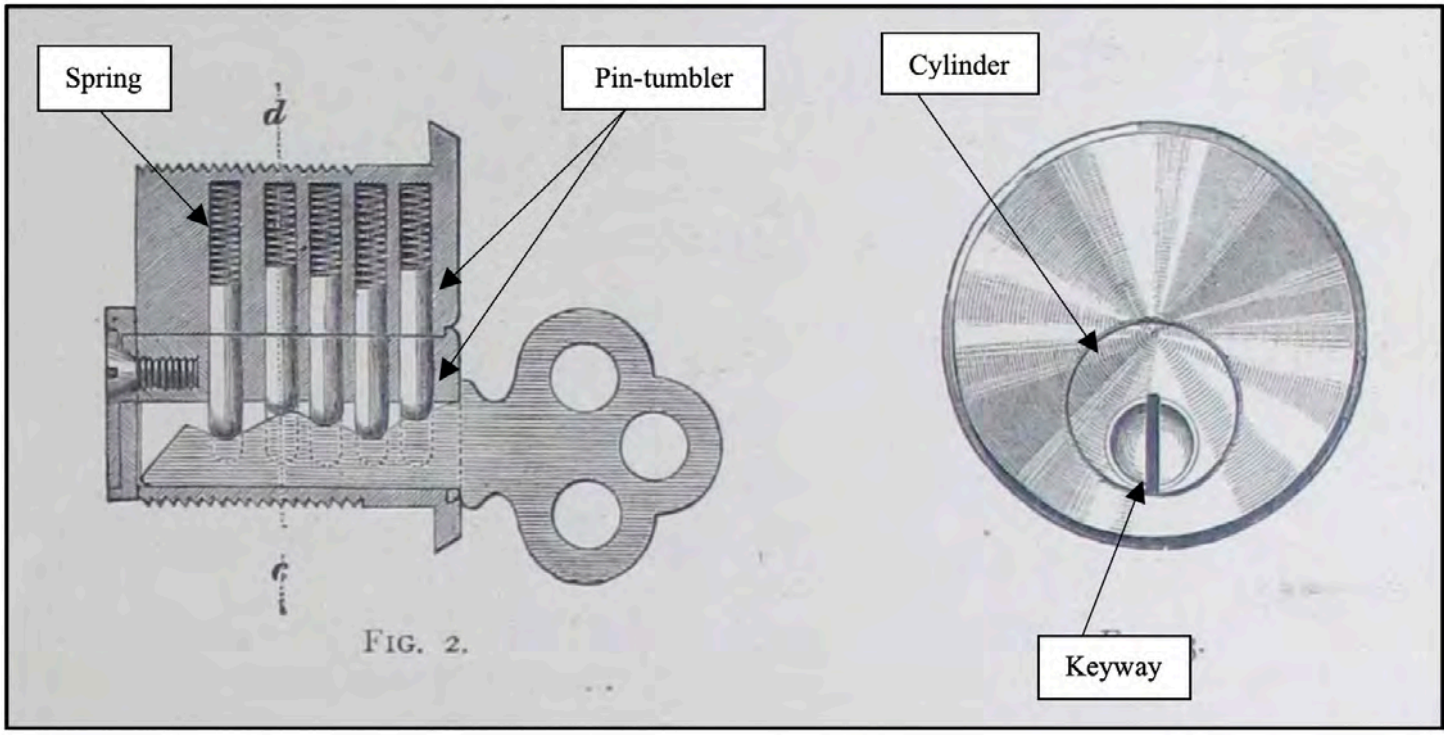


Figure 1. *Diagram of the Yale pin-tumbler cylinder lock (Towne 1889:21).*

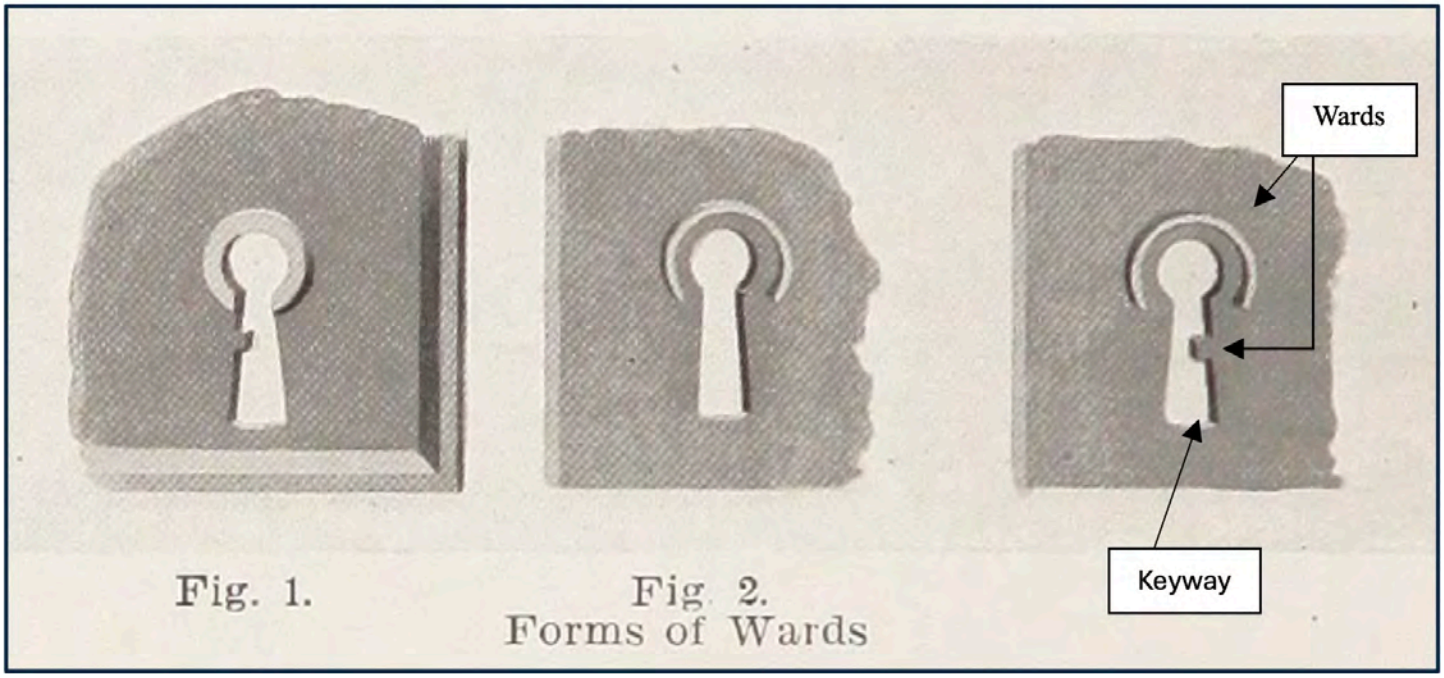


Figure 2. *Diagram of wards for warded locks (Yale & Towne 1905:22).*

lock (Hopkins 1928:64; Yale & Towne Manufacturing Company 1905:18). The pin-tumbler cylinder lock is now the most common locking mechanism used across the world today.

Analysis

Prior to electrolysis treatment, the artifacts from Catalog 676 were recovered as a fused, singular specimen of oxidized metals (See Appendix C). After electrolysis treatment, the remains of five distinct keys were separated from the specimen (Catalog 676.001 – 676.004, 676.007) (Figure 3).

Figure 3. *Keys from Catalog 676: (a) 676.001, (b) 676.002, (c) 676.003, (d) 676.004, and (e) 676.007.*

Artifact 676.001

This is the remains of a rotary key of the round cast-key type (Figures 4 – 8) (Hopkins 1928:16; Towne 1904:139). This specimen contains four identifiable morphological attributes which include the following: (1) a square key bit with three bittings, (2) a stem at the end of the key bit for turning the key against the lock back plate, (3) the round shank of the key, and (4) a confirmed compositional structure of iron with trace residue of brass plating (Appendix D). Due to advanced iron-oxidation, artifact #676.001 is the only specimen to break down after electrolysis. Prior to electrolysis, the artifact measured 84 mm (3.3 inches) in length. After electrolysis, the artifact degraded further, separating the bit, the stem, and the shank into six different fragments (see Figure 4). After electrolysis, the artifact weighed 7.41 grams and measured 61.5 mm (2.42 inches).

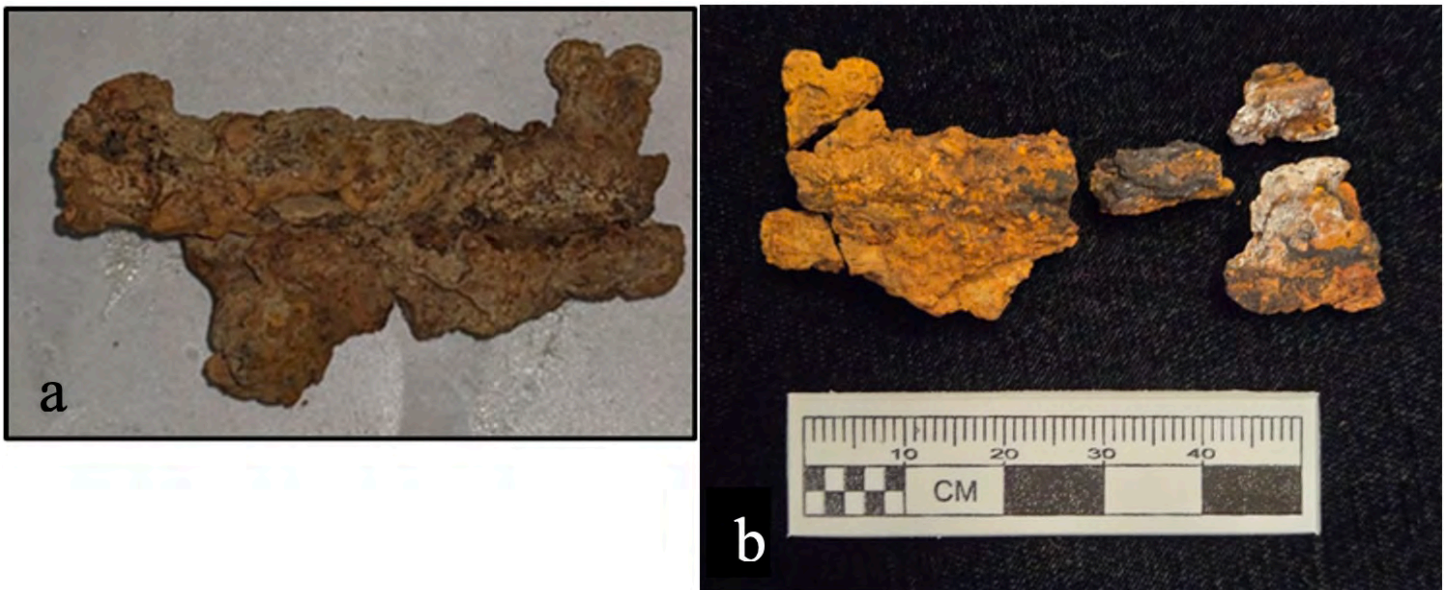


Figure 4. *Round cast-key (676.001): (a) pre-electrolysis and (b) post-electrolysis.*

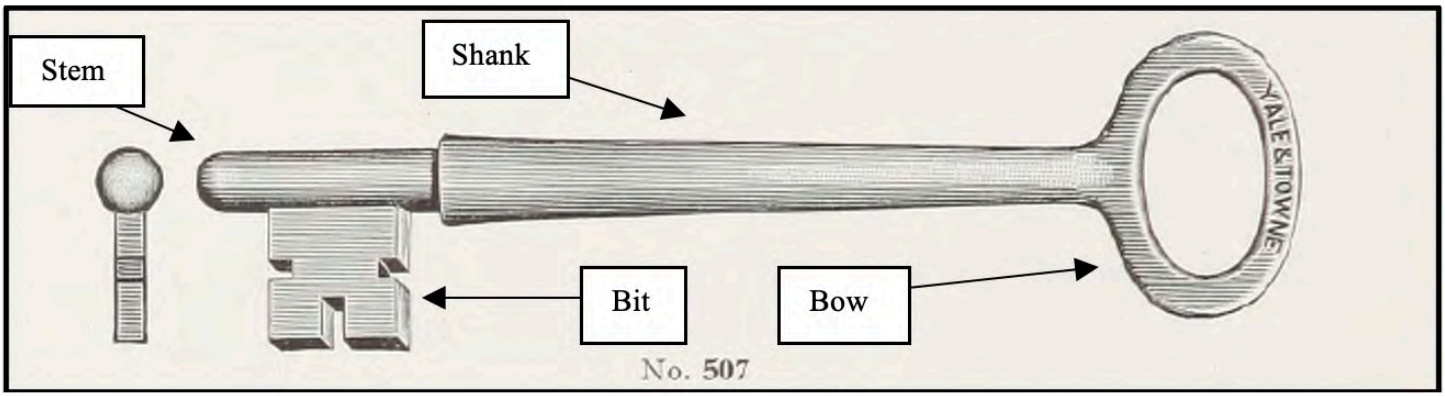


Figure 5. *Example of a round cast-key with matching morphology (Yale & Towne 1921:438).*

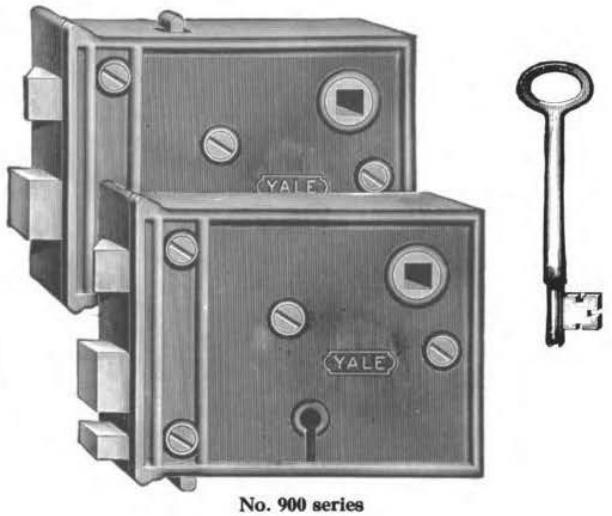
Figure 6. *Round cast-key (676.001) post-electrolysis: (a) left side and (b) right side.*

YALE

Cuts half size

Rim Knob Locks

57



No. 900 series

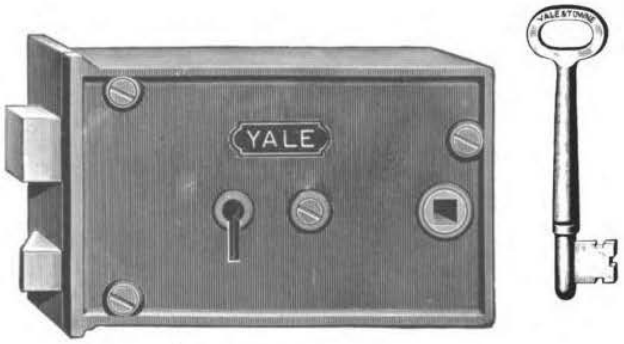
No. 900 series

Case . . . Japanned iron.
Reversible . For doors opening in, of either hand. For doors opening out (reverse bevel) to order only.
Hub . . . Iron; 5/16 in.
Keys . . . One nickel plated malleable iron, No. 507; or One nickel plated solid steel, from No. S240 blank.
Backset . . Key, 2 in.; knob, 3¼ in.
Packed . . Half dozen in a box, with screws and japanned key plates; 10 dozen in a case; gross weight, No. 900 series, 175 lbs.; No. 901 series, 182 lbs.

Case, 3¼ x 4 x ¾ inches

Number	Bolts	Key Class	Tumbler	Changes
With Stop				
900	Iron (Brass plated)	507	One	4
902	Iron	507	"	4
904	Iron (Brass plated)	S240	"	4
906	Iron	S240	"	4
908	Brass	S240	"	4
With Slide Bolt				
901	Iron (Brass plated)	507	One	4
903	Iron	507	"	4
905	Iron (Brass plated)	S240	"	4
907	Iron	S240	"	4
909	Brass	S240	"	4

Not Master-keyed.



No. 921

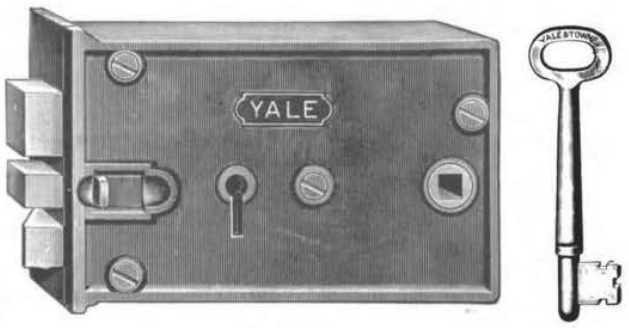
No. 921 series

Case . . . Japanned iron.
Reversible . For doors opening in, of either hand. For doors opening out (reverse bevel) to order only.
Hub . . . Iron; 5/16 in.
Keys . . . One nickel plated solid steel.
Backset . . Key, 1⅞ in.; knob, 4¼ in.
Packed . . Half dozen in a box, with screws and japanned key plates; 10 dozen in a case; gross weight, Nos. 921 & 922, 240 lbs.; No. 923, 260 lbs.

Case, 3¼ x 4⅞ x ¾ inches

Number	Bolts	Key Class	Tumbler	Changes
Without Stop				
921	Brass	S150	One	12
With Stop				
922	Brass	S150	One	12
With Slide Bolt				
923	Brass	S150	One	12

Not Master-keyed.



No. 923

The Yale & Towne Mfg. Co.

Figure 7. *Round-cast key examples for rim knob locks (Yale & Towne 1917:57).*

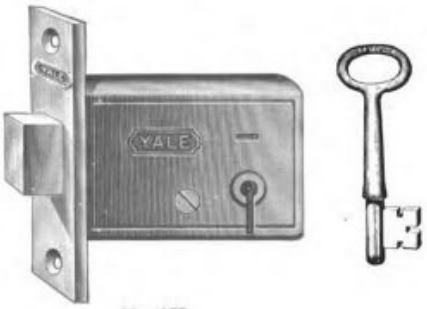
YALE

Cuts half size

Mortise Dead Locks

67

No. 257 lock



No. 257

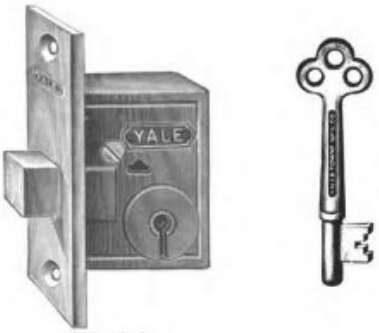
Front . . . Flat, 3¼ x ¾ in.
Reversible . For doors of either hand.
Case . . . Japanned iron.
Keys . . . One nickel plated solid steel.
Backset . . 2⅛ in.
Packed . . Half dozen in a box, with screws, strike, and japanned key plates.

Case, 1⅞ x 2¾ x 9/16 inches

Number	Cast Front	Bolt	Key Class	Lever Tumblers	Changes
257	Brass	Brass	S140	One	12

Not Master-keyed

No. 260 lock



No. 260

Front . . . Flat, 3½ x ¾ in.
Reversible . For doors of either hand.
Case . . . Japanned iron.
Keys . . . One nickel plated solid steel.
Backset . . 1 in.
Packed . . Half dozen in a box, with screws, strike, and No. DT812 bronze key plates.

Case, 2¼ x 1⅝ x ½ inches

Number	Cast Front	Bolt	Key Class	Lever Tumblers	Changes
260	Bronze	Bronze	S30	Three	18

Not Master-keyed.

No. 280 lock

No. 280

Front . . . Flat, 3¼ x ¾ in.
Reversible . For doors of either hand.
Case . . . Japanned iron.
Keys . . . One nickel plated solid steel.
Backset . . 2 in.
Packed . . Half dozen in a box, with screws, strike, and No. DT812 bronze key plates.

Case, 1¾ x 2½ x ½ inches

Number	Cast Front	Bolt	Key Class	Lever Tumblers	Changes
280	Bronze	Bronze	S30	Three	18

Not Master-keyed.

The Yale & Towne Mfg. Co.

Figure 8. *Round-cast key examples for mortise locks (Yale & Towne 1917:67).*

Artifact 676.001 conclusions. The bow of the key, which is the handle, was no longer present at the time of the specimen's recovery. The shank and stem of the key appear to be oxidized to the remains of other unidentified ferrous material. Though the key type is identifiable, the corresponding lock could not be identified. The mortise and rim locks are the most common for this form, but the exact lock is unknown without more information (see Figures 7 – 8 for examples). Round-cast-key forms were ubiquitous in the late-nineteenth century and key blanks for such keys were manufactured widely even until the 1940s (Oakden 1940). Keys of this type are often identified by the bow of the key or a manufacturer maker's mark. Every lock manufacturer and distributor reviewed for this analysis sold keys in this form with only slight variations that are no longer discernible in specimen 676.001. Figure 5 is an example of the form of a round cast-key with the morphological attributes marked. Round cast-keys made of iron were the most common key type manufactured in the late-nineteenth to early-twentieth century, and many of them were plated with nickel or brass (Towne 1904:139). A key of this size would likely have been used on a primary doorway, such as a home or business. Artifact 676.001 is therefore a round cast-key made of iron with plated brass that would have been used on an unspecified warded lock for a primary doorway, such as a home or business that dates between circa 1850 – 1940 (Table 1).

Artifact 676.002

This is a pin-tumbler key of the cylinder-lock key type (Figures 9 – 11) (Hopkins 1928:16; Towne 1904:139). It is identified as a No. 17 key made by the Yale & Towne Manufacturing company from 1905 - 1913 by its attributes (Figure 12). This specimen contains five identifiable morphological attributes associated with the No. 17 key, which include the following: (1) a corrugated key bit with three bittings that align for a pin-tumbler cylinder lock, (2) a trefoil bow as the handle of the key, (3) the flat shank of the key, (4) the dimensions of the bit, shank, and bow, and (5) a confirmed compositional structure of nickel silver (aka, German silver) (Appendix D). The artifact measures 50 mm (1.99 inches) in length and weighs 3.79 grams. The length of the trefoil bow and shank from the end of the handle to the shoulder of the bit measures 27.8 mm (1.11 inches). The length of the bit measures 22.2 mm (0.88 inches) in length. While pin-tumbler keys typically had their bittings milled by machine, this particular specimen shows evidence of hand-filing in the bitting to compensate for the depth of the pin located in the forward cylinder pin of a lock (Figure 10). The filing is visible with the naked eye and was confirmed with microscopic analysis at 40x magnification.

The trefoil design is typically diagnostic to keys manufactured by the Yale & Towne manufacturing company (Yale & Towne). Likewise, corrugation of the key bit is also diagnostic of the same manufacturer. The Eagle Lock Company

Table 1. Artifacts 676.002 and 676.007; corresponding lock type.

Lock Series	Lock type	Manufacturer	Date	Reference
#25 & #25½ *	Night Latch pin-tumbler cylinder	Yale & Towne Mfg.	1905	Yale & Towne 1905:61
#722 & #722½ *	Dead Lock pin-tumbler cylinder	Yale & Towne Mfg.	1905	Yale & Towne 1905:76
#34	Night Latch pin-tumbler cylinder	Yale & Towne Mfg.	1913	Yale &Towne 1913:167
#16	Dead Lock pin-tumbler cylinder	Yale & Towne Mfg.	1913	Yale & Towne 1913:189

*Series 25 ½ and 722 ½ are the same as their #25 and #722 counterparts, with the lock casing being slightly larger to be fitted on doors up to one inch thicker.

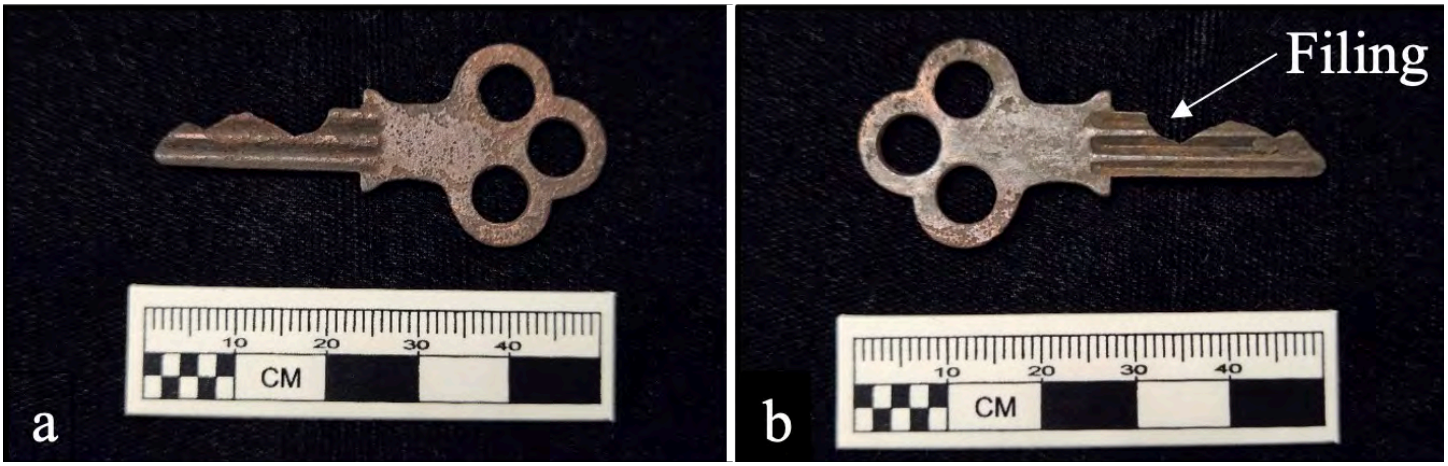


Figure 9. *Corrugated pin-tumbler cylinder key (676.002), sides 1 and 2.*

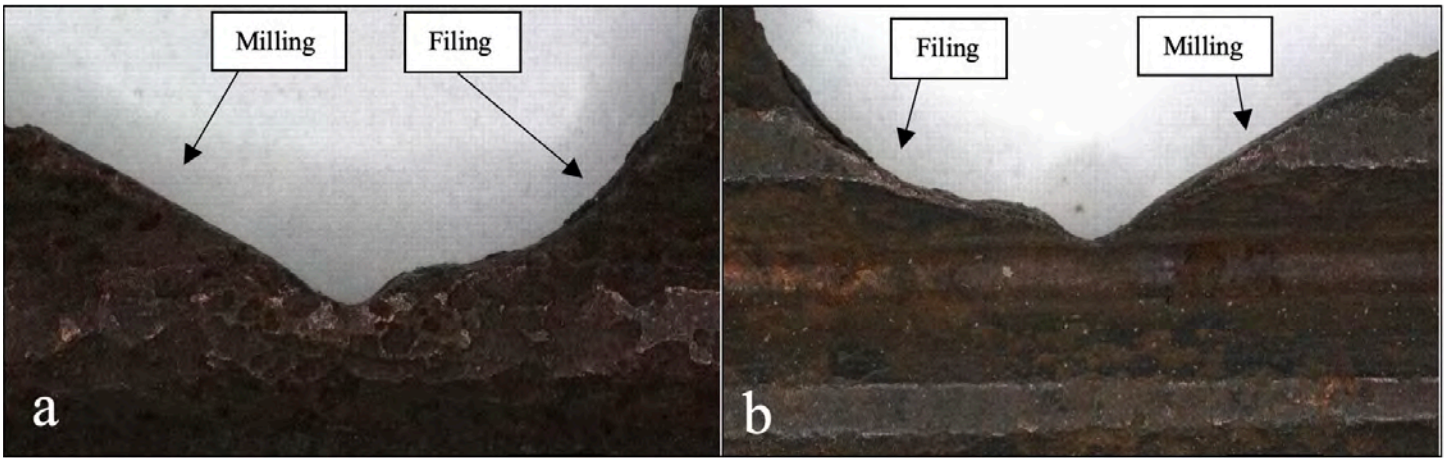


Figure 10. *Artifact 676.002 at 40x magnification, showing milling and hand-filing cut in key bitting, side A and B.*

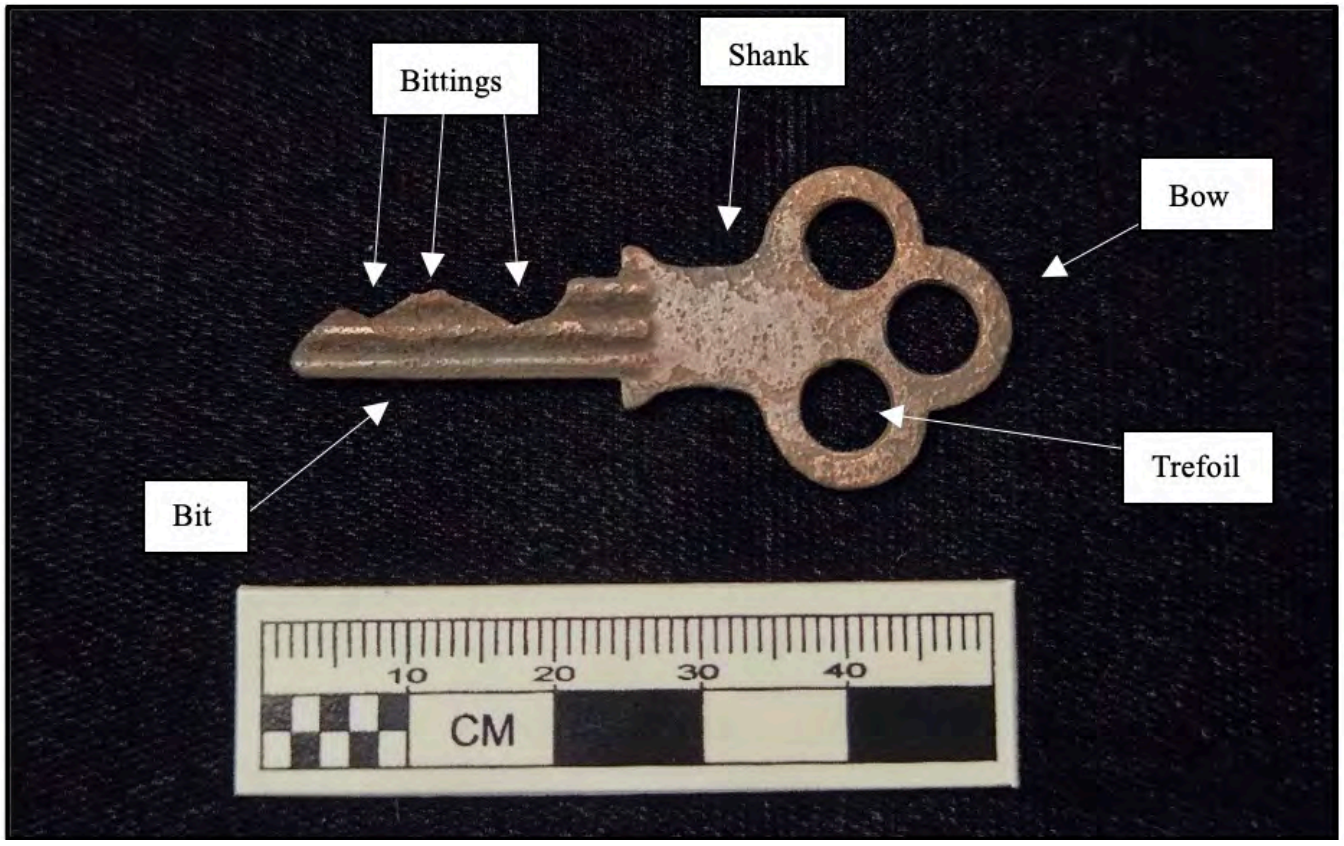


Figure 11. *Corrugated pin-tumbler cylinder key (676.002) morphology.*

manufactured keys with a similar trefoil *bow* and corrugated *bit*, but the shoulder of the shank and corrugation ridges do not match the Yale & Towne form (Eagle Lock Company 1914). Corrugated keys for pin-tumbler cylinder locks were first sold by Yale & Towne in 1878 (Yale & Towne 1921:26). An improved design, the *paracentric* key, was introduced in 1892, but limited lock options that utilized a corrugated key were still offered in catalogues available for review up to 1921 (Towne 1904:74; Yale & Towne 1921:434). Yale & Towne often stamped or printed a maker's mark on their keys, but the design is eroded away on specimen #676.002. Pin-cylinder keys typically contain five *bittings*, as most manufactured locks contained five sets of pin-tumblers for increased security. This specimen has only three *bittings* for locks that retained only three sets of pin-tumblers. A metal composition of nickel-silver (German silver) is specific to a smaller variety of keys and locks offered by the Yale & Towne, as other key options were made of bronze, brass, zinc, steel, iron, and lacquered iron. Additionally, the length of the *bow* and *shank* is unique to corrugated key options with the trefoil design in Yale & Towne catalogues. The diagnostic attributes and limited manufacture of the specimen makes it identifiable as a *No. 17* key that was manufactured for locks between 1905 – 1913 (Figure 12) (Yale & Towne 1905:150; 1913:432).

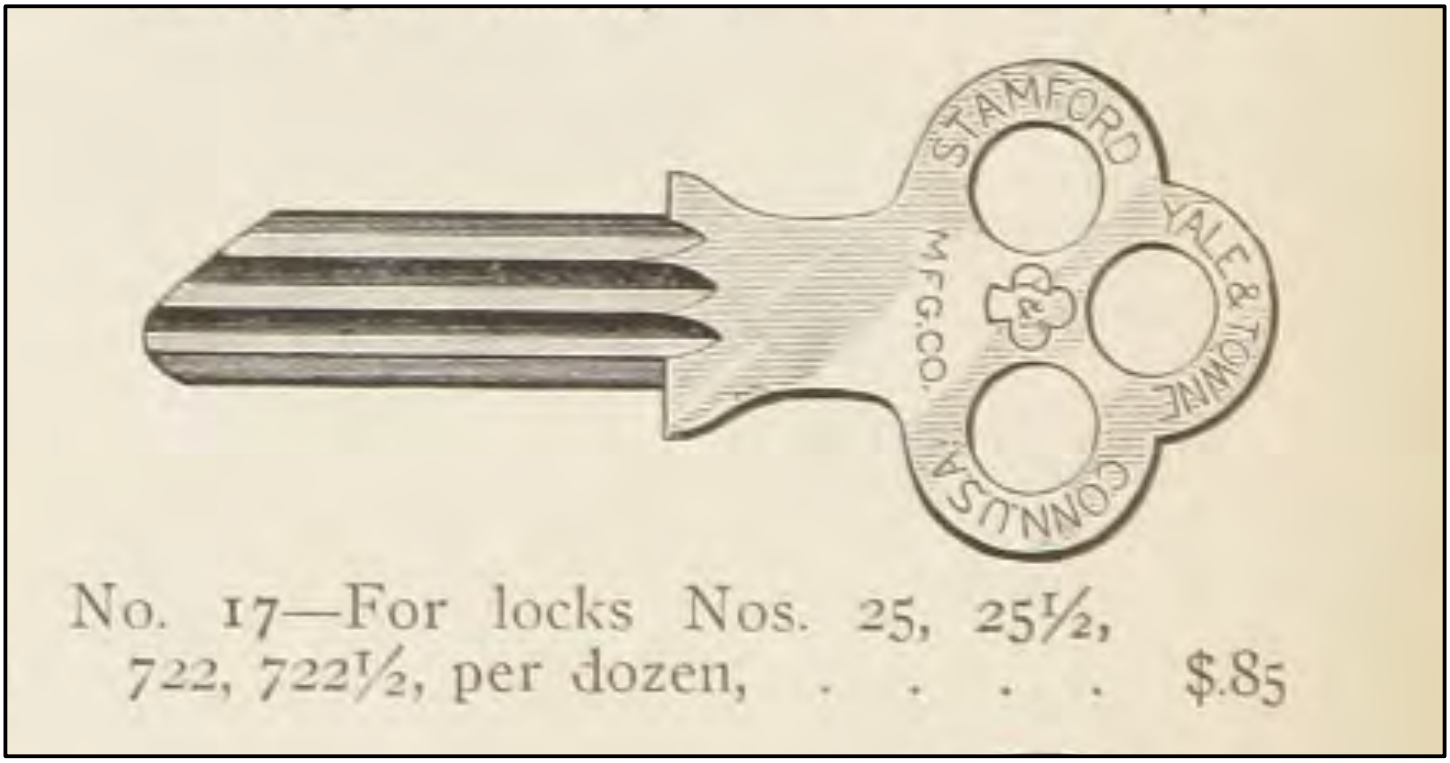


Figure 12. *No. 17 corrugated key blank for pin-tumbler cylinder locks #25, #25 ½, #722, and #722 ½ (Yale & Towne Manufacturing Company 1905:150.)*

A total of four corresponding locks were identified for the No. 17 key (Table 2; Figures 13 – 16). The No. 17 key was manufactured for a Night Latch style lock in 1905 and 1913 (see Figures 13 and 15), and for a Dead Lock style lock in the same years (see Figures 14 and 16). A Night Latch style is generally defined as a lock containing a spring bolt operated by a key (Yale & Towne 1913:147). The spring returns the bolt to a locked position automatically as the door closes and cannot be set to an 'unlocked' position by the key. A Dead Lock style lock does not lock automatically. It contains a deadbolt without a spring so the lock can be set in either a 'locked' or 'unlocked' position (Yale & Towne 1913:183). Functionally, the locks manufactured in 1913 are the same as their counterparts in 1905, with only slight variations to their aesthetic and options for different exterior metal finishes for the Series 34 Night Latch. The Dead Lock is described in the Yale & Towne catalogue as, "A heavy lock for store and entrance doors" (1913:188). The Night Latch is described as somewhat less secure than a Dead Lock, due to the convenience of the automatic spring bolt, but both locks are used on doors (Yale & Towne 1913:147). These types of locks are common on outswing steel security doors that add an extra layer of security to the primary entrance of a home or business. Outswing security doors can be found on homes but are more common for business storefronts.

Artifact 676.002 conclusions. This artifact is a No. 17 key that operated in one of four corresponding locks by Yale & Towne, manufactured between 1905 – 1913 (see Tables 1 and 2). The two types of locks it could have operated are the Dead Lock or Night Latch, most likely for an outswing steel security door. Artifact 676.002 also shows evidence of hand-filing

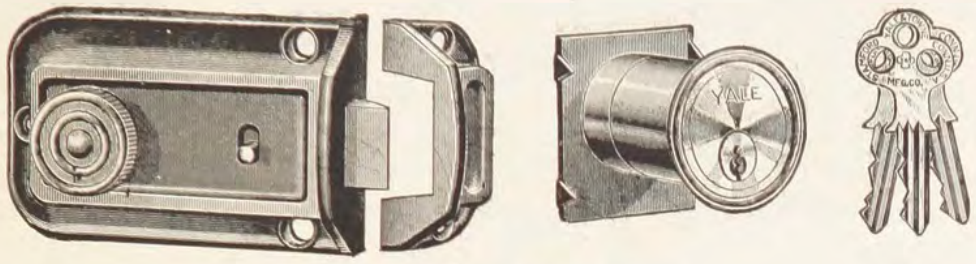
Table 2. Catalogue 676, Artifact Data

Artifact	Key type[1]	Corresponding Lock type	Composition[2]	Weight (post-electrolysis)	Key length	Bit length (mm/inches)	Associated Lock(s)	Date of Manufacture
676.001	Round cast-key	Warded lock	Iron (Brass-plated)	7.41 g	61.5 mm / 2.42 inches	11 mm / 0.43 inches	Unidentified	ca. 1850-1940
676.002	Corrugated cylinder-lock key	Pin-tumbler cylinder lock	Nickel-silver (German silver)	3.79 g	50 mm / 1.99 inches	22.2 mm / 0.88 inches	*No. 17* Door key for Yale & Towne locks #25, #722 (1905) and #16, #34 (1913)	1905-1913
676.003	Barrel key	Warded lock	Brass	2.68 g	30.8 mm / 1.2 inches	6.5 mm / 0.25 inches	Trunk, Bag, Padlock, Cabinet, or Cash Box	ca. 1914
676.004	Barrel key	Lever-tumbler lock or warded lock	Brass	1.87	27 mm / 1.06 inches	3.2 mm / 0.12 inches	Cabinet or Drawer	ca. 1890
676.007	Corrugated cylinder-lock key	Pin-tumbler cylinder lock	Nickel-silver (German silver)	42.8 g	37.8 mm / 1.48 inches	12.2 mm / 0.48 inches	*No. 17* Door key for Yale & Towne locks #25, #722 (1905) and #16, #34 (1913)	1905-1913

[1] *Source:* Hopkins 1928; Towne 1904; Yale and Towne 1905

[2] Source: Appendix D

Cuts one-half size.



No. 25 Line of Yale Rim Night Latches

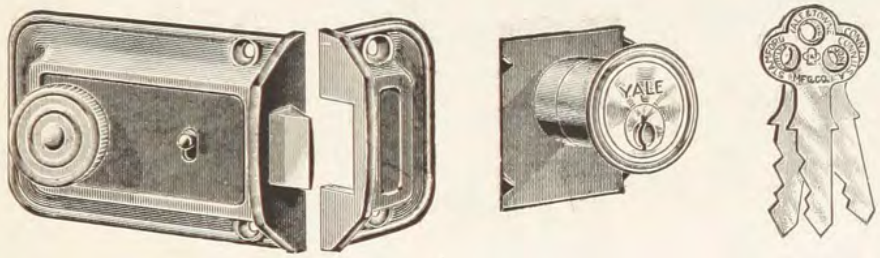
A popular latch with Pin-Tumbler mechanism; easy of application

Case, 2¼ x 3⅝ x ⅞ ins.; Bronze knob and stop; Bronze plated steel tube; Bronze plated iron bolt; 3 Corrugated keys.

Operated from outside by key and from inside by knob; self-locking.

No. 25—Japanned Iron Case and Strike, for doors up to 1½ ins. thick . dozen $27.10

No. 25½—Japanned Iron Case and Strike, for doors 1¾ to 2¼ ins. thick " 27.10



No. 425. Yale Rim Night Latch

A smaller and less expensive form of the No. 25 listed above. Like the No. 25 it has Pin-Tumbler mechanism and is easy of application

Case, 2¼ x 3 x ⅞ ins.; Bronze knob and stop; Bronze plated steel tube; Bronze plated iron bolt; 3 Flat steel keys.

Operated from outside by key and from inside by knob; self-locking.

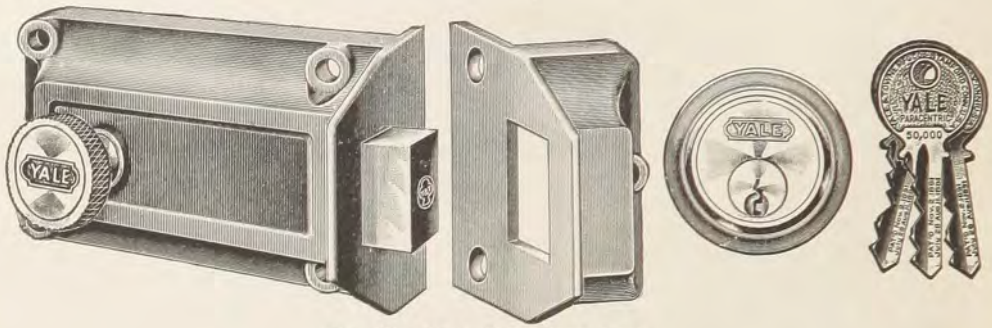
For doors ⅞ to 1½ inches thick.

No. 425—Japanned Iron Case and Strike . . . . . dozen $22.95

Packed: each in a box, with screws.

Figure 13. *Yale & Towne Mfg. catalog; No. 25 Series (top) Night Latch (Yale & Towne 1905:61).*

Cuts one-half size.



No. 32. Yale Rim Dead Lock

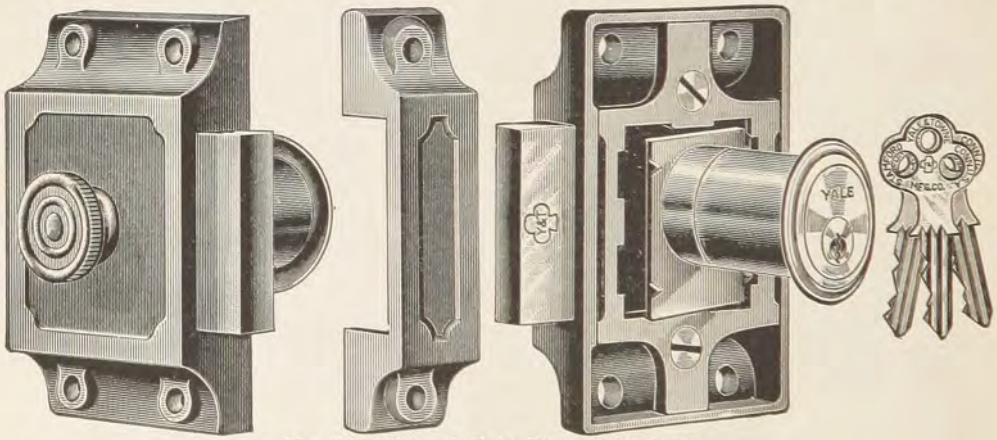
Similar to No. 042 Rim Night Latch, but requiring the use of the key in locking from outside. The dead bolt offers absolute security against tampering through crack between door and frame

Case, 2⅜ x 3⅝ x ⅞ ins.; Backset 2⅜ ins.; Bronze bolt, cylinder and knob; 3 Paracentric keys.

Operated from outside by key and from inside by knob.

For doors 1 to 2½ inches thick.

No. **32**—Japanned Iron Case and Strike . . . . . dozen $65.00



No. 722 Line of Yale Rim Dead Locks

A popular lock with Pin-Tumbler mechanism; easy of application

Case, 4 x 2½ x 1 ins.; Backset, 1¼ ins.; Bronze bolt and knob; Bronze plated Steel tube; 3 Corrugated keys.

Operated from outside by key and from inside by knob.

No. **722**—Japanned Iron Case and Strike; for doors up to 1½ ins. . . dozen $65.00

No. **722½**—Japanned Iron Case and Strike; for doors 1¾ to 2¼ ins. . " 65.00

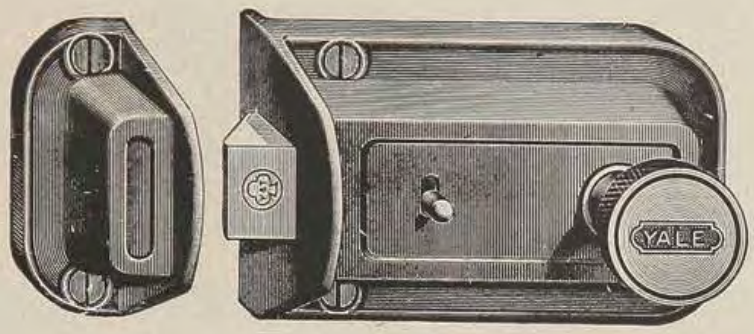
Packed: each in a box, with screws.

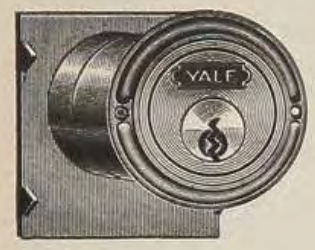
Figure 14. *Yale & Towne Mfg. catalog; No. 722 Series (bottom) Dead Lock (Yale & Towne 1905:76). Yale & Towne Mfg. catalog; No. 25 Series (top) Night Latch (Yale & Towne 1905:61).*

Cuts Half Size 167

Yale Tubular Rim Night Latches

No. 34 Series





A Yale Night Latch of the "tubular" type, admitting of easy application to the door. A very popular night latch.

1500 Key changes

Operated from outside by key, from inside by knob; bolt may be held back by stop.

Case: 2¼ x 3½ x ⅞ inches; iron, finish as below.

Bronze turn knob, stop, cylinder and tube; bronze plated iron bolt.

Keys: 3 corrugated, German silver, from No. 17 blank.

Backset: 2⅜ inches. **For doors** as below.

Reversible for doors opening in, of either hand. For doors opening out (reverse bevel) to order only.

Not Master-keyed. This latch cannot be master-keyed.

No.	Description	Dozen
	For doors ⅞ to 1½ inches thick	
34	Japanned case and strike	$.....
34C	Old copper finished case and strike	.....
	For doors 1¾ to 2¼ inches thick	
34X	Japanned case and strike	.....
34XC	Old copper finished case and strike	.....

Each in a paper box complete with screws

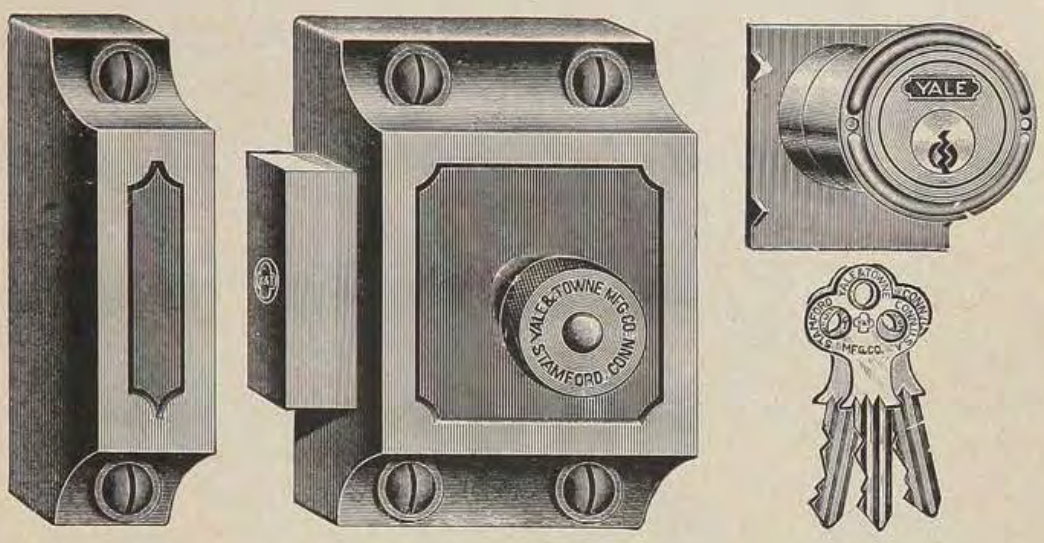
The Yale & Towne Mfg. Co.

Figure 15. *Yale & Towne Mfg. catalogue; No. 34 Series Night Latch (Yale & Towne 1913:167).*

Cuts Half Size 189

Yale Tubular Rim Dead Locks

No. 16 Series



Similar in function to No. 5 (see opposite page), but with "tubular" cylinder, admitting of easy application

1500 Key changes

Operated from outside by key; from inside by knob.

Case: 4 x 2½ x 1 inches; japanned iron.

Bronze cylinder, tube, turn knob and bolt.

Keys: 3 corrugated, German silver, from No. 17 blank.

Backset: (distance from edge of lock to center of cylinder) 1¼ inches.

For doors up to 2¼ inches, as below.

Reversible for doors of either hand.

Not Master-keyed. This lock cannot be master-keyed.

No.	Description	Dozen
16	For doors up to 1½ inches thick	$.....
16X	For doors 1¾ to 2¼ inches thick	.....

Each in a paper box complete with screws

The Yale & Towne Mfg. Co.

Figure 16. *Yale & Towne Mfg. catalogue; No. 16 Series Dead Lock (Yale & Towne 1913:189).*

for the bitting of the key that matches the forward pin-tumbler. The presence of hand-filing suggests one of two possibilities; either the pin-tumbler sequence in the corresponding lock had been changed (called re-pinning), or the original key had been lost and a similar No. 17 key was acquired and hand-filed to operate the lock. Artifact 676.002 is a No. 17 key made by the Yale & Towne Manufacturing company manufactured between 1905 – 1913 that operated either a Yale & Towne Dead Lock or Night Latch for an outswing security door.

Artifact 676.003

This is a rotary key of the barrel-key type (Figures 17 – 18) (Hopkins 1928:16; Towne 1904:139). This specimen contains five identifiable morphological attributes which include the following: (1) a square key bit with one bitting, (2) an opening at the end of the key bit for setting the key onto the lock drill pin inside the lock back plate, (3) the round shank of the key, (4) a flattened plain bow with a semi-ovoid shape for the handle, and (5) a confirmed compositional structure of brass (Appendix D). The artifact measures 30.8 mm (1.2 inches) in length and weighs 2.68 grams.

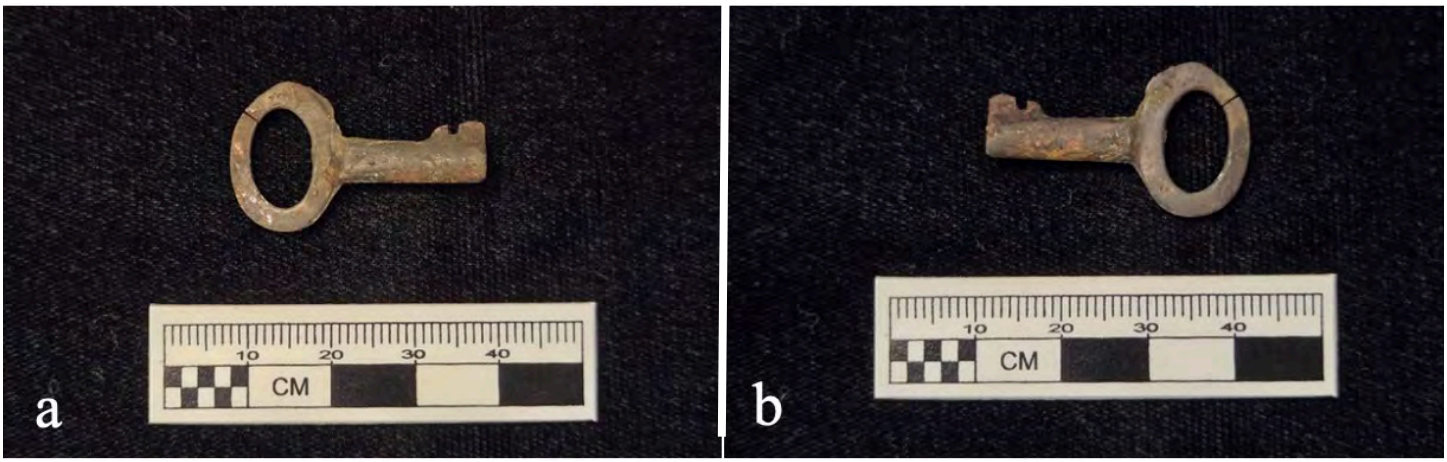


Figure 17. *Two sides (a,b) of a barrel key (676.003).*

Figure 18. *Barrel key (676.003) morphology.*

Based on a review of available product catalogues, the type of lock can be ascertained, but the exact manufacturer is unidentified. Keys bearing the aforementioned morphology and size are associated with locks for trunks (i.e., steamer trunks and luggage), locking bags, shackle padlocks, cash boxes, and cabinets (Figures 19 – 25) (Buhl Sons & Company 1884:255-258; Eagle Lock Company 1914:71, 298, 330; Springer 1920:425).

Examples of keys similar to artifact 676.003 typically share all of the same morphological attributes except for the shank or bow. The shank observed on most keys have one or more raised ridges or grooved incisions around the bit or near the shoulder of the key where the shank meets the bow. The bow style of the handle for #676.003 is described as a plain bow style on matching handles for Eagle Lock Company keys (see Figure 25). And though the given examples have flat bows, only the keys for the cash box or cabinet locks of the Eagle Lock Company have flat plain bows (see Figures 23 – 25). The flat bow has a double ovoid shape from a raised, concave ridge of the handle. The flat plain bow has no such concave design and creates a singular ovoid shape. The composition of the key varies by lock type. Cabinets and cash box locks both used iron or brass and shackle padlocks used steel keys.

Artifact 676.003 conclusions. Based on the morphology and composition of the key, artifact 676.003 most closely resembles a key for use on a cash box or cabinet lock, though the precise manufacturer is unidentified (Eagle Lock Company 1914:71, 330). Artifact 676.003 is a brass rotary key of the barrel key type for either a warded cash box lock or warded cabinet lock that dates to ca. 1914, based on shared attributes of keys from the Eagle Lock Company (see Table 2).

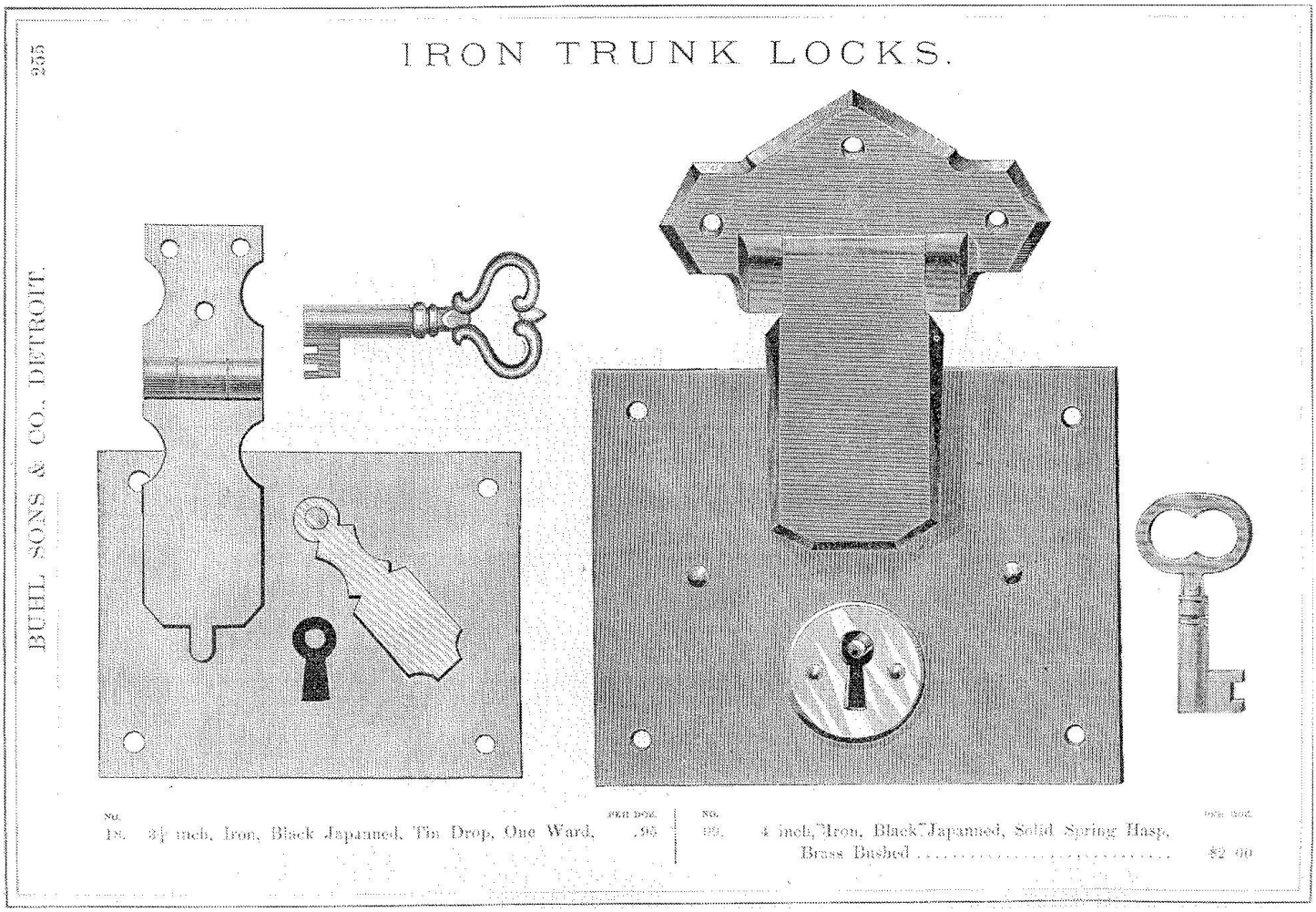
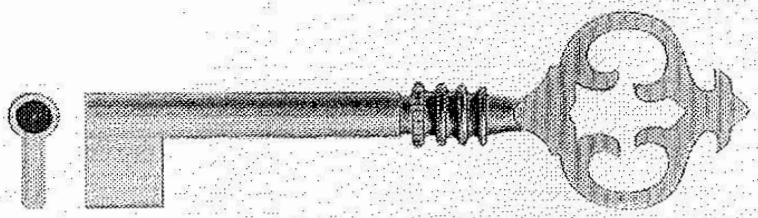


Figure 19. *Barrel key example (right) with flat bow for Trunk Locks (Buhl Sons & Company 1884:255).*

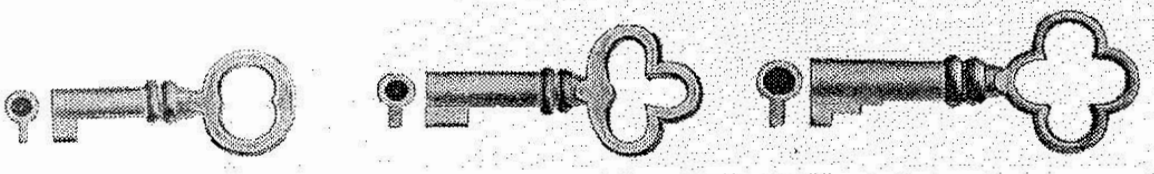
ASSORTED CABINET KEYS.



	PER GROSS.
Cabinet Keys, Assorted (Till, Cupboard and Chest)	$3 75
Till Keys, Assorted	3 25
Chest Keys, Assorted	3 75
Cupboard Keys, Assorted	3 75

ONE GROSS IN A BOX.

ASSORTED TRUNK AND BAG KEYS.



	PER GROSS.
Trunk Keys, Assorted	$3 50
Bag Keys, Assorted	3 00

ONE-HALF GROSS IN A BOX.

PADLOCK KEYS.

	PER GROSS.
Padlock Keys, Assorted, Nos. 0000 to 4	$ 3 30
Padlock Keys, Assorted, Large, Nos. 0000 to 8	4 38
Padlock Keys, Assorted, Nos. 2300, 2400, 2700 and 2800	12 00

ONE-HALF GROSS IN A BOX.

PADLOCK MASTER OR PASS KEYS.

	PER GROSS.
For Padlocks 2300 and 3032	$36 00
For Padlocks 2400 and 2700	72 00

Figure 20. *Barrel key example (middle left) with flat bow for Trunk and Bag Locks (Buhl Sons & Company 1884:258).*

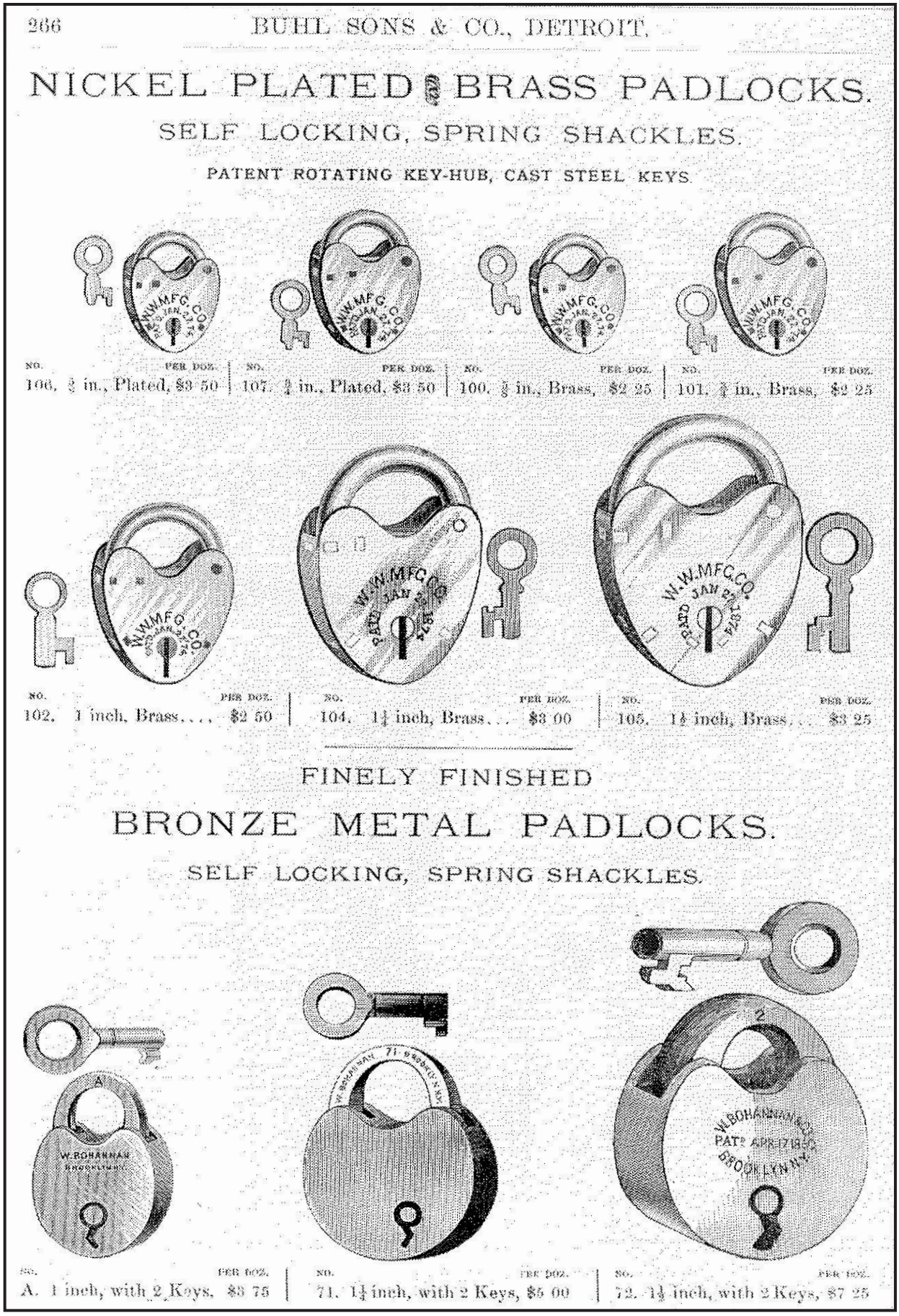


Figure 21. *Barrel key examples (bottom row) with flat bow for Shackle Padlocks (Buhl Sons & Company 1884:266).*

PADLOCKS

No. 213.

DRAGON. STANDARD SHACKLE
Phosphor Bronze Springs

Two Keys Each

No. 213 —Cast Bronze. Six Levers.
No. 213C —Cast Bronze. Six Levers. 9 in. Chain.

Packed Half Dozen in a Box.
Weight 7 lbs. per Dozen.

No. 213½.

DRAGON. ELONGATED SHACKLE
Phosphor Bronze Springs

Two Keys Each

No. 213½—Cast Bronze. Six Letters.
No. 213½C —Cast Bronze. Six Levers. 9 in. Chain.

One Half Dozen in a Box.
Weight 7 lbs. per Dozen.

No. 214

SWITCH OR CONTRACTORS

Phosphor Bronze Springs
Malleable Iron Shackle

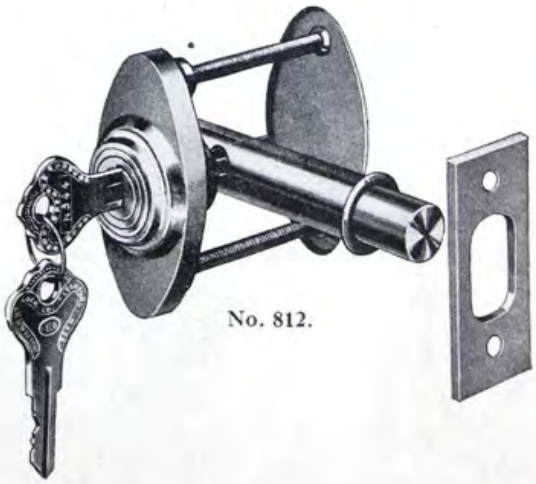
No. 214—Cast Bronze. Extra Heavy. Self Locking. 9 in. Galvanized Chain. One Key Each.

One Half Dozen in a Box.
Weight 10 lbs. per Dozen.

CYLINDER MORTISE DEAD BOLT

Keys—2 Nickel Silver.
Tumblers—Disc Type.
Changes—500.
Master-keyed as desired.
Bolt Steel with ¾ in. throw, can be used on Doors 1⅜ to 2¼ in.

No. 812—Bronze, Polished.



No. 812.

Figure 22. *Barrel key example (second from bottom) with flat bow for Shackle Padlock (Springer Lock Manufacturing Company, Ltd. 1920:425)*

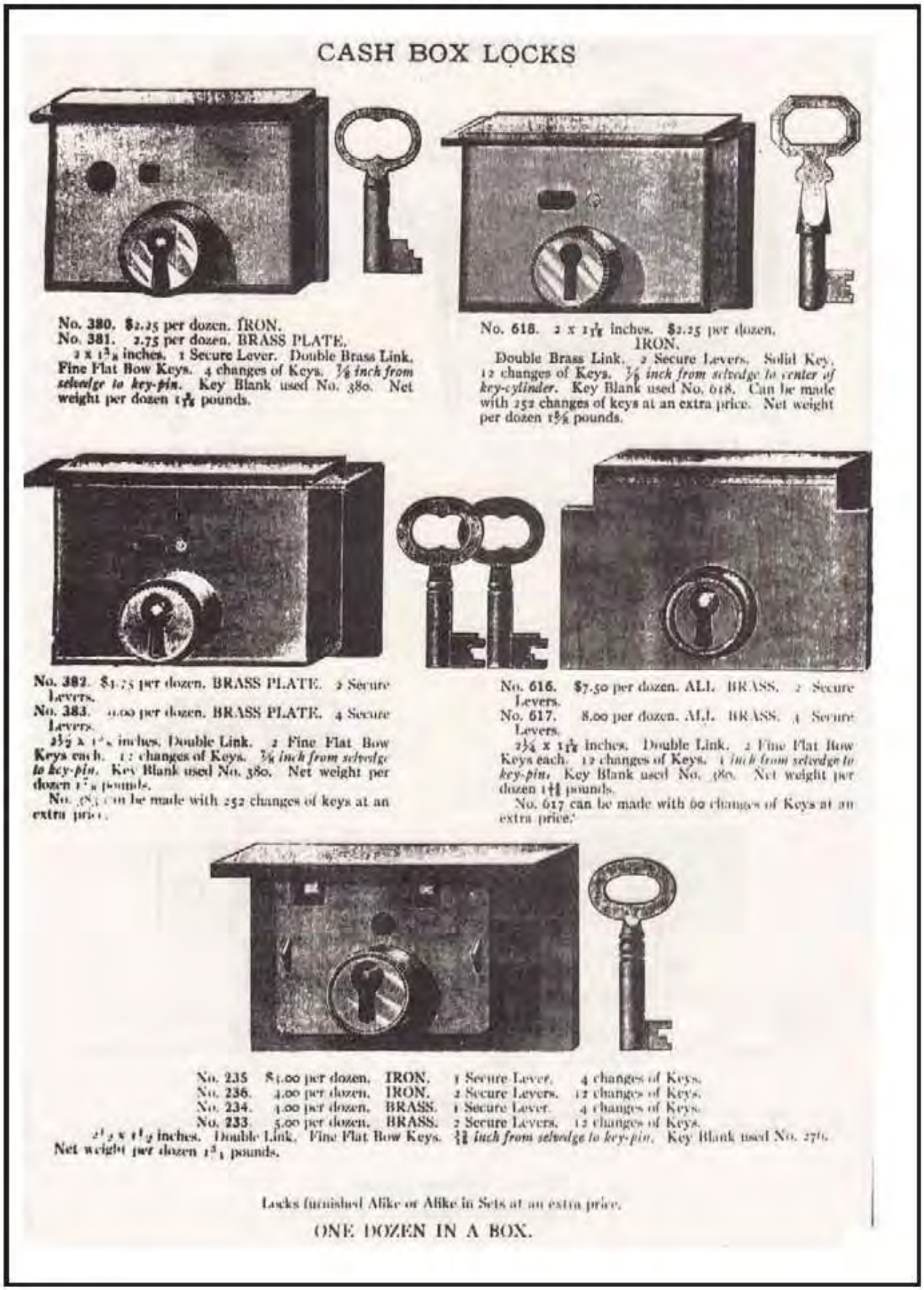


Figure 23. *Barrel key example (bottom, outlined in red) with plain bow for Cash Box Lock (Eagle Lock Company 1914:71). Note that Eagle is spelled incorrectly on the page header.*

EAGEL LOCK CO. TERRYVILLE, CONN,, U.S,A. 298

Figure 24. *Barrel key example with plain bow (Key No. 7833, bottom right) for Cabinet Locks (Eagle Lock Company 1914:298). Note that Eagle is spelled incorrectly on the page header.*

Figure 25. *Barrel key example (Key No. 2199, bottom right) with plain bow (Eagle Lock Company 1914:330). Note that Eagle is spelled incorrectly on the page header.*

Artifact 676.004

This is rotary key of the barrel-key type that would have operated either a warded lock, or a lever-tumbler lock (Figure 26 - 27) (Hopkins 1928:16; Towne 1904:139). This specimen contains five identifiable morphological attributes which include the following: (1) a square key bit with no observed bitting, (2) an opening at the end of the key bit for setting the key onto the lock drill pin inside the lock back plate, (3) the round shank of the key, (4) a flattened bow with a circular ringhole, and (5) a confirmed compositional structure of brass (Appendix D). The artifact measures 27 mm (1.06 inches) in length and weighs 1.87 grams.

Based on a review of available product catalogues, only one key was identified that has shared characteristics to 676.004. The Hopkins and Dickinson Manufacturing Company sold a similar key that operated a Cabinet Lock or Drawer Lock of mortise design in 1890 (Figure 28) (Hopkins and Dickinson Manufacturing Company 1890:108). The key has a grooved shank at the shoulder where it meets the bow, but the general morphology is the same. While other manufacturers did sell keys with a similar bow, they were all paracentric keys for pin-cylinder locks. The Hopkins and Dickinson key is

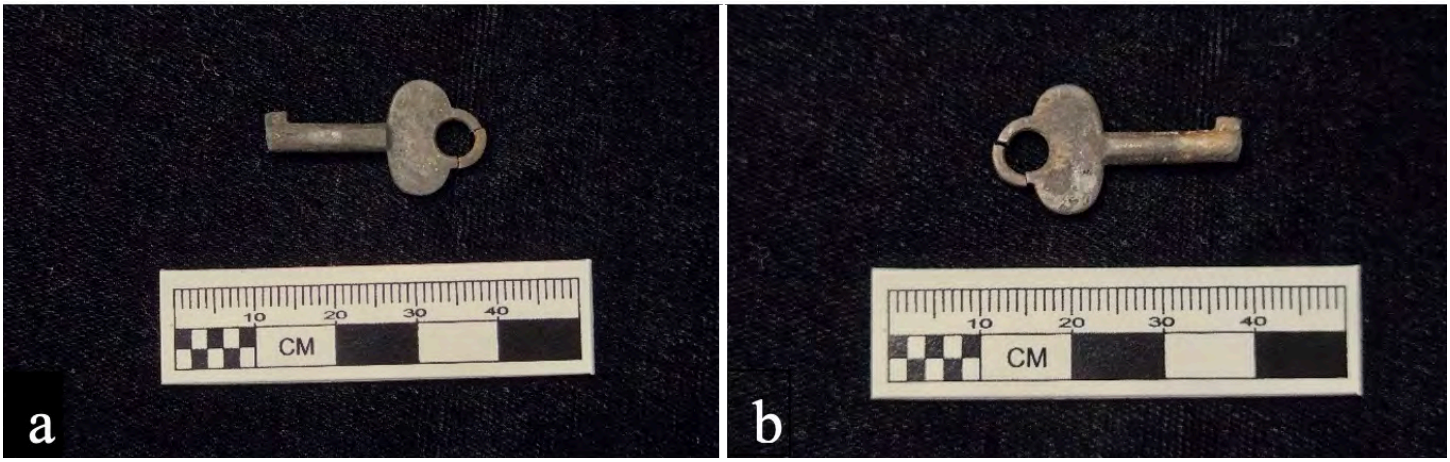


Figure 26. *Both sides (a,b) of barrel key 676.004.*

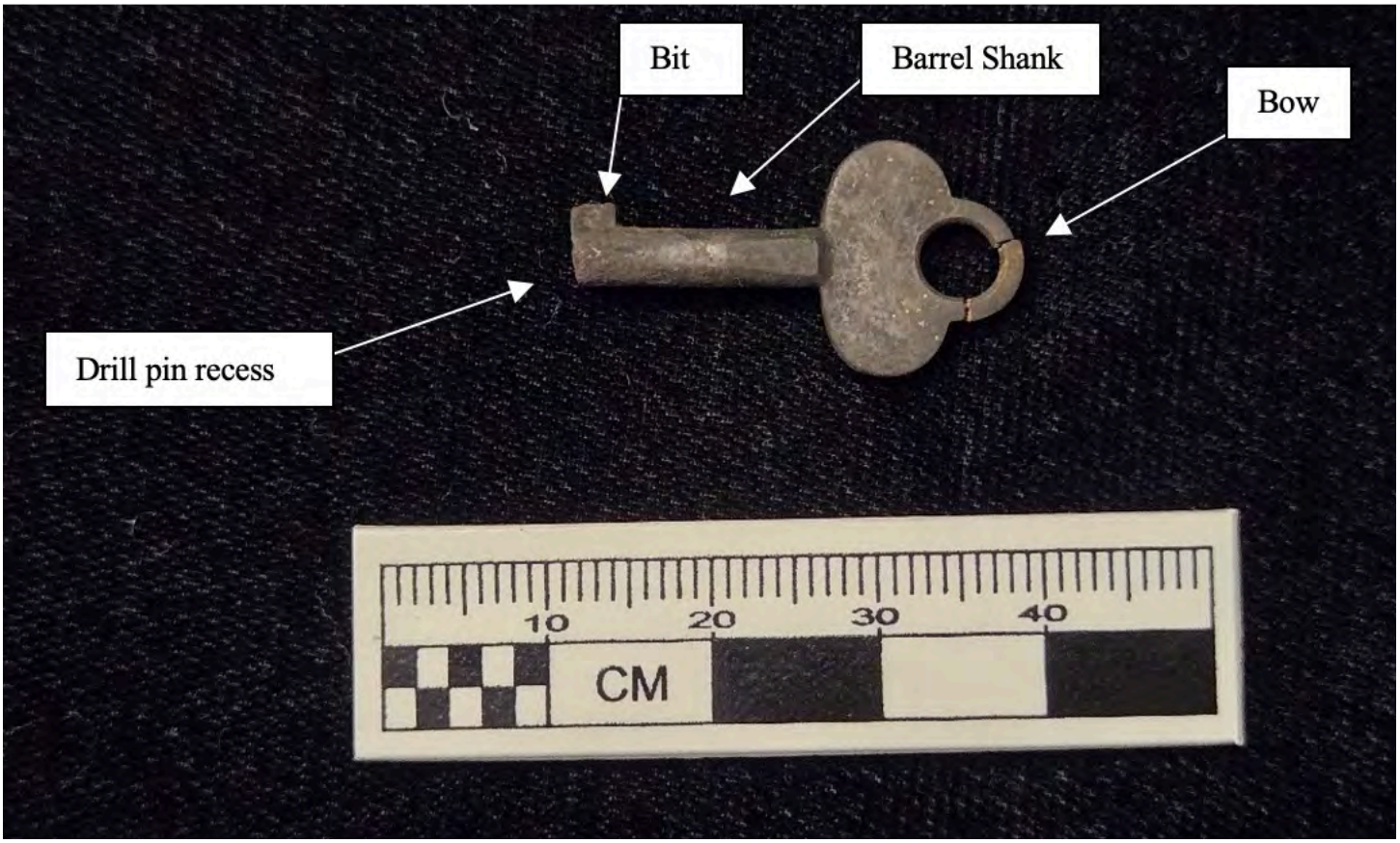


Figure 27. *Barrel key (676.004) morphology.*

HOPKINS & DICKINSON M'F'G CO.

108

EXTRA FINE

Mortise Cabinet and Drawer Locks.

BRONZE KEY.

CABINET AND DRAWER LOCK NO. 5184.

No.	Size.	Depth to centre of Key-hole.	Thickness of Case.	DESCRIPTION.
5184	2 x 2	1½ inches.	7/8 inch.	Plain Bronze Front. All Bronze and Brass Inside Works. Bronze Bolt and Key.
5185	2 x 1¾	1 inch.	7/8 "	Plain Bronze Front. All Bronze and Brass Inside Works. Bronze Bolt and Key.
5186	2 x 1¼	7/8 "	3/8 "	Plain Bronze Front. All Bronze and Brass Inside Works. Bronze Bolt and Key.

If wanted for Drawer Locks, so state in ordering.

In ordering Cabinet Locks, state Hand required. (Cut shows Right Hand.)

Above Locks furnished with 1 Tumbler regularly. Made with 2 Tumblers to order.

Packed half dozen in a box.

DUNHAM, CARRIGAN & HAYDEN CO., AGENTS,

Figure 28. *Barrel key for lock series No. 5184, (No. 5186 listed, but not depicted) cabinet or drawer lock (Hopkins and Dickinson Manufacturing Company 1890:108).*

the only one with a similar bow that is the barrel-key type. The original key sold with the Hopkins and Dickinson lock is listed as bronze. Results of pXRF for artifact 676.004 is brass, which may indicate the artifact is possibly a replacement key for the original lock manufactured. Additionally, the Hopkins and Dickinson lock is advertised as "furnished with one tumbler regularly". This would make the internal components of the mortise design a lever-tumbler lock instead of a warded lock and would also corroborate an absence of a bitting on artifact 676.004. The length of artifact 676.004 27 mm (1.06 inches) also matches the depth to center listed for the keyhole of the No. 5186 series lock (see Figure 28). Unfortunately, the No. 5186 series does not depict a lock and key. The depicted key on Figure 28 is for the No. 5184 series lock, which is one half-inch longer than the No. 5186 key and lock set. The No. 5186 key is not depicted, but likely shares a similar design. If artifact 676.004 is associated with the No. 5186 lock, it might be the manufactured key for the No. 5186 lock, a replacement key, or a key manufactured in a subsequent year.

Artifact 676.004 conclusions. The morphological attributes, including the dimensions of the key and a lack of a bitting on the key bit suggests artifact 676.004 closely matches a Hopkins & Dickinson Manufacturing Company key or replacement key for a No. 5186 lever-tumbler lock on a cabinet or drawer, which dates to 1890, but more evidence is needed from other manufacturers to substantiate this claim. Equally, the key may be for an unidentified warded lock of an unknown manufacturer. The size of the key in this instance limits its use to smaller locks such as those described for 676.003; trunks, bags, padlocks, cash boxes, cabinets, or drawers. Since the Hopkins and Dickinson Manufacturing Company makes a lock with this identified morphology of key for cabinets and drawers, it is likely that artifact 676.004 operated a lock on cabinets or drawers. Given the design of the key, it can be concluded that artifact 676.004 is a brass rotary key of the barrel key type that would have operated either a warded lock, or lever-tumbler lock that was manufactured ca. 1890.

Artifact 676.007

This is a pin-tumbler key of the cylinder-lock key type (Figures 29 – 30) (Hopkins 1928:16; Towne 1904:139). Like artifact 676.002, it is identified as a No. 17 key made by the Yale & Towne Manufacturing company from 1905 - 1913 by its attributes (See Figure 12). This specimen contains four identifiable morphological attributes associated with the No. 17 key, which include the following: (1) a corrugated key bit with at least one visible bitting that aligns for a pin-tumbler cylinder lock, (2) the remnant of a trefoil bow as the handle of the key, (3) the flat shank of the key, and (4) a confirmed compositional structure of nickel silver (also known as German silver) (Appendix D). After electrolysis, the key could not be recovered from the original specimen due to an advanced state of oxidation. The key remains embedded in an amalgamation of iron oxide. The artifact specimen, which includes the key, measures 75.3 mm (2.96 inches) in length and weighs 42.8 grams. The bit, shank, and bow of the key are all partially deteriorated. The remainder of the key within the specimen has a total length of 37.8 mm (1.48 inches). The remainder of the key bit measures 12.2 mm (0.48 inches).

Despite the deterioration of the key, the corrugation ridges of the key bit are still visible. Additionally, one of the distinctive trefoil hoops still remains in the bow that is indicative of the Yale & Towne key design. The flat shank of the key has the same shape and dimensions from the shoulder of the bit to the bow as artifact 676.002 (See Figure 30). Only one bitting is still visible along the key bit. The bitting was measured with calipers and compared with artifact 676.002. The milling depth for artifact 676.002 is 1 mm deeper than artifact 676.007. oth samples were compared under microscope and artifact 676.002 is visibly milled into the second corrugation ridge of the bit while the milling for artifact 676.007 stops just before the ridge.

Figure 29. *Corrugated pin-tumbler cylinder key (676.007).*

Figure 30. *Artifact 676.007 (top) and 676.002 (bottom).*

Artifact 676.007 Conclusions. Despite the deterioration of the key within the specimen, artifact 676.007 can still be identified as a No. 17 key that operated in one of the four corresponding locks by Yale & Towne, manufactured between 1905 – 1913 (Tables 1 - 2). These are the same types of locks identified for artifact 676.002 (see Figures 13 – 16). Though artifact 676.007 would be used on one of these locks, it would not have been used on the same lock as 676.002, as the depth of the bitting is different between both keys. Therefore, artifact 676.007 would have operated a different lock on a separate doorway. Artifact 676.007 is a No. 17 key made by the Yale & Towne Manufacturing company manufactured between 1905 – 1913 that operated either a Yale & Towne Dead Lock or Night Latch for an outswing security door.

Interpretation of Findings

The keys associated with Burial 42 from Catalog 676 are compiled in Table 2 with their corresponding locks, where they could be identified. The catalogue consists of primary and secondary function keys. The primary keys consist of a round-cast key that would have operated a warded lock for an entrance door (676.001) and two corrugated cylinder-lock keys that would have operated pin-cylinder locks on outswing steel security doors (676.002 and 676.007). The secondary keys consist of a barrel key that would have operated a warded lock for either a cash box or cabinet (676.003), and a barrel key that would have operated either a *warded* lock or *lever-tumbler* lock for a cabinet or drawer (#676.004). Given the collection of keys and their respective types, their nature and functional use are most likely associated with a business location. The primary keys likely operated both the main entrance of a commercial building and outswing steel security doors for after business closing. The secondary keys likely operated an associated cash box and a cabinet or drawer within the business.

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APPENDIX D

ANALYSIS OF WOOD SAMPLES FROM THE 2022-2023 FIELD SEASONS AT OAKLAWN CEMETERY

APPENDIX D: ANALYSIS OF WOOD SAMPLES FROM THE 2022-2023 FIELD SEASONS AT OAKLAWN CEMETERY

Jennifer M. Haney, Ph. D.

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APPENDIX D-1: ANALYSIS OF WOOD SAMPLES FROM THE 2022-2023 FIELD SEASONS AT OAKLAWN CEMETERY

Jennifer M. Haney, Ph. D.

This appendix presents the results of an analysis of 71 wood samples recovered during the October-November 2022 and September 2023 excavations at Oaklawn Cemetery, Tulsa, Oklahoma. Overall, wood samples from 34 burial cases, 7 (exterior) crates, and 2 general fill proveniences were examined. Wood specimens were identified to the lowest possible taxonomic unit possible given limitations in wood anatomy and post-depositional changes. A complete inventory of the wood specimens is included in Appendix D-2.

Methods

Analysis was conducted in a temporary, on-site, laboratory space set up within Oaklawn Cemetery, Tulsa. Similar to the 2021 excavations (Haney 2022), each wood specimen was assigned a unique field catalog number which allowed extant wood from various portions/boards of burial cases or shipping containers/exterior crates to be individually identified. During the excavations, a sample was cut/collected from individual boards by field personnel. It should be noted that although boards were originally recovered during the excavation as single (sometimes large) specimens, the individual wood samples often became fragmented during cutting and/or prior to analysis. As such, the counts and weights presented in the table following this discussion represent the state of the analyzed samples; these data do not represent the counts/weights of the wood specimens as originally excavated which were not available to the analyst. Further, not all available boards were sampled by field personnel who typically only sampled one board per burial case/crate wall, lid or floor.

Each specimen was examined at low power with a dissecting binocular microscope (14-90x) for overall anatomical structure/orientation and macroscopic details, such as gross anatomy, including the size/presence of longitudinal and transverse resin canals. It was especially important to examine both the tangential and radial sections because most of the specimens had modern root damage on the cross section that superficially resembled resin canals. After each specimen was categorized as hardwood or softwood, further anatomical details were noted. Finally, hand-cut thin-sections were completed with a razor blade and examined under high magnification (100-1000x). All wood sections were temporarily mounted in ordinary tap water and no slides were retained after the identification was finalized.

Results

2022 Season

During the 2022 season, wood specimens (n = 37) were examined from 1 general fill and 18 burial proveniences, including 18 burial cases and 2 exterior crates. Most (n = 35) of the specimens were desiccated, however, one sample was mineralized in association with metal and one sample was partially carbonized (Table D-1.1). For the most part, wood taxa were found to be consistent by provenience. In other words, as far as may be determined from the examined samples, most of the burial cases or exterior crates were found to be made of a single wood taxon/group or the level of possible wood identification could not disprove a single wood taxon. For example, the floor wood sample from burial case 45 could be identified to the southern, hard pine group (more on this below) but the sample from the northern wall could only be identified to the pine group more generally. Although these two samples could easily be from different pine species, the condition of the samples and/or the limitations of wood anatomy limit further precision and these specimens then are assumed to be consistent.

Table D-1.1. Summary of 2022 Season Wood Provenience and Taxonomic Identifications.

Provenience	chestnut	yellow poplar	conifer	bald cypress	pine	southern, hard pine group
Burial Case 36				X		
Burial Case 37				X		
Burial Case 38						X
Burial Case 39			X			
Burial Case 40					X	
Burial Case 41			X			
Burial Case 42				X		
Burial Case 43		X[1]				
Ext crate 44				X		
Burial Case 44				X		
Burial Case 45						X
Burial Case 46				X		
Burial Case 51				X		
Burial Case 52	X					
Ext crate 58			X			
Burial Case 58			X			
Burial Case 62					X	
Burial Case 64				X		
Burial Case 65					X	
Burial Case 67					X	
Fill				X[2]		
Totals	1	1	4	9	4	2

1 Samples contained mineralized fragments

2 Partially carbonized

Broadly speaking, the taxonomic identifications may be divided among six taxa groups including chestnut (n = 1), yellow poplar (n = 1), conifer (n = 3), bald cypress (n = 8), pine (n = 4), and southern or yellow/hard pine group (n = 2) (see Table D-1.1). Although the current sample of burial case woods favors the use of bald cypress (burial cases, n = 8), pines (n = 3) and southern pines (n = 2) were well represented. These data suggest that the selection of (southern) pine and bald cypress coffins may reflect increased local accessibility and/or possibly production. Two exterior crates or containers were present in the sample, from Burials 44 and 58, and these were identified to the taxonomic level of bald cypress (n = 1) and conifer (n = 1).

Hardwoods

As may be seen from Table D-1.1, only two hardwoods were identified in the 2022 season wood assemblage. The first hardwood was recovered from a bar handle core and was identified as chestnut (*Castanea dentata*). Chestnut was a popular choice for caskets and coffins owing to its durability and its ease of workability (Panshin and de Zeeuw 1980). Since no wood sample was recovered from the burial case associated with this bar handle, it is impossible to know but given the differential preservation, the burial case was unlikely to have been made of chestnut. The second hardwood was recovered from Burial 43 where a wall sample was identified as whitewood or yellow/tulip poplar (*Liriodendron tulipifera*). This whitewood specimen also had a consistent layer of what looked to be a light-colored pigment on one side. This may have been milk paint and was colored white, cream, or perhaps a very light blue. Although the wood specimen exhibited common tyloses, which is not typically a feature of yellow poplar, tyloses may occasionally be present (Purdue Arboretum 2023). Further details of the ray structure and inter-vessel pitting helped to rule out other similar taxa, such as magnolia, birch, and maple.

The native range of yellow poplar does not stretch into Oklahoma (i.e., not a natural component of Oklahoma's forests). Timber production figures are available for the early twentieth century and indicate that overall, harvests of yellow poplar were in decline heading into the 1920s as the old growth forests had largely been cleared (McCarthy 1933: Figure 5, 12-13). During the 1920s, most of the yellow poplar was being harvested out of Alabama, Georgia, and Mississippi (McCarthy 1933: Figure 5). Although nearly 54 percent of yellow poplar was used in furniture, considerable amounts were used for lumber (14 %), boxes and crates (13 %), and miscellaneous products (16 %), such as caskets/coffins, mill work, vehicles, and shuttle/spools/bobbins (McCarthy 1933: 3). While it is possible that this burial case was constructed locally from purchased lumber or recycled boards, it seems more plausible that this burial case was purchased as a finished item. Many burial case catalogs from the late nineteenth century list whitewood as a light-colored wood option for manufactured caskets or coffins.

Conifers

The bulk (n = 19) of the wood specimens recovered during the 2022 season excavations was classified as conifer and more specifically to either bald cypress (*Taxodium distichum*) or pine (*Pinus* spp.). Any conifer which could not be more specifically identified was left at the level of phylum (*Coniferophyta*), which includes seven plant families (e.g., *Pinaceae*, *Podocarpaceae*, *Araucariaceae*, *Cephalotaxaceae*, *Taxaceae*, *Cupressaceae*, and *Taxodiaceae* [not all of which include native taxa]).

Many pine trees cannot be identified to the specific level from wood anatomy alone but are largely grouped by subgenus, section, etc. Based principally on minute cellular anatomy, samples from this season were identified or tentatively identified (*cf.*) to the southern yellow or hard pine group (*Pinus* spp., subgenus *Pinus*, section *Pinus,* subsection *Australes* [*sensu* Price, Liston, and Strauss 1998]). Commercially, these pines are sold interchangeably as members of the southern yellow pine group (Wood Database 2020). Most commonly, the commercially available southern pines include shortleaf pine (*P. echinate*), slash pine (*P. elliotti*), longleaf pine (*P. palustris*), and loblolly pine (*P. taeda*) but other pines may less frequently be encountered, such as pitch pine (*P. rigida*) and pond pine (*P. serotina*), among others.

While no coffin/casket production figures could be located for Oklahoma, one source noted that nearly 69 percent of early twentieth century coffins produced in Arkansas were made of shortleaf pine, a member of the southern pine group (Graves et al. 1912: 19). A further 26 percent were made from (bald) cypress (Graves et al. 1912: 19). Graves and colleagues (1912: 39) also note the use of longleaf pine, another member of the southern pine group, for the construction of coffins in Arkansas, however, no estimate of production figures was provided. Suggesting a local manufacture, the wood characteristics from Burial 65 (pine, *Pinus* spp.) are of note as the resin was still liquid, suggesting that the wood was not properly dried before use.

Burial 42 – Composite Object

Several small metal fragments (catalog OU21) were recovered from near the pelvis within Burial 42 and thought to be personal effects contained in a pocket. Three of ten fragments examined had mineralized wood remains with *in situ* wood structure, rather than a random orientation as might be expected with pressed wood pulp (i.e., paper) or cotton/linen/silk (i.e., currency) paper. Given the generally poor condition of the fragments, had the cells been random, it is doubtful that any determination could have been made between either wood pulp or cotton/linen/silk paper. However, segments of wood remained mineralized such that the differentiation of vessels from fibers/parenchyma were visible based on the lumen diameter and cellular arrangement. Additionally, entire rays were visible along tangential surfaces. Two of the three fragments exhibited portions where the wood anatomy was physically adjacent but anatomically juxtaposed, suggesting either that minute fragmentation had occurred post deposition or that the item was a composite (i.e., made of wood and metal) originally decorated with wood inlay or a design composed of multiple wood pieces. Although no taxa could be assigned to the various wood fragments, at least one fragment was a hardwood based on the presence of wood vessels. Taken all together, the fragments may represent portions of a hardwood handle or decorative wooden piece from something like a pocketknife.

General Fill

A single wood sample was recovered from the general fill of backhoe (BH) trench 3. This isolated, partially carbonized specimen was deeply buried well below the depth of the nearest burial cases to the north. At the time of recovery, it was tentatively thought the sample represented a tree that once stood near the cemetery boundary. Additional fill was documented below the sample by the presence of a metal drum (e.g., an oil drum) fragment. This wood specimen was identified as bald cypress (*Taxodium distichum*). The sample demonstrated regular wood/trunk anatomy and as such, did not appear to be a portion of root, although above-ground portions of

roots will not show the classic characteristics of root anatomy (Schweingruber, Börner, and Schulze 2008:32). Therefore, this fragment could represent a tree which once stood at the cemetery boundary or debris incidentally included in the fill.

2023 Season

During the 2023 season, wood specimens (n = 34) were examined from 1 general fill and 20 burial proveniences, including 16 burial cases and 5 (exterior) crates. All the specimens were desiccated, however, one sample was desiccated and partially mineralized in association with copper fittings (Table D-1.2). Again, wood taxa were found to be consistent by provenience. In other words, as far as may be determined from the examined samples, each burial case or individual crate was found to be made of a single wood taxon/group or the level of possible wood identification could not disprove consistency.

Broadly speaking, the taxonomic identifications may be divided among eight taxa groups including conifer (n = 2), bald cypress (n = 4), pine (n = 6), southern or yellow/hard pine group (n = 4), ponderosa pine group (n = 1), fir (n = 2), arborvitae (n = 2), and redwood (n = 1) (see Table D-1.2). All the excavation seasons have produced relatively small sample sizes; however, the current sample has a higher diversity of wood types, similar to the initial investigation years, 2020-2021. The 2023 wood assemblage was dominated by conifers and fully half of the sample (n = 11) was identified as pine. Not a single hardwood was identified. Again, this may reflect increased accessibility and/or possibly local production. Five crates or exterior crates were examined during this season. Within Burial 75, wood for both the exterior crate and burial case were examined, however, for the other four (Burials 86, 87, 92, and 123) proveniences, no additional information was available regarding the existence of a burial case. Therefore, it was unclear to the analyst if these crates were used as burial cases or contained burial cases for which wood specimens were not collected.

Conifers

As mentioned above, all of the specimens from the 2023 season were classified as conifers and most were more specifically identified to a family, genus, or species. As with the previous excavation seasons, any conifer which could not be more specifically identified was left at the level of phylum (*Coniferophyta*), which includes seven plant families (e.g., *Pinaceae*, *Podocarpaceae*, *Araucariaceae*, *Cephalotaxaceae*, *Taxaceae*, *Cupressaceae*, and *Taxodiaceae* [not all of which include native taxa]).

As noted above, most pine trees cannot be identified to the specific level from wood anatomy alone and consequently are largely grouped by subgenus, section, etc. Based principally on minute cellular anatomy, samples were identified or tentatively identified (*cf.*) to one of three levels of pine identification: pine, hard pine group, or ponderosa pine group. Largely due to preservation issues, many specimens (n = 6) could be confidently placed within the genus pine (*Pinus* spp.) but could not be further specified. Four specimens could be further classified to the southern yellow or hard pine group (*Pinus* spp., subgenus *Pinus*, section *Pinus,* subsection *Australes* [*sensu* Price, Liston, and Strauss 1998]). Commercially, these pines are sold interchangeably as members of the southern yellow pine group (Wood Database 2020). Most

Table D-1.2. Summary of 2023 Season Wood Provenience and Taxonomic Identifications.

Provenience	conifer	bald cypress	pine	southern, hard pine group	ponderosa pine group	fir	arborvitae	redwood
Ext crate 75						X		
Burial Case 75			X					
Burial Case 76				X				
Burial Case 78							X	
Burial Case 79						X		
Burial Case 80		X						
Burial Case 81							X	
Burial Case 84				X				
Crate 86								X
Crate 87				X				
Crate 92		X						
Burial Case 93		X						
Burial Case 95			X					
Burial Case 99					X			
Burial Case 110		X[1]						
Burial Case 117			X					
Burial Case 118				X				
Burial Case 119	X							
Burial Case 122			X					
Crate 123			X					
Burial Case 124			X					
Fill	X							
Totals	2	4	6	4	1	2	2	1

1 Sample contained mineralized fragments

commonly, the commercially available southern pines include shortleaf pine (*P. echinate*), slash pine (*P. elliotti*), longleaf pine (*P. palustris*), and loblolly pine (*P. taeda*) but other pines may less frequently be encountered, such as pitch pine (*P. rigida*) and pond pine (*P. serotina*), among others. Lastly, one sample was tentatively classified to the *Ponderosae* subsection (*cf. Pinus* spp., subgenus *Pinus*, section *Pinus*, subsection *Ponderosae [sensu* Price, Liston, and Strauss 1998]) which includes Ponderosa (*P. ponderosa*) and Jeffrey (*P. jeffreyi*) pines among others. While technically, several pines are native to Oklahoma forests, including shortleaf, loblolly and Ponderosa pines, only the shortleaf pines were numerous enough to have entered the timber trade.

While no coffin/casket production figures could be located for Oklahoma, one source noted that nearly 69 percent of early twentieth century coffins produced in Arkansas were made of shortleaf pine, a member of the southern pine group (Graves et al. 1912: 19). A further 26 percent were made from (bald) cypress (Graves et al. 1912: 19). Graves and colleagues (1912: 39) also note the use of longleaf pine, another member of the southern pine group, for the construction of coffins in Arkansas, however, no estimate of production figures was provided. Similar to Burial 65, the wood characteristics from Burial 95 are of note as the resin was still liquid, suggesting that the wood was not properly dried before use and that the burial case was likely of local manufacture.

Two specimens were classified or tentatively classified (*cf.*) as western firs which include white fir (*Abies concolor*), grand fir (*A. grandis*), subalpine fir (*A. lasiocarpa*), California red fir (*A. magnifica*), Noble fir (*A. procera*), or Pacific silver fir (*A. amabilis*). These taxa are generally light-colored woods and the lumber is sold as Hem-Fir. In other words, the individual species of wood is not distinguished and is lumped together with the hemlocks (both eastern and western). No fir tree is native to Oklahoma forests, and as such, this lumber was most certainly purchased, recycled from other products, or arrived in manufactured burial cases or crates.

Two samples were tentatively identified as arborvitae or the cypress family (*Cupressaceae*), likely arborvitae. The single wood sample from Burial 78 was left as a tentative identification (giant arborvitae [*cf. Thuja plicata]*), partially because it was a single specimen among the assemblage and partially because the diagnostic characteristics were more subjective given post-depositional changes. The single specimen from Burial 81 was also classified to the cypress family but tentatively, if pressed, as eastern arborvitae (*Cupressaceae , cf. T. occidentalis*). The Burial 82 specimen, aside from being again a single sample, was also largely knot or branch base wood with surrounding cross grain. Especially when in a poor state of preservation, this makes acquiring good sections for examination difficult and the diagnostic characteristic (e.g., ray height) was an uncommon variant. Neither of these arborvitae taxa are native constituents of Oklahoma forests and most certainly would have been purchased as lumber, recycled from other products, or arrived as finished burial cases. Giant arborvitae (*Thuja plicata*) was commonly used in the construction of coffins, caskets, boxes, and crates (Panshin and de Zeeuw 1980). Eastern arborvitae (*T. occidentalis*) was not commonly used in the industry for the construction of caskets and coffins but is noted for its light weight and durability when in contact with soil (Panshin and de Zeeuw 1980). Given the wood properties of eastern arborvitae (e.g., light-colored, cedary odor, light weight, and durability), it is not unreasonable to imagine that a local carpenter might have chosen it for a burial case.

Two samples from the exterior crate of Burial 86 were classified, tentatively, as redwood (*cf. Sequoia sempervirens*). Redwood is not easily distinguished from bald cypress when poorly preserved and in this instance, the size of the cross field pits was heavily relied upon to make the assignment. Similar to many of the other woods recovered from the 2023 season, redwood is native to forests of the West Coast and does not grow in Oklahoma. Again, this lumber would have been locally purchased, recycled from another products or brought in as a finished product. Redwood was commonly used in coffins, caskets, boxes, and crates (Panshin and de Zeeuw 1980).

Summary

Wood specimens from the 2022 and 2023 archaeological excavations at Oaklawn Cemetery were examined and included 38 burial and 2 general fill proveniences. Most of the specimens were desiccated, however, several specimens were mineralized in association with metal and one sample was partially carbonized. Broadly speaking, the taxonomic identifications may be divided among 10 taxa groups including chestnut, yellow poplar, conifer, bald cypress, pine, southern or yellow/hard pine group, ponderosa pine group, fir, arborvitae, and redwood. As noted previously and in Tables D-1.1 and D-1.2, the current sample of burial case woods favors the use of bald cypress and pines. This pattern is similar to and reinforces the data from the 2020-2021 excavation season (see below and also Haney 2022). Within this 2022-2023 sample, the wood types were consistent by provenience.

From the wood assignments alone, most of the burial cases could not be assigned as manufactured locally or purchased as a finished product, however, in three instances – Burials 43, 65, and 95 – the wood analysis may provide strong evidence in this debate. The yellow poplar burial case of Burial 43 was likely purchased as a finished product because of the wood type and presence of milk paint. The burial cases of Burials 65 and 95 were likely made locally because the lumber had not been properly dried, and the pine resin was still liquid and flowing from fresh cuts/breaks during analysis. Finally, the burial case from Burial 81 may also be of local manufacture based on the use of an unusual wood (tentatively, eastern arborvitae).

Discussion: 2020-2023 Excavation Seasons

Over the course of investigations, wood specimens were examined from 42 burial cases, 9 crates, and 5 general fill proveniences. These wood samples have been classified into 13 taxa or wood groups. These include true hickory group (*Carya* spp.), chestnut (*Castanea dentata*), yellow poplar (*Liriodendron tulipifera*), conifer (*Coniferophyta*), bald cypress (*Taxodium distichum*), hemlock (*Tsuga* spp.), pine (*Pinus* spp.), southern hard pine group (*Pinus* spp., subgenus *Pinus*, section *Pinus,* subsection *Australes*), white pine group (*Pinus* spp., subgenus *Strobus*), Ponderosa pine group (*Pinus* spp., subgenus *Pinus*, section *Pinus*, subsection *Ponderosae*), fir (*Abies* spp.), arborvitae (*Cupressaceae , Thuja* spp.), and redwood (*Sequoia sempervirens*) (Table D-1.3). Overall, wood types were consistent within a provenience, that is within individual burial cases or crates. The single exception was Burial 30 from the 2021 season where a possible lid sample to the burial case was identified as different from the other samples. Since this exception concerns a possible lid specimen, it remains possible that the wood sample had worked its way down from overlying fill and thus, may not have been part of the burial case. In this instance, the possible lid was classified as a member of the true hickory group while the remaining burial case samples were classified as southern hard pines. Alternatively, it also remains possible that the lid was made of hardwood because it was visible/exposed while the pine walls may have been covered in some manner with veneer or fabric which was not preserved.

Table D-1.3. Cross Tabulated Summary of Wood Identifications by Provenience from Excavation Seasons 2020-2021 (Haney 2022), 2022, and 2023.

Provenience	hickory	chestnut	yellow poplar	conifer	bald cypress	hemlock	pine	southern, hard pine group	white pine group	ponderosa pine group	fir	arborvitea	redwood
2020-2021 ext crate				1		1							
2020-2021 burial case	1				10		2	5	1				
2022 ext crate				1	1								
2022 burial case		1	1	3	7		4	2					
2023 (ext) crate					1		1	1			1		1
2023 burial case				1	3		5	3		1	1	2	
Total	1	1	1	6	22	1	12	11	1	1	2	2	1

*Burial case 30 is the only instance where two woods or types were conclusively identified, including hickory and southern, hard pine. This inflates the counts for the 2020-2021 season burial cases by one.

Since most of the burial cases have been made of bald cypress or pine (see Table D-1.3), these likely represent a mix of local and non-local manufacture. Although it has been suggested that many, if not most, of the burial cases were purchased from suppliers/manufacturers, this may not have been true of Burials 65 and 95. All three of the wood specimens examined from Burial 65 and the single specimen from Burial 95 had not been seasoned and properly dried prior to use. As such, it seems likely that these burial cases were made by a local carpenter rather than purchased from a manufacturer/supplier. While it is possible that these burial cases were constructed in haste or when seasoned wood supplies were in short supply, it is also possible that the comparatively inexpensive nature of pine burial cases may have strongly influenced the carpenter's choice of wood. Of the 52 burial cases thus far examined, only two have not been properly dried and so they are apparently outliers within the examined sample at Oaklawn.

Nine crates were examined thus far between 2020 and 2023 and in several instances represent the sole example of wood types or assignments. The crates and/or exterior crates have been classified as conifer, hemlock, bald cypress, pine, southern hard pine, fir, and redwood (see Table D-1.3). The single assignments belong to hemlock and redwood, which have only been identified within the crate assemblage. While redwood was used in the construction of coffins and caskets, it was also commonly used in boxes and crates. Conversely, hemlock was not typically used in the construction of coffins and caskets but was used commonly in the manufacture of boxes and crates (Panshin and de Zeeuw 1980).

Data gathered since the project began in 2020 suggest that the selection of southern pine and bald cypress coffins may reflect increased local accessibility and/or possibly local/regional

production. Further, the consistency of identified wood within burial cases (except Burial 30, see Haney 2022) suggests that the coffins were likely purchased from suppliers/manufacturers or local carpenters. Across all excavation seasons, five of the proveniences (Burials 4, 21, 44, 58, and 75) were encased in exterior crates or shipping containers (Table D-1.3), further suggesting that these coffins were likely purchased from non-local suppliers/manufacturers. The yellow poplar identified in Burial 43 did not grow in Oklahoma, however, the wood may have been purchased as lumber and finished by a local carpenter. The presence of exterior paint lends additional weight to this coffin being purchased as a finished product, as painted coffins were popular in the late nineteenth century.

Altogether then, at least 6 of the 52 burial cases examined were likely purchased as final products from manufacturers/suppliers based on the presence of exterior crates or milk paint on whitewood. The burial cases within these crates were classified as bald cypress (n = 3), conifer (n = 1), pine (n = 1), and yellow poplar/whitewood (n = 1). Since most (n = 43) of the examined burial cases were classified as either bald cypress or pine and these two taxa also dominate the likely purchased assemblage, it may be that many if not most of these burial cases were purchased from specialized manufacturers/suppliers. Conversely, at least two pine burial cases (Burials 65 and 95) and one assigned to the cypress family (Burial 81) are suspected of being locally made based on the use of poorly seasoned wood or wood not typically used in coffin/casket manufacture.

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APPENDIX D-2: WOOD CATALOG FOR THE 2022 AND 2023 FIELD SEASONS AT OAKLAWN CEMETERY

Season	Cat #	Lot #	Proven Category	Burial #	Location Description	Ct	Wt (g)	Final Wood Taxa/Description
2022	646	5	Burial	36	Sample 1 - lid, burial case	2	6.5	dessicated wood; bald cypress (*Taxodium distichum*)
2022	493	5	Burial	37	Sample 1 - lid, burial case	3	3.0	dessicated wood; bald cypress (*cf. Taxodium distichum*)
2022	513	20	Burial	37	Sample 2 - lid, burial case	4	166	dessicated wood; bald cypress (*Taxodium distichum*)
2022	640	31	Burial	37	Sample 3 - came out with N central handle, burial case	1	11.5	dessicated wood; bald cypress (*Taxodium distichum*)
2022	583	4	Burial	38	Sample 1 - west wall, burial case	1	28	desiccated wood; southern, hard pine group (*cf. Pinus* spp., subgenus *Pinus*, section *Pinus*)
2022	584	5	Burial	38	Sample 2 - east wall, burial case	1	14	desiccated wood; southern, hard pine group (*Pinus* spp., subgenus *Pinus*, section *Pinus*)
2022	453	3	Burial	39	Sample 1 - lid, burial case (over cranium)	7	44	dessicated wood; conifer (*Coniferophyta*)
2022	406	3	Burial	40	Sample 1 - south wall, burial case	2	12.5	dessicated wood; conifer (*Coniferophyta*)
2022	409	4	Burial	40	Sample 2 - north wall, burial case	1	4.5	dessicated wood; pine (*Pinus* spp.)
2022	452	7	Burial	40	Sample 3 - burial case floor	1	4.5	dessicated wood; pine (*Pinus* spp.)
2022	587	3	Burial	41	Sample 1 - SW Corner, burial case	6	5	dessicated wood; conifer (*Coniferophyta*)
2022	596	5	Burial	41	Sample 2 - north wall, burial case	20+	168	dessicated wood; conifer (*Coniferophyta*)
2022	420	3	Burial	42	Sample 1 - lid, burial case	41+	10.5	dessicated wood; bald cypress (*Taxodium distichum*)
2022	421	4	Burial	42	Sample 2 - west wall, burial case	14+	2.0	dessicated wood; bald cypress (*Taxodium distichum*)
2022	476	10	Burial	42	Sample 3 - floor, burial case	1	41.5	dessicated wood; bald cypress (*Taxodium distichum*)
2022	521	5	Burial	43	Sample 1 - plaque sample	3	7.5	mineralized wood; Indeterminate (almost no wood present)
2022	673	19	Burial	43	Sample 2 - indeterminate wall, tentative milk paint, burial case	1	3	dessicated wood; yellow poplar (*Liriodendron tulipifera*)
2022	414	3	Burial	44	Sample 1 - north wall, exterior crate	7	7.5	dessicated wood; bald cypress (*cf. Taxodium distichum*)

APPENDIX D-2: WOOD CATALOG FOR THE 2022 AND 2023 FIELD SEASONS AT OAKLAWN CEMETERY (CONT.)

Season	Cat #	Lot #	Proven Category	Burial #	Location Description	Ct	Wt (g)	Final Wood Taxa/Description
2022	422	5	Burial	44	Sample 2 - east wall of exterior crate	1	3.5	dessicated wood; bald cypress (*cf. Taxodium distichum*)
2022	463	16	Burial	44	Sample 3 - south central burial case floor	22	84	dessicated wood; bald cypress (*cf. Taxodium distichum*)
2022	634	5	Burial	45	Sample 1 - north wall, burial case	5	9	dessicated wood; pine (*cf. Pinus* spp.)
2022	635	6	Burial	45	Sample 2 - burial case floor	2	9.5	desiccated wood; southern, hard pine group (*Pinus* spp., subgenus *Pinus*, section *Pinus*)
2022	416	7	Burial	46	Sample 1 - burial case lid?, approx above left shoulder, fabric & coprous pin underneath	1	12.5	dessicated wood; bald cypress (*cf. Taxodium distichum*)
2022	488	5	Burial	51	Sample 1 - NW burial case corner	50+	115.5	dessicated wood; bald cypress (*Taxodium distichum*)
2022	519	7	Burial	51	Sample 2 - south wall, burial case	15+	54	dessicated wood; bald cypress (*Taxodium distichum*)
2022	520	8	Burial	51	Sample 3 - lid, burial case	40+	43.5	dessicated wood; bald cypress (*cf. Taxodium distichum*)
2022	610	12	Burial	52	Sample 1 - from handle bar core	1	0.5	dessicated wood; chestnut (*Castanea dentata*)
2022	489	3	Burial	58	Sample 1 - south burial case wall	24	4	dessicated wood; conifer (*Coniferophyta*)
2022	522	6	Burial	58	Sample 2 - exterior crate plaque	2	4.5	dessicated wood; conifer (*Coniferophyta*)
2022	631	3	Burial	62	Sample 1 - lid, burial case	13+	135	dessicated wood; pine (*cf. Pinus* spp.)
2022	686	6	Burial	62	Sample 2 - floor, burial case	2	22	dessicated wood; pine (*Pinus* spp.)
2022	693	17	Burial	64	Sample 1 - unknown location	3	54.5	dessicated wood; bald cypress (*cf. Taxodium distichum*)
2022	650	4	Burial	65	Sample 1 - burial case floor	4	13	dessicated wood; pine (*Pinus* spp.)
2022	651	5	Burial	65	Sample 2 - burial case, next to radius/ulna on north side	1	14.5	dessicated wood; pine (*Pinus* spp.)
2022	652	6	Burial	65	Sample 3 - coffin, SW burial case	2	107.5	dessicated wood; pine (*Pinus* spp.)
2022	670	6	Burial	67	Sample 1 - burial case floor	18+	82	dessicated wood; pine (*Pinus* spp.)
2022	423	-	Fill	-	southern most extension of BH3 - deep; not assoc with burials	1	9.2	partially carbonized wood; bald cypress (*Taxodium distichum*)
2023	899	5	Burial	75	Sample 1 - possible burial case lid	1	9.5	dessicated wood; pine (*Pinus* spp.)

APPENDIX D-2: WOOD CATALOG FOR THE 2022 AND 2023 FIELD SEASONS AT OAKLAWN CEMETERY (CONT.)

Season	Cat #	Lot #	Proven Category	Burial #	Location Description	Ct	Wt (g)	Final Wood Taxa/Description
2023	900	6	Burial	75	Sample 2 - possible exterior crate lid	6	46.5	dessicated wood; conifer (*Coniferophyta*)
2023	901	7	Burial	75	Sample 3 - exterior crate, south wall	6	14.5	dessicated wood; fir (*Abies* spp.)
2023	889	5	Burial	76	Sample 1 - burial case, lid	1	45	desiccated wood; southern, hard pine group (*Pinus* spp., subgenus *Pinus*, section *Pinus*)
2023	848	7	Burial	78	Sample 1 - burial case wood	1	15	dessicated wood; arborvitea (*cf. Thuja plicata*)
2023	1062	15	Burial	79	Sample 1 - east wall	1	18	dessicated wood; fir (*cf. Abies* spp.)
2023	998	4	Burial	80	Sample 1 - wood sample, no additional information	1	17	dessicated wood; bald cypress (*Taxodium distichum*)
2023	769	4	Burial	81	Sample 1 - burial case lid	1	8.5	dessicated wood; arborvitae (*Cupressaceae* [*cf. Thuja occidentalis*])
2023	780	8	Burial	84	Sample 1 - burial case, south wall	1	119	desiccated wood; southern, hard pine group (*Pinus* spp., subgenus *Pinus*, section *Pinus*)
2023	840	7	Burial	84	Sample 2 - burial case, north wall just below the knee	1	7.5	dessicated wood; pine (*Pinus* spp.)
2023	841	9	Burial	84	Sample 3 - burial case, removed from between legs, just below knee	1	3.5	dessicated wood; pine (*Pinus* spp.)
2023	877	2	Burial	86	Sample 1 - exterior crate, south wall	1	10	dessicated wood; redwood (*cf. Sequoia sempervirens*)
2023	878	3	Burial	86	Sample 2 - exterior crate, lid	4	24.5	dessicated wood; redwood (*cf. Sequoia sempervirens*)
2023	783	1	Burial	87	Sample 1 - exterior crate lid, east end	1	58.5	desiccated wood; southern, hard pine group (*Pinus* spp., subgenus *Pinus*, section *Pinus*)
2023	786	4	Burial	87	Sample 2 - exterior crate, NE corner of north wall	1	44.5	desiccated wood; southern, hard pine group (*Pinus* spp., subgenus *Pinus*, section *Pinus*)
2023	856	1	Burial	92	Sample 1 - exterior crate, south wall	25	117	dessicated wood; bald cypress (*Taxodium distichum*)
2023	857	2	Burial	92	Sample 2 - exterior crate, north wall	15	132	dessicated wood; cypress (*Cupressaceae*)

APPENDIX D-2: WOOD CATALOG FOR THE 2022 AND 2023 FIELD SEASONS AT OAKLAWN CEMETERY (CONT.)

Season	Cat #	Lot #	Proven Category	Burial #	Location Description	Ct	Wt (g)	Final Wood Taxa/Description
2023	858	3	Burial	92	Sample 3 - exterior crate, west wall	5	142	dessicated wood; cypress (*Cupressaceae*)
2023	859	4	Burial	92	Sample 4 - exterior crate, east wall	0	0	EMPTY BAG
2023	860	5	Burial	92	Sample 5 - exterior crate, lid	15	31	dessicated wood; cypress (*Cupressaceae*)
2023	959	3	Burial	93	Sample 1 - wood sample, no additional info	1	1.5	dessicated wood; bald cypress (*cf. Taxodium distichum*)
2023	1063	4	Burial	95	Sample 1 - north wall	5	3.5	dessicated wood; pine (*Pinus* spp.)
2023	1015	1	Burial	99	Sample 1 - wood sample, south wall	4	10	desiccated wood; ponderosa pine group (*cf. Pinus* spp., subgenus *Pinus*, section *Pinus, subsection Ponderosae*)
2023	1026	6	Burial	110	Sample 1 - prob lid ?, copper hardware remmants	5	61.5	dessicated and mineralized wood; bald cypress (*cf. Taxodium distichum*)
2023	931	2	Burial	117	Sample 1 - southern wall/lid ?	9	17	dessicated wood; pine (*cf. Pinus* spp.)
2023	1044	1	Burial	118	Sample 1 - wood sample, no additional info	2	266.5	desiccated wood; southern, hard pine group (*Pinus* spp., subgenus *Pinus*, section *Pinus*)
2023	1064	3	Burial	119	Sample 1 - lid sample	3+	0.5	dessicated wood; conifer (*Coniferophyta*)
2023	1065	2	Burial	122	Sample 1 - lid sample	1	30.5	dessicated wood; pine (*Pinus* spp.)
2023	1037	3	Burial	123	Sample 1 - exterior crate lid, NE corner	5+	233.5	dessicated wood; pine (*Pinus* spp.)
2023	1080	1	Burial	124	Sample 1 - lid wood sample	8+	13	dessicated wood; pine (*cf. Pinus* spp.)
2023	1081	2	Burial	124	Sample 2 - east wall	15+	46.5	dessicated wood; conifer (*Coniferophyta*)
2023	1096	NA	Burial	124	Sample 3 - wood fragments near left tibia	2	0.62	dessicated wood; conifer (*Coniferophyta*)
2023	1097	NA	Burial	124	Sample 4 - wood fragments near left femur, distal anterior for. proj.	2	1.1	dessicated wood; conifer (*Coniferophyta*)
2023	768	NA	Fill	-	wood fragments, west of Burials 72 & 73, outside burial shafts	11	36.5	dessicated wood; conifer (*Coniferophyta*)

APPENDIX G

PARTICIPANTS IN THE 2022-2023 FIELD SEASONS AT OAKLAWN CEMETERY

PARTICIPANTS IN THE 2022-2023 FIELD SEASONS AT OAKLAWN CEMETERY

The fieldwork that has been conducted to-date could not have been possible without incredible support and active participation by numerous individuals. Those who assisted specifically with the forensic anthropology laboratory and escorting decedents are listed in Chapter 5 of this volume. The list below includes: 1) City of Tulsa personnel who assisted with the logistical coordination and communications; 2) those individuals who assisted with the archaeological monitoring, excavations, screening, analyses, and documentation; and 3) others whose contributions may not be otherwise noted in the body of the report. Some of these individuals also assisted with escorting decedents as needed. We regret any oversights if we have missed anyone.

2022 Field Season

City of Tulsa Personnel
- Michelle Brooks
- Cassia Carr
- Carson Colvin
- Brian Nutt
- Rodrigo Rojas

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- Debra Green, Oklahoma Archeological Survey
- Jennifer Haney, Oklahoma Archeological Survey
- Michael Loughlin, Stantec
- Ryan Peterson, Stantec
- Amanda Regnier, Oklahoma Archeological Survey
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- Michael Loughlin
- Erin McKendry
- Eric Prendergast
- Kathleen Settle
- Jeremy Wilson
- Gretchen Zoeller

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Screeners
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- Haley Rush, Stantec
- Amanda Temple, Stantec
- Danielle Macdonald, University of Tulsa

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Photogrammetry, Digital Data Capture, and Mapping:

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- Eric Prendergast, Stantec
- Amanda Regnier, Oklahoma Archeological Survey

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- Jennifer Haney, Oklahoma Archeological Survey
- Brenda Nails-Alford, Community Member
- Kary Stackelbeck, Oklahoma Archeological Survey
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