Section 5 GPR Human Remains Report

5.1 Test Excavation 096

5.1.1 Excavation Results

T-096 consisted primarily of construction fill and various disturbed, burned historic layers to a depth of 1.29 mbs where reworked, natural, gravelly silty sand was observed. The test excavation contained a subsurface, culturally enriched, former A-horizon. Features 1 and 2 were documented within the excavation, although they were related to modern/historic events and located above the A-horizon. Feature 3 represented a former burned A-horizon which was composed of gravelly, silty, clay loam found at a depth of 1.15 mbs to 1.20 mbs and designated as Stratum Ii. This culturally enriched layer contained faunal bone fragments, rusted metal fragments, unidentified burnt material and slag inclusions. In addition some glass and ceramic fragments were recovered to further indicate a burned, historic layer.

A human talus was recovered from the backfill soil from Stratum Ic/Id (approx. 0.15 mbs to 0.45 mbs). Stratum Ic was a very gravelly loam that had a white color (2.5Y 8/1) and was found from 0.15 mbs to 0.25 mbs. It consisted of a crushed coral fill and several concrete fragments to indicate construction fill. Stratum Id proceeded from 0.25 mbs to 0.45 mbs and was a dark gray (2.5 Y 4/1), very gravelly sandy loam. This stratum was designated as an additional historic fill layer that contained basalt brick, faunal bone, cement brick, building foundation, pipe, nails and glass. The human bone was isolated and previously disturbed since it was found in designated construction fill stratum. The talus was identified by a CSH osteologist as an older adult. The sex was indeterminate. The material in the bin where the talus was found was screened thoroughly and the area of the test excavation where the bucket had been excavating was also screened with no further bone recovery or any other significant cultural recovery.

Feature 1 was the corner of a building foundation along the west excavation wall at the start of Stratum Id at a depth of 0.27 mbs to 1.10 mbs. Red brick and concrete with basalt boulder foundation made up this feature. This could have been a part of the City Mill Company building found in the 1914 Sanborn fire insurance map.

Feature 2 was a concrete slab and possible building foundation remnant of the old City Mill facility found in the west wall of T-096 and intruding into Stratum Ic and Id at a depth of 0.27 mbs to 0.48 mbs.

Feature 3 was the former burned, culturally enriched A-horizon found at a depth of 1.33 mbs. It is observed in the northeast end of the excavation in Stratum Ii. The general contents of material collected includes faunal bone fragments, rusted metal, glass and ceramic fragments, slag inclusions and additional unidentified burned material.

5.1.2 GPR Interpretation

The human remains encountered during the excavation of T-096 consisted of a single talus discovered in the back dirt pile. It is very difficult for the GPR to resolve such a small object, especially in a disturbed context with natural sediments truncated by fill events. There are no distinct hyperbolic reflections observed in the profile that can clearly be linked to the remains (Figure 7). The slice maps do not clearly indicate the presence of pit features based on significant

changes in reflectivity. No distinct shapes are observed in the slices that correspond to features observed during excavation (Figure 8).

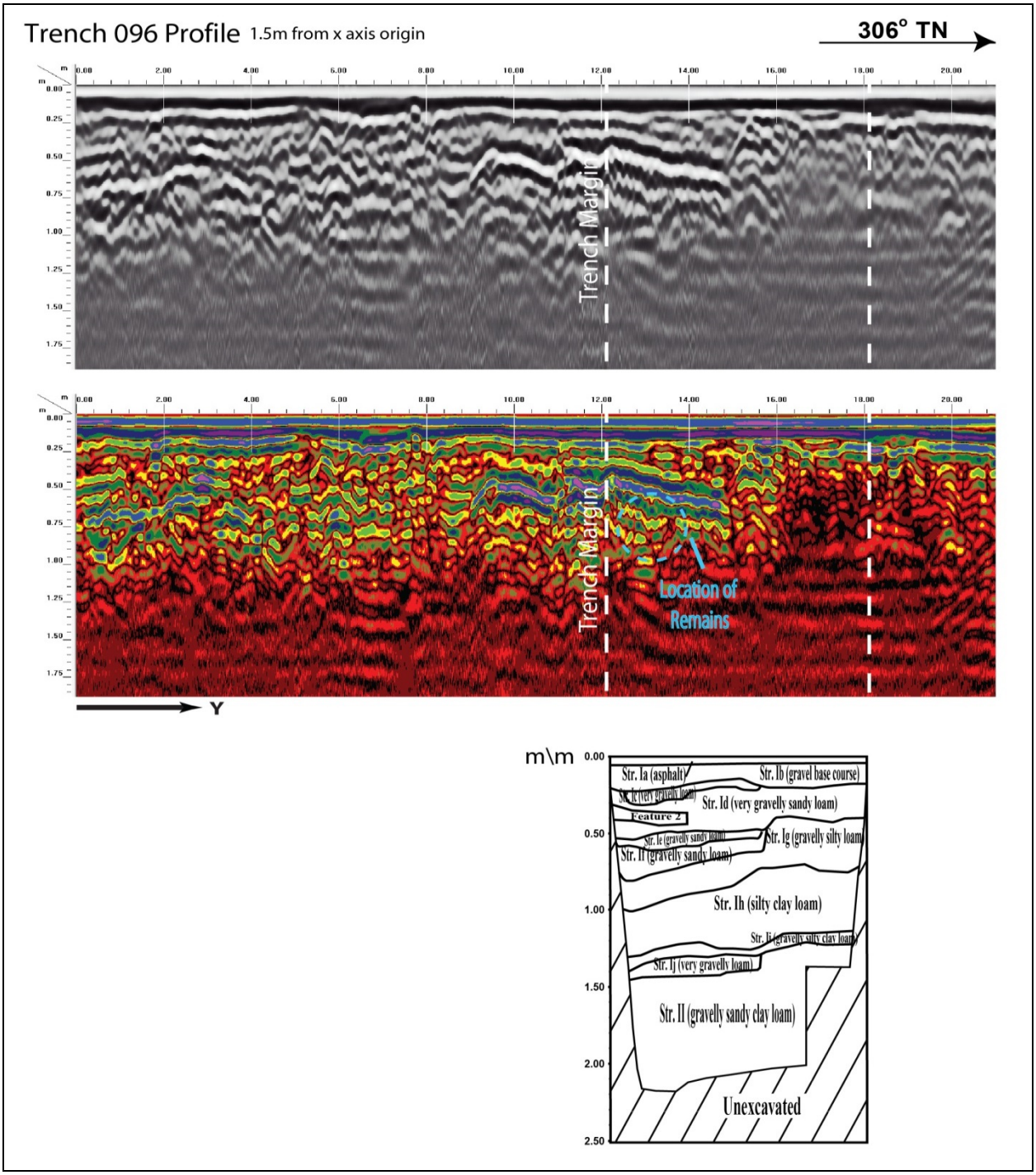

Figure 7. Visual comparison of excavated profile and GPR signal profile for Test Excavation 096

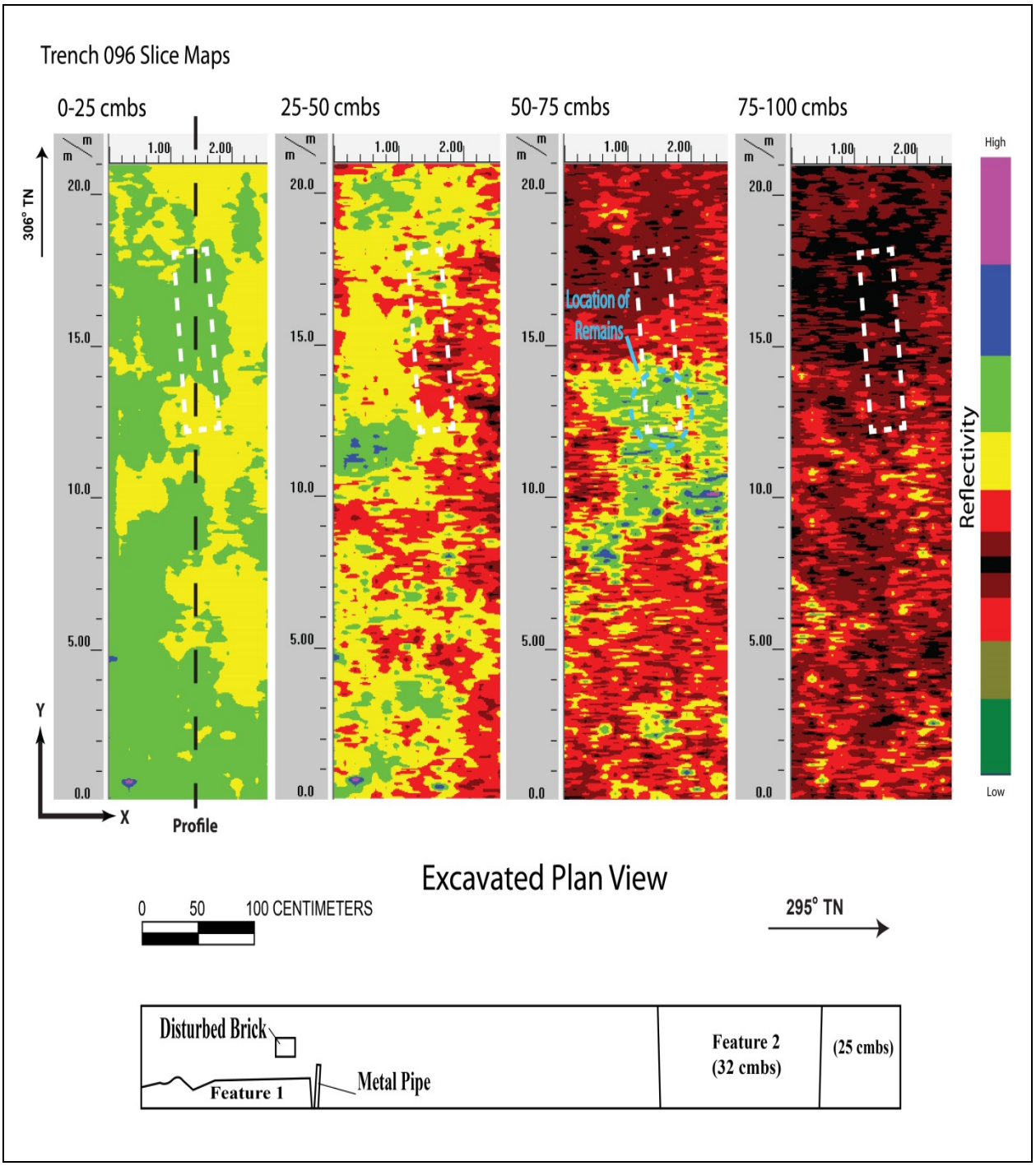

Figure 8. Visual comparison of excavated plan views and GPR slice maps for Test Excavation 096

5.2 Test Excavation 141

5.2.1 Excavation Results

T-141 contained a subsurface, culturally enriched, former A-horizon with four associated features (Features 1, 2, 3, and 6). Two additional features (Features 4 and 5) were documented within the test excavation, although they were related to modern/historic events. The former A-horizon was composed of light brownish gray loamy sand and ranged in depth from 0.43 mbs to 1.18 mbs. It appeared to be historically impacted as clear glass and ceramic fragments and rusted metal pieces were observed within the layer. The stratum contained charcoal, midden, organics, and faunal remains (pig, dog, and bird). One traditional Hawaiian artifact, an octopus lure, was observed at the interface of the former A-horizon and the underlying natural Jaucas sand.

Isolated human skeletal remains were found throughout the former A-horizon in a disturbed context and ranged in depth from approximately 0.61 mbs to 0.75 mbs. Identified skeletal elements included mandible fragments (infant), multiple vertebrae, multiple rib fragments (both adult and infant), a left radius (infant), a long bone (infant), a manubrium, a right third metacarpal, two left second metacarpals, a proximal hand phalanx, an intermediate hand phalanx, two distal hand phalanges (infant), an os coxa, a right os coxa (infant), and a left calcaneus. Unless otherwise noted, the remains were adult. Based on the presence of adult and juvenile remains as well as duplication of adult elements, the minimum number of individuals (MNI) represented within this assemblage is three. Due to the paucity and fragmentary nature of the remains, neither sex nor ancestry was determinable.

Feature 1 contained an *in situ* horse burial. Additionally, isolated human skeletal remains in a disturbed context were observed within the Feature 1 fill material. The identified elements are described above. This feature contained charcoal, midden, non-midden shell, and faunal remains (medium-sized mammal).

Feature 2 was a pit extending down from the former A-horizon and intruding into the underlying natural sand layer. It contained midden.

Feature 3 was a pit extending down from the former A-horizon and intruding into the underlying natural sand layer. It did not contain any traditional Hawaiian cultural material.

Feature 6 was a pit extending down from the former A-horizon and intruding into the underlying natural sand layer. It contained a small amount of charcoal.

Additionally, previously disturbed and isolated human skeletal remains were documented within Feature 5, a historic/modern pit feature. It appears likely that when the pit was excavated through the former A-horizon, it impacted human remains that were located within the former A-horizon and spread them throughout the pit fill. The remains were observed at 0.61 mbs and 0.63 mbs. Feature 4 was also a modern/historic pit feature that was excavated through the former A-horizon; however, no human skeletal remains or traditional Hawaiian artifacts were observed within the pit fill.

5.2.2 GPR Interpretation

The human remains encountered during the excavation of T-141 were non-articulated and distributed throughout the test excavation. It is very difficult for the GPR to resolve such small

objects, especially in a disturbed context with natural sediments truncated by fill events. There are no distinct hyperbolic reflections observed in the profile that can clearly be linked to the remains. A change in signal reflectivity and topography is noted occurring at the same depth and location of an isolated human bone (manubrium) found in the SW sidewall of the test excavation. The signal reflectivity is lower in this area and could imply a change in compaction or density of material. The signal topography is wavy and may represent disturbances in natural depositional patterns (Figure 9). The slice maps do not clearly indicate the presence of pit features based on significant changes in reflectivity. No distinct shapes are observed in the slices that correspond to features located during excavation (Figure 10).

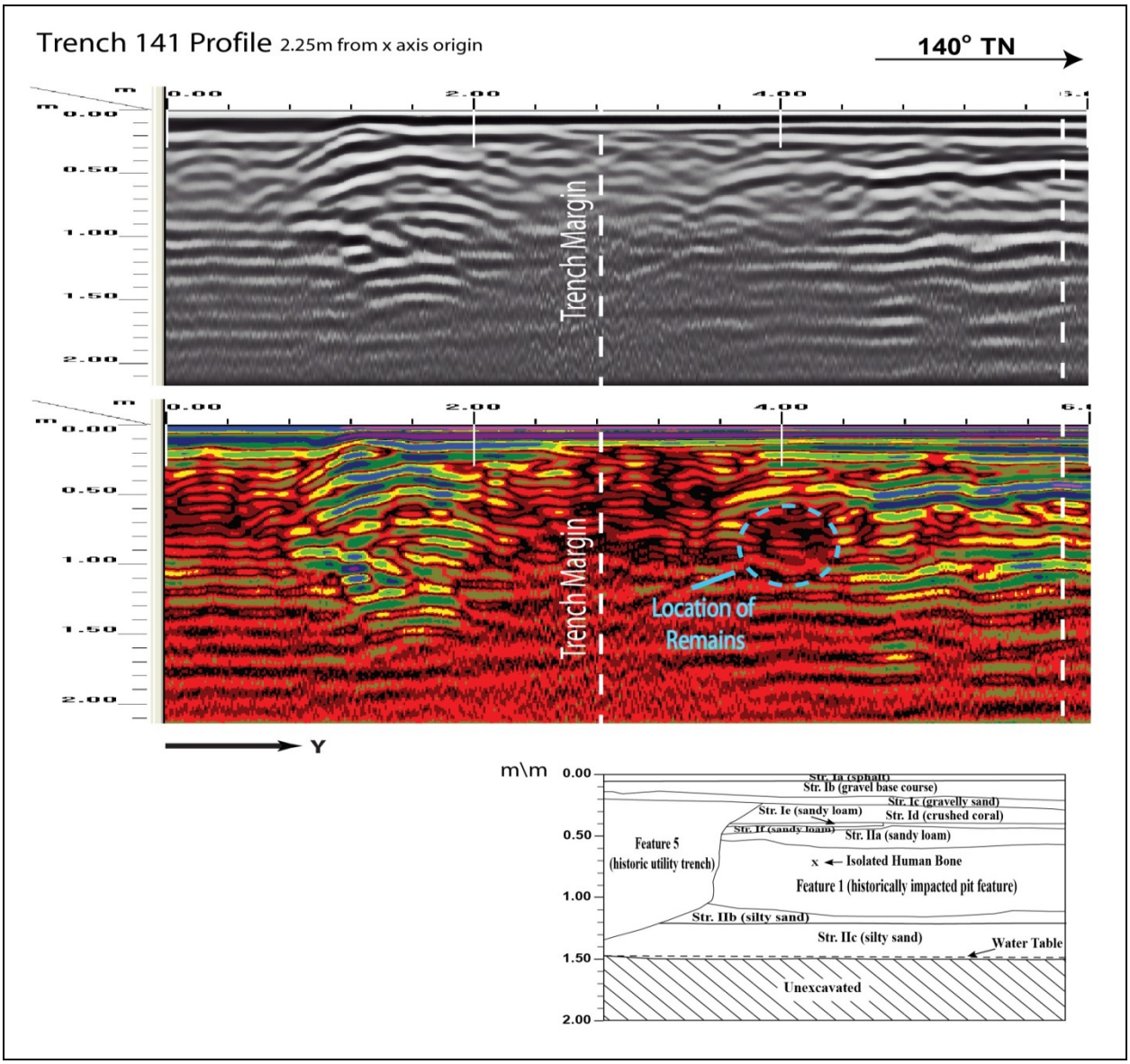

Figure 9. Visual comparison of excavated profile and GPR signal profile for Test Excavation 141

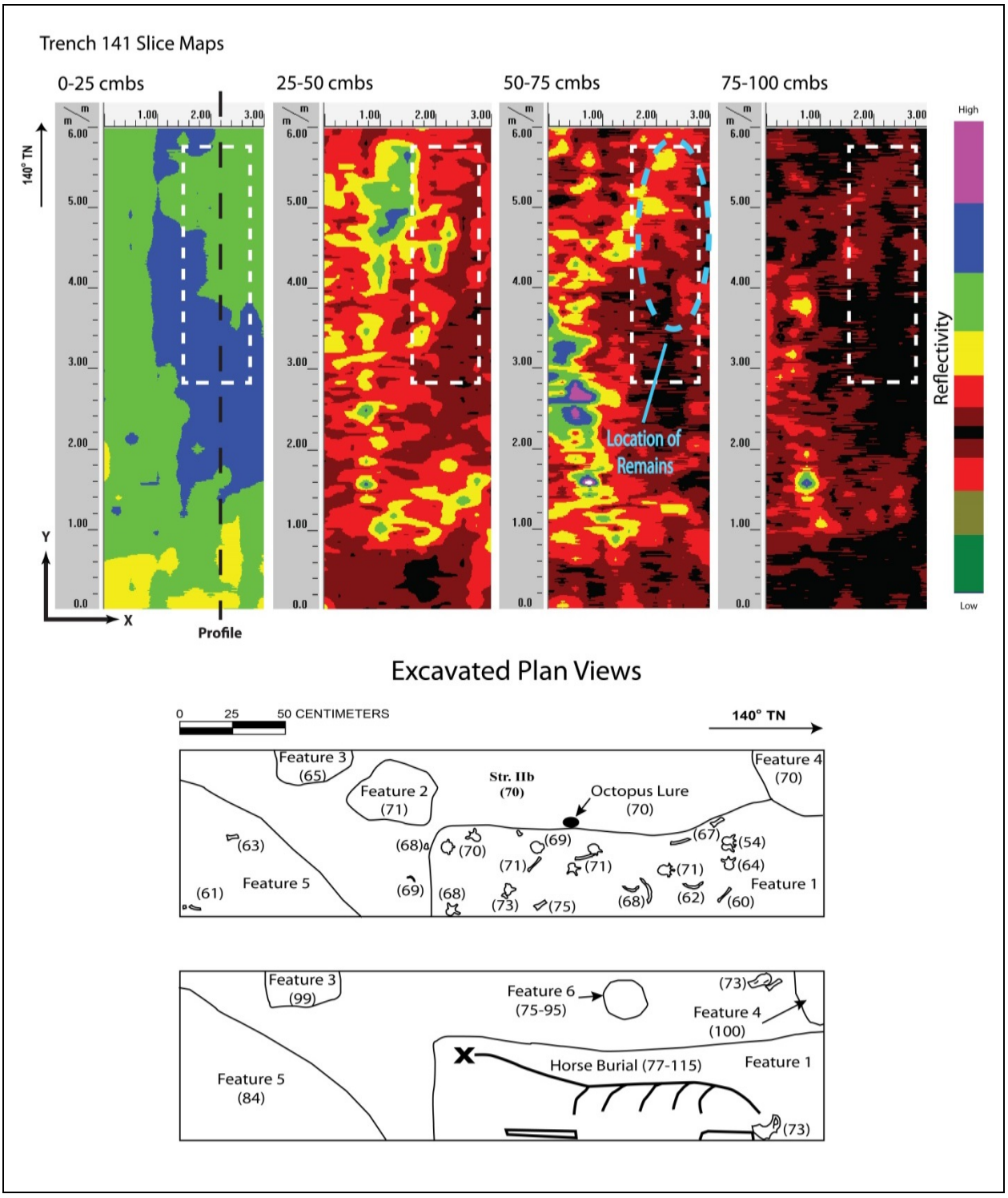

Figure 10. Visual comparison of excavated plan views and GPR slice maps for Test Excavation 141

5.3 Test Excavation 142

5.3.1 Excavation Results

T-142 contained a subsurface, culturally enriched, former A-horizon with four associated features (Features 2, 3, 5, and 6). Three additional features (Features 1, 4, and 7) were documented within the test excavation, although they were related to historic and modern fill events and are not considered part of SIHP #50-80-14-5820. Additionally, an *in situ* human burial was documented in the natural Jaucas sand layer directly underlying the former A-horizon. The burial had a faint burial pit and it was unclear if the pit originated from the former A-horizon or the natural Jaucas sand layer.

The *in situ* burial was only minimally uncovered. The burial pit ranged in depth from 0.80 mbs to 1.25 mbs. The skeletal remains ranged in depth from 1.00 mbs to 1.12 mbs. Based on the observable remains and the size of the burial pit, the burial was flexed or partially flexed. The head appeared to be to the north, while the feet appeared to be to the south. The size of the remains suggested that the burial was an adult or adolescent individual. Neither sex nor ancestry was able to be determined osteologically; however, based on the location and size of the burial, along with a lack of grave goods, the burial is likely traditional Hawaiian.

The former A-horizon was composed of dark grayish brown sandy loam with charcoal flecking and ranged in depth from 0.53 mbs to 0.95 mbs. It appeared to be historically impacted as glass and ceramic fragments were observed within the top portion of the layer. A bulk sample of this stratum contained charcoal, midden, and miscellaneous, non-midden gastropods and limpets.

Feature 2 contained traditional Hawaiian artifacts, including an *‘ulu maika*; a fire-cracked, water-worn basalt cobble; and several flakes from fire-cracked rocks. Historic artifacts were also documented within this feature: two pottery shards and rusted metal pieces were documented. Additionally, this feature contained charcoal, non-midden shell, and fish remains.

Feature 3 contained both traditional Hawaiian and historic artifacts. Historic artifacts included a possible ceramic fragment, a clear glass fragment, and a piece of rusted metal. The single traditional Hawaiian artifact was identified as a shell fishhook. Additionally, charcoal, midden, non-midden shell, water-worn rocks, and faunal remains (cow, fish, rat) were documented.

Feature 5 contained charcoal, midden, non-midden shell, a fragment of vesicular basalt, faunal remains (bird, cow, pig, fish), and several historic artifacts (earthenware, ceramic, metal, and glass fragments).

Feature 6 contained a small amount of charcoal, midden, non-midden shell, and faunal remains (pig, cow, dog, fish).

5.3.2 GPR Interpretation

The human remains encountered during the excavation of T-142 consisted of an *in situ* burial discovered naturally deposited Jaucus sand. There are no distinct hyperbolic reflections observed in the profile that can clearly be linked to the burial (Figure 7). The slice maps do not clearly indicate the presence of pit features based on significant changes in reflectivity. No distinct shapes are observed in the slices that correspond to features observed during excavation (Figure

8). This burial represents the only *in situ,* fully articulated human remains discovered during Section 4.

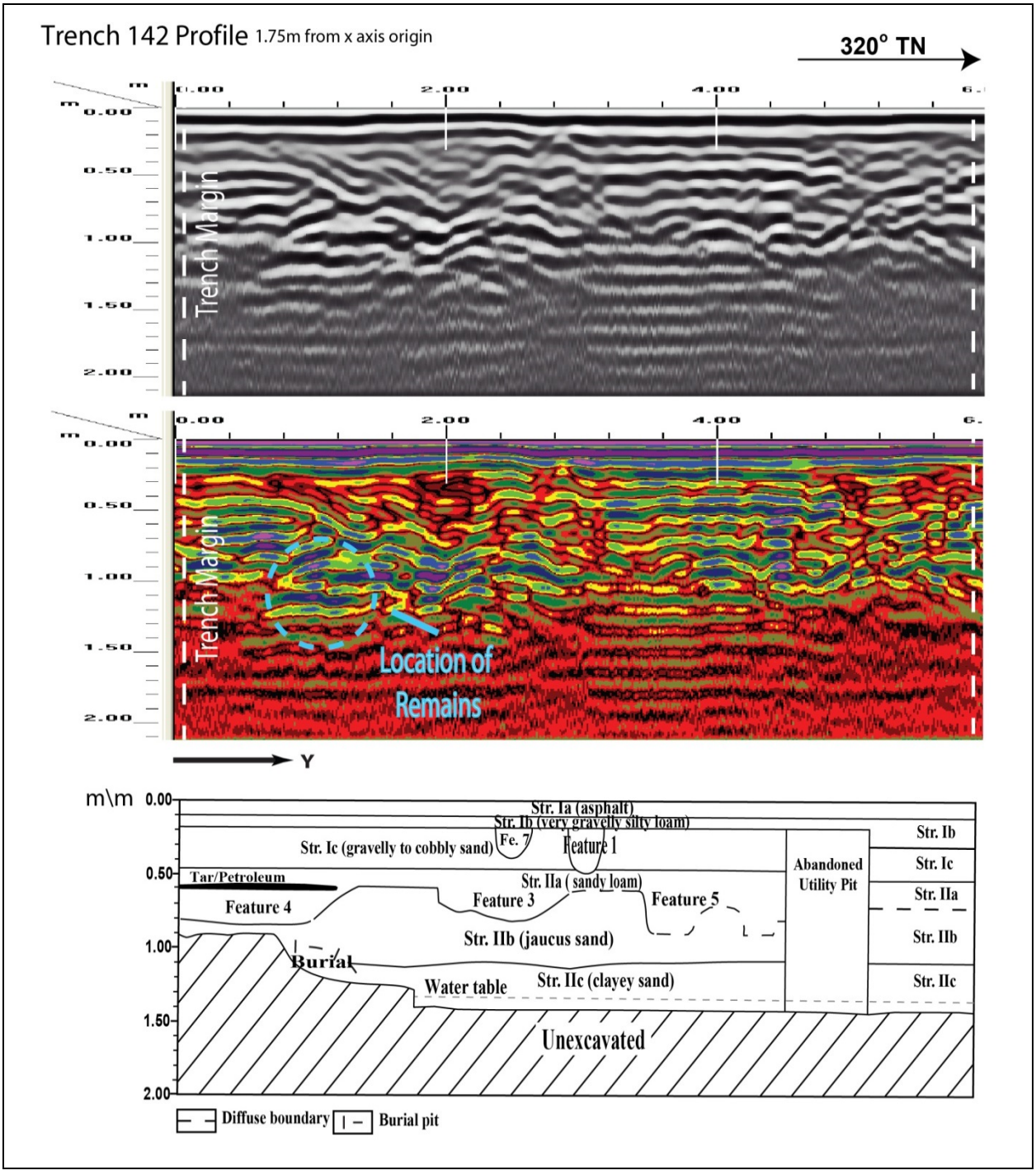

Figure 11. Visual comparison of excavated profile and GPR signal profile for Test Excavation 142

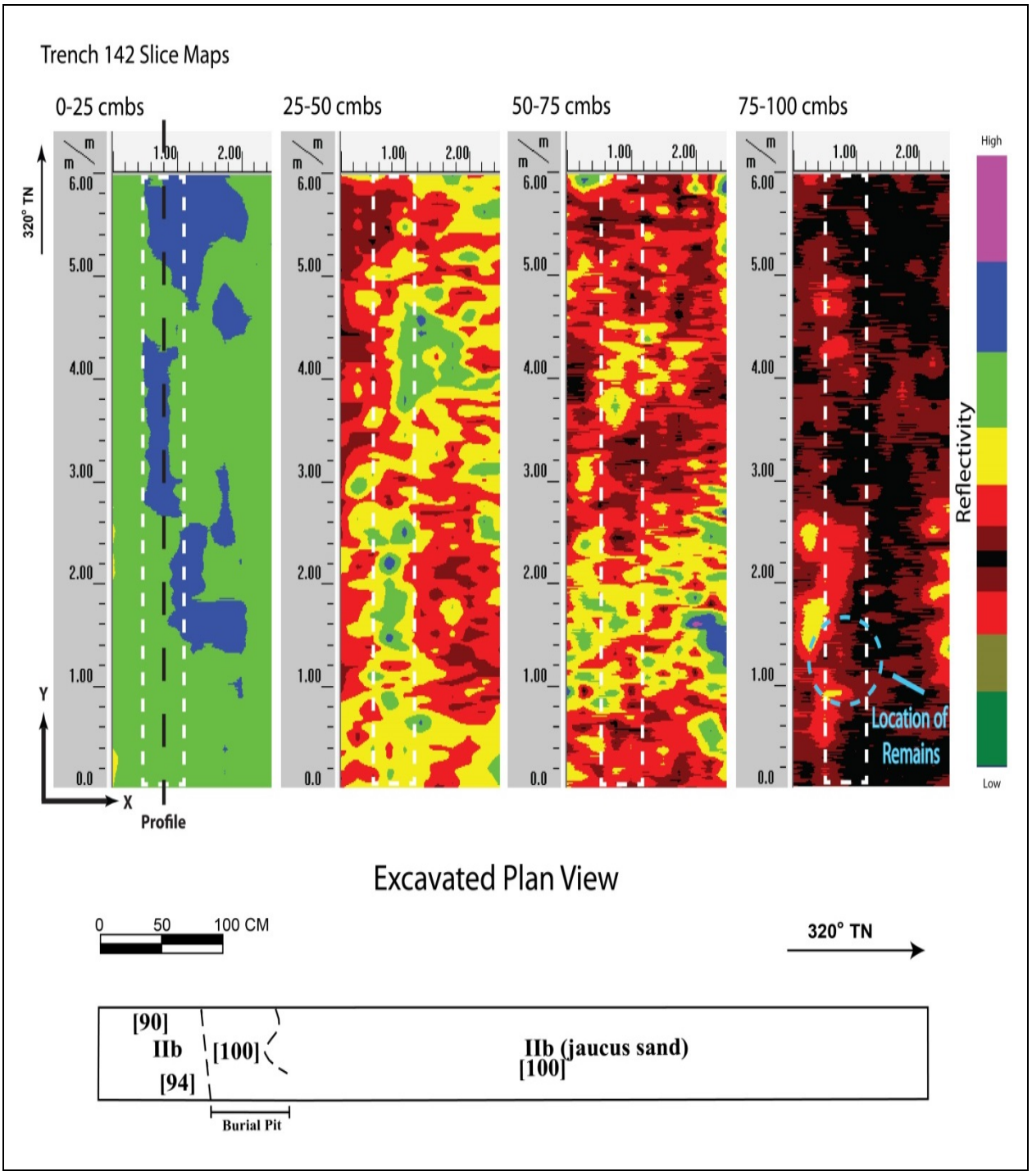

Figure 12. Visual comparison of excavated plan views and GPR slice maps for Test Excavation 142

5.4 Test Excavation 150

5.4.1 Excavation Results

T-150 contained a subsurface, culturally enriched, former A-horizon with three associated features (Features 1, 2, and 3). Stratum Ia was a concrete sidewalk followed by a base coarse (Stratum Ib) and then a very disturbed gravelly, silty, loam (Stratum Ic) that consisted of bits of brick, metal and glass construction debris in addition to crushed coral. The former A-horizon was designated as the next Stratum, Stratum II and was composed of pale brown loamy sand and undulated in depth from 0.53 mbs to 1.31 mbs. This stratum was the origination point of the three features and contained marine midden, fire-cracked rock, a water-rounded cobble, a possible human modified basalt fragment, and faunal remains (pig, fish, and possibly cat). Features 1 and 2 were eventually combined after further excavation revealed subsurface proximity. Feature 3 was later determined to be its own stratum and not a feature.

The human bone was discovered in Feature 1 at depth of 0.75 mbs to 1.05 mbs and identified by a CSH osteologist to be a posterior fragment of a proximal tibia. The fragment was 8 cm in length and was beveled on one end with a polished sheen. Whether this bone fragment was from the right or left tibia or whether it was from a male or female human was not able to be determined. It was decided, however, that the bone had been fractured while still in a fresh state (perimortem trauma) producing the existing fragment. From the cut marks on the bone it was also concluded to have been cut by a repetitive sawing motion and that this motion led to the further polished appearance. No other human remains were revealed in this excavation.

Feature 1 was a dark, charred, undulating intrusion into the Jaucas sand extending down from the former A-horizon. Feature 1 was found from 0.75 mbs to 1.05 mbs and was 0.75 m wide. It contained a worked human bone, fire-cracked rock, shell midden and a modified basalt fragment. The modified basalt fragment had been worked smooth and had striations on one side and was a possible adze fragment.

Feature 2 was an undulating pit extending down from the former A-horizon and intruding into Feature 3 and into the natural Jaucas sand. The feature was found 0.53 mbs to 0.95 mbs and was 1.25 m wide and extending into the south end of the excavation. It contained charcoal, shell midden, non-midden shell, fish remains, and fire-cracked rock.

Feature 3 was a dark charred intrusion extending down from the former A-horizon and intruding into the underlying natural Jaucas sand layer. Feature 3 was 0.90 mbs to 1.30 mbs and 20cm wide and found on the northeast profile only. This feature was truncated by Feature 2. Feature 3 contained charcoal, midden, non-midden shell, a small fragment of volcanic glass, and fish remains.

After the human remains were discovered and secured and with the permission of SHPD/OIBC to further excavate the rest of the test excavation, no further human remains were encountered.

5.4.2 GPR Interpretation

The human remains encountered during the excavation of T-150 consisted of a posterior fragment of a proximal tibia located in Jaucas sand. It is very difficult for the GPR to resolve such a small object, especially in a disturbed context with natural sediments truncated by fill

events. There are no distinct hyperbolic reflections observed in the profile that can clearly be linked to the remains (Figure 13). The slice maps do not clearly indicate the presence of pit features based on significant changes in reflectivity. No distinct shapes are observed in the slices that correspond to features located during excavation (Figure 14).

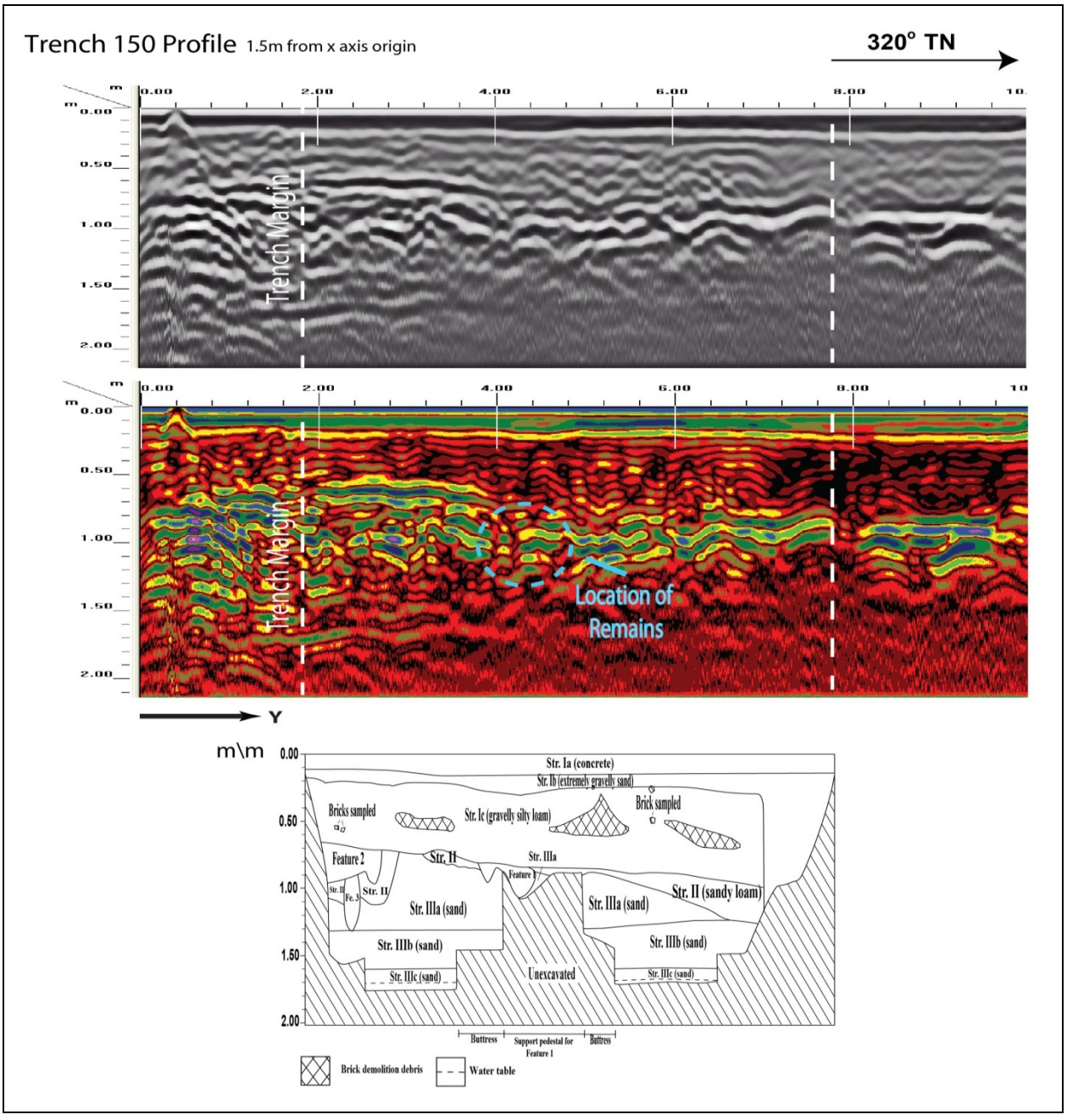

Figure 13. Visual comparison of excavated profile and GPR signal profile for Test Excavation 150

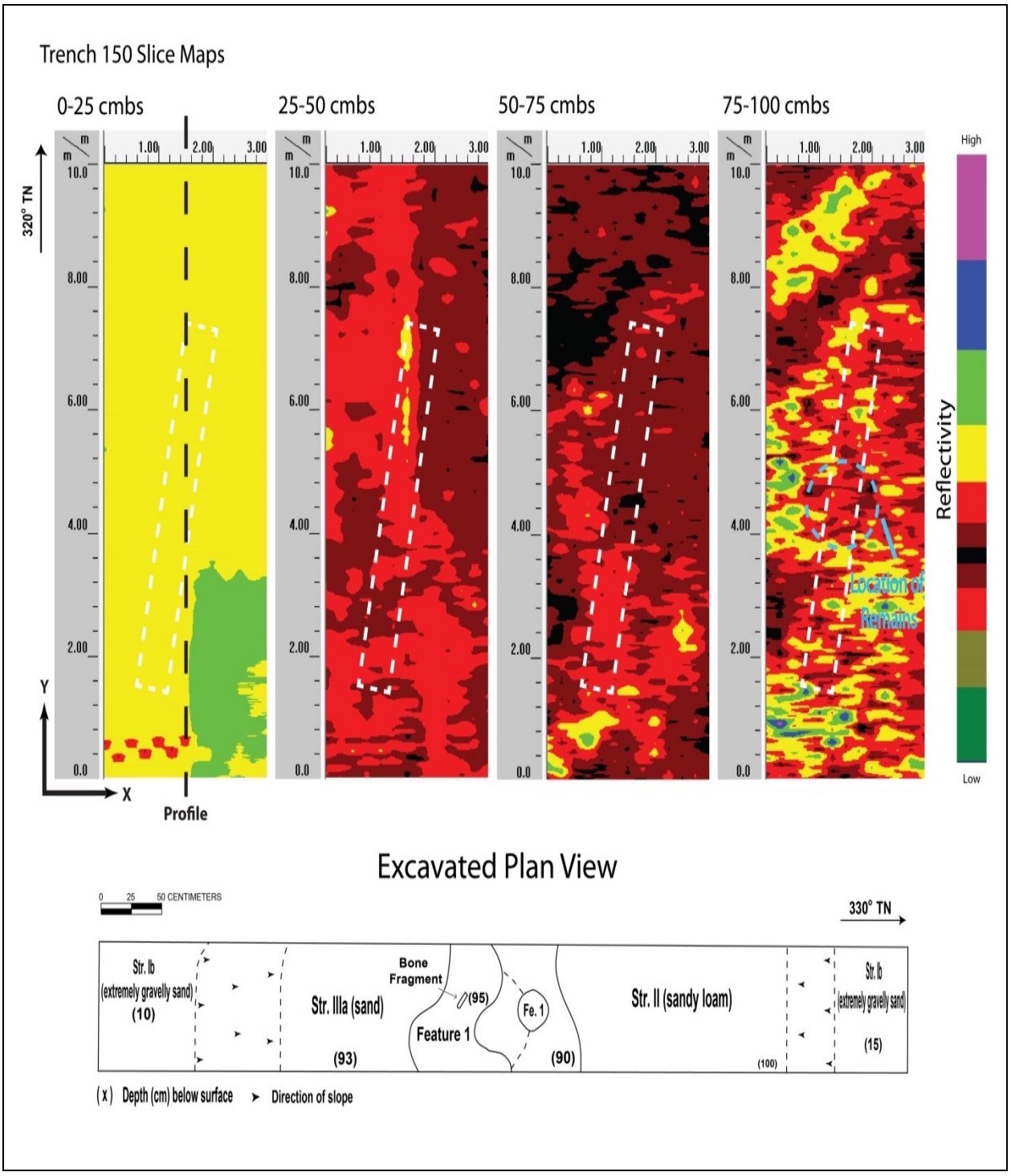

Figure 14. Visual comparison of excavated plan views and GPR slice maps for Test Excavation 150

5.5 Test Excavation 170

5.5.1 Excavation Results

T-170 contained four layers of construction fill (Stratums Ia-Id), a buried A-horizon (Stratum II), natural Jaucas sand (Stratum III), a loamy sand (Stratum IV), and finally a shallow marine sediment (Stratum V). The subsurface, A-horizon was a very dark, grayish, brown (10 YR 3/2), coarse, silty, sand. This non-cultural, A-horizon was designated as Stratum II and had depths of 0.41 mbs to 0.75 mbs. There were no features or pits coming from this stratum, however, when the excavation was completed and a bulk sample was attempted to be collected from the southeast wall at the west end of the excavation at 0.65 mbs, a human cranial fragment was exposed.

The isolated human cranial fragment was determined by a CSH osteologist to be a left temporal fragment including the mastoid process portion and root of the zygomatic arch. The fragment was approximately 0.06 m by 0.06 m and found in situ in the sidewall. There was somewhat limited observation since the rest of the segment was still in place in the sidewall so the age and sex was unable to be determined, however, enough of the bone was exposed to be able to determine that it was human in origin. In addition, the exposed bone was small and gracile. This could indicate that the subject might have been either a female or a young adult.

The excavation of T-170 was complete upon discovery of the human cranial fragment in the southwest wall but since a bulk sample of the A-horizon was in progress upon finding the fragment, further collections of soils and other samples was halted. The natural sand layers below the A-horizon were observed before the cranial discovery to a final depth of 1.16 m.

No additional features were observed during excavation.

5.5.2 GPR Interpretation

The human remains encountered during the excavation of T-170 consisted of a left temporal fragment located in Jaucas sand. It is very difficult for the GPR to resolve such a small object, especially in a disturbed context with natural sediments truncated by fill events. There are no distinct hyperbolic reflections observed in the profile that can clearly be linked to the remains (Figure 15). The slice maps do not clearly indicate the presence of pit features based on distinguishable shapes formed from changes in reflectivity (Figure 16).

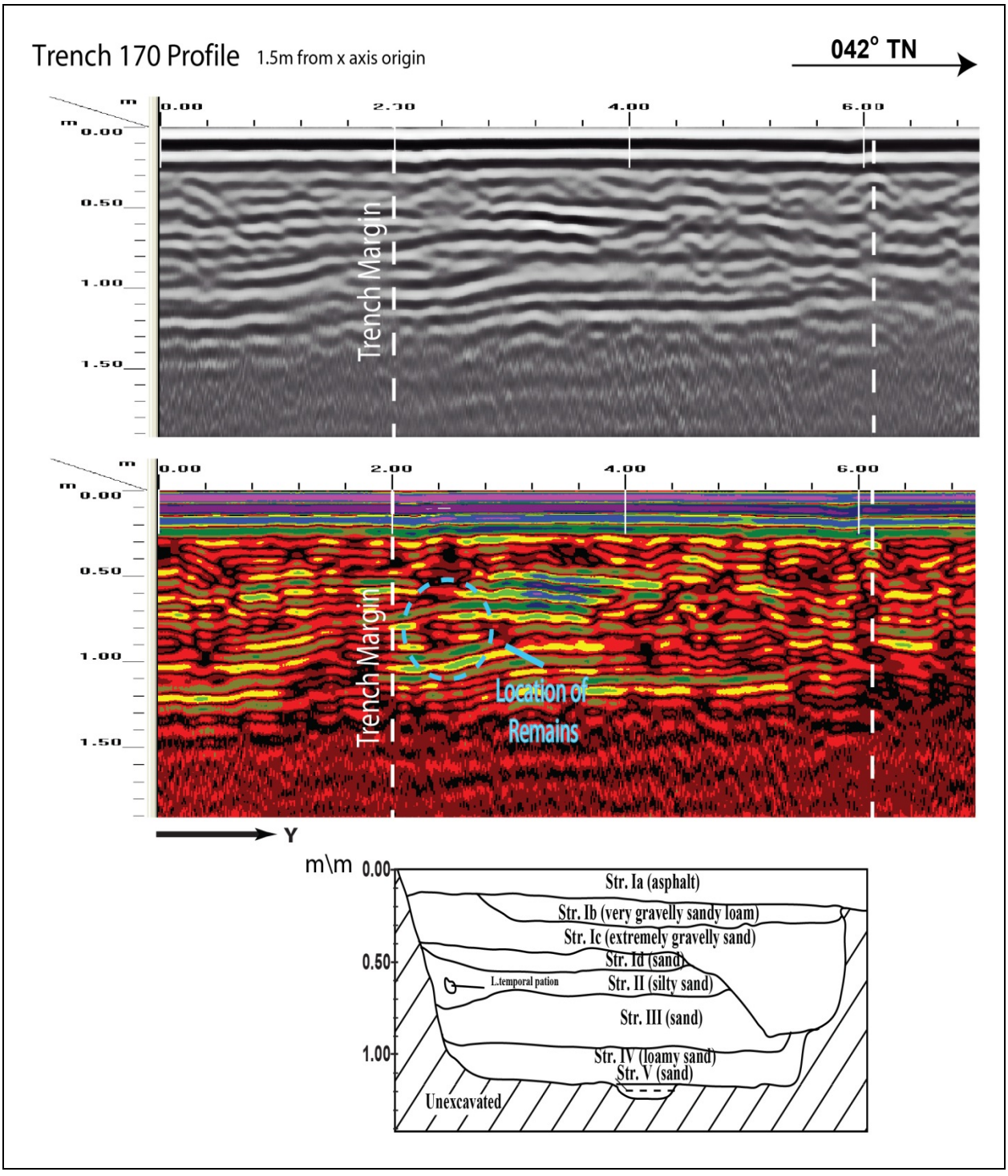

Figure 15. Visual comparison of excavated profile and GPR signal profile for Test Excavation 170

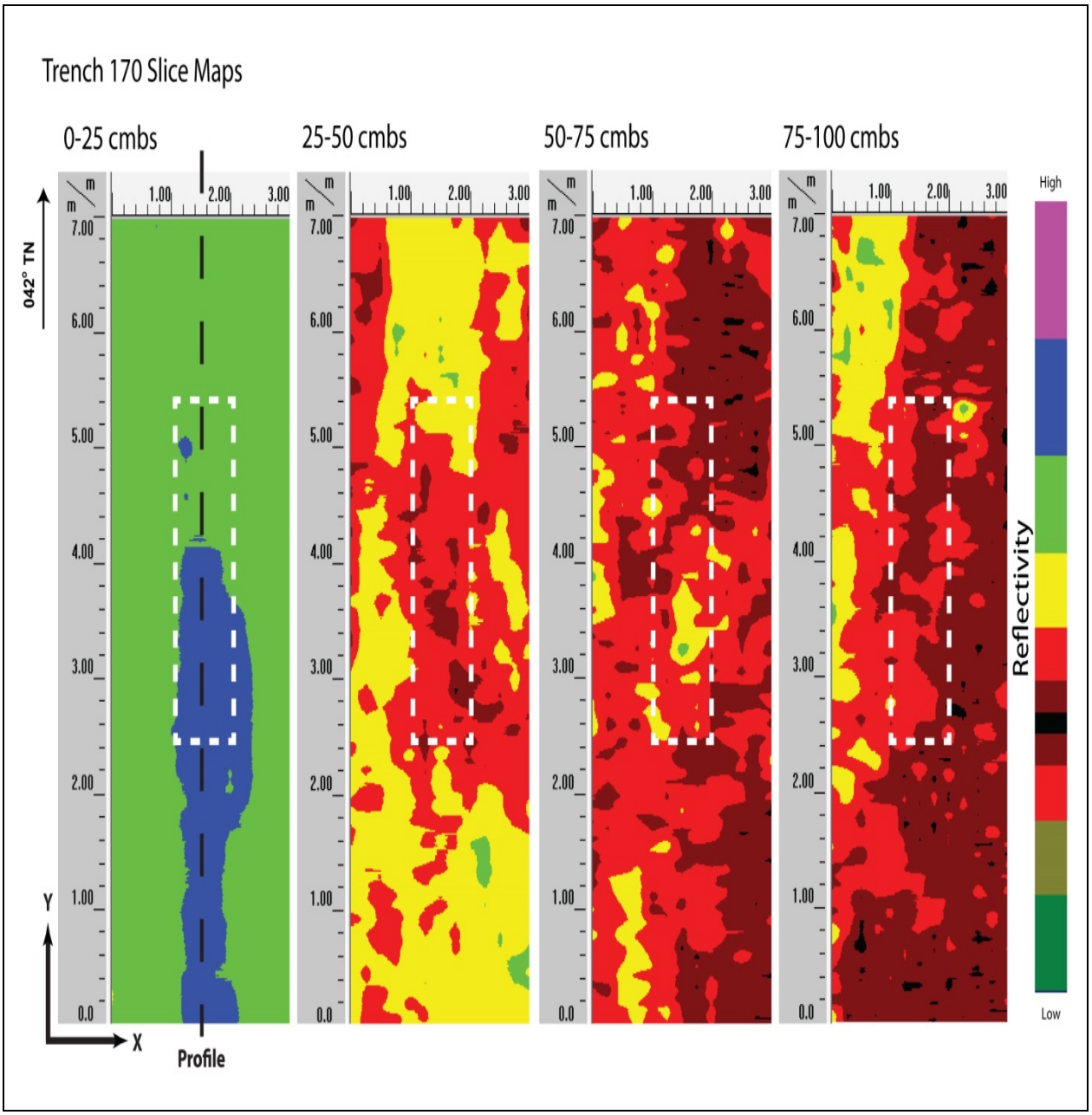

Figure 16. GPR slice maps for Test Excavation 170

5.6 Test Excavation 226C

5.6.1 Excavation Results

Excavation 226C was a moderately disturbed excavation including four strata that had been modified by modern humans followed by the naturally occurring Jaucas sand. Stratum Ia consisted of asphalt, Stratum Ib was designated as utility test excavation fill, Stratum Ic was a mixed fill with crushed coral with a very disturbed A-horizon at its base, and Stratum Id was a re-deposited sand. Finally Stratum II was natural, Jaucas sand. Stratum II was the stratum where a human pelvis had been encountered. Four features were revealed during excavation that had originated from Stratum Id and the disturbed A-horizon (Features A-D).

The human pelvis was designated as Feature D and found between Stratum Id and the natural sand in Stratum II at a depth of 1.15 mbs, 0.10 m above the water table and coral shelf. A CSH osteologist confirmed that the remains were, in fact, human. The remains appeared to be a somewhat fragmented, left and right oscoxae and a sacrum. There was no observed articulation, however the remains could have continued into the south wall. A small pit was apparent in the south wall surrounding the remains and included a fragmented ceramic dish that was recovered 4cm above the remains within the pit staining. The condition of the remains seemed to indicate that this was a previously disturbed burial given that there is no apparent leg bone articulation and that the fragmented ceramic dish was found above the remains. This may suggest that either the burial represents a secondary burial and that the remains could have been previously removed from an in situ burial. The age and sex of the segmented human remains were indeterminate without further excavation and study.

A total of four potential features (Feature A–D) were documented within T-226C. Feature A and Feature B were documented as extensions of the locally-procured mixed loamy sand fill (Ic). Feature C was documented as a truncated pit that was observed at the lower boundary of the locally-procured sand fill (Id) extending to within natural Jaucas sand (II). Feature D was documented as a burial pit containing a previously disturbed burial that was observed at the lower boundary of the locally-procured sand fill (Id) extending to within natural Jaucas sand (II).

Feature A originated at 0.78 m below surface and terminated at 0.97 m below surface. Feature A was circular-shaped in plan and measured 0.42 m long by more than 0.21 m wide, extending into one excavation sidewall. In profile, Feature A was observed as a diffuse pit with downward tapering sidewalls and a rounded bottom. A 2 gallon bulk sediment sample was collected from Feature A, and the remainder of the feature (approximately 5 gallons) was hand excavated and screened (see below). The sediment comprising Feature A, as well as the sediment of the associated fill layer (Ic) appears to be former culturally-enriched sand A-horizon material that was locally-procured, mixed with other fill material, and redeposited. The stratigraphic association with fill deposits (Ic) above the former land surface indicates that Feature A likely post-dates Feature C (pit feature) and Feature D (burial).

Feature B originated at 0.70 m below surface and terminated at 1.13 m below surface. Feature B was circular-shaped in plan and measured 0.30 cm long by more than 0.15 m wide, extending into one excavation sidewall. In profile, Feature B was observed as a pronounced pit with straight sides and a slightly rounded bottom containing a preserved wooden post. The wooden post and fire-cracked rock were collected from Feature B (see below). Feature B is interpreted as

a post mold containing a preserved post. The stratigraphic association with fill deposits (Ic) above the former land surface indicates that Feature B likely post-dates Feature C (pit feature) and Feature D (burial).

Feature C originated at 1.14 m below surface and terminated at 1.39 m below surface, 0.09 m below the documented water table. Feature C was ovular-shaped in plan and measured 0.30 cm long by more than 0.07 m wide, extending into one excavation sidewall. In profile, Feature C was observed as being horizontally truncated by overlying sand fill (Id). The pit was clearly defined with straight sides and a rounded bottom. A 1 gallon bulk sediment sample was collected from Feature C (see below). Feature C was interpreted as a remnant pit feature that once extended from the base of the former land surface (A-horizon), but has been disturbed and horizontally truncated by fill deposits. The function of Feature C is indeterminate.

Feature D originated at 1.15 m below surface and terminated beyond the base of excavation of T-226C. The Feature D burial pit was generally circular-shaped in plan and measured 0.45 m long by more than 0.23 m wide, extending into one excavation sidewall. Feature D was not observed in profile as excavation was ceased upon the discovery of human skeletal remains consisting of a pelvis with no articulating leg elements. Feature D was covered, a 0.50 m buffer was formed, and the buffer and feature were pedestaled as excavation continued to beneath the water table to the northwest and southeast. Feature D is considered to be a burial pit containing human skeletal remains that once extended from the base of the former land surface (A-horizon), but has been disturbed and horizontally truncated by fill deposits.

5.6.2 GPR Interpretation

The human remains encountered during the excavation of T-226C consisted of a non-articulated pelvis located between Stratum Id and the natural sand in Stratum II at a depth of 1.15 mbs, 0.10 m above the water table and coral shelf. The location of the remains was beyond the range of clean signal return. There are no distinct hyperbolic reflections observed in the profile that can clearly be linked to the remains (Figure 17). Although a distinct pit was associated with the remains, the slice maps do not clearly indicate the presence of a pit feature based on significant changes in reflectivity. No distinct shapes are observed in the slices that correspond to features located during excavation (Figure 18).

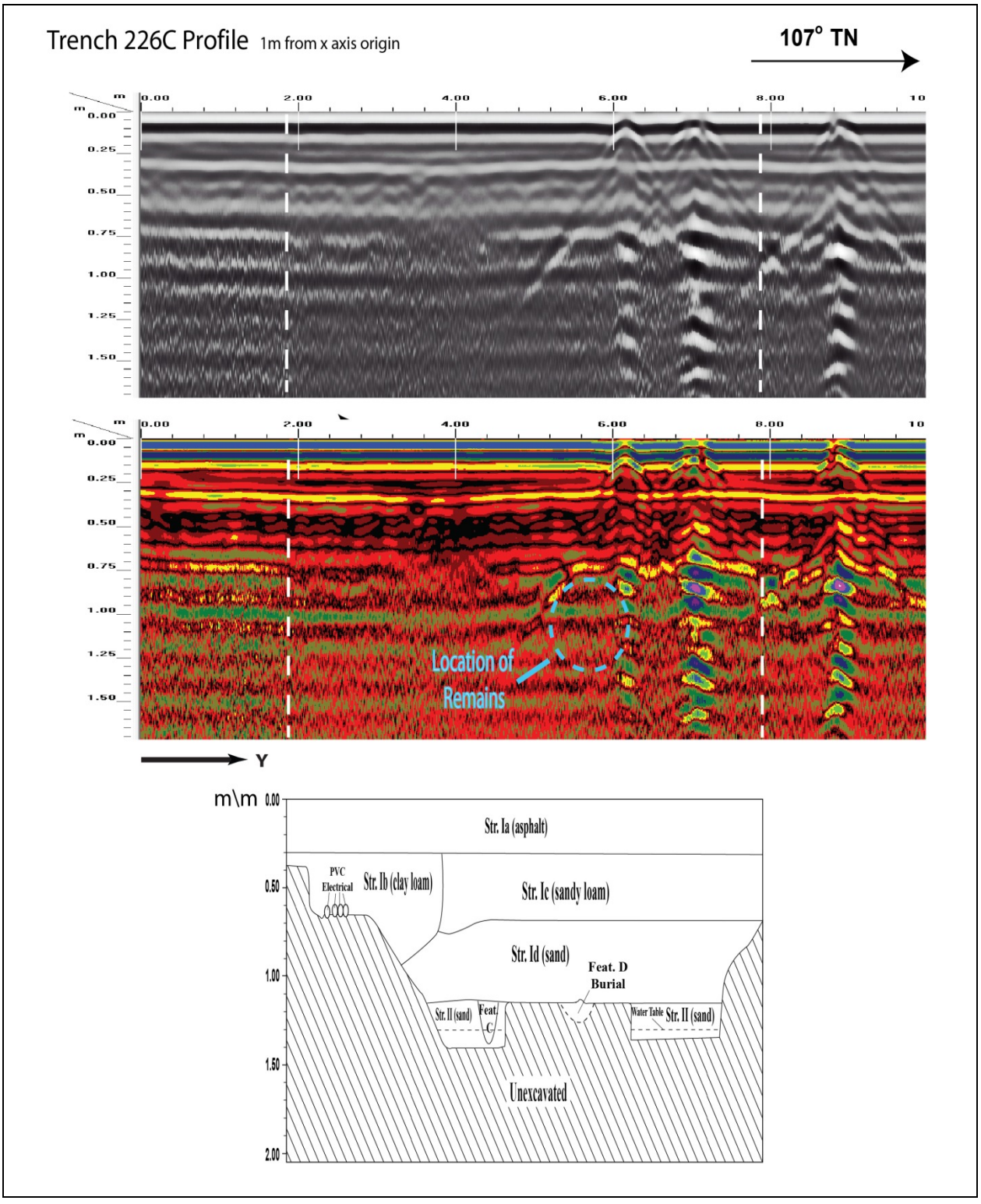

Figure 17. Visual comparison of excavated profile and GPR signal profile for Test Excavation 226C

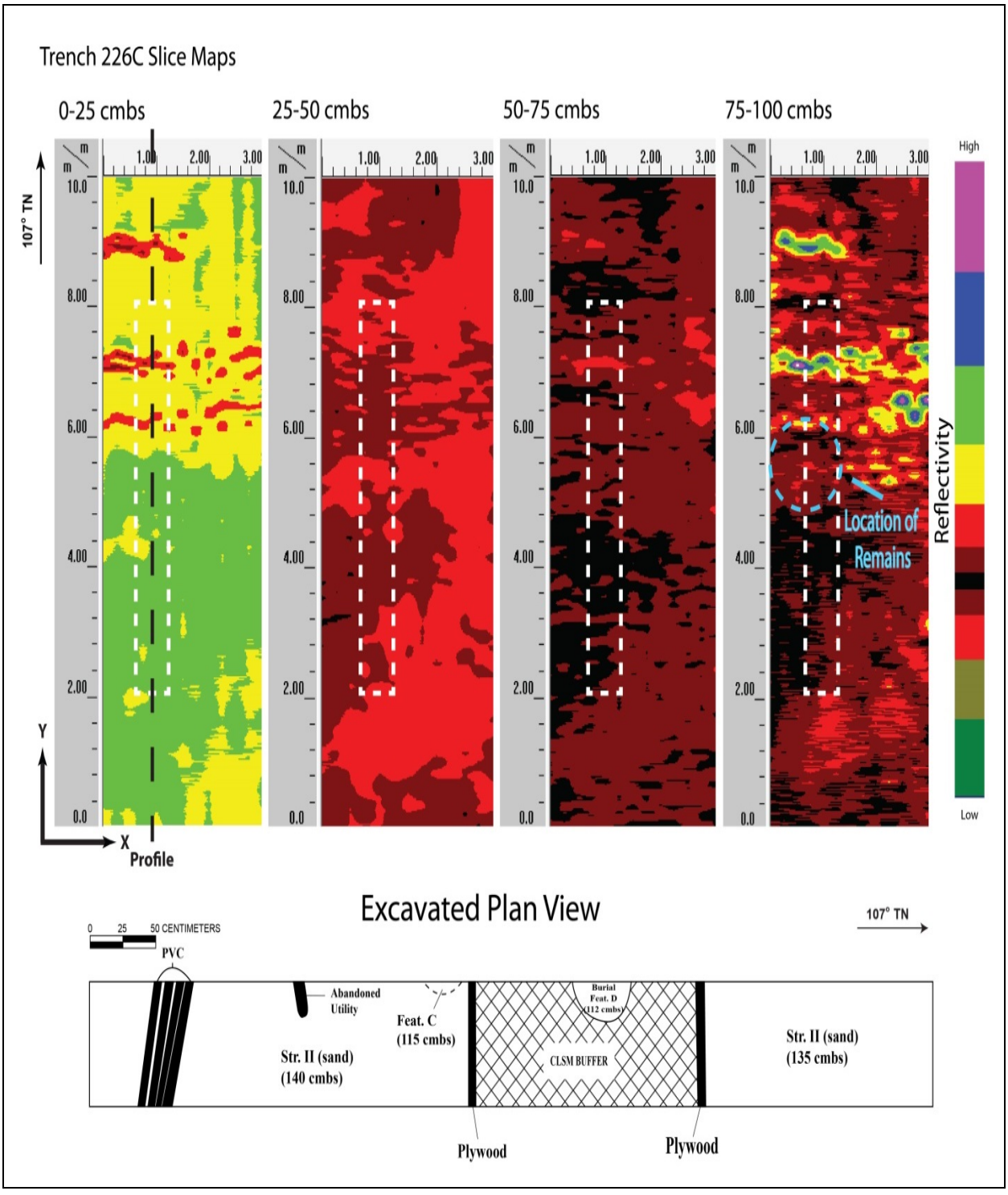

Figure 18. Visual comparison of excavated plan views and GPR slice maps for Test Excavation 226C

5.7 Test Excavation 227A

5.7.1 Excavation Results

Excavation 227A consisted of four stratum of man-made fill (Stratum Ia-Id), a culturally enriched A-horizon (Stratum IIa), Jaucas sand (Stratum IIb), clay sand (Stratum III), and the coral shelf at 1.4 m (Stratum IV). The intact A-horizon consisted mostly of marine shell midden, and fire cracked rock. Five features were associated with this excavation and an infant human burial was found in Stratum IIa.

A partial human burial was discovered at 125 mbs in the natural Jaucas sand and in the A-horizon (Stratum IIa) within the northeast section of T-227A. The burial was determined by a CSH osteologist to be that of a juvenile (0–3 years old). Due to the Jaucas sand sticking to the fragile, cranial fragments and general poor condition of the remains, a more precise age and/or sex was not able to be determined. There was no visible pit outline surrounding the burial.

Feature 1 was found in the center of the excavation at Stratum IIa at a depth of 1.03 mbs to 1.08 mbs. It was observed as a dark, square shaped, stain. Shell midden, faunal bone (fish), fire cracked rock, and a brick fragment was recovered from this feature.

Feature 2 was found in the northeast portion of the test excavation floor in Stratum IIa at a depth of 1.08 mbs to 1.31 mbs. This feature was a circular staining in the soil and the recovery, after a gallon of soil screening, revealed shell midden, faunal bone and some historics. Further charcoal analysis indicated a date of AD 1720–1810, a late pre-Contact early post-Contact charcoal pit (*kōpiko* and *lama*).

Feature 3 was a pit feature found in Stratum IIb at a depth of 1.17 mbs to 1.30 mbs. It was a circular staining that produced shell midden and faunal bone (medium mammal and a shark tooth).

Feature 4 was a pit feature found in the southeast side wall that had originated from Stratum IIa and was found at depth 0.94 mbs to 1.08 mbs. The recovery from this feature was shell midden, faunal bone (fish), and volcanic glass.

Feature 5 was a pit feature found in the southeast side wall and originated at the diffuse lower boundaries of Stratum IIa and Stratum IIb at a depth of 1.12 mbs to 1.37 mbs. The recovery of this feature was shell and faunal bone (canis lupus familiaris).

Once iwi was encountered, all excavation halted, SHPD was contacted. A 2 m long segment containing covered iwi was left undisturbed. The remaining portion of the test excavation was excavated by hand to a depth of 1.4 m at the coral shelf. No more human remains were encountered during the rest of excavation of this unit.

5.7.2 GPR Interpretation

The human remains encountered during the excavation of T-227A consisted of a partial juvenile burial located in naturally deposited Jaucas sand. The location of the remains was beyond the range of clean signal return. There are no distinct hyperbolic reflections observed in the profile that can clearly be linked to the remains (Figure 19). No distinct pit features were associated with the remains. The slice maps do not clearly indicate the presence of any features

observed during excavation based on discernible shapes created from significant changes in reflectivity (Figure 20).

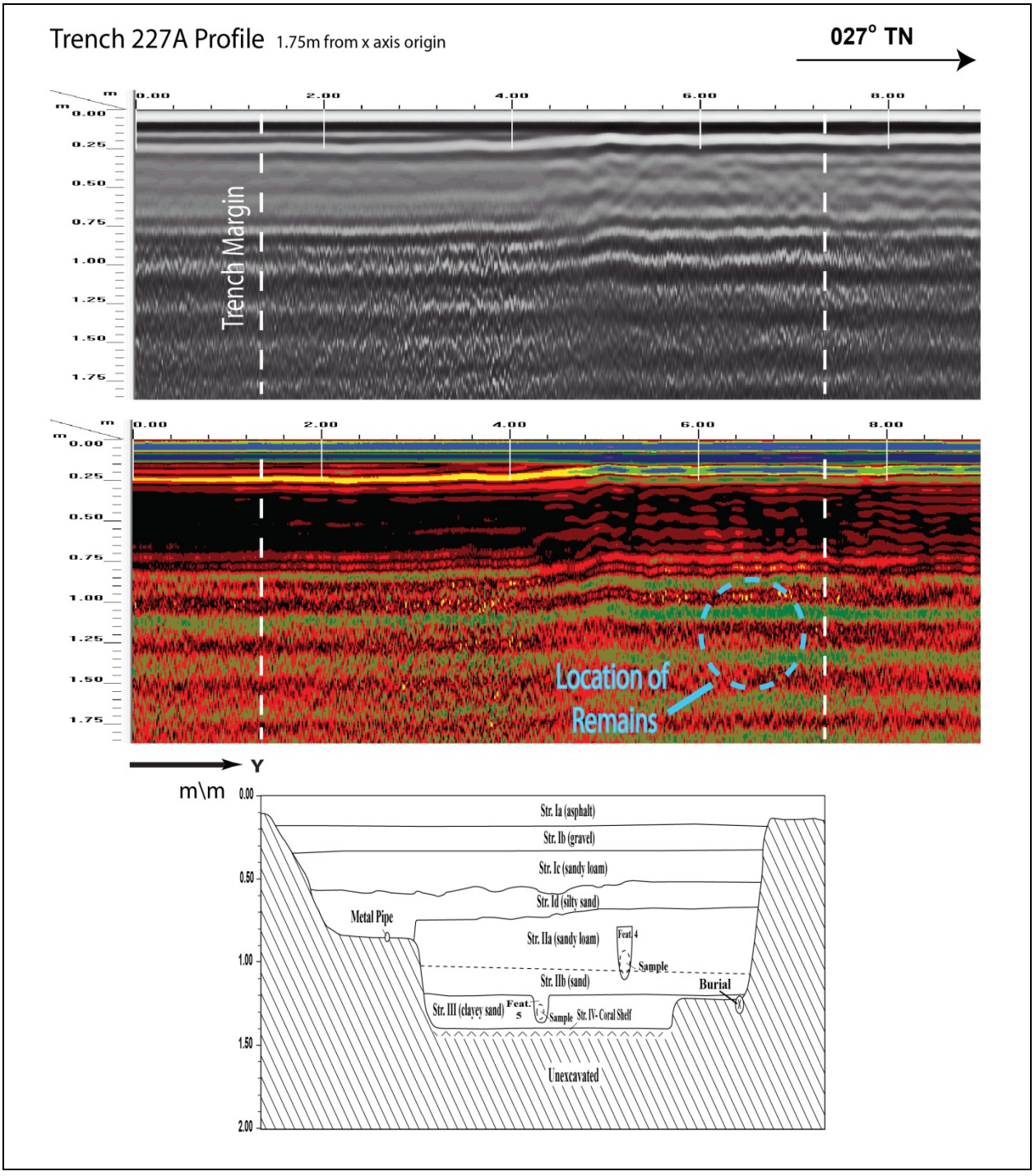

Figure 19. Visual comparison of excavated profile and GPR signal profile for Test Excavation 227A

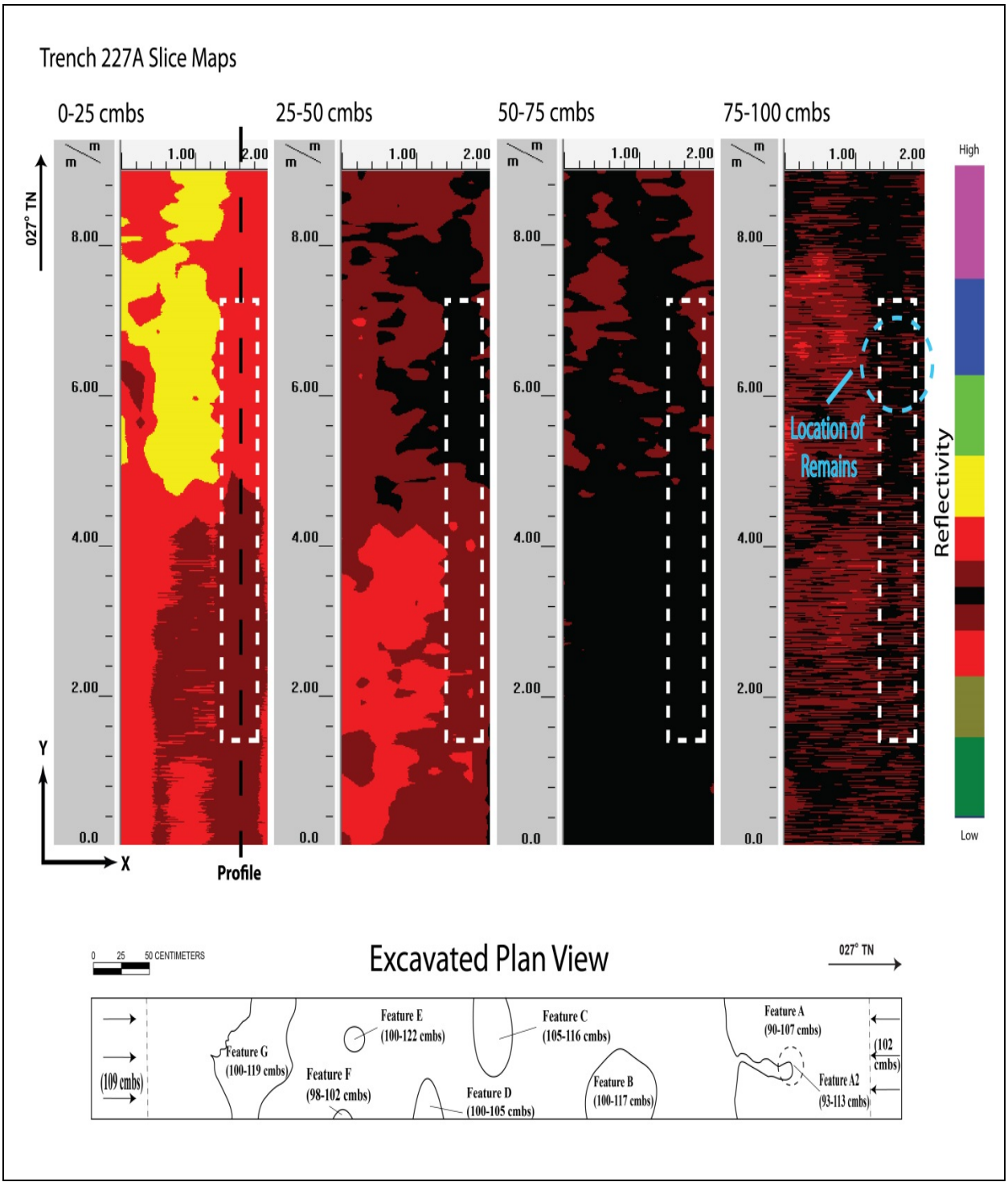

Figure 20. Visual comparison of excavated plan views and GPR slice maps for Test Excavation 227