

Las Capas, an Early Agricultural Irrigation Community in the Santa Cruz River Valley, 1250 to 750 BC



Schematic Chronology and Floodplain Stratigraphy at Las Capas. Geomorphologically Distinct Units With Cultural Occupation Indicated

Early Agricultural Period (Tucson Basin)

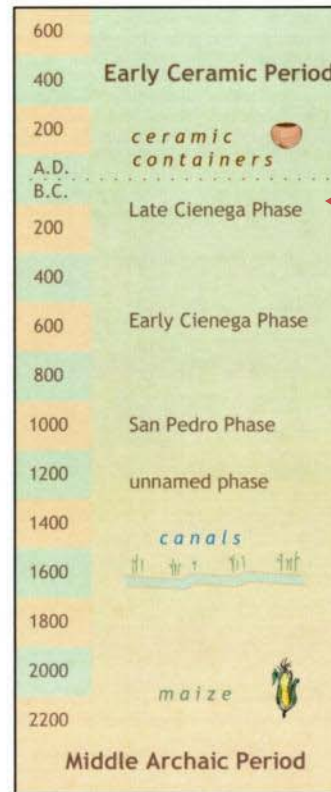
- Spans the introduction of cultigens, irrigation technology, sedentary village life, and ceramic technology

Late Cienega Phase 400 B.C. - A.D. 50

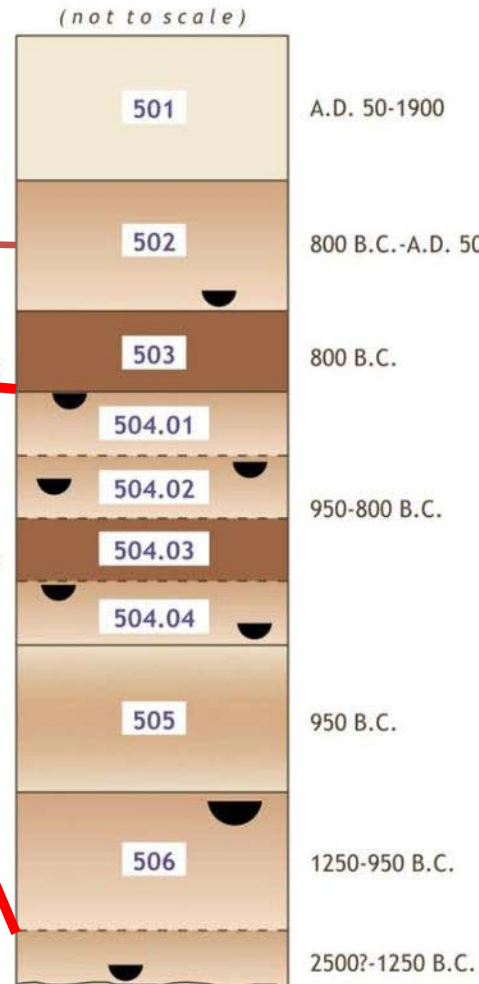
Early Cienega Phase 800 B.C. - 400 B.C.

San Pedro Phase 1200 B.C. - 800 B.C.

"Unnamed Phase" 2100-1200 B.C.
("Silverbell Interval")



LAS CAPAS STRATIGRAPHY SECRET DECODER SHEET



Protohistoric
Classic Period

Cienega Phase

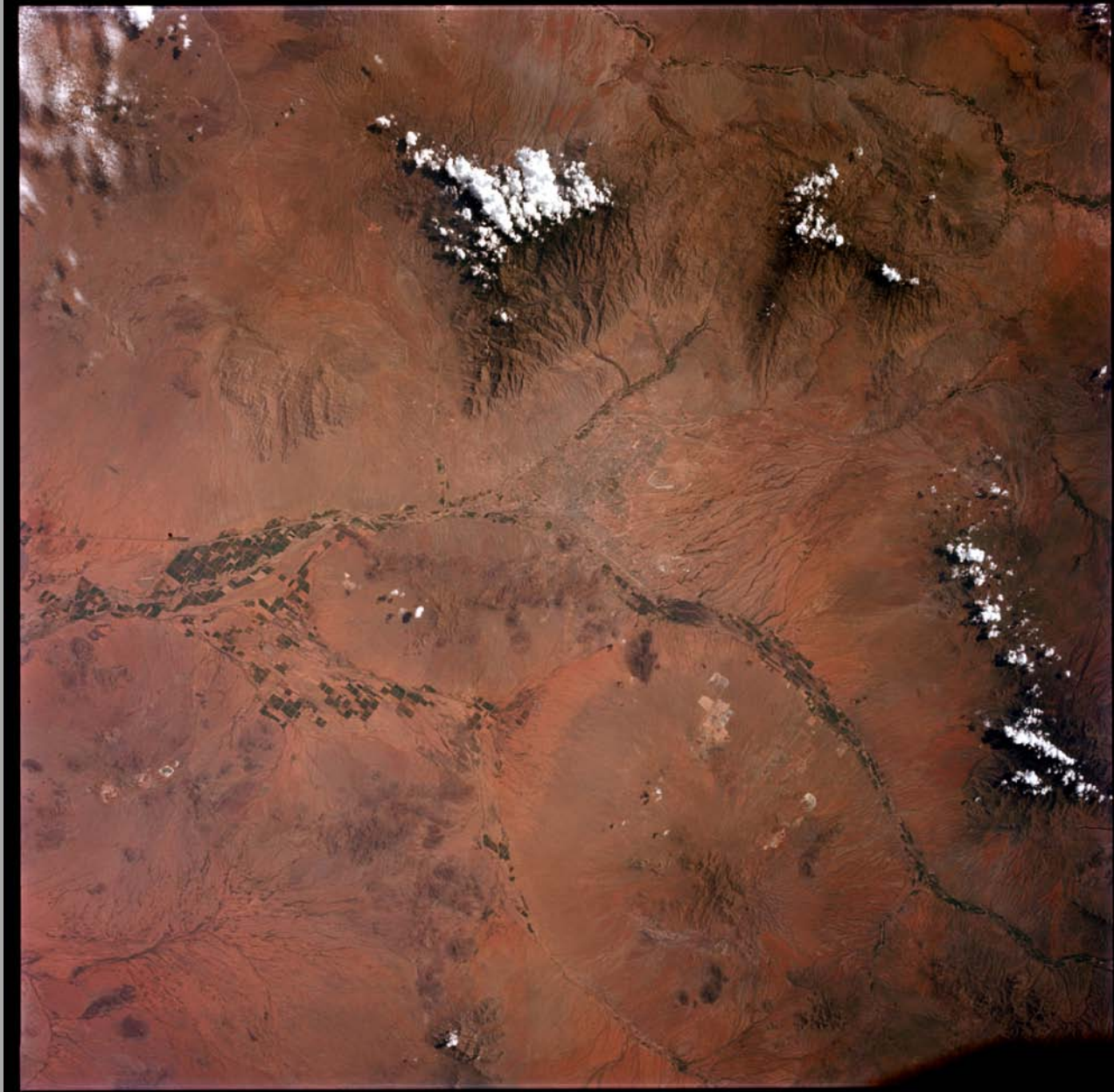
Late San Pedro Phase

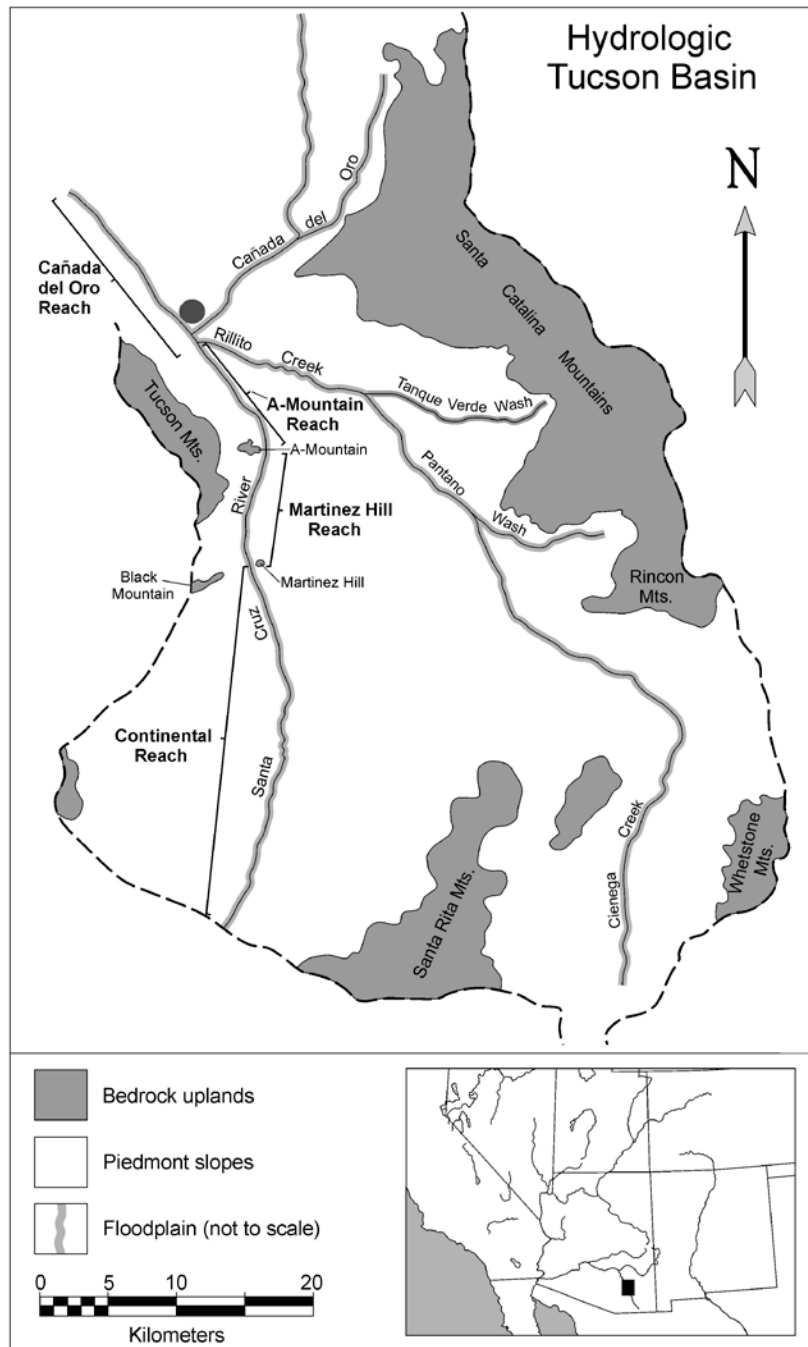
Early San Pedro Phase

501 "strat number"

feature

Tucson from Gemini V, August 8 1965



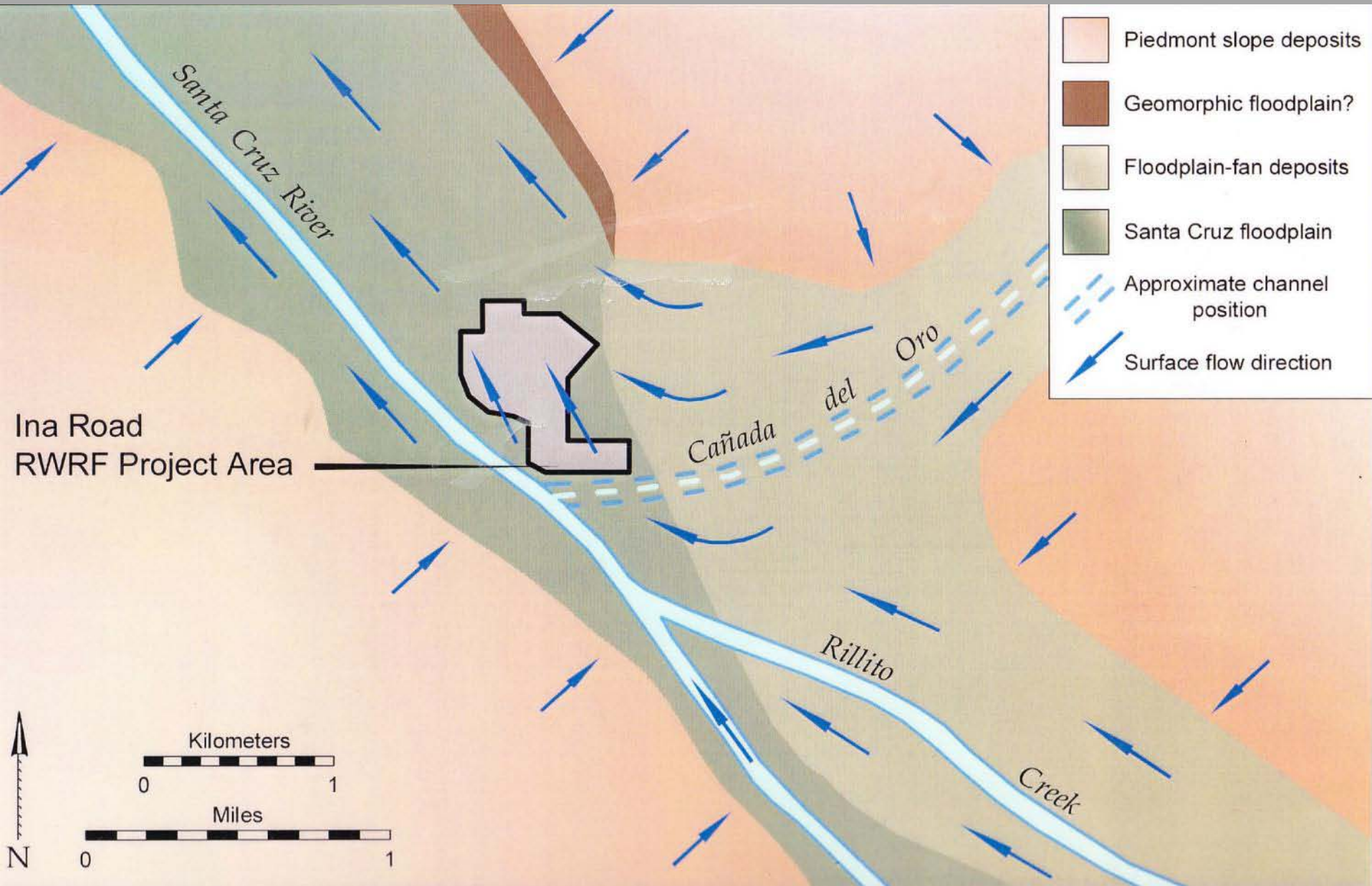


Las Capas (dot) and the hydrologic Tucson Basin.

Stream reaches of the Santa Cruz River indicated. These are areas with gradient and geological features that bring groundwater to the surface.

The location of Las Capas (Canada del Oro Reach) has a watershed nearly twice the size of the stream reaches upstream, and collects water from storms and groundflow over a longer season.

Tributary streams to the Santa Cruz force flow to west side of stream channel, broadening and protecting the flood plain location of Las Capas from many overbank floods, helping preserve irrigable land and the site itself.

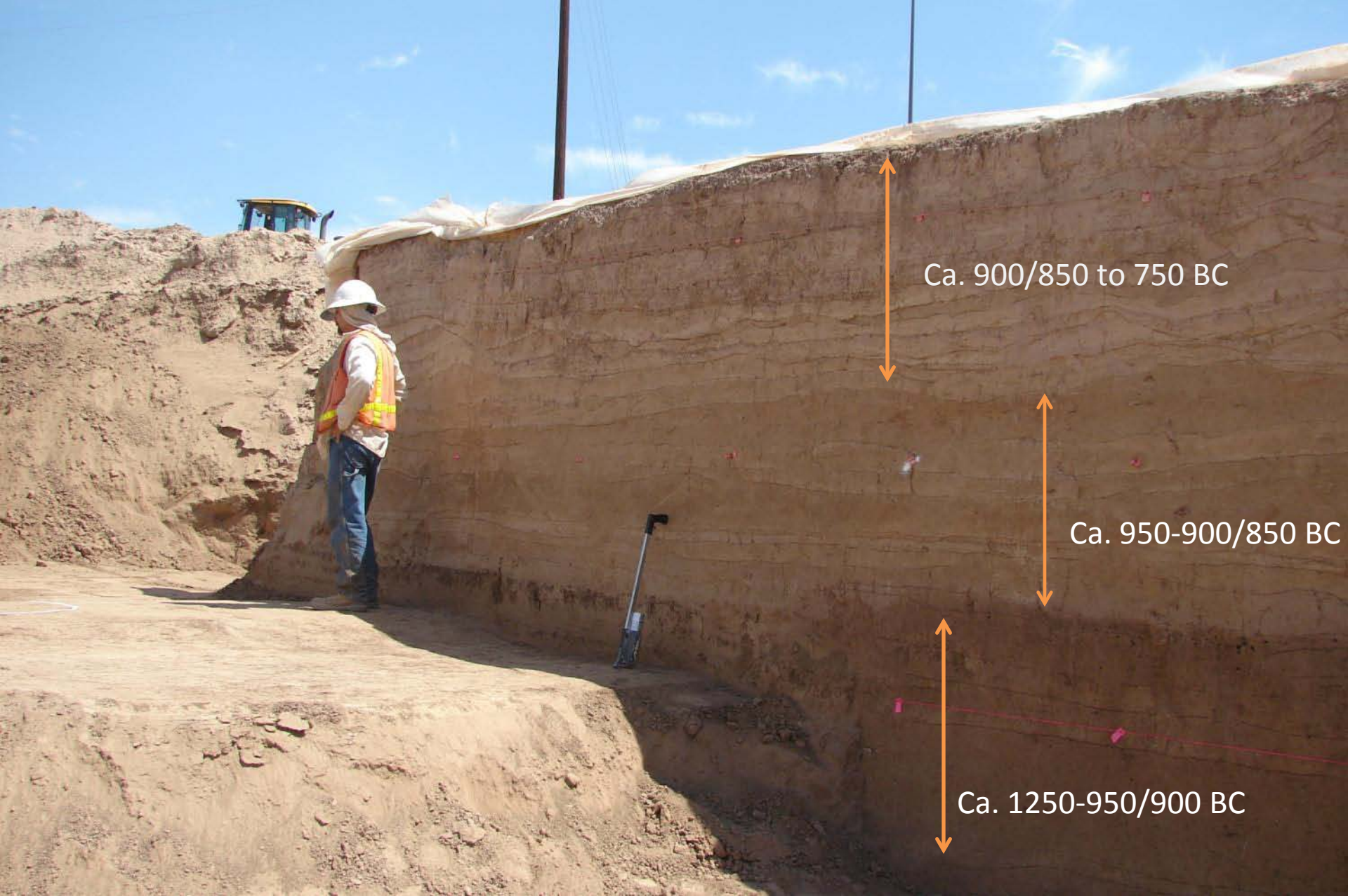


Las Capas and the Ina Road Regional Wastewater Reclamation Facility, looking West



Google Earth image of Ina Road RWRf and completed excavations, November 2009





Ca. 900/850 to 750 BC

Ca. 950-900/850 BC

Ca. 1250-950/900 BC

The beautiful and complex floodplain history of Las Capas, documenting cycles of stability, soil formation, erosion, and aggradation over 500 years. (Gaylen Tinsley for scale)

Mechanical stripping with 7' blades used to expose archaeological features in rock-free floodplain sediments



Stripping in Action





Architecture: “Houses-in-pits” typically round with interior storage pits, but some unusual rectangular ones with entries unlike typical Early Agricultural houses in the area. Similar to northern populations: immigrants?

Other cultural features include

roasting pits,

pits used to store tool caches,

and large bell-shaped pits to store food or other material.

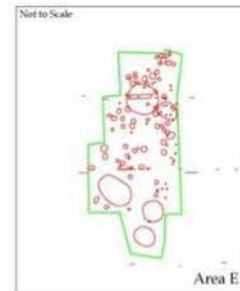




Fired clay figurines

Shell from Sea of Cortez and coastal California including nacreous shell (abalone?) and spiny oyster (*Spondylus*)

Turquoise from the Bisbee area?



Ina Road RWRF
Archaeological Data Recovery
Tucson, Pima County, AZ

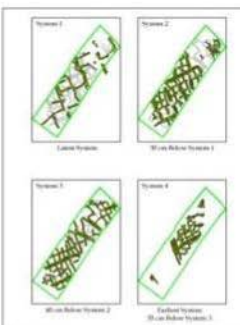
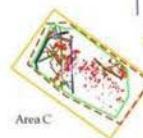
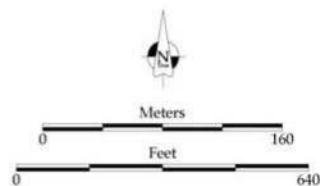
Methods and Findings
Current as of 07/21/2009

AZSP Central (202) NAD83(HARN)

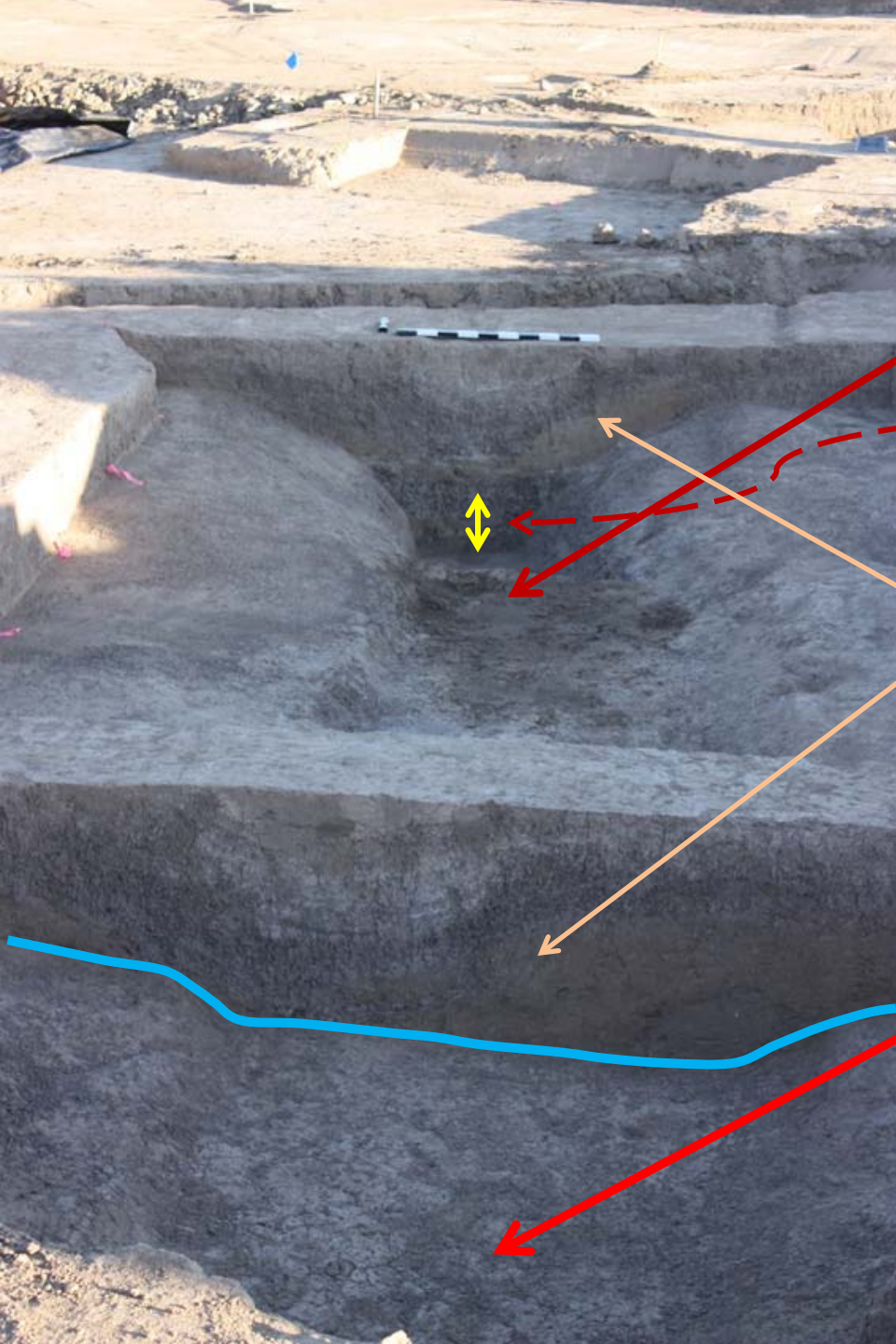


Key

- Project Area Boundary
- Phase 1 Area Boundary
- Excavation Block
- Archaeological Feature (Non-Agricultural)
- Irrigation System Features**
 - Agricultural Field Feature (lower system)
 - Agricultural Field Feature (upper system)
 - Known Canal Segment
 - Hypothesized Relationship with Other Canals
 - Re-excavated (?) Canal Segment



Canal Morphology



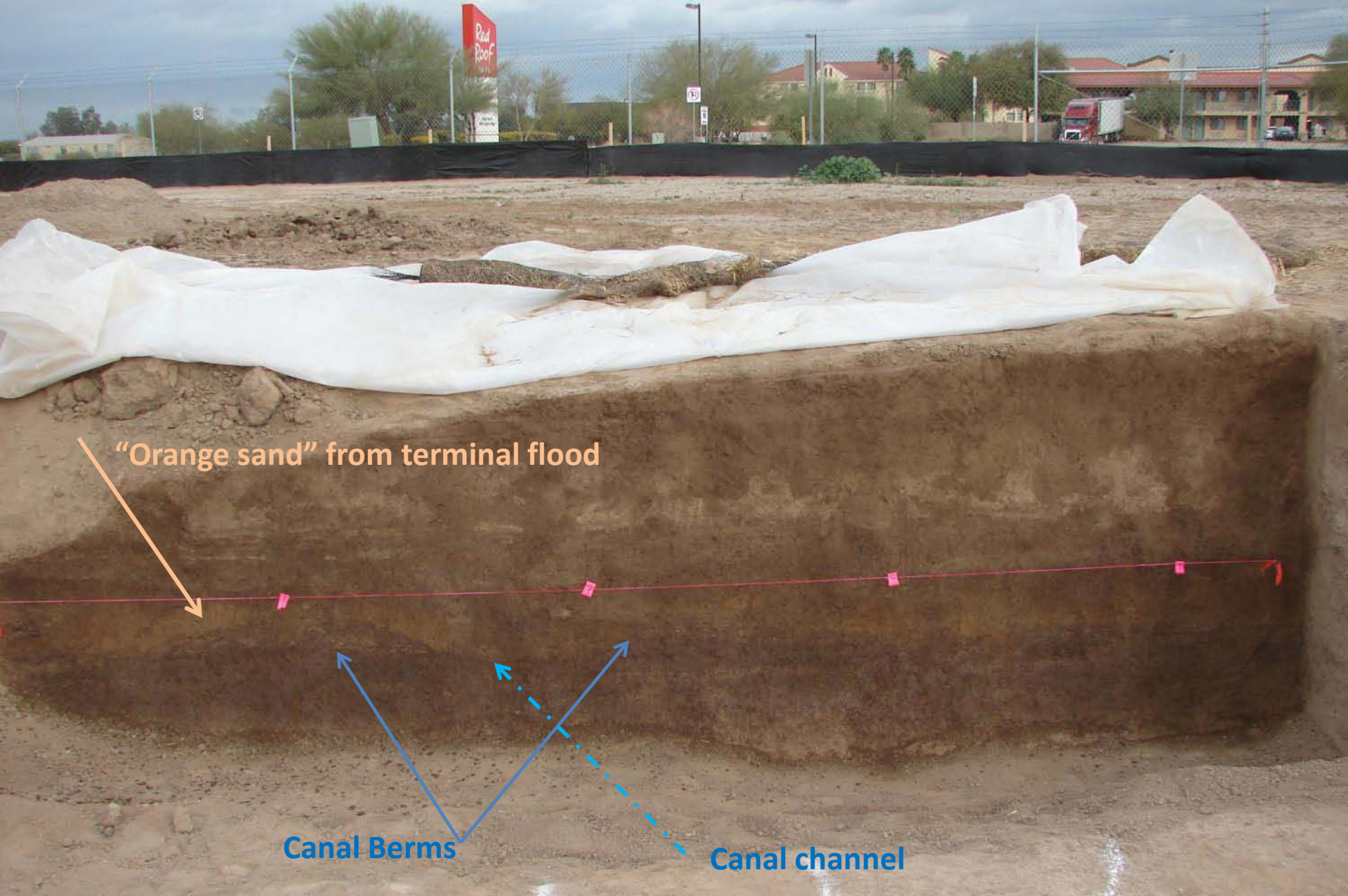
Original canal bottom

Sediments accumulated over life of canal and remodeling

Orange sand: a single flood event ca. 800 BC that capped the entire functioning San Pedro phase field system.

Functional canal width and depth at time of flood

Main canals typically 1.5 m wide, 40-50 cm deep. With functional water depth of ca. 30 cm. Snails, freshwater molluscs, and ostracodes very common in canal sediments.

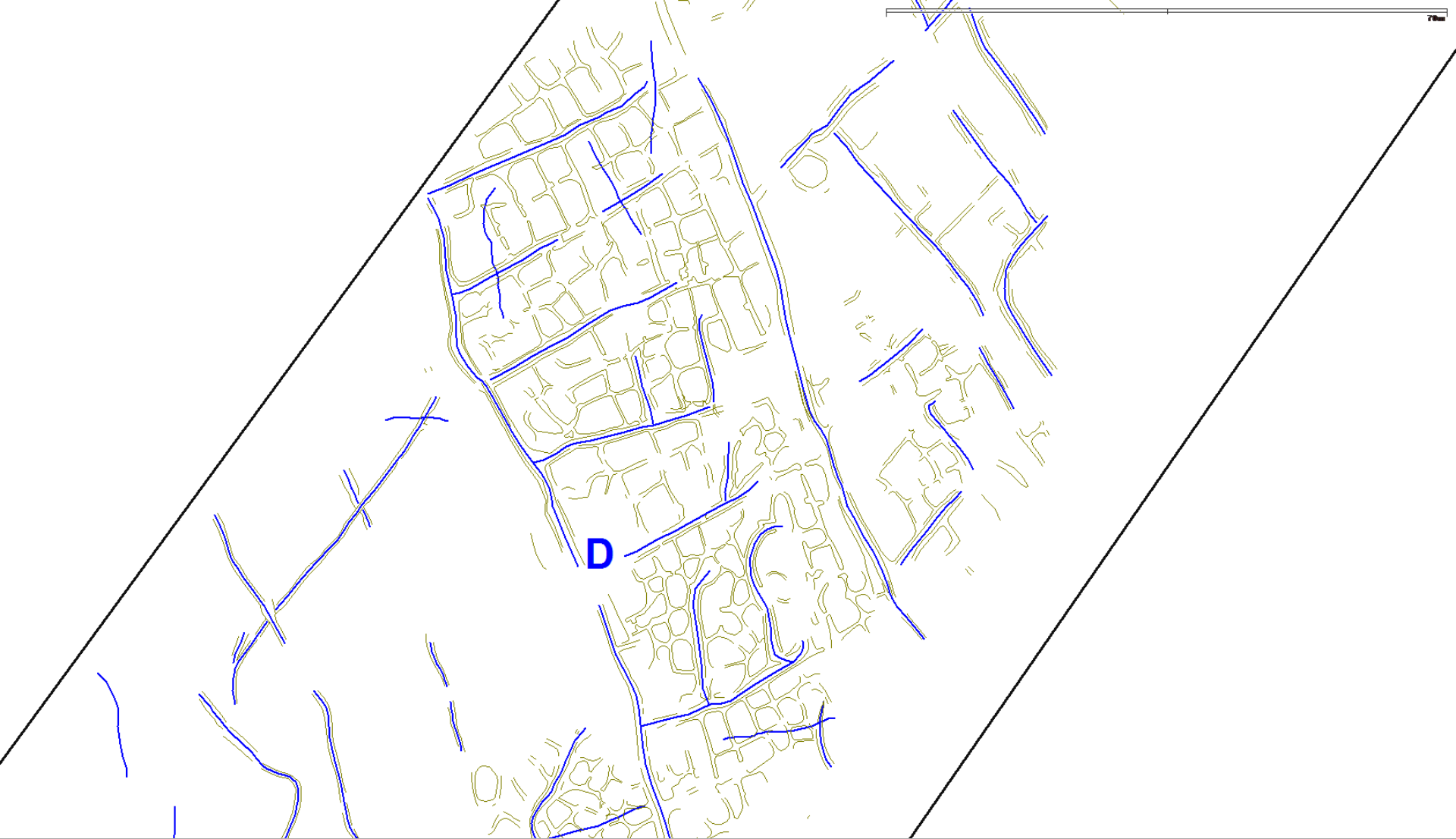


Example of a small distribution canal near the far end of documented system



Field berms, planting holes.

Note dark sediments around field periphery due to how borders were constructed.



Canals, field laterals, and fields typically regularly spaced.

Allows for close control of irrigation water and possibly scheduled planting of crops

**Example of field system
toward end of canal reach.**

**Fields smaller than those near
main canal.**

**Direction of water flow was
able to be reconstructed
based on silt and sand
laminations.**





Reconstructing fields: Scraping ca. 5 cm deep and 20-30 cm on either side of desired berm, using sediment to build berm.

Results in high-spot in center of field, causing clay- and silt rich sediments to settle in outer perimeter of field, as observed in exposed prehistoric fields.

Construction time of average field based on experiments with mesquite digging stick and young archaeologists: 28 minutes per field cell.



Tohono O'odham 60 flour corn. Note drying cracks in clay-rich field sediments. This can lead to piping and field degradation.



(The maize was depredated by rabbits until we “discovered” chicken wire fencing)



Some of what they grew:

Maize, a popcorn variety probably most closely related to Chapalote or Reventador races known from modern northern Mexico

Other plants in fields include
chenopods, amaranth, other edible
“field weeds” and some cool-season
grasses

PHYTOLITHS

A-F: maize

I-K: likely Little Barley

L-M: Bottle gourd (*Lagenaria*)

S: Common reed (*Phragmites*)

U: Nettleleaf Hackberry fruit (*Celtis
reticulata*)

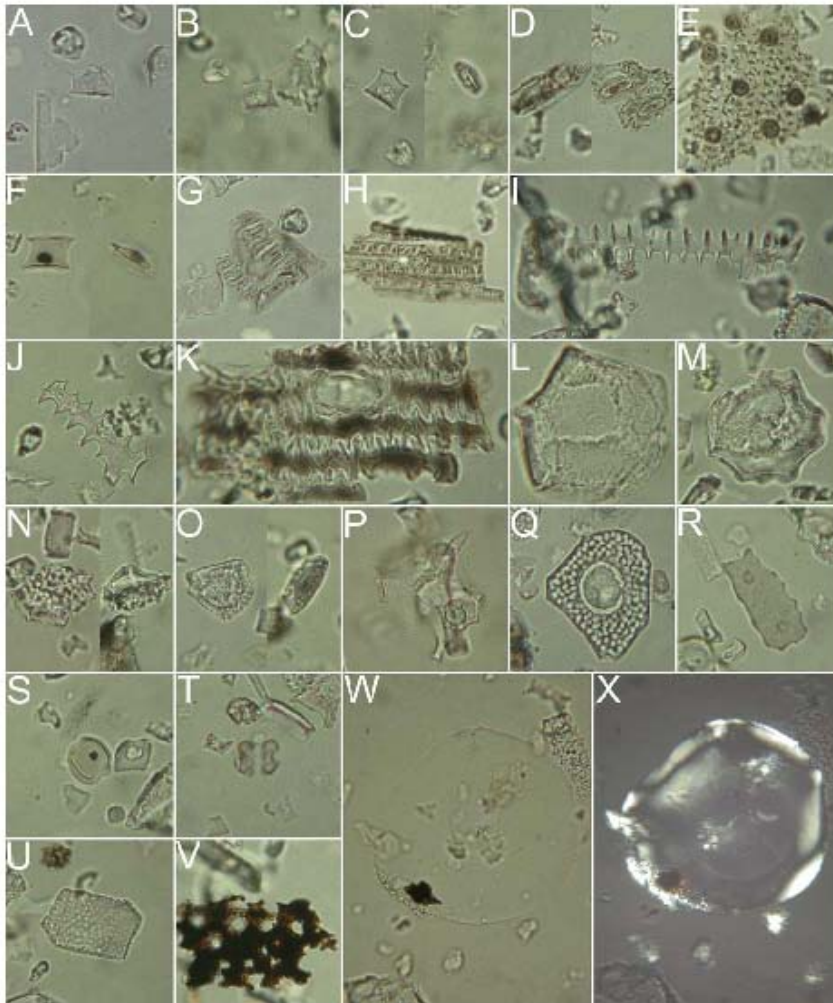


FIGURE 4. SELECTED PHYTOLITHS AND A STARCH GRAIN RECOVERED FROM AREA A SAMPLES

All micrographs taken at 500x magnification. Sample 8307 microfossils are represented by images A, G, J, P, W and X. Sample 8308 microfossils are represented by images H, I, Q, R, and U. Sample 8311 microfossils are represented by images L, O, S, T, and V. Sample 8312 microfossils are represented by images B-E, and M. Sample 8313 is represented by images F and K.

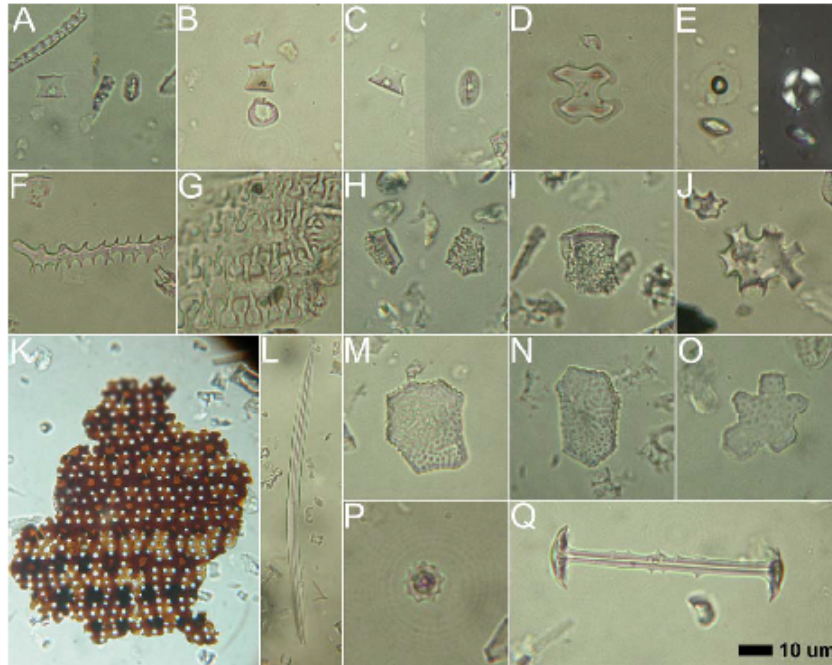


FIGURE 8. SELECTED PHYTOLITHS AND A STARCH GRAIN RECOVERED FROM AREA E SAMPLES

All micrographs taken at 500x magnification. The starch grain in image E was recovered from sample 16050. The phytoliths in images A and H were recovered from sample 16052. The phytoliths in images J and K were recovered from sample 16221. The phytolith in image B was recovered from sample 16224. The phytoliths in images D, F, G, and P were recovered from sample 16227. The phytoliths in images C, I, L, M, and Q were recovered from sample 16271.

A-C) Wavy-top rondels diagnostic of maize (*Zea mays*) in side view, and top view (right side of A and C).

D) Large Panicoideae cross (max width 24 μm) possibly derived from *Zea mays*.

E) Spherical starch grain typical of non-*Hordeum*, -*Elymus* and -*Agropyron* grasses. These also may be seen in *Zea mays* kernels.

F) Disarticulated dendriform phytolith diagnostic of grass glume, lemma, and palea structures.

G) Non-dendritic silicified grass epidermis fragment with distinctive wavy long-cell patterning. Although not diagnostic, wavy long-cells identical to this are observed in *Hordeum* leaf and inflorescence epidermis.

H) Seed coat phytolith diagnostic of *Commelina dianthifolia* in side view (left) and top view (right).

More Phytoliths and Microfossils

A-C: Maize

E: Grass starch grain, possibly maize

K: Sunflower family (*Asteraceae*)

L, P, Q: Freshwater sponge spicule, sphereaster, and gemmoslere

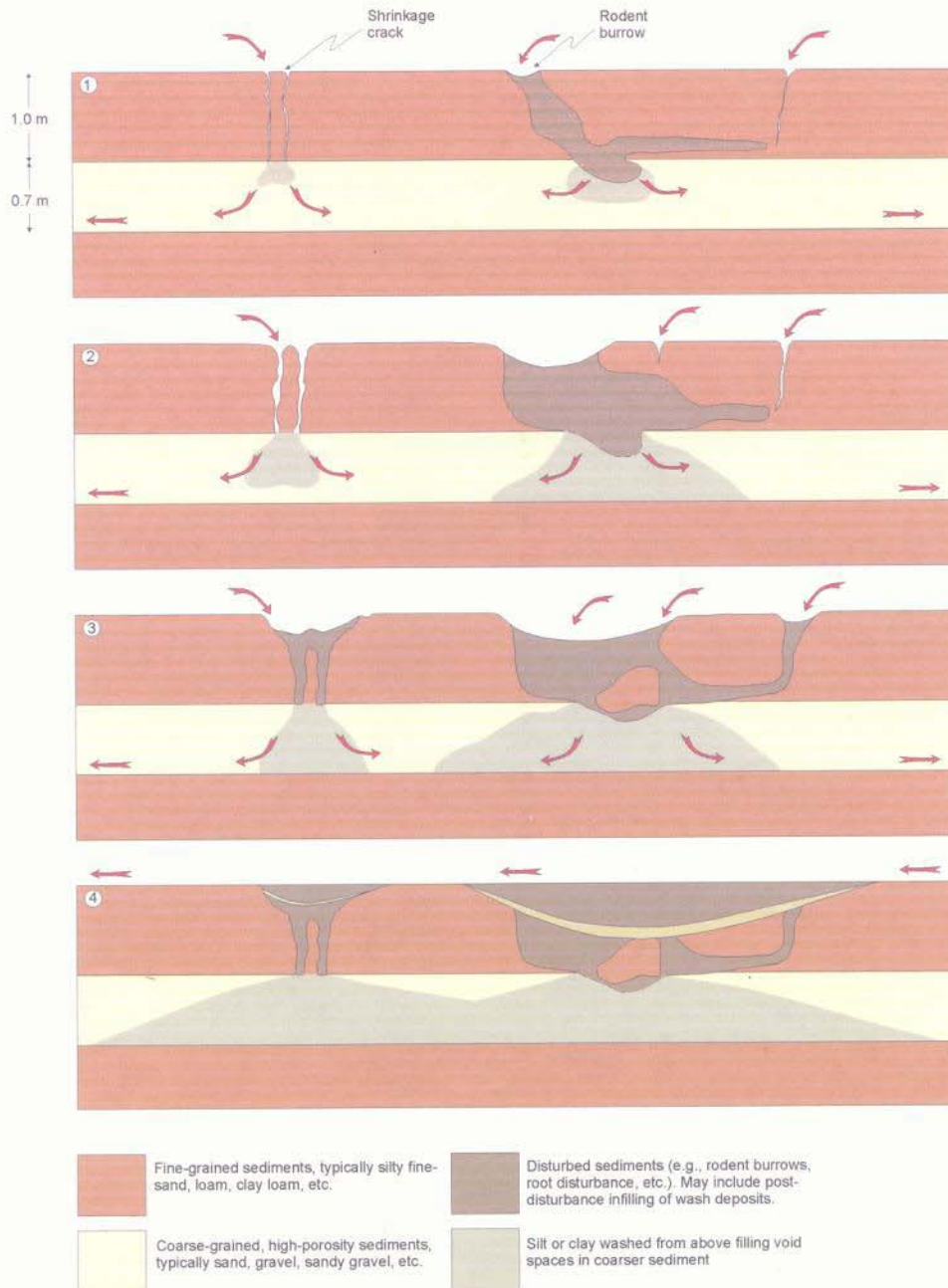
Piping: A problem then and a problem now

Formed by water introduced through soil cracks, rodent holes, or porous sediments.

Piping especially prevalent with effective local drought and incised river/stream channels

Can occur in fields, unlined canals, and along stream margins (has cause problems recently along the Santa Cruz parkway)

Observed in fields on San Xavier Reservation over 2 km from river.



What Else is Going on in the World from 1200 to 800 B.C.?

