1B Option: Selectively thin the existing hedgerow by > 50%, remove every other tree plus any that are hazardous, save as much understory vegetation as possible, and replant new fastigiate poplars in spaces made available by removal of existing trees. Over the next 20 years the remaining poplars would be removed and replaced with fastigiate poplars as described above.

Positive Impacts

The variety of age classes in the hedgerow would increase its value as wildlife habitat and as a visual screen. Fifty percent of the existing habitat for wildlife and screening of the highway would be retained in the initial phase. The spacing would reduce competition for water and provide ample space and access to sunlight to support new plant growth.

Negative Impacts

Negative Impacts associated with option B would be similar to those described for option A. The visual character of hedgerow would be irregular because of variable plant dates and species differences. This would not reflect the historic hedgerow's uniform character for some time.

1C Option: This option is similar to option B with exceptions. The stumps of cut trees are not treated, instead saving the dominant sucker and cutting off all others. The dominant sucker is then pruned to replace the removed decadent tree.

Positive Impacts

Replacing the decadent poplars with dominant suckers would preserve both the historic landscape pattern and historic genetic material. This option may be more successful and less labor intensive since suckers are generally hardy, genetically the same as the parent plant, and new trees will not need to be established. Mike Kuhns, Utah State University Extension Forester, believes that this is a viable option that could be augmented with new plantings of white poplar (M. Kuhns, pers. comm). Chemical treatment will not be required to treat stumps, reducing the environmental impact of the proposed action.

Negative Impacts

The Negative Impacts would be similar to those described for option B. In addition, the water conservation benefits (wider spacing of new trees requires less water) and habitat benefits of planted poplars would be lost.

Species Options: Pros/Cons

Lombardy poplar *Populus nigra* 'Italica'

Positive:
- Historically accurate

Negative:
- Short Lifespan

other fastigiate (narrow, upright form) cottonwood

Positive:
- Better habitat for wildlife
- Possesse historical visual similarities
- Moderate lifespan / disease resistant

Negative:
- Not historically accurate

Note: Several fastigiate poplars exist which warrant consideration including: *Populus alba* 'fastigiata'-- Bolleana poplar, *Populus canadensis* 'eugenei'--Carolina poplar, *Populus simonii* 'fastigiata'--Chinese Poplar, *Populus nigra* 'Thevestina'. Hybrid cultivars include *Populus x* 'Walker', *Populus x* 'Hill', *Populus x canadensis* 'Prairie Sky, and *Populus x canescens* 'Tower'. Pros and cons of these and other species to be researched as part of phase 2 of this study.

2 **Action: Selective removal of scattered *Ailanthus* trees throughout Visitor Zone.** *Ailanthus altissima*, tree of Heaven, was an early introduction to Utah by Mormon pioneers. Its ease of growth and relatively luxuriant foliage made it a favored tree to create instant green in a newly settled arid landscape. Benjamin Ferris in his work *Utah and the Mormons*, 1854, describes the streets flanking the temple block in Salt Lake City as "planted with locust and ailanthus trees, cooled by two running streams of water from the hillside" (Tucker, 1867). A letter in the Woolley Family Collection notes that *Ailanthus* trees were planted (along with cottonwood, elm, and willow) near the fort during the 1885-1891 period of Woolley occupancy of PISP (McKoy 2000, 41). Although *Ailanthus* has fallen out of favor for its propensity to sucker and overtake native plants, it should be viewed during the period of significance of PISP as a generally admired exotic. Recommendation is to control suckering growth to prevent overly wild forestation, but to allow selected specimens to grow, continually regenerating overstory trees for shade, visual, and historic character in the VZ and HD.

Positive Impacts

Selective removal of *Ailanthus*, some of which appear to be diseased and dying, would control an aggressive species that out competes native species and consumes valuable water resources. Planting cleared spaces with native shrub steppe species will stabilize the disturbance site and expand the area dominated by shrub-steppe species in the V Zone. Maintaining a selected ongoing population of the tree will ensure historic integrity, provide shade, and create visual interest.

Negative Impacts

Removing some *Ailanthus* will reduce the carbon sequestering capacity of the monument, reduce on-site shade, and visually open the site, exposing sections of the "A" Zone to visitor views. In the short term soil would be disturbed and noise levels would be high during tree removal. Conversely, *Ailanthus* is an invasive plant, which competes with other species. Keeping some *Ailanthus* requires commitment to an ongoing maintenance schedule to control sprouts and suckers.

3 **Action: Replace *Ailanthus* trees at south end of the hedgerow with a mixed cottonwood/willow plantings and extend the existing ditch.** This area of PISP was devoid of trees in early photographs, and the *Ailanthus* grove in this location has apparently self-seeded; an example of the propensity of the species to spread invasively when not controlled.

Positive Impacts

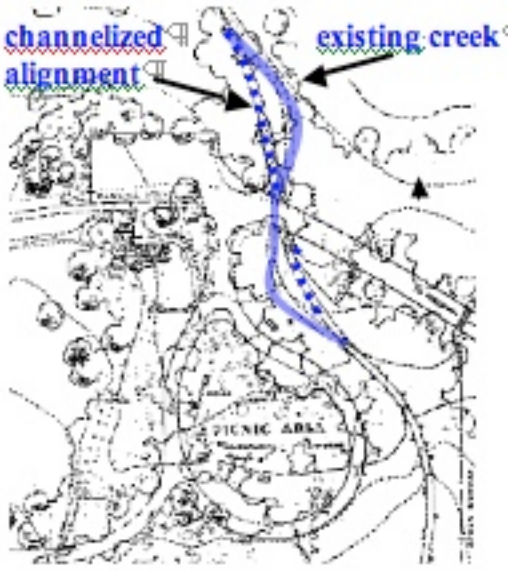
Planting a patch of willow/cottonwood habitat within the VZ would replace willow habitat west of the corral in the SGZ which is in decline due to altered drainage patterns. Overflow water from the poplar hedgerow would be captured and used to irrigate the willows. This water is currently diverted west across the south corral into a natural wash. Vegetative evidence suggests that most of the diverted water is lost to infiltration before reaching the wash. The new willow/cottonwood planting would not only replace critical bird habitat, but it would also screen portions of the AZ from visitor views once it matured.

Negative Impacts

Removal of *Ailanthus* would to a limited extent expose some maintenance structures to visitor views from the pond and fort area. It could take 8-10 years before the willow/ cottonwood planting would be tall enough to screen these facilities. Planting willows and a few carefully located cottonwoods in this location will require removal of *Ailanthus* root wads, re-grading the site into a retention basin and extension of the irrigation ditch to deliver water to the planting site, extending the ditch from its existing south end to the north end of the retention basin. Construction will disturb the soil and create noise and dust. Cultural artifacts could be unearthed. The extension of the irrigation ditch will endanger, and likely destroy the declining willow patch in the southwest. Minor

site disturbance would occur during weed control and could continue for 3-5 years.

4 Action: Realign the flood ditch and redesign the cross section to enhance its ecological function and appearance, while retaining designed flow capacity.



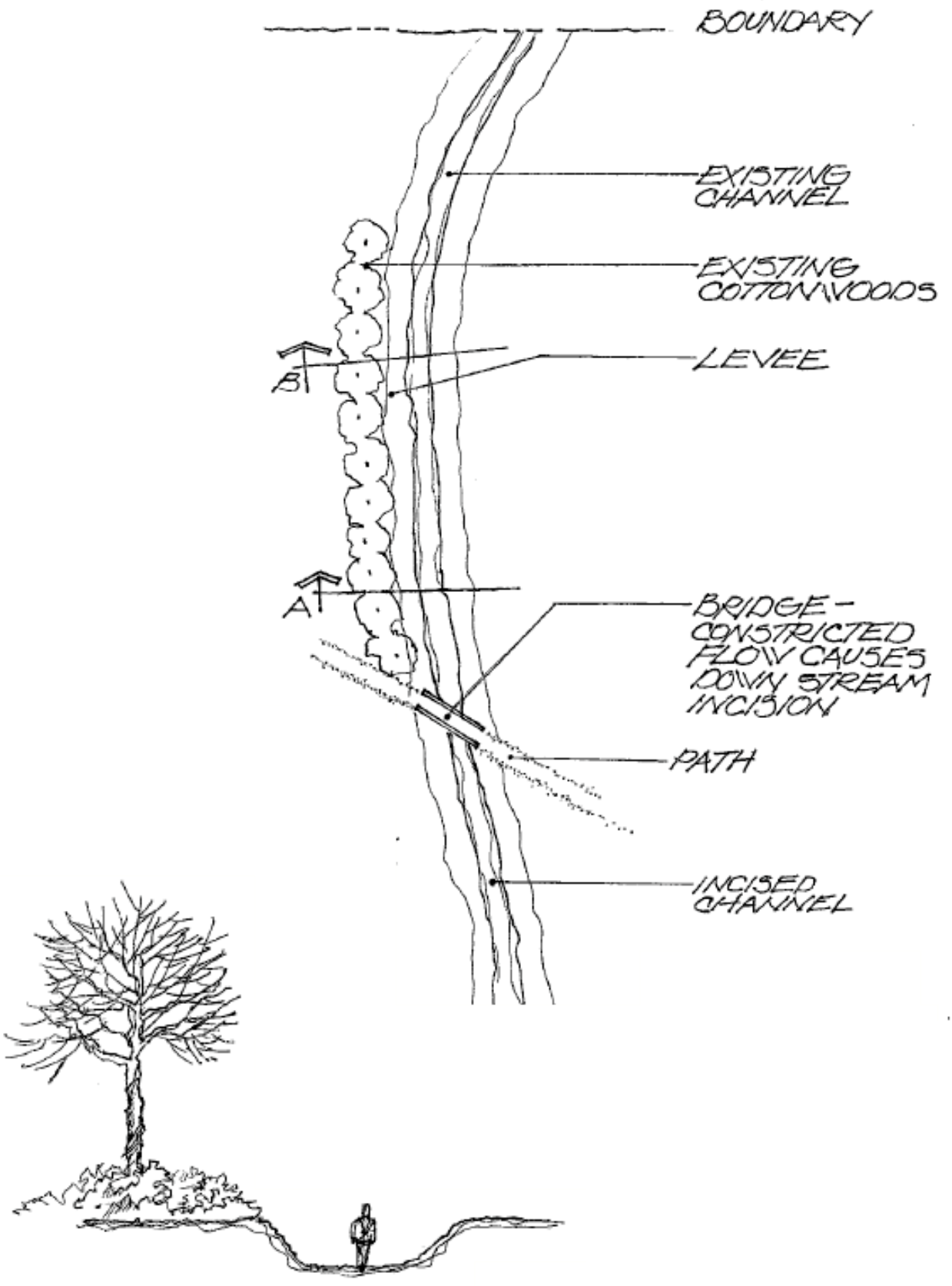
Early plan drawings including the 1947 master plan shown to the right, indicate a more naturally curving alignment of the drainage which accommodated flood conditions through the wash. Following the construction of a campground and later a parking lot in the flood plain, flooding issues became commonplace. (McKoy 2000). The current straight alignment dates from the 1960s, and is the final culmination of several efforts to artificially realign, deepen, and line the channel beginning in the 1930's. One of these realignments is indicated on the 1947 master plan. (source: NPS Technical Information Center, reproduced in McKoy 2000, 355)

<u>Positive Impacts</u>

A reconfigured flood ditch would appear more natural to PISP visitors, would enhance their experience and be more supportive of the historic period than the "ditch". In addition, the re-contoured ditch would reintroduce natural floodplain functions, creating sites for "wash" deposited sediments needed for native plants to colonize and for natural succession to occur.

<u>Negative Impacts</u>

Reconfiguring the flood ditch would require moving large quantities of soil. A site to deposit excess cut (which is likely) would have to be located and it, in turn, would be impacted. Some shrub-steppe vegetation would be removed. Short term impacts would include noise and dust associated with construction. The regraded site would be prone to invasive exotic plant species and maintenance of the site would be required until revegetation plantings became established.



Existing Channel – Plan and Section (not to scale) – note uniformity and depth of channel