Summary Report of the Level I Documentation of One Segment of the Government Highline Canal, Mesa County, Colorado

by

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Under the Provisions of
State of Colorado Archaeology Permit 2017.1

March 2018

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INTRODUCTION

The Grand Valley Water Users Association (GVWUA) has been funded through the Bureau of Reclamation's (BOR) Colorado River Basin Salinity Control Program to repair a 3.3-mile (mi.)-long segment of the Government Highline Canal (Government Highline Paradise Hills project). The project will entail reshaping the canal prism, installing a three-part fabric and Poly Vinyl Chloride (PVC) liner in the canal over the reshaped prism, and covering the PVC with a 3-inch (in.)-thick layer of shotcrete wear surface. The repairs to the canal are being proposed to reduce the amount of salt and selenium entering the Colorado River. Because the project is a federal undertaking and is federally funded, various cultural resources laws apply, including Section 106 (54 U.S.C. § 306108) of the National Historic Preservation Act (54 U.S.C. § 300101 et seq.). These laws require that all significant cultural resources be identified prior to planned development, and are intended to insure that historical and prehistoric cultural resources important to our national heritage are not inadvertently harmed or destroyed by federally initiated or authorized actions. The canal segment (site 5ME4676.38) was inventoried by Alpine Archaeological Consultants, Inc. (Alpine), of Montrose, Colorado, in 2017 (Reed 2017). A Memorandum of Agreement between the BOR, GVWUA, and the Colorado State Historic Preservation Officer (SHPO) stipulated Level I Documentation as mitigation for adverse effects to 3.3 mi. (5.3 km) of the Government Highline Canal system. The specifications for Level I Documentation are presented in History Colorado Publication No. 1595 (History Colorado 2013). The GVWUA hired Alpine to conduct the Level I Documentation and supplemental narratives and to present these data in a summary report.

Level I Documentation is the most basic form of site documentation and closely follows the survey and recordation requirements established by the Office of Archaeology and Historic Preservation, with the additional specification that the documentation is prepared on archival bond paper and that photographic materials be archival. Photographs are stipulated to be black-and-white prints or digital images printed on fiber paper or archival quality resin paper. Although prints are acceptable in 3-x-5-in. or larger sizes, 4-x-6-in. prints are preferred by History Colorado (2013).

METHODS

The information used in the preparation of the Level I Documentation was gathered during the Class III cultural resource inventory by Charles A. Reed and Trevor R. Lindland of Alpine on April 24, 2017 (Reed 2017). The 3.3 mi. of the Government Highline Canal system to be lined (site 5ME4676.38), including all of the associated water-control structures, were recorded using a Global Positioning System unit capable of sub-meter accuracy. Documentation also included photographs and descriptions of the canal that focused on water-control features. A list of maps and photographs are included in Appendix A. The maps and reproductions of photographs, themselves, are included in Appendix B.

LOCATION AND ENVIRONMENTAL SETTING

The Government Highline Canal Paradise Hills project area is located along the northern outskirts of the city of Grand Junction, Colorado (Figure 1). The project is north of the Paradise Hills subdivision and extends from just southeast of the intersection of H Road and 27 Road northwest to roughly 0.5 mi. east of the intersection of the canal and 25 Road. The project area is on the northern Colorado Plateau, an area characterized by moderately high elevations, a semiarid climate, and horizontal exposures of sedimentary rock formations that are often eroded to form mesas and canyons. The canal is south of the Book Cliffs, which also represent the southern flanks of Mount Garfield. The Book Cliffs are an uplifted syncline elevated approximately 914 m (3,000 feet [ft.]) above the Grand Valley (Fenneman 1931).

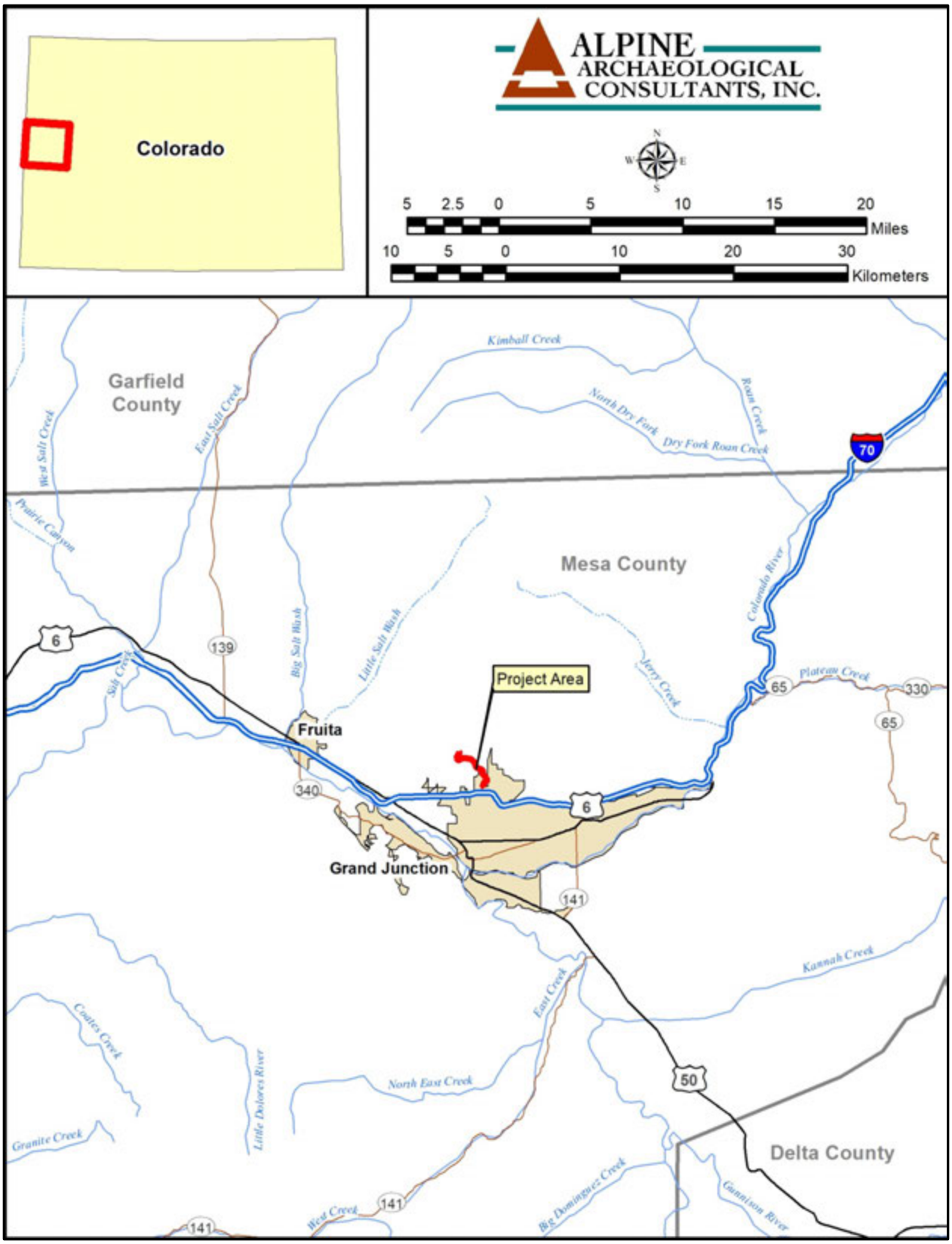

Figure 1. General location map of the project area.

Elevations in the project area vary only slightly, at a fairly consistent elevation of around 1,451 m (4,760 ft.). The project area generally cuts through rolling adobe hills, derived from Mancos Shale eroding from the Book Cliffs (Tweto 1979). The area above the canal to the north and east is fairly undeveloped, seeing only some development and light grazing. The area below the canal to the south and west has seen much greater development, with both agricultural fields along the canal and residential neighborhoods flanking the sides of the canal. The soils in the undeveloped portions of the canal support desert shrubs, such as rabbitbrush, saltbush, snakeweed, shadscale, and greasewood. Scattered cottonwoods, sagebrush, kochia, and a variety of grasses are also present in the project area. Common game animals within the project area include deer, mountain lion, cottontail, and several species of raptors. The developed neighborhoods along the canal host a wide variety of introduced plant species.

CULTURE HISTORY

The following culture history is a brief synthesis of historical and prehistoric occupation in the southern Rocky Mountains, including the current project area. It is based upon archaeological and historical work undertaken in and around the southern Rocky Mountains. For more detail, see the Colorado prehistoric context for the northern Colorado River basin (Reed and Metcalf 1999) and the Colorado historical archaeology context (Church et al. 2007).

The mountains of Colorado may have been first inhabited, to a limited degree, as early as 11,500 B.C. by big game hunters representative of the Paleoindian Tradition. Evidence of this early Pleistocene occupation is rarely encountered in the region. With the end of the Pleistocene came climatic conditions very similar to those of the present. By about 6400 B.C., coinciding with this climatic moderation, there was a transition in subsistence and material culture to a new lifeway, termed the Archaic Tradition. Archaic peoples exploited a greater variety of plant and animal foodstuffs and manufactured tools that were quite distinct from those of their predecessors. The Archaic period is very well represented archaeologically in the region. At the time of Euroamerican contact, the primary aboriginal group in the project area was the Ute, living an Archaic-like lifestyle. The Utes were Numic speakers, who may have arrived in western Colorado as early as A.D. 1500. As a result of Euroamerican contact, the Utes acquired the horse and underwent rapid culture modification, similar to the assimilated Plains Indian tribes.

Western Colorado was designated as a reservation for the Utes as a result of the Treaty of 1868. In 1873, the San Juan Mountains were removed from the reservation as a result of the Brunot Agreement. The Brunot Agreement ultimately increased hostilities between Utes discordant with the removal and the Euroamericans responsible, culminating in the Meeker Massacre in 1879. The Meeker Massacre served as the catalyst for removing the White River and Uncompahgre (Tabeguache) Utes from western Colorado. By the end of 1881, the last of the Utes were restricted to reservations in northwestern Utah and southernmost Colorado.

The Grand Valley irrigation history begins almost immediately after the removal of the Utes. The first appropriation of water sourced from the Colorado River, appropriated on August 22, 1882 in the amount of 520.81 cubic feet per second (cfs) and intended for use in irrigating the Grand Valley. To make use of this water, construction of the Grand Valley Canal was begun by the Grand River Ditch Company on January 10, 1883 (Grand Valley Irrigation Co. 2008). The company quickly ran out of money, and T. C. Henry purchased the company with the backing of the Travelers' Insurance Company, completing the project in 1884 (Holleran 2005:E-25). The original diversion from the Colorado River was a wooden structure. The initial 17.12 mi. of the canal is now known as the Upper Mainline. When constructed, it was 25 to 30 ft. wide and carried water at a depth of 3 to 4 ft. At the end of the Upper Mainline, the canal was split into two canals by a divider. From this point, the northern branch of the canal continued along the same contour elevation to a point 3 mi. northwest of Fruita as the Highline, and the southern branch dropped 22 ft. and continued westward as the Mainline to its terminus at Big Salt Wash. These canals were completed by Henry in 1884.

Later that year, the Mesa County Ditch was constructed, supplied by a feeder canal midway along the route of the Upper Mainline. Also constructed in 1884 was the Independent Ranchmen's Canal, which took water from the Mainline a short distance below the divider. All of the canals were consolidated under the ownership of the Grand River Ditch Company in 1886, which was controlled by the Travelers' Insurance Company. Financial difficulties resulted in the incorporation of the Grand Valley Irrigation Company (GVIC) on January 7, 1894 to acquire the holdings of the Grand River Ditch Company, the Grand Valley Canal Company, the Mesa County Ditch Company, and the Independent Ranchmen's Ditch Association from the Travelers' Insurance Company. The GVIC was organized as a cooperative, mutual ditch company, comprised of individual water users as shareholders of water stock; it continues to the present day.

Water was the key ingredient that turned the desert lands of the valley into an irrigated oasis. The push to convert the landscape into productive fields continued through the nineteenth century, but, by then, all of the lands that could be irrigated by the abovementioned water systems were already under cultivation. By the end of the 1890s, additional irrigation projects were being envisioned and devised in an effort to put thousands more acres into cultivation. The Grand Valley Project was one of these, proposed with the intent of diverting additional water from the Colorado River and transporting it through a lengthy canal along the whole of the Grand Valley. The canal would also deliver water to previously unirrigated lands between the Grand Valley Canal and the northern edge of the valley below the Book Cliffs. A survey for the canal was completed in 1897; however, the project was a commercial endeavor and funding for the project never transpired (Holleran 2005; O'Brien Printing Company 1938). After the formation of the Reclamation Service in 1902, the Grand Valley Project was again proposed; it was one of six such projects slated to have lands withdrawn from the public domain to provide the necessary funding after the passage of the Reclamation Act on June 17, 1902. After the lands were withdrawn, the Reclamation Service began surveying lands, drafted engineered drawings of the system, and was preparing to begin construction by 1903. Before ground could be broken, the project was put on hold, as private investors were again proposing to fund the project. Not wanting to overshadow private enterprise, the Reclamation Service discontinued work on the project. Over the span of several years, it became apparent that private investors were not able to raise the capital necessary to complete the project. As a result, the Grand Junction Chamber of Commerce approached the Secretary of the Interior in 1907 requesting that the government again consider constructing the project. Two years later, approval for the project was granted and the Reclamation Service began limited construction on March 10, 1909. Within three months, the project was put on hold once more, this time because of legal considerations between the government and the future water users. The legal questions continued for several years, even though 1.5 million dollars was secured for the project by a government feasibility study completed in 1910. Project delays would continue until September 1912, at which point the Secretary of the Interior James R. Garfield gave the Reclamation Service authorization to begin the project. Construction of the project began on one of three tunnels along the upper portions of the proposed project canal. Construction on the Grand Valley Diversion Dam began in 1913, following considerable debate concerning its design and location. Because of concerns about flooding, the design for the dam included a spillway system to moderate water levels in the case of overfill. The end result was the installation of a roller crest dam with six controlled roller gates. Construction on the dam continued through 1914 and into 1915 without major project delays. The first roller was installed in March 1915, with the last of the rollers installed and the dam completed in October 1916. The final product was the largest roller crest dam in the world (Simonds 1994).

The Grand Valley Diversion Dam and its accompanying high-volume conveyance canal were constructed concurrently. Excavations on the soon-to-be-named Government Highline Canal began in June 1913, with the headworks and diversion gates extending from the western abutment of the diversion dam. Water for the canal was diverted through nine 7-x-7-ft. cast-iron sliding gates. The canal was constructed as a cut-and-fill feature, and during its initial 1913–1914 construction, much of the fill was used to raise the Denver and Rio Grande Western railroad grade. The earthwork for

the initial 1.7 mi. of the canal to the first tunnel was awarded to Reynolds-Ely Construction Company. Work on this section of the canal began on July 9, 1913 and was finished just over a year later on July 14, 1914. A second earthwork contract for the canal was awarded to The Winston Brothers Company of Minneapolis, Minnesota. The contract included constructing the second leg of the canal, beginning at the southern end of the three tunnels and continuing 30 mi. to the west. Work on this portion began on June 14, 1914 and was completed on June 15, 1915. A limited amount of water was released into the canal to help cure it after construction; however, water was not officially diverted into the canal until May 4, 1916. Almost immediately, the canal began to leak, particularly in those areas cut through Mancos Shale. Several attempts to the address the leakage issues were undertaken, including sluicing clay through the canal and lining some sections with concrete. The measures had limited success, but the canal continued to function. The Grand Valley Project contributed significantly to agricultural production within the valley.

By the 1930s, project deterioration was having a detrimental impact on the delivery of water through the system. To rectify this, the BOR (renamed from the Reclamation Service in 1923) utilized the Civilian Conservation Corp (CCC) to make much needed repairs to the system beginning in 1935. The CCC established camps on project lands and began to rehabilitate project features (Simonds 1994). A portion of this work was undertaken by CCC Company 2803, working out of Camp BR-22-C. The camp was established 2 mi. east of Grand Junction and was first inhabited on July 27, 1935. The 201-man work force in the camp derived largely from Tulsa, Oklahoma, and to a lesser extent from Texas and Colorado. The camp was under the command of Capt. L.L. Chambers and the enrollees were turned over to the BOR technical force to begin maintenance work on the Grand Valley Canal Project. The work completed by the enrollees consisted of replacing wooden flumes, headgates, laterals, and farm turnouts. These earlier features were replaced with metal conduits and concrete features; 2 mi. of the main ditch was concreted to prevent seepage, and areas of the canal were lined with rock to prevent bank cutting (O'Brien Printing Company 1938:23). The camp continued to complete maintenance work on the canal and was later aided by the addition of Camp BR-59-C, established at Palisade on October 16, 1935. The original company that inhabited Camp BR-59-C only worked on the canal project for a short period before they were transferred to California and replaced by Company 868. Company 868 was sent from Ponca, Oklahoma, where they were engaged in constructing the Lake Ponca Park. The company worked on the Grand Valley Project until they were disbanded on June 30, 1938 and replaced with Company 2120. The Company 2120 contingent was made up of 100 men from Connecticut under the command of Captain Ralph A. Stevens. Company 2120 was divided into three divisions—Canyon, Orchard Mesa, and the Main Canal, Palisade Division. The Canyon Division concentrated on clearing and repairing the sections of the Government Highline within the Colorado River Canyon, whereas the Main Canal Division did the same type of work on portions of the canal beginning at the southern end of the tunnels and continuing westward. The Orchard Mesa Division was responsible for carrying out maintenance and repair work on the Orchard Mesa Canal on the southern side of the Colorado River. The CCC would continue as an active program working on maintenance and upgrades to the Grand Valley Project until it was terminated by Congress on June 30, 1942 following the outbreak of World War II (Pfaff 2001).

DESCRIPTIONS OF THE GOVERNMENT HIGHLINE CANAL

5ME4676.38 – Government Highline Canal

Site Description

Alpine documented a 3.33-mi.-long segment of the canal (site 5ME4676.38) that will be impacted by the current project. The documented segment begins at a modern check dam 0.1 mi. southeast of the intersection of H and 27 roads. From this point, the canal continues on a winding path to the northwest. The end of the recorded segment is around 0.57 mi. east of the intersection of the canal and 25 Road. The GVWUA right-of-way for the canal crosses private lands. Several residential neighborhoods flank the canal to the south and west and there are some agricultural

fields near the northwestern extent of the recorded segment. The northern and eastern edges of the recorded canal segment are much less developed. While some residential development has occurred on this side of the canal near the southern end of the segment, much of this side of the canal is relatively undeveloped and characterized by rolling adobe hills. The Walker Field Airport (Grand Junction Regional Airport) is roughly 1 mi. east of the southern end of the documented segment; some absence of development is likely related to a buffer area around the airport. Vegetation in the undeveloped portions along the canal includes greasewood, sagebrush, grasses, cottonwood, and Mormon tea. Sediment is light brown silty clay loam with some gravels.

The Government Highline Canal is a high-volume canal that carries water diverted from the Colorado River to supply additional canals and water users along its 55-mi. total length (Simonds 1994). The canal is around 75 ft. wide and was full during Alpine's documentation. The recorded segment is generally of earthen cut-and-fill construction, with the cut on the northern side and the resulting soil fill placed along the downslope side of the canal (southern and western sides). This method of construction has created a fairly evenly contoured canal grade with a raised earthen bank. The banks rose between 3 and 5 ft. above the water at the time the segment was documented. The embankment on the southern side of the canal varied in height above the surrounding landscape; the northern bank was generally fairly even with the surrounding area. The primary canal maintenance road runs along the southern bank and has a leveled width of 20–25 ft. An access road also runs along the northern bank of the canal, but has a smaller constructed footprint of around 10–12 ft. wide. There are a few areas where the canal has been cut through adobe hills; in these areas, the banks rise over 20 ft. above the water. Only one section of the canal was lined with concrete, a roughly 215-ft.-long section around two headgate features. The features are on the outside of a curved section of the canal, and the lining may have been placed to reduce erosion of the bank on the outer curve of the channel. Concrete riprap was also observed periodically along the canal banks. Several modern undershot culverts crossed underneath the documented portion of the canal—most had elements only visible outside of the project corridor.

Seventeen headgates were documented along the recorded segment of the canal (Table 1). Several of the headgates were observed to have a painted-on GVWUA headgate/structure number. When available, this number is listed; unlabeled headgates were given a feature number. Only one of the headgates (Headgate 13) is diagnostically historical, with "1940" inscribed in the concrete. Headgates 10.5 and 7.25 and Features 12 and 15 have concrete headwalls with gravel matrix, suggesting that they are also older headgates, although they are not demonstrably historical. None of the documented headgates outlet to field ditches. Most of the headgates outlet to buried pipes, with manhole access on the opposite side of the maintenance road. Three headgates, all on the northern side of the canal, outlet to pumphouses at the base of a large hill and bring irrigable water to the land above the ditch.

Headgates along the segment are generally of two basic forms. The first type is a simple headgate that consists of an angle-iron framed headgate with a handwheel lift set into a concrete headwall that is placed along and parallel to the canal bank. Several of these have wingwalls that extended perpendicularly from the headwall into the canal. Metal debris grates extend across and are bolted to the wingwalls; these serve to filter large debris from entering the headgate. Some variation was observed among those headgates that fit this form; for example, Headgate 10.5 has a short headwall and then wingwalls that flare out into the channel, and a modern pump has been placed on the Feature 15 headgate to pump water up the adjacent hillside.

The second type of headgate seen along the documented segment of the Government Highline consists of a headgate built into a small concrete side-outlet diversion box. Headgates of this type are characterized by concrete diversion boxes of varying size that are set along the canal bank and slope into the channel. One or two metal debris grates cover the opening of the side-outlet headgate box. These headgate features have metal panels that cover access to the interior of the box

and to the headgate itself. Functionally, these operate similarly to the simple headgates, with all containing a single angle-iron and handwheel lift headgate. All of these features divert to buried pipe.

Five additional features were documented: a flume, the remains of a pump headgate or intake feature, a culvert, a large bridge, and a large modern check dam. Feature 1 is a modern concrete flume, measuring around 180 ft. long. The central channel of the flume is about 80 ft. long, with wingwalls extending at a 30-degree angle for an additional 50 ft., both upstream and downstream of the central channel. The concrete channel walls are 15 in. wide. The channel is 12 ft. wide and about 9 ft. deep. The sides of the channel have "1220" painted on the exterior. The flume carries the canal over an unnamed intermittent drainage. A modern bridge is adjacent to the feature on the western bank and carries the maintenance road over the drainage.

Feature 10 represents the remains of a pump headgate or an intake feature and appears to be historical. The feature consists of two concrete walls set perpendicular to the channel bank. One wall has the remains of milled lumber bolted to the top of the concrete. The walls are 4 ft. long, 4 ft. apart from each other, and about 3 ft. tall. A 6-in.-diameter metal pipe exits from near the top of the canal's western bank, then runs downslope and into the middle of the walls. While the feature could represent an intake structure for the canal, perhaps related to overflow drainage from a nearby residential neighborhood, the remains of the milled lumber on one of the walls suggests that a pump may have at one time been bolted above the concrete wingwalls, serving to pump water up the hill through the metal pipe.

Feature 11 is an undershot culvert that brings Leach Creek underneath the Government Highline Canal. The feature consists of a concrete culvert headwall with three 5-ft.-diameter pipes that extend underneath the canal. The culvert headwall is 6½ ft. tall, 22 ft. wide at the top, and 17 ft. wide along its base. The mouth and exit headwalls of the culvert are 105 ft. apart. Wing walls extend out 9 ft. from the ends of the headwall. The feature has 40-ft.-long retaining walls above the headwalls; the retaining wall on the upstream edge is constructed out of large cement blocks, while the retaining wall on the downstream edge is constructed out of cobble masonry. The downstream retaining wall is clearly older than the upstream retaining wall, which appears to be a modern rebuild. The feature's culvert headwalls look to be consistent in age and probably date to the original construction of the Highline Canal over Leach Creek.

Feature 20 is a large bridge over which H Road crosses the canal. The bridge is 40 ft. long and 56 ft. wide; the bridge deck is about 10 ft. above the canal. The bridge is supported by tiered concrete walls, with wingwalls on the upstream end that flare out into the bank and are 9 ft. tall and 7½ ft. long. The bridge itself is supported by I-beams. A large pipe is set into both sides of the concrete wall on the northern, downstream, end of the bridge; a second pipe runs underneath the bridge. The canal banks are lined with concrete upstream of the bridge. National Bridge Inventory data suggests the bridge was constructed in 1990. A previously conducted survey of the bridge on H Road was conducted in 1988, apparently before the modern rebuild of the bridge.

Feature 21 is a large modern check dam feature with two radial gates that is flanked by two flumes. The feature is 100 ft. long, 50 ft. wide, and about 8 ft. tall. The central channel is around 60 ft. long, with wingwalls extending out 20 ft. on both the upstream and downstream ends of the feature. A concrete-decked bridge crosses the canal in the center of the feature, and three concrete walls extend into the canal below the decking, serving to subdivide the canal flow into four channels. The central two channels have large metal radial gates affixed to the downstream edge of the bridge, with electrical lift mechanisms bolted onto the bridge decking, allowing the gates to be lifted independently. The outer two channels are slightly lower, extending upstream from the concrete divider walls below the bridge; these walls serve to back water up into the central two channels. The outer channels have no gates and likely serve as measurement weirs.

Table 1. Headgates Recorded along the Government Highline canal (site 5ME4676.38).

Headgate/ Feature Number	Canal Side	Handwheel Diameter (in.)	Gate Width (in.)	Stem Diameter (in.)	Notes
H 7.25	West	10	11	¾	Handwheel-operated lift gate. Is 15 ft. upstream of Feature 18. Two adjoining headwalls—older headwall is 5 ft. long and has gravel matrix. Newer headwall is 4 ft. long. Outlets to pipe. Headgate painted with "7.25".
H 7AB	West	10	13	¾	Handwheel-operated lift gate. Is 15 ft. downstream of Feature 19. Concrete headwall is 5 ft. wide and set into concrete-lined canal bank. Fresno valves handwheel, headgate painted with "7AB". Headgate set behind metal grate. Outlets to pipe.
Feature 17	South	10	9½	¾	Handwheel-operated lift gate. Concrete headwall is 5 ft. long with inset wingwalls that slope into canal. A grate across wingwalls covers headgate opening. Outlets to pumphouse. Fresno Valves handwheel. "15" engraved on headwall.
Feature 16	South	10	9½	¾	Handwheel-operated lift gate. Concrete headwall is 5 ft. long with inset wingwalls that slope into canal. A grate across wingwalls covers headgate opening. Outlets to pumphouse. Fresno Valves handwheel.
Feature 15	East	10	15	¾	Handwheel-operated lift gate. Concrete headwall is 3 ft. long, 6 in. thick. Wingwalls extend out 2.5 ft. A modern pump is installed on top of headgate.
Feature 14	East	10	13	¾	Handwheel-operated lift gate. Concrete headwall is 5 ft. long with inset wingwalls that extend and slope into canal. Metal debris grate on wingwalls covers headgate opening. Outlets to pumphouse. Fresno Valves handwheel.
H 9	South	10	11	¾	Handwheel-operated lift gate. Concrete headwall is 8 ft. long. Headgate outlets to pipe, and the opening is covered by a metal grate cage. Headwall has braided cable anchor supports, and has a painted "9." Hydro brand handwheel.
Feature 12	South	-	0	-	Remains of a concrete headgate. Headwall is 3 ft. long and is about 3 ft. out from canal bank. No headgate mechanism remaining.
H 9.5	South	10	9	¾	Handwheel-operated lift gate. Concrete headwall is 5 ft. long. Wingwalls are inset 9 in. from headwall ends and slope into channel. Headgate is covered by grate. Headgate outlets to pipe. Fresno Valves handwheel, headgate painted with "9.5".
H 10	West	24	3½	1½	Handwheel-operated lift gate. Side-outlet concrete headgate box, 10 ft. long on channel, walls are 1 ft. thick. Headgate painted with "10".
H 10.25	West	-	15	¾	Handwheel-operated lift gate. Concrete headwall is 7 ft. long and 7 in. thick, reinforced with gravels. No handwheel, but handwheel stem is embossed with

Table 1. Headgates Recorded along the Government Highline canal (site 5ME4676.38).

Headgate/ Feature Number	Canal Side	Handwheel Diameter (in.)	Gate Width (in.)	Stem Diameter (in.)	Notes
					"Armco". Headgate is covered with metal debris grate and is 2 ft. out from bank. Outlets to pipe.
H 10.38mc	West	10	18	¾	Handwheel-operated lift gate. Concrete headwall is 8 ft. long and 7 in. thick. Headgate outlets to diversion box across road. Headwall inscribed with "1976".
H 10.5	West	10	12	1.0	Handwheel-operated lift gate. Five foot long wingwalls extend out at a 45-degree angle from a 2-ft.-long concrete headwall. Concrete reinforced with gravels. Walls are 15 in. thick, at most. Armco brand handwheel. Outlets to division box and then to pipe.
Feature 5	West	14	24	1.0	Handwheel-operated lift gate. Side-outlet diversion headgate, 6 ft. long on channel. Outlets to channel covered with grate. Hydro brand handwheel.
Feature 4	West	10	15	¾	Handwheel-operated lift gate. Wingwalls slope out at least 3 ft. into channel. Concrete headgate is 5 ft. long and over 6 ft. tall. Headgate outlets to buried pipe. The bank adjacent to the headwall is cobble armored. Hydro brand handwheel.
H 12	West	15	43	1.0	Handwheel-operated lift gate. Headgate outlets to pipe, sloped intake covered with metal grate. Concrete headwall is 11 ft. long. "12" painted on headwall. Waterman handwheel.
H 13	West	10	15	¾	Handwheel-operated lift gate. Concrete headwall is 5 ft. wide and 10 in. thick, and has a "1940" inscription. Headgate is 4 ft. out from the canal's bank. "13" is painted on headwall.

Historical Background

The canal was originally documented in 1984 for the Grand Valley Unit, Stage Two, whereby the Grand Valley irrigation system was cursorily inventoried and documented (Martorano and Hyer 1984). Detailed historical background for the Government Highline Canal is discussed in the irrigation section, under the Culture History heading above.

SUMMARY

The Level I Documentation was performed on one segment (site 5ME4676.38) totaling 3.3 mi. of the Government Highline Canal system in advance of reshaping the canal prism, installing a three-part fabric and PVC liner in the canal over the reshaped prism, and covering the PVC with a 3-in.-thick layer of shotcrete wear surface. The repairs to the canal are being proposed to reduce the amount of salt and selenium entering the Colorado River. This undertaking is part of the BOR's Basinwide Salinity Control Program. Seventeen headgates and five additional features were documented along the recorded segment. A list of maps and photographs are provided in Appendix A; maps and reproductions of photographs are included in Appendix B. Original archival black-and-white photographs are included with the documentation package to the Colorado SHPO.

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APPENDIX A

Level I Documentation: List of Maps and List of Photographs

List of Maps

Map 1: The Government Highline Canal (5ME4676.38.73) showing photographic points for headgates and the landscape.

List of Photographs

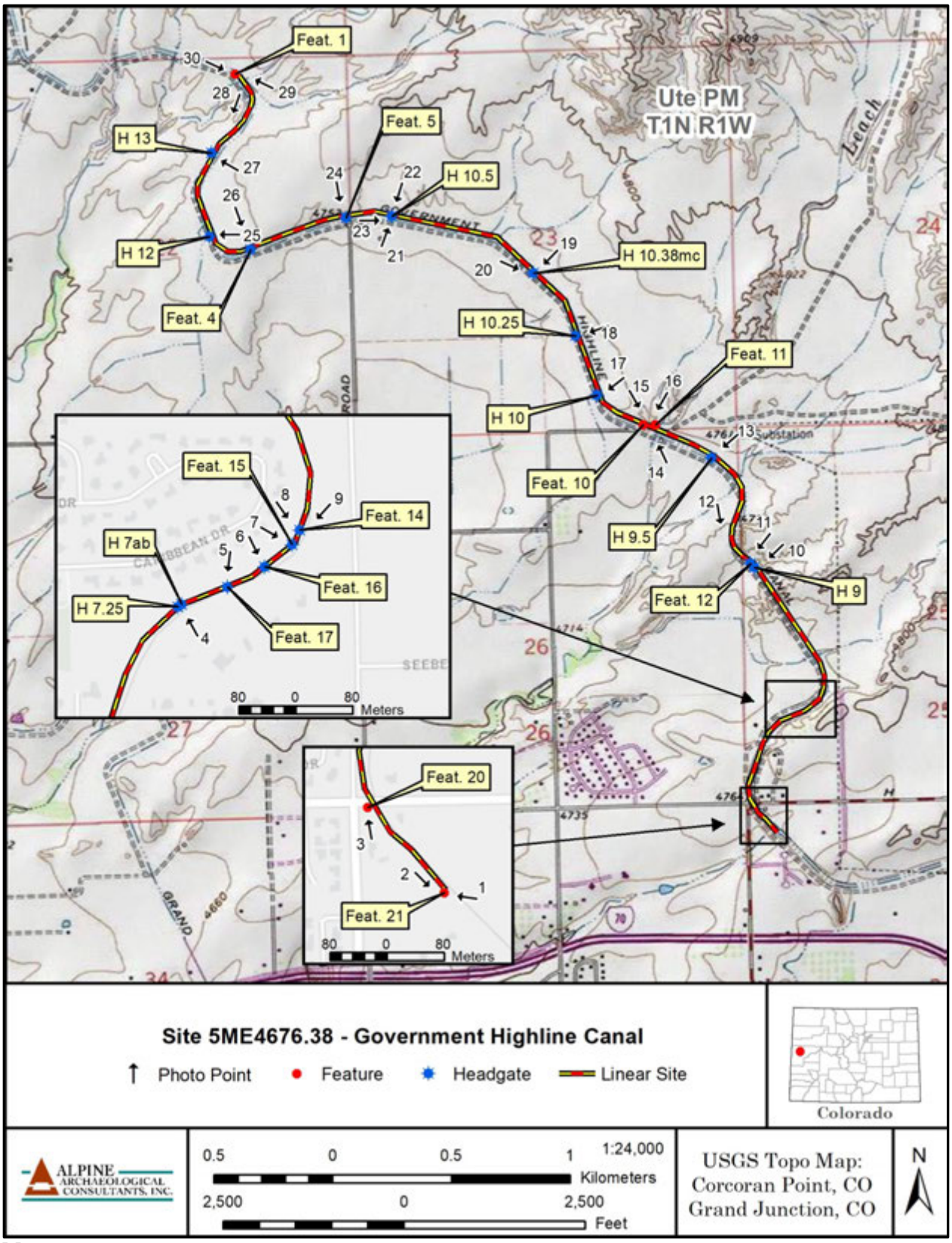
Subject: The Government Highline Canal (5ME4676.38).
Photographers: Charles A. Reed and Trevor R. Lindland
Date: April 24, 2017.

Photographs of the Government Highline Canal (5ME4676.38)

Photograph Number	Facing	Description
1	W	Overview of Feature 21, a modern check dam
2	SE	Feature 21, a modern check dam
3	N	Feature 20, the H Road bridge crossing the canal
4	NNW	Headgates 7AB and 7.25
5	S	View of Feature 17
6	SSE	Feature 16, an unnumbered headgate
7	ESE	Feature 15, a headgate modified with a pump
8	SE	Feature 14, an unnumbered headgate
9	SW	Overview of the Government Highline Canal (site 5ME4676.38) from Feature 14
10	SW	Headgate 9
11	SW	Feature 12, an abandoned takeout
12	S	Overview of the Government Highline Canal (site 5ME4676.38) showing an incised portion of the canal. Photograph was taken between Headgate 9 and Feature 12.
13	SW	Headgate 9.5
14	NNW	Feature 11, an undershot culvert
15	SSE	Overview of Feature 11, the undershot culvert
16	SSW	Feature 10, a remnant of a pump headgate or intake feature
17	SW	Headgate 10
18	WSW	View of Headgate 10.25
19	SW	Headgate 10.38mc
20	ESE	Overview of the Government Highline Canal (site 5ME4676.38) taken from north of Headgate 10.38mc
21	NNE	Detail of Headgate 10.5
22	SSW	Headgate 10.5
23	ESE	Overview of the Government Highline Canal (site 5ME4676.38) with Grand Mesa in the background. Photograph was taken between Feature 5 and Headgate 10.5
24	S	Feature 5, an unnumbered headgate
25	SSE	Feature 4, an unnumbered headgate
26	W	Headgate 12
27	NNW	Headgate 13
28	SSW	Overview of the Government Highline Canal (site 5ME4676.38), between Feature 1 and Headgate 13
29	WNW	Feature 1, a modern concrete flume
30	ESE	The southwestern side of Feature 1, a modern concrete flume

APPENDIX B

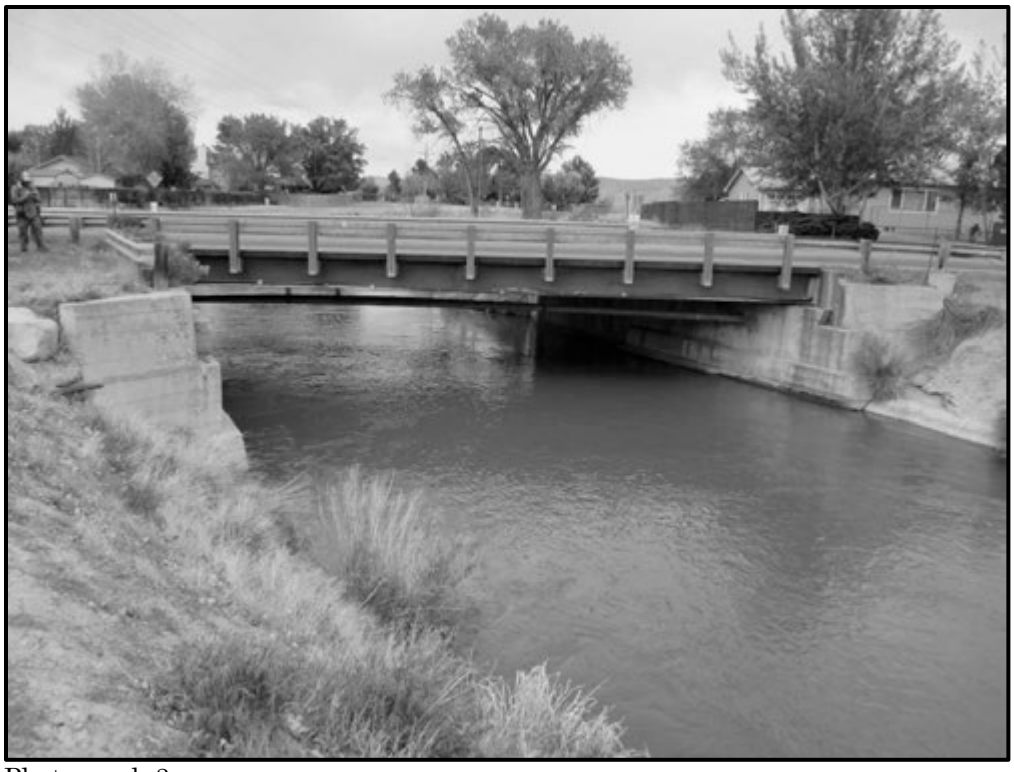
Level I Documentation: Maps and Photographs


Ute PM
T1N R1W
Feat. 1
Feat. 4
Feat. 5
Feat. 10
Feat. 11
Feat. 12
Feat. 14
Feat. 15
Feat. 16
Feat. 17
Feat. 20
Feat. 21
H 13
H 12
H 10.5
H 10.38mc
H 10.25
H 10
H 9.5
H 9
H 7ab
H 7.25
Substation
80 0 80 Meters
Site 5ME4676.38 - Government Highline Canal
Photo Point
Feature
Headgate
Linear Site
Colorado
ALPINE ARCHAEOLOGICAL CONSULTANTS, INC.
0.5 0 0.5 1 1:24,000
Kilometers
2,500 0 2,500
Feet
USGS Topo Map:
Corcoran Point, CO
Grand Junction, CO
N

Map 1.

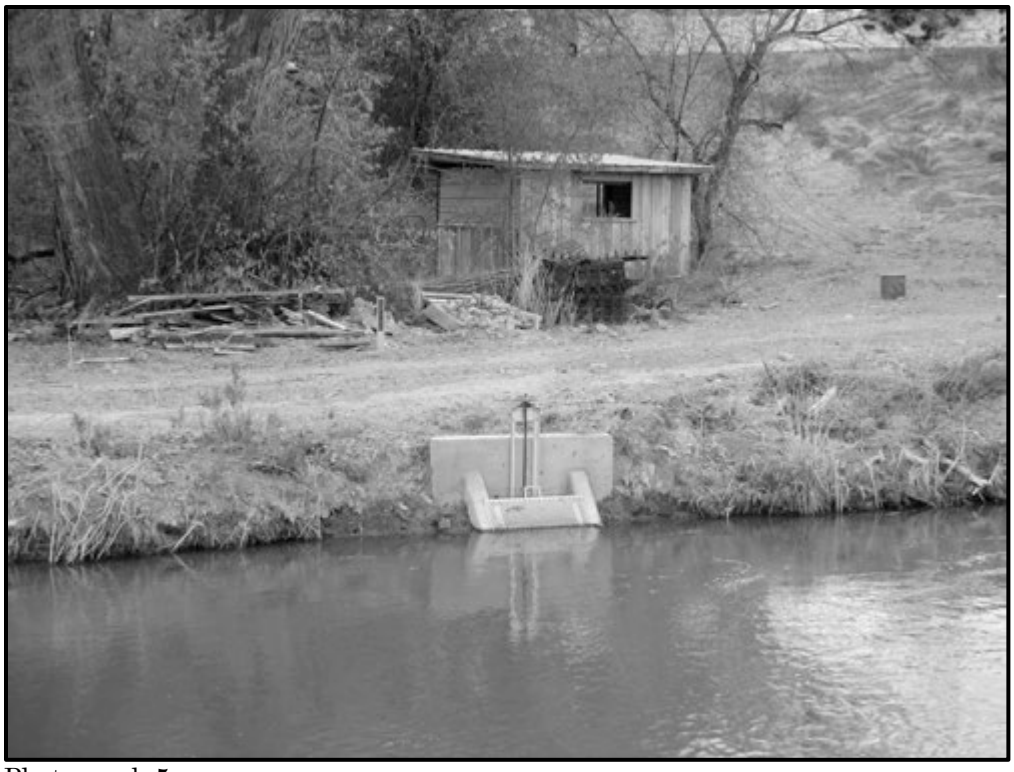
Photograph 1.

Photograph 2.



Photograph 3.

Photograph 4.



Photograph 5.

Photograph 6.

Photograph 7.

Photograph 8.

Photograph 9.

Photograph 10.

Photograph 11.

Photograph 12.

Photograph 13.

Photograph 14.

Photograph 15.

Photograph 16.

Photograph 17.

Photograph 18.

Photograph 19.

Photograph 20.

Photograph 21.


Photograph 22.

Photograph 23.

Photograph 24.

Photograph 25.

Photograph 26.

Photograph 27.

Photograph 28.

Photograph 29.

Photograph 30.