

Greg Stachon Landscape Architect Community Services Department El Paso County 200 S. Cascade Avenue, Suite 100 Colorado Springs, CO 80903

RE: Paint Mines Interpretive Park Restoration (Con# 20-112) (HC# 78632)

Dear Mr. Stachon,

Thank you for your correspondence received by our office on November 4, 2020 regarding consultation with our office pursuant to the Colorado State Register Act – Colorado Revised Statute (CRS) 24-80.1 for the above mentioned subject action.

The provided documentation notes that eleven cultural resources (5EP.3094, 5EP.3098, 5EP.3099, 5EP.3100, 5EP.3107, 5EP.3118, 5EP.3119, 5EP.3120, 5EP.3121, 5EP.3122, and 5EP.3258) sit in the area of proposed action. 5EP.3258 is an archaeological district listed on the National Register of Historic Places (NRHP). 5EP.3094, 5EP.3098, 5EP.3099, 5EP.3100, 5EP.3107, 5EP.3118, 5EP.3119, 5EP.3120, 5EP.3121, and 5EP.3122 contribute to the eligibility of 5EP.3258 for the NRHP. Based on the documentation provided, we agree that the subject action will not adversely affect the resources.

Please note that our comments should not be interpreted as concurrence under the National Historic Preservation Act or any other environmental law or regulation. If human remains are discovered during ground disturbing activities, the requirements under CRS 24-80 part 13 apply and must be followed. Should the current subject action change, please contact our office for continued consultation under CRS 24-80.1.

In the event that there is federal agency involvement, please note that it is the responsibility of the federal agency to meet the requirements of Section 106 as set forth in 36 CFR Part 800 titled "Protection of Historic Properties." This includes not only reasonable and good faith identification efforts of any historic properties located within the area of potential effects, but determining whether the undertaking will have an effect upon such properties. The State Historic Preservation Office, Native American tribes, representatives of local governments, and applicants for federal permits are entitled to consultative roles in this process.

We thank you for the opportunity to comment. If we may be of further assistance, please contact Matthew Marques, Section 106 Compliance Manager, at (303) 866-4678 or matthew.marques@state.co.us.

Sincerely,

Steve Turner, AIA State Historic Preservation Officer

We are now accepting electronic consultation through our secure file transfer system, MoveIT. Directions for digital submission and registration for MoveIT are available at https://www.historycolorado.org/submitting-your-data-preservation-programs.

Steve Turner
State Historic Preservation Officer
History Colorado
1200 Broadway
Denver, CO 80203

Subject: HC# 78636 – Paint Mines Interpretive Park Restoration (Con# 20-112)

Steve,

Thank you for the continued support your office has provided El Paso County (County) during the consultation process for this project. We particularly appreciate the advice and guidance provided by Mr. Mathew Marques and Dr. Holly Norton. In keeping with their guidance, through our construction contract with Smith Environmental and Engineering, we have retained A&B Cultural Consultants, LLC (A&B) as a subcontractor to address the cultural resources aspects of this project. We are no longer pursuing federal CARES Act funding for this project and all work will be self-funded by the County. All other details of the project remain the same as they were described in our letter to you dated September 22, 2020. Details concerning the project are provided in Attachment 1 that includes the Plan for construction activities along with examples of the types of signage we will be installing.

The Area of Potential Effects (APE) for this project is defined as the portion of the Paint Mines Interpretive Park (PMIP) to the east of Paint Mines Road as shown by the green shaded area on the Plan on Page 1 of Attachment 1. There will be no direct impacts outside of the PMIP boundary and no visual, auditory, indirect, or cumulative effects outside of the

PMIP boundary. To identify potential conflicts within the APE, the County obtained shape files for all sites that are considered to be contributing to the characteristics that make the Calhan Paint Mines Archaeological District (**5EP.3258**) eligible for listing in the National Register of Historic Places (NRHP). These sites are shown on the plans in purple and were overlaid on the construction plans to identify any areas of concern. These plans were used by Dr. Robert Mutaw of A&B to conduct background research and a field assessment to assist with the determination of potential effects to any of these contributing resources.

Based on the overlay map, ten sites were identified within the APE that had the potential to intersect with one or more of the project elements that included: work on existing trails; closure of social trails; installation of culverts, mile markers, signs, and other markers; main parking lot expansion; and staging areas. No new access roads are required. The ten sites with possible intersection(s) with project elements are: 5EP.3094, 5EP.3098, 5EP.3099, 5EP.3100, 5EP.3107, 5EP.3119, 5EP.3120, 5EP.3121, and 5EP.3122. Site files for these ten sites were reviewed as well as the NRHP Nomination Form for 5EP.3258. While this previous work revealed extensive human occupation of the area potentially from the Late Paleoindian through the Late Prehistoric stages with several potential areas with buried cultural features, it appears that no formal geomorphological analysis of the area has been conducted. Pertinent geological and soil literature was therefore consulted to prepare this. In addition, a site visit was conducted on October 24, 2020 by Dr. Mutaw, who was assisted by Anne Mutaw, with the primary purpose of assessing the potential intersections of sites and project elements along with establishing the geomorphological context for each of the ten sites.

Specific methodologies employed included walking parallel transects across areas to confirm site boundaries; walking side-by-side along trail segments with each archaeologist observing the area extending from their side of the trail; randomly walking over specific areas searching for any artifacts or features in those areas; taking photographs of sites and geologic features, and obtaining Geographic Positioning System (GPS) coordinates for portions of sites intersecting project features that should be avoided. The site visit relied on observations of natural surfaces. No shovel probes or other subsurface investigation was performed other than observation of natural cut exposures. The results of the background research and site visit are presented in the following and the references can be found at the end of Attachment 2 that also includes Photographs of the APE.

Paint Mines Interpretive Park Geomorphology

Archaeological sites are generally eligible under NRHP criterion D when they can produce data through analysis of artifacts and features found in an original context, i.e., *in situ*, that can be used in answering important research questions. This is indeed the case for the sites that are contributing to the Calhan Paint Mines Archaeological District (**5EP.3258**). Soils that formed in alluvial valleys yield evidence of the geomorphic and environmental settings and ages of archaeological deposits. These soils are formed in relation to patterns of alluvial sedimentation, and only on stable land surfaces (Holliday 1992; Ferring 1992; Mandel 2006). An understanding of the geomorphological history of an area is useful in assessing cycles of deposition and erosion that first protect then and destroy cultural resources in that area. During the early Quaternary period, the uplifting of lands to the west caused streams in eastern Colorado to start downcutting through the Pliocene bedrock. After this, cycles of stream erosion and sedimentation followed leaving terraces and fans in alluvial valleys that formed stable surfaces that were favored by the prehistoric inhabitants for site locations (Mandel 2006b; Prescott 1953). Continuing sedimentation at times led to the preservation of these sites, while new periods of erosion and downcutting may have caused their destruction.

Along the middle and lower reaches of some streams, thick layers of sediments spanning the Holocene were formed, while in upland areas and floodplains the sediments tend to be thin and recent in origin. These sediment layers that formed during the past 13,500 years have a potential to contain buried archaeological sites that are usually associated with buried soils (paleosols) that reflect the stable land surface. In contrast, surfaces that have been stable during this period are unlikely to have buried cultural deposits but rather a surface assemblage ranging from the Paleoindian to historic times (Mandel 1992, 2006; 2007; Layzell et al. 2018).

The geomorphology of PMIP is complex, yet straight forward as it reflects the recognized processes behind gully formation and erosion. PMIP is situated near the top and along the north slope of a large hill. This is along a structural divide that separates the Arkansas and South Platte river basins with the Paint Mine ephemeral drainages flowing north to Big Sandy Creek, an initially east then south flowing tributary of the Arkansas River. The south side of this hill is ephemerally drained by the east flowing Horse Creek, also an Arkansas River tributary. The divide, which is continuous with the Palmer Divide south of Denver, is an uplifted area mantled by the remnants of a series of outwash events from the Rocky Mountains at the Cretaceous/Tertiary boundary that filled the Denver Basin with delta and river deposits of varying compositions. Collectively, these sediments are called the Dawson formation that is divided into upper and lower units (Thorson 2005; Thorson and Madole 2003). Geologic maps covering this area show that only the lower unit is present at the PMIP. Silicified wood fossils, locally known as "Parker petrified wood" are abundant in this formation and were commonly used as source materials for stone tools by Native Americans. Thorson's mapping further divides the Dawson formation into five

facies, two of which, Tkda4 and Tkda5. The Tkda4 facies represents the D1 sequence of Bryant, and the exposures at the PMIP, and the Tkda5 is the lower portion of the D2 sequence. This distinction is archaeologically important because while both facies produce petrified wood fossils, the quality of the material used as tool stone is far superior in material from the D2 sequence than from the D1 (Mutaw 2020).

The geologic maps also show the crest of the hill is capped with a remnant of the Eocene-Oligocene aged White River formation and this unit runs along the south edge of the PMIP (Bryant 1981; Moore et al. 2001; Tweto 1979). This White River formation consists of fine-grained alluvial deposits that were derived from volcanic ash that coalesced into tuffaceous mudstone from extreme volcanic activity in Utah and Nevada that buried much of the central Rocky Mountains and then washed out onto the Great Plains (Hembree and Hasiotis 2007; Larson and Evenhoff 1998). Repeated cycles of glacial outwash during the Pliocene and Pleistocene stripped much of the Denver Basin and surroundings of these deposits exposing the underlying Dawson formation and stripping away all or portions of its upper layer in some areas. Tweto (1979) shows the geology underlying the PMIP is Tertiary aged Denver and Arapahoe formations, which have recently been redefined as the lowest member of the Dawson formation (Raynolds 2002). This is characterized as interbedded layers of yellowish-green and greenish- gray to olive brown sandstone, brown to brownish-gray siltstone, sandy claystone from andesitic sources, and occasional thin coal seams (Thorson and Madole 2003). Moore and co-workers (2001) describe the surficial geology covering the PMIP area as arkosic loamy colluvium and sheetwash alluvium. The south and east facing slopes of the hill are shown to be underlain by Nussbaum alluvium.

A gravelly outwash deposit from the mid-Pleistocene (Bryant 1981; Tweto 1979)

Soils in the area reflect these different substrates with Bresser sandy loam found along the south and east sides of PMIP over the White River formation bedrock and Cushman loam along the borders of the Paint Mine exposures, which are themselves mapped as badland. Bresser soils are derived from arkosic alluvium and residuum on terraces and uplands. They are deep and well drained with a well-developed A1-B1-B21-B22t-B3-C profile, with a solum depth of 0-40 in. Cushman soils formed in weakly consolidated beds of sandstone and shale residuum or colluvium in upland settings. They are well-drained and deep with a well-developed A1-B2t-B3ca-C1ca-C2r profile and solum depth between 15 and 22 in. These complex soil profiles indicate that both soils are old; on the order of magnitude of 1,000s of years. The badland areas cover the areas of the main geologic features of the PMIP and areas downstream. This area is typically steep, rough, eroding gullies with rapid runoff and high erosion with little or no soil development. Areas of soil within the areas mapped as badlands appear to be remnants of the soils formed on the original surface before mass movement displaced them into the arroyo slopes and bottoms (Larson 1981).

Sometime before the Illinoian glacial stage, which began about 200,000 years ago, the present drainage systems in eastern Colorado were generally established, and main valleys were essentially cut as deeply as they are today. By the beginning of the Wisconsin glacial stage, about 110,000 years ago, uplands in the region had become deeply weathered and were covered with material that would become residuum providing the initial material for the development of the soils in the area. Through the Pleistocene, cycles of glacial outwash would repeatedly refill and then erode these channels leaving behind a series of terraces in the Denver Basin and other remnants throughout the region (Hunt 1953, 1954; Scott 1963). An example of this is the large area identified as Nussbaum alluvium that forms the southeastern sloping flank of the hill south and east of the PMIP and described above. Downcutting after the end of the Pleistocene was completed by 2,000 to 4,000 years ago as inferred by the deposition of the Piney Creek alluvium, which unlike the Pleistocene alluvia, originated from the erosion of lateral tributaries

and side hills (Hunt 1954). Others (Madole and Rubin 1984) argue for even a much earlier age, placing these deposits in the Altithermal, or roughly 5,500 to 7,000 years ago, based on sediments from northern Colorado. Based on this timing the cessation of the backcutting of the channels within PMIP likely occurred between 7,000 and 4,000 years ago.

Landform erosion is not random but proceeds through stages in a systematic fashion during which large channels are extended upward and valleys become deeper and wider. Drainages along the Colorado Piedmont represent the middle stage of this process with a well-established drainage system; headward erosion extending upslope to the divides; and deep, wide valleys with narrow, rounded interstream divides. Two principal ephemeral drainages have cut into the PMIP, one that heads on west side of Paint Mine Road and one on the east, which is the subject of this evaluation and will be referred to as the main Paint Mines drainage. Both have created upland gully systems that form the characteristic exposures and formations for which the park is known. These drainages merge approximately three miles south of the headwall of the main Paint Mines drainage, which is the one that extends furthest to the south. The system descends a total of approximately 550 ft on its way to Big Sandy Creek approximately 6.5 miles from the headwall of the main Paint Mines drainage. The initial gradient for the first mile along the main Paint Mines drainage is 230 ft per mile (4.6%) which decreases to approximately 85 ft per mile (1.6%) between the first mile and the confluence with west tributary, and approximately 43 ft per mile (<1%) for the last 3.5 miles of the shared channel.

The PMIP shows evidence of all the principal mechanisms of valley erosion: down cutting that lowers the stream level, headward erosion that extends drainage upslope, and slope retreat where valley walls recede laterally from the drainage. Beginning at the south end of the PMIP and looking west from south parking lot, it can be seen in photograph DSC_4089 (see Attachment 2 for photographs) that this area is a stable surface with thick grasses that has yet to experience any mass movement. Looking to the southeast from the south parking lot trailhead, Photograph DSC_4090 shows the gently sloping landscape with sparse and disturbed ground vegetation demonstrating the effects that mass movement and sheetwash erosion are having on the uplands in the northeastern portion of PMIP. At the headwall of the main Paint Mine drainage the crescent-shaped upper margin of a clearly defined slump can be seen in Photograph DSC_4394. The steepness of the channel at the base of the slump indicates active erosion and an interior slump with concentric fracture lines can be seen just above this cut. Sloping banks to the left and right of the slump resulted from glides or planar slippage of a large mass down along a bedding plane that became inclined from downslope undercutting. The surface from which Photograph DSC_4394 was taken is along the upper slope of an older glide near the breakaway line.

This same older glide along the west side of the main drainage can be seen in Photograph DSC_4410 from the east side. To the left and right of this, materials from other glides have for the most part been washed out of the drainage. The surface in the foreground of this photograph is a glide along the east side of the drainage and the boulder on the right is a remnant of the White River formation capstone. The view from the toe of the glide on the west side of the drainage is shown in Photograph DSC_4423 that also shows the terracing that is formed due to step-like planar collapse as the slope is side cut by the drainage. The resilient White River formation capstone can be seen at left in Photograph DSC_4427 that also shows evidence of slumps and glides and the pediments that are left once the surface materials have completely eroded away. The view in Photograph DSC_4426 shows the area just downstream of the previous view with caprock remnants now at the right. Views downstream from the lowest pediments show colluvial valley fill in the northern part of PMIP in Photograph DSC_4420. A view along the toe of a glide on the east of the main drainage is shown in Photograph DSC_4404 with a deflated soil horizon to right of the person. A side drainage cut through west side is seen in Photograph

DSC_4395 and a slump and glide can be seen above the trail in the middle ground with extreme erosion at the right. The far north end of the PMIP is seen in Photograph DSC_4429 and sheetwash colluvial deposits are seen on the right on an old glide remnant and recent alluvial floodplain deposits are on the left behind the sign.

It is likely that the unique geologic features of the PMIP are at this location because of the combination of the White River formation capstone and the Nussbaum alluvium that forms the southeastern sloping flank of the hill to the south and east providing a back-stop to the backcutting and preventing the erosional processes from cutting completely through to a saddle. Once the backcutting stopped, continued downcutting lowered the elevation at the base of the headwall and steepened the incline. Over time, the colluvial glide and slump deposits were washed out of the upper reaches of the valley leaving the exposed bedrock pediments and lower glides and slumps gradually deflated leaving behind the typical valley erosion patterns that can be seen today throughout the northern portions of the PMIP.

Potential Effects

Turning to the archaeological deposits at PMIP and their relation to the geomorphology of the area and project impacts, in Photograph DSC_4389 of the upland areas, **Site 5EP.3094** is located to the left and right of the snow fence in the center ground. This site was mapped as extending to the east end of the snow fence and the area between it and the parking lot was intensively re-surveyed to confirm this. No materials were observed in this area. A portion of a stone circle originally mapped at the west end of the snow fence was observed to be well-sodded and stable. The site is situated in Bresser sandy loam over the White River formation bedrock, which supports a thick grass coverage and relatively stable surfaces subject to minor wind and water erosion. Typically, archaeological deposits in these settings tend to be surficial and do not yield materials below the level of the solum, which is borne out by the identification on the surface of this site of projectile point types from late Archaic or early Ceramic to the late Prehistoric stage. The proposed activity nearest to this site is this use of the south parking Lot as a staging area, which will not have any impacts to this site.

Site 5EP.3098 extends along a finger ridge formed from eroded glide deposits on the east side of the drainage as seen in Photograph DSC_4426c. The site is away from the main trails and was not directly observed during the field survey because it was clear that its location was sufficiently buffered by gullies to preclude any impacts to it by the proposed activities. The proposed activity nearest to this site is the closure of the social trail providing access to the social trail that crosses this site, which will not have any impacts to the site and should reduce that amount foot traffic crossing it. The social trail across the site will not be rehabbed, but a sign discouraging disturbance of the formations will be installed at point #6 on the Sign Plan on page 3 in Attachment 1 near this site. A culvert is planned for installation near the bench at point #11 on the Plan on page 1 of Attachment 1.

Site 5EP.3099 is a large site with scattered artifacts and deflated hearth features extending from the east rim of the main Paint Mines drainage for approximately 335 m to the east and 550 m from head to toe. It is situated along a large glide that dips north and is sparsely vegetated and prone to sheetwash erosion (Photograph DSC_4426). The existing trail that runs along the east side of the site is seen in Photographs DSC_4404, DSC_4405, DSC_4406, and DSC_4407. A remnant of the solum is seen in Photograph DSC_4404 while the other views show that generally along the east edge of the Paint Mines main drainage erosion has deflated soils to the C horizon. Proposed work in this area includes resurfacing of the trail, replacing the existing culvert, and stabilizing the grade of the trail. No artifacts or features were observed in this area during the site visit and the soils are deflated and unlikely to have

intact buried cultural deposits, and therefore the proposed undertaking will have no adverse effect on the characteristics that qualify this site for the NRHP. The south portion of site **5EP.3099** follows along the main Paint Mines drainage on a colluvial bench that has formed along the toe of the glide (Photographs DSC_3097, DSC_4398, and DSC_4400). While the overlay map shows portions of the existing trail crossing over this site in this area, this was not found to be the case during the site visit. The site is clearly restricted to the bench and slumps immediately below it in this area and it does not extend into the floodplain where the trail is located. The only work being planned along this trail is the replacement of an existing sign and installation of new signs and markers, which will not impact the site in this area.

Site 5EP.3100 is a small scatter of flakes and bones eroding from a colluvial glide area located east of the main Paint Mines drainage near the head of a secondary gully. The overlay map shows that the site is crossed by the existing trail that is planned to be resurfaced in this area. As seen in Photographs DSC_4408 and DSC_4409, the site is on the surface and slumps of the glide that is being cut by slump erosion exposing the characteristic pediments. The northern toe of this site may well cross the trail although no materials were observed in this area during the site visit. The main deposition of this site is upslope from the trail and the only proposed work in this area is the resurfacing of the existing trail, which will have no adverse effect on the characteristics that qualify this site for the NRHP.

Site 5EP.3107 is located on the bench and slump deposits formed by a heavily deflated glide located along the east side of the main Paint Mine drainage. As can be seen in Photograph DSC_4398 it is above and back from the main channel through which the trail runs. The only work being planned along this trail is the replacement of an existing sign and installation of new signs and markers near the trail if needed, which will not impact the site.

Site 5EP.3118 is located along a low, deflated glide with mostly colluvial deposits and a small area of alluvium at the north end (Photographs DSC_4429, DSC_4440, DSC_4431, and 5DSC_4434). The overlay map shows the existing trail crossing the north tip of the site and a portion along the eastern flank near the north end. It was confirmed that the site extends to the north and south of the trail crossing, which also corresponds with the current location of the existing Ecology sign. As can be seen in Photograph DSC 4429, the area to the north appears to represent recent alluvial deposits that may be materials that washed in from this site, or from other upstream sites, and the area to the south is the toe of the deflated glide. The east flank of the glide is seen in Photograph DSC_4430 at the transition point of the drainage floodplain. Photographs DSC_4431 and DSC_4434 show views across the deflated glide upon which the site is located and from the surface of which artifacts from multiple prehistoric stages have been recovered. Work being planned along this trail includes the resurfacing of the western portion from the parking lot to the existing sign location, and installation of new signs and markers if needed. These activities have the potential to impact this site and steps have been taken to minimize this impact. The segment of the trail that crosses the site has been identified with GPS coordinates and the only work that will occur within this area will be resurfacing the trail. Any new signs will be sited outside of this area. With these provisions in place, the planned activities will have no adverse effect on the characteristics that qualify this site for the NRHP.

Site 5EP.3119 is located along a ridge-like glide between the Main Parking Lot and the main area of exposed pediments. As can be seen in Photograph DSC_4395 the site is north of the east-west

secondary drainage through this area and well to the east of the trail. The are no activities planned near this site therefore there will be no impacts to it.

Site 5EP.3120 is on a low, deflated glide remnant along the west side of the main Paint Mine drainage and south of the east-west secondary drainage (Photographs DSC_4397, DSC4399, DSC_4400, DSC_4401, DSC_4403). It is a narrow area that extends for 180 m along the drainage and reflects the last remnants of an old glide. Previous investigations, as documented on the site form, demonstrated some mixing of the deposits, and yielded invalid radiocarbon age estimates. For the most part, the existing trail through this area runs along the bottom of the drainage to the east of the site with the exception of the north end the site where the trail crosses it for short distance. The only work being planned along this trail is the installation of new signs and markers if needed. The segment of the trail that crosses the site has been identified with GPS coordinates and no work will occur in this area. With these provisions in place, the planned activities will not impact this site.

Site 5EP.3121 is in the bottom of the main Paint Mines pediment area along the toe of a glide that is still eroding down the west slope of the gully (Photographs DSC_4410, DSC_4413, DSC_4422, DSC_4423, DSC_4424, DSC_4425). The site is narrow and extends for approximately 210 m along the drainage and the sediments are the collapsed and tilted toe deposits of the glide. This is quite evident in Photograph DSC_4411, while Photograph DSC_4423 highlights the hummocky appearance of the toe deposits. The main trail runs along the eastern margin of this site and crosses it at the northern end. Work along the trail includes the closure of a social trail that crosses the site at the southern end and the installation of new signs and markers as needed. No work is planned for the trail itself. The segment of the trail that crosses the site has been identified with GPS coordinates and no work will occur along this area of the trail. An existing social trail running across the site above and to the west of the main trail will be decommissioned, seeded, and covered with an erosion blanket. With these provisions in place, the planned activities will only impact this site in the areas of the existing social trails that have already disturbed these parts of the site and therefore there will be no adverse effects to the characteristics that qualify this site for the NRHP.

Site 5EP.3122 is located along the west rim of the gully overlooking the main Paint Mains pediments (Photographs DSC_4392, DSC_4393, DSC_4394, and DSC_4410). It situated above the glide that site **5EP.3121** is along at the toe and extends to the north and south of this area along a low crest to the west of the trail along the rim and then downslope to the north towards the east-west secondary drainage. A small area of the site is crossed by the existing trail and this portion is shown in Photograph DSC_4394c. Work along the trail includes the installation of new signs and markers as needed and no work is planned for the trail itself. The segment of the trail that crosses the site has been identified with GPS coordinates and no work will occur in this area. Work at point #18 on the Plan includes building timber steps and covering a culvert with fill in the low spot in the drainage way, however, no cultural materials were observed in this area during the site visit and these activities appear to be outside of the site boundary. With the above provisions in place, the planned activities will not impact this site.

General Observations

Based upon the appearance of the sites in the photographs taken at the time of their recording, most the area has been subject to continuing erosion and deflation. Even at the time of documentation, many of the sites and features were already described as being deflated and eroded, and conditions have only worsened since then. When initially recorded, several sites were documented as having surface

diagnostic artifacts from multiple prehistoric stages spanning the Late Paleoindian to the Late Prehistoric. This is consistent with soils forming in early Holocene residuum that have persistent surfaces with minimal burial of cultural materials into the solum. While several sites were identified as having deep soils, no buried A horizons, or paleosols, have been identified. Deep soils in this area are not surprising given their extreme age, but these are not in themselves indicative of deeply buried cultural materials. Other sites were observed during the original survey as potentially having buried hearths or charcoal lenses, but without a geomorphological analysis it is impossible to say if these are intact buried sediments, or representing side-slope collapse as seen at site **5EP.3121**. Unlike the other sites directly observed within the PMIP, site **5EP.3094** is not undergoing active erosion due to its location on a stable surface and the a stone circle on the site appears to be somewhat more deeply buried now than it appears to be in the photograph taken when it was originally recorded. To date, Clovis and Folsom stage materials have not been recovered at the PMIP and it is probable that in those times, the stream had not backcut as far or deep, nor was the valley sufficiently deep and wide enough yet to expose the pediments that make this area so attractive to people in the past as well as people today.

The primary project elements, stabilization of the trails, rehabilitation of erosional rills, closure of social trails, installation of directional signs restricting traffic in areas, and installation or replacement of culverts to restrict drainage flow to existing channels, are activities that will be beneficial to the preservation of the sites in the PMIP and the overall the Calhan Paint Mines Archaeological District (5EP.3258) because these activities will slow, or stop in some areas, the on-going erosion the area is undergoing.

Determination of Effects

As a result of the above analysis and efforts to avoid and minimize direct impacts to cultural resources, the County has determined that the proposed activities will have **no impacts** to sites **5EP.3094**, **5EP.3098**, **5EP.3119**, **5EP.3120**, and **5EP.3122**. We have also determined that the proposed activities will have **no adverse effect** on the characteristics that qualify sites **5EP.3099**, **5EP.3100**, **5EP.3118**, and **5EP3119** for the NRHP, and the proposed undertaking will overall have **no adverse effect to the Calhan Paint Mines Archaeological District** (**5EP.3258**). The County hereby requests your concurrence with these determinations.

Through the course of this project, if any unanticipated archaeological materials are discovered, work will be stopped, and El Paso County Parks will be called to investigate, and if needed, an archaeologist meeting the Secretary of the Interior's standards will be consulted. El Paso County will follow all standard SHPO reporting procedures and follow any additional requirements regarding any unanticipated archaeological discoveries.

Sincerely,

Greg Stachon
Landscape Architect
Community Services Department

GregStachon@elpasoco.com

Attachment 1 - PMIP Construction Plans

PAINT MINES INTERPRETIVE **PARK RESTORATION PROJECT**

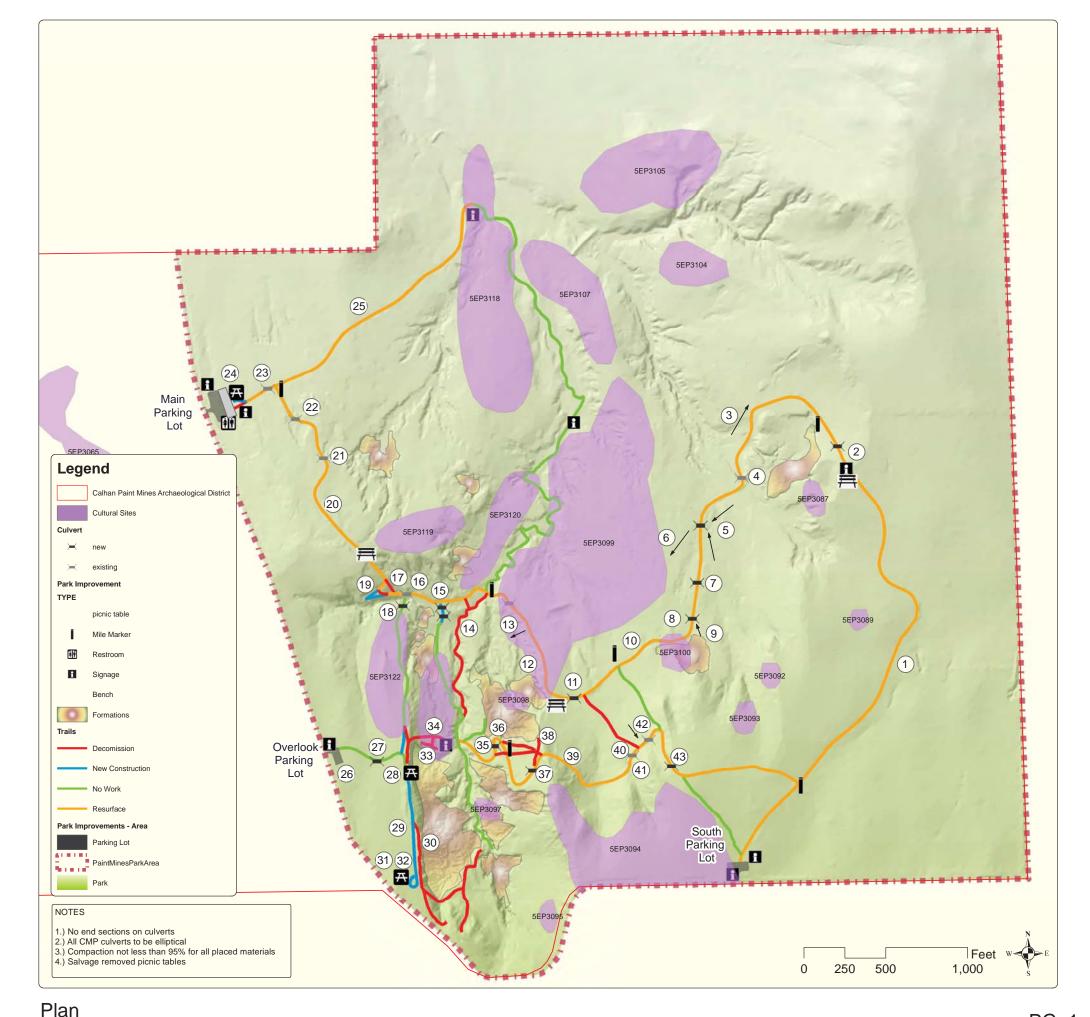
DATE PRINTED: 10-20-2020



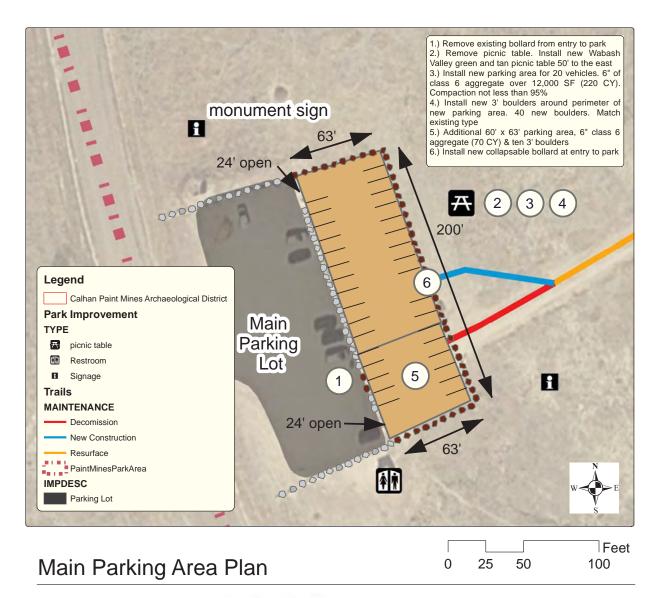
Orientation Map

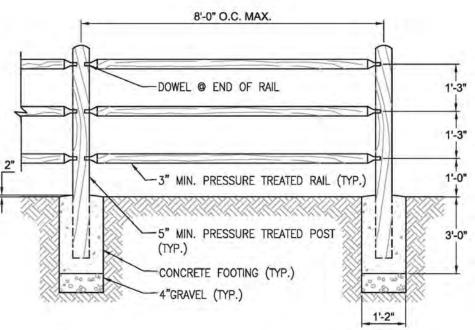
- (1.) Resurface trail, 7,200 LF @ 8' wide x 4" depth (710) CY trail surfacing)
- 2.) Grade reversal 1/2 way down hill (10 CY excavation). Install 18" x 15' CMP ellipitical culvert. No end sections. Install 2 CY rip rap each end
- 3.) Cut swale to north to direct water off trail (8' wide x deep x 100' long = 30 CY)
- 4.) Existing culvert. Clean out, grade end and install 4 CY rip rap on north end (5 CY grading) 5.) Grade ditches (2 @ 100' EA.) Extend natural ditch to
- culvert (30 CY)
- 6.) Grade ditch (4' wide x 100' long x 1' deep). Extend natural ditch to divert water off trail (15 CY)
- 7.) Erosion on E. side of trail. Install new 18" x 15' CMP culvert at trail. Grade ditch to send water E. off trail (1 ditch @ 100', 4' wide x 1' deep = 15 CY)
- 8.) Install 18" x 15' CMP eliptical culvert. Install 2 CY rip rap each end
- 9.) Grade ditch 100' long from formation to culvert (4' wide x 1 deep = 15 CY)
- 10.) Seed + blanket on N. side of trail. (30 SY)
- Superelevate trail toward S. along the curve (10 CY) 11.) Install 18" x 15' eliptical CMP culvert & 2 CY rip rap
- EA. end. Fill in social trail w/ cut material (5 CY)
 12.) Ditch formation side. Berm next to bench. Pitch trail toward downhill side (100' long x 4' wide x 1' depth = 15
- 13.) Remove existing 8" pipe. Grade ditch 4' wide x 100' long x 1' depth = 15 CY. Install rip rap in channel 10 CY
 14.) Decomission creek trail. 200 LF post & dowel
- fencing on north end, 48 LF post & dowel fencing on
- 15.) Install new 18" x 15' long CMP eliptical culvert with 2 CY rip rap each side x 2, Install new Tier 1 trail 8' wide x 50' long (5 CY trail surface, 2 CY roadbase)
- 16.) Lower existing culvert, reuse culvert
- 17.) Decommission social trail, Scarify, seed & blanket 110' LF, install 16 LF post & dowel fence at each end
- 18.) Keep native surface social trail. Install new 18" 15' long CMP eliptical culvert with 2 CY rip rap each end. Install timber steps at beginning of trail.
- 19.) Decomission 70 LF trail Scarify, seed & blanket. Install 200 LF post & dowel fence on inside of switchback 48 LF post & dowel fence at decomissioned trail. Install 140 LF new trail x 8' wide (14 CY trail surfacing, 7 CY road base, 40 CY excavation)
- 20.) Resurface trail, 2,300 LF x 8' wide @ 4" depth-(230 CY trail surfacing)
- 21.) Clean out existing culvert, regrade ditch (4' wide 1' depth = 15 CY)
- 22.) Clean out existing 18" culvert. Install 2 CY rip rap to EA. end. Grade ditch on east side (10 CY)
- 23.) Clean out existing 18" culvert

- 24.) Install new 6" class 6 gravel parking lot. 260' x 63' (288 CY gravel, 200 CY excavation)
- 25.) Resurface trail, 2,100 LF x 8' wide @ 4" depth=
- 26.) Install new post & dowel fencing around parking lot,
- 27.) Remove 4" pipe, install 18" CMP eliptical culvert at low point, Install 1 CY rip rap.
- 28.) Replace picnic table with 6' Wabash Valley green and tan metal table. Realign timbers to east edge of picnic table. Remove damaged timber on west side for new trail. Trail moves to west side of table.
- 29.) Remove 60 LF wire fencing and install 60 LF of CPW Wildlife Friendly 4-Wire Agricultural Field Fence 10' un hilll
- 30.) Decomission first 100' of social trail, scarify surface seed & blanket. Install 100 LF new post & dowel fence.
- 31.) Install new Wabash Valley green and tan metal 6 32.) Install new trail 5' west of existing social trail. Place
- excavated material on top of social trail. Trail terminates as culdesac. 700 LF @ 8' wide x 4" depth (70 CY trail surfacing + 35 CY road base + 35 CY excavation). 48 LF new post & dowel wood fence at end of trail.
- 33.) Install new post & dowel fencing, 300 LF 34.) Decomission social trails, scarify, seed & blanket 500 LF. Install 100 LF new post & dowel fencing
- 35.) Excavate ditch at top of trail towards west vegetation. Install 3 rock check dams in ditch (100' long \times 4' wide \times 1' depth = 15 CY)
- 36.) Install new 18" x 15' CMP culvert x 2. Excavate new ditch to divert water off trail (100' long x 4' wide x 1' deep = 15 CY). Lower trail 2' at top of hill. (50' long x 8' wide x 2' deep = 30 CY)
 37.) Install new 18" x 15' long CMP culvert, 2 CY rip rap
- each end
- 38.) Decomission social trails. Scarify, seed & blanket 200 LF. Install 200 LF post & dowel fence 39.) Resurface trail, 3,000 LF x 8' wide @ 4" depth=
- 40.) Decomission social trails. Scarify, seed & blanket
- 100' at each end. Install 16 LF post & dowel fence at
- 41.) Excavate ditch along bottom of trail (4' wide x 1' deep x 100' long = 15 CY. Excavate ditch along high side of trail (4' wide x 1' deep x 100' long = 15 CY. 42.) Ditch high side of trail to culvert (4' wide x 1' deep x
- 100' long = 15 CY) 43.) Install new 18" x 15' long CMP eliptical culvert with 2 CY rip rap at each end.

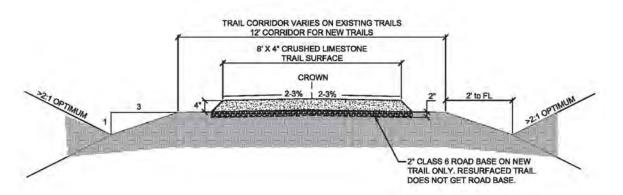


New Work

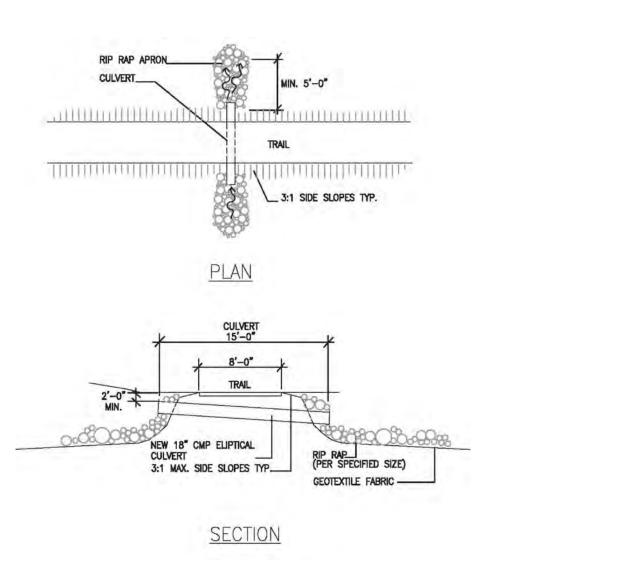




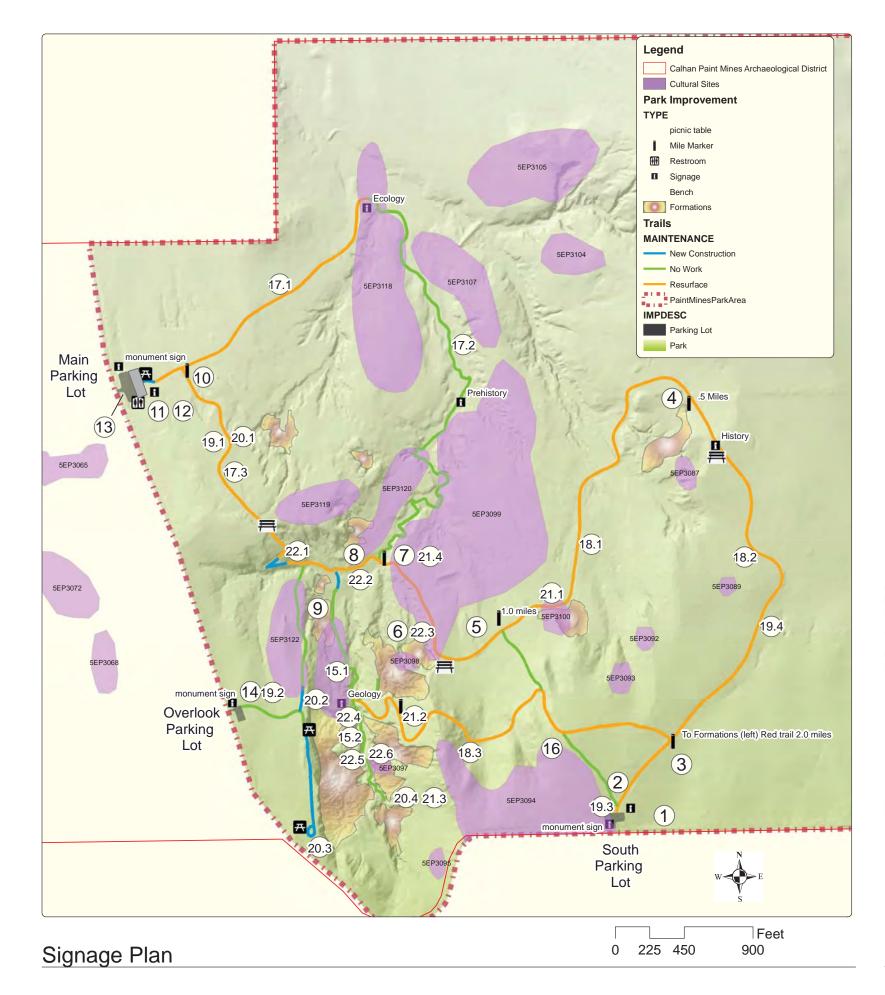
Post and Dowel Fence



Tier 1 Trail Detail

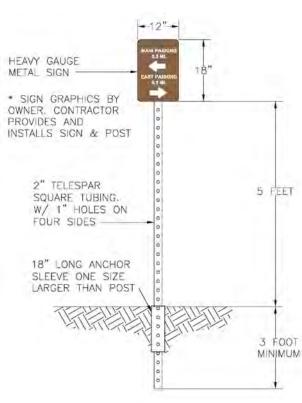


Culvert with Rip Rap

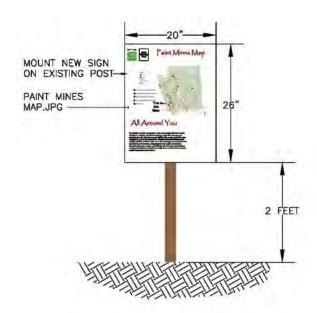


- 1.) Remove & Dispose of (3) existing interpretive signs and posts 2.) Install new metal signs on metal posts. 12"x18" "Park Rules, 12"x18" "Protect the Paint Mines", 12"x18" map
- 3.) Remove existing mile marker sign. Install new wayfinding 12" x 18 metal sign ".5 miles formations to left"
- 4.) Remove mile marker post. Install new 12" x 18" map metal sign on
- new metal post. New 12"x18" conservation sign 5.) Remove mile marker post. Replace with 12"x18" metal wayfinding
- sign. (Formations .25 miles up arrow, Main parkng .75 up arrow, East parking lot, .25 miles left arrow), Install new 12"x18" map metal sign on new metal post
- 6.) Install new "No Climbing on Formations" sign
- 7.) Remove existing mile marker post. Install new 12"x18" metal wayfinding sign. (Formations 500' left arrow, Formations 300' up arrow, Main Parking Lot 1.1 miles right arrow, Main Parking Lot .5 miles up arrow). Install new 12"x18" map metal sign on new metal
- 8.) Install new wayfinding 12" x 18" metal sign. (To Main Parkng Lot .6 miles left arrow, To East Parking Lot .5 miles right arrow) 9.) Install new "No Climbing on Formations" sign
- 10.) Remove existing mile marker post. Install new 12"x18" metal wayfinding sign (Formations .5 miles right arrow, Dry Creek Bed Trail .3 miles up arrow). Install new 12"x18" map metal sign on new metal
- 11.) Intall permanent 'Protect Paint Mines' 12"x18" metal sign & post New 12"x18" conservation sign 12.) Replace map with new 20"x26" map/interpretive sign on existing
- 13.) Install new 24"x36" roadside sign on metal post "Additional
- 14.) Install new 12" x18" metal "Protect the Paint Mines" sign on new metal post
- 15.) Install new 12" x 18" metal sign (No Climbing on Formation)
- 16.) Install new 12" x 18" wayfinding sign ("Formations .3 miles", lef arrow). Install new 12" x 18" map metal sign on new metal post
- 17.) Instal three route marker type 1 18.) Install three route marker type 2
- 19.) Install four route marker type 3
- 20.) Install four new 12"x 18" metal "Do Not Enter" signs
- 21.) Install four new 12"x18" "metal "No Climbing" signs
- 22.) Install six new 6"x6" metal sign on wood post "Area Closed / Do Not Enter"

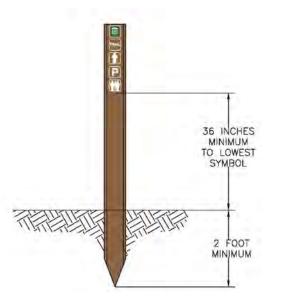
New Signs



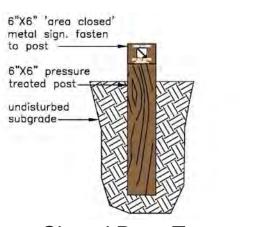
12" x18" Metal Sign, Typ.



Replacement Map



Route Marker, Typ.



Area Closed Post, Typ.

Attachment 2 - PMIP Photographs and References

PHOTOGRAPHIC LOG

Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

Photo No.: Date:

DSC_4389 10/24/2020

Site Number:

5EP.3094

Description:

Looking west from the South Parking Lot at stable surface formed on caprock residuum. The eastern extent of site 5EP.3094 corresponds with the posts in the center at the end of the snow fence.



Client Name: Smith Project: Paint Mines Interpretive Park Project No.: 2020-010

Restoration Project

DSC_4390 10/24/2020

Date:

Site Number:

Photo No.:

N/A

Description:

Gently sloping glide terrain east of the South Parking Lot looking northnortheast.



PHOTOGRAPHIC LOG

Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

Photo No.: Date:
DSC_4394c 10/24/2020

Site Number:

5EP.3122

Description:

Background shows historic slumps and glides and an active slump at south end of main pediment area. Portion of site 5EP.3122 crossed by trail is in the foreground. Facing south.



Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

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DSC_4410 | 10/24/2020

Date:

Site Number:

Photo No.:

5EP.3121 & 5EP.3122

Description:

From east side of main arroyo looking west at large glide along west side with site 5EP.3121 at toe and site 5EP.3122 along top edge above and along breakaway line. A remnant of the White River formation caprock at far right foreground.



PHOTOGRAPHIC LOG

Client Name: Smith **Project:** Paint Mines Interpretive Park Project No.: 2020-010

Restoration Project

DSC_4423 10/24/2020

Date:

Site Number:

Photo No.:

5EP.3121

Description:

Looking west at toe of large glide along west side of main arroyo. Site 5EP.3122 is in these materials up to approximately where the figures are standing and extending to the right. Photograph was taken from the trail.



Client Name: Smith **Project:** Paint Mines Interpretive Park **Project No.: 2020-010**

Restoration Project Photo No.:

DSC_4427 10/24/2020

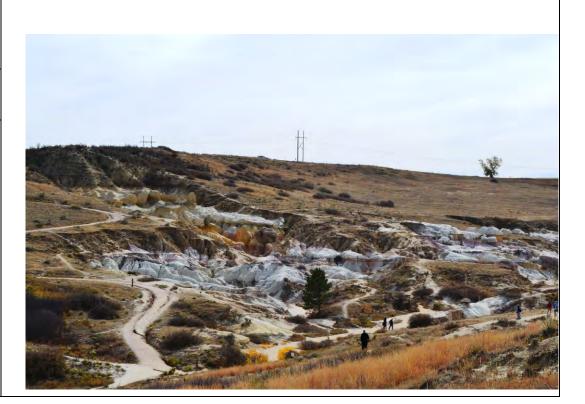
Date:

Site Number:

N/A

Description:

View southeast of White River formation capstone at left, evidence of slumps and glides throughout, and the pediments that are left once the surface materials have completely eroded away.



PHOTOGRAPHIC LOG

 Photo No.:
 Date:

 DSC_4426
 10/24/2020

Site Number:

5EP.3098 & 5EP.3099

Description:

Looking east at area just downstream of the previous view with caprock remnants now at the right, the large glide with site 5EP.3099 above the eroded areas at left, and site 5EP.3098 on the glide remnant near center.



Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

Photo No.: Date:

DSC_4404 | 10/24/2020

Site Number:

5EP.3099

Description:

View facing east along east face of main drainage near east-west secondary drainage looking at solum remnant and western edge of site 5EP.3099.



10/24/2020

PHOTOGRAPHIC LOG

Client Name: Smith Project: Paint Mines Interpretive Park Project No.: 2020-010

Photo No.: Date:

Site Number:

DSC_4395

5EP.3119

Description:

Looking north at side drainage cut through west side and a slump and glide above the trail in the middle ground with extreme erosion at the right. Site 5EP.3119 is on the high bench near the center.



Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

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Site Number:

Photo No.:

DSC_4429

5EP.3118

Description:

View north-northeast from the far north end of the PMIP showing sheetwash colluvial deposits on the right and alluvial floodplain deposits on the left behind the sign. This is also the far north end of site 5EP.3118.

Date:

10/24/2020



10/24/2020

PHOTOGRAPHIC LOG

Photo No.: Date:

Site Number:

DSC_4426c

5EP.3098

Description:

Cropped image looking east at site 5EP.3098 along ridgeline extending into badland area in center right.



Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

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DSC_4405 | 10/24/2020

Date:

Site Number:

Photo No.:

Description:

5EP.3099

View south-southeast along west edge of site 5EP.3099 and existing trail with existing drainage culvert at lower right.



PHOTOGRAPHIC LOG

Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

Photo No.: Date: DSC_4406 10/24/2020

Site Number:

5EP.3099

Description:

View south-southeast along west edge of site 5EP.3099 and existing trail showing erosion along the trail margin.



Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

Photo No.: Date:

DSC_4407 | 10/24/2020

Site Number:

5EP.3099

Description:

View north-northwest along west edge of site 5EP.3099 and existing trail showing erosion along the trail margin.



PHOTOGRAPHIC LOG

Client Name: Smith Project: Paint Mines Interpretive Park Project No.: 2020-010

Restoration Project

 Photo No.:
 Date:

 DSC_4397
 10/24/2020

Site Number:

5EP.3099 & 5EP.3120

Description:

Looking north at site 5EP.3099 on bench at right and site 5EP.3120 on low bench at left. Figure is along trail route.



Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

Site Number:

5EP.3099 & 5EP.3107

Description:

Looking north at site 5EP.3099 on bench and slumps at right middle ground, site 5EP.3107 on bench and slumps in center with trail in right foreground.



PHOTOGRAPHIC LOG

Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

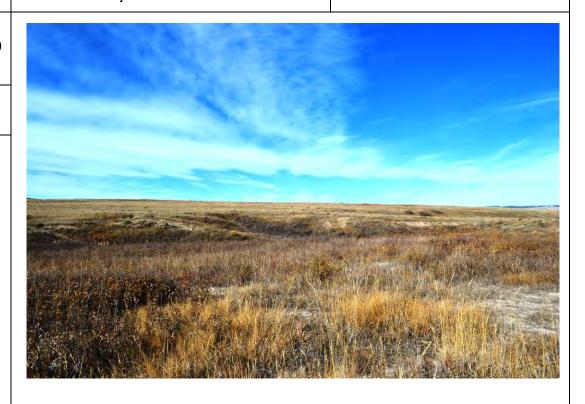
Photo No.: Date:
DSC_4399 10/24/2020

DSC_4399 10/24/2020

Site Number: 5EP.3120

Description:

From floodplain looking northwest across site 5EP.3120 on bench and slumps in middle ground.



Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

 Photo No.:
 Date:

 DSC_4400
 10/24/2020

Site Number:

5EP.3099 & 5EP.3120

Description:

Looking south at site 5EP.3099 on bench and along slumps to the left and site 5EP.3120 on bench and slumps to the right with trail in center.



10/24/2020

PHOTOGRAPHIC LOG

Client Name: Smith Project: Paint Mines Interpretive Park Project No.: 2020-010

Photo No.: Date:

Site Number:

5EP.3120

DSC_4401

Description:

Looking south at site 5EP.3120 on bench and slumps to the right with trail in center.



Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

Trestoration i rojec

Site Number:

Photo No.:

DSC_4403

5EP.3120

Description:

Looking south at north end of site 5EP.3120 on bench and slumps to the right above sign.

Date:

10/24/2020



PHOTOGRAPHIC LOG

Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

Photo No.: Date:
DSC_4408 10/24/2020

Site Number:

5EP.3100

Description:

View west-southwest of southern portion of site on bench and along slumps.



Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

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DSC_4409 | 10/24/2020

Date:

Site Number:

Photo No.:

5EP.3100

Description:

View west along trail at portion that crosses site 5EP.3100 along deflating glide to left.



Date:

10/24/2020

PHOTOGRAPHIC LOG

Client Name: Smith **Project:** Paint Mines Interpretive Park Project No.: 2020-010

Restoration Project Photo No.:

Site Number:

DSC_4411

5EP.3121 & 5EP.3122

Description:

Looking west at the north end of site 5EP.3121 at toe of glide on the far right and the north end of site 5EP.3122 in the area above the breakaway line of the glide and the eroded area to the left.



Client Name: Smith **Project:** Paint Mines Interpretive Park **Project No.: 2020-010**

Restoration Project Photo No.:

Date:

DSC_4413 10/24/2020

Site Number:

5EP.3121 & 5EP.3122

Description:

Closer view looking west at the north end of site 5EP.3121 at toe of glide on the far right and the north end of site 5EP.3122 in the area above the breakaway line of the glide and the eroded area to the left.



10/24/2020

PHOTOGRAPHIC LOG

Photo No.: Date:

Site Number:

DSC_4422

5EP.3121

Description:

Looking northwest along the toe of glide at base of west side of arroyo and at site 5EP.3121.



Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

Trestoration riojec

Site Number:

Photo No.:

DSC_4424

5EP.3121

Description:

Looking northwest along the toe of glide at base of west side of arroyo and at site 5EP.3121 where trail crosses the site.

Date:

10/24/2020



PHOTOGRAPHIC LOG

Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

Photo No.: Date:
DSC_4425 10/24/2020

DSC_4425 10/24/2020

Site Number:

5EP.3121

Description:

Looking south-southeast along the toe of glide at base of west side of arroyo and at site 5EP.3121 where trail crosses the site.



Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

 Photo No.:
 Date:

 DSC_4430
 10/24/2020

Site Number:

5EP.3118

Description:

Looking north from drainage bottom and trail at portion of site 5EP.3118 crossed by the trail and east side.



10/24/2020

PHOTOGRAPHIC LOG

Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

Photo No.: Date:

Site Number:

5EP.3118

DSC_4431

Description:

Looking northwest across site 5EP.3118 from east side with Ecology sign near center right.



Client Name: Smith Project: Paint Mines Interpretive Park Restoration Project

Project No.: 2020-010

Trestoration riojec

Site Number:

Photo No.:

DSC_4436

5EP.3118

Description:

Looking south across site 5EP.3118 from trail along west side of site.

Date:

10/24/2020



PHOTOGRAPHIC LOG

Client Name: Smith **Project:** Paint Mines Interpretive Park Project No.: 2020-010 Restoration Project

Photo No.: Date: DSC_4392 10/24/2020

Site Number:

5EP.3122

Description:

View south of trail along west rim of main arroyo area with site 5EP.3122 away from the trail to the right.



Client Name: Smith **Project:** Paint Mines Interpretive Park **Project No.: 2020-010 Restoration Project**

Photo No.: Date:

DSC_4393 10/24/2020

Site Number:

5EP.3122

Description:

From west from trail along west rim looking across site 5EP.3122.



References cited:

Bryant, B., L.W. McGrew, and R.A. Wobus

1981 Geological Map of the Denver 1° x 2° Quadrangle, North-central, Colorado. USGS, Miscellaneous Investigations Series I-1163. USGS, Washington, D.C.

Ferring, Reid C.

1992 Alluvial Pedology and Geoarchaeological Research. In *Soils in Archaeology: Landscape Evolution and Human Occupation*, Vance T. Holliday, editor, pp. 1-39. Smithsonian Institution Press, Washington, D.C.

Hembree, Daniel I., and Stephen T. Hasiotis

2007 Paleosols and Ichnofossils of the White River Formation of Colorado: Insight into Soil Ecosystems of the North American Midcontinent during the Ecoene-Oligocene Transition *PALAIOS* Vol. 22, No. 2, pp. 123-142.

Holliday, Vance T.

1992 Soil Formation, Time, and Archaeology. In *Soils in Archaeology: Landscape Evolution and Human Occupation*, Vance T. Holliday, editor, pp. 101-117. Smithsonian Institution Press, Washington, D.C.

Hunt, Charles B.

1953 Pleistocene-Recent Boundary in the Rocky Mountain Region. *Geological Survey Bulletin 996-C.* Department of Interior, United States Geological Survey.

1954 Pleistocene and Recent Deposits in the Denver Area, Colorado. *Geological Survey Bulletin 996-A*. Department of Interior, United States Geological Survey.

Larson, Edwin E., and Emmett Evanoff

1998 Tephrostratigraphy and source of the tuffs of the White River sequence. Special Paper 325. Geological Society of America, Boulder.

Larsen, Lynn S.

1981 *Soil Survey of El Paso County Areas, Colorado*. USDA Soil Conservation Service, Washington, D.C.

Layzell, Anthony L., Rolfe Mandel, Courtney L. Ziska, and John R. Bozell

2018 "Systematic Approach to Identifying Deeply Buried Archaeological Deposits, Part I: Final Report. Nebraska Department of Transportation Project P1(16) M048.

Madole, Richard F., and Meyer Rubin

1984 Reinterpretations of Holocene Alluvial Chronology in Major Valley of the Northern Colorado Piedmont. In *American Quaternary Association: Program and Abstracts of the Eighth Biennial Meeting, P. 76.* University of Colorado, Boulder.

Mandel, Rolfe D.

- 1992 Soils and Landscape Evolution in Central and Southwestern Kansas.: Implications for Archaeological Research. In *Soils in Archaeology: Landscape Evolution and Human Occupation*, Vance T. Holliday, editor, pp. 41-100. Smithsonian Institution Press, Washington, D.C.
- The Effects of Late Quaternary Landscape Evolution on the Archaeological Record in Kansas. In *Kansas Archaeology*, edited by R.J. Hoard and W.E. Banks, pp. 28-45. University of Kansas Press, Lawrence.
- 2007 Geomorphology and Stratigraphy. In *Results of Evaluative Testing at Site 14SC112 in the Ladder Creek Drainage, Scott County, Kansas,* Jennifer Borresen Lee and Damita Hiemsta. Metcalf Archaeological Consultants, Eagle, Colorado. KSHS Doc. No. B4071.

Moore, David W., Arthur W. Straub, Margaret E. Berry, Michael L. Baker, and Theodore R. Brandt

2001 Generalized Surficial Geologic Map of the Denver 1° x 2° Quadrangle, Colorado. Miscellaneous Field Studies Map MF-2347. US Geological Survey, Washington, D.C.

Mutaw, Robert J.

2020 "Dawson Formation Silicified Wood." *Colorado Encyclopedia*, (in preparation).

Prescott, Glenn C., Jr.

1953 Geology and Ground-water Resources of Sherman County, Kansas. Kansas Geological Survey Bulletin 105. Internet document: http://www.kgs.ku.edu/General/Geology/Sherman/index.html.

Raynolds, R.G.

2002 "Upper Cretaceous and Tertiary stratigraphy of the Denver Basin, Colorado," *Rocky Mountain Geology* 37(2).

Scott, Glen R.

1963 Quaternary Geology and Geomorphic History of the Kassler Quadrangle Colorado. *USGS Professional Paper 421-A*. Department of Interior, United States Geological Survey.

Thorson, Jon P.

2005 Geologic Map of the Castle Rock North Quadrangle, Douglas County, Colorado. Open-File Report 05-2. Colorado Geological Survey, Denver.

Thorson, Jon P., and Richard F. Madole

2003 Geologic Map of the Monument Quadrangle El Paso County, Colorado. Open-File Report 02-4. Colorado Geological Survey, Denver.

Tweeto, Ogden

1979 Geologic Map of Colorado. U.S. Geological Survey, Reston, Virginia.