Appendix O

Archaeological Reconnaissance Survey

Cultural Resources Assessment for the Horse Ridge Site, Deschutes County, Oregon

Prepared for
Deschutes County Department of Solid Waste

January 2026

Parametrix

Cultural Resources Assessment for the Horse Ridge Site, Deschutes County, Oregon

Prepared for

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Federal Agency:	[none]
Local Agency:	Deschutes County Department of Solid Waste
Area:	400 acres
Area Surveyed:	~50 acres
Survey Dates:	November 3–4, 2025
Resources Identified:	3 Sites: 1H-DCHR, 2H-DCHR, Site 5; 2 Isolates: ISO-1P-DCHR, ISO-2P-DCHR
Recommendations:	Comprehensive archaeological pedestrian survey; Archaeological subsurface survey in areas with high buried site potential; Resource evaluations, as needed

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FIGURES (ALL IN APPENDIX A)

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Acronyms and Abbreviations

cm	centimeter(s)
County	Deschutes County Department of Solid Waste
GLO	Bureau of Land Management General Land Office
NETR	Nationwide Environmental Title Research
NRHP	National Register of Historic Places
OARRA	Oregon Archaeological Records Remote Access
OHSD	Oregon Historic Sites Database
SHPO	State Historic Preservation Office
SOI PQS	Secretary of the Interior's Historic Preservation Professional Qualifications Standards
SWMF	Solid Waste Management Facility
USGS	U.S. Geological Survey

1. Introduction

Deschutes County Department of Solid Waste (County) is conducting Final Solid Waste Management Facility (SWMF) site evaluations and has retained Parametrix to research critical issues, including cultural resources, to confirm the feasibility of future landfill and associated facilities development and to further compare candidate sites. The ultimate objective of the Final SWMF Site Evaluation is to provide the County with the critical information necessary to select a preferred site to acquire, permit, and develop to serve as the new Deschutes County SWMF, which would include a municipal solid waste landfill.

This memo summarizes the methods and results of a cultural resources assessment conducted by Parametrix for one of the final candidate SWMF sites referred to as the "Horse Ridge Site". The Horse Ridge Site encompasses approximately 400 acres within Township 19S, Range 14 E (Willamette Base Meridian), in Deschutes County, Oregon, as depicted in the Horse Ridge, Oregon, U.S. Geological Survey 7.5-minute topographic quadrangle (USGS 1981). This 400-acre area is hereafter referred to as the Study Area (Figures 1 and 2, in Attachment A). The Study Area includes portions of the following parcels: 1914000000300, 1914000000500, 1914000000600, and 1914000000700. This cultural resources assessment consisted of background research; a reconnaissance-level pedestrian survey of the Study Area; and recommendations for future cultural resources work that could be needed to comply with environmental regulations. This memo summarizes the environmental and cultural setting for the Study Area, survey methods, findings, and technical recommendations. This memo is in accordance with the *State of Oregon Guidelines for Reporting on Archaeological Investigations* from the Oregon State Historic Preservation Office (SHPO) (Oregon SHPO 2016a).

Parametrix archaeologists conducted a reconnaissance survey of the Study Area on November 3–4, 2025, revisiting previously recorded cultural resources documented by David Evans and Associates in 1996 (David Evans and Associates 1996) and inspecting additional upland landforms for new resources. Fourteen previously recorded resources were revisited; one of these—a historic-era artifact scatter—was rediscovered. Parametrix identified four previously unrecorded cultural resources in the Study Area during the survey: two historic-era debris scatters (Sites 1H-DCHR and 2H-DCHR) and two precontact isolates (ISO-1P-DCHR and ISO-2P-DCHR). Based on these results, Parametrix recommends additional investigation of the Study Area, including systematic pedestrian survey, subsurface survey, and resource significance evaluations. These efforts will help determine the presence/absence, extent, and integrity of buried archaeological deposits in the Study Area to guide future project planning and review under applicable environmental regulations.

2. Project Personnel

Parametrix Archaeologist Melissa Teoh, MS, acted as field director and lead author for this memo. Teoh meets the Secretary of the Interior's *Historic Preservation Professional Qualification Standards* (SOI PQS) for Archeologist. Parametrix Senior Cultural Resources Consultant Robin Hoffman, MA, acted as Principal Investigator for this study. Hoffman is a Registered Professional Archaeologist and meets the SOI PQS for Archeologist and Historian (62 Federal Register 33708–33723). Parametrix Architectural Historian Corey Lentz, MA, acted as Architectural Historian and provided memo contributions; Lentz meets the SOI PQS for Architectural Historian. Parametrix archaeologist Anisa Shepperd-Becker, MA, participated in the field survey with Teoh.

3. Environmental and Cultural Setting

This section summarizes the environmental and cultural setting of the Study Area. This information was used to inform expectations about archaeological resource sensitivity, precontact and historical land use, and potential cultural resource types. Relevant background is adapted or cited from the recent cultural resources assessment prepared for the County's Moon Pit Project (Goodwin and North 2024), which is approximately 1.75 miles to the east of the current Study Area.

3.1 Geography and Geology

The Study Area is at the base of Horse Ridge within the High Lava Plains physiographic province of Central Oregon, which is characterized by young lava flows, cinder cones, lava buttes, and the Newberry Volcano shield cone. Geologic formations are primarily composed of Pliocene and Pleistocene volcanic rocks including lavas, tuffs, and alluvium, with Quaternary valley fill deposits from lacustrine, alluvial, and windblown (eolian) sediments overlying the volcanic rocks in many areas (Franklin and Dyrness 1988). Most drainages in the area are seasonal due to the dry climate and porous bedrock. Many lakes were present throughout the area during the Pleistocene and are currently dry basins. Horse Ridge is at the edge of the Millican Valley and the Oregon Badlands Wilderness Area. The former is a basin bound by lava flows and volcanic ridges that formerly contained Lake Millican. In the late Pleistocene, Lake Millican was breached and drained; this resulted in connecting the lake to the Crooked and Deschutes Rivers through Dry River Canyon (McKay et al. 2017; Vanaman 2007). The mouth of Dry River Canyon is approximately 1 mile to the east of the Study Area.

The surficial geology of the majority of the flat (northern) portion of the Study Area consists of Quaternary (Holocene and Pleistocene) alluvial fan deposits characterized by unconsolidated alluvium, colluvium, eolian, and lacustrine deposits. The surficial geology of the upland (southern) portion of the Study Area consists of Pliocene and Miocene basalt—specifically thin basalt flows, flow breccia, and interbedded near-vent deposits of basaltic cinders, blocks, and bombs—which forms Horse Ridge. Within the northwestern corner of the Study Area, the surficial geology consists of Quaternary basaltic andesite lava flows (MacLeod et al. 1995).

Mapped soils in most of the northern half of the Study Area consist of Clovkamp series loamy sand, which is deep ashy loamy sand formed in volcanic ash over gravelly alluvium with depths up to 150 centimeters (cm). Gardone series sand comprises the mapped soils in an east-west swath through the center of the Study Area; this soil consists of very deep ashy sand formed in eolian deposits from volcanic ash with depths up to 150 cm. Mapped soils in the southern portion of the Study Area are a mix of Stookmoor series ashy loamy sand and Westbutte series stony loam, both of which have depths up to 60 cm. A complex of Gosney series stony ashy loamy sand, Deskamp series ashy loamy sand, and rock outcrops comprise the mapped soils in the northwest corner of the Study Area; Gosney series has depths up to 35 cm, and Deskamp series up to 81 cm (USDA 2025).

3.2 Flora and Fauna

The Study Area is in the High Lava Plains province (Franklin and Dyrness 1988). The flora and fauna common within this zone and the Study Area are delineated into the categories below:

- Tree species within the vicinity include western juniper (*Juniperus occidentalis*).
- Understory species within the vicinity include sagebrush (*Artemisia tridentata*), rabbitbrush (*Ericameria nauseosa*), and a variety of native grasses.

- Terrestrial fauna species within the vicinity include mule deer (*Odocoileus hemionus*), American beaver (*Castor canadensis*), Virginia opossum (*Didelphis virginiana*), various species of shrew (*Sorex* spp.), various species of rabbit (*Sylvilagus* spp.), raccoon (*Procyon lotor*), skunk (*Mephitis mephitis*, *Spilogale gracilis*), various species of ground squirrel (*Spermophilus* spp.), nutria (*Myocastor coypus*), porcupine (*Erethizon dorsatum*), river otter (*Lontra canadensis*), coyote (*Canis latrans*), black bear (*Ursus americanus*), elk (*Cervus canadensis*), mountain goat (*Oreamnos americanus*), bighorn sheep (*Ovis canadensis*), and mountain lion (*Puma concolor*).
- Avian fauna species within the vicinity include swan (*Cygnus* spp.), duck (*Anas* spp. and related genera), goose (*Branta* spp. and *Anser* spp.), grouse (*Dendragapus* spp. and *Centrocercus urophasianus*), white-headed woodpecker (*Dryobates albolarvatus*), pinyon jay (*Gymnorhinus cyanocephalus*), golden eagle (*Aquila chrysaetos*), greater sage-grouse (*Centrocercus urophasianus*), pheasant (*Phasianus colchicus*), and turkey (*Meleagris gallopavo*).
- Aquatic fauna species within the broad vicinity (within 100 miles) include bull trout (*Salvelinus confluentus*), steelhead trout (*Oncorhynchus mykiss*), and sockeye salmon (*Oncorhynchus nerka*).

3.3 Archaeology

The following relevant precontact archaeological context is excerpted from Goodwin and North (2024:4–5):

> *The [Study Area] lies near the boundary of the Plateau and Northern Great Basin culture areas. The PGT-PG&E Pipeline Expansion Project (PEP) is one of the most comprehensive large-scale archaeological efforts to examine precontact land-use in this region (Atwell et al. 1995; Bryson et al. 1995; Schalk et al. 1994, 1995). We have used this study, in combination with other regional studies, to synthesize the following summary of precontact land-use in the [Study Area].*
>
> *Prior to about 7,600 years ago, people in the region employed a highly mobile land-use system (Schalk et al. 1995). Site frequency is low, and there is little diversity among excavated assemblages. Sites of this age are broadly similar in content, and logistical mobility was uncommon or not employed regularly. Archaeological evidence indicates that lithic technology was more formal, with limited expedient tool use, and tool stone was directly procured from individual sources, suggesting larger territories. Ground stone was rare. Diet was generalized, and while people consumed plant resources, the focus was likely on small and medium sized mammals.*
>
> *After about 7,600 calibrated years before present (cal BP), robust, semisubterranean structures appear in the archaeological record, although they are infrequent. The number of sites increases, as does the level of diversity among assemblage types (Schalk et al. 1995:9–28), suggesting some use of logistical mobility. This period likely saw people adopting a system with brief winter sedentism in pithouses. Evidence for storage during this time is low. However, a noticeable increase in handstones and milling stones combined with an increase in the number of sites located in upland plant collection areas suggest people were making greater use of plants (probably seeds). An increased focus on larger mammals is also found. This led PEP archaeologists to speculate cold weather sedentism may have been possible with some storage of seed and intensive winter hunting.*

Between about 4,500 years ago and contact with European Americans, people adopted a much different land-use strategy, based on longer sedentary occupations, increased logistical organization and likely food storage. However, this system varied considerably during the late Holocene. In general, pithouse sites become more common, usually found in small clusters of houses (Schalk et al. 1995:9–30). People increasingly used more informal tools and intensively focused on large mammals and plants. Handstones and milling stones decreased dramatically, replaced by mortars, which probably reflects an increased use of roots in place of seeds (Couture et al. 1986). Over the last circa 3,000 years, evidence suggests people increased trade dramatically with most tool stone procured indirectly (Schalk et al. 1995:9–31).

Assemblage type diversity along with the number of house sites peaks between about 3,000 and 1,500 years ago, possibly signifying the highest level of logistical organization during the Holocene (Schalk et al. 1995). After 1,500 years ago these measures both decline but reasons for this are unclear. The decline may represent people moving into fewer, larger house sites and even more intense logistical organization, both of which may result in an overall decline in the frequency of sites on the landscape.

This description of precontact land-use is generally derived from data compiled from sites within the larger high-desert region. However, while small variations probably existed on a local level, this description likely still reflects broad land-use patterns through time within the [area].

3.4 Ethnography

The following relevant ethnographic context is excerpted from Goodwin and North (2024:6–8):

The [Study Area] is within an area of overlapping interest and cultural significance to the Tenino and Northern Paiute people, specifically, the Hunipui band.

The Tenino

The Tenino are part of the 'Western Columbia River Sahaptin' language group; itself a subgroup of the larger Sahaptin language family, that also included the Walla Walla, Lower Snake, Palouse, Wanapam, Yakima, Kittittas, Upper Cowlitz, and Klickitat (Hunn and French 1998:378).

The topographic diversity of the Tenino territory played a key role in how their economic and social life were organized throughout the year. This territory lies within a semi-arid basin, whose major hydrological features were the John Day and Deschutes rivers. These drainages are bordered to the west by the upland valleys along the East Cascade foot slopes and to the east by the Blue and Ochoco mountains (Thorson et al. 2003).

Ethnographic and ethnohistoric documentation describes villages as consisting of 2 to 20 houses, with populations ranging from about 30 to 400 people. (Hunn and French 1998:385–388). Each village group's main settlements consisted of a permanent winter village and a major fishing locality. Secondary or tertiary sites were also common but were not usually occupied for long periods and these localities were rarely the subject of intensive recurrent occupation every year. However, the

winter village location of some groups also doubled as a major fishing or plant processing locality (e.g., the Tygh valley Tenino; Jenkins and Connolly 1994). Thus, for some groups the winter village and a major resource locality would be the same settlement, with an additional plant/fishing (whichever resource was furthest from the main winter village) locality making up the second major settlement. However, it should be considered that our understanding of the non-riverine portion of the Tenino economy and social organization is poorly understood. Ethno-historical documentation exists largely from the Lewis and Clark expedition, which never ventured far from the Columbia, and from intermittent accounts by early European fur-traders from the Hudson's Bay Company in the 1820s and 1830s (Hunn and French 1998:394). Proper ethnographic work did not take place until the 1930s (Murdock 1938; Spier 1935; Spier and Sapir 1930).

The annual Tenino subsistence round began in the spring, when task groups and families would leave winter villages to first exploit wet meadow crops such as camas, false onion, and 'Indian Carrot,' followed by drier soil plants in upland settings; e.g., lomatiums, desert parsley, and bitterroot (Hunn and French 1998:380–383). Around June, groups would reconvene around their principal fishing locations (typically after the major flooding episodes of the major rivers) for the seasonal harvest of salmon and other fish. Fish were harvested by spearing, gaffing, dip and set netting, gill and seine netting, hook and line, and in weirs and traps. At least five species of Pacific salmon and two species of suckers were of primary importance and were acquired alongside major rivers, such as the Columbia and its confluence with the Deschutes and John Day rivers. However, Warm Springs' accounts also suggest that trout and eels/lamprey were also major fishing staples (Hunn and French 1998:380–383; Zucker et al. 1987). These are typically caught along smaller tributaries or in slower moving, shallower bends within the John Day or Deschutes rivers, notably quite different settings than salmon fishing sites.

During the end of the major fish runs, typically in August to early September, groups would move back into upland areas to acquire and process fruits, especially huckleberries. Like the plants mentioned above, typical processing involved the drying and pounding of the edible plant tissues into cakes or kinds of flour, which were light and easy to preserve/store for winter and trade (Hunn and French 1998). Fall consisted of continued hunting of mammals, especially deer/elk, which were also acquired alongside all other activities throughout the year as encountered. Additionally, bighorn sheep, pronghorn, and black bear were and continue to be hunted in the region.

The Hunipui

The Northern Paiute belong to the Western Numic language group, an offshoot of the Uto-Aztecan linguistic family (Fowler and Liljeblad 1986:435). The subgroup known in English as the Hunipui are traditionally called huniputÖka, based on their harvest of Seepweed (Sueda depressa), a lakeshore perennial whose seeds are an important part of the seasonal round, typically harvested in late summer and stored and eaten throughout the year (Couture 1978:91). This is a system of naming based on an association with a specific resource and its habitat that is consistent with other Northern Paiute groups, i.e., "tɨbadɨkaʔa, pine nut eaters" (Fowler and Liljeblad 1986:436).

The Northern Paiute traditional economy was based on a seasonal cycle of hunting, gathering (plants and insects, especially crickets), and fishing throughout their homeland, by family groups known as nanobɨaʔa ("neighbors together"), and who settled in socially flexible residence patterns (Fowler and Liljeblad 1986:436). The material culture consisted of various seasonally available plants, animals, and mineral sources, including but not limited to trees and grasses, deer, and birds. Plants used for food and medicine were varied (Fowler and Liljeblad 1986) and made the most of the local ecology, and included sagebrush, juniper, camas, bitterroot, wild onion, and biscuitroot, and various berries (Fowler and Liljeblad 1986:443; O'Grady 2006:11), as well as the trees and plant species that grew on lakeshores and marshland that were used for clothing, tools, and dwellings. The diversity of plant life along lakes and marshland fostered migratory birds, as well as resident mammals and fish, all of which were part of the traditional economy.

Important food resources also included mammals, divided between seasonal and year-round game species, including deer, elk, mountain sheep, and antelope; various rabbits, beaver, raccoons, porcupines, muskrats, and marmots; as well as bison in the precontact period (O'Grady 2006). Rabbit drives were conducted using nets and occasionally with fire (Steward 1938:38–39; Whiting 1950:20), and large game was hunted using bows and arrows (Fowler and Liljeblad 1986:439). Fish species included but were not limited to chub, northern pike minnows, salmon in the Malheur and Drewsey basins, and trout (O'Grady 2006:16).

Paiute social organization is described as egalitarian, flexible, often related to harvest of traditional foods, and based on the nuclear family (Fowler and Liljeblad 1986:446). Social organization also included an expanded kin network based on various levels of relationship. For example, various groups came together for collective salmon fishing or cricket collecting, then dispersed into smaller groups to hunt and gather roots and seeds (O'Grady 2006:18). Winter dwellings were conical or dome-shaped, built of wood frames covered with layers of sewn tule mats (Fowler and Liljeblad 1986:444), and people ate stored foods throughout the winter, occasionally supplemented by fresh catches.

3.5 History

Early non-Indigenous exploration of Oregon was limited to exploration routes along the Columbia River and later through the Willamette Valley and the Klamath Mountains. In 1805 to 1806, the Discovery Corps exploration of the Columbia River began to spur American commercial and settlement interest in the future Oregon Territory (Lang 2022). Fur trappers of the Hudson's Bay Company, operating out of Fort Vancouver in present-day Vancouver, Washington, undertook expeditions down the length of the Willamette Valley in the 1820s. The expeditions led to the establishment of the Oregon-to-California Trail and Applegate Trail, which brought migrants north from California into the Willamette Valley and Klamath Basin (LaLande 2021). Christian missions were later established along these early routes; examples are the Wascopam Mission and St. Peter's Mission at The Dalles, Oregon, established in 1838 and 1848, respectively (Ruby et al. 2010:379). By the 1840s, thousands of migrants traveled westward along the Oregon Trail to settle in Oregon. However, the trail was routed through northern Oregon along the Columbia River to the northern end of the Willamette Valley, and few settlers were drawn southward into the Deschutes Basin (NPS 2021). Deschutes County's first recorded settlers, Cort Allen and William Staats, would not arrive until 1877 (Houser 2001:8–1).

The following relevant additional historic context is excerpted from Goodwin and North (2024:8–9):

> *During the mid-nineteenth century, the Homestead Act of 1862 and the subsequent establishment of more transportation routes drew farmers, cattle ranchers, and sheep herders to Central Oregon (Hanson 2018:9), especially around Bend, Oregon, which provided one of the few areas where wagon trains could efficiently ford the Deschutes River (Brogan 1964; McArthur and McArthur 2003). The population of central Oregon increased steadily during the 1870s and 1880s as ranchers moved their cattle herds to the sage flats of the high desert. In 1916, Deschutes County was established from the western portion of Crook County, with Bend serving as the county seat (State of Oregon 2023).*
>
> *Early farmers in the central Oregon high desert were dry-land farmers, meaning that they farmed without the aid of irrigation. This kind of farming was challenging in the arid environment, but success was found with cereal crops, and certain legumes such as alfalfa (Tonsfeldt and Claeyssens 2004). Irrigation efforts in the early twentieth century increased agriculture which led to the growth of towns and cities like Bend and brought new agricultural settlers into Deschutes County. By 1907, the Central Oregon Canal was constructed, diverting water from the Deschutes River. Newly irrigated lands continued to be the major impetus for settlement in Deschutes County through the 1910s and 1920s (Central Oregon Irrigation District 2023).*
>
> *The nearest settlement to the [Study Area], the town of Millican, is named after George Millican, a stockman who established a ranch in the area in the late 1800s (McArthur and McArthur 2003). While the population has never been large, ranching and agriculture did bring in more settlers, and the Millican post office was established in 1913. In 1920 William Rahn became postmaster (McArthur and McArthur 2003). However, the population of the area contracted sometime after, and for a time Rahn was the sole resident of the town.*

4. Background Methods and Findings

This section summarizes the methods and findings of the cultural resources assessment. Several resources and repositories were used to determine whether cultural resources have been documented in the Study Area and whether the Study Area has sensitivity for containing as-yet undocumented cultural resources. These methods included a review of existing cultural resource databases and an archaeological reconnaissance-level pedestrian survey of the Study Area.

4.1 Cultural Resources Database Review

On October 31, 2025, Parametrix cultural resources specialists reviewed the Oregon Archaeological Records Remote Access (OARRA), Oregon Historic Sites Database (OHSD), and Deschutes County Landmarks list for information on previously recorded cultural resources in the Study Area and vicinity (Oregon SHPO 2025a, b; DCHLC 2025). Additionally, in 1996 David Evans and Associates conducted a cultural resources study for the County for a landfill site evaluation that covered the entire current Study Area (David Evans and Associates 1996). Several cultural resources were identified, but not formally recorded, in the current Study Area during that review. This information is incorporated into the database review results summarized below.

OARRA indicated that three previous cultural resource studies (two of the reports are associated with the same study) have been conducted in or within 1 mile of the Study Area; one included a portion of the Study Area. Of these previous studies, all but one included a pedestrian survey, one included limited subsurface testing, and one did not include any fieldwork. These previous surveys are summarized in Table 1.

Table 1. Previous Cultural Resources Studies Performed within 1 Mile of the Study Area

OARRA Number	Title	Author (Date)	Resources Near Study Area	Report Type	Survey Methods	Relationship to Study Area
79	Cultural Resource Overview of the Brothers EIS Area, Prineville District, Oregon U.S. Bureau of Land Management	Teopel and Beckham (1978)	n/a	Overview	n/a	Entire Study Area
16772	Archaeological Survey of the Arnold Ice Caves Road-Horse Ridge Section (MP 12.3–20.97), Central Oregon Highway (US 20), Deschutes County	Connolly (1999)	97FTV-ORE12, IF-1	Survey Report	Pedestrian	0.3 miles to N
16744	Cultural Resources Inventory of the Proposed FTV Western Build	Sharp et al. (1998)	97FTV-ORE12, 97FTV-ORE13	Survey Report	Pedestrian	0.3 miles to N
16745	Supplemental Site Investigations for the FTV Western Build, Oregon	Fulton and Fulton (1999)	97FTV-ORE12, 97FTV-ORE13	Survey Report	Monitoring, Collection, Testing	0.3 miles to N
22055	Archaeological Survey of the US Highway 97 Bowery Lane-Romaine Village Way Project, Deschutes County, Oregon	McAlister and Connolly (2008)	n/a	Survey Report	Pedestrian	24 acres in N-Central portion of Study Area
[none] [a]	Deschutes County Final Landfill Site Evaluation	David Evans and Associates (1996)	12 sites, 1 isolate	Survey Report	Pedestrian (reconnaissance)	Entire Study Area

a Not on file at OARRA (Oregon Archaeological Records Remote Access).

A review of OARRA indicated that there are no previously recorded cultural resources in the Study Area, but three are within 1 mile of the Study Area. These resources consist of one historic-era archaeological site (97FTV-ORE12), and two precontact archaeological isolates (IF-1, 97FTV-ORE13). During the 1996 reconnaissance pedestrian survey of the current Study Area, David Evans and Associates identified 13 cultural resources in the Study Area: 12 sites and 1 isolate. The 12 sites consisted of 4 precontact lithic scatter and 8 historic-era artifact dumps (all cans dating to the early 20th century), while the isolate was a precontact projectile point (David Evans and Associates 1996). A review of OHSD and the Deschutes County Landmarks list indicated there are no previously recorded historic built environment resources in the Study Area or within 0.5 miles of the Study Area (Oregon SHPO 2025b). A review of Deschutes County Assessor's Office Data also indicated that there are no unrecorded historic-age (50-year-old or older) buildings and structures in the Study Area (DCAO 2025). These cultural resources are summarized in Table 2.

Table 2. Previously Recorded Cultural Resources Within 1 Mile of the Study Area

Trinomial Number	Site Name	Site Type	Description	NRHP Eligibility	Relationship to Study Area
[none]	97FTV-ORE12	Historic	Site: sparse artifact scatter	Unevaluated	0.5 miles to E
[none]	97FTV-ORE13	Precontact	Isolate: utilized obsidian flake	Not Eligible	0.5 miles to E
[none]	IF-1	Precontact	Isolate: obsidian flake	Not Eligible	0.3 miles to N
[none]	1	Historic	Site: can dump (early 20th c.)	Unevaluated	Study Area
[none]	2	Precontact	Isolate: obsidian projectile point	Unevaluated	Study Area
[none]	3	Precontact	Site: lithic scatter	Unevaluated	Study Area
[none]	4	Historic	Site: can dump (early 20th c.)	Unevaluated	Study Area
[none]	5	Historic	Site: can dump (early 20th c.)	Unevaluated	Study Area
[none]	6	Historic	Site: can dump (early 20th c.)	Unevaluated	Study Area
[none]	7	Precontact	Site: lithic scatter	Unevaluated	Study Area
[none]	8	Historic	Site: can dump (early 20th c.)	Unevaluated	Study Area
[none]	9	Precontact	Site: lithic scatter	Unevaluated	Study Area
[none]	12	Historic	Site: can dump (early 20th c.)	Unevaluated	Study Area
[none]	13	Historic	Site: can dump (early 20th c.)	Unevaluated	Study Area
[none]	15	Precontact	Site: lithic scatter	Unevaluated	Study Area
[none]	16	Historic	Site: can dump (early 20th c.)	Unevaluated	Study Area

NRHP = National Register of Historic Places.

4.2 Historic Map and Aerial Photography Research

On January 20, 2026, Parametrix conducted a review of the following sources of historic maps: Library of Congress (https://www.loc.gov/); U.S. Geological Survey (USGS) TopoView (https://ngmdb.usgs.gov/topoview/); Nationwide Environmental Title Research (NETR) (https://www.historicaerials.com/); and the Bureau of Land Management's General Land Office (GLO) records (https://glorecords.blm.gov/) . The historic map and photography review focused on the Study Area and vicinity. The historic maps and historic photography reviewed included the following:

- GLO Maps:
  - → *Township No. 19 South Range No. 14 East Willamette Meridian, Oregon* (GLO 1880).
- USGS topographic maps:
  - → *Horse Ridge, Oregon* (USGS 1969, 1981).
- NETR Aerial Images:
  - → Aerial Photograph of Study Area and Vicinity (NETR 1960, 1963, 1982).

The only features depicted in the historic-era topographic maps and aerial photographs reviewed are Horse Ridge Frontage Road, in its current alignment but as U.S. Highway 20, present by 1960 (NETR 1960), and a small dirt road along the base of the hills at the southern portion of the Study Area, present by 1960 (NETR 1960). No potential historic-era resources were identified through the review of historic-era maps and aerial photographs.

5. Expectations

Previous reconnaissance-level investigations of the Study Area identified multiple unevaluated cultural resources, including both historic-era and precontact archaeological sites and isolates (David Evans and Associates 1996). Given these findings and that the surficial geology of much of the Study Area consists of Quaternary (Holocene and Pleistocene) alluvial fan deposits, Parametrix anticipates the presence of both precontact and historic-era archaeological resources in the lowland portions of the Study Area, with integrity potentially affected by historic-era and modern aggregate mining activities. Expected resource types include precontact low-density lithic scatters and isolated artifacts in both surficial and subsurface contexts, as well as early-20th-century (historic-era) artifact deposits (i.e., dumps).

Background research for the Study Area did not identify any previously recorded historic built-environment resources. Accordingly, Parametrix anticipates that no historic buildings or structures are present in the Study Area.

6. Survey Methods and Results

On November 3–4, 2025, Parametrix archaeologists Melissa Teoh and Anisa Shepperd-Becker conducted a reconnaissance survey of the Study Area, which includes parcels 1914000000300, 1914000000500, 1914000000600, and 1914000000700. During the survey, archaeologists revisited previously recorded cultural resources and potential cultural resources originally documented by David Evans and Associates in 1996. Archaeologists also examined upland landforms between drainages in the southern portion of the Study Area using meandering pedestrian transects spaced no more than 20 meters apart. Ground surfaces and any exposed subsurface features—such as rodent burrows and road cuts—were carefully inspected for archaeological materials. The ArcGIS Field Maps application was used to record spatial data and photographs during the survey. All work was conducted in accordance with Oregon SHPO's *Guidelines for Conducting Field Archaeology in Oregon* (Oregon SHPO 2016b). Relevant information and observations were recorded using digital survey forms. Figure 3 (see Attachment A) depicts the reconnaissance survey coverage.

Weather conditions during the survey were partly cloudy to clear, with a high temperature of approximately 50°F. The ground surface was largely exposed and vegetated with dispersed sagebrush, rabbitbrush, and western juniper (Photo 1). Surface visibility ranged from 50% to 100%. The aggregate pit area in parcel 191400000600 was not revisited, as the entire area had been extensively excavated (Photo 2).

In 1996, 13 cultural resources were newly recorded in the current Study Area (David Evans and Associates 1996). Except for four resources (three obsidian flakes and one lithic scatter) [redacted], Parametrix revisited all the previously recorded resource locations. Of these revisited resource locations, only one — a historic-era debris scatter (Site 5) — was rediscovered. None of the materials observed within this site were diagnostic (e.g., sanitary cans). Parametrix identified two previously unrecorded historic-era sites (1H-DCHR and 2H-DCHR) and two precontact isolates (ISO-1P-DCHR and ISO-2P-DCHR) during the survey. Note, none of the cultural resources identified in the Study Area have been evaluated or are herein evaluated for eligibility for listing in the National Register of Historic Places (NRHP). The one rediscovered and four newly recorded resources are discussed below. [redacted] Table 3 summarizes the survey results.

Photograph 1. Overview of the Study Area, View North

Photograph 2. Overview of Aggregate Pit in Study Area, View West

Table 3. Previously and Newly Recorded Cultural Resources Within the Study Area

Trinomial Number	Name	Type	Description	NRHP-Eligibility	Location	Newly or Previously Recorded	Relocated by Parametrix
[none]	1H-DCHR	Historic	Site: debris scatter (mid-20th c.)	UE	[redacted] Study Area	Newly	n/a
[none]	2H-DCHR	Historic	Site: debris scatter (mid-20th c.)	UE	[redacted] Study Area	Newly	n/a
[none]	ISO-1P-DCHR	Precontact	Isolate: obsidian flake	UE	[redacted] Study Area	Newly	n/a
[none]	ISO-2P-DCHR	Precontact	Isolate: obsidian projectile point	UE	[redacted] Study Area	Newly	n/a
[none]	1	Historic	Site: can dump (early 20th c.)	UE	[redacted] Study Area	Previously	No
[none]	2	Precontact	Isolate: obsidian projectile point	UE	[redacted] Study Area	Previously	No
[none]	3	Precontact	Site: lithic scatter	UE	[redacted] Study Area	Previously	No
[none]	4	Historic	Site: can dump (early 20th c.)	UE	[redacted] Study Area	Previously	No
[none]	5	Historic	Site: can dump (early 20th c.)	UE	[redacted] Study Area	Previously	Yes
[none]	6	Historic	Site: can dump (early 20th c.)	UE	[redacted] Study Area	Previously	No
[none]	7	Precontact	Site: lithic scatter	UE	[redacted] Study Area	Previously	No
[none]	8	Historic	Site: can dump (early 20th c.)	UE	[redacted] Study Area	Previously	No
[none]	9	Precontact	Site: lithic scatter	UE	[redacted] Study Area	Previously	No
[none]	12	Historic	Site: can dump (early 20th c.)	UE	[redacted] Study Area	Previously	No
[none]	13	Historic	Site: can dump (early 20th c.)	UE	[redacted] Study Area	Previously	No
[none]	15	Precontact	Site: lithic scatter	UE	[redacted] Study Area	Previously	No
[none]	16	Historic	Site: can dump (early 20th c.)	UE	[redacted] Study Area	Previously	No

NRHP = National Register of Historic Places; UE = Unevaluated.

6.1 Rediscovered Previously Recorded Resources

6.1.1 [Field #] 5 (David Evans and Associates 1996)

This historic-era site was originally identified by David Evans and Associates in the [redacted] current Study Area during their 1996 reconnaissance survey (Table 3). [redacted]

[redacted] David Evans and Associates' only description of the resource was a "can dump" (David Evans and Associates 1996: Figure 3).

During Parametrix's survey, the site was relocated. Artifacts observed at the site location consisted solely of several historic-era motor oil cans and a 55-gallon metal drum appearing to date to the early- to mid-20th century; no diagnostic artifacts were observed.

6.2 Newly Recorded Resources

6.2.1 1H-DCHR

This newly recorded archaeological site is a historic-era debris scatter [redacted]. The scatter consists of five sanitary cans and one diagnostic colorless bottle base bearing the maker's mark "LP", in italics, within a keystone, referring to Lummis and Pennsylvania, with Lummis the distributor for Pennsylvania Bottle Company, who manufactured the bottle, which dates to between 1940 and 1952 (Photo 3).

Photograph 3. 1H-DCHR, Diagnostic Bottle Base, Plan View

6.2.2 2H-DCHR

This newly recorded site is a historic-era debris scatter [redacted] Artifacts observed at the site consisted of five sanitary milk cans, four aqua glass fragments, and at least five milk glass fragments, though it is likely that the fragments are associated with two items: a milk glass jar and a Coca Cola bottle (Photo 4). One diagnostic aqua glass fragment—a portion of a Coca-Cola hobble-skirt bottle—bears the embossed text "[...]K

REGISTERED [...]TENTS 6 FL OZ" (Photo 5). Based on these markings, the bottle dates to between 1951 and 1959.

Photograph 4. 2H-DCHR Overview, View North

Photograph 5. 2H-DCHR, Diagnostic Bottle Fragment, Plan View

6.2.3 ISO-1P-DCHR

This newly recorded precontact isolate is a single tertiary obsidian flake found on the northern slope of a hill [redacted] in the [redacted] Study Area.

6.2.4 ISO-2P-DCHR

This newly recorded precontact isolate is a single obsidian projectile point recovered from a disturbed context on top of a spoil heap [redacted] in the [redacted] Study Area. The artifact is roughly triangular in overall shape, with minimal flaking on one side except for a heavily flaked margin, with retouch evidence on the opposing margin. Side- or corner-notching evident though the stem appears to be missing (Photo 6 and 7).

[redacted]

[redacted]

Photograph 7. ISO-2P-DCHR, Side A, Plan View

7. Conclusions and Recommendations

The current investigation documented a total of five cultural resources, all archaeological, within the Study Area, consisting of one previously recorded resource relocated from the 1996 investigation and four newly identified resources. Of the 13 cultural resources documented during the 1996 reconnaissance-level survey (David Evans and Associates 1996), only one (historic-era site [Field # 5]) was relocated during the present study. The four resources newly recorded as a result of the current study consist of two historic-era archaeological sites (1H-DCHR, 2H-DCHR) and two precontact archaeological isolates (ISO-1P-DCHR, ISO-2P-DCHR).

None of the cultural resources, all archaeological, identified in the Study Area to date have been evaluated for NRHP-eligibility. As a result, any potential effects of development of the Study Area into the Deschutes County SWMF on these resources cannot be fully assessed at this time. Archaeological subsurface survey and some limited archaeological evaluative testing would likely be needed to assess the NRHP-eligibility of most, if not all, of the archaeological resources identified in the Study Area.

The Study Area is situated within an ancient landscape characterized by deep pluvial and alluvial deposits. This environmental context is manifested by the large volume of sand observed in the aggregate surface mining area. Although portions of the Study Area were previously surveyed, nearly 20 years ago, that study did not include an intensive-level (systematic) pedestrian survey or archaeological subsurface investigations. The presence of deep sediments of Holocene and Pleistocene age, combined with repeated wet–dry climatic cycles and wind-driven deposition, suggests the potential presence in the Study Area of buried former land surfaces. Such buried

surfaces, if stable for extended periods, could have been amenable for human occupation and/or activity, and pedestrian survey alone cannot provide data on the presence/absence of archaeological material in such contexts. Because no subsurface survey or testing has been conducted in the Study Area, including at previously recorded or newly identified archaeological resources, there remains the potential for intact buried archaeological material within the Study Area; in short, additional archaeological sites and/or isolates may be present in the Study Area.

Based on the results of the current investigation and environmental context of the Study Area, Parametrix recommends the following actions:

- Conduct an intensive-level (systematic) pedestrian survey of the entire Study Area to more thoroughly document surface-visible archaeological resources and to clarify archaeological resource presence/absence and distribution patterns.
- Conduct an archaeological subsurface survey of the Study Area, particularly in areas with deep pluvial and alluvial deposits, to assess the presence/absence of buried archaeological resources and presence of former land surfaces.
- Evaluate the NRHP-eligibility of all archaeological resources confirmed present in the Study Area (through systematic pedestrian survey and archaeological subsurface survey). This would likely consist of archaeological subsurface survey at identified resources to determine horizontal and vertical extent, controlled volume testing focusing on resource characterization and integrity assessment, and consultation with interested Tribes.
- Integrate cultural resources findings into project planning, including consideration of ground-disturbing activities and access routes, to avoid or minimize potential effects on identified archaeological resources, particularly those determined to be NRHP-eligible.
- Develop and implement an unanticipated discovery plan to ensure appropriate treatment of any additional cultural resources encountered during project construction activities and operations.

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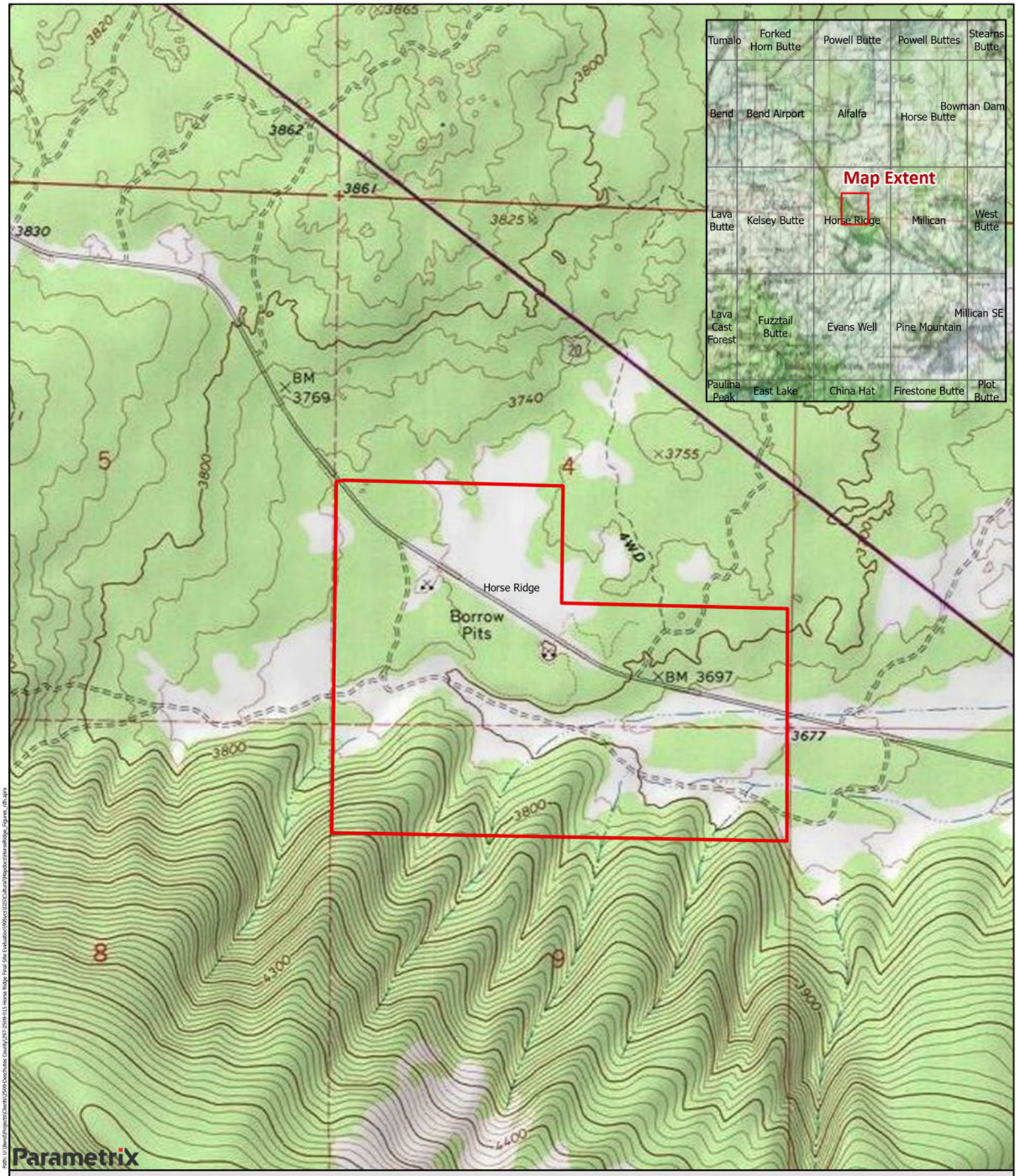
Appendix A

Figures



Parametrix

Study Area

Figure 1 - Study Area Vicinity
Horse Ridge Site Evaluations
Cultural Resources

Date: 12/10/2025
Sources:
USGS 7.5' Topo Quad: Horse Ridge
PCS: WGS 1984 Web Mercator Auxiliary Sphere
Disclaimer: This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes.

0 500 1,000 2,000
Feet

Deschutes County, OR

Path: U:\Bend\Projects\Clients\2509-Deschutes County\297-2509-015 Horse Ridge Final Site Evaluation\Wildcat\GIS\Cultural\Mapdocs\HorseRidge_Figure_rdh.aprx

Parametrix

Date: 12/10/2025
Sources:
PCS: WGS 1984 Web Mercator Auxiliary Sphere
Disclaimer: This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes.

Study Area
Taxlot

Figure 2 - Study Area
Horse Ridge Site Evaluations
Cultural Resources

0 312.5 625 1,250
Feet

Deschutes County, OR

WILLAMETTE
CULTURAL RESOURCES ASSOCIATES, LTD.

Archaeological Reconnaissance Survey for the Deschutes County Landfill Project, Roth East Property, Deschutes County, Oregon

Archaeological Reconnaissance Survey for the Deschutes County Landfill Project, Roth East Property Deschutes County, Oregon

Prepared by
Michelle North
Matt Goodwin

February 2, 2024

WillametteCRA Report No. 22-80 Roth East
Portland, Oregon

Prepared for
Parametrix, Inc.
Seattle, Washington

WILLAMETTE
CULTURAL RESOURCES ASSOCIATES, LTD.

Report Details

Project Name:	Deschutes County Landfill Roth East
Agency:	Deschutes County
Client:	Parametrix
Project Undertaking:	Landfill Siting
County(ies):	Deschutes
Legal Description:	Township 20S, Range 15E, Sections 11 and 12
USGS Quad(s):	*Pine Mountain, Oregon* 7.5-minute
Project Acreage:	~645
Survey Acreage:	~128
Permit Number(s):	N/A
Field Note Location:	WillametteCRA, Portland Office
Fieldwork Type:	Reconnaissance Survey
Fieldwork Dates:	September 6 and 7, 2023
Field Personnel:	Michelle North and Matt Goodwin
Findings:	6 sites (22-80-6, 22-80-10, 22-80-11, 22-80-12, 22-80-13, 22-80-14), 6 isolates (22-80-3-ISO, 22-80-4-ISO, 22-80-5-ISO, 22-80-7-ISO, 22-80-8-ISO, 22-80-9-ISO)
Recommendations:	Formal Archaeological Survey

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Introduction

On behalf of Deschutes County, Parametrix, Inc. (Parametrix) contracted Willamette Cultural Resources Associates, Ltd. (WillametteCRA) to conduct a reconnaissance survey of the Roth East property project area in support of the Deschutes County Landfill Siting Project, Phase 2. The Roth East project area encompasses approximately 645 acres of a single privately owned parcel (205000000301) in Sections 11 and 12, Township 20 South, Range 15 East, Willamette Meridian, in Deschutes County, Oregon (Figures 1 and 2).

Deschutes County is in the process of scouting potential sites for a new landfill. Phase 1 of this project identified six potential locations. Desktop review and assessment of several variables including cultural resources further narrowed this selection to two potential sites. The Roth East property project area is one of the two potential landfill sites being further investigated during Phase 2. There is currently no federal nexus for the project. However, the project must comply with county permitting processes, which require consultation with the Oregon State Historic Preservation Office (SHPO) to ensure cultural resources that are important, eligible, or listed in the National Register of Historic Places (NRHP) will not be impacted by the project. This report was created as an internal planning document and is not intended to satisfy project cultural resource requirements.

The purpose of the reconnaissance survey is to gather additional information about the archaeological sensitivity of the Roth East project area and assist in providing recommendations for further actions that may be necessary to address cultural resources requirements. At the time of the field reconnaissance there were no standing structures on the property, and the only existing infrastructure consisted of informal dirt roads. The surrounding area is sparsely developed and characterized by large open areas dotted with rabbitbrush, sagebrush and sparse juniper, bordered by low hills and upland plateaus. A total of 12 archaeological resources were identified during the reconnaissance survey.

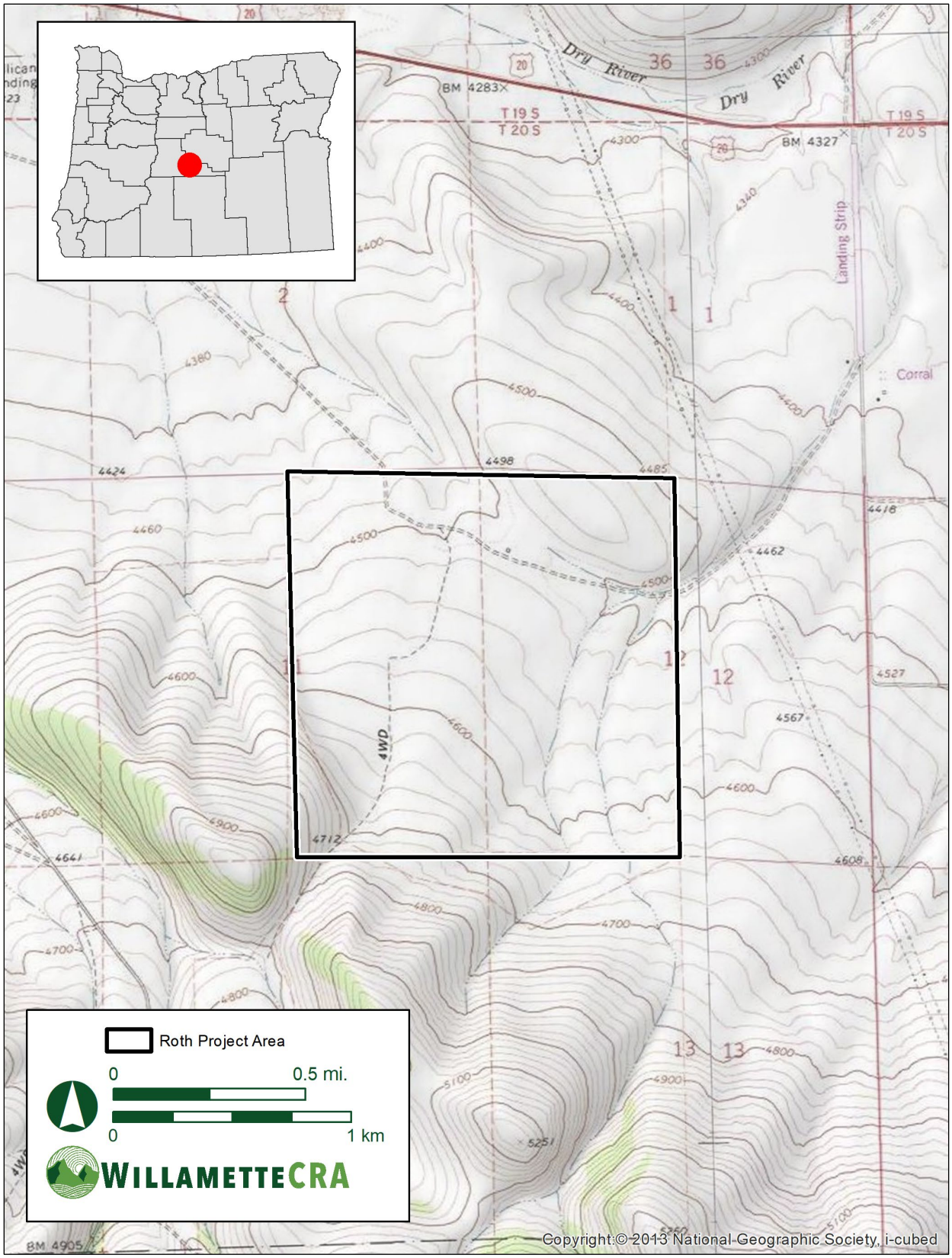

Figure 1. Project location map.

Figure 2. Project configuration on modern aerial imagery.

Natural and Cultural Background

Environmental Setting

The project area is situated in the vicinity of the Millican Valley within the High Lava Plains physiographic province of Central Oregon (Franklin and Dyrness 1988). The province is characterized by young lava flows of moderate relief interspersed with numerous cinder cones and lava buttes. Newberry Crater, part of the Paulina Peak shield volcano, is the largest peak in the area and is located approximately 16 miles (mi.) southwest of the project. Because the bedrock in this area is porous and the climate is generally dry, many streams and drainages are seasonal. During the Pleistocene the area held extensive lakes, which are now dry basins.

The Millican Valley is a high desert basin bound by lava flows and volcanic ridges uplifted by the Brothers Fault Zone (McKay et al. 2017; Vanaman 2007). The basin once contained Lake Millican, one of the northernmost water bodies in the Pleistocene Great Basin pluvial system. The basin was drained during the late Pleistocene when the northern margin of the lake was breached, creating an outburst flood that connected the lake to the Crooked and Deschutes rivers through the Dry River Canyon (McKay et al. 2017; Vanaman 2007). Other prominent landforms in the area include the previously discussed Dry River Canyon, situated approximately 1 mi. to the north, and Pine Mountain, an eroded volcanic peak located approximately 1.5 mi. to the south.

The Natural Resources Conservation Service (NRCS) identifies two soil types within the project area, Blayden loamy sand and Menbo stony loam. Blayden soils are shallow to duripan, well drained soils that form in volcanic ash above older alluvium. A typical soil profile consists of loamy sand that transitions to a gravelly loam, above cemented material. Blayden loamy sand is found on lava plains. Menbo soils are moderately deep, well drained soils that form in volcanic ash above colluvium. A typical soil profile consists of a stony loam, which transitions into a gravelly loam, above very cobbly clay loam and above bedrock. Menbo soils are found on hillslopes (NRCS 2023).

Precontact Archaeological Context

The project area lies near the boundary of the Plateau and Northern Great Basin culture areas. The PGT-PG&E Pipeline Expansion Project (PEP) is one of the most comprehensive large-scale archaeological efforts to examine precontact land-use in this region (Atwell et al. 1995; Bryson et al. 1995; Schalk et al. 1994, 1995). We have used this study, in combination with other regional studies, to synthesize the following summary of precontact land-use in the project area.

Prior to about 7,600 years ago, people in the region employed a highly mobile land-use system (Schalk et al. 1995). Site frequency is low, and there is little diversity among excavated assemblages. Sites of this age are broadly similar in content, and logistical mobility was

uncommon or not employed regularly. Archaeological evidence indicates that lithic technology was more formal, with limited expedient tool use, and tool stone was directly procured from individual sources, suggesting larger territories. Ground stone was rare. Diet was generalized, and while people consumed plant resources, the focus was likely on small and medium sized mammals.

After about 7,600 calibrated years before present (cal BP), robust, semisubterranean structures appear in the archaeological record, although they are infrequent. The number of sites increases, as does the level of diversity among assemblage types (Schalk et al. 1995:9–28), suggesting some use of logistical mobility. This period likely saw people adopting a system with brief winter sedentism in pithouses. Evidence for storage during this time is low. However, a noticeable increase in handstones and milling stones combined with an increase in the number of sites located in upland plant collection areas suggest people were making greater use of plants (probably seeds). An increased focus on larger mammals is also found. This led PEP archaeologists to speculate cold weather sedentism may have been possible with some storage of seed and intensive winter hunting.

Between about 4,500 years ago and contact with European Americans, people adopted a much different land-use strategy, based on longer sedentary occupations, increased logistical organization and likely food storage. However, this system varied considerably during the late Holocene. In general, pithouse sites become more common, usually found in small clusters of houses (Schalk et al. 1995:9–30). People increasingly used more informal tools and intensively focused on large mammals and plants. Handstones and milling stones decreased dramatically, replaced by mortars, which probably reflects an increased use of roots in place of seeds (Couture et al. 1986). Over the last circa 3,000 years, evidence suggests people increased trade dramatically with most tool stone procured indirectly (Schalk et al. 1995:9–31).

Assemblage type diversity along with the number of house sites peaks between about 3,000 and 1,500 years ago, possibly signifying the highest level of logistical organization during the Holocene (Schalk et al. 1995). After 1,500 years ago these measures both decline but reasons for this are unclear. The decline may represent people moving into fewer, larger house sites and even more intense logistical organization, both of which may result in an overall decline in the frequency of sites on the landscape.

This description of precontact land-use is generally derived from data compiled from sites within the larger high-desert region. However, while small variations probably existed on a local level, this description likely still reflects broad land-use patterns through time within the Millican Valley.

Native Peoples

The project area is within an area of overlapping interest and cultural significance to the Tenino and Northern Paiute people, specifically, the Hunipui band.

The Tenino

The Tenino are part of the ‘Western Columbia River Sahaptin’ language group; itself a subgroup of the larger Sahaptin language family, that also included the Walla Walla, Lower Snake, Palouse, Wanapam, Yakima, Kittittas, Upper Cowlitz, and Klickitat (Hunn and French 1998:378).

The topographic diversity of the Tenino territory played a key role in how their economic and social life were organized throughout the year. This territory lies within a semi-arid basin, whose major hydrological features were the John Day and Deschutes rivers. These drainages are bordered to the west by the upland valleys along the East Cascade foot slopes and to the east by the Blue and Ochoco mountains (Thorson et al. 2003).

Ethnographic and ethnohistoric documentation describes villages as consisting of 2 to 20 houses, with populations ranging from about 30 to 400 people. (Hunn and French 1998:385–388). Each village group's main settlements consisted of a permanent winter village and a major fishing locality. Secondary or tertiary sites were also common but were not usually occupied for long periods and these localities were rarely the subject of intensive recurrent occupation every year. However, the winter village location of some groups also doubled as a major fishing or plant processing locality (e.g., the Tygh valley Tenino; Jenkins and Connolly 1994). Thus, for some groups the winter village and a major resource locality would be the same settlement, with an additional plant/fishing (whichever resource was furthest from the main winter village) locality making up the second major settlement. However, it should be kept in mind that our understanding of the non-riverine portion of the Tenino economy and social organization is poorly understood. Ethno-historical documentation exists largely from the Lewis and Clark expedition, which never ventured far from the Columbia, and from intermittent accounts by early European fur-traders from the Hudson's Bay Company in the 1820s and 1830s (Hunn and French 1998:394). Proper ethnographic work did not take place until the 1930s (Murdock 1938; Spier 1935; Spier and Sapir 1930).

The annual Tenino subsistence round began in the spring, when task groups and families would leave winter villages to first exploit wet meadow crops such as camas, false onion, and 'Indian Carrot,' followed by drier soil plants in upland settings; e.g., lomatiums, desert parsley, and bitterroot (Hunn and French 1998:380–383). Around June, groups would reconvene around their principal fishing locations (typically after the major flooding episodes of the major rivers) for the seasonal harvest of salmon and other fish. Fish were harvested by spearing, gaffing, dip and set netting, gill and seine netting, hook and line, and in weirs and traps. At least five species of Pacific salmon and two species of suckers were of primary importance and were acquired alongside major rivers, such as the Columbia and its confluence with the Deschutes and John Day rivers. However, Warm Springs’ accounts also suggest that trout and eels/lamprey were also major fishing staples (Hunn and French 1998:380–383; Zucker et al. 1987). These are

typically caught along smaller tributaries or in slower moving, shallower bends within the John Day or Deschutes rivers, notably quite different settings than salmon fishing sites.

During the end of the major fish runs, typically in August to early September, groups would move back into upland areas to acquire and process fruits, especially huckleberries. Like the plants mentioned above, typical processing involved the drying and pounding of the edible plant tissues into cakes or kinds of flour, which were light and easy to preserve/store for winter and trade (Hunn and French 1998). Fall consisted of continued hunting of mammals, especially deer/elk, which were also acquired alongside all other activities throughout the year as encountered. Additionally, bighorn sheep, pronghorn, and black bear were and continue to be hunted in the region.

The Hunipui

The Northern Paiute belong to the Western Numic language group, an offshoot of the Uto-Aztecan linguistic family (Fowler and Liljeblad 1986:435). The subgroup known in English as the Hunipui are traditionally called huniputÖka, based on their harvest of Seepweed (*Sueda depressa*), a lakeshore perennial whose seeds are an important part of the seasonal round, typically harvested in late summer and stored and eaten throughout the year (Couture 1978:91). This is a system of naming based on an association with a specific resource and its habitat that is consistent with other Northern Paiute groups; i.e., “tɨbadɨkaʔa, pine nut eaters” (Fowler and Liljeblad 1986:436).

The Northern Paiute traditional economy was based on a seasonal cycle of hunting, gathering (plants and insects, especially crickets), and fishing throughout their homeland, by family groups known as nanobɨaʔa (“neighbors together”), and who settled in socially flexible residence patterns (Fowler and Liljeblad 1986:436). The material culture consisted of various seasonally available plants, animals, and mineral sources, including but not limited to trees and grasses, deer, and birds. Plants used for food and medicine were varied (Fowler and Liljeblad 1986) and made the most of the local ecology, and included sagebrush, juniper, camas, bitterroot, wild onion, and biscuitroot, and various berries (Fowler and Liljeblad 1986:443; O’Grady 2006:11), as well as the trees and plant species that grew on lakeshores and marshland that were used for clothing, tools, and dwellings. The diversity of plant life along lakes and marshland fostered migratory birds, as well as resident mammals and fish, all of which were part of the traditional economy.

Important food resources also included mammals, divided between seasonal and year-round game species, including deer, elk, mountain sheep, and antelope; various rabbits, beaver, raccoons, porcupines, muskrats, and marmots; as well as bison in the precontact period (O’Grady 2006). Rabbit drives were conducted using nets and occasionally with fire (Steward 1938:38–39; Whiting 1950:20), and large game was hunted using bows and arrows

(Fowler and Liljeblad 1986:439). Fish species included but were not limited to chub, northern pike minnows, salmon in the Malheur and Drewsey basins, and trout (O'Grady 2006:16).

Paiute social organization is described as egalitarian, flexible, often related to harvest of traditional foods, and based on the nuclear family (Fowler and Liljeblad 1986:446). Social organization also included an expanded kin network based on various levels of relationship. For example, various groups came together for collective salmon fishing or cricket collecting, then dispersed into smaller groups to hunt and gather roots and seeds (O'Grady 2006:18). Winter dwellings were conical or dome-shaped, built of wood frames covered with layers of sewn tule mats (Fowler and Liljeblad 1986:444), and people ate stored foods throughout the winter, occasionally supplemented by fresh catches.

European American Colonization

The first non-Native presence in the Central Oregon high desert was likely transient traders with the Hudson's Bay Company who traveled through the area in the 1820s and 1830s (LaLande 2023). Some emigrants traveling to the Willamette Valley also passed through the high desert on their journey to the Cascade wagon road passes. However, European American settlement during this early period was limited due to the rugged terrain of the Ochoco Mountains and the ongoing conflicts with Native American tribes in the region, which persisted until the 1860s.

During the mid-nineteenth century, the Homestead Act of 1862 and the subsequent establishment of more transportation routes drew farmers, cattle ranchers, and sheep herders to Central Oregon (Hanson 2018:9), especially around Bend, Oregon, which provided one of the few areas where wagon trains could efficiently ford the Deschutes River (Brogan 1964; McArthur and McArthur 2003). The population of central Oregon increased steadily during the 1870s and 1880s as ranchers moved their cattle herds to the sage flats of the high desert. In 1916, Deschutes County was established from the western portion of Crook County, with Bend serving as the county seat (State of Oregon 2023).

Early farmers in the central Oregon high desert were dry-land farmers, meaning that they farmed without the aid of irrigation. This kind of farming was challenging in the arid environment, but success was found with cereal crops, and certain legumes such as alfalfa (Tonsfeldt and Claeyssens 2004). Irrigation efforts in the early twentieth century increased agriculture which led to the growth of towns and cities like Bend and brought new agricultural settlers into Deschutes County. By 1907, the Central Oregon Canal was constructed, diverting water from the Deschutes River. Newly irrigated lands continued to be the major impetus for settlement in Deschutes County through the 1910s and 1920s (Central Oregon Irrigation District 2023).

The nearest settlement to the project area, the town of Millican, is named after George Millican, a stockman who established a ranch in the area in the late 1800s (MacArthur and MacArthur 2003). While the population has never been large, ranching and agriculture did bring in more

settlers, and the Millican post office was established in 1913. In 1920 William Rahn became postmaster (MacArthur and MacArthur 2003). However, the population of the area contracted sometime after, and for a time Rahn was the sole resident of the town.

Historic Map Review

At the time of the earliest mapping of the project area by General Land Office (GLO) surveyors in 1880, the project area was depicted as devoid of development, and no natural features or landforms were specifically mapped within it (GLO 1880). However, several ravines are mapped southeast of the project, and a prairie is depicted approximately 2 mi. to the south (Figure 3). Deschutes National Forest is mapped approximately 1 mi. south of the project (GLO 1880).

The next available map of the project is the United States Geological Survey (USGS) topographic *Cresent, OR* from 1957. At this time windmills/windpumps are depicted 1.5 mi. to the northwest and 0.4 mi. to the northeast and an airstrip is mapped approximately 1.3 mi. to the northwest (USGS 1957). Additionally, structures labeled “ranches” are located approximately 0.7 mi. to the northeast (USGS 1957). The Dry River, Millican, and Highway 20 are all present on the 1957 topographic map. Historic aerial imagery of the project area from 1963 depicts it as an undeveloped desert interspersed with informal roads and trails (Nationwide Environmental Title Research [NETR] 1963). The 1963 imagery also displays evidence of some agriculture on the property. However, the nearest visible structure is located approximately 0.6 mi. to the northeast of the project, off what is now Newt Morris Road.

The 1969 topographic map *Millican, OR* depicts two intermittent streams traversing the east half of the parcel running south-north (USGS 1969; Figure 4). A trail labeled “jeep trail” is mapped in the western half of the project area positioned roughly north-south and connects to an unimproved road in the north (USGS 1969). This road is still visible in modern aerial imagery (NETR 2020). There is one structure present in the north central portion of Roth East visible on the 1969 map (USGS 1969), this structure may also be displayed on a 1963 aerial, however, image quality makes it difficult to confirm (NETR 1963). Modern aerial imagery suggests the ruins of the structure may still be present. A deep well is mapped approximately 0.6 mi. to the southwest of the project and a transmission line is depicted approximately 0.07 mi. east of the project, running northwest/southeast (see Figure 4). The transmission line is still present today and the two structures labeled “Ranches” on the 1957 map are still present on the 1969 topographic (USGS 1957, 1969). The project area appears to have undergone little to no development by 1973 (and the surrounding looks much the same USGS 1973). In 1982, aerial imagery of the project area exhibits little change, except a decrease in agricultural activity (NETR 1982).

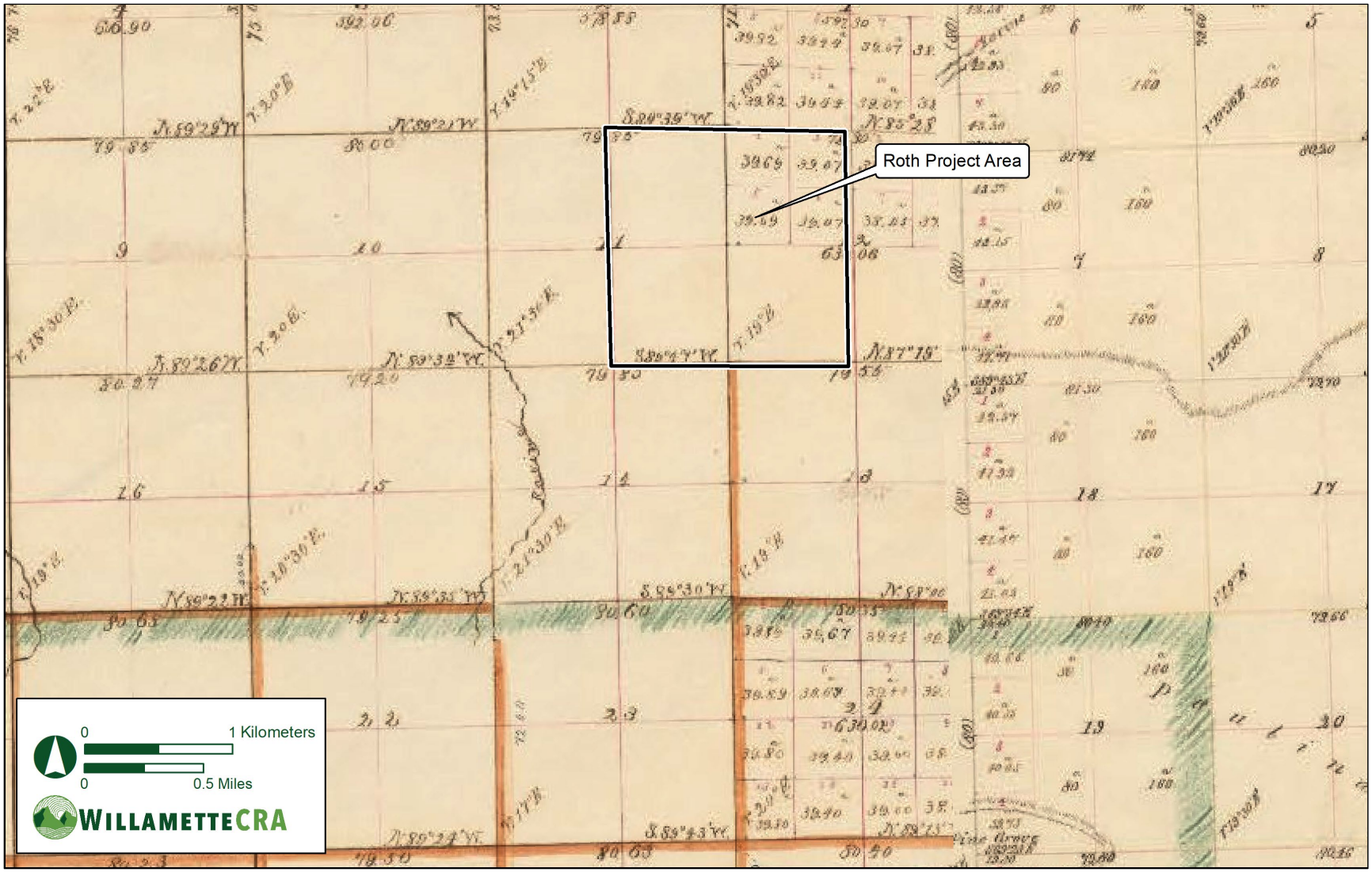

Figure 3. 1880 General Land Office map of Township 20 S, Range 15 E.

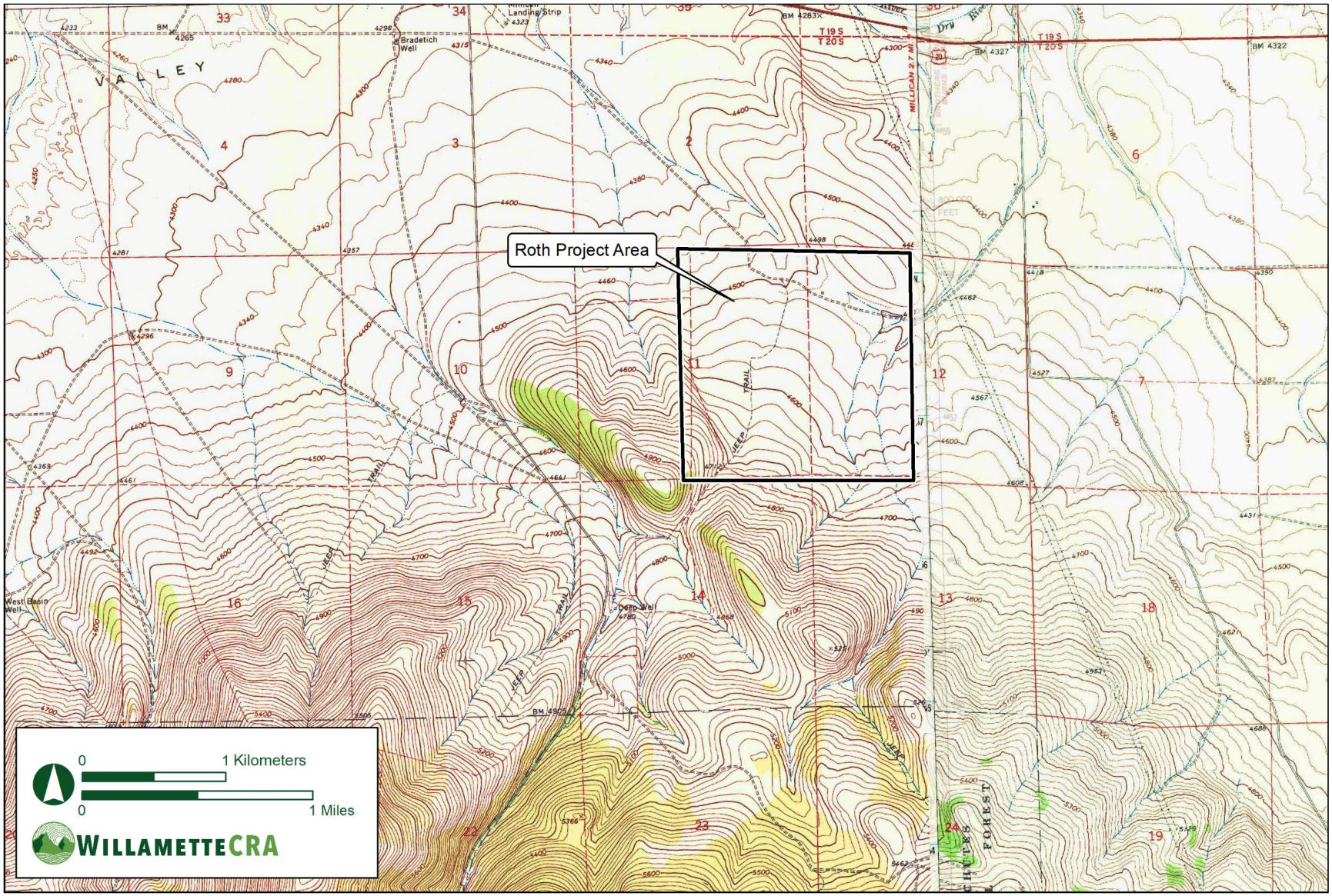

Figure 4. USGS 1969 topographic maps *Millican, OR* and *Pine Mountain, OR.*

Previous Archaeological Studies

A review of the SHPO GIS database has identified 10 previous cultural resource studies within approximately 1 mi. of the project area (Table 1). Only one of these previous archaeological studies has overlapped with the project area (Toepel and Beckham 1978). This study was an overview of existing cultural resources in the Brothers EIS area within the Prineville BLM District and did not involve field survey. Of the 7 previous studies that involved fieldwork, 6 have identified archaeological resources (e.g., Griffin 2008; Hamilton 1999). Most previously recorded resources have been identified on the surface, which is unsurprising given the depositional environment. Additionally, very few of the previous studies in the vicinity have used subsurface investigations. Previous investigations in the broader area are limited and has been primarily associated with roadwork along Highway 20 (e.g., Connolly 2001), transmission and fiberoptic projects (e.g., Sharp et al. 1998; Toepel 1981), and vegetation management (e.g., Griffin 2008; Hamilton 1999).

Our research identified four previously recorded archaeological resources within approximately 1 mi. of the project area (Table 2), none of which are within the project location. These resources include one precontact lithic scatter, two lithic isolates, and one historic site. The lithic scatter site (35DS1916) is a small concentration of debitage located on the edge of a flat upland area southeast of the project area (Griffin 2008). It was recommended as Not Eligible for listing in the NRHP; however, SHPO has not concurred, and it is still listed as “Unevaluated” on the SHPO database. The historic site (35DS1914) is an early twentieth century historic homestead complex. It includes eight structural ruin features and a scatter of historic refuse primarily comprised of vent-hole milk cans (Griffin 2008).

In the broader vicinity, archaeological resources have generally been recorded anywhere there has been substantial survey. These resources primarily include precontact lithic scatters and historic refuse scatters. Lithic scatters, while ubiquitous, are loosely associated with level upland areas overlooking or adjacent to drainages. Historic refuse scatters are primarily early to mid-twentieth century can scatters. These sites are sometimes associated with homesteads, but more often are independent of known structures or settlements.

Table 1. Previous Archaeological Studies Within Approx. 1 Mi. of the Project Area.

SHPO Biblio No.	Reference	Type of Work	Result	Within Project Area?
79	Toepel and Beckham 1978	Literature Review	N/A	Yes
653	Follansbee and Mays 1979	Literature Review	N/A	No
3115	Dudley et al. 1979	Cultural Resources Overview	N/A	No
3125	Toepel 1981	Pedestrian Survey	Positive	No
4613	Crowley 1982	Pedestrian Survey	Negative	No
16744	Sharp et al. 1998	Pedestrian Survey	Positive	No
16745	Fulton and Fulton 1999	Monitoring, Trenching,	Positive	No
17618	Hamilton 1999	Pedestrian Survey	Positive	No
17736	Connolly 2001	Pedestrian Survey	Positive	No
22105	Griffin 2008	Pedestrian Survey	Positive	No

Note: All reports can be found at the Oregon SHPO. Only those reports referenced in text are included in the **References** section.

Table 2. Previously Recorded Resources Within Approx. 1 Mi. of the Project Area.

Resource No.	Resource Type	Reference	General Age	Description	NRHP Eligibility	Within Project Area?
35DS1914	Site	Griffin 2008	Historic	Homestead, refuse scatter	Not Eligible	No
35DS1916	Site	Griffin 2008	Precontact	Lithic scatter	Unevaluated	No
30345	Isolate	Hamilton 1999	Precontact	1 flake, 1 projectile point	Not Eligible	No
0505061326IF	Isolate	Griffin 2008	Precontact	2 flakes	Not Eligible	No

Expectations

The proposed project is located on a parcel that encompasses both a relatively level lowland, and gentle slopes leading up to Pine Mountain in the south and a level upland area in the northeast part of the project that overlooks the valley. Relic drainages bisect the property. Given the lack of previous survey, presence of drainages, and the distribution pattern of previously identified sites in the broader vicinity, the area has a high probability of containing precontact archaeological resources. Based on previous archaeological investigations, we would expect to find sparse lithic scatters and/or lithic isolates that may represent ephemeral habitation areas.

There are no historic built environment resources in the Roth East project area. Additionally, our historic map research shows little historic-period development within or near the project area and we suspect there is a low probability of historic-period archaeological resources in Roth East. The exception to this would be the potential ruins of the 1960s structure noted in the 1969 topographic map and on modern aerial imagery, which would be recorded as an archaeological resource.

Result of Reconnaissance Survey

On September 6 and 7, 2023, WillametteCRA archaeologists Michelle North and Matt Goodwin conducted a reconnaissance survey of the proposed Roth East project area. The reconnaissance survey included visual inspection of approximately 128 of the approximately 645 project acres. The goal was to characterize the topography, assess past disturbances, inspect the area for archaeological resources, and identify areas with a higher probability of containing archaeological resources. Twelve archaeological resources were identified during the reconnaissance survey (Table 3; Figure 5).

During the reconnaissance survey, opportunistic portions of each of the project quadrants were walked using meandering transects spaced approximately 20 meters (m) apart. Ground surface visibility at the time of survey was good (50–75%). Archaeological resources were noted and mapped, but were not formally recorded or delineated, as this was outside the scope of work.

Table 3. Archaeological Resources Identified During the Reconnaissance Survey.

Resource No.	Resource Type	General Age	Description
22-80-3-ISO	Isolate	Precontact	1 obsidian flake fragment
22-80-4-ISO	Isolate	Precontact	1 obsidian biface fragment
22-80-5-ISO	Isolate	Precontact	1 obsidian flake
22-80-6	Site	Precontact	2 obsidian flakes
22-80-7-ISO	Isolate	Precontact	1 obsidian flake fragment
22-80-8-ISO	Isolate	Precontact	1 obsidian flake fragment
22-80-9-ISO	Isolate	Historic	1 spoked wheel
22-80-10	Site	Precontact	3 flake tools, 1 side notched projectile point fragment, 8 obsidian flakes, 2 FGV* flakes
22-80-11	Site	Precontact	1 obsidian biface, 3 obsidian flakes
22-80-12	Site	Historic	Can scatter and dimensional lumber
22-80-13	Site	Precontact	2 obsidian flakes
22-80-14	Site	Precontact	5 obsidian flakes

**FGV = fine-grained volcanic*

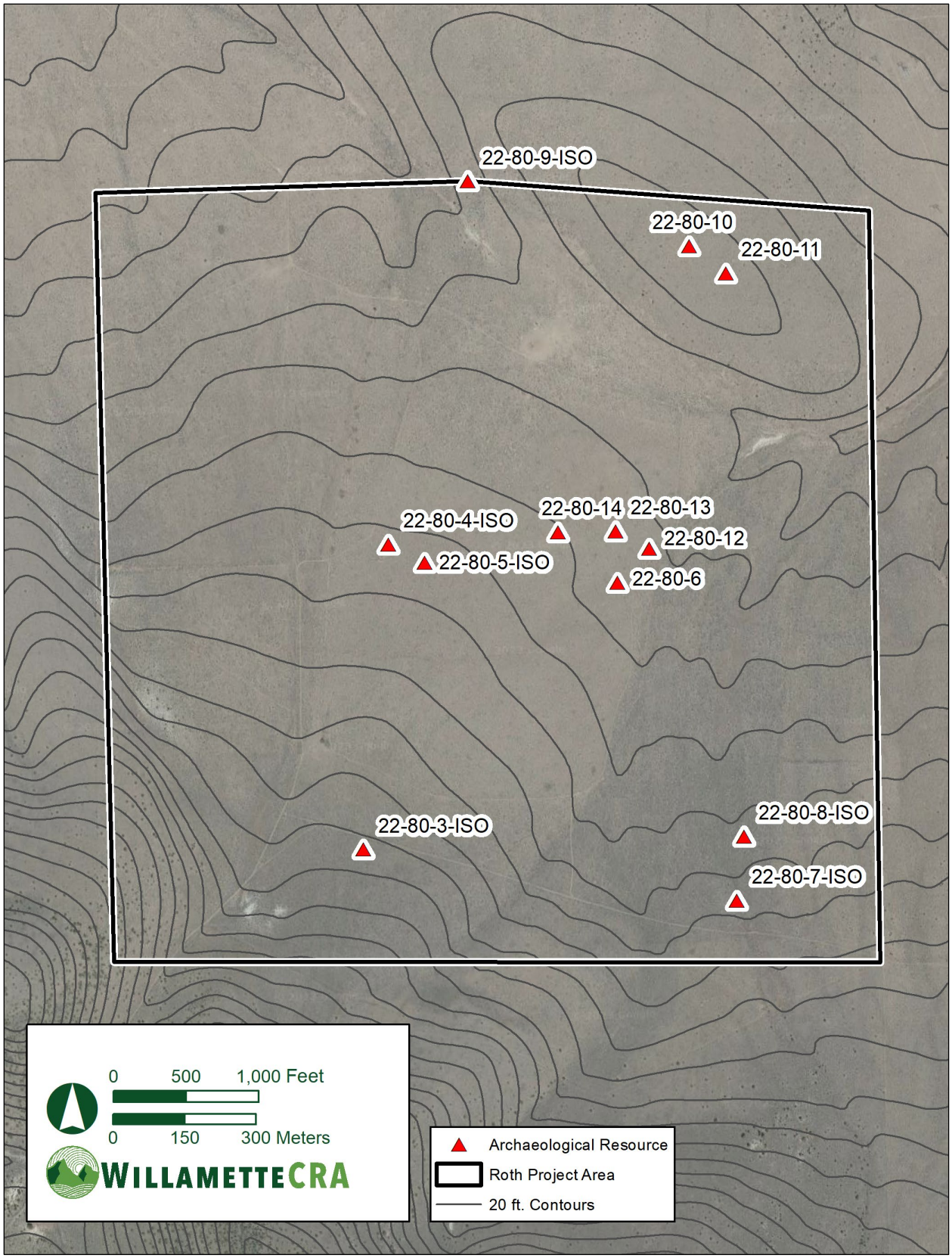

Figure 5. Results of the reconnaissance survey.

The project area is currently undeveloped aside from informal dirt roads. The property is a near-level lowland that slopes upward in the south towards Pine Mountain, and in the northeast corner, where it becomes a level upland butte that overlooks the surrounding valley (Figure 6–Figure 10). In the lowland areas, evidence of ephemeral seasonal drainages such as shallowly incised channels and rounded gravels was observed. Vegetation at the time of survey consisted primarily of rabbitbrush and sagebrush with sparse, small juniper. Where the project area begins to slope upward in the south and northeast, juniper trees are larger and more common (see Figure 6). Occasionally, wildflowers were noted on the southern slope.

The lack of established juniper on the more level portions of the project area, in combination with push-piles of rock (see Figure 10), and historic imagery, suggests that these areas have been previously cleared for farming purposes. Past disturbance in the project area appears to be limited to land clearing, informal road construction, and agricultural activity.

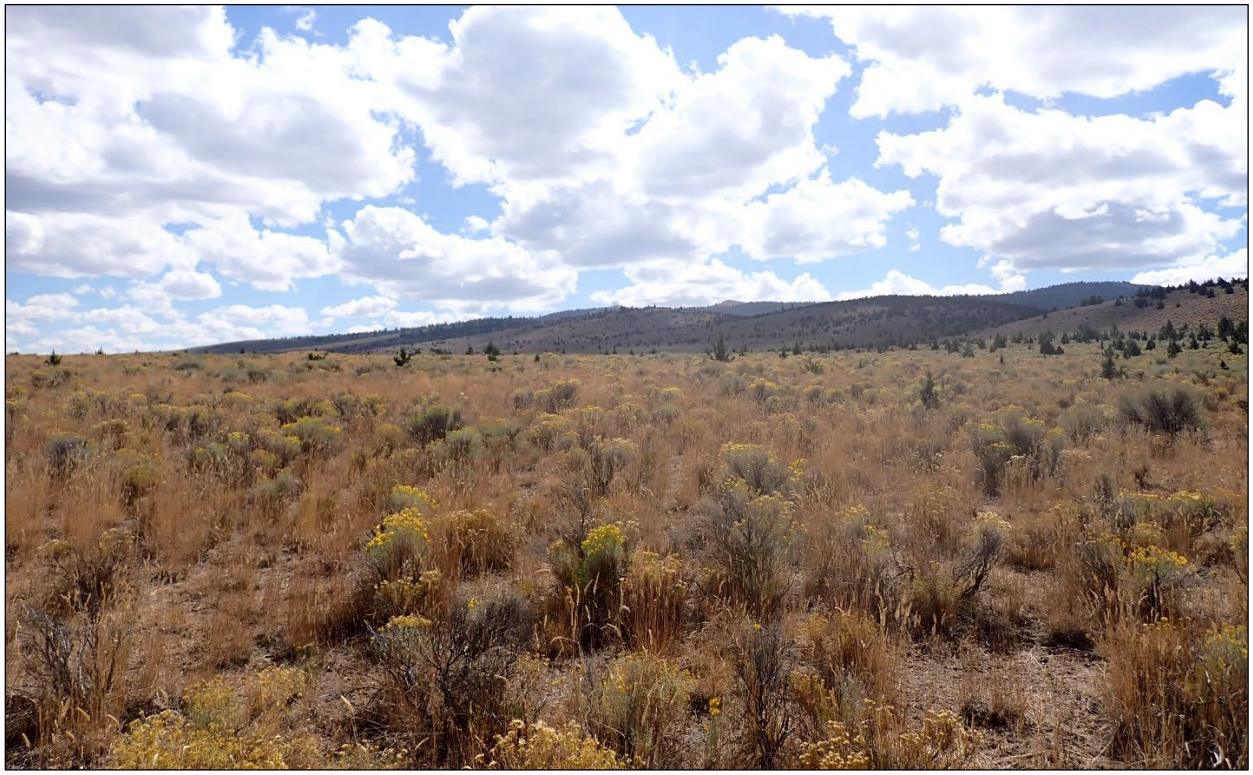

Figure 6. Overview of SW quadrant of the project area, note increase in juniper on hillslope. View south.

Figure 7. Overview of site 22-80-10 in the NE quadrant of the project area. View southwest.

Figure 8. Overview of NE quadrant. View northeast.

Figure 9. Overview of SE quadrant of the project area. View south.

Figure 10. Overview of rock pile and area around 22-80-12. View northwest.

Archaeological Resources

WillametteCRA archaeologists identified six new archaeological isolates and six new archaeological sites during reconnaissance survey of the project area (see Table 3). The majority of resources (n=10) consist of precontact lithic material (see Table 3 and Figure 11).

Precontact sites identified in the project area vary in size and content. The largest site with the most diverse assemblage is 22-80-10. This site is located on the level upland in the northeast corner of the project area (see Figure 5 and Figure 7). The 22-80-10 assemblage has four formed tools which include two used flakes, one unifacially modified flake, and one side notched projectile point (Figure 12 and 13). The projectile point resembles a plateau side-notched point. This point type dates to ca. 1500 years before present (Carter 2017).

The single historic isolate (22-80-9-ISO) comprises a metal spoked wheel (Figure 14). The wheel resembles the style used on wheeled cultivator tools from the early twentieth century (Sears, Roebuck & Co. 1908). This type of tool was used in dryland farming, and historic imagery and maps indicate that agriculture in the project vicinity had substantially diminished by the 1980s.

The historic site (22-80-12) is a scatter of approximately 20 cans, some of which were opened using a church key opener, approximately five 12 by 2 ft. dimensional lumber boards, and a push-pile of rock (see Figure 10). Church key openers were introduced in 1935 (Kimball 2011). They were used regularly until the 1960s when advances in technology led to the development of the “tab-top” or “pop-top” can (Maxwell 1993). This “tab-top” design did not require a separate opening device and soon became ubiquitous. The site is located adjacent to an informal dirt road.

Figure 11. 22-80-4-ISO biface fragment.

Figure 12. 22-80-10 obsidian flake tool.

Figure 13. Projectile point from 22-80-10.

Figure 14. 22-80-9-ISO spoked wheel.

Conclusions and Recommendations

WillametteCRA has completed background research and a reconnaissance survey of the Roth East project area for the Deschutes County Landfill Siting Project. The project area has not been subject to previous archaeological survey, and past disturbances appear to be limited to informal road construction and agricultural activities. Six archaeological sites and six isolates were identified within the project area during the reconnaissance survey.

Based on the information provided above, WillametteCRA recommends that the entire parcel has a high probability of containing archaeological resources. If the project includes the Roth East project area moving forward, we recommend that:

- A formal systematic archaeological survey is conducted of the entire project area.
- The resources identified during the reconnaissance survey are relocated and delineated, and any new resources are delineated.
- That an Oregon SHPO archaeological excavation permit is obtained prior to formal survey to allow for delineation of previously recorded resources and new resources identified during the survey using subsurface methods (i.e., shovel probing).

When a resource is identified and the project has the potential to impact it, then the resource needs to be delineated and formally evaluated under Oregon state law (assuming there is no federal nexus to the project). With some exceptions, evaluating whether an archaeological resource is significant requires an Oregon SHPO archaeological permit. To obtain a SHPO permit, a Secretary of Interior-qualified archaeologist on the Oregon SHPO's approved list must apply. The application requires a research design, which takes time to prepare. Once submitted, the application goes through a 30-day review period (realistically closer to 35 days) with SHPO during which time interested Tribes may comment. SHPO or Tribal comments or questions about the application may delay the process. Once the permit is obtained, field investigations may commence. The duration of the field investigations depends on the complexity of the resource. Once field investigations and post-field analysis are completed, the permit holder presents the findings (report and resource forms) to SHPO for concurrence. SHPO has 30 days to review the findings.

If the resource is determined significant, then impacts to the resource will need to be avoided or mitigated (e.g., archaeological data recovery, public interpretation, etc.); mitigation is specific to the individual resource and impact. If the resource is determined not significant, then the resource is not protected by Oregon law and requires no avoidance or mitigation, and the project may proceed as planned. If SHPO disagrees with a finding or requests more information to support a finding, SHPO's review clock starts over at 30 days. Under State law, Oregon SHPO has the final say as to whether a resource is significant.

Should the project area or the scope of work change, these recommendations may not apply, and additional work may be necessary.

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