Appendix 14A

Archaeological Baseline Study Report

Technical Report Identifying the Potential Range of Cultural Resources within the Aurora Gold Mining Project Area, Guyana

Prepared for and submitted to:

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1.0 Introduction

This report is a summary of a literature, records and collections review requested by ENVIRON International Corporation (ENVIRON) on behalf of Guyana Goldfields Inc. (GGI) as part of an updated Environmental and Social Impact Assessment (ESIA) for the Aurora gold mining project. As part of the baseline studies for the ESIA, ENVIRON requires a review of data needed to assess the potential to find cultural, historical, archaeological remains within the project and surrounding area and along the 33 km access and extension of the road beyond Tapir Crossing. The property is located in northwestern Guyana approximately 140 km west of Georgetown, Guyana within a GPS range of 59˚44.5'W, 6˚ 47.7'N, 59˚ 45.43'W, 6˚ 47.7N, 59˚ 44.5'W, 6˚ 46.8'N, 59˚ 45.43'W, 6˚ 46.8'N. The project area is accessed from Georgetown by the Parika Road where water transport is available to Buckhall. From Buckhall the project location is approximately 130 km. in a straight line west and four to six hours by road (truck/pickup) from Buckhall to Tapir and then one hour by river to Aurora.

This desktop review includes a general overview of the prehistory of Guyana, a review as data were available on the Cuyuni area (with consideration of historic use of the area), recommendations regarding high vs. low probability areas (areas where archaeological/historic sites might be expected, and recommendations regarding discovery/inadvertent discovery.

This summary reviews all existing literatures, records and collections pertaining to the Cuyuni area. The records and collections held at the National Library, Walter Roth Museum of Anthropology, the National Trust, National Museum, and collections of the Caribbean Studies Library/Amerindian Research Unit, University of Guyana were reviewed.

2.0. History of Archaeological Research in Guyana

Though notable scholars of Guyana including Schomburgk (1841), Farabee (1918, 1924) and Roth (1924) refer to archaeological sites, particularly petroglyphs, the pioneers in Guyanese archaeology are Brett (1868) and Im Thurn (1884), whose early excavations of sites, including Waramuri mounds and observations about the distribution and relatedness of material cultures, mark the beginning of scientific archaeology in Guyana. Early accounts of prehistoric cultures brought several excavators to the northeast and northwest regions of Guyana where a number of coastal sites were investigated early in the 20th century. These early accounts, including that by Toro (1905), report on sites characterized by quartz utensils, pottery adornos, and burial urns but provide little descriptive context. Generally characterized by a lack of systematic investigation, the late 19th and early 20th century in Guyanese archaeology must be considered a period of considerable speculation.

One of the more important early descriptive syntheses is Verrill's (1918) discussion of the material and geographic variability of Guyanese mounds. Defining variations in "hill

top" and "shell heap" sites, he provided the first good descriptions of such notable sites as Akawabi, Kumaka, Koriabo and Barabina where he estimated shell mass at some 5 billion shells. Most importantly, Verrill concluded that two distinct patterns existed: a lowland coastal pattern, like those in the Pomeroon region, and a second pattern situated on hilltops at distances from the coast. While his speculations regarding the origins and migrations and habits of these early coastal peoples are rather untenable, his descriptions of site contexts and material remains are important. Equally important are his (1918) investigations of sites in the Demerara area, and along the Abary River.

The beginnings of what may be termed the descriptive-historic period in Guyanese archaeology are marked by Cornelius Osgood's 1944 explorations in the northwest and Demerara regions. Asserting an Arawak affiliation for the peoples of the northwest District, Osgood noted similarities between Demerara style potteries and the Los Barrancos style to the west and argued that people lived on hilltop sites rather than using them exclusively for ceremonial functions, as suggested by Verrill.

Following Osgood, Evans and Meggers (1960) spent several months in the field in 1952 visiting the Rupununi Savannah, the Mabaruma area in the northwest, and the Abary River area in the Northeast and the Taruma country along the Kassikaityu River in southeastern Guyana. Their investigations resulted in the development of several phase chronologies, the important Rupununi and Taruma phases, and the description of many ceramic types.

Beginning in the late 1970's Denis Williams conducted fieldwork in several locations throughout Guyana. The range of Williams' (1982, 1985a, 1992) work is broad and includes contributions to petroglyphic signage associated with fisheries management (1985a) and the origins of horticulture in the Northwest of Guyana (Williams, 1992). Williams' work has been largely historical, though he has employed ecological considerations in analyses that provide insights regarding the varied use of resources within the tropical environment. This is particularly true in his assessments of the prehistory of the shell middens in northwest Guyana. In the northwest, recent excavations at Kabakaburi (Plew, Pereira and Simon 2007) at Wyva Creek (Plew and Willson 2010) and Siriki (Plew, Willson and Daggers n.p.) continue to expand our knowledge of the Archaic shell mound pattern.

During the past several years, Plew and Pereira (2001, 2002) have conducted extensive surveys and test excavations of a number of locations throughout the south savannahs. These surveys have identified a greater range of archaeological site types than described earlier by Evans and Meggers in their important survey of the area. In addition, Plew (2002) has conducted surveys and test excavations in the Iwokrama rainforest reserve. These investigations suggest a broader use of the Iwokrama rainforest than previously believed. In spite of a history of archaeology that spans more than a century, the prehistory of the region remains very much in a pioneering stage.

3.0. The Natural Setting

Guyana is characterized by considerable variation in landforms, climate, floral and faunal distributions. The modern and paleo-environmental contexts provide by analogy, useful insights regarding land use by Amerindians and establish a baseline from which long-term environmental and cultural changes may be assessed.

Guyana consists of a land mass of almost 197,000 square kilometers. Situated on the northeastern coast of South America, it possesses an Atlantic coastline of some 430 kilometers and is bounded by Venezuela on the west, Suriname on the east and Brazil on the west and south. Geologically, it consists of a coastal plain, a white sand belt and interior highlands. The coastal plain consists of alluvial sediments washed into the ocean from the Amazon River and deposited on the Guyanese coastline and extensive overlays of white sand and clay deposits resulting from interior erosion of bedrocks carried to the coast by interior rivers. The plain itself extends some 5-6 kilometers from the Atlantic and extends along the entirety of Guyana's coastline from Suriname to Venezuela. Though constituting less than five percent of the total land mass the coastal plain presently contains more than 90 percent of the non-Amerindian population. Within the coastal plain as it reaches the Atlantic are extensive mudflats and mangrove swamps. Many areas are inundated during high tide.

South of the coastal plain are extensive white sand formations covering an area that is between 150 and 250 km wide at its maximum. Created from interior erosion of bedrock, the white sands are characterized by low lying sand hills, rocky outcrops and dense forest. Beyond the white sands are the interior highlands; Guyana's largest geological area. This area is characterized by high plateaus, mountains and savannahs. While much of the southern portion of the interior highlands includes the expansive grasslands (c. 15,000 square kilometers) of the Rupununi Savannah, the western portion of the highlands is dominated by the Pakaraima Mountains. Formed from the uplift of some of the oldest sedimentary formations on the continent, the Pakaraimas include Mount Roraima on the Venezuelan border; at 2,762 meters, Guyana's highest peak. South of the Pakaraimas, the Kaiteur Plateau rises to nearly 600 meters and further south the Kanuku Mountains reach elevations of 1,000 meters. The Kanuku, as with the Pakaraimas, have heavy forest cover but are characterized by areas of exposed granite. Many areas within the interior including the savannahs are characterized by highly lateritic soils.

The coastal plain, the white sands belt and the interior highlands are drained by a number of generally north-south flowing rivers. The exception is eastern Guyana where rivers flow generally in an easterly direction into the Essequibo River. These include the Cuyuni and the Mazaruni Rivers. These rivers drain the Kaiteur Plateau while the Essequibo, the country's largest river flowing from Brazil to the coast, drains the majority of the interior basin. In the northwest, the Barima, the Waini and the Pomeroon Rivers parallel the coast plain before draining into the Atlantic. In the northeast a number of small rivers including the Abary and Koriabo flow north-south into the Atlantic. Draining into the Essequibo in the south are the Rupununi, the Kuyuwini and the

Kassikaityu. The western Brazilian and Venezuelan borders include the Takatu and Ireng Rivers. The major river of the eastern region is the Berbice. Rapids and waterfalls limit upstream transport. Among the most noted hydrological features of the country is the Kaiteur Falls on the Potaro River, which descends 226 meters. Water types in Guyana include whitewater, black water and clear waters. Whitewater includes yellowish colored water carrying heavy sediment load in suspension, while clear water types appear green to olive-green in color and carry low levels of suspended sediments and organics. Clear waters are transparent to depths of more than 4 meters. Black waters which are olive to reddish-brown in color, are dominated by humic and fluvic acids carried in solution and typically are transparent to depths of about 3 meters. Whitewater is common in lower elevations, the coastal plains and major rivers including the Essequibo, Demerara and the Courtyne. Black waters are typically found in forested regions whereas clear waters occur in the interior highlands.

Climatically, Guyana lies south of the Caribbean hurricane belt and is influenced greatly by the northeast trade winds. Characterized by a tropical climate, high temperatures, humidity and rainfalls vary little seasonally. The most significant variation is between the dry and wet seasons though levels of rainfall do vary between coastal and interior highlands. The heaviest rains fall in the northwest of Guyana with significantly lesser rainfalls in the interior and southeast. Yet, rainfall levels in the Iwokrama Forest of central Guyana range between a high of more than 10,500 mm of precipitation in May (rainy season, May to July) to 1375 mm in November. Rainfall levels in the Rupununi Savannah are typically much lower. Temperatures remain relatively constant though varying slightly between wet and dry seasons. During the hottest months temperatures vary between 32ºC and 24ºC with slightly lower ranges during the cooler months, of the year (February). Humidity rates average approximately 70% year round though levels are typically somewhat lower in the interior portions of the country.

4.0. The Ethnographic Context

Guyana's Amerindian population consists of ten tribal groups which include three coastal and seven interior tribes. These groups are distinguished by language and culture but are socio-politically similar, exhibiting a highly individualistic social structure (Rivière 1984). Ethnographic documentation of Guyanese Amerindians began in the late 19th century with Im Thurn's *Among the Indians of Guiana* (1983). In the early 20th century Walter Roth conducted ethnographic studies which resulted in the publication of a number of important surveys (Roth, 1915, 1924, 1929). Additionally, Farabee (1918, 1924) conducted fieldwork in southern Guyana. In the 1930's Gillen (1936) conducted extensive research among the Barama River Caribs. In the 1940s, Myers conducted minor studies among the Wapishana (see Meyers 1944, 1946). More systematic investigations were undertaken beginning in the 1950's with Butt's (1954) study of the Akawaio. Butt (Butt-Colson) continued to publish extensively on various aspects of Akawaio culture through the 1980's. In the 1950's and early 1960's, Fock (1963) and Yde (1965) published accounts of the lifeways and material culture of the Wai-Wai—work furthered by Mentore (1984, 1988, 1995). More recently, Forte has published on

Makushi and Wapishana and on issues relating to contemporary Amerindians (1989, 1993, 1996a, 1996b). Menezes has published widely on the history of Amerindians in Guyana (1979).

The coastal groups consist of Carib, Arawak and Waroa tribes—their names derived from the three language families of Guyana. The remnant Carib population is largely coastal while Arawak are found to the west in the vicinity of the Pomeroon River, and are with Warao located in eastern Guyana near the Couretyne River. The remaining interior tribes include the Akawaio, Arekuna and Barama River Caribs and Patamona, who inhabit the northwestern portion of Guyana and the Makushi, Wapishana and Wai-Wai who are inhabitants of the southern savannahs. The Wai-Wai are found in southern Guyana in what was formerly Taruma territory and in Brazil.

The settlement-subsistence regimes of the Amerindian populations in Guyana vary somewhat according to environmental context. The most obvious distinctions are those between forest populations of the southern savannahs though socially groups are generally autonomous as Revière (1984) has observed. The northern forested regions of Guyana are inhabited by populations living in small villages along major river courses. Forest villages consist of several households typically garden manioc and a range of other vegetables, hunt local game which is often scarce and make use of the extensive fishery. Garden plots and more extensive fields tend to be located within relatively short distances of structures.

Variation in subsistence relates primarily to the dry/wet seasons which make different resources either plentiful or scarce. In the south, villages consist of a few to several households but tend to be less aggregated and are situated near bush islands where gardens/farms are located. While settlements are adjacent to the forest, most are found several kilometers from residences. Though the rainy season generally impacts all groups, peoples of the south are particularly affected by the seasonal flooding of the savannahs. The rains, however, insure the migration of large freshwater fishes into the streams and rivers of savannah and are held in shallow ponds for extended periods until rainfall lessens at the beginning of the dry season.

5.0. Pleistocene-Holocene Environmental Settings and Settlement

Though paleo-environmental data for northeastern South America are not extensive, a number of studies allow for construction of major episodes of change relating to both coastal (littoral) and interior portions of Guyana. Pleistocene glacial advances saw the Guyana coast to extend 100 kilometers seaward from its present configuration. During the Late Pleistocene-Early Holocene (10,000-7200 B.P., Before Present) the coastline was inundated by waters associated with the glacial recessions which left the coastline laying some meters below the present surface (see van der Hammen 1963, van Andal 1967). After 7200 B.P. coastal conditions favor the development of mangrove swamps and associated peat deposition which created the brackish conditions prevalent today in areas of the north littoral. Williams (2004) suggests that between 6,000 and 4,000 years

ago, highland runoff converted intertidal mudflats to seasonally inundated savannahs. Following a warming interval around 4,000 B.P., water salinity increased and peat deposition ended creating what are essentially modern conditions. One of the significant features of the Holocene environments of the coast is an increase in shellfish resources, which Williams (1985) considers important to the emergence of Archaic culture in the northwest and which correlates it with episodes of the alternating presence of freshwater and brackish swamps which Williams believes provided an important alternative to use of the *terra firma*. The varied micro-niches of the context are suggested by the pollen analyses of Seba Creek.

The interior forests and savannahs of Guyana have been significantly influenced by glacial climates. Though debate continues about the extent of savannahs within the tropical forests (see e.g. Sarmiento 1984), several dry episodes or warmer periods are known. Between 26,000 and 14,000 B.P. relatively cool/dry conditions prevailed across the Guianas. Following this cooler period, conditions 14,000 and 10,000 years ago became somewhat warmer and were associated with increased rainfall. The emergent conditions of the Holocene or modern period are characterized by several dry intervals occurring between 11,000 and 9,500 B. and around 4,000 B.P. During these times there appears to be increased settlement of the interior forests and savannahs in what Williams (n.d.) views as a shift to horticulture. Following Haffer's (1969) forest fragmentation thesis, Haffer (1982), Brown (1977), Brown and Ab'saber 1979), and Prance (1973, 1982) have argued for the emergence of *refugia*, one of the larger stretching across southern Guyana to the Pakaraima Mountains. Recently, Van der Hammen and Absy (1994) argue for a Late Pleistocene (22,000-13,000 B.P.) desication resulting in the development of a large western Amazonian forest and several smaller forests in the eastern shield. Importantly, the desiccation associated with these models would have resulted in significantly greater areas of savannah or mixed forest/savannah of the type associated with Paleo-Indian occupations elsewhere on the continent (e.g. Roosevelt et al. 1996). Plew (2010), in contrast to Williams (2004), views the alternating conditions of the Late Pleistocene/Early Holocene as providing new adaptive opportunities rather than periods of instability.

6.0. Paleo-Indian Hunter-Gatherers and Early Archaic Foragers

Traditionally viewed as an ecological barrier providing scarce resources, the Amazon Basin was seen as having limited aboriginal development. Despite the bias of North American archaeologists, scholars who have recognized the richness of the Amazonian environment and the innovation of technologies adapted to the utilization of arboreal fauna and aquatic resources have argued for a cultural pattern co-existing or coeval with the North American pattern (see Bryan 1991).

Between 1988 and 1992, Anna Roosevelt, working closely with Brazilian archaeologists exploring sites along the lower Amazon, conducted excavations at the site of Pedra Pintada near Monte Alegre. Based upon 56 radiocarbon dates from carbonized plant remains and 13 TL dates from burned lithics and sediments, Roosevelt documents an impressive series of occupations between 16,000 and 10,200 years ago. The majority of

dates fall between 12,000 and 10,000 years ago, a period contemporary with the North American Clovis. The occupational levels are characterized by bifacially produced quartz spear points of the type found at Lagoa Santa (Hurt 1960; see Lynch 1998 for discussion) and elsewhere in Late Pleistocene/Early Holocene contexts, other bifacial implements, pigments in stratigraphic relation to cave paintings, and a wide variety of plants including fruits, berries, and palm, and faunal remains which include fishes, mollusks, turtles, tortoises, birds, rodents, and small and large game.

The work of Roosevelt and her colleagues (1996) demonstrates that some Paleo-Indians were rock-painting, tropical, forest river foragers contemporary with North American Paleo-Indian cultures and provides evidence that Paleo-Indians were more complex, widespread, and diverse in their adaptations than formerly believed.

Such recent discoveries have implications for the early prehistory of Guyana inasmuch as Williams (1985b) suggests that the earliest peoples inhabiting Guyana were Big Game Hunters of the type associated with North American temperate climates, though neither technology nor faunal remains are present document a megafaunal pattern (see Williams 1985b:6). This pattern is based in part on the convention that the Rupununi is a remnant of a larger Pleistocene Savannah extending along the periphery of the Amazon during glacial maximums when the Amazon was substantially smaller than at present and that it served as a corridor through which early peoples migrated into Brazil.

Two Paleo-Indian specimens have been collected near the Barima River and an additional specimen collected from the Essequibo River. In addition, Williams (1985b) reports a tanged Paleo-Indian projectile from near the Ireng River on the northern perimeter of the Rupununi. These projectiles are similar to the Paleo-Indian specimens recovered by Roosevelt at Pedra Pintada on the lower Amazon, by Hurt (1960) at Lagoa Santa in Brazil, and at several other locations east of the Andes (see Lynch 1998; Simoes 1976) and most recently near Mariwau in the south Rupununi savannahs (Plew and Pereira 2002).

Following a Paleo-Indian period, Williams (1985b) argues that so-called Meso-Indian or Archaic hunter-gatherers emerged on the savannah ca. 7,500 B.P. and were characterized by bifacially worked projectile points, crudely chipped stone implements, and elaborate petroglyphs. The chronology of the "Rupununi Archaic," which may be quite correct, is at present based on typological comparisons with relatively older assemblages in other areas of South America. This is particularly true of many of the rather simple tools reported for the region.

Williams (1985b, 2004) argues for an early occupation by Archaic peoples in northwest Guyana beginning around 7,000 B.P., originating in the vicinity of the Aruku Hills and Barima River and distinct from the savannahs in its emphasis upon littoral resources and in particular upon the molluscan resources of the mangrove swamps near the coast. Within the area, material culture is composed of the simplest chipped stone tools and a few simple woodworking tools adapted to forest exploitation. Direct evidence in support

of the assertion is tentative at best. Nonetheless, it would appear that in the post 7,000 B.P period that a more traditional Archaic lifeway emerged.

7.0. Archaeology of Northwestern Guyana: Archaic Shellfishers and Early Horticulturalists

In the northwest of Guyana, there are presently no significant evidence of Paleo-Indian occupations. Thismay reflect the less than hospitable environment of the coast during the late Pleistocene (Plew 2010). The archaeology of the northwest includes Archaic and later Horticultural occupations. The Archaic is characterized as the Alaka Phase dating between A.D. 1 and A.D. 500. The Archaic occupations which are associated with an extensive exploitation of shellfish are known from excavations of several shell mounds found within the region. The mounds which range up to 80 X 30 meters and are between one and fifteen meters in height provide insights regarding the economic and social lifeway of the early littoral pattern. The earliest known shell mound is the Pirika Mound, which has been radiocarbon dated at c. 7, 280 B.P. (Williams 2004) Subsistence data suggest the periodic use of snail, mussel, oyster, crab and conch as well as birds, fish and mammals. Though not directly evidenced in the record it is presumed that a range of plants including palm were utilized by local groups. The toolkit associated with the earliest populations includes simple percussion made choppers, hammerstones and picks produced from andesite, quartz and schist. Associated features of the Alaka Phase culture dating between A.D. 1 and A.D. 500 and well known from Barabina Mound include fire-cracked rock, and concentrations of lithic debris associated with the manufacture of stone tools, hearths, storage pits, postmolds and burials. Evans and Meggers (1960: 63-64) note what they describe as a late “incipient ceramic” phase associated with a few rather crudely made shell-tempered sherds of the type Wanaina Plain. The “incipient ceramic” period is associated with groundstone tools that include celts, mortars, manos, pestles and grinding stones. The excavation of flexed burials of adults and children provides some limited insights into the social aspects of Archaic life in the northwest.

The Archaic shell mounds of the northwest have recently become the focus of a debate regarding the early appearance of pottery in Guyana and thereby an early emergence of horticulture. Traditionally, horticulture was associated with large village sites of the Mabaruma Phase dating between A.D. 500 and A.D. 1600 (Evans and Meggers 1960:122). These sites, which range to more than17,000 square meters in area, are associated with coarsely tempered Mabaruma Plain and an assemblage that includes manos, metates, polished celts and possible hoes. Mabaruma pottery is replaced by sand-tempered Hosororo pottery in the later part of the phase. Notably, the appearance of pottery in the archaeological record has been taken to reflect the beginning of the Formative period. Williams (1998) has recently argued for an early beginning of the Mabaruma Phase at 1600 B.C. on the basis of early pottery at Barabina and at Hosororo Mounds. His assertions are, however, challenged by Roosevelt (1997), who notes inconsistencies in his data presentations and points to an early occurrence of pottery in Alaka Phase levels instead of those considered Mabaruma.

During the past five years, excavations at the Kabakaburi, Wyva Creek and Siriki shell mounds have expanded knowledge of this Archaic pattern.

Wyva Creek produced is radiocarbon dated to 6340+/-50 BP (Beta-264970, calibrated age of 7410-7350 BP) — making the mound one of the oldest in the northwest and possibly of the age of the Piraka Mound (Williams 2004, Plew and Willson 2010).Though it is clear that the primary activity at Wyva Creek was collection and processing of shellfish, the recovery of fish and large to medium mammal remains indicate some variance in diet.

In contrast to Wyva Creek, Siriki is the largest of the Archaic shell mounds in northwestern Guyana.

Occupations of Siriki mound, which appears relatively undisturbed, span a period of some 4,000 years. The early use of the site is contemporary with occupations at Akawabi and Barabina. A more recent date of 270+/- 30 BP suggests a very late use of the mound and and may indicate a late presence of shellfish in the area or simply a late Holocene re-occupation of the mound. Materials are of the Alaka Phase.

8.0. The Archaeology of the Northeastern Guyana

The northeastern portion of Guyana is characterized by prehistoric occupations that include evidences of two major cultural patterns— the Abary Phase (Evans and Meggers 1960) and the Hertenrits Complex described in Suriname (Boomert 1980). The Abary Phase is found within the Abary watershed of the Berbice River and dates the period after A.D. 1200. Defined by Evans and Meggers, subsequent excavations at Recht-Door-Zee (Wishart 1982a) have demonstrated possible Koriabo influences in the ceramic inventory and the use of wattle and daub house construction (Wishart 1982b). To the east of the Abary River, the Hertenrits complex is defined primarily from excavations in Suriname (Boomert 1980, Versteeg 1985) and appears to date somewhat earlier than the Abary pattern. Occurring as early as A.D. 600 at the Buckleburg Mound in Suriname, ceramics are notable in the use of kaolin temper derived from the Orealla Cliffs on the left bank of the Corentyne River.

Pottery sherds were typed into three major types including, Tiger Island Plain, Tuarakuli Plain and Abary Plain. Tiger Island Plain is cariapé tempered while Taurakuli Plain is tempered with crushed sherds and Abary Plain with sand. Stratigraphically, Tiger Island Plain is the predominant early type followed by Taurakuli and Abary Plain types. Abary Phase pottery exhibits some incision and modeling using nubbins with punctuates. Groundstone tools include axes, adzes, hammerstones, manos, metates and rubbing stones.

Subsistence is known from both archaeological and ethnographic data (see Williams 2004) and suggest that early occupants of the region utilized a range of resources reflecting the coastal and interior riverine environments and that would have included the

use of a variety of plants, mammals, fishes and shellfish. The settlement patterns of the Abary and Hertenrits Phases most probably varied seasonally with a settlement pattern utilizing both primary and secondary waterways and characterized by use of sand reefs, ridges and artificial habitation mounds as well as raise field agriculture (see Boomer 1976, 1980; Im Thurn 1984, Osgood 1946; Parsons and Deneven 1967; Poonai 1962; Roth 1944; Verrill 1918; Verteeg 1983 and Wishart 1982a, 1982b).

In northeastern Guyana and in adjacent areas of Suriname and perhaps as a part of the Abary pattern, artificial habitation mounds and raised fields are present. Artificial habitation mounds of the Hertenrits Culture include the Buckleburg 1 and Wageningen-1 mounds reported east of the Cortenyne River in Suriname (Boomert 1980; Verteeg 1985). Many of the mounds rise 2-2.5 meters above the surrounding areas and are quite large having, as in the case of the Buckleburg-1 mound, an estimated volume of 100,000 cubic meters. Many of the late Hertenrits mounds are encircled by moat-like water bodies measuring 20-100 meters in width (see Williams 2004, 32

Also present in the region are raised fields of the type generally described by Parsons and Deneven (1967). Features of this type are known in Guyana near the historic Fort Nassau on the Berbice River (Simon n.d., 2008). The features consists of 787 raised field mounds ranging between 1.7 and 0.48 meters in height, 4.96 and 8.25 meters in length and 1.7 and 6.9 meters in width. The mounds constructed from savannah top soil are generally arranged in a linear configuration and have no material culture associations. The presence of raised fields suggests that some areas saw the implementation of innovative strategies to local conditions and may have supported larger aggregates of population than previously thought.

9.0. The Taruma Phase: The Archaeology of Southeastern Guyana

Named after the historic Taruma population which inhabited the area of the upper Essequibo between the mouths of the Kassikaityu and the Kuyuwini Rivers, the Taruma archaeological phase is characterized by a settlement pattern in which sites were located on hilltops and along river terraces having elevations above the flood zone. Sites appear to have been surrounded by garden areas and characterized by relatively shallow levels of refuse which in only one instance exceeded 30 cm in depth (Evans and Meggers 1960: 245). Refuse levels appear to be correlated with site size. Some sites such as Yochó are relatively small, measuring only 70 by 20 meters while other sites such as the Kassikaityu Mouth site measure in excess of 200 by 100 meters. Using seriation techniques and an estimation that a 10% change in sherd frequencies within stratigraphic cuts reflected occupation episodes, Evans and Meggers (1960:240-242) estimate the length of individual occupations and the overall occupation of the area to have been about 200 years. This suggests with respect to refuse levels that occupations while repeated in some instances involved relatively short intervals of time.

In addition to open village sites, petroglyphs documented near the mouth of the Kassikaityu River include both geometric and zoomorphic motifs.

Stone tools include an axe, chopper, rubbing stones, griddle or metate fragments quartz pebbles, cassava grater chips, and cores and debitage of chert, quartz and sandstone suggesting the manufacture of stone tools in Taruma Phase sites. Vessel forms include shallow to moderately deep bowls with upcurving walls, direct rims with a variety of lip forms, carinated bowls and globular jars having constricted necks and everted rims with pointed lips. Sand temper is common while cariapé-tempered pottery appears sporadically. Decorated pottery includes incised, punctate, stamped and red-on-white types. This trend is supported by evidence from three Taruma Phase sites (Muri, Camp Jaguar and Itabru) excavated by in the New River Triangle and the Upper Berbice River areas (Williams 1978, 1988). In addition to formal pottery types, other ceramic artifacts include conical pot rests, disks, spindle whorls and whistles. While European trade goods are relatively common in many archaeological phases of Guyana, only five Taruma Phase sites produced European materials. On this basis, Evans and Meggers (1960:246) argue for sporadic and superficial contact with Europeans. Regardless, the Taruma Phase represents a classical forest pattern.

10.0. Archaeology in Iwokrama: The Central Guyana Rainforest

The archaeology of Iwokrama provides what is presently the best source for interpreting forest adaptations in Guyana and the surrounding areas as well as the simultaneous use of the forest and savannah as part of a broader settlement regime. This is based upon surveys and test excavations conducted by Williams (1996) and Plew (2002, 2003). Williams (1996) explorations followed an intuitive strategy in which the survey effort was maximized by conducting a linear survey of stream and river courses. Williams (1996) analyzed the data from these surveys within a cultural-historical framework which included consideration of the Paleo-Indian, Archaic, Horticultural and the Historic Period associated with Fort Arinda established in 1734.

The Archaic Period, dating between 7,000 and 3500 years ago, is characterized by a pattern of broad spectrum foraging associated with a wide range of archaeological site types including artificial groundstone depressions, chipping stations/manufacturing locations, petroglyphs and isolated artifacts. Because the Archaic economic strategy reflects considerable use of the forest, a range of new "groundstone" tools including axes, adzes and other woodworking and plant processing tools appears in the archaeological record for the first time. Some items are associated with the manufacture and use of artificial depressions consisting of open basins used for plant processing and for sharpening grooves.

Among the most notable archaeological sites within the Iwokrama forest are groundstone features which occur in numerous locations along the major rivers. The features include shallow basin depressions used for processing plants, most commonly plants used for fish poisons, and steeply incised grooves believed to be used as sharpening grooves for axes, adzes and other woodworking implements. Stone grinding depressions and sharpening grooves which Williams (1985b) has commonly referred to as "pollisoirs" have not been

systematically recorded in many areas. These occur in a variety of forms and often with shallow basin depressions.

Though Archaic occupations/use areas are primarily located along major rivers, the Iwokrama Mountain survey (Plew 2002) identified landscape features including streams, seeps, boulders along small streams, rock outcrops, stone piles and large rock boulders near summits which are as site locations in the interior forest at distances from major rivers.

During the Horticultural Period dating between 3,500 B.P. and the Historic period, occupation in Iwokrama is documented by the recording of seven archaeological sites containing evidence of pottery.

Most notable and relevant to the horticultural horizons in the reserve are excavations conducted by Williams (1996) and Plew and Pereira at Errol's Landing.

Radiocarbon dates of 2080+/-70 B.P. (Beta-76246) for the 45-60 cm level and of 2910+/-80 B.P. (Beta-76247) establish the lower levels of the site to date into the early Horticultural Period.

Pottery was manufactured using a coiling technique and temper that utilized quartz sand, decomposed granite and caraipé. Core color varies, with pottery being relatively hard (3.0 Moh), well smoothed and occasionally burnished (Williams 1996). Painted pottery generally consists of red-on-white.

Decorated ceramics from Errol's Landing include a range of vessel forms and decoration techniques that include , modeling, incising, brushing, scraping, stamping and fingertip impressions, . red and white slips, vertical semicircles, strap handles, zoomorphic lugs and punctated nubbins.

While no evidence of Paleo-Indians has to date been identified, it appears likely that such evidence may come to light given the appearance of Paleo-Indians elsewhere in Guyana and the Amazonian basin. It seems likely that Paleo-Indians utilizing the northern Rupununi would have intruded into the Iwokrama forest.

The Archaic Period, which dates between 7,000 and 3,500 years ago, suggests a pattern of broad spectrum foraging and a range of associated sites which are well documented within the reserve, and include a range of sites that include petroglyphs, sharpening grooves and a chipping stations.

The settlement pattern of the Archaic Period may be described as one in which sites were situated along major river courses and near falls and rock outcrops. The location and size of sites suggest that foraging populations utilized the fisheries and forest resources, the exploitation of which was made possible by stone tools produced from locally acquired materials. The recent discovery of aboriginal sites along tertiary drainages (Plew 2002) away from major rivers may indicate an intensive use of Iwokrama.

11.0. Archaeology of the Rupununi Savannah

Evidence of Paleo-Indians in the Rupununi is limited to a few discoveries including Williams' (1985b) report on a Paleo-like point from the Ireng River. Additionally, Plew (1997) has identified a second triangular quartz specimen from the Im Thurn collections at Cambridge University which were collected on the Ireng River. An additional specimen from the Mariwau area in the Rupununi has been identified (Plew and Saras 2001). At present, these finds constitute the limited record of early Paleo-Indians in the Rupununi.

As defined by Williams' (1985) Archaic artifacts, features and sites in the North Rupununi include chipped and groundstone artifacts (Evans and Meggers 1960, Roth 1924, 1929, Williams 1978); features which include rock alignments (Brown 1876, Henderson 1952), rock circles (Brown 1873, Henderson 1952) and rock piles (Henderson 1952); grinding surfaces or depressions and sharpening grooves (*pollisoirs*); and petroglyphs. Earlier explorers in the area noted petroglyphs in the north Savannahs (see Hortsmann and Tollenaer in Harris and Villiers 1911), while additional glyphs have been described by Brown (1876) on the Kwitaro. Petroglyphs have also been reported by Dubelaar and Berrange (1979), Hanif (1967), Poonai (1970), Goodland (1976), and most notably by Williams (1979a, 1985b) at Aishalton and at Shiriri Mountain (Plew and Pereira 2001). Williams (1985) considers these features to date to the pre-horticultural Archaic period. It appears likely that many of the Archaic artifacts and features are also associated with later horticultural communities.

The archaeology of the Rupununi Savannahs documents possible early Paleo-Indians and extensive Archaic and Horticultural occupations. A Paleo-Indian presence is evidenced by paleo-type points found near the Ireng River (Evans and Meggers 1960) and in the vicinity of Mariwau (Plew 2005a) in the south savannahs. The Archaic Period is assumed to date as early as 5,000 B.C. and is characterized by a range of chipped and portable groundstone artifacts as well as features/permanent artifacts that include grinding surface/depressions and sharpening grooves (*pollisoirs*). In addition, geometric rock alignments, stone piles (cairns), and circles are common. Further important is the widespread manufacture of petroglyphic rock art. Best known is the rock art of Aishalton and Makatau Mountain where 30 petroglyph sites comprised of 686 motifs are carved on granite boulders. Consisting mainly of bimorphic and geometric motifs, elements were inscribed using a broad line and deep groove technique which often combined dots and furrows in settings with bimorphic and geometric motifs. Williams (1980, 1985) argues that varied combinations of motifs allowed for a sequential reading of elements which signed the presence of resources in different areas. This association is thought to have linked rituals related to subsistence though it is unclear whether the local shamans or *peaiman*s produced the rock art. Williams (1979), based on excavations along the margins of the granite boulders reports the recovery of stone tools he believes were associated with the manufacture of the rock art.

The material culture of the Rupununi Phase as described by Evans and Meggers (1960) and Plew (2001, 2005) includes a range of chipped and groundstone artifacts (N=76).

Made predominately from syenite, quartzite, sandstone and felsite, these include anvils, grooved axes, choppers, hammerstones, hoes, manos, metates, cores and flakes and two stone bowl fragments. More prominently represented are pottery vessels and sherds of the types Kanuku and Rupununi Plain. Made by coiling, a variety of surface colors within a range of orange to reddish orange to reddish brown is characterized by three forms. These include shallow to deep bowls with outsloping to almost vertical walls, direct rims and flattened to rounded lips; globular bowls and jars with walls rounded and incurving with rounded lips; and bowls and jars with a ridge of carination forming sharp to rounded shoulders, above which walls incurve before expanding to direct rims having flattened or rounded lips (Evans and Meggers 1960:307-308). Kanuku Plain is distinguished from Rupununi Plain by the absence of a gray core. In addition to a few unclassified cariape-tempered sherds, a number of unclassified decorated sherds were noted. Techniques include incision, applique, punctate, white paint, white slip and red film. Pottery artifacts included three fragments of a pottery rest, crude anthropomorphic figurine fragments, a coiled ceramic disk, nineteen shaft polishers made from both Kanuku and Rupununi Plain sherds and a cubical rubbing tool (Evans and Meggers 1960).

The Horticultural Period is associated with the first presence of pottery and is associated with the Rupununi Phase defined originally by Evans and Meggers (1960). The phase thought to be associated with the historic Makushi and Wapishana is believed to date from the end of the 18th century. In many instances Rupununi phase sites contain 18th and 19th century European trade goods. Two pottery types, Rupununi Plain and Kanuku Plain constitute the majority of the ceramic inventory. Forms include deep bowls with steep walls, globular bowls and jars with rounded walls and incurving and rounded lips and carinated vessels forming round to sloping shoulders. Surface color ranges typically from orange to reddish orange to reddish brown. The two types are distinguished by Rupununi Plain having a gray core. A few unnamed sherds include decoration in the form of appliqué, punctuates, white paint and white and red slips. Other ceramic artifacts include pottery rests, disks and anthropomorphic figurines. Chipped and groundstone artifacts include anvils, choppers, grooved axes, hoes, manos, metates, hammerstones and stone bowl fragments. The settlement pattern includes habitation sites (open villages), manufacturing stations, fishing sites, ceremonial sites (rock alignments), cemetery sites and rock art locations. Recent investigations suggest a broader range of activities and site types within the area as evidenced by the elaborate cemeteries at Shiriri Mountain (Plew and Pereira 2001) and near Mariwau (Plew and Saras 2008) and in variation with specific site types as with groundstone features near the Sawariwau River (Plew, Mercer and Sundell 2008). The diversity of Rupununi settlement reflects the varied nature of the savannah environment in which Amerindians utilized open terrain along streams and rivers for habitation, adjacent bush islands for farming or gardening and higher elevations within the mountains for ritual practice and for cemeteries.

12.0. Prehistory and History of the Cuyuni River Area

Little archaeological work has been previously conducted within the project and/or surrounding area. Indeed, little is known of this region generally. The most notable exception is William's (2004:371-372) work at Quartz Island on the Mazaruni. The excavation of two test pits saw the recovery of chipping waste and pottery sherds of the Koriabo phase. As noted, Koriabo materials exhibit Barrancoid features that include adornos that led Williams (2004:378) to suggest that the area was influenced by the cultures of the Lower Orinoco through the Aruka River area. Williams (2004:371) obtained a radiocarbon date for the occupation of 2030+/-70 B.P. (Beta 41946.)

Evans and Meggers (1960:21) report on three projectiles from the Cuyuni River that include one made from quartz, one from chert and a specimen made from chalcedony. One specimen has a contracting stem and flat base while two others have contracting stems with rounded bases. The specimens exhibit secondary retouch. An additional point with contracting stem and rounded base was reported by Roth (1929). The items range from 10.6-5.8 cm in length and 4.0-2.5 cm in width. Williams (2004:24) reports a large red jasper scraper dredged from the Wenatu River in the North Pakaraimas which empties into the Cuyuni River. Perhaps best known is the so-called "Mazaruni Pectoral" dredged from the middle Mazaruni by "porknockers" in 1990. The item is a gold chest pendant in the form of a two-headed eagle of toucan (Whitehead 1990: 7-38). Whitehead views the item as reflecting part of a metallurgical technology that disappears by the 17th century as a result of intrusions into the northern Amazon by Europeans. There is no archaeological evidence to support Whitehead's assertions.

Based upon the reporting of a few isolated finds and William's work at Quartz Island, it is clear that there were prehistoric occupations of Cuyuni-Mazaruni area, and it appears that both chipped stone and ceramic industries were utilized and date as early as ca. 2000 RCYPB. What remains unclear are the regional chronology and the intensity of these occupations. The absence of more systematic survey precludes description of a regional settlement pattern.

The most comprehensive regional surveys providing a comparable basis for discussing settlement locations in the Cuyuni River, are, as noted those surveys in Iwokrama (William's 1996, Plew 2002). These surveys included intuitive inspection of locations along the Essequibo, Burro-Burro, Siparuni and Takatu Rivers. The general settlement pattern described by Williams (1996) is one in which habitation sites are located along on high terraces above major rivers, near falls and adjacent to rock outcroppings. Sites include petroglyphs, sharpening grooves, pollisoirs, stone depressions, and chipping or reduction stations. At Inscription Rock site, he reports thousands of pieces of quartz debitage and choppers. Ceramics are common. Activities include toolmaking, re-tooling, fishing, hunting and processing. More recent survey in the Iwokrama Mountains (Plew 2002) identified sites on smaller streams and at some distance from the major rivers. In general and as evidenced by survey in Iwokrama, most sites are situated along major rivers and at the mouth of small tributaries.

Historically the Cuyuni River area saw intrusions by both Dutch and British explorer/traders. In 1616, the Dutch established Kijk-Over-Al, a fort constructed at the mouth of the Mazaruni. Other colonies were established at Berbice in the east in 1627, at Zeeland in 1657 and at Demerara in 1741. These colonies were held by the British in 1781 and permanently after 1796. The period of Dutch and British control of the region saw explorations into the hinterland though these are not well documented. These intrusions included geographic explorations (Schomburghk 1840) and the establishment of trading networks. Material culture dating from the late 18th and 19th centuries has been recovered from numerous locations in Guyana. Beyond a wide range of glass bottles, the range of material culture includes hand blown dark-green "seamed" European wine bottles, crockery fragments, Dutch "Delftware", ceramic bottles, British glazed ceramic bowls and plates in blue-on-white lineal and floral patterns, along with hand forged nails/spikes and metal locks with latches as recovered at Kabakaburi shell mound on the Pomeroon River (Plew, Pereira and Simon 2007). Additional 19th century European materials have been recovered in Rupununi (Evans and Meggers 1960 and Plew, Sundell and Mercer 2008). The discovery of gold on a tributary of the Cuyuni River in 1857 saw an influx of miners into the area as would have the discovery of diamonds on Putareng Creek in the Upper Mazaruni River. Historic features and equipment dating to the 19th and earlier 20th centuries should be expected within the area.

13.0 Site/Artifact/Feature Types Expected within the Aurora Project Area

The following are relevant definitions: artifact-an item produced by human agency (e.g. projectile points, pottery sherds, stone axes, historic household items, see Figures 1-7), archaeological site-any area exhibiting/documenting human use of the landscape (e.g.,living area, grinding surfaces, petroglyphs; see Figure 8), features-task specific human constructions (e.g., fish weirs, fire hearths).

The general world-wide definition of archaeological significance is the potential of an item/artifact, feature, or site whether prehistoric or historic to potentially inform regarding the prehistory or history of a region. As such, all prehistoric and historic materials should be considered significant. This said, task and time specific items that include projectile points, pottery types, historic glass and ceramic wares, and metal tools are perhaps, along with features and sites "most significant". It is important to remember that all prehistoric and historic items, are essentially refuse—they are the material by-products of past activities whether purposely discarded or lost. Typically, historic era materials from the 18th, 19th and early 20th century will occur in greater quantities with site areas being substantially larger. Early mining activities, for example, may consist of a variety of features and refuse distributions. These should be considered significant.

The following site types might be expected within the project area:

- Sherd scatters. These are light surface scatters of ceramic sherds (<5 sheds per sq. meter). Sherds may be undecorated or may exhibit decoration in the form of incisions or adornos.

- Lithic scatters. These are light surface scatters of lithic flakes— often quartz flakes (<10 lithic flakes per sq. meter).

- Quarry sites/Lithic workshops. These are areas characterized by dense scatters of flakes and cores (>20 flakes per sq. meter).

- Habitation sites. Large open areas (characterized by dense scatters of lithic and ceramic remains >100 sq. meters).

- Caves and rockshelters. These locations served as habitation and burial locations. Ceramic scatters and burial urns have been found in caves and rockshelters.

- Petroglyphs or pictographs. Pecked and painted geometric, zoomorphic and anthropomorphic elements are known from both northern Guyana and the Rupununi.

- Grinding surfaces (*pollisoirs*). These surfaces may be circular or trough-like. Isolated pottery sherds, cores, picks (pointed triangular items made from andesite), shaft straighteners/polishers (small sandstone slabs having one or more grooves), stone projectile points and groundstone axes.

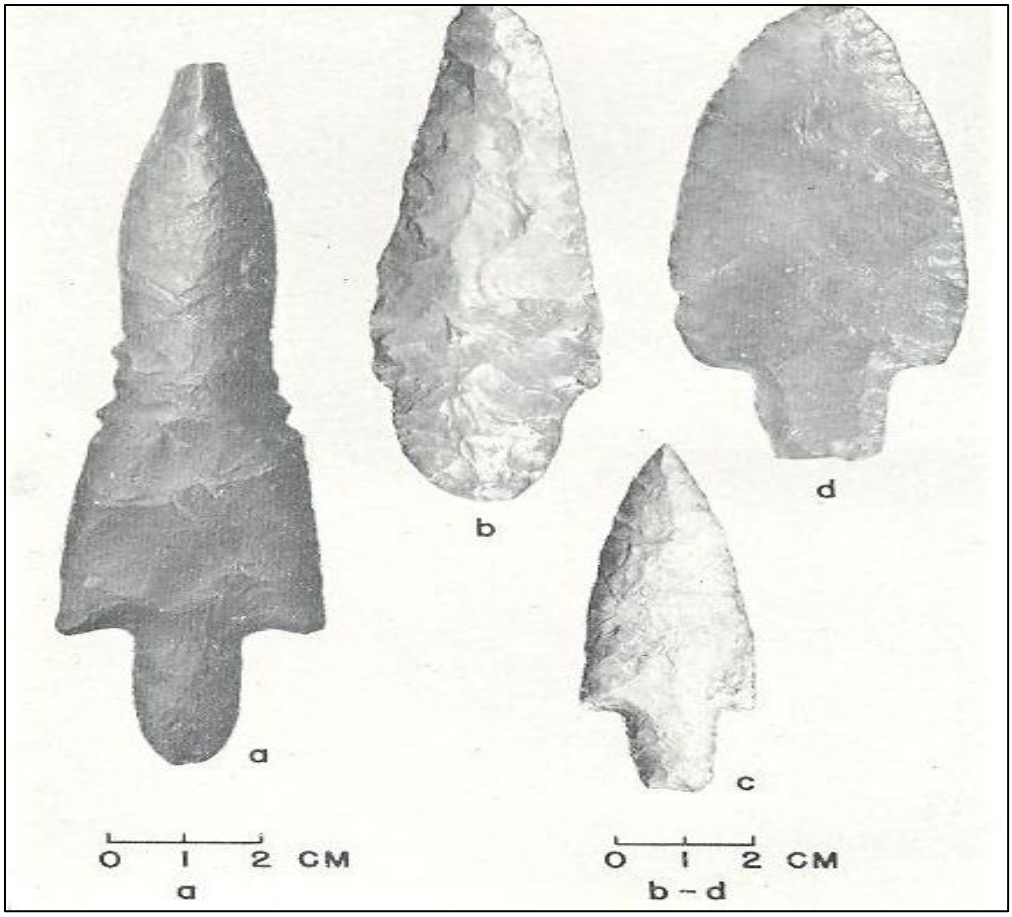

Figure 1. Paleoindian Projectile Points, b-d are from the Cuyuni River (Evans and Meggers 1960: Plate 8).

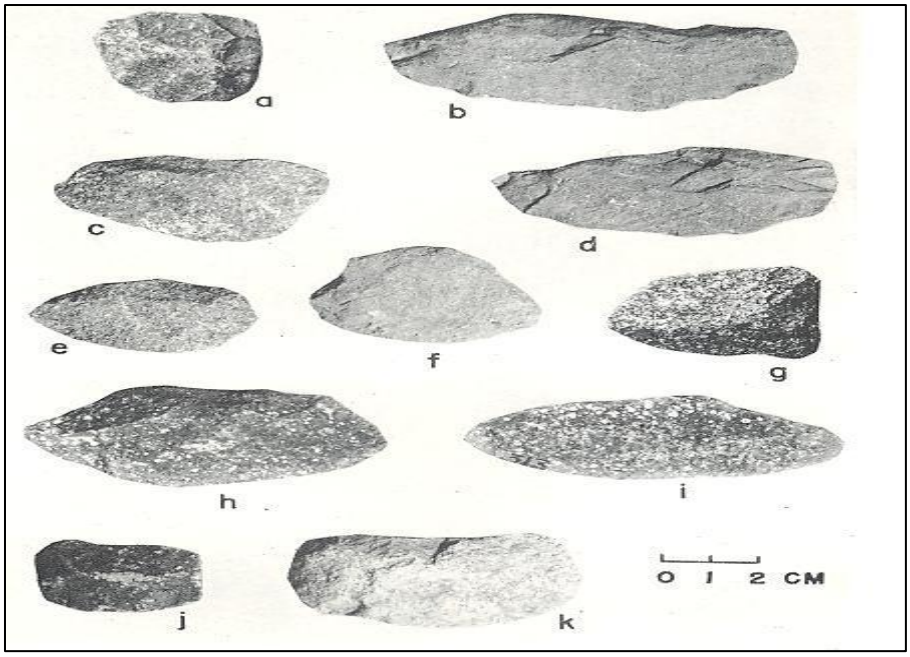

Figure 2. a-k, Flake Tools of the Alaka Phase (Evans and Meggers 1960: Plate 11)

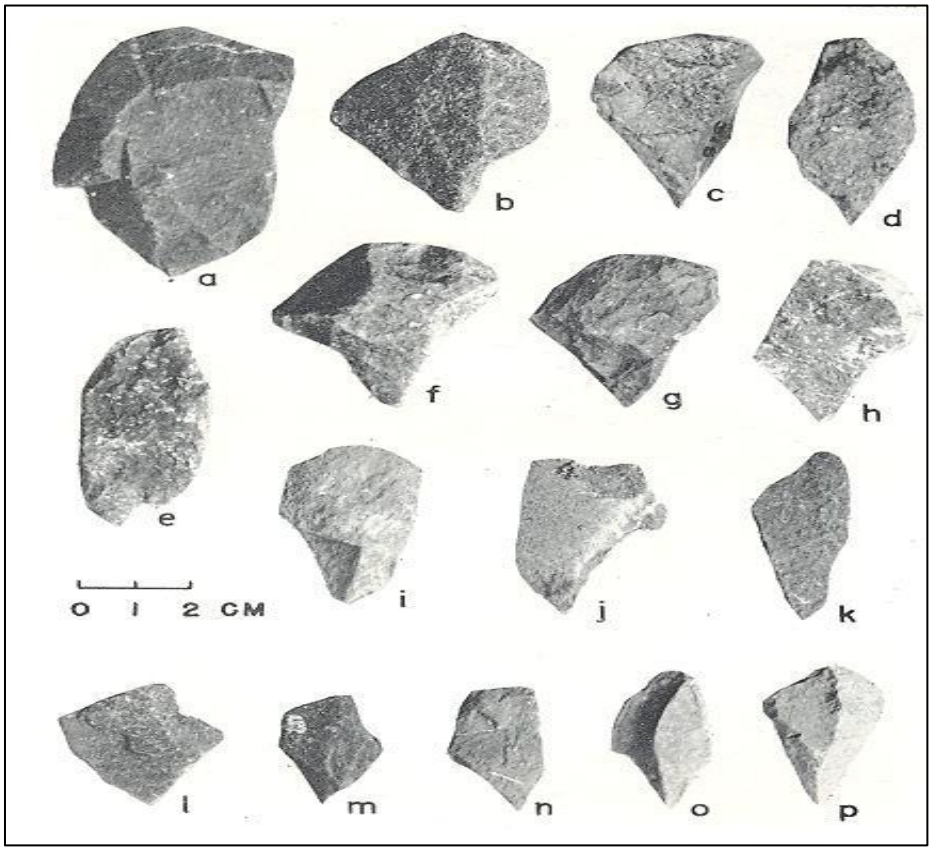

Figure 3. a-p, Picks of the Alaka Phase (Evans and Meggers 1960: Plate 12)

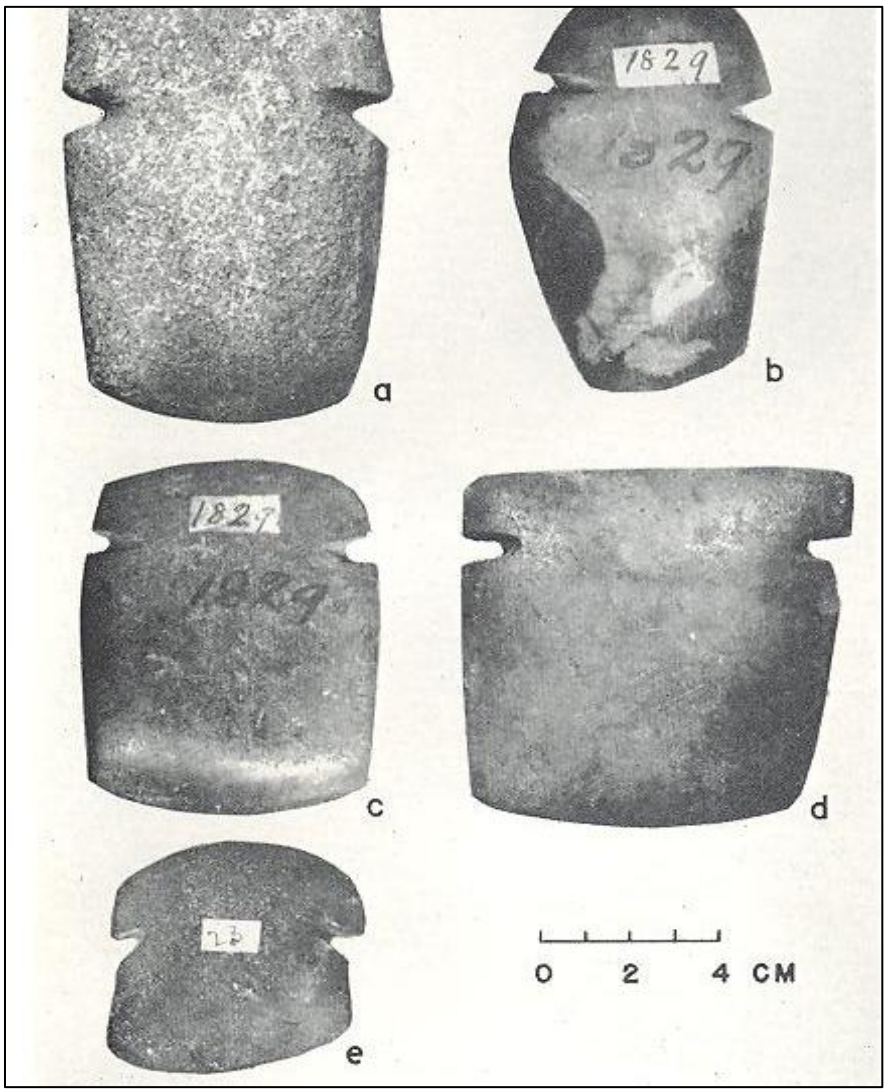

Figure 4. a-e, Stone Axes (Evans and Meggers 1960: 81)

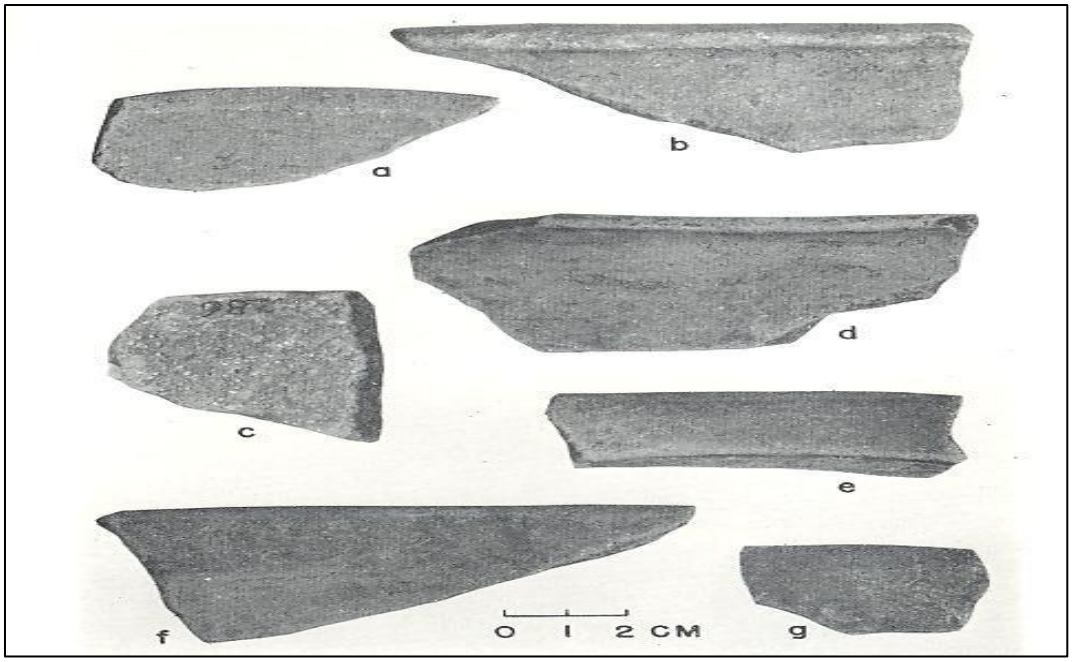

Figure 5. a-g, Mabaruma Phase Plain Ware

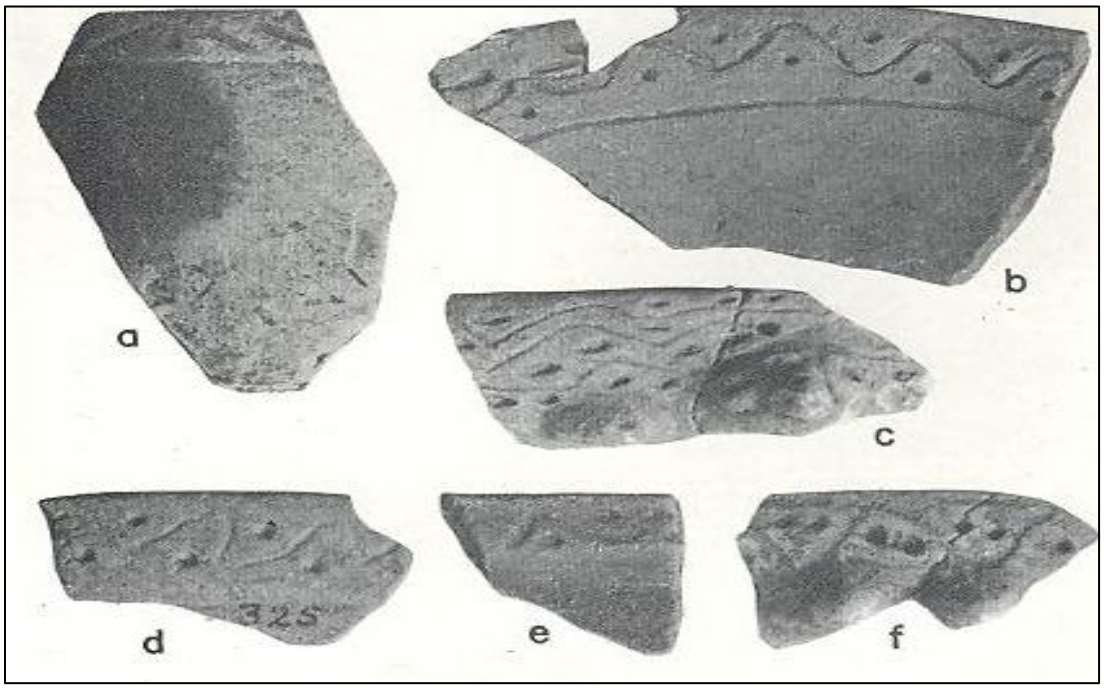

Figure 6. a-f, Mabaruma Phase Incised and Punctate

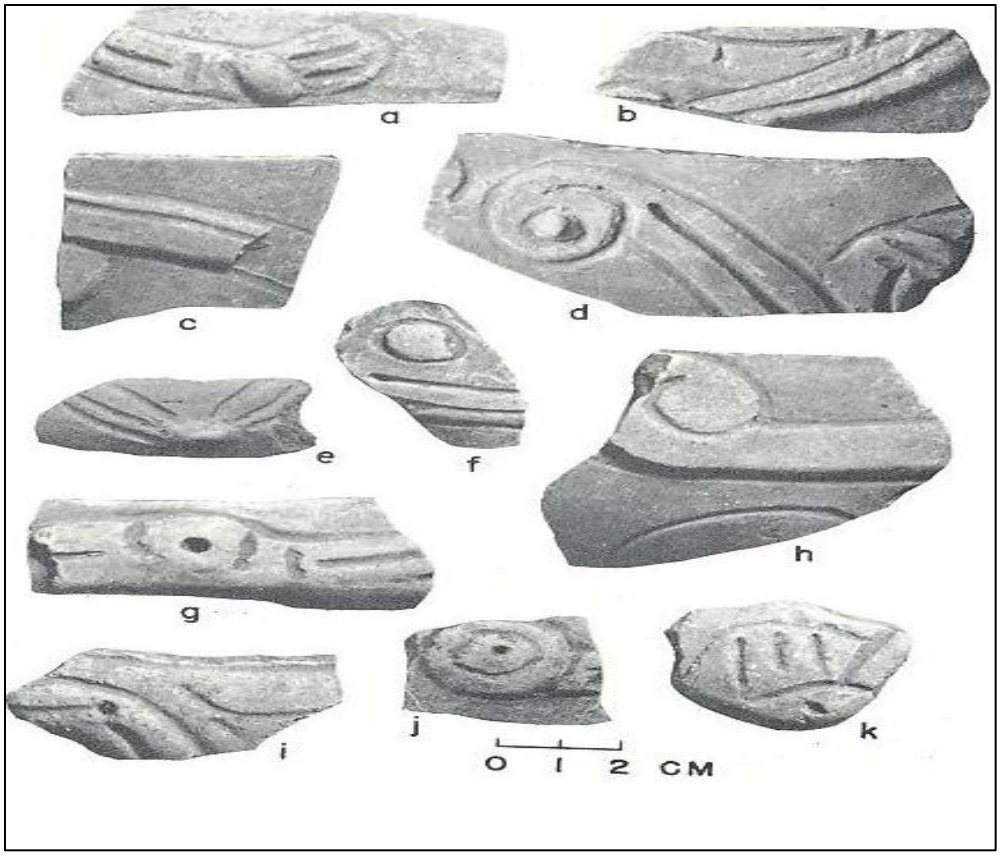

Figure 7. a-k, Mabaruma Phase Incised

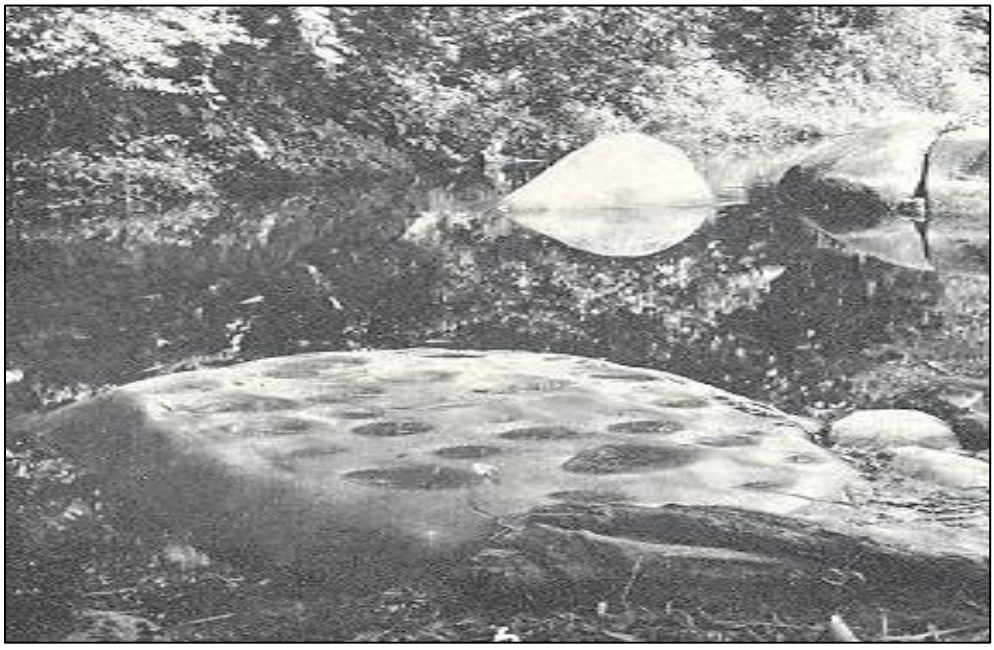

Figure 8. Grinding Surfaces (*pollisoirs*).

14.0. Areas Likely to Produce Evidence of Prehistoric or Historic Artifacts/Sites/Features with Probability Noted

For purposes of the this study, levels of probability reflect the common/specific association of a site/feature type with a particular topographic location as they are known within a locale or in this instance the project area. High probability areas are those known always to be more or less associated with a particular landscape feature. Low probability reflects the limited occurrence of a site type associated with what are typically less common geological features (caves/rockshelters). Obviously, the latter varies by local terrains. Medium probability reflects situations where site/features are known to occur with some regularity in association with certain geological features. Any area where drainage occurs (prominences, ridgelines) or where water may collect (natural ponds, seeps, springs) are likely locations. The following are site types/features that are more likely to be encountered by high to low probability.

- **Sherd and Lithic Scatters.** Most likely located on /along primary and secondary river/stream benches or terraces. May be found at falls and riffles where fishing was a co-occurring activity. Since there are no significant fluvial benches, terraces, falls, or riffles between the Aurora site and Tapir Crossing, there is a low to medium probability that ceramic and lithic materials could potentially be found in the clearance of forest areas near the Cuyuni.

- **Habitation sites.** Habitation sites are most likely to be found along major river/stream benches or terraces. These sites are locations where Amerindians lived and conducted a variety of tasks within a delineated area. As is the case for sherd and lithic scatters, there are no significant fluvial benches, terraces, falls, or riffles between the Aurora site and Tapir Crossing. It is therefore estimated that there is a low to medium probability that forest clearance areas along the Cuyuni River are potential locations of habitation sites.

- **Grinding surfaces/features.** Typically found near or above water levels along major river/streams. Features are located on exposed and typically water-worn granites. Presence varies by season. Most commonly seen during dry periods. There is a low probability of encountering grinding surfaces/features, as water levels on the Cuyuni in the project area are rarely, if ever low enough to expose water-worn rocks.

- **Quarry Sites/Lithic workshops.** Most likely located in and around rock outcrops or eroded areas exposing raw materials, particularly quartz. There is a low probability of encountering quarry/lithic workshops.

- **Caves and rockshelters.** Generally found in areas of greater topographic relief. Areas where large boulders are exposed on steep slopes. There is a low probability of encountering caves and rockshelters.

- **Petroglyphs/pictographs.** Typically found in areas where caves and rockshelters occur. Rock art is often found on the facies of rockshelters. There is a low probability of encountering petroglyphs/pictographs.

15.0. Inadvertent Discovery: Procedures and Recommendations

Inadvertent discoveries of cultural remains may occur during project inspections and construction phases. As such, it is recommended that all project workers be informed of the need to report any inadvertent discoveries of cultural artifacts, features, sites. If possible, workers should be provided a briefing regarding cultural resources prior to going into the field. Once construction phases begin, it may be useful to use the criteria outlined here to identify any locations within the project area and proposed roadway extension that are areas having high to medium potential as site locations. It is important to remember that these criteria are specific to features of the existing landscape. There is the possibility of excavation encountering buried deposits though this would be most likely only along river terraces.

In all instances, finds should be reported as quickly as possible to the Director, Walter Roth Museum of Anthropology (WRMA) in Georgetown. The WRMA serves as the primary clearing house for cultural resources in Guyana and facilitates with the National Trust, the University of Guyana and the Environmental Protection Agency. If isolated artifacts are identified in the field, workers should bag and label the item with GPS coordinates, briefly describe the physical location and if possible photograph both the item/feature or site and location. These items and documentation can be submitted to WRMA as time permits. Reporting sites that are not directly impacted by construction/mining activities can also be noted and reported. If unique features/sites are encountered every effort should be made to avoid impacting the area until a qualified archaeologist is consulted regarding the site/feature. Minor realignments are the most efficient means of mitigating any potential impacts. In the rare case that human remains are encountered, work should immediately cease and the WRMA be contacted. Owing to the increasing concerns of Amerindian communities about disturbance of human remains all caution should be used. If possible, inadvertently discovered human remains should be left intact and *in situ*. If for any reason, this is not possible, skeletal elements should be individually wrapped in tissue or newspaper and carefully placed in a container that will ensure their safety in transport.

16.0. Discussion of Probability of Encountering Cultural Resources within Project Areas.

Based on a literature review, records and collections checks, the presence of cultural resources within the project areas is to be expected. This said, it seems unlikely that evidence of large sites or features will be encountered. In contrast, it is more likely that only isolated artifacts and lithic/ceramic scatters be found. It is not expected based on

survey in similar areas, in particular, Iwokrama, that site density would be high in certain locations (those identified in this report). Rather, low site densities are more probable. Though low site densities are to be expected overall, the fact that sites are located and their distribution configured by local landscape features, sites found within the project areas are most likely to be clustered in and around or near the locations identified in this report.

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18.0. CV Summary for Mark Plew

Dr. Mark G. Plew is Professor of Anthropology and Chair of the Department of Anthropology at Boise State University. In his academic capacity he also serves as Director of the Center for Applied Archaeological Science (CASS) and is Co-Director of the Boise State University Desert Studies Institute. He has conducted over 270 archaeological and ethnographic projects throughout North and South America and Australia and received more than $2,674.566.00 ($US) in grants and contracts in support of his work. He is the author of more than 370 books, journal articles, monographs and technical reports published in more than 30 different state, national and international journals and has been abstracted widely including in the *Abstracts of the Royal Anthropological Institute*. His recent synthesis *The Archaeology of the Snake River Plain* (2000, 2nd Edition, 2008) received excellent reviews in *American Antiquity* and *Antiquity*, the premier American and British archaeological journals.

He has made more than 50 scholarly presentations at regional, national and international conferences. He has served as a reviewer for a number of important regional, national and international journals including *American Antiquity*, *Plains Anthropologist, Journal of Californian and Great Basin Anthropology, Journal of Archaeological Science* and the *Journal of Field Archaeology* and as a reviewer for such granting agencies as Wenner-Gren and the National Science Foundation. He has served as an expert witness on a number of high profile forensic cases, as an expert witness for the Fallon Paiute tribe's Spirit Cave Mummy repatriation case –providing testimony before the National NAGPRA Board, Harvard Law School, in 2001 and for Indian Child Welfare cases for the State of Idaho. Dr. Plew has received a number of recognitions including his selection as the 2001 Boise State University Foundation Scholar in Research, the university's highest award for scholarly activity.

Much of his work has focused on the prehistory of the Snake River Plain and the Northern Great Basin. In this context, he has serves as editor of the Idaho state archaeological journal, the *Idaho Archaeologist* and as a member of the Advisory Board of the Archaeological Survey of Idaho. He has in addition worked closely with indigenous peoples. For the past seven years he has participated in the "Wings and Roots" consultation program, serving as a consultant to the Shoshoni-Paiute tribes on matters involving cultural issues. Consultations have included work with numerous federal and state agencies, the U.S. Army and the U.S. Air Force, as well as numerous regional, national and international companies and fourteen U.S. and foreign universities and museums.

During the past 26 years he has worked cooperatively with the Amerindian Research Unit, University of Guyana where he continues as Research Affiliate. Dr. Plew serves as a member of the Science Advisory Board of the Walter Roth Museum of Anthropology, and as Guyana's Chief Non-Resident Archaeologist, a position in which he works cooperatively with the Walter Roth Museum to direct archaeological research in the country. He has conducted research in the Rupununi Savannahs of southern Guyana and in the Iwokrama Rain Forest reserve where he is a Research Affiliate and Consultant to the Iwokrama International Centre of Rainforest Conservation and Development. In these settings he has worked closely with local Amerindian groups, including the Macushi and Wapishana. He serves as an Associate Editor of the *Journal of Archaeology and Anthropology*, the scientific journal of the Walter Roth Museum of Anthropology. He has recently authored "The Archaeology of the Iwokrama Rainforest, Southern Guyana," in *Antiquity* (2003), "The Archaeology of Iwokrama and the North Rupununi" in the *Proceedings of the Academy of Natural of Sciences, Philadelphia* (2005) and *The Archaeology of Guyana* (Archaeopress, British Archaeological Reports, International Series, 2005). In July 2007, he was named Director of the Archaeological Field School Program, Denis Williams School of Anthropology, University of Guyana.