APPENDIX 8

ENNADAI LAKE
REMEDIATION PROJECT

ARCHAEOLOGICAL IMPACT ASSESSMENT(AIA)

FINAL REPORT

November 2012

ARCHAEOLOGICAL IMPACT ASSESSMENT

Ennadai Lake Weather Station

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EXECUTIVE SUMMARY

During August of 2012 Golder Associates Limited (Golder) conducted an Archaeological Impact Assessment on behalf of EBA, a Tetra Tech Company working for Public Works and Government Services Canada and Aboriginal Affairs and Northern Development Canada in conjunction with a Phase 3 Environmental Site Assessment for the Ennadai Weather Station. The Ennadai Weather Station is located on the east coast of the northern portion of Ennadai Lake and is approximately 370 km west from the Hamlet of Arviat. All required field work was conducted under Nunavut Archaeologists Permit 2012-006A issued by the Department of Culture and Heritage, Government of Nunavut to Julie M. Ross of Golder.

All areas of proposed disturbance were surveyed for heritage resources. The Ennadai Weather Station is located on a sandy esker and the majority of the Project area is not covered by vegetation; however, areas of high potential with ground cover were shovel tested. Attempts were made to confirm the location of archaeological sites JgMf-1, JgMf-2, JgMf-3, and JgMf-11 reported to be within the Project area and recorded in the 1960s.

By conducting this AIA, it is recommended that EBA, Public Works and Government Services Canada, and Aboriginal Affairs and Northern Development Canada have fulfilled the requirements of the current program in their attempts to identify the potential for impact to heritage resources resulting from the proposed remediation of the weather station. The AIA included the participation of Randy Demcheson from Iqaluit who participated in identifying heritage resource sites.

The results of the Archaeological Impact Assessment included the identification of nine previously unrecorded archaeological sites and three land use sites; only one of the previously recorded heritage resources was revisited. The location of the three other previously recorded sites could not be confirmed. It is recommended JgMf-3, JgMf-14, and JgMf-19 be considered while determining the final selection of landfarm, landfill, road(s), and potential borrow source locations. It is recommended that any impacts to these sites be avoided. Sites JgMf-12, JgMf-13, JgMf-16, and JgMf-17 consist of isolated finds in previously disturbed areas and were collected. Sites JgMf-15, JgMf-18, and JgMf-20 are far enough from the potential disturbance that they will not be impacted. Three land use sites have been identified within the Project area and are described in this report. While not meeting the technical requirements to be classified as heritage resources, they are cultural markers of recent occupation and activity, and, as such, it is also recommended that community input assist in\understanding their value to the community.

Community insight into the significance of the heritage resources is always valuable and important owing to the history of Inuit – Euro Canadian relations in the area; should any Elders from the Ennadai Lake area be available to comment on site significance it should be solicited.

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1.0 INTRODUCTION

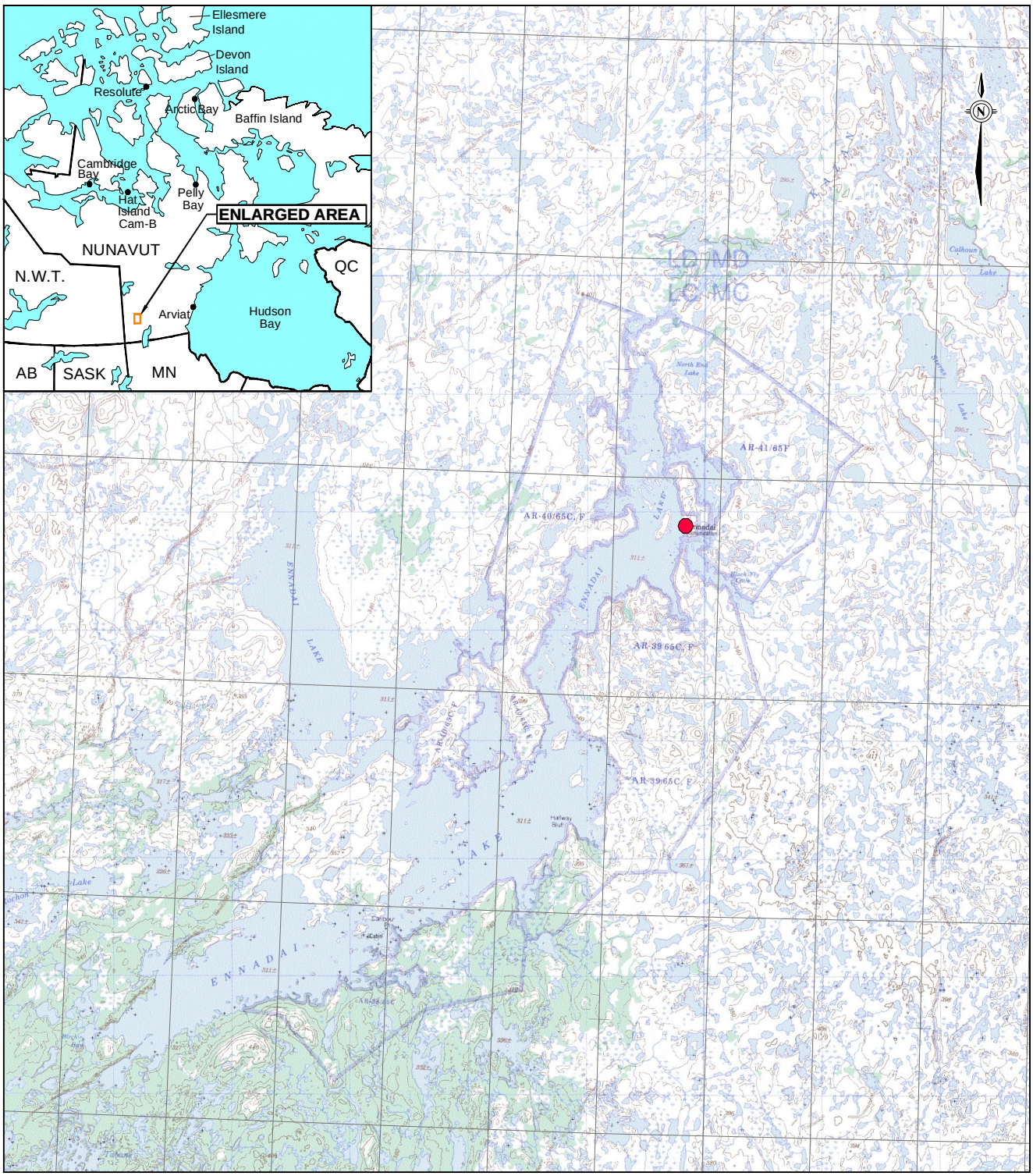
During August of 2012, Golder Associates Ltd. (Golder) conducted an Archaeological Impact Assessment (AIA) of the Ennadai Lake Weather Station (the Project) in the Kivalliq Region of Nunavut, on behalf of EBA, a Tetra Tech Company (EBA) working for Public Works and Government Services Canada (PWGSC) and Aboriginal Affairs and Northern Development Canada (AANDC). All required field work was conducted under Nunavut Archaeologists Permit 2012-006A issued by the Department of Culture and Heritage, Government of Nunavut (Culture and Heritage) to Julie M. Ross of Golder.

Pedestrian reconnaissance over areas with moderate to high archaeological potential was conducted, the spacing of the traversed varied depending on terrain. If an area was assessed as having high potential and vegetation coverage the area was subject to shovel testing.

The AIA was intended to identify any artifacts or heritage resource areas that might be impacted by remediation activities, for instance, proposed borrow sources, landfarm, landfill, camp, and road locations.

1.1 Location

The Ennadai Lake Weather Stations was constructed in 1949 and was operated until 1979 (Laugrand et al. 2010; WESA Inc. 2010). The landscape is strewn with eskers and kettle lakes; the land forms around the weather station range in elevation from 300 to 350 m above sea level (ASL) (Figure 1; Plate 1). The weather station is located in the traditional territory of the Caribou Inuit, specifically the Ahiarmuit however the Dénésuline also claim the area (Canadian Geographic Enterprises 2005). The current geopolitical boundaries place the site within the Nunavut Territory's Kivalliq region approximately 370 km west of the Hamlet of Arviat on the north east shore of Ennadai Lake. The majority of the Project is on Inuit Owned Land (IOL) Parcel AR39 with some portions on Crown lands.



LEGEND

APPROXIMATE WEATHER STATION LOCATION

REFERENCE

TOPOGRAPHIC MAP 065/F AND 065/C OBTAINED FROM Canmatrix © 2008. HER MAJESTY THE QUEEN IN RIGHT OF CANADA. DEPARTMENT OF NATURAL RESOURCES.
DATUM: NAD83 PROJECTION: UTM ZONE 14

PROJECT

EBA, A TETRA TECH COMPANY
ENNADAI WEATHER STATION REMEDIATION AIA
NUNAVUT

TITLE

ENNADAI LAKE
WEATHER STATION AIA STUDY AREA

Golder Associates

PROJECT	12.1372.0045.1900		FILE No.	12137200451900A001
DESIGN	JR	23 Oct. 2012	SCALE AS SHOWN	REV. 0
CADD	DLM	26 Oct. 2012		
CHECK	JMR	31 Oct. 2012		
REVIEW	BM	31 Oct. 2012		

FIGURE: 1

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Plate 1: Overview of Ennadai Lake Weather Station Project Area

1.2 Potential Impacts

The potential impacts to heritage resources around the Ennadai Lake Weather Station are dependent upon the proximity of those resources to the remediation activities that will be conducted to remove the remnants of the former weather station site. Heritage resource sites are non-renewable resources that may be located at or near ground level or may be deeply buried. Prehistoric or precontact archaeological sites are those sites which contain features, artifacts, or ecofacts reflecting the use of a given land base by people prior to European influences and technologies. Features are non-portable articles that indicate a human modification of the local environment such as hearths, pits, tent rings, stone cairns, and Inuksuit. Artifacts are portable items that have been modified by people at some time in the past. These include such items as projectile points, stone flaking debris, and cut and modified bone. Ecofacts are naturally occurring items such as preserved plant remains or pollen that can aid in the interpretation of archaeological sites. Historic archaeological sites include the features, artifacts, and ecofacts relating to the past few hundred years of human occupation. These sites are typically identified by the presence of buildings or structural remains, but may include any site that has evidence of historic use of the landscape.

Alteration of the landscape can result in the damage or complete destruction of all or portions of historic resource sites. These alterations often involve the displacement of artifacts resulting in the loss of valuable contextual information or may involve the destruction of the artifacts and features themselves resulting in complete information loss. These losses are permanent and irreversible. Primary, secondary, and tertiary impacts are possible with any new development. Remediation can be considered a new development in this context if it impacts previously undisturbed areas during operation.

Primary impacts include those disturbances resulting immediately from a project. The primary impact zone is the area within the remediation footprint including access roads, temporary work zones, borrow areas, and landfills. Individual sites are likely to be affected to varying degrees if they are located within the development area. Artifact context is fundamental to interpretation of archaeological sites. By disturbing the context in which artifacts and features are recovered, interpretations of heritage resources sites and, ultimately, past lifeways are affected negatively.

Secondary impacts can occur when the support services or additional access required by development adversely affects heritage resources outside the primary target areas. The remediation project should have no secondary effect on heritage resources.

Tertiary impacts are the results of project induced changes in demography and land use patterns. Increased rates of intentional and unintentional impacts can be expected as a result of increased visitation to an area if the project were large enough to affect regional population bases. Tertiary impacts are anticipated to be very low for this project, especially because changes to the site through remediation will probably only negatively affect the visitation rates.

The study detailed in this report is intended to identify areas of possible impact and to determine whether the current proposed project will disturb those heritage resources located in proximity to the development.

1.3 Project Objectives

The objective of the Project is to ensure that heritage resources are not inadvertently impacted by the proposed clean-up and remediation activities. Specifically the purpose of this AIA is to:

- conduct a pre-impact assessment of the proposed remediation areas;
- identify any archaeological sites within proposed remediation areas (if present);
- make recommendations to Culture and Heritage, EBA, and PWGSC to mitigate or avoid those sites;
- make recommendations on surveillance and monitoring; and
- prepare a draft final report to be reviewed by EBA and PWGSC, followed by a final report for distribution as required and submission to Culture and Heritage.

2.0 PHYSICAL AND CULTURAL SETTING

2.1 Environmental Context

An understanding of past environmental conditions and the environmental factors that shape human approaches to subsistence and settlement patterns enables archaeologists to not only locate sites, but also to provide more accurate interpretations of individual sites. The physical aspects of the environs (topography, drainage, climate, and soils) as well as resource availability (flora, fauna, lithic materials, and water) are prime criteria for the identification of site location and function. Assessments of universal cultural activities related to site location, travel within and through variable terrain, and resource exploitation are key components of any archaeological site analysis.

Bostok (1970) classifies the area as the Kazan Upland Region and characterizes it as rolling country side dotted with lakes typical of the Canadian Shield. The area is also part of the Barrenlands within a continuous zone of permafrost. The vegetation is classified as sub-arctic vegetation. The coastline predominately has low relief with occasional bedrock outcrops and cliffs, which would influence prehistoric settlement patterns. The inland topography is flat and low lying and is predominately overlain by glacial depositions as well as marine sediments as the result of the postglacial Tyrrell Sea. Since deglaciation at approximately 8,000 years before present (B.P.), the area has been uplifting. Much of the Project area's topography consists of an extensive esker system.

The Barrenlands has been subject to climatic varation since occupation. The Holocene Thermal Maximum lasted from approximately 9000 to 3400 B.P., and was characterized by warmer than present temperatures (Kaufman et al. 2004). However, within this time period there were climate fluctuations; with evidence of two cooler periods lasting between 5300 to 4600 B.P. and again between 4000 to 2000 B.P (Barry et al 1977; Jacoby et al 1985; Seppa et al 2003; Szeicz 1996.). During the intervening period, warmer temperatures persisted. Based on several pollen records (Nichols 1972; Ritchie 1984) there may have been another warm period from about 2000 to after 900 B.P., with a peak of the warmth centered at approximately 1500 B.P. A cold period registers from approximately 1,000 years ago to the 20th century, with a relatively warmer period beginning at about A.D. 1700 (D'Arrigo et al 1992; D'Arrigo et al 1999).

The Arctic Barrenlands is the coldest of the Arctic regions in winter because it does not have the Arctic waters to moderate the cold's influence. Some of the highest wind chill factors have also been recorded from Barrenlands communities such as Baker Lake and Chesterfield Inlet. The cold temperatures and distance from open water sources probably explains why there is less snow in the Barrenlands of Canada than the arctic islands. Like the other regions of the Arctic, ice along the Barrenlands' northern coast does not clear until August. Spring and summer are dynamic times owing to changes in the pressure systems; the Barrenlands in particular is more influenced by westerly currents from the Pacific than other areas in the Canadian Arctic. Average precipitation for the Barrenlands is between 20 and 30 cm a year and most falls in late summer and early fall; almost half of this occurs as rainfall. The July average temperature along the coastal Barrenlands is about 7.5°C (Phillips 1990). The terrestrial animals ranging throughout the Barrenlands include Barrenground caribou, grey wolf, Arctic fox, red fox, grizzly bear, wolverine, ermine, least weasel, mink, arctic hare, and brown lemming. Musk-oxen are present throughout most of the Barrenlands. Black bear and woodland caribou can be found in the westerns portion of the Barrenlands. Moose are found in pockets of the more south eastern portion, and more extensively in the southwest. Marten, northern red backed vole, ground squirrel, and meadow vole are present in the more southern portions (Anand-Wheeler 2002; GNT 2005).

2.2 Heritage Resources

Archaeology is the study of human history through the material remains of culture, often referred to as heritage resources. The ultimate goal in archaeology is to describe the cultures and events responsible for the creation and deposition of the remains at a given archaeological site. As such, archaeologists use material remains to determine the nature and age of cultural occupations at a site. Artifacts, ecofacts and features deposited into the natural environment, along with their inter-relationships, are the integral parts that make up an archaeological site.

Predating the arrival of Europeans, precontact archaeological sites are comprised of artifacts, features, and residues of native origin typically characterized by modified bone and stone, and stone structures. Historic sites are those structures, features, and objects of European influence that date to as early as contact with the Europeans but can also represent more recent activity of more than 50 years. Depending on the context, sites less than 50 years old may be considered to represent traditional land use and are identified to document continued use and occupation of an area to the present time. A key component of the historic period record are the sites, artifacts, and affiliated resources relating to post-contact Aboriginal people's use of the landscape. These include both archaeological sites and objects such as standing and collapsed cabins, campsites, graves, and traditional sites and resources, such as special places, hunting and plant collecting areas, traplines and their associated remains, oral traditions, and documents. These latter resources are usually identified through consultation procedures such as Traditional Use Studies (TUS), Inuit Qaujimajatuqangit (IQ) or other forms of community consultations.

Heritage resources are non-renewable and are susceptible to alteration, damage, and destruction by construction and development activities. The value of heritage resources cannot be measured in terms of individual artifacts or biological specimens; rather the value of these resources lies in the integrated information which is derived from the relationship of the individual artifacts and fossil specimens, associated features, spatial relationships (distribution), and contextual situations. Interpretation of heritage resource materials, and the ability to interpret the significance of particular sites in a landscape, is based on an understanding of the nature of the relationship between individual archaeological and palaeontological materials, as well as the sediments and strata within which they are contained. As such, removal or mixing of cultural or fossil bearing sediments results in the permanent loss of information basic to the understanding of these resources.

Tundra areas north of the tree line are characterized by extremely slow rates of soil development and sediment accumulation. Accordingly, at repeatedly occupied sites, there is little chance of distinguishing occupations relating to different periods within the 5,000year record of human occupation in the region without recovering a diagnostic indicator. Some areas of high sediment deposition rates are present within the study area, but these are not the typical scenario.

The lack of temporally diagnostic artifacts, the absence of materials suitable for radiocarbon dating, and the natural mixing of shallow archaeological deposits serve to limit the definition of the recognized prehistory for the region. In contrast, extant documents, records, and oral testimony provide a firmer basis for understanding the historic period of the region.

2.2.1 Cultural Chronology

A brief outline of the regional culture history can be summarized as a result of the archaeological work conducted in the study region since the mid 20th century. It should be noted that throughout the millennia, peoples who lived in the Barrenlands relied almost exclusively on caribou for subsistence. The annual migration patterns of these animals would dictate the seasonal rounds of the highly mobile hunting and gathering populations that inhabited the region.

Occupation of the Barrenlands of Nunavut began shortly after the recession of the glaciers approximately 9000 B.P. The Tyrrell Sea occupied lands boarding the current extent of the Hudson Bay until approximately 5000 BP (Canadian Museum of Civilization 2005). The earliest recognized archaeological tradition is Northern Plano (8000 to 6500 B.P.), which is characterized by projectile points similar in form to Agate Basin

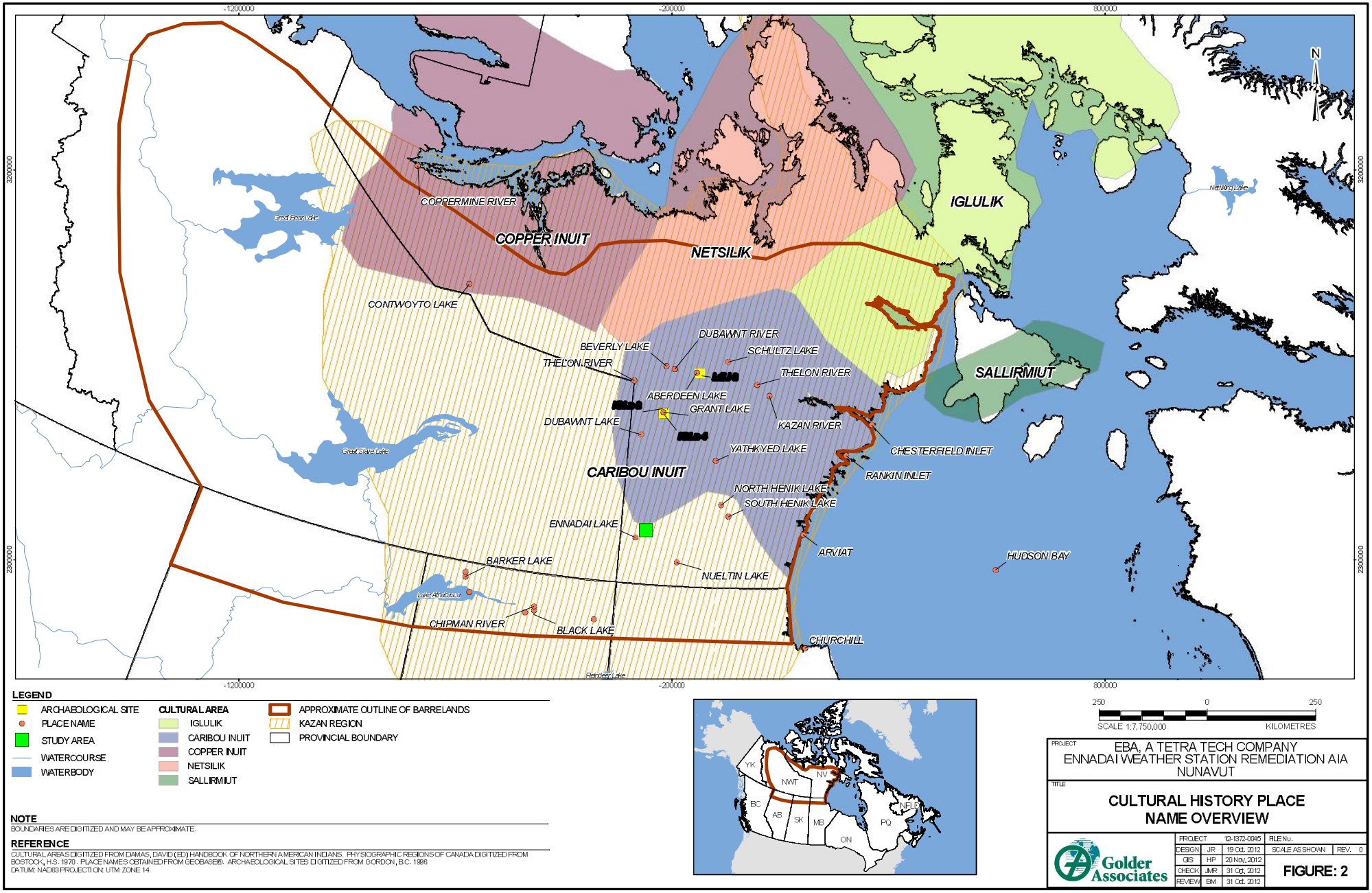
points found in the plains of North America (Gordon 1996:219). These long lancelate points with tapered and ground bases were manufactured largely out of quartzite. Radiocarbon dates from the Migod site (KkLn-4) on Grant Lake suggest that Northern Plano dates from at least 8000 B.P (Gordon 1975). The concentration of Northern Plano materials on Grant Lake further suggest the Dubawnt and Thelon Rivers were major caribou migration corridors exploited by Northern Plano peoples (Gordon 1996:219) (Figure 2).

Approximately 6,500 years ago, Northern Plano evolved into Shield Archaic (6500 to 3500 B.P.) (Gordon 1996:199). This cultural development coincided with a warming period that resulted in the expansion of the boreal forest as far north as Dubawnt Lake. Projectile points were also manufactured primarily out of quartzite, but differed from the preceding Northern Plano Tradition in that they were "side-notched lance heads with ground, rocker [convex] bases" (Gordon 1996:201).

The Shield Archaic Tradition was followed by the Pre-Dorset Tradition which lasted from approximately 3450 to 2650 B.P. (Gordon 1996:149). Pre-Dorset is part of the Arctic Small Tool Tradition (ASTt), well known in the high arctic. The migration of these early Pre-Inuit groups corresponded with a cooling trend that adversely affected maritime hunting. As a result, these arctic-adapted people were forced further south in their quest for food. They were able to exploit migrating caribou herds on the Barrenlands as a result of the southward retreating forest edge. The Pre-Dorset Tradition is characterized archaeologically by very small, finely retouched tools manufactured from fine grained, banded chert. Distinct tools include end and side blades used for harpoons and arrows, burins, and microcores.

The Taltheilei Tradition is the latest precontact archaeological culture identified in the study area, and dates from approximately 2600 to 1200 B.P. (Gordon 1996). People representing this tradition moved into the region from the west after the preceding cooling period ended and are generally regarded as ancestral Dene. The material culture of the Taltheilei Tradition is characterized by a continuum of lancelate and notched points, distinct discoidal hide-working tools known as chithos, and a variety of scraping tools. This archaeological culture has been divided into three Periods based on projectile point style: the Early Period (2600 to 1800 B.P.) characterized by long stemmed points; the Middle Period (1800 to 1300 B.P.) by unshouldered lancelate points; and, the Late Period (1300 to 200 B.P.) by small side and corner-notched points (Gordon 1996).

During the 18th Century, Dene groups were decimated by European diseases and abandoned the Barrenlands in favour of the forests to the south to engage in the fur trade (Arima 1984:459; Gordon 1996:51). As a result of this abandonment, the historic Caribou Inuit moved into the region approximately 200 years ago, either from the central arctic or the east coast of Hudson's Bay (Arima 1984; Burch 1979; Gordon 1996; Linnamae and Clark 1976). Their descendents have occupied much of the interior of Nunavut ever since, including the Kazan, Dubawnt, and lower Thelon drainage basins. The margins of these major rivers and lakes are dominated by Inuit sites, which are characterized by stone features including Inuksuit, tent rings, caches, hunting blinds, and kayak stands (Friesen 1989:4.7). The precontact origins of the Caribou Inuit ultimately lie in the Thule Tradition, which spread across the central and eastern arctic approximately 750 B.P. (McGhee 2009). Thule are traditionally known for their bone and antler technologies, as well as a ground stone slate technology.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Great Bear Lake
COPPER INUIT
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IGLULIK
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DUBAWNT RIVER
BEVERLY LAKE
SCHULTZ LAKE
THEL'ON RIVER
THELON RIVER
SALLIRMIUT
ABERDEEN LAKE
GRANT LAKE
DUBAWNT LAKE
KAZAN RIVER
Great Slave Lake
YATHKYED LAKE
CHESTERFIELD INLET
CARIBOU INUIT
RANKIN INLET
NORTH HENIK LAKE
SOUTH HENIK LAKE
ENNADAI LAKE
ARVIAT
HUDSON BAY
BARKER LAKE
NUELTIN LAKE
Lake Athabasca
CHIPMAN RIVER
BLACK LAKE
CHURCHILL
Reindeer Lake
LEGEND
ARCHAEOLOGICAL SITE
PLACE NAME
STUDY AREA
WATERCOURSE
WATERBODY
CULTURAL AREA
IGLULIK
CARIBOU INUIT
COPPER INUIT
NETSILIK
SALLIRMIUT
APPROXIMATE OUTLINE OF BARRELANDS
KAZAN REGION
PROVINCIAL BOUNDARY
NOTE
BOUNDARIES ARE DIGITIZED AND MAY BE APPROXIMATE.
REFERENCE
CULTURAL AREAS DIGITIZED FROM DAMAS, DAVID (ED) HANDBOOK OF NORTHERN AMERICAN INDIANS. PHYSIOGRAPHIC REGIONS OF CANADA DIGITIZED FROM BOSTOCK, H.S. 1970. PLACE NAMES OBTAINED FROM GEOBASE®. ARCHAEOLOGICAL SITES DIGITIZED FROM GORDON, B.C. 1996
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PROJECT
EBA, A TETRA TECH COMPANY
ENNADAI WEATHER STATION REMEDIATION AIA
NUNAVUT
TITLE
CULTURAL HISTORY PLACE
NAME OVERVIEW
Golder Associates
PROJECT 12-1372-0045 FILE No.
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GIS HP 20 Nov. 2012
CHECK JMR 31 Oct. 2012
REVIEW BM 31 Oct. 2012
FIGURE: 2
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In the 1950s the Canadian Government began a policy of settling the local Inuit into communities such as Baker Lake, Chesterfield Inlet, and Rankin Inlet (Stager 1977). The relocation of the Ahiarmuit from Ennadai Lake first to Nueltin Lake in the 1950s, Henik Lake in 1957, and Arviat in 1958 is discussed in detail elsewhere (Belsey 1985; Laugrand et al. 2010); however, two specific details of the story relate to the archaeological evidence in the vicinity of the Project. The homes of the Ahiarmuit are reported to have been bulldozed after they were resettled and in 1985, 28 years after the second relocation, surviving Ahiarmuit returned to the area to collected items from the campsites (Belsey 1985; Laugrand et al. 2010). Although year-round occupation of the Barrenlands no longer occurs, seasonal caribou hunting and fishing are still important activities for local residents. It is evident from recent graffiti and debris associated with dates that the weather station is still visited.

2.2.2 Historic Inhabitants and Heritage Studies

The first historical accounts of the area are from Thomas Button (1612-1613); however regular contact with people was not established until James Knight established Fort Prince of Wales, at Churchill Manitoba (Arima 1984). Early European exploration of the area of the Barrenlands now known as Nunavut began with the establishment of fur trade posts on the western shore of Hudson's Bay in 1670. The travels of Samuel Hearne from Fort Prince of Wales to the mouth of the Coppermine River between 1769 and 1772 (Tyrrell 1911) are well documented. However, the first scientific exploration of the Barrenlands would not occur until the expedition of James Tyrrell of the Geological Survey of Canada (Tyrrell 1898). In 1893 Tyrrell travelled north from Lake Athabasca, eventually ascending the Dubawnt River to the Thelon River, then eastward through Aberdeen and Baker lakes to Chesterfield Inlet. In 1900 Tyrrell embarked on another expedition, this time travelling eastward from Great Slave Lake along a series of rivers and lakes to the Thelon River, then on to Chesterfield Inlet. David Hanbury (1900; 1903) also explored and mapped the rivers of the Barrenlands at the turn of the century in two separate expeditions. He travelled westward through the region by canoe in 1898 to 1899 from Chesterfield Inlet, along the Thelon River to Great Slave Lake. In the second expedition of 1901, he travelled eastward along a similar route, this time embarking from Great Slave Lake. In 1922 Knud Rasmussen entered the region as part of the Fifth Thule Expedition (Rasmussen 1926). Members of his party travelled inland from Chesterfield Inlet to Baker Lake, then south along the Kazan River to Yathkyed Lake to conduct geographic and ethnographic research.

One of the earliest archaeological assessments of the Nunavut Barrenlands began with artifact collections by the Moffat Canoe expedition of 1955 (Harp 1959). Members of the expedition travelled from Black Lake, Saskatchewan, along the Chipman and Dubawnt rivers to Baker Lake. A total of nine archaeological sites were recorded south of Aberdeen Lake along this route. This expedition was followed by an archaeological survey conducted by Elmer Harp in 1958 along Beverly, Aberdeen, and Schultz lakes, as well as the lower Thelon River (Harp 1961). A total of 42 new sites were recorded as a result of this survey and Harp proposed the first culture history of the region based on the data obtained from these sites. Subsequent research by Irving (1968) on the Upper Kazan River and in the North Henik and Dubawnt Lake areas would result in a revision of Harp's proposed cultural chronology. Irving (1968) also visited and collected in the Ennadai Lake area during the 1960s. He indicated that once the weather station was established camp sites were placed within a 5 mile radius, with many of the sites consisting of tent rings, and there is a clear change in settlement patterns.

Archaeological investigations continued in the region in the 1970s with more controlled excavations conducted at a number of sites first recorded by Harp. Wright (1972a, b; 1976) excavated at the Aberdeen (LdLl-2) and Grant Lake (KkLn-2) sites, while Gordon (1976) conducted excavations at the Migod (KkLn-4) site located north of Dubawnt Lake (Figure 2). These multi-component sites were significant in further refining the continuum of precontact occupation in the region. Additional surveys were also conducted by Gordon (1974) in the vicinity of the Baker Lake settlement where five of Elmer Harp's sites were revisited and four new sites were recorded.

2.2.3 Pervious Local Heritage Studies

Prior to the current assessment of the Ennadai Lake Weather Station, four heritage resources sites were recorded in the Nunavut or Canadian Museum of Civilization (CMC) database for this location. There are numerous other sites reported along the shores of Ennadai Lake.

JgMf-1 was recorded in 1960 by W. Irving and consists of a lithic scatter and a tent ring which was partially destroyed at the time of observation. The lithic material was collected at the time of recording.

JgMf-2 was recorded in 1960 by W. Irving and consists of an isolated find. The item was apparently not collected in the 1960s, which may suggest it was not a diagnostic item and at the time not considered significant.

JgMf-3 was recorded in 1960 by W. Irving and consists of a tent ring and a lithic scatter as well as possibly some metal items. The artifacts were subject to surface collection at the time of recording.

JgMf-11 was recorded in 1963 by W. Irving and consists of an artifact scatter including lithic and metal materials. These materials were collected at the time they were recorded.

3.0 METHODOLOGY

3.1 Field Inventory and Assessment

Archaeological field studies are conducted with the intent of identifying significant heritage and cultural resources that might be affected by the Project. Locations identified for assessment are investigated using a combination of surface and subsurface investigation techniques. Surface techniques include pedestrian reconnaissance of areas that are not water saturated or poorly suited for occupation, and visual inspection of any fortuitous subsurface exposures that might be present. Subsurface techniques include placement of shovel tests or test units in area assesses as having high archaeological potential and covered by vegetation. Vegetation coverage in many parts of the Nunavut indicate undisturbed ground, however in the sub arctic this is not necessarily the case as demonstrated in Plates 2 and 3.

Plate 2: 1950s Ground Disturbances North West of Ennadai Weather Station (Volex Versutus Vigilans N.D.)

Plate 3: View Northwest of Weather Station, Demonstrating 60 years of Vegetation Re-growth

Site evaluation is based on assessment of physical attributes, including site size, depth and character of deposits, assemblage density, and diversity and current condition. Consideration is also given to traditional significance reported by local community representatives assisting on the project, to cultural historic context and to relative frequency in the region. Sites or areas of traditional significance that are not considered

archaeological sites are also recorded in detail. These results are included in written submissions to the Department of Culture and Heritage as required by the permit to conduct the AIA.

3.2 Heritage Feature/Structure Evaluation

Evaluations of heritage features and standing structures are completed for features/structures that are observed during the investigations. These evaluations consider perceived heritage resource value and community cultural value as well as the predicted impact from the proposed program. In general, disturbed sites with limited cultural remains would be assigned lower archaeological resource values than undisturbed sites, large sites with large amounts of cultural material, complex sites, and multicomponent sites. Undisturbed multicomponent sites would generally be assigned the highest heritage resource value.

Community input plays a role in the evaluation of site value and the inclusion of a member of the local community on the field crew when possible aids discussions regarding site significance[1].

3.3 Reporting and Conservation

Analysis of collected artifacts includes consultation with a professional conservator regarding specific conservation requirements; cleaning, cataloguing, identification, inventory, and description of each individual piece for inclusion in the final report. GPS site information is provided to Culture and Heritage and the Canadian Museum of Civilization for archival purposes and is used for mapping features and important aspects of each identified site, but is not included in the final versions of the report. Archaeological site maps and photographs are prepared as digital files. Based on the cultural material collected and site observations, a recommendation regarding final site disposition relative to future projects is made.

Upon completion of the field components, a final permit report on the archaeological studies is prepared on behalf of EBA for review by Culture and Heritage. This report includes a Project description, environmental setting, cultural and archaeological context for the project area, field methodology, and the results of the field reconnaissance. All identified sites are documented on appropriate site inventory forms.

In general, the following recommendations are employed:

- Avoidance by 30 m is recommended, if feasible, at all archaeological sites.
- Documentation is undertaken as a mitigative option of sites, as a method of protecting the heritage resource from future undocumented impacts due to increased personnel activity in the vicinity.
- Sites at immediate risk of disturbance, or if the location of a site conflicts with project cleanup activities, (depending on their scientific significance) sites will be photographed, mapped, and test excavations conducted and collections made if warranted.

3.4 Community Consultation

Consultation regarding the Ennadai Lake Phase III Environmental Site Assessment, Hazardous and Non-Hazardous Materials Audit, Geotechnical Evaluation and Remedial Action Plan is scheduled for

[1] Attempts were made to hire an Arviat or at least a Kivalliq community member; however, community members contacted were unable to commit therefore a NLCA Beneficiary, Randy Demcheson, from Iqaluit was hired and was able to provide some general Inuit Qaujimajatuqangit.

December 2012; consultation will happen with the community of Arviat. During the permit application process the community was consulted by means of letter from the Permit Holder and the Inuit Heritage Trust Incorporated (IHTI) was in contact with the community. Copies of permit reports are typically submitted to the hamlet(s) situated closest to the Project. The IHTI requested that the Department of Culture and Heritage add a condition to NAP2012-006A that a copy of the current report also be submitted to the Arviat Heritage Society.

4.0 RESULTS

Upon completion of the field component and the artifact curation, a draft report was prepared. This final permit report on the AIA will be forwarded to EBA for review, and then submitted to Culture and Heritage for review. The report includes a project description, the environmental setting, the historical and archaeological context for the Project area, field methodology, and the results of the field reconnaissance. The report also includes descriptive data on the sites, artifacts, and features identified, as well as detailed information on the nature, content, and significance of the artifacts and features identified. Cultural material that was recovered was inventoried, described, and discussed within the report text to aid in evaluation of scientific and interpretive value. All identified sites have been documented on appropriate site inventory forms.

If required, a summary of the findings will be prepared for inclusion in a screening document.

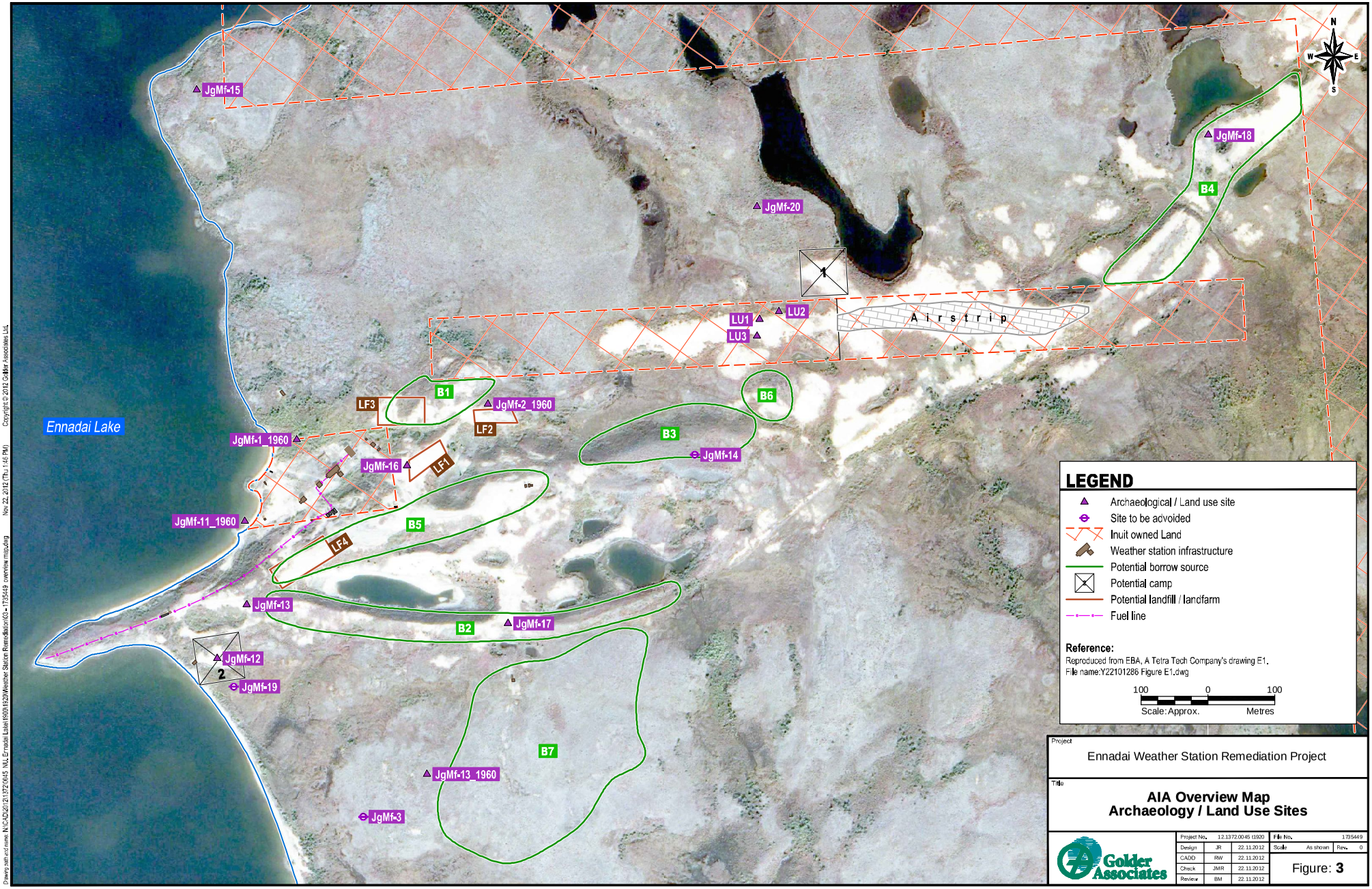
The following workplan was followed:

- Avoidance has been recommended where feasible at all sites assigned high archaeological resource value (this to include all constructed features: burials, tent rings, caches, hunting blinds, hearths).
- Collection and documentation has been undertaken as a mitigative option of sites with low archaeological resource value and as a method of protecting the heritage resource from future undocumented impacts due to increased personnel activity in the vicinity.
- Acceptable methods of mitigation were discussed with Culture and Heritage and the Territorial Archaeologist, and may lead to a recommendation for detailed mapping, collection, and/or test excavations at those sites assigned high archaeological resource value that cannot be avoided by the remediation project.

A management plan for required mitigation, monitoring, or surveillance relative to the proposed remediation will be developed as part of the contracted services deliverable to PWGSC. This includes site mitigation, additional survey of any project re-locates required due to site avoidance, and verification of those heritage sites located outside the proposed development activity area that should remain outside re-located areas.

4.1 Heritage Resources recorded in 2012

During the survey of the project area and surrounding area nine previously unrecorded archaeological sites were recorded and documented as per the *Nunavut Archaeological and Palaeontological Sites Regulations* (Government of Nunavut 2003) (Figure 3).



Project
Ennadai Weather Station Remediation Project

Title
AIA Overview Map
Archaeology / Land Use Sites

Golder Associates

Project No.	12.1372.0045 (1920)		File No.	1735449	
Design	JR	22.11.2012	Scale	As shown	Rev. 0
CADD	RW	22.11.2012	Figure: **3**		
Check	JMR	22.11.2012			
Review	BM	22.11.2012			

Drawing path and name: N:\CAD\2012\1372\0045 (NU, Ennadai Lake\1920\1920Weather Station Remediation\03 - 1735449 overview mxd.dwg Nov 22, 2012 (Thu 1:46 PM)

4.1.1 JgMf-12, JgMf-13, JgMf-16 and JgMf-17

JgMf-12, JgMf-13, JgMf-16, and JgMf-17 are isolated find sites. The finds are likely not *in situ* owing to the degree of ground disturbance associated with the weather station construction and occupation. The remains from all four sites were collected because they would likely be impacted either by primary or tertiary disturbances associated with proposed activities at the Ennadai Weather Station.

JgMf-12 was located in a sand blow out south west of the main weather station area. There was a dock and fishing nets in the area. The isolated find consists of a grey-white quartzite. The flake is a secondary flake, with a clear striking platform and bulb of percussion. The quality of the quartzite is low and granular for chip stone tool technology. No further archaeological work is recommended at sites JgMf-12 (Figure 4; Plate 4; Appendix 1).

JgMf-13 is located up slope from JgMf-12 and is also in a sand blowout boarded by a patch of vegetation. Shovel test were placed proximal to the flake location and within the vegetation cover. No additional cultural material was identified. The flake is a secondary flake, with a clear striking platform and bulb of percussion. The quality of the quartzite is low and granular for chip stone tool technology. No further archaeological work is recommended at sites JgMf-13 (Figure 4; Plate 5; Appendix 1).

JgMf-16 is located south east of the main weather station buildings. The flake is located in exposed portion of the esker. An intensive surface survey was conducted in the area surrounding the flake however no additional cultural material was identified. The flake is a primary flake with some cortex. The flake has a clear striking platform and bulb of percussion. No further archaeological work is recommended at sites JgMf-16 (Figure 5; Plate 6; Appendix 1).

JgMf-17 is located south east of the main weather station buildings on a narrow portion of the esker. The site consists of a metal fish hook. The fishhook is likely an example of synergy between Inuit and European technologies. No further archaeological work is recommended at sites JgMf-17 (Figure 6; Appendix 1).

JgMf-12, JgMf-13, JgMf-16, and JgMf-17 are isolated find sites. The finds are likely not *in situ* owing to the degree of ground disturbance associated with the weather station construction and occupation. The remains from all four sites were collected because they would likely be impacted either by primary or tertiary disturbances associated with proposed activities at the Ennadai Weather Station. The isolated finds include three grey-white quartzite flakes and a fishhook (Figures 4 to 6; Plates 4 and 6; Appendix 1). No further archaeological work is recommended at sites JgMf-12, JgMf-13, JgMf-16 and JgMf-17.

Plate 4: Flake JgMf-12

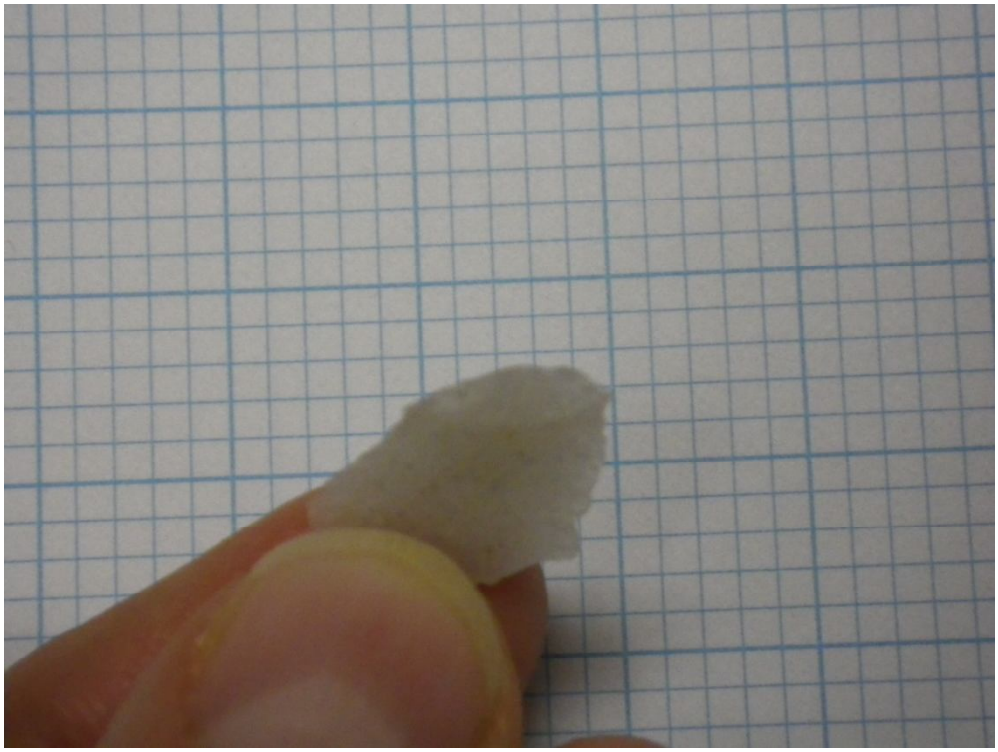


Plate 5: Flake JgMf-13

Plate 6: Flake JgMf-16

Ennadai Lake

JgMf-13

JgMf-12

2

15 0 15
Scale:Approx. Metres

N
W E
S

JgMf-12 location

JgMf-13 location

LEGEND

- Archaeological site
- Inuit owned Land
- Weather station infrastructure
- Potential borrow source
- Potential camp location
- Potential landfill / landfarm
- Fuel line

Reference:
Reproduced from EBA, A Tetra Tech Company's drawing E1.
File name:Y22101286 Figure E1.dwg

Project
Ennadai Weather Station Remediation Project

Title
Site Map of JgMf-12 and JgMf-13

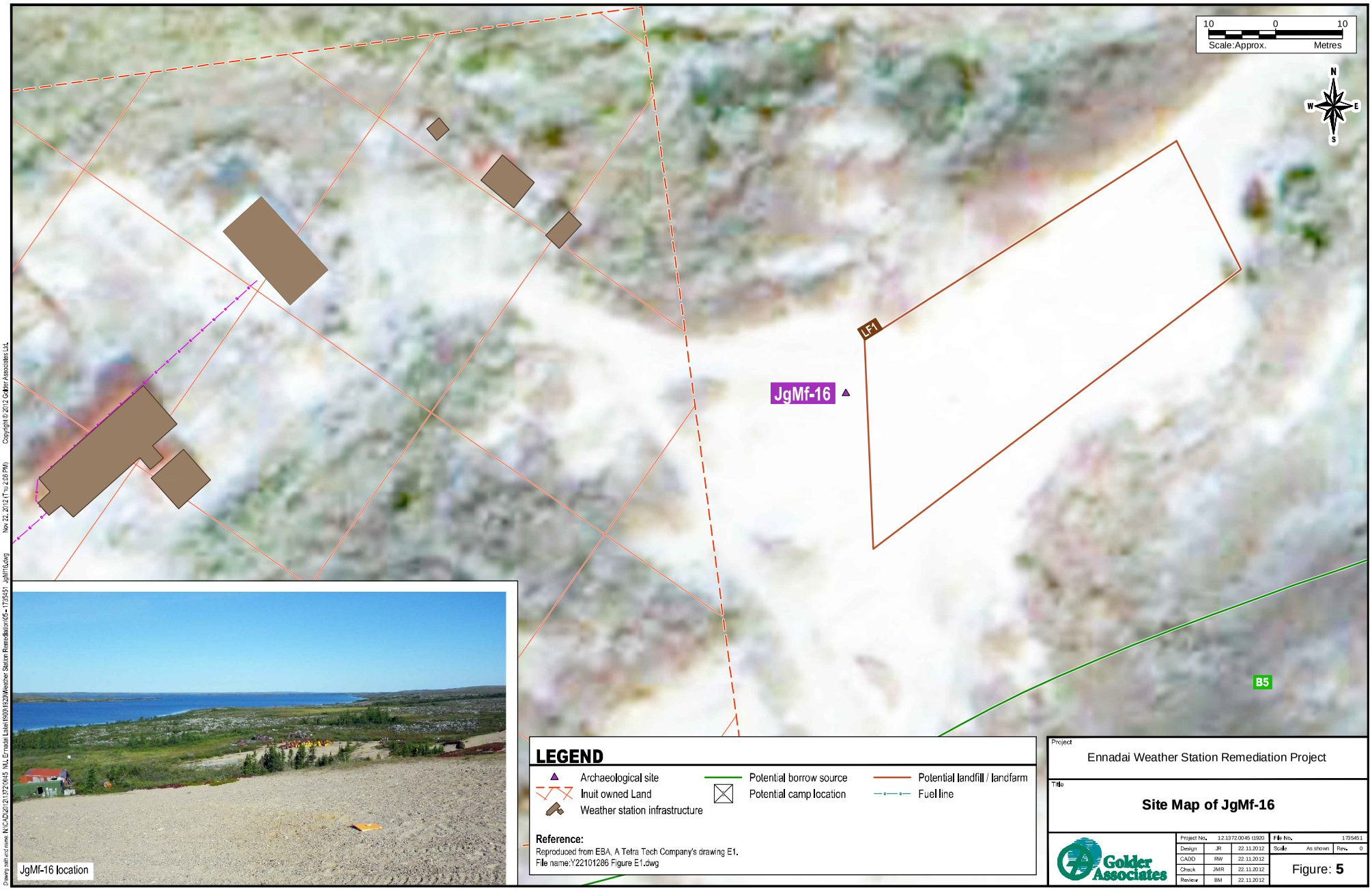
Golder Associates

Project No.	12.1372.0045 (1920)		File No.	735450	
Design	JR	22.11.2012	Scale	As shown	Rev. 0
CADD	RW	22.11.2012			
Check	JMR	22.11.2012			
Review	BM	22.11.2012			

Figure: **4**

Nov 22, 2012 (Thu 1:48 PM) jgMf12-JgMf13.dwg

Drawing path and name: N:\CAD\2012\1372\0045 - NU, Ennadai Lake\1920\1920WWeather Station Remediation\04 - 735450



LEGEND

- Archaeological site
- Inuit owned Land
- Weather station infrastructure
- Potential borrow source
- Potential camp location
- Potential landfill / landfarm
- Fuel line

Reference:
Reproduced from EBA, A Tetra Tech Company's drawing E1.
File name:Y22101286 Figure E1.dwg

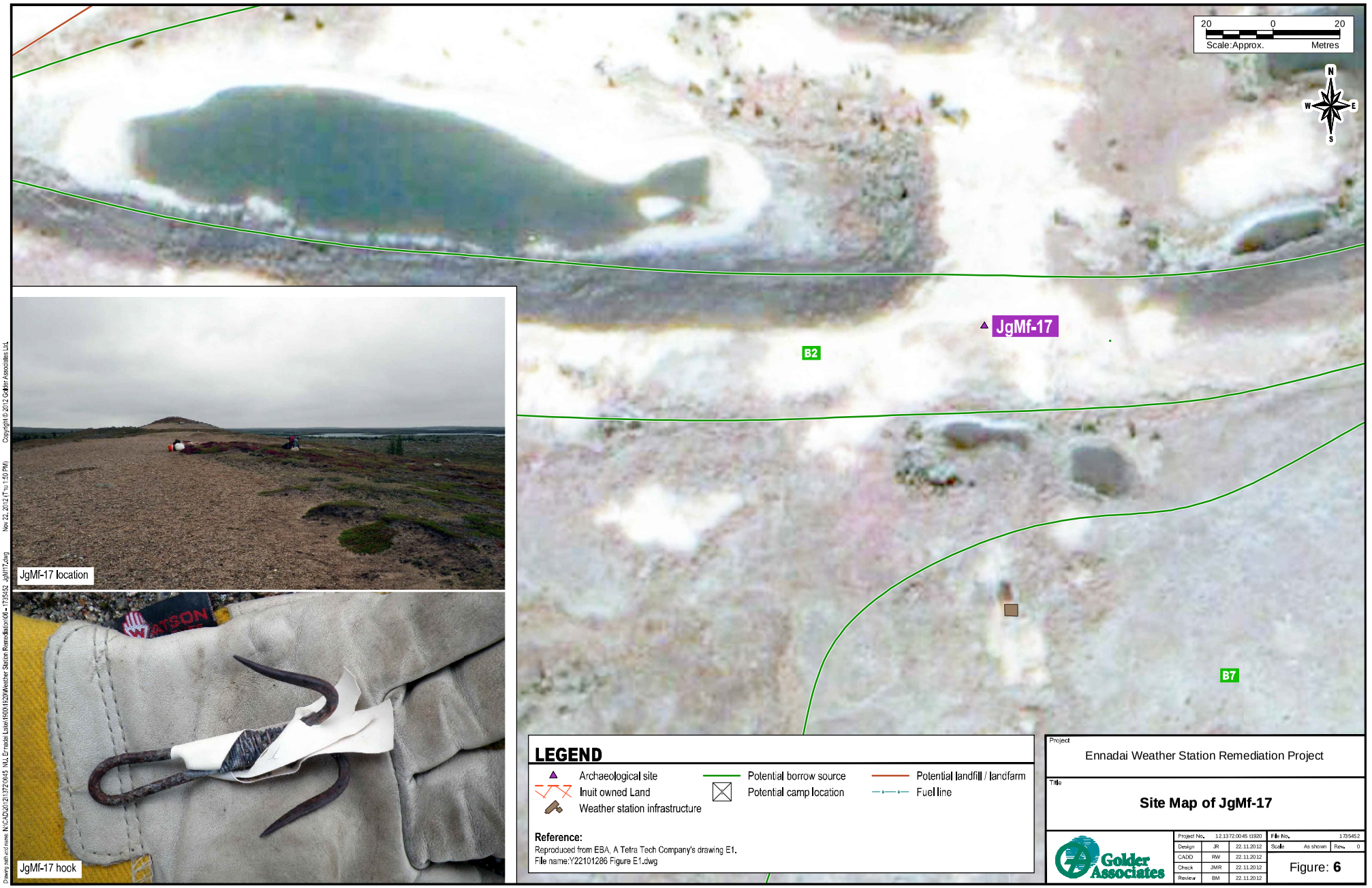
Project
Ennadai Weather Station Remediation Project

Title
Site Map of JgMf-16

Golder Associates

Project No.	12.1372.0045 (1920)		File No.	1735451	
Design	JR	22.11.2012	Scale	As shown	Rev. 0
CADD	RW	22.11.2012			
Check	JMR	22.11.2012			
Review	BM	22.11.2012			

Figure: **5**



Drawing path and name: N:\CAD\2012\12720045 - NU, Ennadai Lake\1920\1920W\Weather Station Remediation\06 - 735452 - JgMf17.dwg
Nov 22, 2012 (Thu 1:50 PM)

4.1.2 JgMf-14

JgMf-14 consists of eight features and is associated with proposed borrow source. The features consist of four stone markers (Feature 1, 2, 3, 5), a possible cache (Feature 4), a hunting blind (Feature 6), and a grave (Feature 8). The features may have been constructed at different times since some look more recent than others, based on the degree of lichen which covers the features and its distribution over individual rocks. The oldest, Feature 8, may be from the indigenous historic period and the youngest, Feature 4, maybe recent (Figure 7).

Feature 1, a stone marker, is dispearsed with five of the stones appearing to have slid off the top of the feature on to the side of the larger base rock. Feature 2 and 3 are also stone markers and made up of four and five stones, respectively. Feature 4 is interpreted as a possible cache because, although there is no clear internal cavity, the feature is constructed in a mound like fashion and is associated with caribou antlers. Feature 5 is located approximately 60 m northeast of the other features (Figure 7). Feature 6, a hunting blind, takes advantage of a natural sorted circle/polygon of stones for its construction. While unlikely temporally associated with the feature, there is an empty bear banger casing in the hunting blind. Feature 7 is a stone marker made up of a single stone on top of a large boulder.

Feature 8 is an open burial and is marked by a broken wooden post; the grave contains a human occipital skull fragment. The external demission of the grave are 1.70 north –south 1.90 east- west; the internal cavity was 0.80 m north –south and 0.70m east- west. It is assumed the wood is a grave marker, but since it is a fragment function cannot be assumed. The bone fragment was left *in situ*.

Shovel test were placed in Feature 6 and around the remaining features excluding Feature 8; no material culture was recovered. It is recommended that the community, the IHTI, and Culture and Heritage be consulted about solely avoiding Feature 8, the grave. The other features have been mitigated in accordance with their degree of archaeological significance.

4.1.3 JgMf-15

JgMf-15 is located outside of any of the proposed disturbance areas. The site consists of two features; a possible stone marker that is associated with an oval tent outline. The marker is made up of four stones and is approximately 1.5 m north-south by 60 cm east-west. The tent ring is 5.10 m north-south by 5.5 m east-west (Figure 8). There is Euro-Canadian debris in the area, likely from trade with the weather station. There is also red stone, slate or mud stone, not seen anywhere else in the vicinity of the weather station. None of the red stone showed evidence of working. No further archaeological work is recommended at JgMf-15.

4.1.4 JgMf-18

JgMf-18 is likely an indigenous historic camp site. The remains are limited to a piece of wood approximately 50 cm by 5 cm; with evidence of having been nailed and a tin can, likely a tobacco tin (Figure 9). The wood is interpreted as being an old tent pole. A short distance from the site a wood fragment with evidence of charring was also located. The site has been recorded and photographed and mitigated in accordance with its archaeological significance. No further archaeological work is recommended at JgMf-18.

4.1.5 JgMf-19

JgMf-19 consists of two wooden stakes still partially buried in the ground and a tin can apparently opened with a knife; no stone features were evident. The site is in a moderately wet area and would likely have been used

when the ground was partially frozen. The site is possibly the remains of an indigenous camp contemporaneous with the early occupation of the weather station. There is other metal tin debris around the site (Figure 10). This site is west of proposed Borrow Source 7, southwest of proposed Borrow Source B2 and south of proposed Camp 2. Since the site is located outside the boundaries of proposed development areas shovel tests were not placed around the posts. It is recommended that JgMf-19 be avoided by accessing potential borrow Source 7 and B2 from the north and east and limiting the camp area to the exposed sand area.


JgMf-14 location


JgMf-14 F1

JgMf-14 F2


JgMf-14 F3

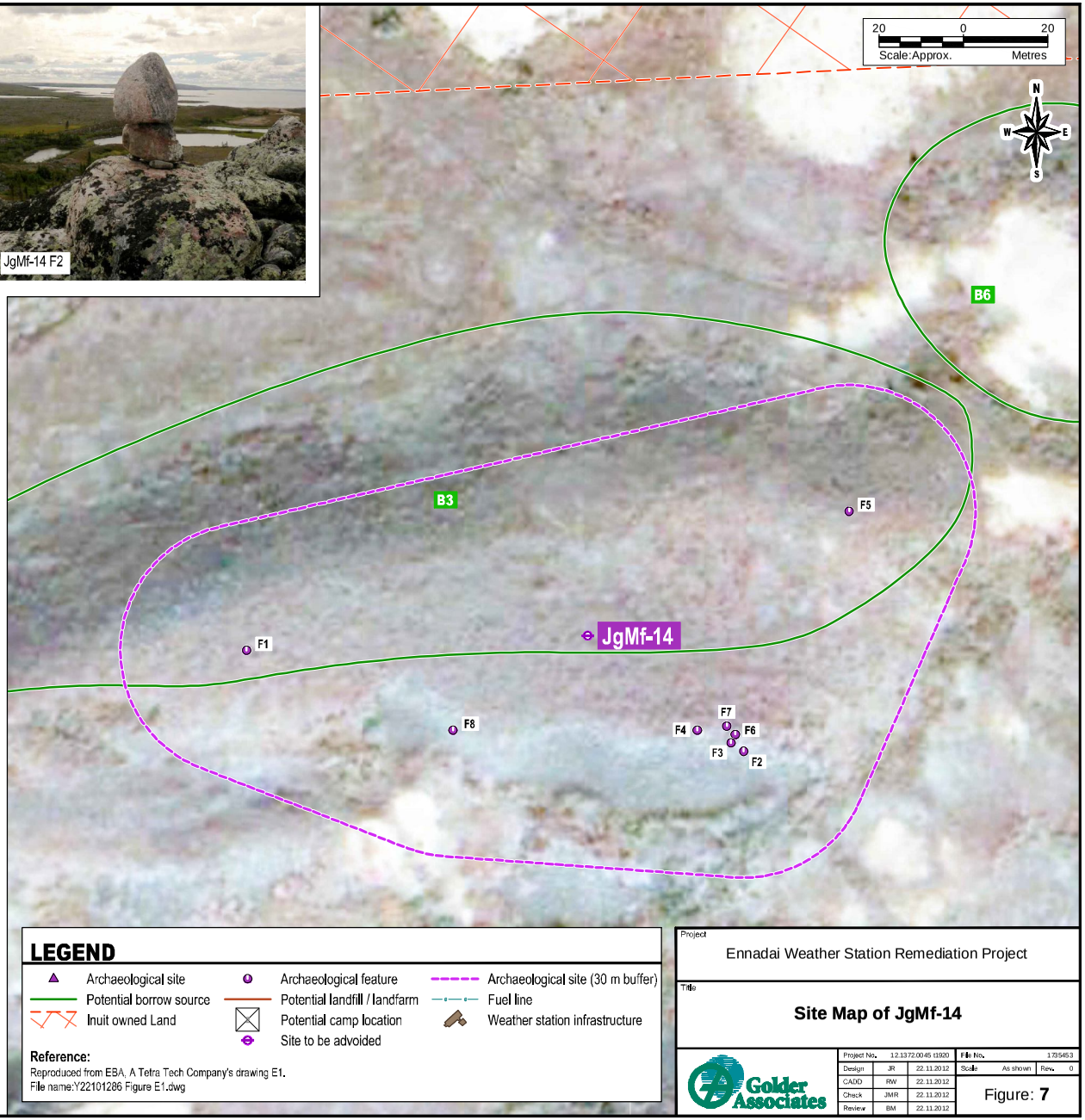

JgMf-14 F4


JgMf-14 F5


JgMf-14 F6


JgMf-14 F7


JgMf-14 F8 Grave



LEGEND

- Archaeological site
- Potential borrow source
- Inuit owned Land
- Archaeological feature
- Potential landfill / landfarm
- Potential camp location
- Site to be advoided
- Archaeological site (30 m buffer)
- Fuel line
- Weather station infrastructure

Reference:
Reproduced from EBA, A Tetra Tech Company's drawing E1.
File name:Y22101286 Figure E1.dwg

Project
Ennadai Weather Station Remediation Project

Title
Site Map of JgMf-14

Golder Associates

Project No.	12.1372.0045 (1920)		File No.	735453	
Design	JR	22.11.2012	Scale	As shown	Rev. 0
CADD	RW	22.11.2012			
Check	JMR	22.11.2012			
Review	BM	22.11.2012			

Figure: **7**

Drawing path and name: N:\CAD\2012\12-1372-0045 - NU, Ennadai Lake\1920\1920WeatherStationRemediation\07 - 735453 JgMf14.dwg Nov 22, 2012 (Thu 1:53 PM)


JgMf-15 F1 Marker


JgMf-15 F2 Tent ring


JgMf-15 Tinlid


JgMf-15 Wood disk

Nov 22, 2012 (Thu 1:55 PM)

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15 0 15
Scale:Approx. Metres

N
W E
S

JgMf-15

Marker

Tent ring

Ennadai Lake

LEGEND

- Archaeological site
- Archaeological feature
- Archaeological site (30 m buffer)
- Potential borrow source
- Potential landfill / landfarm
- Fuel line
- Inuit owned Land
- Potential camp location
- Weather station infrastructure

Reference:
Reproduced from EBA, A Tetra Tech Company's drawing E1.
File name:Y22101286 Figure E1.dwg

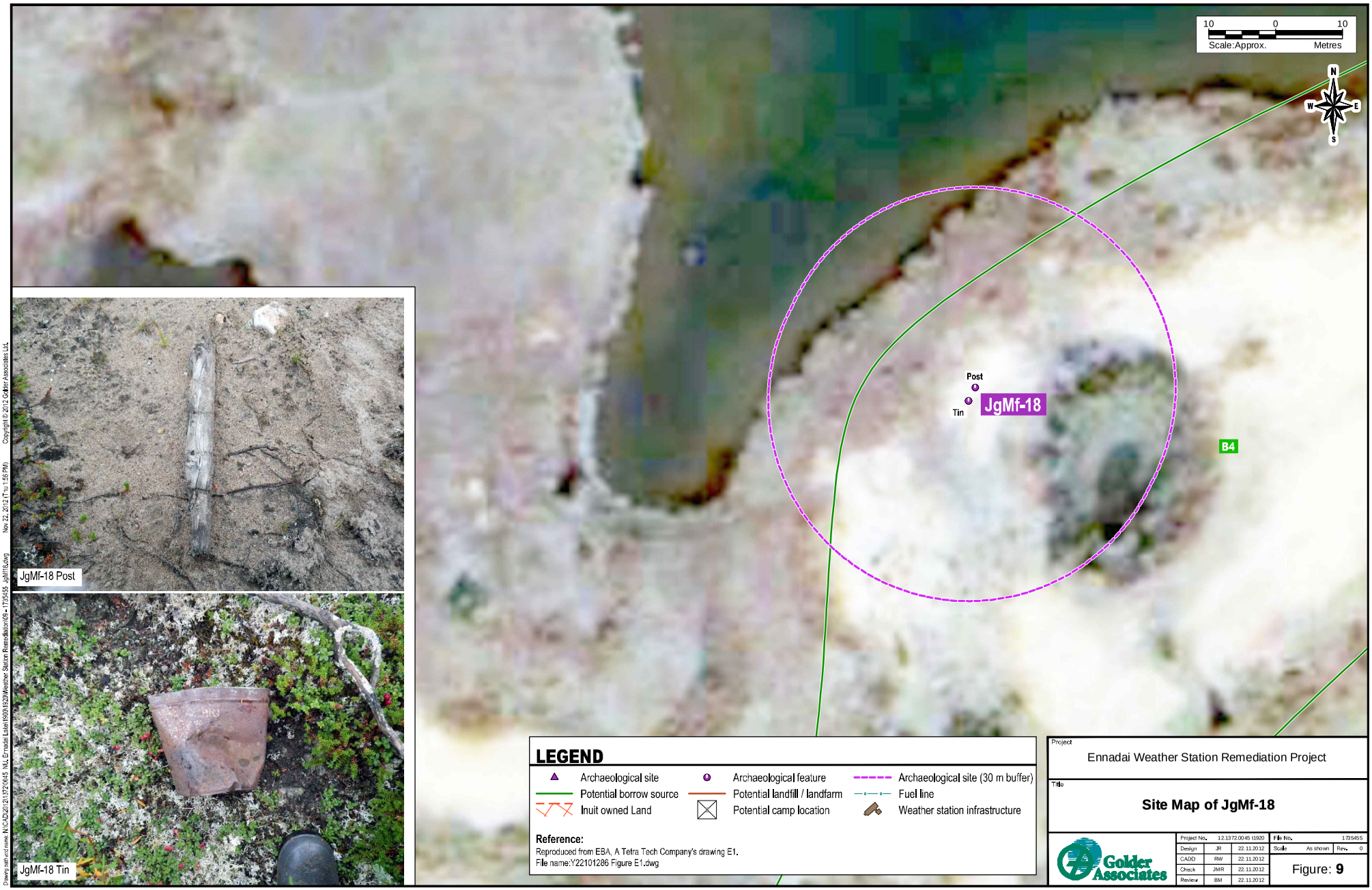
Project
Ennadai Weather Station Remediation Project

Title
Site Map of JgMf-15

Golder Associates

Project No.	12.1372.0045 (1920		File No.	1735454	
Design	JR	22.11.2012	Scale	As shown	Rev. 0
CADD	RW	22.11.2012			
Check	JMR	22.11.2012			
Review	BM	22.11.2012			

Figure: **8**



LEGEND

- Archaeological site
- Archaeological feature
- Archaeological site (30 m buffer)
- Potential borrow source
- Potential landfill / landfarm
- Fuel line
- Inuit owned Land
- Potential camp location
- Weather station infrastructure

Reference:
Reproduced from EBA, A Tetra Tech Company's drawing E1.
File name:Y22101286 Figure E1.dwg

Project
Ennadai Weather Station Remediation Project

Title
Site Map of JgMf-18

Golder Associates

Project No.	12.1372.0045 (1920)		File No.	735455	
Design	JR	22.11.2012	Scale	As shown	Rev. 0
CADD	RW	22.11.2012	Figure: **9**		
Check	JMR	22.11.2012			
Review	BM	22.11.2012			

Nov 22, 2012 (Thu 1:56 PM)

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LEGEND

- Archaeological site
- Archaeological feature
- Archaeological site (30 m buffer)
- Potential borrow source
- Potential landfill / landfarm
- Fuel line
- Inuit owned Land
- Potential camp location
- Weather station infrastructure
- Site to be advoided

Reference:

Reproduced from EBA, A Tetra Tech Company's drawing E1.
File name:Y22101286 Figure E1.dwg

Project

Ennadai Weather Station Remediation Project

Title

Site Map of JgMf-19

Golder Associates

Project No.	12.1372.0045 (1920)		File No.	1735456	
Design	JR	22.11.2012	Scale	As shown	Rev. 0
CADD	RW	22.11.2012			
Check	JMR	22.11.2012			
Review	BM	22.11.2012			

Figure: **10**

Drawing path and name: N:\CAD\2012\12-1372-0045 - NU, Ennadai Lake\1920\1920W\Weather Station Remediation\10 - 1735456 - jgMf19.dwg Nov 22, 2012 (Thu 1:59 PM)

4.1.6 JgMf-20

JgMf-20 is a stone marker that consist of two small stones situated on top of a large glacial erratic; the stones are covered in lichen suggesting some age. There is also a collection of stones below which may have fallen off the main boulder (Figure 11). The site is located north of the potential remediation areas and will not be impacted. No further archaeological work is recommended at JgMf-20.

4.2 Previously recorded Heritage Resources

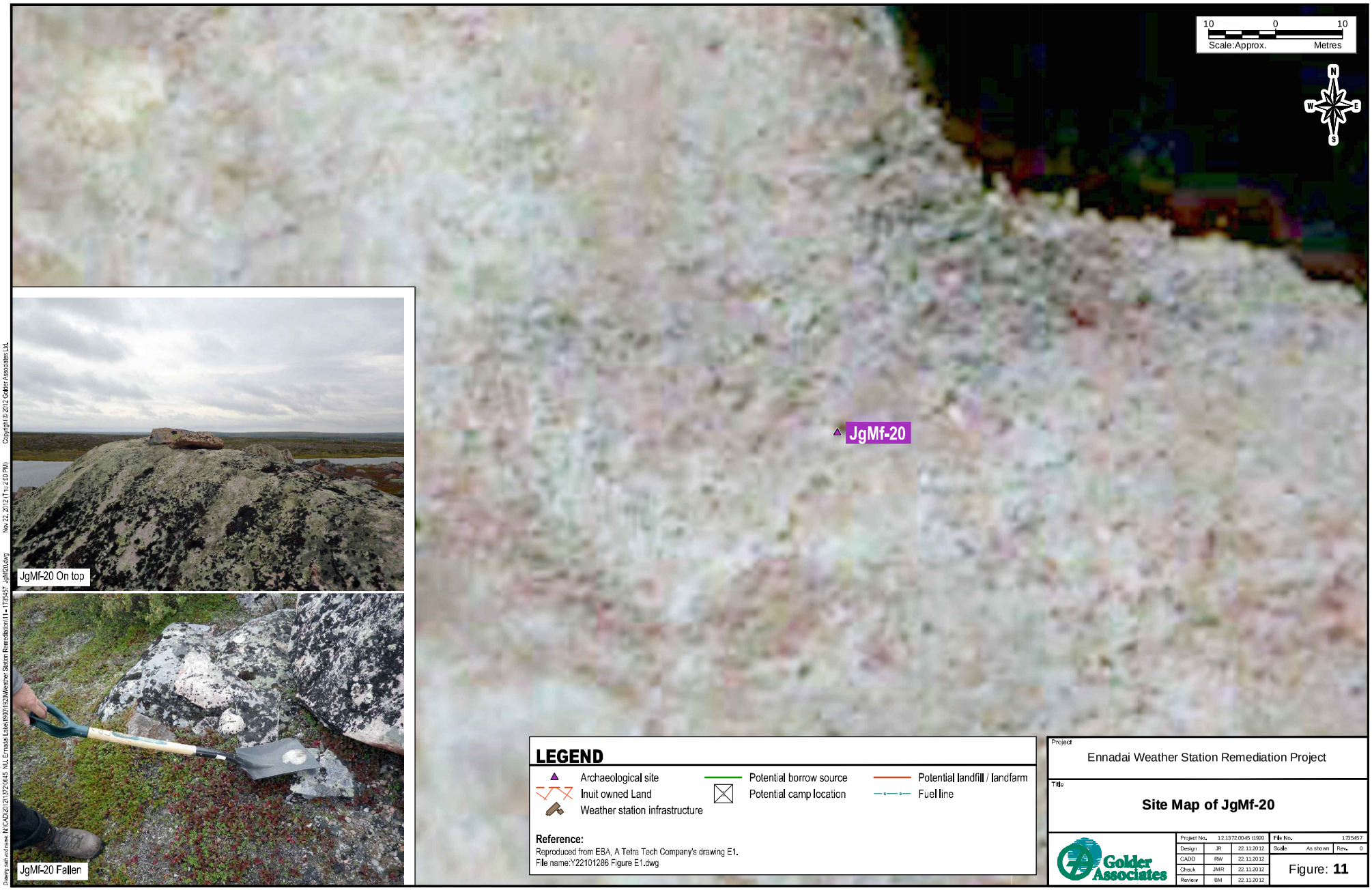
There are four (JgMf-1, JgMf-2, JgMf3, and JgMf-11) previously recorded archaeological sites within the immediate vicinity of the Project. These sites were recorded in the 1960s (Figure 3) and are described below.

4.2.1 JgMf-1

The data available from the CMC site records for this site indicate that the location is inaccurate and the site was plotted approximately. Plate 7 illustrates the location of the coordinates currently associated with the site records. The location description suggests the site is on a broad, well drained area between base of promontory formed by esker and radio station south[2] of Ennadai Aeradio Station. The site is classified as a prehistoric, indigenous historic, historic campsite consisting of a tent ring and lithic scatter. A surface collection was made from the site. The site was reported as disturbed by construction in the 1960s. An attempt was made to reconfirm the location of JgMf-1 but it was not possible to confirm its current existence. The site has already been impacted by operation and post operation activities at the weather station and the current proposed remediation program does not need to alter its activities owing to the previous existence of this site. No further archaeological work is recommended in association with the Project and site JgMf-1.

Plate 7: Location of 1960s Coordinate for JgMf-1

[2] The approximate co-ordinates plot to the north of the weather station, the broad well drained areas both north and south of the weather station were surveyed for the site.



LEGEND

- Archaeological site
- Inuit owned Land
- Weather station infrastructure
- Potential borrow source
- Potential camp location
- Potential landfill / landfarm
- Fuel line

Reference:
Reproduced from EBA, A Tetra Tech Company's drawing E1.
File name:Y22101286 Figure E1.dwg

Project
Ennadai Weather Station Remediation Project

Title
Site Map of JgMf-20

Golder Associates

Project No.	12.1372.0045 (1920)		File No.	735457	
Design	JR	22.11.2012	Scale	As shown	Rev. 0
CADD	RW	22.11.2012	Figure: **11**		
Check	JMR	22.11.2012			
Review	BM	22.11.2012			

Drawing path and name: N:\CAD\2012\12-1372-0045 - NU, Ennadai Lake\1920\1920W\Weather Station Remediation\11 - 735457 - JgMf20Loc.dwg
Nov 22, 2012 (Thu 2:00 PM)

4.2.2 JgMf-2

The data available from the CMC site records for this site indicate that the location is inaccurate and the site was plotted approximately. Plate 8 illustrates the location of the coordinates currently associated with the site records. The location description suggests the site is on rough terrain north east off Ennadai Aeradio Station on the north side of the esker and is crossed by numerous caribou trails. The site is classified as a prehistoric, isolated lithic scatter and the artifact was not collected in 1963. An intensive search was made for JgMf-2 but it was not possible to confirm is current existence. It is possible that the lithic material associated with JgMf-2 was collected by occupants of the weather station since Dr. Irving was in the area or by visitors to the area after the weather station closed. Dr. Irving did collection material during his work in the area in 1960 and 1963 and one can only presume that if Dr. Irving did not collect this material it was interpreted as being of limited archaeological and scientific significance. The current proposed remediation program does not need to alter its activities owing to the previous existence of this site. No further archaeological work is recommended.

Plate 8: Location of 1960s Coordinates for JgMf-2

4.2.3 JgMf-3

The data available from the CMC site records suggests the site is on a rocky moraine and high beaches facing west, south of and adjacent to DOT (Department of Transport) esker. The site is classified as a prehistoric, indigenous historic camp site with a lithic scatter that was noted and collected by a Stewart Patterson. In the site notes there is also the suggestion that the site is a modern camp. JgMf-3 was located approximate 100 m south of where the 1960s coordinates plot it (Figure 3). The site is made up of a disperse tent ring (Figure 12: Feature 2 and Figure 13) and three wooden tent posts (Figure 12: Feature 1). Two posts are currently still in the ground and some distance away is the remains of an army cot. There are also tin cans and other debris scattered around (Figures 12 and 13). The boundary of the archaeological site takes into consideration the reported material culture scatter. This site is west of potential Borrow Source 7 and will not be impacted by remediation work as long as transportation routes are north and east of the potential borrow. It is recommended that JgMf-3 be avoided.

LEGEND

- Archaeological site
- Potential borrow source
- Inuit owned Land
- Archaeological feature
- Potential landfill / landfarm
- Potential camp location
- Site to be advoided
- Archaeological site (30 m buffer)
- Fuel line
- Weather station infrastructure

Reference:
Reproduced from EBA, A Tetra Tech Company's drawing E1.
File name:Y22101286 Figure E1.dwg

Project
Ennadai Weather Station Remediation Project

Title
Site Map of JgMf-3

Golder Associates

Project No.	12.1372.0045 (1920		File No.		735458
Design	JR	22.11.2012	Scale	As shown	Rev. 0
CADD	RW	22.11.2012			
Check	JMR	22.11.2012			
Review	BM	22.11.2012			

Figure: **12**

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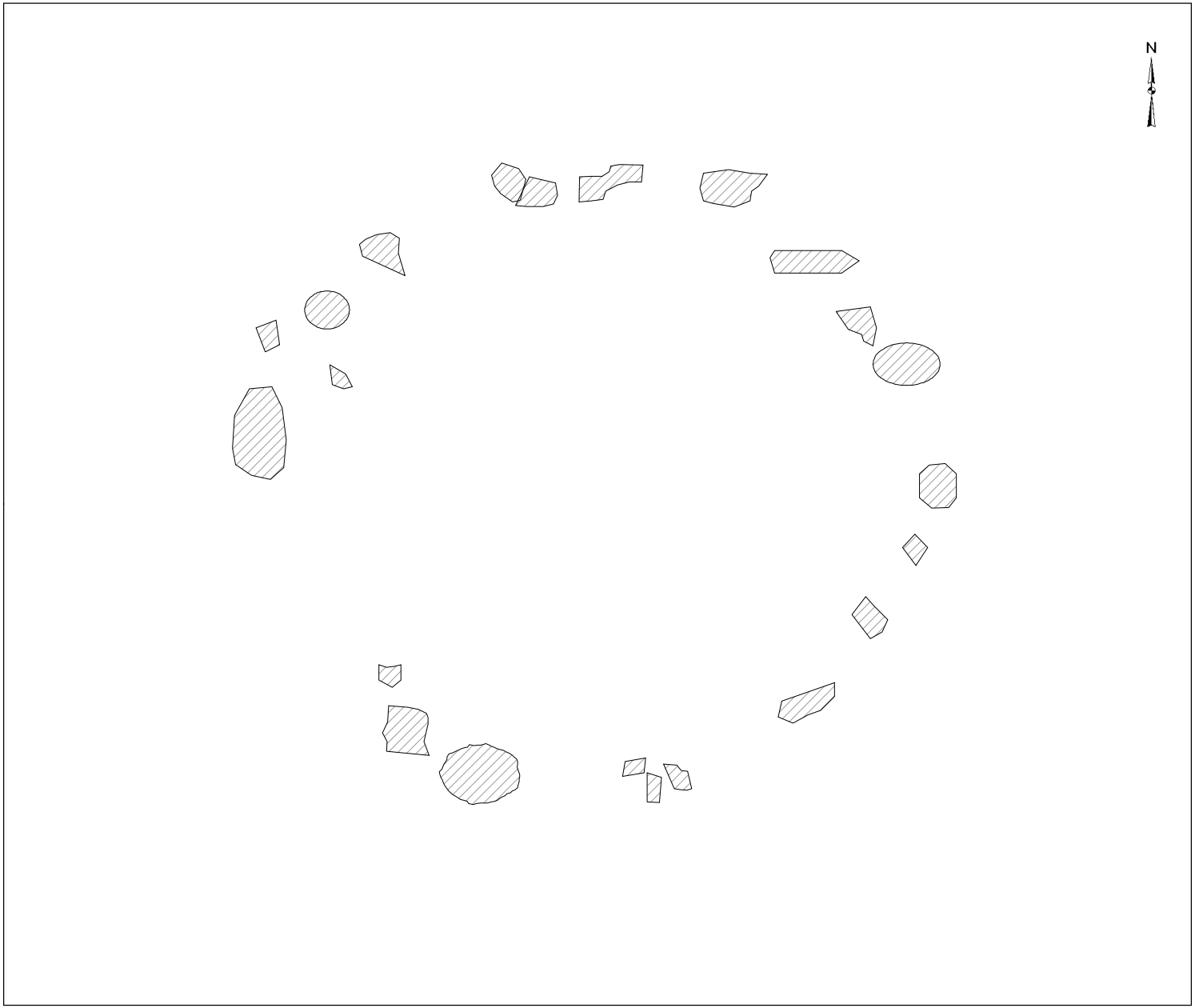
Nov 22, 2012 (Thu 2:02 PM)



LEGEND

JGMF-3

FEATURE 2

FEATURE 1

REFERENCE

TIPI RING SURVEYED DATA WAS PROVIDED BY JULIE ROSS, AUGUST 2012,
GOLDER ASSOCIATES LTD
DATUM: NAD83 PROJECTION: UTM ZONE 14

1 0 1
SCALE 1:35 METRES

PROJECT
EBA, A TETRA TECH COMPANY
ENNADAI WEATHER STATION REMEDIATION AIA
NUNAVUT

TITLE
SITE PLAN, JgMf-3

Golder Associates

PROJECT 12-1373-0046			FILE No.	
DESIGN	JR	13 SEP 2012	SCALE AS SHOWN	REV. 0
GIS	JH	14 SEP 2012	**FIGURE: 13**	
CHECK	JMR	31 OCT 2012		
REVIEW	BM	31 OCT 2012		

I:\2012\12-1373\12-1373-0046\Mapping\MXD\Archaeology\KFJF_171_F5.mxd

4.2.4 JgMf-11

The data available from the CMC site records for JgMf-11 indicate that the location is inaccurate and the site was plotted approximately. Plate 9 illustrates the location of the coordinates currently associated with the site. The description of the site location suggests it was directly in front of DOT Aeradio station next to a cutbank overlooking Ennadai Lake (Plate 10). The site was assigned an undetermined cultural affiliation and consisted of lithic artifacts and debitage as well as a metal artifact which were collected in the 1960s. An intensive search of the cutbacks below the weather station was made for additional material associated with JgMf-11 but no additional material was located. The current proposed remediation program does not need to alter its activities owing to the previous existence of this site. No further archaeological work is recommended for JgMf-11.

Plate 9: Location of 1960s Coordinates for JgMf-11

Plate10: Likely Actual Location for JgMf-11

4.3 Land Use Site

Land use sites represent evidence of human, typically but not exclusively Inuit, use of the land within the past 50 years. They are not assigned Borden numbers, there is no obligation to report them and they are not afforded protection under law. Therefore, there is no requirement to make accommodations for them during non-traditional land use planning. However, they are important to note because as time passes, should these sites not be disturbed, they will qualify as archaeological sites; they provide important information about changes in land use and technology and they may indicate the presence of other valued environmental components for which it is prudent for land developers to be aware of these sites.

The Project area does contain three makers which may be current land use sites. Originally it was thought that these markers might have been related to weather station activities, however Randy Demcheson indicates that these types of expedient markers are often used around Iqaluit as snow mobile trail markers (Figure 3; Plates 11 to 13). In addition, they are similar to JgMf-20. Should development or use of this area occur the community should be consulted regarding the significance of the makers.

Plate11: Land Use 1, Stone Marker

Plate 12: Land Use 2, Marker

Plate13: Land Use 3, Marker

4.4 Overview of Development areas

For details on the remediation program for the Ennadai Weather Station refer to EBA's Ennadai Lake Weather Station Remedial Action Plan (2012). The description and summary of the potential development area are written exclusively from a heritage perspective. It is currently unknown which areas will be used during remediation and for what purposes. It is also possible that the final contractor may recommend additional locations for use. While the AIA was conducted on an area beyond those described below, only the areas mentioned below were systematically investigated for heritage resources (Figure 3).

4.4.1 Airstrip

The airstrip was constructed during the use of the weather station in the mid to late 20th century and it is situated within IOL parcel AR-39 which is northeast of the weather station buildings. The area has been heavily disturbed and has low potential for *in situ* archaeological resources (Plate 14). No heritage resources were found within the airstrip area. Land Use sites were found to the west, but the area in which they are located are not currently within the proposed development area. No further archaeological work is recommended for the airstrip.

Plate14: View of Airstrip Area (photo Kumari C. Karunaratne Ph.D., EBA Terrain Scientist)

4.4.2 Potential Borrow Source 1/ Land Farm 3

Potential Borrow Source 1 and Land Farm 1 overlap and are located northeast of the weather station buildings. However, the area is currently a fuel barrel dump and has been heavily disturbed therefore having low potential for *in situ* archaeological resources (Figure 3; Plate 15). An intensive surface survey of the area was conducted. No archaeological material was observed or recorded in these areas. No further archaeological work is recommended for the potential Borrow Source 1 / Land Farm 3.

Plate15: Potential Borrow Source 1/ Land Farm 3

4.4.3 Potential Borrow Source 2

Borrow Source 2 is located south of the weather station buildings, on a narrow and steep sided branch of the esker. The area is heavily disturbed and has low potential for *in situ* archaeological resources (Figure 3; Plate 16). JgMf-17, the fish hook, was recorded within this potential borrow source and likely belongs to the indigenous historic period. The fish hook was collected as it is an example of the synergies between Euro-Canadian materials and Inuit technology. An intensive surface survey was conducted for other material and limited portions of the landscape with vegetation coverage were subject to shovel testing. No other cultural material was collected. No further archaeological work is recommended for potential Borrow Source 2.

Plate16: View West Along Potential Borrow Source 2

4.4.4 Potential Borrow Source 3

Borrow Source 3 is located east of the weather station buildings, on a narrow and steep sided branch of the Esker which is strewn with boulders. JgMf-14 was recorded within this potential borrow source (Figure 3 and 7; Plate 17). JgMf-14 consists of eight features including a grave. It is recommended that the grave associated with JgFm-14 be avoided and that the community, the IHTI and Cultural and Heritage be consulted about the site.

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Plate17: View Southeast of Potential Borrow Source 3 and JgMf-14

4.4.5 Potential Borrow Source 4

Borrow Source 4 is at the far eastern end of the esker complex on which the weather station and airstrip are located (Figure 3; Plate 18). The area is of moderate elevation (330 m ASL) and is situated between two arms of the Ennadai Lake. The area was originally assessed as having moderate archaeological potential owing to its distance from Ennadai Lake; however, site JgMf-18 was recorded in this area. This site has been mitigated and no further archaeological work is recommended.

Plate18: Potential Borrow Source 4, View South

4.4.6 Potential Borrow Source 5/ Land Farm 4

Borrow Source 5/Land Farm 4 overlap in their extent. Both are located south and east of the location of the former weather station. This area is heavily disturbed, however one grey-white quartzite flake, JgMf-16, was recovered (Figure 3; Plates 19 and 20). An intensive surface survey was conducted for other cultural material within potential Borrow Source 5/Land Farm 4 and limited portions of the landscape with vegetation coverage were subject to shovel testing. No other cultural material was recovered and the flake was collected. No further archaeological work is recommended for potential Borrow Source 5 / Land Farm 4.

Plate19: Western Portion of Potential Land Farm 4 and Potential Borrow Source 5

Plate 20: Eastern Portion of Potential Borrow Source 5

4.4.7 Potential Borrow Source 6

Borrow Source 6 is located east of the former weather station and south of the air strip (Figure 3; Plate 21). The area has been heavily disturbed. An intensive surface search was conducted but no cultural material was observed or recorded. No further archaeological wok is recommended for potential Borrow Source 6.

Plate21: Potential Borrow Source 6 (photo Kumari C. Karunaratne Ph.D., EBA Terrain Scientist)

4.4.8 Potential Borrow Source 7

Borrow Source 7 is located south of the main esker complex and is predominately situated on a north south running boulder area. The potential borrow source surface cover is a mix of vegetation (moss, lichen, shrubs), sand blowouts, frost boils, and boulders. There is a minimal amount of weather station associated debris in the area such as underground wires. While the area has moderate potential for heritage resources, no heritage resources were recorded. Heritage sites JgMf-3 and JgMf-19 were recorded to the west of potential Borrow Source 7. Should this area be chosen for development access needs to occur from the north and lower elevation areas west of the potential borrow source should be avoided (Figure 3; Plate 22).

Plate22: Potential Borrow Source 2 and the Location of JgMf-3, Based on 190s Data

4.4.9 Potential Land Farm 1

Potential Land Farm 1 has been heavily disturbed during the use of the weather station as evidence by a bulldozer push. JgMf-16, an isolated find, was located just to the west of this area (Figure 3; Plates 23). An intensive surface search was conducted of the area; however no cultural material was recorded. No further archaeological work is recommended for Potential Land Farm 1.

Plate 23: Potential Land Farm 1

4.4.10 Potential Land Farm 2

Potential Land Farm 2 has been heavily disturbed during the use of the weather station as evidence by a bulldozer push and debris (Figure 3; Plate 24). Prior to the establishment of the weather station this area would have had high archaeological potential as it is high, providing a view of the well drained area. The 1960s co-ordinate for JgMf-2 plots just to the north, however the location of site could not be confirmed. No further archaeological work is recommended for Potential Land Farm 2.

Plate 24: Potential Land Farm 2 View East

4.4.11 Potential Camp Location 1

Potential Camp 1 is located north east of the weather station (Figure 3; Plate 25). While close to a small water source the areas is relatively low in elevation and was assigned low to moderate potential for archaeological resources. An intensive surface search was conducted of the area; however no cultural material was recorded. No further archaeological work is recommended for Potential Camp Location 1.

Plate 25: View Northeast at Potential Camp Location 1

4.4.12 Potential Camp Location 2

Potential Camp 2 is located southwest of the weather station. The area has been heavily disturbed during the occupation of the weather station (Figure 3; Plate 26); there is little chance of locating *in situ* archaeological remains. However JgMf-12, an isolated find, was located in this area. An intensive surface search was conducted and no additional cultural material was observed. No further archaeological work is recommended in this area. JgMf-19 is to the south of the potential Camp Location 2 and this site should be avoided. The site is not 30 m from the potential camp location; however there is a natural break in the topography which will protect the site. The archaeological site area is approximately 2 400 m^2. Should camp location 2 be chosen, stakes or a snow fence should be placed along the northern boundary of the site (Figure 10).

Plate 26: View Northwest, Potential Camp 2

4.5 Life at Ennadai Lake Weather Station –Archaeological Evidence

The weather station was constructed in 1949 and was operated by the Federal government until 1979 (WESA 2010). In 1983 and 1985 portions of the area and the buildings were leased to Tundra Adventures and in 1994 this lease was transferred to the Kivalliq Inuit Association (Figure 2 and 3). It is clear from the debris and graffiti on site that the area is still currently used (Appendix 2).

Based on the chain of ownership it is clear that the Ennadai Weather stations is not an archaeological site however photo documentation of the Euro-Canadian debris at site provides an archaeological perspective of activities at the site.

While the debris documented cannot clearly be assigned to the period of weather station use or post abandonment some interesting information can be gained. As would be expected canned food is common. There is a fair bit of evidence for tomato based food. Some glass containers suggest soya sauce and ketchup were two common condiments. There are a fair number of alcohol related bottles some with dates as late at 2001. Pop cans with different mouth styles indicate occupation and change of manufacturing techniques through time. There is a dumbbell in one of the debris areas which suggest possible weight lifting as an activity to pass the time, there must have been a fair amount of spare time since there is evidence of white washed stone paths around the weather station. Tobacco tins and coffee are also common and may have been a trade items.

5.0 SUMMARY AND RECOMMENDATIONS

During August of 2012 Golder conducted an AIA on behalf of EBA, in conjunction with a Phase 3 Environmental Site Assessment for the Ennadai Weather Station. All required field work was conducted under Nunavut Archaeologists Permit 2012-006A issued by the Culture and Heritage to Julie M. Ross of Golder.

All areas of potential disturbance were surveyed for heritage resources. The weather station is located on a sandy esker and the majority of the Project area is not covered by vegetation. The majority of the area has been previously disturbed. Nine previously unrecorded archaeological sites were recorded during the 2012 AIA and attempts were made to confirm the location of previoulsy recorded archaeological sites JgMf-1, JgMf-2, JgMf- 3, and JgMf- 11 and recorded in the 1960s. Only the location of JgMf- 3 was confirmed.

Of the thirteen archaeological sites referenced in this report, it is recommended that JgMf-3, JgMf-14, and JgMf-19 should be avoided (Table 1). JgMf-3 is located west of potential Borrow Source 7. JgMf-14 is located in potential Borrow Source 3 and JgMf-19 is located south of Potential Camp Location 2.

Community insight into the significance of the heritage resources is always valuable and important owing to the history of Inuit – Euro Canadian relations in the area. Should any Elders from the Ennadai Lake area be available to comment on site significance it should be solicited and recorded.

By conducting this AIA, it is recommended that EBA, PWGSC and AANDC have fulfilled the requirements of the current program in their attempts to identify the potential for impact to heritage resources resulting from the potential remediation of the Ennadai Weather Station. The AIA included the participation of Randy Demcheson from Iqaluit who participated in identifying and recording heritage resource sites.

Table 1: Recommendations

Borden Number	Type	Period	Significance[3]	Associated Potential Development	Status of Work	Recommendation
JgMf-1	campsite	prehistoric, indigenous historic, historic	low	location not confirmed	surface collection made in 1960s; disturbed in 1960s; location not confirmed	no further work
JgMf-2	isolated find	prehistoric	low	location not confirmed	location not confirmed	no further work
JgMf-3	campsite	prehistoric, indigenous historic, historic	Ihalmuit/Ahiarmuit community input on significance recommended	west of potential Borrow Source 7	surface collection made in 1960s; update coordinates; photographed; mapped	avoid
JgMf-11	isolated find	undetermined	low	location not confirmed	surface collection made in 1960s	no further work
JgMf-12	isolated find	prehistoric	low	In Potential Camp Location 2	coordinates recorded; collected	no further work
JgMf-13	isolated find	prehistoric	low	west of Borrow Source 2	coordinates recorded; collected	no further work
JgMf-14	markers, grave	indigenous historic	high	In potential Borrow Source 3	feature coordinates recorded; features photographed; shovel testing	avoid whole site, consult with Culture and Heritage, IHTI to only avoid Feature 8, (grave)
JgMf-15	campsite	indigenous historic	Ihalmuit/Ahiarmuit community input on significance recommended	north of Project area	feature coordinates recorded; features photographed	avoid

[3] Community consultation may alter significance assessment

Table 1: Recommendations (cont.)

Borden Number	Type	Period	Significance[3]	Associated Potential Development	Status of Work	Recommendation
JgMf-16	isolated find	prehistoric	low	just west of potential Land Farm 1	coordinates recorded; collected	no further work
JgMf-17	isolated find	indigenous historic	low	located in potential Borrow Source 2	coordinates recorded; collected	no further work
JgMf-18	camp site	indigenous historic	Ihalmuit/Ahiarmuit community input on significance recommended	located in potential Borrow Source 4	coordinates recorded; heritage remains photographed	no further work
JgMf-19	camp site	indigenous historic	Ihalmuit/Ahiarmuit community input on significance recommended	just south of potential Camp Location 2	coordinates recorded; heritage remains photographed	avoid
JgMf-20	marker	undetermined	low	north of Project area	coordinates recorded; photographed	avoid

Report Signature Page

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APPENDIX A

Artifact Catalogue

Catalogue Number	Permit number	Permit holder	Site Borden	Artifact Series	Field Number	Location	Level	Date excavated
JgMf-12:1	11-006A	J.Ross	JgMf-12	1	WP44	14 V 398115 6778647	surface	24-Aug-12
JgMf-13:1	11-006A	J. Ross	JgMf-13	1	WP43	14 V 398159 6778728	surface	24-Aug-12
JgMf-16:1	11-006A	J. Ross	JgMf-16	1	WP96	14 V 398399 6778935	surface	23-Aug-12
JgMf-17:1	11-006A	J. Ross	JgMf-17	1	WP153	14 V 398550 6778699	surface	25-Aug-12

Catalogue Number	Material	Description	Length (mm)	Width (mm)	Thickness (mm)	Quantity	Excavator comments
JgMf-12:1	quartize (grey-white)	poor quality flake	22	14	4	1	broke post collecton
JgMf-13:1	quartize (grey-white)	poor quality flake	16	12	4	1	
JgMf-16:1	quartize (grey-white)	poor quality flake	42	22	4	1	
JgMf-17:1	metal and plastic	fish hook	85	46	4	1	

APPENDIX B

Select Photo Documentation of Ennadai Lake Weather Station

Photo 1 Stretcher

Photo 2 NABOB coffee tin

Photo 3 Blank Sign Post

Photo 4 Corn oil tin

Photo 5 Glass beer(?) bottle

Photo 6 Labatt's Blue can

Photo 7 Coffee tin

Photo 8 Whisky bottle

Photo 9 Old cot springs

Photo 10 Glass bottles (soya sauce?)

Photo 11 5 Lb barbell weight

Photo 12 Whiskey bottle

Photo 13 Pop push tab

Photo 14 Glass bottles

Photo 15 Pull tap can

Photo 16 Mail box

Photo 17 Food tine (ham?)

Photo 18 Black Cat tobacco tin

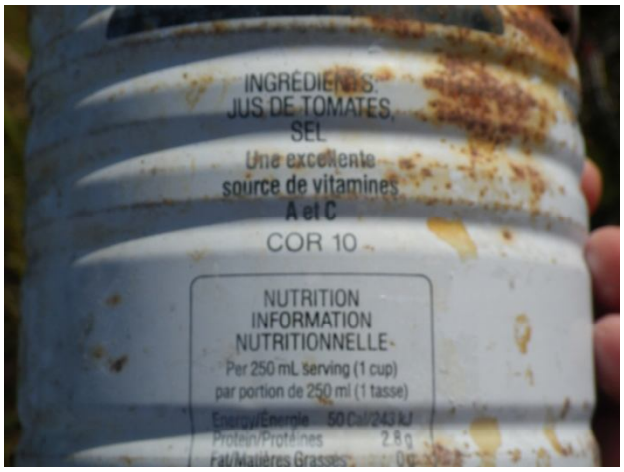

Photo 19 Tomato juice tin

Photo 20 Maxwell House coffee tin

Photo 21 Sail tobacco tin

Photo 22 Cameo tobacco tin

Photo 23 2009 glass wine bottle

Photo 24 Camp sausage tin

Photo 25 Food tin

Photo 26 Yeast tin

Photo 27 Ketchup bottle

Photo 28 Ketchup lid

Photo 29 Vogue tobacco tin

Photo 30 Weather Station garbage

Photo 31 White washed stone path

Photo 32 No trespassing sign

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