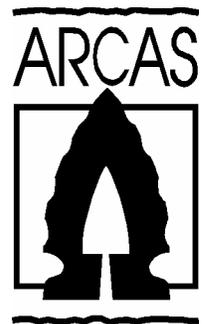


**CENTRAL OKANAGAN MULTI-MODAL
CORRIDOR, KELOWNA, B.C.
ARCHAEOLOGICAL IMPACT ASSESSMENT
VOLUME 1 - MAIN REPORT
Heritage Inspection Permit 2007-054**



**CENTRAL OKANAGAN MULTI-MODAL
CORRIDOR, KELOWNA, B.C.
ARCHAEOLOGICAL IMPACT ASSESSMENT
VOLUME 1 - MAIN REPORT**

Conducted in accordance with
HERITAGE INSPECTION PERMIT 2007-054,
issued by the Archaeology Branch, Ministry of Tourism, Sport and the Arts
and
CULTURAL HERITAGE INVESTIGATION PERMIT 2007-003,
issued by the Okanagan Indian Band

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19 March 2008

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MANAGEMENT SUMMARY

This partial final report describes the results of an archaeological impact assessment conducted by Arcas Consulting Archeologists Ltd. for a new transportation corridor in the Okanagan Valley. The City of Kelowna is proposing the Central Okanagan Multi-Modal Corridor (COMC) to bypass the Highway 97 commercial corridor through the eastern neighbourhoods of the City. The project will eventually include a new 4- to 6-lane divided highway, an extension of McCurdy Road from Highway 97 to Rifle Road, new interchanges at major street junctions, a potential commuter rail-link, and bicycle/hiking paths. The COMC corridor assessed during this project commences at a point just west of Spall Road (Stn 200+00), generally paralleling Mill Creek (a.k.a. Kelowna Creek) and/or the Canadian National (CN) Railway grade, and connecting with Highway 97 near the UBC Okanagan campus, for a total distance of 8 km.

A number of documented archaeological sites are situated within the COMC corridor, and much of the surrounding lands exhibit environmental characteristics that favourably influenced the distribution and preservation of archaeological sites. In accordance with the requirements of a Request for Proposals issued in the summer of 2006 (City of Kelowna 2006), Summit Environmental Consultants Ltd. (subcontractor to Urban Systems Ltd. and Associated Engineering) engaged the services of Arcas Consulting Archeologists (Arcas) to carry out an archaeological study for this development.

The project locality is within the traditional territory of the Westbank First Nation, and the area of responsibility of the Okanagan Indian Band; both of these Aboriginal communities are members of the Okanagan Nation Alliance.

The subject of this report represents an archaeological impact assessment as defined in the *British Columbia Archaeological Impact Assessment Guidelines*, issued by the provincial Ministry of Tourism, Sport and the Arts. The assessment was carried out in accordance with provincial Heritage Inspection Permit 2007-054, issued to Richard Brolly (Arcas) pursuant to Section 14 of the *Heritage Conservation Act*, as well as Okanagan Indian Band Cultural Heritage Investigation Permit 2007-003.

The archaeological field survey in the COMC corridor took place in April 2007. Three prehistoric artifact scatters with buried archaeological remains were identified within the proposed COMC corridor. Of these, documented sites DIQu-21 and DIQu-22 were revisited and re-recorded, and one new site (DIQu-202) was identified and recorded. Documented site DIQu-145 was revisited, but no archaeological remains were found at this site. Lastly, designated historic site DIQu-24 (the Brent Mill) was revisited, but no further action was taken at this site during the present study. No sites were identified within that portion of the McCurdy Extension right-of-way that was inspected.

A significant length of the COMC corridor and proposed McCurdy Extension right-of-way remains unexamined, within two private properties to which access was denied in April 2007. Lands believed to exhibit high or at least moderate archaeological resource potential exist within the COMC corridor on at least one of these properties.

The impact assessment study established that the proposed COMC corridor could cause adverse impacts to three protected archaeological sites (DIQu-21, DIQu-22, DIQu-202). The first two of these sites are rated as having moderate-to-high scientific significance, while the third is rated as having low scientific significance. Designated historic site DIQu-24 is situated south of the corridor as presently envisioned; the project should not conflict with this site. Lastly, one COMC corridor option conflicts with DIQu-145, but no evidence of this site remains and no adverse impacts would occur as result of construction. Based on these findings, resource management recommendations were made for the proposed COMC project, including its ancillary facilities.

(1) Unsurveyed Properties in COMC Corridor and McCurdy Extension Right-of-Way

Two properties traversed by the corridor could not be inspected by the archaeologists during April 2007, because access to those lands was denied by their respective landowners. The properties in question are located as follows: (i) Lot A, Plan KAP83361 @ 2750-2784 Hwy 97 N & Lot B, Plan KAP83361 @ 2786-2788 Hwy 97 N (COMC Stn 234+50 - 243+25 & McCurdy Extension Stn 0+700 - 0+950); and (ii) Lot 1, Plan 41723 @ 2851 Sexsmith Road (Stn 309+40 - 317+60). Some of the terrain within these properties exhibits high or moderate archaeological potential and it is recommended that these lands be inspected by archaeologists prior to the onset of construction for the COMC Project and/or McCurdy Road Extension.

(2) DIQu-21

To manage potential project effects to the buried archaeological remains in the western part of DIQu-21, considered to have moderate-to-high significance, the following recommendation is made:

- (1) Relocate the COMC corridor to a less-sensitive location, such as the hillside immediately northwest of the site, which is rated as having low archaeological potential. If the COMC corridor is relocated here, additional archaeological field survey would be required to inspect the level terrace lands west and southwest of DIQu-21.

If the redesign option proposed in Recommendation #1 is not feasible from an engineering or environmental perspective, or can only be partially implemented, then the following recommendations are made:

- (2) Initiate mitigation in the form of a systematic data recovery program (archaeological excavation) to salvage a sample of cultural materials from DIQu-21. The investigation should focus upon the area of buried archaeological deposits, rather than the entire area of the site. All cultural materials recovered during the mitigation of DIQu-21 should be fully analyzed (including radiocarbon dating of suitable samples) and reported.

- (3) Following archaeological mitigation, construction activities can take place within the site in accordance with a Section 12 (Site Alteration) Permit, issued by the Archaeology Branch to the proponent and/or contractor.
- (4) Implement the Heritage Resource Contingency Plan (see below) if significant cultural materials are encountered during any land-altering activities associated with road construction after the archaeological mitigation project.

For the remainder of DIQu-21, where no buried archaeological deposits or surface artifacts were observed (i.e., the eastern part of the site), the following recommendations are made:

- (5) No further archaeological work is required in the eastern part of DIQu-21 prior to project construction.
- (6) During construction, Environmental Inspectors should implement the Heritage Resource Contingency Plan if unanticipated, significant archaeological remains are encountered at DIQu-21.

(3) DIQu-22

To manage potential project effects to the buried archaeological remains in the southwestern part of DIQu-22, which are rated as moderate-to-high significance, the following recommendations are made:

- (1) Relocate the COMC corridor to a less-sensitive location, such as the hillside landward of the natural gas pipeline immediately north of site DIQu-22. No additional field survey should be required to inspect a revised alignment in this location, since the hillslope has low archaeological potential.

If the redesign option proposed in Recommendation #1 is not feasible for engineering or environmental reasons, or can only be partially implemented, then the following recommendations are made:

- (2) Initiate mitigation in the form of a systematic data recovery program (archaeological excavation) to salvage a sample of cultural materials from the southwestern portion of DIQu-22. The investigation should focus upon the area of buried archaeological deposits, rather than the entire area of the site. All cultural materials recovered during the mitigation of DIQu-22 should be fully analyzed (including radiocarbon dating of suitable samples) and reported.
- (3) Following mitigation, construction activities within the site can be carried out in accordance with a Site Alteration Permit.

- (4) Implement the Heritage Resource Contingency Plan if significant cultural materials are encountered during the land-altering activities associated with road construction after the mitigation project.

To manage potential impacts to the remainder of DIQu-22, where buried archaeological deposits or surface artifacts were not observed in 2007 (i.e., the eastern part of the site), the following recommendations are made:

- (5) No further archaeological work is required in the eastern part of DIQu-22 prior to project construction.
- (6) During construction, Environmental Inspectors should implement the Heritage Resource Contingency Plan if unanticipated, significant archaeological remains are encountered.

(4) DIQu-24

The Brent Mill and associated heritage buildings are situated in a municipal park reserve south of the COMC corridor. This proposed corridor does not conflict with the site and no adverse impacts to the site should be incurred as a result of future highway construction. For these reasons, no resource management recommendations are necessary for this site.

(5) DIQu-145

No cultural materials attributable to DIQu-145 were observed in 2007, and only two artifacts were found when the site was originally recorded in 2006. If the L300C2 route option was selected, conflicts with this site would be unavoidable.

- (1) Although this site is protected by the *Heritage Conservation Act*, it is considered to be destroyed, and no further actions are recommended to mitigate adverse project effects. Construction within the reported site boundary would still require a Site Alteration Permit.

(6) DIQu-202

To manage potential project effects to site DIQu-202, the following recommendations are made:

- (1) Relocate the COMC corridor to a less-sensitive location, such as the hillside landward of the natural gas pipeline immediately west of site DIQu-202. Additional archaeological field survey would be required for localized areas of level terrain on the slope, which have moderate or high archaeological potential.
- (2) If the preceding option is infeasible for any reason, no further archaeological mitigation is necessary; however, construction activities within the recorded site boundary must be carried out in accordance with a Site Alteration Permit.
- (3) Implement the Heritage Resource Contingency Plan if significant cultural materials are encountered during the land-altering activities associated with road construction.

(7) Heritage Management Plan

Survey coverage within the proposed COMC corridor was thorough, and aside from the properties to which access was denied, it is believed that no additional archaeological remains are present within the inspected lands. However, readers of this report should be aware that even the most thorough investigation may fail to reveal all archaeological remains that may exist within a proposed development area. In particular, isolated artifacts and/or individual burial places would be very difficult to identify during a field survey. To ensure that any unanticipated discovery of archaeological remains is addressed, it is further recommended that:

- (1) The City of Kelowna and/or their representatives inform its contractors that:
(i) archaeological remains in British Columbia are protected from disturbance, intentional or inadvertent, by the *Heritage Conservation Act*; (ii) in the event that archaeological remains are encountered, all ground disturbance in the immediate vicinity must be suspended at once; (iii) it is the individual's responsibility to inform the Archaeology Branch, as soon as possible, about the location of any archaeological remains and the nature of the disturbance; and (iv) the *Heritage Conservation Act* sanctions severe penalties for failing to comply with these requirements.
- (2) Further, the City of Kelowna should promptly inform representatives of the Westbank First Nation and Okanagan Indian Band about the particulars of any unanticipated archaeological discoveries.

To ensure that appropriate actions are taken if unanticipated, significant archaeological remains (e.g., burial places) are encountered by contractors' personnel during construction, it is recommended that contractors implement a Heritage Resource Contingency Plan during the

construction phase of the COMC Project. The Heritage Resource Contingency Plan would be implemented as follows:

- (3) Contractor suspends work immediately in the vicinity of any newly-discovered archaeological remains. Work at that location may not resume until the measures described below are undertaken.
- (4) Notify the Environmental Inspector.
- (5) The Environmental Inspector would provide information regarding the archaeological remains to the proponent's archaeological consultant, and under their direction, either allow construction to resume, or notify:
 - applicable government agencies (e.g., Archaeology Branch) as required; and
 - designated representatives of the First Nations' communities.
- (6) If significant archaeological resources are found, the proponent's archaeological consultant may deem it necessary to visit the site and will, regardless of whether a site visit is required, develop an appropriate mitigation plan in consultation with the proponent and contractors and, if necessary, First Nations' communities and appropriate government agencies.

ACKNOWLEDGEMENTS

Arcas Consulting Archeologists would like to thank Summit Environmental Consultants Ltd. for the opportunity to conduct this study. In particular, we would like to acknowledge the assistance and support of Brent Phillips throughout this project. Tim Blackburn (Urban Systems Ltd.) and Andrew Albiston (City of Kelowna) provided assistance of various kinds during the project, particularly involving acquisition of design plans prior to the field work. Kari O'Rourke (City of Kelowna) helped us to obtain property legal descriptions and prepared letters that were sent to property owners along the route.

We also wish to thank Darcy Hamilton and Roxanne Lindley (Westbank First Nation) and Keona Joe (Okanagan Indian Band) for their advice and help in obtaining Band members to assist with our field survey, as well as Clint Swite and Kelly Fosbery (WFN) and Jana Bonneau and Darcy Good Water (OKIB) who participated in the fieldwork.

Jim Pike (Archaeology Branch, Ministry of Tourism, Sport and the Arts) is thanked for his review of our Heritage Inspection Permit application.

The professional opinions expressed in this report are those of Arcas, and not necessarily those of any other individuals, groups, or institutions involved in the study. Arcas is solely responsible for the content of this report, including any errors, omissions, or other shortcomings.

TABLE OF CONTENTS
VOLUME 1 - MAIN REPORT

	Page
CREDITS	i
MANAGEMENT SUMMARY	ii
ACKNOWLEDGEMENTS	viii
TABLES AND FIGURES	xi
1.0 INTRODUCTION	1
1.1 PROTECTION OF ARCHAEOLOGICAL RESOURCES	1
1.2 OBJECTIVES	3
1.3 DEVELOPMENT DESCRIPTION	3
2.0 METHODOLOGY	4
2.1 BACKGROUND RESEARCH	4
2.2 FIRST NATIONS' INVOLVEMENT	4
2.3 EVALUATION OF ARCHAEOLOGICAL RESOURCE POTENTIAL	5
2.4 FIELD PROCEDURES	6
2.5 REPORTING	8
3.0 BIOPHYSICAL SETTING	9
3.1 LANDSCAPE AND TERRAIN	9
3.2 GEOLOGY	9
3.3 HYDROLOGY	11
3.4 MODERN VEGETATION	12
3.5 ANCIENT ENVIRONMENTS	12
3.5.1 Late-Glacial Events in the Okanagan Valley	13
3.5.2 Environmental History	14
4.0 CULTURAL SETTING	16
4.1 ETHNOGRAPHIC BACKGROUND	16
4.2 ARCHAEOLOGICAL BACKGROUND	18
4.2.1 Archaeological Site Types	18
4.2.2 Archaeological Research in the Okanagan Valley	19
4.2.3 Regional Cultural Chronology	20
Early Prehistoric Period (11,000-7000 BP)	20
Middle Prehistoric Period (7000-3500 BP)	22
Late Prehistoric Period (3500-200 BP)	23
4.2.4 Archaeological Resources near the Project Locality	24
4.3 HISTORIC BACKGROUND: 1811 - PRESENT	26
5.0 RESULTS	27
5.1 FIELD SURVEY	27
5.2 HERITAGE RESOURCES	30
5.2.1 Artifact Scatter Site: DIQu-21	30
5.2.2 Artifact Scatter Site: DIQu-22	34
5.2.3 Brent Mill: DIQu-24	38

TABLE OF CONTENTS, continued

	Page
5.2.4 Artifact Scatter Site: DIQu-145	38
5.2.5 Artifact Scatter Site: DIQu-202	40
5.3 SIGNIFICANCE EVALUATION	43
5.3.1 DIQu-21 Significance Evaluation	43
5.3.2 DIQu-22 Significance Evaluation	44
5.3.3 DIQu-24 Significance Evaluation	45
	Page
5.3.4 DIQu-145 Significance Evaluation	46
5.3.5 DIQu-202 Significance Evaluation	46
6.0 IMPACT ASSESSMENT	56
7.0 RECOMMENDATIONS AND CONCLUSION	58
7.1 RECOMMENDATIONS UNSURVEYED PROPERTIES	58
7.2 RECOMMENDATIONS - DIQu-21	59
7.3 RECOMMENDATIONS - DIQu-22	60
7.4 RECOMMENDATIONS - DIQu-24	61
7.5 RECOMMENDATIONS - DIQu-145	61
7.6 RECOMMENDATIONS - DIQu-202	61
7.7 DEVELOPMENT OF A HERITAGE RESOURCE CONTINGENCY PLAN	62
8.0 REFERENCES CITED	64

VOLUME 2 - APPENDICES

APPENDIX I: ARCHAEOLOGICAL IMPACT ASSESSMENT OF THE MARSHALL PROPERTY, KELOWNA, B.C.	I-1 - I-19
APPENDIX II: RESULTS OF EVALUATIVE TESTING AT DIQu-21 & DIQu-22, KELOWNA, B.C., July 2008	II-1 - II-52

TABLES

	Page
Table 1. Archaeological periods of the Southern Interior region	21
Table 2. Documented sites within 5 km of the COMC corridor	24
Table 3. COMC corridor archaeological potential and field survey summary, April 2007	28
Table 4. Subsurface and evaluative testing results at DIQu-21, April 2007	32
Table 5. Subsurface and evaluative testing results at DIQu-22, April 2007	37
Table 6. Subsurface testing results at DIQu-202, April 2007	43

FIGURES

Figure 1. Location of Central Okanagan Multi-Modal Corridor and documented archaeological and historic sites	2
Figure 2. Kelly Fosbery (Westbank First Nation) and Darcy Good Water (Okanagan Indian Band) shovel testing near a wetland at COMC Stn 227+30. A mineral lick used by many resident animals is reported from the hillside at right	4
Figure 3. Clint Swite (Westbank First Nation) and Ginelle Taylor (Arcas) testing on level terrace landform near COMC Stn 334+00	8
Figure 4. View of crew members Jana Bonneau (OKIB), Clint Swite (WFN), and Ewan Anderson on hillside above Rutland Siding neighbourhood, showing typical appearance of terrain in northern part of COMC corridor	10
Figure 5. View southwest showing typical appearance of dissected glaciolacustrine terraces at toe of Mount Dilworth; Mill Creek flows through linear area of deciduous vegetation at left; site DIQu-21 located amongst ponderosa pine at centre	10
Figure 6. View east across southern end of the site DIQu-22, showing abundant balsamroot in bloom in April 2007	13
Figure 7. Map of archaeological site DIQu-21	31
Figure 8. View southeast toward southern end of site DIQu-21; dashed outline denotes remainder of the site. Area of the subsurface cultural materials at right extremity of the site	33
Figure 9. DIQu-21, profile of evaluative test EU1, showing brown silty loam overlying clay loam	33
Figure 10. Map of archaeological site DIQu-22	35
Figure 11. View southeast toward southern part of DIQu-22; subsurface cultural materials are confined to the low rise where the balsamroot is growing (white outline area); remainder of sites extends away to the left	36
Figure 12. DIQu-22, profile of evaluative test Eu2, showing brownish grey fine sand over brown fine to medium sand	36
Figure 13. View north of Brent Mill in its original setting off Cary Road; photo taken in September 1981	39
Figure 14. View east of Brent Mill in its original setting; photo taken in September 1981	39
Figure 15. View north toward DIQu-145 (outlined area) on narrow terrace east of Highway 97, north of new UBC Interchange	40
Figure 16. Map of archaeological sites DIQu-202	41
Figure 17. View west toward DIQu-202 site area	42
Maps 1 - 12. Orthophoto plans of the COMC corridor, showing extent of field survey coverage, subsurface tested locations, and archaeological sites	48-55

1.0 INTRODUCTION

This report describes the results of an archaeological impact assessment conducted by Arcas Consulting Archeologists Ltd. for a proposed transportation corridor in the Okanagan Valley. As part of its Official Community Plan, the City of Kelowna is proposing to construct a new route to bypass the Highway 97 commercial corridor through the eastern neighbourhoods of the City (Figure 1), including a 4- to 6-lane divided highway, new interchanges at major street junctions, a potential commuter rail-link, and bicycle/hiking paths.

A number of documented archaeological sites are situated within the proposed Central Okanagan Multi-Modal Corridor (COMC), and much of the corridor exhibits environmental characteristics that favourably influence the distribution and preservation of archaeological sites.

In accordance with the requirements of a Request for Proposals issued in the summer of 2006 (City of Kelowna 2006), Summit Environmental Consultants Ltd. (subcontractor to Urban Systems Ltd. and Associated Engineering) engaged the services of Arcas Consulting Archeologists (Arcas) to carry out an archaeological study for this development.

The project locality is located within the traditional territory of the Westbank First Nation and the area of responsibility of the Okanagan Indian Band; both of these Aboriginal communities are members of the Okanagan Nation Alliance.

1.1 PROTECTION OF ARCHAEOLOGICAL RESOURCES

Archaeological sites in B.C. are protected by the *Heritage Conservation Act* (RSBC 1996, c.187), administered by the Archaeology Branch (Ministry of Tourism, Sport and the Arts). Sites are protected by the *Act* whether located on public or private lands. Archaeological sites are protected if they have been designated as “provincial heritage sites” in accordance with Section 9 of the *Act*, or through automatic protection under Section 13 by virtue of particular historic or archaeological values. Sites automatically protected in B.C. include:

- archaeological sites occupied or used before AD 1846;
- aboriginal rock art with historical or archaeological value;
- burial places with historical or archaeological value;
- heritage ship and aircraft wrecks; and
- sites of unknown attribution, that could have been occupied prior to AD 1846.

Protected archaeological sites may not be altered or disturbed in any manner without a Permit issued under Sections 12 or 14 of the *Heritage Conservation Act*. Further, heritage sites of Aboriginal origin not automatically protected by the *Act* may be subject to legal interpretations of the Supreme Court of Canada decision in *Delgamuukw vs. British Columbia* (1997), regarding the fiduciary responsibilities of provincial governments for protecting First Nations’ cultural heritage.

1.2 OBJECTIVES

The subject of this report represents an archaeological impact assessment as defined in the *British Columbia Archaeological Impact Assessment Guidelines* (Archaeology Branch 1998), issued by the Ministry of Tourism, Sport and the Arts. According to the *Guidelines*, the objectives of the impact assessment were to:

- identify and evaluate the significance of any archaeological sites located within the proposed COMC corridor;
- identify and evaluate possible impacts by the COMC development on archaeological resources; and
- recommend appropriate impact management measures where necessary.

The assessment was carried out in accordance with provincial Heritage Inspection Permit 2007-054, issued to Richard Brolly (Arcas) pursuant to Section 14 of the *Heritage Conservation Act*, as well as Okanagan Indian Band Cultural Heritage Investigation Permit 2007-003.

This study is concerned with potential impacts to archaeological resources that may arise from the Central Okanagan Multi-Modal Corridor development. It does not address potential impacts to traditional use sites by this development. It is not the intent of this report to document the interests of First Nations' communities with traditional territories in this locality. The study was conducted without prejudice to First Nations' treaty negotiations, Aboriginal rights, or Aboriginal title.

1.3 DEVELOPMENT DESCRIPTION

This project is intended to assess a proposal by the City of Kelowna to develop a new municipal transportation corridor from a point just west of Spall Road (Stn 200+00), generally paralleling Mill Creek (a.k.a. Kelowna Creek) and/or the Canadian National (CN) Railway grade, and connecting with Highway 97 near the UBC Okanagan campus, for a total distance of 8 km (Figure 1). Maps 1-12 are orthophotos showing the COMC corridor as proposed when the archaeological impact assessment took place in April 2007.

Specifically, the proposed COMC will consist of the following components (City of Kelowna 2006):

- design and construction of a 4-lane grade-separated highway (expandable to 6-lane);
- design and construction of an extension to McCurdy Road, connecting to Dilworth Drive/Rifle Road;
- construction of new interchanges at Dilworth Drive, McCurdy Road, Sexsmith Road, and Highway 97;
- provide pedestrian and bicycle trails parallel to the roadway; and
- potential adaptation of the existing CN railway grade as a commuter passenger rail-link.

According to the Request for Proposals (City of Kelowna 2006), all preliminary design and environmental studies (including the present archaeological impact assessment) are to be completed by July 2007. Construction should begin in the spring of 2008, with an estimated completion date of October 2009.

The COMC corridor is primarily situated within private lands, although existing thoroughfares (e.g., Spall Road, Dilworth Drive, Sexsmith Road) and parklands along Mill Creek are City-owned.

2.0 METHODOLOGY

The research for this impact assessment study involved the following tasks:

- C background research, involving a review of ethnographic, archaeological, historic, and biophysical documents for the Okanagan Valley;
- C communications with the First Nations' communities with traditional interests in the project locality;
- C preparation of permit applications for the study, which invited comments from the First Nations' communities;
- C a field survey of the COMC corridor to identify and evaluate archaeological resources in conflict with the proposed development; and
- C preparation of a report (this document) describing the outcome of the study.

2.1 BACKGROUND RESEARCH

The background research consisted of an in-office review of historic, ethnographic, and archaeological literature relevant to the Okanagan Valley in general and the Kelowna - Westbank area in particular. Documents in the libraries of Arcas and the Archaeology Branch in Victoria were reviewed. This aspect of the research sought general information on pre-Contact archaeology, traditional First Nations' occupation and land use, and Euro-Canadian settlement in the area.

Mapped biophysical data was reviewed for information pertinent to this study, including surficial geology, soils, and vegetation associations. The Provincial Heritage Register was searched using the Remote Access to Archaeological Data (RAAD) on-line application, to obtain information about documented archaeological and historical sites present in the vicinity of the COMC corridor. RAAD was also used to search for information about sites in comparable environmental settings, to establish the distribution and kinds of undocumented archaeological sites that could be present in the project locality.

2.2 FIRST NATIONS' INVOLVEMENT

Readers are reminded that communications between Arcas staff and representatives of the Westbank First Nation and Okanagan Indian Band do not constitute "consultation" as defined by those communities, or as may be required by federal and provincial regulatory authorities in order to gain project approval.

The Archaeology Branch officially notified the Westbank First Nation and Okanagan Indian Band about this project. The Heritage Inspection Permit application prepared by Arcas was submitted to these communities for review, to ensure that specific archaeological methodology concerns, if any, could be addressed before the Permit was issued. In addition, an application for a Cultural Heritage Investigation Permit was submitted by Arcas to the Okanagan Indian Band, who issue permits for archaeological studies in their area of responsibility. Lastly, Arcas personnel contacted Darcy Hamilton (Westbank First Nation) and Keona Joe (Okanagan Indian Band) prior to the field survey, to arrange for community representatives to participate in the fieldwork (Figure 2).

- current understanding of traditional resource use and settlement by Aboriginal people;
- environmental setting of documented archaeological sites in the surrounding area; and
- integrity of the modern landscape as a reflection of historic land use practices.

Lands that could be affected by the proposed COMC development were categorized as having “High”, “Moderate”, or “Low” potential. The potential values are defined as follows:

- **High Potential:** Lands exhibiting topographic and biophysical attributes highly supportive of traditional activities in the past that would have left archaeological evidence. An archaeological impact assessment is usually required for lands rated as having high archaeological potential.
- **Moderate Potential:** Lands exhibiting fewer attributes that would have supported traditional activities that could have left archaeological evidence. An archaeological impact assessment may be recommended for lands rated as moderate archaeological potential, though the level of effort might be less than that expected for high-potential lands.
- **Low Potential:** Lands that exhibit few characteristics supportive of traditional activities. Further archaeological investigations are not normally recommended for lands categorized as having low archaeological potential.

2.4 FIELD PROCEDURES

The field survey of the COMC corridor was carried out by Richard Brolly (Arcas/Field Director), with Rizwaan Abbas (Arcas/Crew Leader), Ginelle Taylor (Arcas/Crew Leader), Ewan Anderson (Arcas/Field Director), Kelly Fosbery and Clint Swite (Westbank First Nation/Assistants), and Darcy Good Water and Jana Bonneau (Okanagan Indian Band/Assistants) on 24-26 April 2007. The primary focus of the survey was to locate intact and/or minimally-disturbed settings within the COMC corridor, identify archaeological remains and evaluate their significance, and determine the extent and severity of impacts that could arise from proposed development activities.

Field survey procedures began with a visual inspection of the COMC corridor as shown on current development plans. The survey included an in-field assessment of archaeological potential from a micro-topographic perspective. More detailed inspections were made on lands exhibiting characteristics of high or moderate archaeological resource potential. Observations in settings with low archaeological potential were made while passing through them *en route* to another location. The field survey concentrated on landscape features that positively influence the distribution of archaeological sites, including terraces associated with rivers and streams, terrace margins, and localized height-of-land features (e.g., knolls, ridges). Although the limits of the corridor and the survey stations cited in this text were not marked when the field survey was carried out, tie-in points for archaeological sites and subsurface testing locations were easily determined on high-resolution coloured orthophotos obtained through the City of Kelowna Internet Map Viewer.

Survey groups of variable sizes were deployed during the project. Lands along a traverse were examined using crew-members spaced at roughly constant intervals (between 5 and 10 m), subject to topographic and visibility constraints. The land surface was inspected for cultural features, artifacts, fire-altered rocks, and other evidence of past human activity. Natural exposures (e.g., trails, road-



Figure 2. Kelly Fosbery (Westbank First Nation) and Darcy Good Water (Okanagan Indian Band) shovel testing near a wetland at COMC Stn 227+30. A mineral lick used by many resident animals is reported from the hillside at right.

2.3 EVALUATION OF ARCHAEOLOGICAL RESOURCE POTENTIAL

“Archaeological resource potential” is defined as the capability of a landscape (or portion of a landscape) to have supported the kinds of traditional activities that would have resulted in the formation and preservation of archaeological remains. Some kinds of traditional activities did not result in the formation of physical remains, and usually cannot be considered in the context of an assessment of archaeological resource potential. As used here, potential ratings are not synonymous with *probability*, which is a quantifiable measure of site occurrence, but simply identify lands that should be examined by archaeologists in advance of development projects.

Assessment of archaeological resource potential is based upon a consideration of the locations of documented sites, ethnographic and historic information, and topographical and biophysical characteristics that favourably influence the distribution of archaeological sites. Because archaeological site locations are often correlated with particular micro-environmental attributes, the presence or absence of these variables can be used to identify lands with greater or lesser archaeological potential. The variables considered for this overview study included:

- modern vegetation/forest cover;
- observed or documented fisheries and wildlife values (e.g., the mineral lick near Stn 226+00);
- proximity to traditional resources (e.g., flakable stone, economic plants);
- proximity to aquatic features, both modern and ancient (e.g., streams, wetlands);
- aspect (i.e., wind or solar exposure based on direction of slope);
- presence/absence of fine-textured sediments and soil drainage quality;

cuts, stream banks) were examined for archaeological remains, and bedrock outcrops were inspected for rock art, burial places, and evidence of lithic raw material procurement.

Surface exposures were fair to excellent throughout much of the corridor, but fair to poor on the agricultural properties in the northeastern part of the corridor and within a municipal cemetery at the southwestern end of the corridor. Subsurface testing was used to search for archaeological remains in forested and/or overgrown settings, as well as to identify the buried components of documented sites (Figure 3). The tests were judgementsly excavated at approximately 5 to 10 m intervals, with smaller intervals (2-5 m) to fill in gaps between positive tests within sites. All tests were dug as deeply as feasible in compact clay soils, always well into the B-horizon. The shovel tests averaged about 40 x 30 or 40 x 35 cm in area and ranged from 35 to 55 cm in depth. Sediments excavated from all subsurface tests were screened through 6 mm mesh for recovery of artifacts and other cultural materials. All cultural materials encountered in the tests were described in the fieldnotes and collected for further analysis and curation. No cultural materials were collected from surficial contexts. All subsurface tests were backfilled after stratigraphic information and other observations had been recorded in fieldnotes.

Five evaluative tests, each measuring 50 cm², were excavated during the field survey. The purpose of these tests was to provide more information about the integrity of cultural deposits and recover a larger sample of cultural materials from undisturbed contexts. Procedures used to excavate the evaluative tests were similar to the shovel testing, except that they were dug in 10 cm arbitrary levels. All recovered cultural materials were collected for further analysis and description. The evaluative tests were backfilled upon completion.

Archaeological sites encountered during the field survey were recorded according to the procedures specified in the *British Columbia Archaeological Site Inventory Form Guide* (Archaeology Branch 2006). Sites were mapped by chain-and-compass, their geo-references acquired with hand-held GPS receivers, and plotted onto the COMC corridor plans available when the fieldwork was conducted. Information about each site was recorded in fieldnotes. Site boundaries were not flagged or otherwise marked in the field, as all are situated in open environmental settings used by many recreational hikers and bikers.

Survey proceedings and contextual views of the landscape traversed by the proposed COMC route were photographed with digital cameras and on 35 mm colour print film.



Figure 3. Clint Swite (Westbank First Nation) and Ginelle Taylor (Arcas) testing on level terrace landform near COMC Stn 334+00.

2.5 REPORTING

Information about the archaeological sites observed during the field survey was recorded on B.C. Archaeological Site Inventory Forms, as required by the conditions of Permit 2007-054. Completed site forms will be submitted to the Archaeological Site Inventory section (Archaeology Branch) for registration. Temporary site numbers assigned to one new site in the field will be replaced with permanent Borden site numbers assigned by Archaeology Branch staff.

This document represents a report for work completed under Heritage Inspection Permit 2007-054, in compliance with Permit conditions required by the Archaeology Branch. The report is produced in a format specified in the provincial *Guidelines* (Archaeology Branch 1998), as well as the *Standards for Electronic Submission of Permit Reports* (Archaeology Branch 2004).

One bound copy and one digital copy (PDF) on CD-ROM will be submitted to the Ministry of Tourism, Sport and the Arts in fulfillment of the conditions of the Permit. Copies of this report will be sent to the development proponent and the First Nations' communities, in compliance with professional standards of practice.

3.0 BIOPHYSICAL SETTING

The proposed COMC corridor assessed under Permit 2007-054 is situated from 2.5 km east to 9.0 km east-northeast of the Kelowna city centre. Most of the proposed route is situated within private lands, with a small fraction within existing City rights-of-way or parkland.

3.1 LANDSCAPE AND TERRAIN

The proposed COMC corridor is situated in the eastern neighbourhoods of Kelowna, in the central Okanagan Valley (Figure 1). The project locality is within a broad, shallow valley east of Okanagan Lake that was once an arm of a much-larger waterway known as Glacial Lake Penticton (see Section 3.5). The landscape presently occupied by Kelowna is irregularly undulating to rolling with steep-sided rocky knolls, low rounded hills, and flat-bottomed basins with localized wetlands and alkaline lakes (Figure 4).

The landscape traversed by the proposed corridor is typical of low- and middle-elevation glaciated settings on the Interior Plateau of British Columbia. The valley bottom along the route is an alluvial plain flanked to the east and west by glaciolacustrine terraces and raised stream deltas (Figure 5) deeply dissected by early-Holocene stream channels, many of which are now permanently dry. From Spall Road northeasterly to the Dilworth Drive crossing, the route passes through a light-industrial/commercial neighbourhood on the left bank (south side) of Mill (Kelowna) Creek. From Dilworth Drive to Sexsmith Road, the corridor traverses the floodplain of Mill Creek and/or the lower slopes of Mount Dilworth and its outlier ridges. North of Sexsmith Road, the route climbs over an unnamed low hill west of Highway 97, before rejoining the existing highway at the new UBC Interchange (presently under construction by the Ministry of Transport). Lastly, the McCurdy Road Extension originates on the Mill Creek floodplain at Highway 97, and ascends the lower slope of Mount Dilworth to Rifle Road via an ephemeral stream gully.

The elevation of the COMC corridor rises on a gently undulating grade from a low point of 360 m above sea level (asl) at its southern extremity (Spall Road), to 400 m asl at the interchange with the McCurdy Road Extension, 412 m at the Sexsmith Road crossing, and 412 m at the point where it rejoins Highway 97. The highest point reached by the route is 456 m asl, on the crest of the hill between Highway 97 and the Sexsmith Road crossing. Between Spall Road and Sexsmith, the highest point reached is 414 m asl, on a low knoll at Stn 232+40. The point of commencement for the McCurdy Road Extension is approximately 390 m asl at Highway 97, rising to 450 m where it connects with Rifle Road.

3.2 GEOLOGY

Rock outcrops are present within the COMC corridor on Mount Dilworth and the hill between Sexsmith Road and Highway 97. Geological mapping characterizes the bedrock on Mount Dilworth as Eocene-aged Marama Formation volcanic rocks like dacite (Tempelman-Kluit 1989; Roed and



Figure 4. View south of crew members Jana Bonneau (OKIB), Clint Swite (WFN), and Ginelle Taylor on hillside above Rutland Siding neighbourhood, showing typical appearance of terrain in northern part of COMC corridor.



Figure 5. View southwest showing typical appearance of dissected glaciolacustrine terraces at toe of Mount Dilworth; Mill Creek flows through linear area of deciduous vegetation at left; site DIQu-21 located amongst the prominent ponderosa pines at centre.

Greenough 2004). The unnamed hill between Sexsmith Road and Highway 97 at the northeastern end of the corridor is comprised of Kitley Lake Formation trachyte and trachyandesite (Tempelman-Kluit 1989). These rock types would not have been used by aboriginal people for making stone tools, though pioneer ethnographer James Teit (1930) reports that a traditional village that once existed in the vicinity of Mission Creek was named for a type of stone obtained from a nearby hill, that was used for making arrow smoothers. Moreover, localized occurrences of materials favoured for stone tool manufacture (e.g., agate, banded chalcedony, and crystalline quartz) are reported from the Marama Formation elsewhere in the Kelowna - Westbank area, and fine-grained dacite is available near Pennask Lake west of Okanagan Lake (Roed 2004).

Surficial geology mapping of the Okanagan Valley shows that the landscape within and adjacent to the COMC corridor is characterized by alluvial fans and glaciofluvial or glaciolacustrine terraces (Nasmith 1962). More detailed mapping of surface sediments and terrain has been prepared for this locality by the provincial Surveys and Resource Mapping Branch (Ministry of the Environment). A review of this large-scale mapping verified that terraces along the northwest or west side of Mill Creek are comprised of glaciolacustrine silt and clay, sometimes overlain by alluvial fan deposits (sand or silt), with rare bedrock outcrops on Mount Dilworth and localized veneers of aeolian sand in the vicinity of Sexsmith Road. The northeastern part of the route is typified by a mix of glaciofluvial sand and gravel or glaciolacustrine silt and clay, with hummocky rock outcrops and morainal deposits (gravel and sand) on the hill west of Highway 97 (Surveys and Resource Mapping Branch 1989a, 1989b, 1989c).

Soils throughout the project locality are dominated by relatively homogeneous silty clay loam to clay loam known as Glenmore Clay Loam (Kelley and Spilsbury 1949). This is an Eluviated Dark Brown soil or Orthic Grey Luvisol, developed on stone-free, fine-textured lacustrine sediments, and is typical of moderate slopes to nearly level settings (Wittneben 1986). These soils are neutral to slightly alkaline or calcareous, signifying that bony faunal remains could be preserved in archaeological deposits.

3.3 HYDROLOGY

Mill (Kelowna) Creek is the dominant aquatic feature within the lands traversed by the COMC corridor. Mill Creek is a small but permanent stream arising in the Okanagan Highlands several kilometers east of the Kelowna Airport and entering Okanagan Lake near the Lake Okanagan Bridge. In the project locality, Mill Creek has a meandering course occasionally flanked by localized but significant wetlands. Where observed during the field survey, the creek has a channel approximately 2-3 m wide, with well-defined banks usually stabilized by riprap in its lower reaches.

A few ephemeral tributaries of Mill Creek were observed along the slopes of Mount Dilworth, some of which appear to arise as small springs. Carney Pond is a distinctive wetland complex separated from Mill Creek by the CN Rail grade, though it may once have drained into the creek; it appears to be a partially infilled Holocene lake basin that may have developed in a glacial kettle feature.

3.4 MODERN VEGETATION

The proposed COMC corridor is situated within the Okanagan Basin ecoregion of the Thompson - Okanagan Plateau Ecoregion, according to the Ecoregion Classification System used to classify British Columbia's terrestrial ecosystems (Demarchi 1996).

The project locality is also located within the Okanagan variant of the Very Dry Hot Ponderosa Pine biogeoclimatic subzone (PPxh1), as defined by the Ministry of Forests Research Branch (2003; Meidinger and Pojar 1991). Zonal forests in this subzone are dominated by ponderosa pine with Douglas-fir, the latter principally at higher elevations and/or north-facing slopes (Hope *et al.* 1991). Riparian settings are dominated by black cottonwood, with locally-dense thickets of shrubs and small trees, including hawthorn, red-osier dogwood, willows, and wild roses.

From Spall Road (Stn 203+00), the COMC corridor runs through urban (commercial/light industrial) and weedy pasture settings on the Mill Creek floodplain to Stn 221+60. The developed lands are essentially unvegetated, except for a typical riparian association of cottonwood and non-native elm and Russian olive with chokecherry, saskatoon berry, wildroses, and mock-orange.

At Stn 221+60, the route ascends to a series of glaciolacustrine terraces and hillsides near the toe of Mount Dilworth, approximately to Stn 245+00. The terrace lands are predominantly covered with bunchgrass, non-native weeds, and scattered ponderosa pine trees, as well as important traditional food plants like balsamroot (*Balsamorhiza sagittata*; Figure 6) and biscuit-root (*Lomatium* spp.).

Northeast of Stn 245+00 (approximate), the COMC corridor traverses an alluvial plain in the Rutland Siding neighbourhood to Stn 322+00 or 323+00 (depending on which route option is considered). Most of this segment is covered by old and/or disused pasture lands, as well as semi-rural residences along Sexsmith Road. There are only limited areas where native vegetation is now present.

From Stn 322+00 or 323+00, the corridor traverses steep hillsides to Stn 336+00. The hill is covered with a young to mature ponderosa pine forest with an open understory dominated by grasses and herbs. The remainder of the COMC corridor traverses agricultural fields to the new UBC Interchange (currently under construction), east and west of Highway 97.

3.5 ANCIENT ENVIRONMENTS

Significant environmental changes have taken place in the Okanagan Valley in the 12 millennia since the end of the last glacial advance. These changes altered the local availability of food and other resources, and played a critical role in the lives of the ancient inhabitants of the region. The Quaternary geology of southeastern B.C. and adjoining parts of Washington and Idaho is summarized in Baker *et al.* (1991), Clague (1991), and Fulton and Smith (1978). Paleoclimatic and ecological summaries for the region can be found in Dyke (2006), Hebda (1995), Barnosky *et al.* (1987), and Mathewes (1985).



Figure 6. View east across southern end of site DIQu-22, showing abundant balsamroot in bloom in April 2007.

3.5.1 Late-Glacial Events in the Okanagan Valley

Paleoenvironmental research in the Southern Interior has established that the Cordilleran Ice Sheet covered all of southern British Columbia until about 12,000 BP (radiocarbon years Before Present) (Hebda 1982, 1995; Clague 1981). The Okanagan Lobe of the Fraser Glacier was the last advance of glacial ice in the study area (Kershaw 1978; Roed and Greenough 2004). Geologists believe that it existed between about 25,000 and 12,000 BP, with the most intensive glacial conditions beginning around 19,000 BP (Kershaw 1978; Roed and Greenough 2004), and reaching its maximum extent about 15,000 BP near the northern Washington town of Chelan on the Columbia River (Carrara *et al.* 1996). Sediments from the earlier Okanagan Centre Glacier (beginning ca. 50,000 BP) and the mild Olympia Nonglacial Interval (ca. 100,000 BP) are exposed at several places within the Okanagan Valley (Fulton and Smith 1978), though most indications of these periods were obliterated by the last advance of the Fraser Glacier (Roed and Greenough 2004).

In the Okanagan Valley, deglaciation began around 11,000 BP and was nearly complete by 9000 BP. Deglaciation proceeded more quickly in the uplands marginal to the valley, and the main body of what is now the Okanagan Valley was choked by “stagnant ice” after surrounding upland regions were ice-free. Before deglaciated lands were recolonized by vegetation, fine-textured silts and

sandy sediments were removed by winds and deposited in veneers and dunefields along the valley (Kershaw 1978).

As the down-wasting glaciers freed the uplands, stagnant ice tongues remained in the valleys, obstructing meltwater flow and creating periglacial lakes much larger and deeper than their modern counterparts (Fulton 1969). The main and tributary valleys of the central and northern Okanagan were filled with a gigantic lake known as Glacial Lake Penticton. At its earliest and highest stand (called the Long Lake Stage), this lake stood at an elevation between 488 and 518 m asl. The later and better-defined Grandview Flats and B.X. Stages stood at elevations of 488 m and 427 m asl, respectively. The last and lowest stand (the O'Keefe Stage) was approximately 354 m asl, or some 12 m higher than the modern elevation of Okanagan Lake (Roed and Greenough 2004).

At its maximum, Lake Penticton extended from the present-day location of Mara Lake, south to an ice dam near Okanagan Falls, east to the upper reaches of the Shuswap River and Mabel Lake, and filled the valley between Kelowna and Vernon, presently occupied by Ellison, Wood, and Kalamalka Lakes (Fulton 1969; Roed and Greenough 2004). During this interval, Glacial Lake Penticton captured the water in the present-day Thompson-Shuswap basin, and the whole system drained south into the Columbia River. The glacial lake had receded to the present-day limits and elevation of Okanagan Lake (342 m asl) by about 8900 BP (Kershaw 1978).

The timing of the various events that affected development of the Southern Interior glacial lakes is not well known. However, it is likely that Lake Penticton only existed for about 1000 years (Roed and Greenough 2004), and had largely disappeared by about 8900 BP. Modern drainage patterns in the Okanagan Valley were established between 8500 and 7000 BP, and most deposition of aeolian sediments had ceased by about 6000 BP (Alley 1976; Kershaw 1978). Lastly, rivers throughout the Southern Interior achieved their bedrock-controlled modern channels by about 5000 BP, creating stable waterways which could be inhabited by anadromous salmon populations. Permanent barriers to spawning salmon are present at two locations within the Okanagan Basin: (1) at Enloe Falls on the Similkameen River below the International Boundary; and (2) at Okanagan Falls near the foot of Skaha Lake. Such barriers would have impeded fish running into these waters at the time that the rivers reached their bedrock-controlled channels; therefore, local salmon runs probably have not been available in the central Okanagan Valley or the Similkameen River valley for at least 5000 years.

3.5.2 Environmental History

The best recent summaries of the paleoenvironmental history of British Columbia, including the Okanagan Valley, are Hebda (1995) and Dyke (2006). As uplands within the Okanagan Valley began to deglaciate (between 12,000 and 11,000 BP), plant and animal populations re-established themselves from warmer habitats in Washington and Oregon, beyond the extremes of glacial ice and arctic cold. During this Early Neoglacial interval, the Okanagan was characterized by a treeless landscape consisting of cold-adapted, pioneering grasslands (so-called steppe tundra) in the uplands and extensive relict ice and glacial lakes in the valleys (Roed and Greenough 2004; Hebda 1995; Dyke 2006). Hardy coniferous forests dominated by lodgepole pine and spruce became established

between 12,000 and 10,000 BP, and grasslands developed in the valley bottoms as they were cleared of relict ice (Hebda 1995; Dyke 2006). At the end of this period (approximately 10,000 BP in the Okanagan Valley), a shift to a significantly warmer and drier climate began, signified by increases in ponderosa pine, grasses, and sage, and a corresponding decrease in lodgepole pine and spruce (Mathewes 1985; Roed and Greenough 2004). Earth scientists refer to this interval as the Hypsithermal. Between 10,000 and 7500 BP, sage grasslands became widespread throughout the Southern Interior, especially at lower elevations. In especially arid settings, such as would have existed around Okanagan Lake, valley-bottom grasslands probably expanded upwards to merge with alpine grasslands (Hebda 1995; Dyke 2006). Forest vegetation in such conditions would have been restricted to stream valleys and moist, north-facing slopes at upper elevations. The end of the Hypsithermal interval coincides with a massive fall of tephra (volcanic ash) from the catastrophic eruption of Mount Mazama (now Crater Lake, in Oregon) around 6800 BP. Shortly after this period (approximately 5000 to 4000 BP), the climate again shifted, gradually becoming moister and cooler (Alley 1976; Hebda 1995; Mathewes 1985).

Between 4000 and 3500 years ago, montane grasslands receded and dryland species (e.g., sagebrush) were largely replaced by plants better adapted to mesic conditions (Hebda 1982, 1995). Expansion of ponderosa pine and Douglas-fir forests occurred throughout the uplands and eventually descended to altitudes just above modern elevations (Hebda 1982). These changes signify a return to cooler and moister conditions, and geologists refer to this period as the Mid-Neoglacial Interval, marked by pronounced advances of mountain glaciers throughout the Pacific Northwest (Roed and Greenough 2004; Dyke 2006). The cool and moist climate persisted until about 2000 BP, but mountain glaciers again began to advance between 900 and 100 BP during the last, or Late-Neoglacial Interval (the “Little Ice Age”) (Roed and Greenough 2004). During this most recent Neoglacial period, grasslands became restricted to the valley bottoms. Soon after this, the climate became slightly drier, and modern vegetation boundaries were established.

Historic colonization and land development have profoundly affected the modern distribution of vegetation in the Okanagan Valley. In particular, there is evidence that timber harvesting and cattle ranching may have resulted in increased abundance of sagebrush at the expense of grasses and trees (Cawker 1978). Land clearing for farming has also resulted in increased populations of cottonwood, alder, willows, and non-native ornamental trees and weedy herbs throughout the region.

4.0 CULTURAL SETTING

4.1 ETHNOGRAPHIC BACKGROUND

The proposed COMC corridor is located within the asserted traditional territory and areas of interest of the Westbank First Nation (Kelowna) and Okanagan Indian Band (Vernon), both of whom are members of the Okanagan Nation Alliance.

These communities are traditionally speakers of Okanagan, an Interior Salishan language (Kennedy and Bouchard 1998). Pioneer B.C. ethnographer James Teit (1930) has published the most thorough description of Okanagan culture and language. Geologist George Dawson (1892) wrote a brief account, while Leslie Spier (1938) and other American anthropologists published a description of southern Okanagan culture. More recently, linguistic ethnographers Dorothy Kennedy and Randy Bouchard conducted several seasons of fieldwork with Okanagan informants, much of which is summarized in Kennedy and Bouchard (1998). A comparative summary of traditional Plateau cultures is provided by Ray (1939).

Traditional Okanagan culture can be characterized as a semi-sedentary, egalitarian lifeway. Religious beliefs included the guardian spirit quest, shamanism, and spiritualism. Okanagan communities were divided into several distinct bands, which would have been smaller than the modern bands. Each traditional band resided at a main winter village, represented by a single chief. Residence between villages was quite fluid, and families moved regularly in response to seasonal resources. Two traditional villages are reported from the east side of Okanagan Lake, in what is now the City of Kelowna:

- ***Nxoko'stEn*** ['arrow smoother']: This village is reported to have been located on the east shore of Okanagan Lake near the mouth of Mission Creek (Kennedy and Bouchard 1998). Teit (1930) provided the translation, stating that the village was named after a nearby hill where rock suitable for making arrow smoothers could be obtained.
- ***SkElā'un.na*** ['grizzly bear']: This village is reported to have been situated at some location in what is now Kelowna (Teit 1930). The etymology of the City's name can easily be discerned in this traditional place name.

The Okanagan were hunters, gatherers, and fishers who lived, from early spring to late autumn, a nomadic existence in small family groups followed by winter residency at permanent villages in river valleys or around lakes. The seasonal availability and abundance of food resources dictated the annual cycle of subsistence activities and settlement locations. Low-elevation habitats (e.g., river valleys and lake margins) would have been utilized for fishing, and as locations for winter villages and base camps for hunting and plant collecting in adjacent, inland and mid-elevation environments such as the project locality.

The Okanagan hunted several species of animals as part of their seasonal round. Large game predominantly included wapiti and deer, but black bears and bighorn sheep would have been hunted when and where available. Mineral licks, such as the one reported from the COMC corridor near Stn 226+00, would have been attractive locations to establish nearby hunting camps where hunters could lay in wait for game animals. Smaller mammals such as rabbits, beaver, ground squirrel,

marmot, and porcupine were opportunistically hunted for food but also for their fur. Birds that were hunted included upland species like grouse, and waterfowl such as swans, ducks, and geese. Turtles have a sporadic distribution in Okanagan Valley wetlands, and would have been utilized where present.

Fishing was an extremely important activity in rivers, streams, and lakes. Favoured species included anadromous salmonids (e.g., sockeye salmon and steelhead), kokanee (land-locked sockeye salmon), resident rainbow trout, suckers, and northern pikeminnow. Fishing methods known to have been used in Okanagan territory involved leisters, harpoons, gaff hooks, and gill nets. Fish weirs and traps were used in some sections of major rivers such as the Okanagan River, and may have been used in the lower reaches of permanent streams like Mill Creek as well.

Many different plant resources were utilized by Interior Plateau First Nations (e.g., Lepofsky and Peacock 2004). The most important food plants in the Okanagan were yellowbells, balsamroot, bitterroot, biscuitroot or *cous*, chokecherry, saskatoon berry, huckleberries, blueberries, and soapberry. Most of these species are still at least locally abundant in the Okanagan Valley, together with numerous medicinal plants and less-favoured varieties of food plants (Turner *et al.* 1980). Sagebrush, Douglas-fir, and ponderosa pine were utilized for firewood and timber. Cottonwood trees growing in riparian settings were used for making dugout canoes. Other plants, such as rushes and tall grasses, were necessary for manufacture of woven artifacts, and a diverse assortment of additional species were exploited for medicinal purposes (Turner *et al.* 1980).

Okanagan material culture was distinguished by tools of wood, bone and antler, and chipped and ground stone. “Fibre” artifacts, such as basketry, tule-rush mats, and birch bark containers were also characteristic. The bow and arrow was the primary hunting weapon in late pre-Contact times (that is, just prior to contact with European societies); earlier, spears or shorter darts hurled with an atlatl (or throwing stick) were used.

The traditional winter dwelling was the distinctive semi-subterranean pithouse, which after abandonment and natural infilling, leave sub-rectangular to circular depressions familiar to many residents of the Southern Interior. In the Okanagan Valley, pithouse villages are usually located in lake shore settings, or near major streams with fishing stations. For the remainder of the year, the Okanagan resided in temporary tule-mat structures called matlodges. Like pithouses, matlodges were usually built near lakes and rivers, but could also be associated at seasonal resource harvesting camps. In the later pre-Contact period, matlodges may have begun to replace pithouses as the favoured winter dwelling in this region. Other constructed features used in the day-to-day life of Okanagan people included hearths, cache pits, and cooking features.

It is important to note that not all aspects of traditional First Nations’ cultures are recorded in the anthropological and ethnohistoric literature. Additional knowledge of traditional culture and lifeways still exists in many contemporary First Nations’ communities. Furthermore, Aboriginal societies underwent significant changes as a result of their contact with Europeans, and some cultural aspects reported in the literature may not accurately reflect that culture prior to contact.

4.2 ARCHAEOLOGICAL BACKGROUND

Archaeological sites are locations with material remains produced by human activities in the past. In British Columbia, archaeological sites are usually attributed to First Nations' settlement and land use in pre-Contact times, but places with physical evidence of more recent activities pre-dating World War 2 are often considered to be historical archaeological sites. Historical sites will often have intact structural remains or "built heritage" (including residences, industrial structures, and farm outbuildings), but could also include roads and trails, single objects such as vehicles or machines, and featureless sites such as rubbish dumps.

Archaeological sites in British Columbia are registered in the Provincial Heritage Register maintained by the Archaeology Branch (Ministry of Tourism, Sport and the Arts), the provincial government agency responsible for management of archaeological resources in accordance with the *Heritage Conservation Act*.

Archaeological sites are numbered according to the Borden Site Designation Scheme (Borden 1952), which is used throughout Canada. This scheme is based on the maps of the National Topographic System and uses latitude and longitude to pinpoint a site's location. The four alternating upper and lower case letters (e.g., DIQu) denote a unique 10' latitude x 10' longitude "block". Sites are numbered sequentially within this block based (usually) on their date of discovery (i.e., "DIQu-21" would be the twenty-first site recorded in block DIQu).

4.2.1 Archaeological Site Types

Archaeological sites are defined according to the types of **archaeological remains** (i.e., artifacts and features) present, and according to the types of traditional activities suspected to have taken place at the site. A particular site can be comprised of one or more of these types of archaeological remains, and generally speaking, it is expected that larger sites will be more complex than smaller ones.

Typical archaeological remains found in the Okanagan Valley include housepits, subsistence features, artifact scatters, burial places, petroforms, rock art, culturally modified trees, trails, and historic remains, each of which is described below:

- **Housepits** are circular to sub-rectangular depressions (rarely, square), in this region usually between about 4 m and 10 m in diameter (or along its longest axis). These features are the remains of semi-subterranean pithouses or matlodges. Housepits frequently occur in small village clusters, often in association with smaller pits used for food preparation and storage, butchered animal bones, and artifacts. Housepits are typically found in environmental settings with good solar exposure, protection from winter winds, and proximity to potable water, though secluded locations were sometimes selected for defensive reasons.
- **Subsistence features** are usually present at locations traditionally used to harvest and process traditional resources, but are often associated with village sites as well. Cache or storage pits are the most common type of subsistence feature, and appear as circular surface depressions between 1 m and 3 m in diameter, frequently in closely-spaced clusters and often in proximity to housepits. Cooking features are another characteristic subsistence feature in this region; they may appear as small, charcoal-filled depressions, or level platforms covered with black carbon-stained soil, but are generally larger than cache pits (Lepofsky and Peacock 2004).

- **Artifact scatters** are the most common archaeological remains in the Okanagan Valley, and are comprised of clusters of (usually) stone artifacts, including expedient or formed tools and the waste products of tool manufacture (debitage). Most artifact scatters represent transitory use of the landscape, and are often associated with the exploitation of particular resources. Recurrently occupied sites may include other kinds of archaeological remains, such as butchered animal bones and fire-altered rocks, as well as charcoal-stained soils.
- **Burial places** are locations where First Nations' people interred their dead. They are commonly found near winter villages, but occur generally throughout the landscape for individuals who died when away from their villages. In this region, burial places are most often found in sandy hills overlooking lakes or other waterways.
- **Petroforms** are deliberate constructs of stones (e.g. walled enclosures, cairns, stone-lined pits), which might either be associated with subsistence activities like hunting blinds or berry-drying, or ceremonial activities such as puberty rituals.
- **Rock art** sites are locations where First Nations' people painted designs (pictographs) in red ochre, often in places of particular spiritual power used for vision-questing. Rock art sites in this region are usually found on prominent bedrock outcrops along lakes or rivers, as well as along traditional trails (Corner 1968, Nankivell and Wyse 2003).
- **Culturally modified trees** (CMTs) are trees which have been intentionally altered by First Nations' people as part of their traditional use of forest resources. Although a number of tree species were traditionally used by Aboriginal people on the Interior Plateau, cambium-stripped lodgepole pine and ponderosa pine are the most common CMT type (Lepofsky and Peacock 2004). A cambium-stripped or bark-stripped CMT is a tree from which a section of bark has been removed, resulting in a lenticular bark scar (Archaeology Branch 2001). Nearly all CMTs will occur in proximity to a major watercourse on well-drained, level ground or hillsides with less than 50° of slope, and in old-growth stands containing mature pine trees.
- **Trails** represent traditional routes used by Aboriginal people, either for subsistence pursuits or for long-distance trade and communication with neighbouring First Nations. Many traditional trails became historically known routes during the fur trade period, and used later still for contemporary roads. In the Okanagan, rock art sites are frequently associated with traditional trails, and CMTs are commonly found within a short distance of traditional and more recent trails.
- **Historic remains** denote artifacts, structures, and other features usually associated with Euro-Canadian or Asian-Canadian settlement and land use. In the Kelowna project locality, they are most likely to be associated with late-19th and early-20th century homesteading, ranching, and orchard-growing.

4.2.2 Archaeological Research in the Okanagan Valley

The first site survey that included this part of the Okanagan was carried out by Warren Caldwell (University of Washington), who recorded several sites in the early 1950s (Caldwell 1954). Additional sites were recorded by Garland Grabert (University of Washington) in the late 1960s, particularly in the northern Okanagan Valley and Spallumcheen Valley (Grabert 1974). Large-scale surveys for archaeological sites were undertaken in the southern Okanagan Valley in 1975 by James Baker (Okanagan College) and Stan Copp (Simon Fraser University) in 1974 and 1975 (Baker 1975; Copp 1974, 1976). Several seasons of site survey around Okanagan Lake were carried out by archaeologists employed by the provincial Archaeological Sites Advisory Board between 1975 and 1977 (Lawhead and McAleese 1976; Rousseau and Wales 1977). In the early 1980s, Mike Rousseau (1984) conducted a site inventory and test excavations in the Westbank locality.

Throughout the 1960s, avocational archaeologist John Corner (1968) conducted an inventory of pictographs of the Southern Interior, including several sites on the Osoyoos IR#1; Corner's pioneering work on rock art has been taken up in recent years by Nankivell and Wyse (2003).

Since the mid-1970s, most sites in the Okanagan Valley have been discovered in the context of development-specific archaeological impact assessments (e.g., Rousseau 1979; Arcas Consulting Archeologists 2006, 2007a). Aside from Rousseau's (1984) test excavations at Westbank and a recent mitigation project at Bear Creek Park (Arcas Consulting Archeologists 2007b), few archaeological excavations have been undertaken in the Kelowna-Westbank area.

4.2.3 Regional Cultural Chronology

The Okanagan Valley is situated within the Canadian Plateau as defined by Richards and Rousseau (1987). Scholarly syntheses on the prehistory of the Interior Plateau of British Columbia include Richards and Rousseau (1987), Chatters and Pokotylo (1998), Pokotylo and Mitchell (1998), Prentiss and Kuijt (2004), Rousseau (2004), and Copp (2006). A popular account on the prehistory of the Okanagan Valley was recently prepared by Ewonus *et al.* (2004). Excavations of numerous prehistoric sites throughout the Plateau have provided a fairly reliable understanding of regional prehistory, as summarized in the following text and in Table 1.

Early Prehistoric Period (11,000-7000 BP)

The initial peopling of the Southern Interior of B.C. probably commenced between about 11,000 and 10,000 BP (Rousseau 2004; Copp 2006), by ancient First Nations' people moving into the region from the Columbia Plateau and Great Basin to the south. These migrations appear to have involved peoples belonging to five different archaeological traditions: (1) the Western Fluted Point Tradition, (2) the Intermontane Stemmed Point Tradition, (3) the Plano Tradition, (4) the Early Coast Microblade Complex and (5) the Old Cordilleran Tradition (Stryd and Rousseau 1996).

During the Early Prehistoric Period, initial cool and wet postglacial conditions were quickly replaced by hot and dry conditions (the Hypsithermal or "Climatic Optimum"). During this period, a reliance on hunting and a subsistence pattern characterized by an ever-broadening foraging spectrum is inferred, involving more intensive and more efficient exploitation of small animals and plants (Stryd and Rousseau 1996), though the earliest inhabitants of the region may have been able to exploit relict Pleistocene mega-fauna, including extinct forms of bison. The earliest manifestations of this occupation may have been associated with mid- and high-elevation grasslands, away from the inhospitable glacial lakes that filled the valley bottoms. As glacial lakes drained between 9000 and 8000 BP, valleys would have become more attractive as sources of potable water during the xeric climatic regime of the Hypsithermal. Settings away from rivers and lakes would have been extremely arid and perhaps devoid of many game species. Sites of this age will almost always be found in deeply-buried contexts, often associated with thick deposits of aeolian sediments.

Table 1. Archaeological periods of the Southern Interior region.		
Period	Dates ¹	Cultural Characteristics (selected)
Early	10,000 - 7000 BP	<ul style="list-style-type: none"> - associated with warmer/drier environmental conditions - subsistence pattern characterized by a reliance on hunting and a broad foraging spectrum with increasingly-efficient exploitation of small animals and plants - often associated with mid-elevation Holocene grassland environments - low-elevation valley settings away from rivers and lakes would have been extremely arid, and some modern game species may have been absent, though bison and perhaps pronghorn antelope were present (predominantly to the SE) - no evidence for social ranking - no evidence of permanent villages or habitation structures
Middle	7000 - 3500 BP	<ul style="list-style-type: none"> - coincides with onset of cooler, moister conditions. - correlated with the 6800 BP ashfall from Mt. Mazama (Westgate <i>et al.</i> 1970) - subsistence was still based primarily on hunting game animals and gathering plant foods, although salmonid populations available in some watersheds, freshwater mussels are more important in sites of this age than at later times (Prentiss and Kuijt 2004). Lochnore Phase represents a riverine-adapted society able to exploit stabilized salmon populations - no evidence for ranked social organization - no evidence for presence of resource storage - a few permanent houses known (e.g., South Thompson River; Columbia River) - a few burial places known, but rare
Late	3500 - 200 BP	<ul style="list-style-type: none"> - Plateau Pithouse Tradition represents a more sedentary way of life focused on resource mass-harvesting and systematic food storage - subsistence activities identical to those recorded by ethnographers - semi-subterranean pithouse in general use as winter residence - matlodges may begin to replace pithouses in latest pre-Contact times - permanent villages present, some of large size - artifacts identical or similar to those used by ethnographic communities - long-range trading networks present - achieved status widespread; localized evidence for ascribed status - burial places within pithouse floors (Shuswap Horizon), prominent landscape features, talus slopes (winter interments), occasionally within cairns or cists
Historic (Ethnographic) Period	About 200 years BP to present	<ul style="list-style-type: none"> - abandonment of traditional house styles and artifact types occurs quickly - adoption of European house styles and tools - subsistence activities become oriented to European cash economies

¹ Following archaeological convention, dates are expressed as radiocarbon years BP (Before Present), where present equals AD 1950.

Dated sites earlier than about 7000 BP are very rare in the Southern Interior of B.C., but examples are known from: (1) a campsite (dated 7530 BP) buried by the Drynoch Slide south of Spences Bridge (Rousseau 2004); (2) a human skeleton (dated 8240 BP) from Gore Creek west of Chase (Cybulski *et al.* 1981); (3) another encampment (dated 8400 BP) at the Landels Site on Oregon Jack Creek near Ashcroft (Stryd and Rousseau 1996; Rousseau 2004); and (4) a third campsite, at Stirling Creek (dated 7400 BP) in the Similkameen River valley southeast of Hedley (Copp 2006).

A small number of distinctive Early Prehistoric artifacts, primarily projectile points (which would have been used to arm spears or atlatl darts), have been discovered in various parts of the Okanagan Valley. Generally speaking, artifacts which appear to be attributable to the Western Fluted Point and Plano traditions have only been found in the Shuswap region beyond the Okanagan Valley. Early Stemmed Point Tradition and Old Cordilleran tradition artifacts are most common to the south, but have been found throughout the Southern Interior. Early Microblade Complex artifacts are characteristic of sites in the Cascade Mountains, and have recently been identified in the Similkameen River valley (Copp 2006). “Early-looking” artifacts associated with still-undocumented sites have also been reported in the Salmon River valley around Falkland and Westwold (Wayne

Choquette, consultant, pers. comm., 1988), and at Sugar Lake in the Shuswap River basin (Al Mackie, Archaeology Branch, pers. comm., 1996).

Middle Prehistoric Period (7000-3500 BP)

The Middle Prehistoric Period in the Interior Plateau generally coincides with the end of the Hypsithermal and onset of cooler, moister conditions. Subsistence was based primarily on hunting game animals and gathering plant foods, although there were robust salmon populations available to First Nations' fishers in some watersheds.

At the beginning of this period, the distinctive ungulate-hunting Nesikep Tradition culture emerged, once thought to be unique to the Fraser-Thompson drainage (Stryd and Rousseau 1996), but recently observed in the Similkameen Valley as well (Copp 2006). Its origins doubtless lie in the mix of early regional traditions, but appears to have affinities to archaeological remains from the Columbia Plateau of Washington and Idaho (e.g., Andrefsky 2004; Salo 1985). Where sites of this age have been identified, they are usually configured to the higher terraces of existing rivers, but sites have also been found in mid-elevation settings beyond the study area (Rousseau 2004). The latter part of the Nesikep Tradition is called the Lehman Phase, dated ca. 6000/5000 to 4400 BP; Lehman Phase sites are normally associated with existing rivers in valley bottoms, and existing watercourses and lakes in mid-elevation and upland settings (Stryd and Rousseau 1996).

A new archaeological culture, called the Lochnore Phase, appears in the Fraser - Thompson drainage about 5500 BP and persists until 4000/3500 BP (Stryd and Rousseau 1996). The appearance of this tradition signals the arrival of riverine-adapted, Salishan-speaking peoples from the Northwest Coast, presumably to exploit the salmon which became more abundant in the main rivers of the region with the onset of post-Hypsithermal climatic and hydrological conditions. The Lehman Phase people of the Nesikep Tradition and the Lochnore Phase people seem to have co-existed and maintained separate cultural identities for at least several hundred years. By ca. 4400 BP, the fishing-oriented, Salish-speaking, Lochnore Phase people had absorbed (perhaps both culturally and genetically) the indigenous, hunting-oriented, Lehman Phase people, thereby bringing the Nesikep Tradition to an end (Stryd and Rousseau 1996).

Dated Lehman or Lochnore Phase sites are known from Monte Creek (Wilson 1991; I.R. Wilson Consultants 1992) and Adams Lake (Bailey *et al.* 1993) northwest of the Okanagan, and on Shuswap Lake (Rousseau *et al.* 1991). Neither Lehman nor Lochnore Phase cultural materials are presently known from the Okanagan Valley (*cf.*, Stryd and Rousseau 1996), but they have been encountered in the Similkameen River valley (Copp 2006) and in the Northern Cascade Mountains of Washington as well (Mierendorf *et al.* 1998).

The Middle Prehistoric occupation of the Okanagan and Similkameen River valleys is not as well understood as the Thompson-Shuswap region, because fewer sites of this age are known. Large, leaf-shaped projectile points (or bifacial knives) have been collected at many places within the Okanagan, some of them in environmental contexts that could suggest attribution to Middle Prehistoric sites. However, a radiocarbon date of 5130±40 BP, recently obtained from a site (DIQv-

78) on the west of Okanagan Lake at Bear Creek Park (Arcas Consulting Archeologists 2007b), remains the only dated evidence of this period in the Okanagan Valley.

The proximity of the Okanagan Valley to the adjacent Columbia Plateau of Washington suggests obvious similarities with the cultural sequence developed for that region (Grabert 1968; Salo 1985; Andrefsky 2004; Copp 2006). This period is well-expressed along the middle Columbia River near its confluence with the Okanagan River in Washington (Grabert 1968; Salo 1985), but is also known in the Okanagan Valley from some undated sites excavated by Garland Grabert (Stryd and Rousseau 1996). For this region, Grabert proposed the Okanagan (10,000-6000 BP) and Indian Dan (ca. 6000-3000 BP) Phases, which he believed evolved as local expressions of the Old Cordilleran Tradition (Grabert 1968; 1974). Recent work in the Similkameen Valley has produced a local cultural sequence for that area, including dated Middle Prehistoric cultural materials (Copp 2006).

Late Prehistoric Period (3500-200 BP)

The end of the Lochnore Phase (and Middle Prehistoric Period) and establishment of the succeeding Plateau Pithouse Tradition (Late Prehistoric Period) is somewhat clouded by recent discoveries, but occurred about 3500 BP (Rousseau 2004). The Plateau Pithouse Tradition represents a more sedentary way of life focused on intense salmon exploitation and storage, supplemented as required by other resources, and on use of the semi-subterranean pithouse as a winter residence (Stryd and Rousseau 1996; Rousseau 2004).

The Late Prehistoric Period has been divided into three successive cultural horizons, each with its own artifact styles, technological attributes, and settlement patterns (Richards and Rousseau 1987; Rousseau 2004; *cf.*, Pokotylo and Mitchell 1998). The three horizons are the Shuswap Horizon (3500-2400 BP), Plateau Horizon (2400-1200 BP), and Kamloops Horizon (1200-200 BP).

All three horizons of the Late Prehistoric Period, as well as early historic remains, are commonly represented in cultural materials recovered from archaeological excavations in the Thompson-Shuswap region and further west in the Thompson-Fraser basin (Richards and Rousseau 1987). Richards and Rousseau (1987; also Rousseau 2004) assert that this cultural sequence is fully applicable to the Okanagan and Similkameen River valleys, but archaeological assemblages in this region appear to exhibit more similarities to the Columbia Plateau sequence of central Washington (Salo 1985; Andrefsky 2004). Grabert's research in the Okanagan Valley (1968, 1974), on both sides of the International Boundary, resulted in development of a cultural sequence beginning with the Okanagan and Indian Dan Phases as previously mentioned, and in the Late Prehistoric Period including the Chiliwist (3000-850 BP) and the Cassimer Bar (850-Contact) Phases. Subsequent excavations near Vaseaux Lake led Copp (1979) to refine the Chiliwist Phase into three subphases (I: 3000-2350 BP; II: 2350-950 BP; III: 950 BP-Contact), of which the last subphase appears to represent an occupational hiatus in the southern Okanagan Valley (Copp 1979; Pokotylo and Mitchell 1998).

4.2.4 Archaeological Resources near the Project Locality

Thirteen documented, pre-Contact archaeological sites are within 5 km of the COMC corridor project locality (Figure 1). Four sites are recorded from the immediate vicinity of Mill Creek within or near the COMC corridor, two are east of Highway 97 near the northeastern end of the corridor, and another is situated at the toe of Mt. Knox, north of the CN grade and east of the COMC corridor.

Six more pre-Contact archaeological sites are recorded from settings on or near the east shore of Okanagan Lake, approximately 5 km west of the project locality.

Historic sites protected by municipal designation in the City of Kelowna Heritage Register are fairly abundant, with 36 sites being present within the area covered by Figure 1. No sites are shown west of Ethel Street, but many more historic places are situated closer to the city core. Table 2 summarizes information about the documented sites in the vicinity of the COMC corridor project locality.

Site	Site Type	Location	Environmental Correlates	Comments
DIQu-1	Artifact scatter	E of Hwy 97, S of CNR overpass	Fluvial terrace	Artifacts reported from area of historic Simpson Ranch in 1969
DIQu-11	Artifact scatter	Okanagan Lake shore, N of Kelowna city centre	Lake shore beach	A single lithic artifact reported in 1977
DIQu-12	Rock shelter; artifact scatter	Okanagan Lake shore, N of Kelowna city centre	Rocky lake shore	A small scatter of surface artifacts and possible rock shelter reported in 1977
DIQu-13	Rock shelter; pictograph	Okanagan Lake shore, N of Kelowna city centre	Rocky lake shore	A small rock shelter w/soot-stained roof & possible pictograph figure seen in 1977
DIQu-18	Petroform; artifact scatter	Okanagan Lake shore, N of Kelowna city centre	Lake shore beach	A small stone-lined pit & surface artifacts reported in 1977
DIQu-19	Artifact scatter	N bank of Kelowna (Mill) Creek, W of Dilworth Drive	Glaciolacustrine terrace	A small scatter of surface artifacts reported in 1979
DIQu-20	Artifact scatter	N of Mill Creek, between Dilworth and Omineca Place	Wave-cut bench on Mt. Dilworth slope	A small scatter of surface artifacts reported in 1979
DIQu-21	Artifact scatter	N bank of Mill Creek, S of Dilworth	Glaciolacustrine terrace	A few surface artifacts seen in 1979; subsurface artifacts and faunal remains found in 2007
DIQu-22	Artifact scatter	N bank of Mill Creek, SE of Dilworth	Glaciolacustrine terrace	A few surface artifacts seen in 1979; subsurface artifacts and faunal remains found in 2007
DIQu-23	Artifact scatter	Wave cut bench at toe of Mt. Knox, overlooking Kelowna city centre to S	Glaciolacustrine terrace	A small scatter of surface artifacts reported in 1979
DIQu-24	Historic: grist mill	2002-2128 Leckie Place*	N/A – park reserve	Brent Grist Mill, built 1873; moved to present location in 2005; restoration is planned
DIQu-25	Historic: mission	3685 Benvoulin Road	N/A – institutional lot	Pandosy Mission, established 1859; 3 structures present
DIQu-26	Historic: church	2269-2279 Benvoulin Road	N/A – institutional lot	Benvoulin United Church, built ca. 1892
DIQu-36	Historic: house	1988 Bowes Street	N/A – residential lot	W.A.C. Bennett House, built ca. 1914
DIQu-37	Historic: house	1056-1060 Cameron Avenue	N/A – residential lot	Guisachan Heritage Park; Guisachan House, built ca. 1891

Site	Site Type	Location	Environmental Correlates	Comments
DIQu-180	Historic: house	840 Old Vernon Road	N/A – residential lot	Renwick House
DIQu-183	Historic: house	840 Old Vernon Road	N/A – farm property	Ellison Ranch House
DIQu-189	Historic: house	3430 Pooley Road	N/A – farm property	Bright House
DIQu-196	Historic: house	1024 Rutland Road North	N/A – residential lot	Willis Schell House
DIQu-197	Historic: house	520 Rutland Road North	N/A – farm property	McDonald Farm House
DIQu-198	Historic: house	3652 Spiers Road	N/A – farm property	Cross House
* Original location of Brent Mill near the end of Cary Road.				

4.3 HISTORIC BACKGROUND: 1811 - PRESENT

The first Europeans to enter the Kelowna area were associated with the fur trade under the leadership of David Stuart in 1811 (Buckland 1979), and the establishment of Fort Okanagan in 1811-1812. By the mid-1850s, American prospectors were exploring the Interior of British Columbia (including Mission Creek in 1853) in search of gold. In order to counteract the negative influences on First Nations' communities by an influx of European and American settlers, a Mission was established on the creek of the same name by Father Pandosy in 1859 (recorded as historic site DIQu-25). By the 1860s, the development of various travel routes from the Coast to the Interior facilitated European expansion in the Okanagan Valley. The earliest Euro-Canadian settlers focussed on ranching and grain-farming, in response to which the Brent family built and operated a grist mill (historic site DIQu-24) beside Mill Creek in 1871 (Buckland 1979).

After the 1870s, an influx of moderately wealthy English immigrants lead to the establishment of thriving tobacco plantations and orchards, which dominated the landscape of the Okanagan Valley until the years after World War 2 (Koroscil 2003). Increased industrial activity, and the need to get local products (livestock, fruit and vegetables, tobacco, and more recently lumber and minerals) to market, along with increased homesteading activities, furthered the development of Kelowna as a regional centre. Continued population growth in the Okanagan Valley, particularly after World War 2, has resulted in the intensive and extensive development of Kelowna and its suburbs.

Site	Site Type	Location	Environmental Correlates	Comments
DIQu-39	Artifact scatter	Okanagan Lake shore, N of Kelowna city centre	Rocky lake shore	The medial section of a single projectile point reported in 2002
DIQu-40	Petroform; Historic: cairn	Okanagan Lake shore, N of Kelowna city centre	Bench above rocky lake shore	A small stone-lined pit & putative historic cairn reported in 2002
DIQu-42	Historic: school	770 Rutland Road	N/A – institutional lot	Rutland Elementary School, built ca. 1913
DIQu-48	Historic: house	3430 Benvoulin Road	N/A – residential lot	Brookdale house, built ca. 1912
DIQu-68	Historic: house	1590-1640 Belgo Road	N/A – farm property	Belgo House, built ca. 1912
DIQu-69	Historic: house	2269-2279 Benvoulin Road	N/A – residential lot	McIvor House, built ca. 1904
DIQu-70	Historic: tobacco barn	3139 Benvoulin Road	N/A – farm property	McEachern Tobacco Barn, built ca. 1912
DIQu-85	Historic: house	911 Borden Avenue	N/A – residential lot	H.D. Riggs House, built ca. 1915
DIQu-91	Historic: house	1056-1060 Cameron Avenue	N/A – residential lot	Guisachan Heritage Park; Third John McDougall House; built ca. 1886
DIQu-95	Historic: community hall	2704 East Kelowna Road	N/A – community property	East Kelowna Community Hall, built ca. 1940
DIQu-96	Historic: church	2710 East Kelowna Road	N/A – institutional lot	St. Mary's Anglican Church, built 1938
DIQu-100	Historic: house	1449 Ethel Street	N/A – residential lot	Billy Lloyd-Jones House
DIQu-107	Historic: house	1537 Lakeview Street	N/A – residential lot	Davies House, built ca. 1912
DIQu-112	Historic: house	250 Leathead Road	N/A – farm property	Dudgeon Farm House, built ca. 1910
DIQu-132	Historic: house	3690 Pooley Road	N/A – farm property	Pooley House
DIQu-133	Historic: house	3285 Reid Road	N/A – farm property	Reid House, built ca. 1911
DIQu-145	Artifact scatter	E side of Hwy 97, E of UBCO campus	Glaciolacustrine terrace	Small scatter of lithic artifacts, recorded in 2006
DIQu-155	Historic: house	933 Bernard Avenue	N/A – residential lot	Pitt-Trenwith House, built ca. 1910
DIQu-156	Historic: barn	1019-1023 Borden Avenue	N/A – farm property	Clement Barn, built ca. 1912
DIQu-157	Historic: house	1049 Borden Avenue	N/A – farm property	Charles Clement House, built ca. 1912
DIQu-165	Historic: house	1927 Ethel Street	N/A – residential lot	G. Davis House, built ca. 1923
DIQu-166	Historic: house	1858 Highland Drive North	N/A – farm property	Ireland Farm House, built ca. 1919
DIQu-167	Historic: house	180 Highway 33 East	N/A – farm property	Sproul Farm House, built ca. 1906
DIQu-168	Historic: house	2796 KLO Road	N/A – farm property	KLO House
DIQu-169	Historic: house	1551 Lambert Avenue	N/A – residential lot	L.E. Taylor House
DIQu-170	Historic: house	1001 Lawrence Avenue	N/A – residential lot	Second Knowles House
DIQu-178	Historic: house	963 Lawrence Avenue	N/A – community property	Old United Church manse
DIQu-179	Historic: house	987 Lawrence Avenue	N/A – residential lot	Robert Munson House

5.0 RESULTS

Fieldwork within the proposed COMC corridor was conducted on 24-26 April 2007. Three protected archaeological sites (i.e., sites believed to pre-date 1846) were identified during the fieldwork within the proposed COMC corridor. Documented sites DIQu-21 and DIQu-22 were revisited and re-recorded, and one new site (DIQu-202) was identified and recorded. Documented site DIQu-145 was revisited, but no cultural materials were observed at its location. Lastly, designated historic site DIQu-24 (the Brent Mill) was revisited, but no further action was taken at this site during the present study. Maps 1-12 show the sites observed during the field survey, as well as the extent of survey coverage and locations where subsurface testing took place.

The field survey inspected lands in undisturbed or minimally disturbed settings. Developed urban lands were not examined, such as the commercial/light industrial neighbourhood between Spall Road and the Mill Creek crossing at Stn 213+00. Similarly, only a field reconnaissance (visual assessment) was made of the developed residential properties off Sexsmith Road in the Rutland Siding neighbourhood. Two private properties along the route could not be inspected during the field survey, because access was denied by their respective landowners. The unsurveyed lands within the COMC corridor are described as follows:

- Lot A, Plan KAP83361 @ 2750-2784 Hwy 97 N & Lot B, Plan KAP83361 @ 2786-2788 Hwy 97 N: COMC Stn 234+50 - 243+25 & McCurdy Extension Stn 0+700 - 0+950; and
- Lot 1, Plan 41723 @ 2851 Sexsmith Road: Stn 309+40 - 317+60.

5.1 FIELD SURVEY

Prior to the fieldwork, nearly all of the lands within the COMC corridor were suspected to exhibit high or moderate archaeological potential, principally due to the prevalence of level or minimally sloping terrain, the presence of Mill Creek and associated wetlands in much of the corridor, the likely presence of traditional plant and animal resources, and the known occurrence of documented archaeological sites.

During the field survey, the in-office appraisal of archaeological resource potential was ground-truthed, providing a more realistic impression of the actual potential of particular landscape units within the corridor. Table 3 summarizes the archaeological potential ratings along the COMC corridor, as well as other observations arising from the fieldwork carried out in April 2007.

The portion of the COMC corridor inspected in April 2007 can be separated into five distinct divisions:

- the heavily urbanized setting between Spall Road (Stn 203+00) and the Mill Creek crossing at Stn 213+00;
- low-lying alluvial plain settings between Stn 214+00 - 222+60 and 241+00 - 317+60/318+00;
- the dissected glaciolacustrine terraces and lower slopes of Mount Dilworth from Stn 222+60 to 241+00;
- the unnamed hill between Stn 317+60/318+00 - 334+00/334+80; and
- the undulating to sloping glaciolacustrine terraces from Stn 334+00/334+80 to the Point of Termination at the UBC Flyover interchange.

Table 3. COMC corridor archaeological potential and field survey summary, April 2007.

Survey Stations	Potential Rating	Landscape Description	Surface Exposure	# Tests	Survey Results
COMC 203+00 - 204+25	Low	Low-lying fluvial terrace; disturbed by streets, railway, gravel pit	N/A	0	Severely disturbed setting; no ground inspection
COMC 204+25 - 205+00	High	High fluvial terrace; disturbed by old golf course and cemetery	Minimal	11	No cultural materials observed; crew notified that inspected area was a former golf tee on imported fill
COMC 205+00 - 213+50	Low	Low-lying fluvial terrace in built-up urban setting	N/A	0	Severely disturbed setting; no ground inspection
COMC 213+50 - 220+50	Moderate	Low-lying fluvial terrace; pasture; disturbed by roads, railway, utility lines	Extensive	5	No cultural materials observed in tests, on low-lying terrace margin near Mill Creek; historic Brent Mill now situated S of COMC corridor at Stn 214+00
COMC 220+50 - 221+60	Moderate	Forested, low-lying glaciolacustrine or fluvial, dissected terrace	Minimal	5	No cultural materials observed; terrain may have been disturbed by historic land use but not obviously so
COMC 221+60 - 223+25	High	Level to undulating glaciolacustrine terrace	Extensive	29	DIQu-21 revisited and re-recorded in this setting
COMC 223+25 - 226+00	Low	Steeply sloping hillside	Extensive	0	Sloping setting
COMC 226+00 - 229+25	Moderate	Gently to moderately sloping glaciolacustrine terrace, partly adjacent to wetland & close to mineral lick	Moderate	7	No cultural materials observed in tests beside wetland at Stn 227+40; large area of recent subsurface disturbance inspected at Stn 228+50
COMC 229+25 - 232+75	High	Level to gently sloping, dissected glaciolacustrine terrace and knoll overlooking creek	Extensive	33	DIQu-22 re-located and re-recorded; new site DIQu-202 identified and recorded in this setting
COMC 232+75 - 234+75	Low	Steeply sloping hillside	Extensive	0	Sloping setting, no cultural materials or features observed
COMC 234+75 - 243+25	Some High	Gently sloping terrace lands between Mill Creek & gas pipeline; some level terraces overlooking creek	Unsurveyed	N/A	Access to property denied by landowner
COMC 243+25 - 309+40	Low	Gently sloping fluvial terrace; pasture	Moderate	0	No cultural materials observed
COMC 309+40 - 318+00 ¹	Low	Low-lying pasture; streets; residential properties	Part unsurveyed; rest moderate	N/A	Access to property between Stn 309+40 - 317+60 denied by landowner; other areas disturbed
COMC 309+40 - 317+60 ²	Low	Low-lying pasture; streets; residential properties	Part unsurveyed; rest moderate	N/A	Access to property between Stn 309+40 - 317+60 denied by landowner; other areas disturbed
COMC 318+00 - 334+80 ¹	Low	Moderately to steeply sloping forested hillside	Moderate	0	Disturbed residential setting to Stn 322+20, then open forested hillside; no cultural materials observed
COMC 317+60 - 334+00 ²	Low	Moderately to steeply sloping forested hillside	Moderate	0	Disturbed residential setting to Stn 322+00, then open forested hillside; no cultural materials observed
COMC 334+00 - 339+00 ²	Moderate	Gently sloping glaciolacustrine terrace; close to Carney Pond	Minimal	0	No cultural materials observed in sloping hayfield

Table 3. COMC corridor archaeological potential and field survey summary, April 2007.

Survey Stations	Potential Rating	Landscape Description	Surface Exposure	# Tests	Survey Results
COMC 334+80 - 342+00 ¹	Moderate	Gently sloping glaciolacustrine terrace; close to Carney Pond	Minimal	8	No cultural materials observed in sloping hayfield; testing on localized terrace overlooking pond
COMC 339+00 - 341+40 ²	Low	Hwy 97 roadbed; fill-pile; farmyard; all disturbed	Extensive	0	Severely disturbed setting; no ground inspection; inspected in 2006 for UBC Flyover
COMC 341+40 - 342+00 ²	Moderate	Gently sloping glaciolacustrine terrace; disturbed	Moderate	0	Disturbed farmyard setting; inspected in 2006 for UBC Flyover
COMC 342+00 - 342+80 ²	Low	Wetland in steep-sided basin	Minimal	0	No ground inspection
COMC 342+80 - 346+00 ²	High	Level glaciolacustrine terraces	Extensive	0	S part is site of UBC Flyover construction, inspected in 2006; no trace of DIQu-145 observed in N part near Stn 344+40
McCurdy 530+000 - 530+650 ³	Low	Gently sloping, disturbed pasture; stream gully	Moderate	0	Some disturbance from road construction & agriculture; no cultural materials observed
McCurdy 530+650 - 530+720	Low	Sloping hillside; stream gully	Unsurveyed	N/A	Access to property denied by landowner
McCurdy 530+720 - 530+800	High	Low knoll overlooking Mill Creek	Unsurveyed	N/A	Access to property denied by landowner; other areas disturbed
McCurdy 530+800 - 530+950	Low	Hillside above Mill Creek; low-lying terrace; disturbed by residence/farmyard	Unsurveyed	N/A	Access to property denied by landowner
McCurdy 530+950 - Hwy 97	Low	Low-lying pasture; disturbed by farmyard/feedlot operation	Moderate	0	Significant disturbance, road construction & agriculture; no cultural materials observed

¹ McCurdy - UBCO Option L300B4 route.
² McCurdy - UBCO Option L300C2 route.
³ McCurdy Road Extension, Rifle Road to Highway 97.

As a general observation, it was noted that the glaciolacustrine terraces along the toe of Mount Dilworth consistently exhibited the highest potential for archaeological resources, primarily due to their proximity to Mill Creek and availability of traditional resources such as balsamroot and game animals.

A comparable group of glaciolacustrine terraces is present at the northeastern extremity of the COMC corridor; these lands were inspected during an impact assessment for the UBC Flyover (Arcas Consulting Archeologists 2006). During the present assessment, construction for the interchange was underway, restricting access to much of this setting, though the location of one site recorded in 2006 could still be accessed.

A third location that may once have exhibited archaeological potential comparable to the glaciolacustrine terraces is present at the southern extremity of the Kelowna Municipal Cemetery (Stn 204+25 - 205+00). This setting is an elevated fluvial terrace with a good view of the alluvial plain to the south and west. Unfortunately, the landscape within the present cemetery was profoundly modified during its former incarnation as a golf course and the modern land surface is built up on imported fill.

5.2 HERITAGE RESOURCES

During the field survey, three protected archaeological sites and one protected historic site were identified within or adjacent to the COMC corridor. No remnants of a fourth protected site could be found in 2007. The locations of all these sites in the context of the COMC corridor are shown on Maps 1-12, and this section provides details about each site.

5.2.1 Artifact Scatter Site: DIQu-21

This site is located near the margin of a level to undulating and gently sloping glaciolacustrine terrace overlooking Mill Creek and the CN railway grade (Figure 7). It is entirely situated within the COMC corridor, between Stn 221+60 and 222+80. This is a grassland setting with a few scattered juvenile and mature ponderosa pine trees (Figure 8). It is apparent that the terrace margin at this location was only minimally cut back to accommodate the railway grade.

The site was originally identified and recorded by Mike Rousseau and Geordie Howe (Heritage Conservation Branch), who were conducting an assessment of lands on Mount Dilworth for the Central Okanagan Regional District (Rousseau 1979). At that time, the site was described as a surface lithic scatter, though the number and density of artifacts was not reported. No subsurface testing was done at that time. In comparison to Figure 7, the 1979 artifacts were observed within the eastern portion of the site area, and included materials scattered on the slope leading down to the railway grade.

During the 2007 assessment, cultural materials were encountered in eight positive shovel tests and three evaluative tests (50 cm²; Figure 9). Twenty-one negative shovel tests (≤ 5 m intervals) were excavated in the immediate vicinity of the positive tests, and further east in the area where the 1979 artifacts were reported. All of the positive tests within this site are situated on a slight rise relative to the rest of the site, at the crest of which is a broad, shallow depression (natural origin). One surface artifact (a white chalcedony flake) was observed at the edge of the terrace near the original discovery test, but no additional artifacts were identified elsewhere, in particular within the original site area reported in 1979. Table 4 summarizes the results of the shovel testing and evaluative tests at DIQu-21.

A total of 86 lithic artifacts were recovered from the shovel tests and evaluative tests at DIQu-21 during the 2007 impact assessment. The artifacts include two tools: the base of a stemmed projectile point from evaluative unit (EU) EU2, and a fragmentary utilized flake from EU3. All other artifacts are unmodified flakes classed as debitage, the waste product of stone tool manufacture. The ratio between debitage and tools in the artifact assemblage is about typical for archaeological sites in this region. Unfortunately, the projectile point fragment is too small to determine its original form, and hence its relative age is unknown. The artifacts and other cultural materials are curated at the Kelowna Centennial Museum in trust of the First Nations' communities.

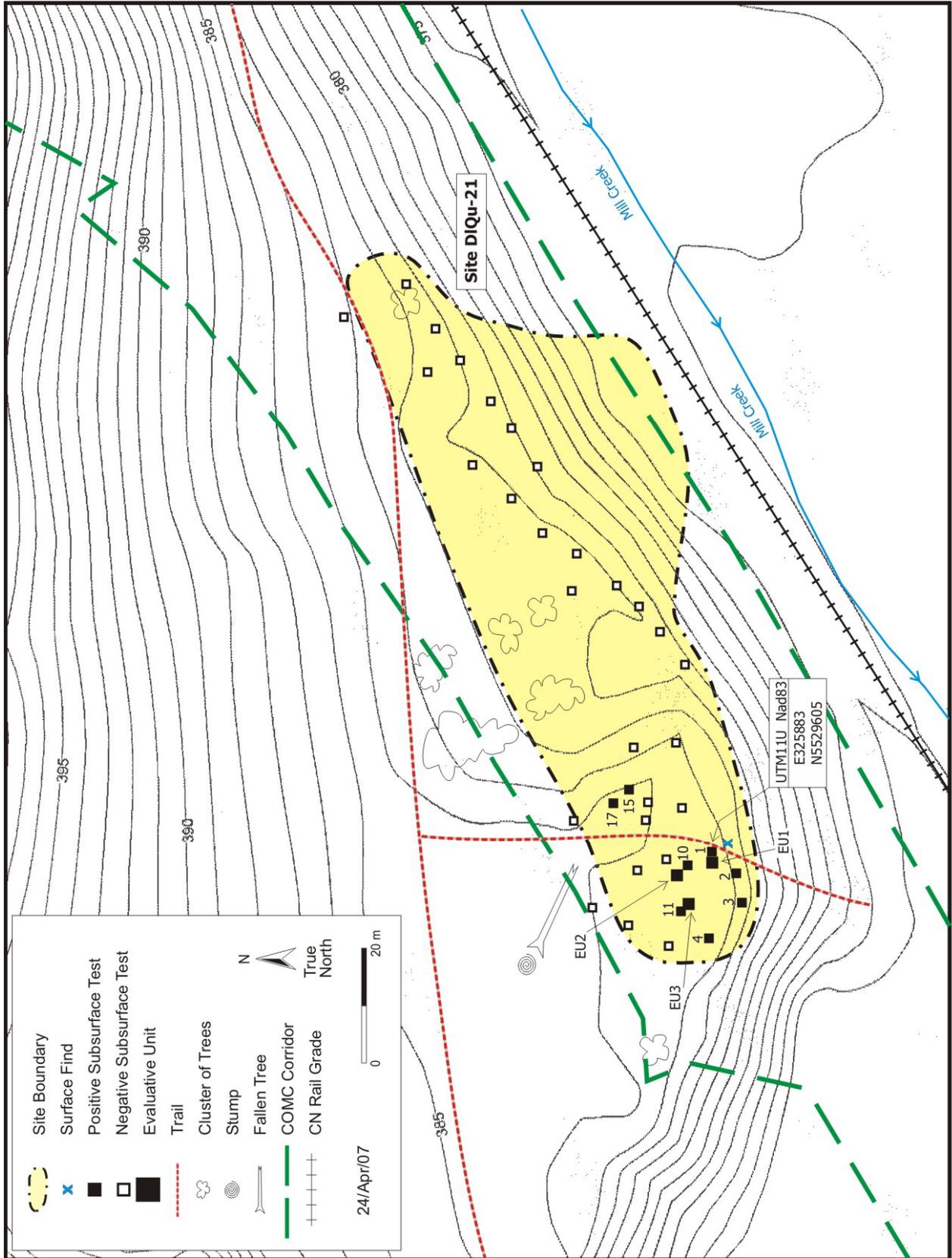


Figure 7. Map of archaeological site DIQu-21 (1:1,000).

Test #	Depth	Profile	Results
ST1	50 cm	Undifferentiated light brown silt	5 chalcedony & 2 dacite flakes
ST2	not reported	Same as ST1	4 chalcedony flakes
ST3	not reported	Same as ST1	1 mammal bone fragment
ST4	not reported	Same as ST1	9 freshwater mussel shell fragments
ST10	not reported	Same as ST1	9 chalcedony flakes
ST11	not reported	Same as ST1	1 chert flake
ST15	not reported	Same as ST1	Several deer tooth fragments
ST17	not reported	Same as ST1	1 burned mammal bone fragment
EU1	0-10 cm	Brown silty loam with little stone	6 chalcedony & 1 dacite flakes; 1 mammal bone fragment
	10-20 cm	Brown silty loam overlying light brown clay silt with little stone	2 chalcedony & 1 chert flakes
EU2	0-10 cm	Brown silty loam with little stone	1 chalcedony biface fragment; 1 chalcedony core fragment; 22 chalcedony & 1 dacite flakes
	10-20 cm	Brown silty loam with little stone	15 chalcedony, 1 chert & 1 dacite flakes
	20-30 cm	Compact light brown clay silt	1 chalcedony flake & 1 chert flake
EU3	0-10 cm	Brown silty loam with little stone	1 chalcedony utilized flake; 8 chalcedony & 1 chert flakes; 6 mammal bone fragments
	10-20 cm	Compact light brown clay silt	1 dacite flake

The artifacts recovered in 2007 are conspicuously dominated by white chalcedony (87%), with white chert and dark grey to black dacite occurring in approximately similar, much lower frequencies. All these lithic raw material types are typical of Okanagan Valley sites. Both the chalcedony and chert were likely obtained from local sources, perhaps even from Mount Dilworth. The dacite most likely originated from the Pennask Mountain source to the southwest.

Faunal remains at DIQu-21 occur as often in the shovel tests as lithic artifacts but are not abundant and principally appear as small fragments of mammal bone, some of which is burned. Freshwater mussel shell is present in one shovel test and none of the evaluative tests, implying that it is quite localized within the site. Fire-altered rocks were not observed in any of the positive tests at this site.

Subsurface cultural materials to a depth of at least 30 cm are present at the western end of this site, but no buried or surface artifacts were discovered within the original boundary of DIQu-21. The original site map (Rousseau 1979) is easy to interpret in comparison to the modern landscape, and it is obvious that the site was correctly plotted at that time. Moreover, the archaeologists who originally discovered the site had considerable experience in this region, and we can be certain that the artifacts reported in 1979 were genuine. Though the buried cultural materials encountered in



Figure 8. View southeast toward southern end of site DIQu-21; dashed outline denotes remainder of the site. Area of the subsurface cultural materials at right extremity of the site.



Figure 9. DIQu-21, profile of evaluative test EU1, showing brown silty loam overlying clay loam.

2007 are situated in a different (though nearby) location than the unseen 1979 surface artifacts, it is reasonable to incorporate the materials as a western extension of DIQu-21.

DIQu-21 likely represents a recurrently occupied transitory camp, and its location near the edge of a terrace overlooking Mill Creek suggests that the site may have been used by hunters to observe game animals near the creek and its associated wetlands. The presence of freshwater mussel shell in one test implies that some aquatic resources may also have been taken from the creek. The modern abundance of native plant resources like balsamroot on the terrace might have been another attraction of this location, though cultural materials typically associated with traditional plant-processing activities (e.g., fire-altered rocks) are absent.

5.2.2 Artifact Scatter Site: DIQu-22

DIQu-22 is located along the margin of a gently sloping to undulating glaciolacustrine terrace dissected by a number of old runoff gullies (Figure 10). It overlooks Mill Creek and the CN railway grade (Figure 11). Slightly more than half of the site area is situated outside the COMC corridor, the remainder is within the corridor between Stn 230+20 and 231+50. This is a grassland setting with abundant balsamroot and a few scattered shrubs, but no trees. There is a small railway cut into the terrace at the southern extremity of the site, but it does not seem likely that the site was affected. A natural gas pipeline traverses the terrace on the landward edge of the site, and there is a slight chance that the site could have been adversely affected. Much more recently, some kind of development activity (possible residential subdivision elsewhere on the property in which the site is situated) has resulted in deposition of a large pile of reworked fill at the toe of the montane slope northwest of DIQu-22.

Like the preceding site, DIQu-22 was originally recorded by Rousseau and Howe (Rousseau 1979). The site was reported to be a surface lithic scatter, with an unspecified number of artifacts being observed; no subsurface testing was done. As with DIQu-21, the cultural materials encountered in 2007 were concentrated in the western portion of the site area as originally reported.

Cultural materials were identified in four positive shovel tests and two evaluative tests in 2007 (Figure 12). Nineteen negative shovel tests (5-10 m intervals) were excavated in the western site area and further east within the boundary of the site as reported in 1979. All of the positive tests at DIQu-22 are situated on a prominent “headland” situated between two runoff gullies. Three surface artifacts (all white chalcedony flakes) were observed within the western part of the site; no artifacts were observed in the eastern portion of the site. Table 5 summarizes the results of the shovel testing and evaluative tests at DIQu-22.

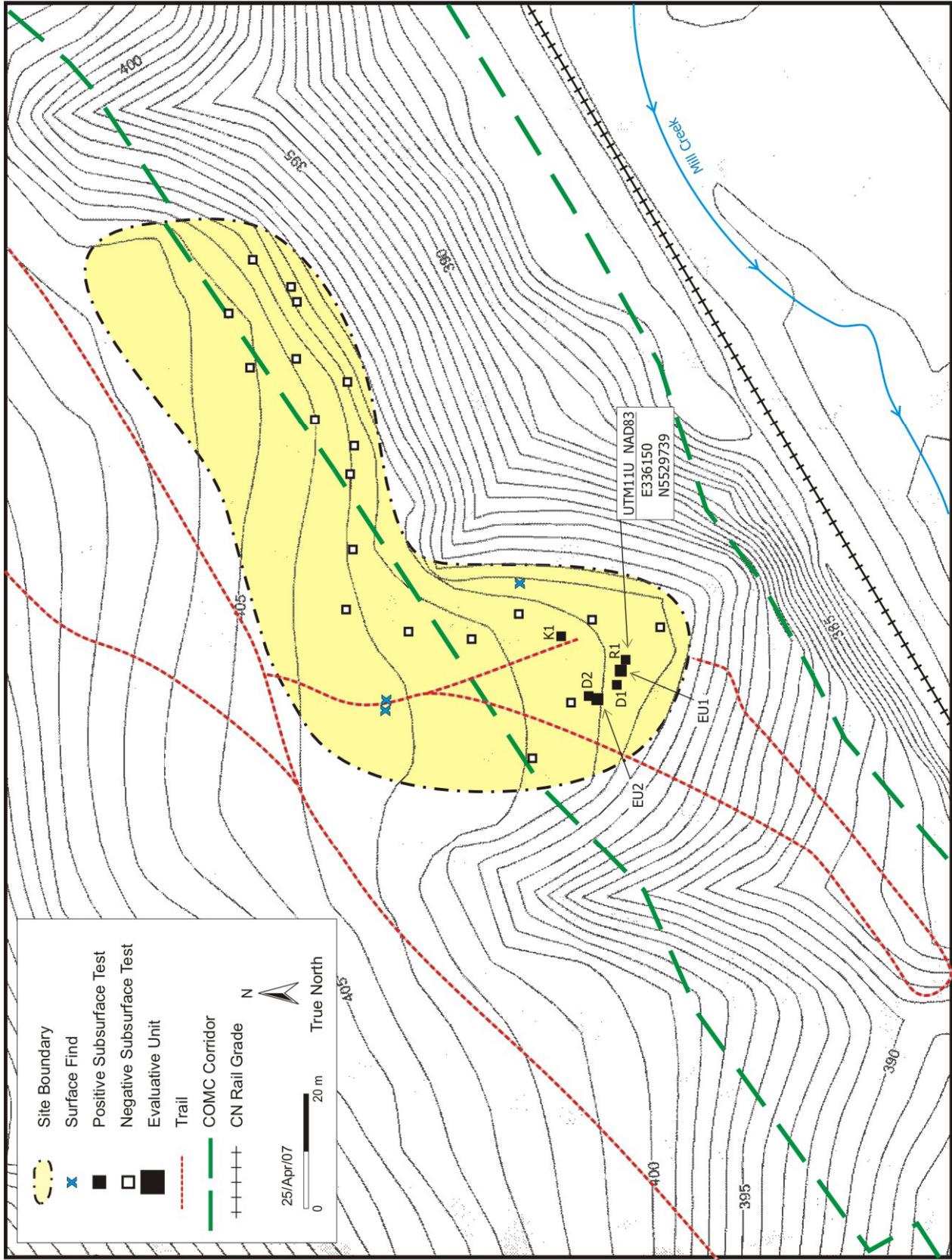


Figure 10. Map of archaeological site DIQu-22 (1:1,000).



Figure 11. View southeast toward southern part of DIQu-22; subsurface cultural materials are confined to the low rise where the balsamroot is growing (white outline area); remainder of site extends away to the left.



Figure 12. DIQu-22, profile of evaluative test EU2, showing brownish grey fine sand over brown fine to medium sand.

Test #	Depth	Profile	Results
R1	not reported	Light brown to brown silty fine sand	1 chert & 1 chalcedony & 1 dacite flakes; 1 freshwater mussel shell fragment; 1 mammal bone fragment
D1	not reported	Same as R1	3 siltstone flakes
D2	55 cm	Same as R1	3 siltstone & 2 dacite & 2 chert & 1 chalcedony flakes; 4 mammal bone fragments; FAR present
K1	not reported	Same as R1	1 chalcedony debitage
EU1	0-10 cm	Light brown silty loam	1 chert biface fragment; 2 chert & 2 chalcedony & 2 dacite & 1 siltstone flakes; 1 mammal bone fragment
	10-20 cm	Light brown silty loam to 17 cm BS, overlying brown silty loam	2 chert & 1 dacite flakes
	20-30 cm	Brown silty loam	2 dacite & 1 siltstone flakes
	30-40 cm	Brown silty loam	No cultural materials
	40-55 cm	Brown silty loam w/increasing frequency of gravel and pebbles	No cultural materials
EU2	0-10 cm	Brownish grey fine sand	2 chert & 2 dacite & 1 siltstone flakes; 1 mammal bone fragment
	10-20 cm	Brownish grey fine sand	1 dacite flake; 1 small fire-altered rock (FAR)
	20-30 cm	Brown fine to medium sand	12 siltstone & 2 dacite & 2 chert flakes; 3 burned mammal bone fragments; 19 FAR
	30-40 cm	Brown fine to medium sand	4 chert & 2 dacite flakes; 3 calcined & 4 mammal bone fragments; 5 FAR - decreasing frequency with depth in this level
	40-50 cm	Brown fine to medium sand	2 siltstone flakes
	50-55 cm	Brown fine to medium sand w/increasing frequency of pea gravel	No cultural materials

A total of 59 artifacts were recovered from the shovel tests and evaluative tests at DIQu-22 in 2007. One tool (the base of an unusually thick, brown chert biface from EU1) is present in the artifact assemblage. The remaining artifacts are unmodified debitage elements. The unusual biface fragment appears to be too thick to be a projectile point, and is too small to determine its complete form. The artifacts and other cultural materials from DIQu-22 are curated at the Kelowna Centennial Museum.

In contrast to preceding site DIQu-21, the artifact assemblage at DIQu-22 is dominated by brown to brownish grey siltstone (39%), with chert (27%) and dacite (25%) occurring at slightly lower frequencies. The siltstone is almost certainly available from local lithic sources, along with the other raw material types recovered from this site.

Faunal remains at DIQu-22 occur infrequently, and are dominated by small fragments of mammal bone, some of which are calcined by fire. Mussel shell fragments occur, but are rare. In contrast to DIQu-21, fire-altered rock is moderately abundant, but was restricted to evaluative test EU2 and the adjoining shovel test (D2).

Subsurface cultural materials were recovered to a depth between 40-50 cm below surface. Surface artifacts are present, but not abundant and are restricted to the western end of the site. No surficial or buried cultural materials were observed in the eastern part of the site as reported in 1979, but as reported above for DIQu-21, it was decided to retain the original site boundaries in the expectation that a low-density/low-visibility scatter of artifacts is still present in this setting.

DIQu-22 is also believed to have been a camp with multiple occupations, likely used by hunters and possibly also by people harvesting traditional plant resources. In consideration of the latter, it may be relevant to report that the western part of the site was covered with blooming balsamroot at the time the field survey took place (see Figure 6).

5.2.3 Brent Mill: DIQu-24

The historic Brent Mill (built 1871) was recorded by Richard Brolly and Chuck Bollong (Heritage Conservation Branch) in 1981 at the request of Kelowna Centennial Museum personnel (Brolly 1981). Its original location was on the south side of Mill Creek off the end of Cary Road – south of the COMC corridor at approximate Stn 227+40. Figures 13 and 14 are views of the Brent Mill in its original setting, as it appeared in 1981.

A commemorative cairn was erected at the site in 1958 by the Rutland Centennial Committee. The Brent property was acquired by the City of Kelowna around 2000, after which the mill and associated structures (residence, dairy barn) were moved to a heritage park reserve west of Dilworth Drive and south of the CN railway grade. In 2004, the structures were protected by a Heritage Designation under the *Local Governments Act* (Bylaw No. 9185).

At present, the mill and accompanying structures are situated south of the COMC corridor between Stn 213+90 and 214+70, where they are awaiting restoration by a joint venture between the City of Kelowna and the Central Okanagan Heritage Society.

Although the historic structures are situated near the COMC corridor, they do not conflict with it and no further action to protect the site should be required prior to or during construction for the COMC project.

5.2.4 Artifact Scatter Site: DIQu-145

DIQu-145 is located at the northeastern extremity of the COMC corridor in the vicinity of Stn 344+40 (of the L300C2 route option). The site is situated upon a narrow glaciolacustrine terrace east of Highway 97 and north of the UBC Flyover interchange. The site was identified and recorded in March 2006 by Richard Brolly and Heather Myles, during an archaeological impact assessment of the UBC Flyover project (Arcas Consulting Archeologists 2006). At that time, two lithic artifacts were observed on the surface of a plowed/disked fallow field, both in an area measuring about 2 m². Nine negative shovel tests were excavated (5 m intervals) in a grid pattern around the find-locations,



Figure 13. View north of Brent Mill in its original setting off end of Cary Road; photo taken in September 1981.



Figure 14 View east of Brent Mill in its original setting; photo taken in September 1981.

but no additional cultural materials were encountered (Arcas Consulting Archeologists 2006). Figure 15 is a view of the DIQu-145 site location, taken during the 2006 impact assessment survey.

Both of the lithic artifacts from DIQu-145 were unmodified debitage elements, manufactured from brownish grey siltstone. The artifacts were collected during the 2006 survey, and are curated at the Kelowna Centennial Museum.

A follow-up visit was made to DIQu-145 during the field survey for the present impact assessment. Surface exposures in the field where the site is located remained excellent in April 2007. However, no additional cultural materials were identified during the April 2007 survey. It is concluded that nothing remains of this site.



Figure 15. View north toward DIQu-145 (outlined area) on narrow terrace east of Highway 97, north of new UBC Interchange.

5.2.5 Artifact Scatter Site: DIQu-202

Pre-contact site DIQu-202 was identified and recorded during the field survey in April 2007. This site is located on a level patch of ground on the landward side of a weathered bedrock knoll (Figure 16), at the northern end of the undulating terrace complex that stretches back to Stn 225+80. The land surface drops off steeply to the south and east from the site, and the crest of the knoll has an excellent view of lowland settings in several directions. Site DIQu-202 is situated entirely within

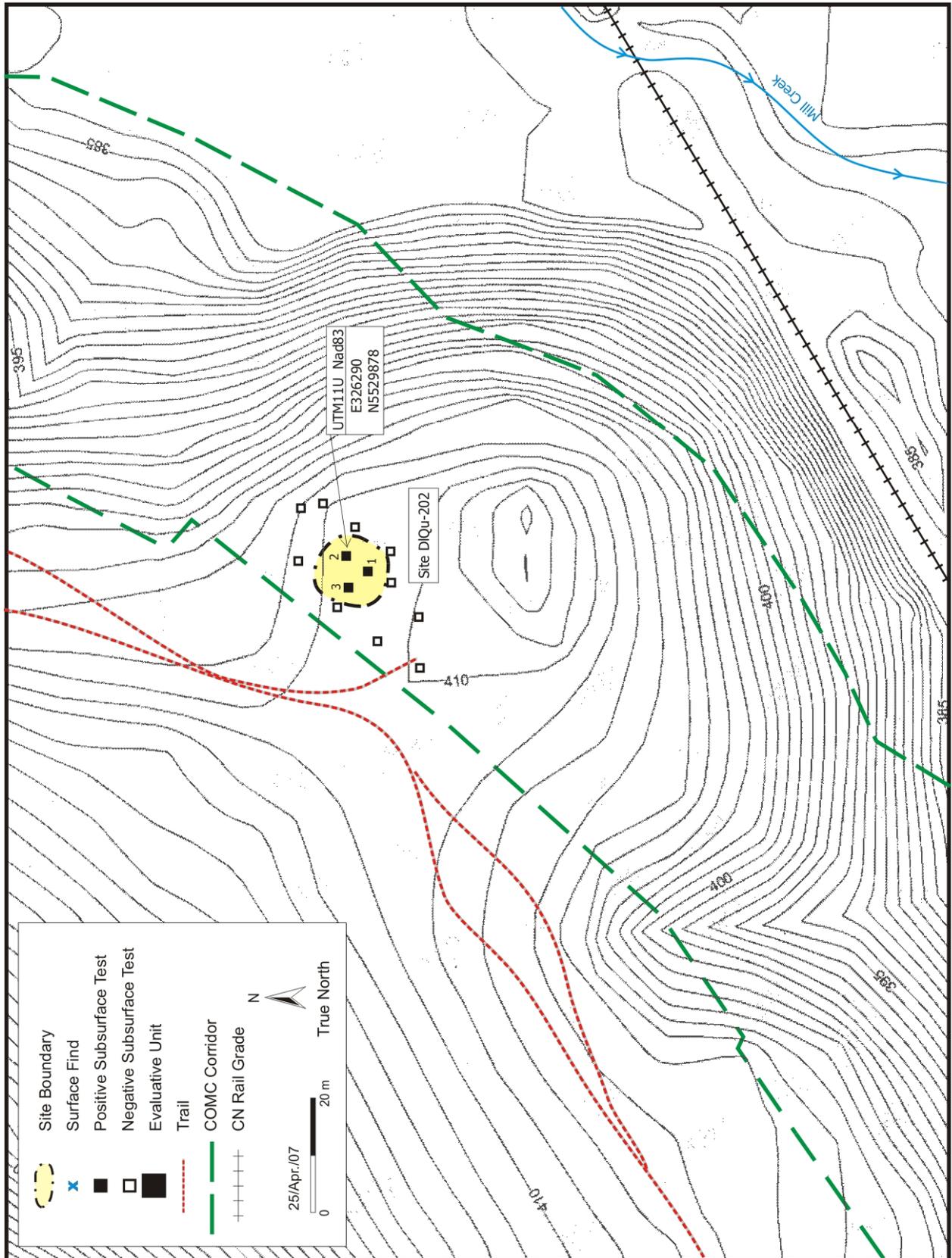


Figure 16. Archaeological site DIQu-202 (1:1,000).

the COMC corridor between Stn 232+50 and 232+60, though much of the landform upon which it is situated is outside the corridor. Like the other sites on the glaciolacustrine terraces, this site is within a weedy grassland setting, surrounded on three side by juvenile and maturing ponderosa pine and Douglas-fir trees, as well as deciduous shrubs (Figure 17). The railway grade has cut into the toe of the bedrock knoll, but did not affect the integrity of DIQu-202. The natural gas pipeline discussed at preceding site DIQu-22 passes within a few meters of the site, and could have adversely impacted the site when it was built.



Figure 17. View west toward DIQu-202 site area (white outline).

Cultural materials were identified in three positive shovel tests at DIQu-202. Ten negative shovel tests (5-10 m intervals) were also excavated in the immediate vicinity of the discovery location. No evaluative tests were excavated due to the low frequency and shallow deposits encountered in the shovel tests. No artifacts were observed on the surface of this site, and in particular, on the bare crest of the knoll, which is a natural lookout point. Table 6 summarizes the results of the shovel testing at DIQu-202.

Eight artifacts were recovered from the shovel tests at DIQu-202 in April 2007. Only unmodified debitage was recovered, nearly all of which is manufactured from locally available brownish grey siltstone, though one chalcedony flake was also observed. Faunal remains and fire-altered rocks are not present. As with the preceding sites, the DIQu-202 artifacts are curated at the Kelowna Centennial Museum.

Test #	Depth	Profile	Results
ST1	25 cm	Grayish brown silty loam with angular to subangular gravel	6 siltstone flakes
ST2	ca 20 cm	Same as ST1	1 chalcedony flake
ST3	ca. 20 cm	Same as ST1	1 siltstone flake

Buried artifacts were recovered to a depth between 5-15 cm below surface. The positive tests at DIQu-202 are restricted to a localized area of silty loam soils – the negative tests were all dug in a superficially similar setting, but distinguished by moist sandy loam containing a high frequency of angular, weathered bedrock.

DIQu-202 is suspected to have been a transitory hunting camp, situated near an obvious game-overlook feature (the bedrock knoll) in a setting sheltered from prevailing winds.

5.3 SITE SIGNIFICANCE EVALUATION

Archaeological sites DIQu-21, DIQu-22, DIQu-24, DIQu-145, and DIQu-202 were evaluated in terms of their scientific, ethnic, historic, and public significance as defined in the *Guidelines* (Archaeology Branch 1998). The sites were assigned significance ratings based on a number of considerations, including integrity, uniqueness, quantity and variety of artifacts, activities, public interest, educational value, and relevance to specific cultures, time periods, individuals, or events.

Scientific significance is based upon the potential of an archaeological site to provide evidence that would substantively enhance understanding of culture history, culture process, and various aspects of local and regional prehistory. **Ethnic** significance refers to the traditional, social, or religious importance of a site to a particular First Nation community. As far as possible, ethnic significance should be evaluated and expressed in terms of the value system of the community involved. Of particular importance, the *context* of a site must often be addressed when evaluating ethnic significance. **Historic** significance refers to the association of a site with important historic events, persons, or communities. **Public** significance represents the potential of an archaeological site to serve in an interpretive, educational, or recreational capacity. Lastly, **economic** significance of identified archaeological sites is evaluated in special cases where some attributes of a site suggest that potential economic benefits are possible, but was not considered warranted for any of the sites assessed under this Permit.

5.3.1 DIQu-21 Significance Evaluation

In consideration of the factors described above, DIQu-21 can be characterized as the remnants of a small hunting camp on a terrace overlooking Mill Creek. No cultural features appear to be present within the site. A total of 86 artifacts (two of them tools) and moderately abundant bone and mussel

shell were recovered from DIQu-21. Nearly all of the cultural materials observed in 2007 were restricted to a low rise on the terrace, beyond the area of the site reported in 1979. Aside from minor impacts resulting from ongoing recreational use (e.g., hiking, dog-walking, mountain-biking) of the terrace lands, this site does not appear to have been disturbed since it was recorded.

DIQu-21 is considered to have **moderate-to-high** scientific significance, based on the following criteria:

- C lithic artifacts are moderately abundant, with a normal ratio of tools to debitage;
- C no temporally-diagnostic artifacts were recovered in 1979 or 2007, but one fragmentary projectile point was recovered in 2007 and additional examples are likely to be present;
- C cultural materials appear to be restricted to an area measuring approximately 230 m²;
- C cultural materials are present to a depth of at least 30 cm below surface;
- C cultural materials (i.e., faunal remains) suitable for radiocarbon dating are present;
- C faunal remains are present in low frequencies, but no human remains were observed;
- C the site appears to be essentially intact, though an unknown number of surface artifacts reported in 1979 could not be found in 2007; and
- C intact, prehistoric archaeological sites are no longer common within the City of Kelowna.

Although the site is categorized as having moderate-to-high scientific significance, this rating really only applies to the limited area of the site where subsurface cultural materials were identified in 2007. In the absence of these deposits, the site would have been considered to have low significance.

Based on past comments by representatives of the Westbank First Nation and the Okanagan Indian Band, as well as heritage policy documents issued by both communities, we conclude that the ethnic significance of this and all archaeological sites in their respective areas of interest is considered to be **high**. There does not appear to be any connection between this site and the historic settlement of Kelowna, and the historic significance of this site is accordingly rated as **low**. Despite the attractive setting of DIQu-21 near the edge of a terrace with an excellent view of Mill Creek and its surroundings, its public significance is rated as **low**, due to the absence of distinctive cultural features which could be used in an interpretive role.

5.3.2 DIQu-22 Significance Evaluation

As with the preceding site, DIQu-22 appears to have been a small, hunting/plant-gathering camp on a terrace beside Mill Creek. No cultural features were encountered within the site, but the occurrence of fire-altered rocks signifies that buried hearth features could be present. A total of 59 artifacts (including one tool fragment) and several fragments of bone or shell were recovered from DIQu-22. All of the cultural materials encountered in 2007 were restricted to the southernmost aspect of the site, on a promontory overlooking the creek. No cultural materials were observed within a large area of the site where surface artifacts were reported in 1979. A natural gas pipeline traverses the landward edge of the site, and may have impacted this portion of the site. There have also been low-level impacts to the site resulting from recreational use of the terrace lands (e.g., mountain biking, hiking), but the integrity of the site appears to be the same as it was when recorded in 1979.

DIQu-22 is considered to have **moderate-to-high** scientific significance, based on the following criteria:

- C lithic artifacts are moderately abundant, with a normal ratio between tools and debitage;
- C no temporally-diagnostic tools were observed in 1979 or 2007, but may be present;
- C no cultural features were encountered in 2007, but the presence of fire-altered rock indicates that at least one hearth is present within the site;
- C at present, subsurface cultural materials appear to be restricted to an area measuring approximately 150 m²;
- C cultural materials are present to a depth of nearly 50 cm below surface
- C cultural materials (i.e., faunal remains) suitable for radiocarbon dating are present;
- C faunal remains are present in low frequencies, but no human remains were observed;
- C the site appears to be nearly intact, though an unknown number of surface artifacts reported in 1979 could not be found in 2007; and
- C intact, prehistoric archaeological sites are no longer common within the City of Kelowna.

The moderate-to-high scientific significance rating only applies to the area of the site where subsurface cultural materials were encountered in 2007. The remainder of the site is considered to have low significance.

As described for DIQu-21, it is concluded that DIQu-22 is considered to have **high** ethnic significance by the Westbank First Nation and Okanagan Indian Band. There does not appear to be any connection between this site and the historic settlement of Kelowna, and its historic significance is rated as **low**. Although DIQu-22 is situated along the edge of a terrace with an excellent view of surrounding terrain, and frequently used by recreational walkers, its public significance is rated as **low**, due to the absence of distinctive cultural features which could be used in an interpretive role.

5.3.3 DIQu-24 Significance Evaluation

DIQu-24 is the historic Brent Mill, originally constructed in 1871 to service the growing agricultural population of the Mission Creek Valley (as Kelowna was then known). Its original setting was on the left bank (southeast side) of Mill Creek, between the locations of DIQu-21 and DIQu-22 which are on the right bank of the creek. Although the mill machinery was removed some time before 1948 (Buckland 1979), the surviving building was used as a barn for many years. After the mill and its surrounding property were purchased by the City of Kelowna, it and other structures on the original Brent property were moved to a new location for preservation and eventual restoration.

As an historic structure, DIQu-24 is considered to have **low** scientific significance, for the following reasons:

- C the mill building is no longer situated in its original landscape context;
- C the milling machinery was removed from the building over 60 years ago, and it is essentially an empty shell; the machinery may be in storage elsewhere in Kelowna (Buckland 1979), and could be reunited with the mill building as part of a restoration project); and
- C scientific insights are unlikely to be forthcoming from further investigation of the mill structure.

The Brent Mill is obviously of Euro-Canadian origin, but Buckland (1979) reports that many 19th century First Nations' communities in the region brought their grain to be processed at the mill.

While waiting their turn at the mill, they established camps along the creek and engaged in traditional gambling games (e.g., *slahal*). For this reason, the [original] mill site may have had at least **moderate** ethnic significance. The historic significance of DIQu-24 is rated as **high**, owing to its linkage to the early Euro-Canadian settlement of Kelowna, as well as its association with one of the region's historic families. DIQu-24 is now situated within a municipal park reserve, and restoration is planned according to an information sign on Dilworth Drive; for this reason its public significance is rated as **high**.

5.3.4 DIQu-145 Significance Evaluation

As observed in 2006, DIQu-145 was characterized as a very small, pre-Contact activity area on a narrow terrace east of Highway 97 (Arcas Consulting Archeologists 2006). No cultural features are present within the site. Only two lithic artifacts were observed on the surface of this site; both were unmodified waste flakes. No cultural materials were recovered from nine subsurface tests excavated around the artifact find-locations. Local soil chemistry is somewhat alkaline, meaning that bony faunal remains would have been well-preserved had they been present. The integrity of this site has been compromised by past and ongoing agricultural land use, and both artifacts were collected during the field survey. In 2006, the site was considered to be completely disturbed. No additional cultural materials were observed during the 2007 field survey.

DIQu-145 is considered to have **low** scientific significance, based on the following criteria:

- C lithic artifacts are very scarce, being comprised of two unmodified flakes;
- C no temporally-diagnostic or formed tools are present;
- C cultural materials were restricted to an area measuring approximately 2 m²;
- C no fire-altered rocks or faunal remains are present;
- C the entire site has been disturbed by past and ongoing agricultural land use; and
- C human remains were not observed.

As with preceding sites DIQu-21 and DIQu-22, it is concluded that the Westbank First Nation and Okanagan Indian Band communities consider this site to have **high** ethnic significance. The historic significance of this site is rated as **low**. Its public significance is also rated as **low**, due to the absence of interpretable cultural features, as well as its situation on private property to which public access is restricted.

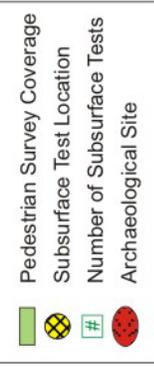
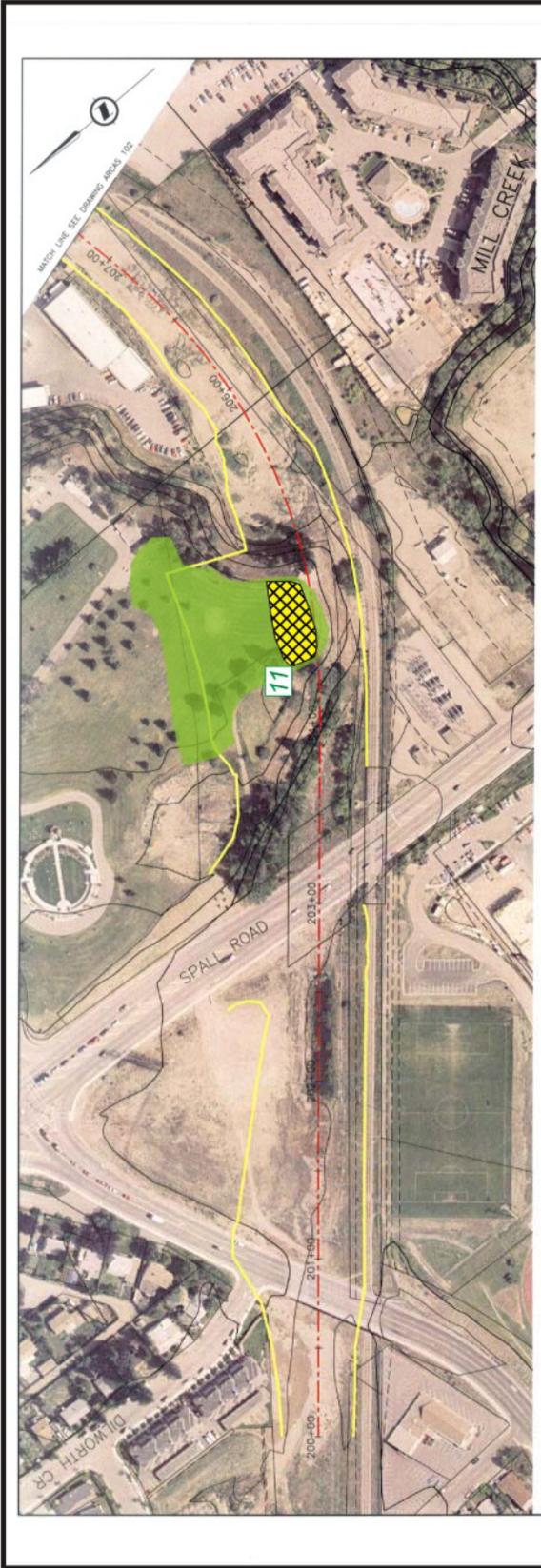
5.3.5 DIQu-202 Significance Evaluation

DIQu-202 is believed to have been a transitory hunting camp, located in the shelter of a rocky knoll that would have afforded an excellent viewpoint for game animals along Mill Creek. No cultural features were encountered within the site, nor were cultural materials (i.e., fire-altered rocks) suggestive of buried hearths or cooking features. A total of eight artifacts (all unmodified debitage) were recovered from DIQu-202. The cultural materials encountered in 2007 were restricted to a localized area of deeper soil amidst sediments containing a high percentage of weathered bedrock. A natural gas pipeline traverses the landward edge of the site, but does not appear to have impacted

it. The site appears to be intact, aside from the impacts resulting from its discovery and testing. DIQu-202 is rated as having **low** scientific significance, according to the following criteria:

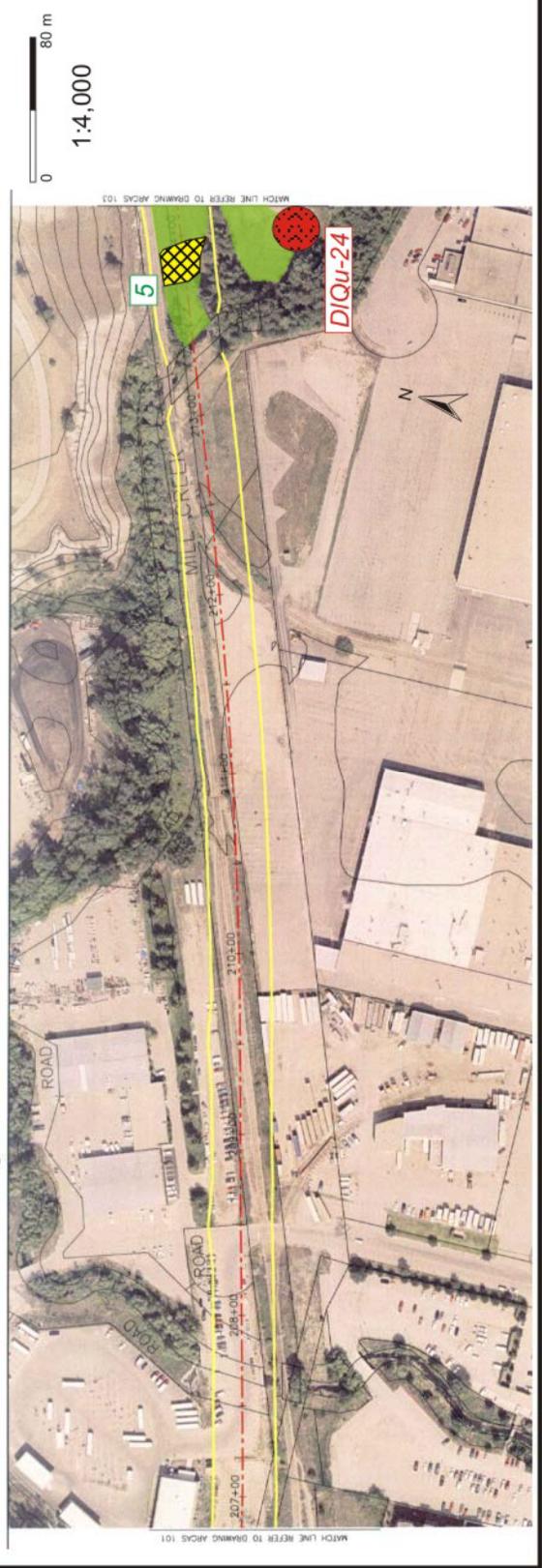
- C lithic artifacts are not abundant, being comprised of eight unmodified flakes;
- C no temporally-diagnostic or formed tools were observed, though some may be present;
- C cultural materials were restricted to an area measuring approximately 25 m²;
- C no fire-altered rocks or faunal remains are present;
- C no cultural materials suitable for radiocarbon dating are present; and
- C human remains were not observed.

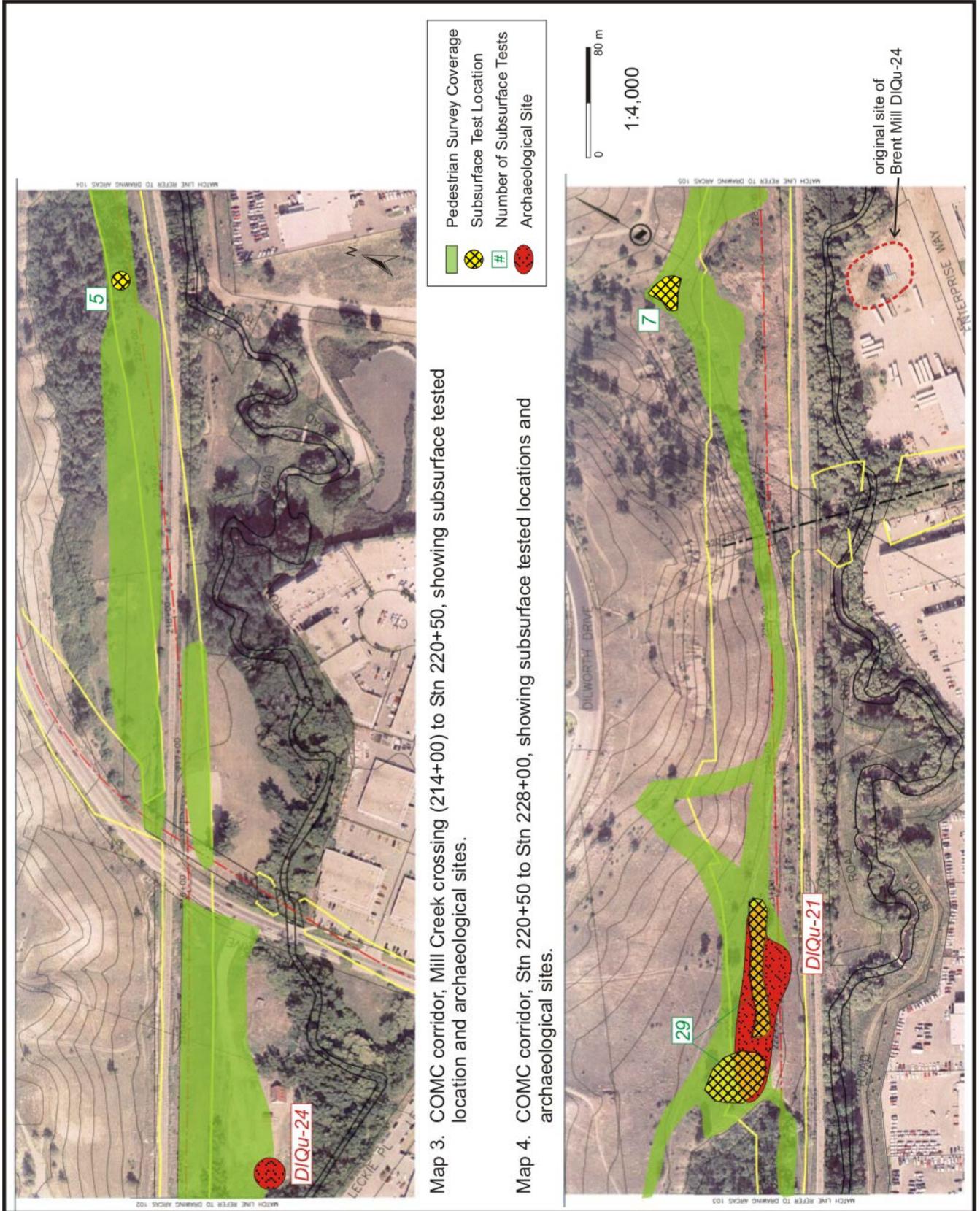
It is concluded that DIQu-202 is considered to have **high** ethnic significance by the Westbank First Nation and Okanagan Indian Band. The historic significance of this site is rated as **low**. Despite its pleasant setting in an area used by recreational hikers, its public significance is also rated as **low**, due to the absence of interpretable cultural features, as well as its situation on private property to which public access is potentially restricted.



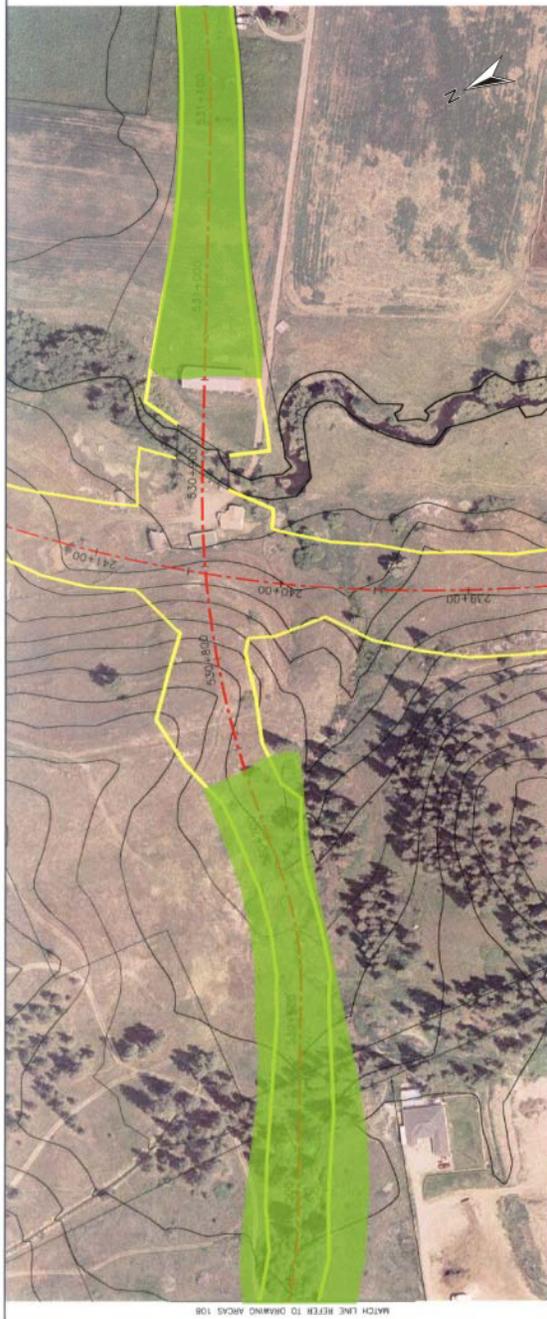
Map 1. COMC corridor, Spall Road (203+00) to Stn 207+00 showing subsurface tested location.

Map 2. COMC corridor, Stn 207+00 to Mill Creek crossing (214+00), showing subsurface tested location and archaeological site.



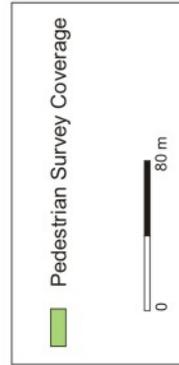


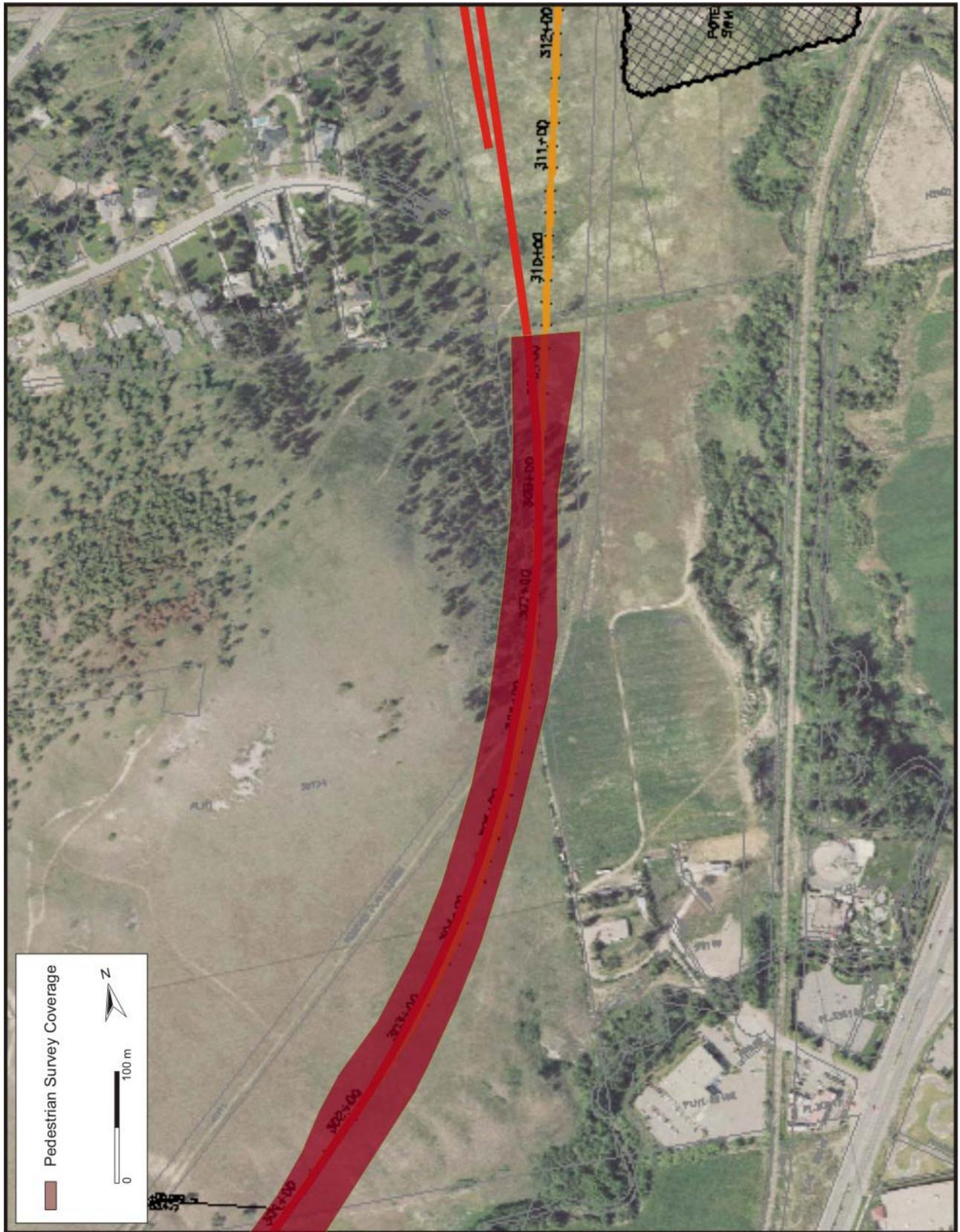




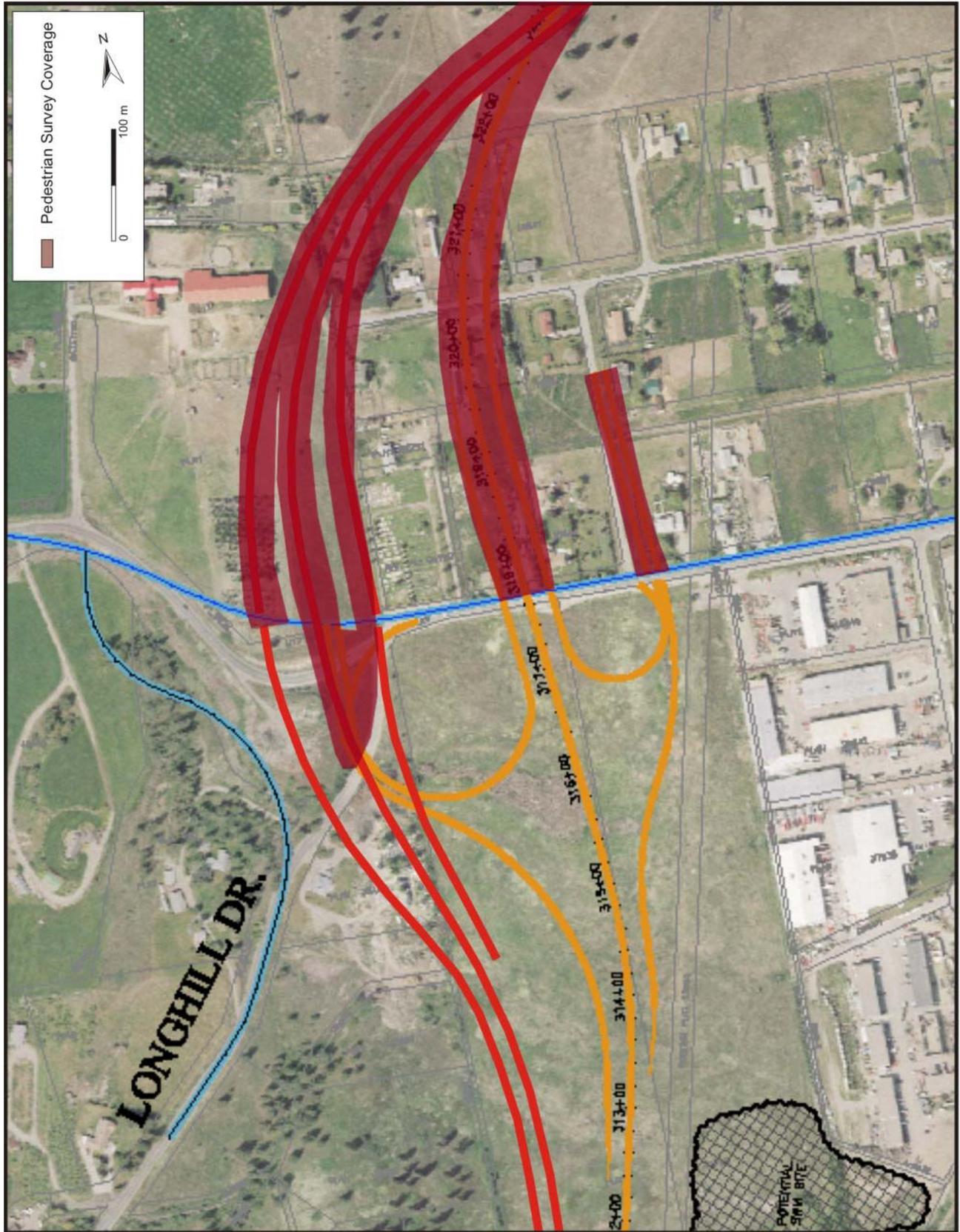
Map 7. COMC corridor, Stn 239+00 to 241+50 and McCurdy Extension, Stn 530+500 to Stn 531+100.

Map 8. McCurdy Extension, Stn 530+000 to Stn 530+500.





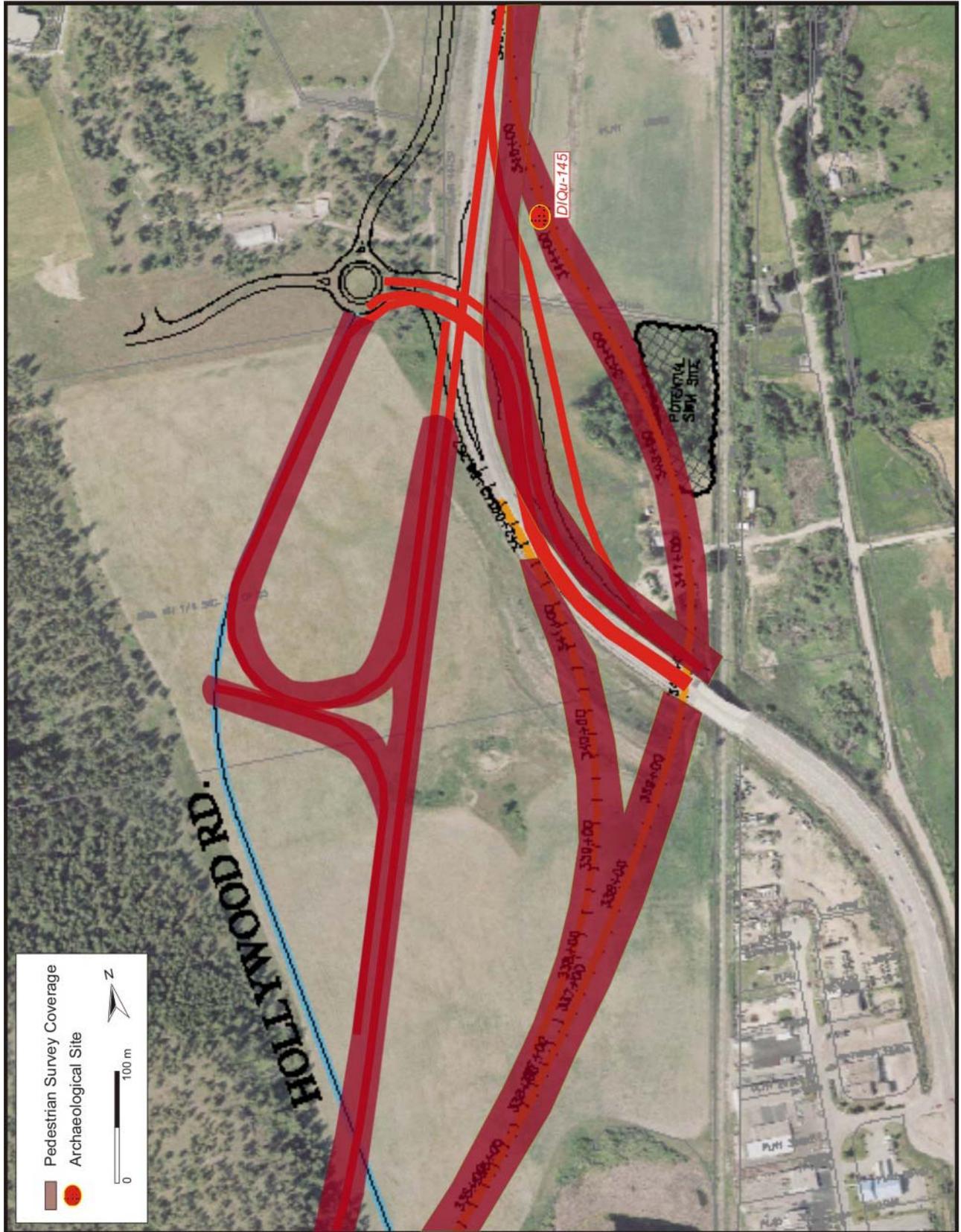
Map 9. COMC corridor, Stn 301+00 to Stn 310+00 (1:5,000).



Map 10. COMC corridor, L300B4 Stn 312+00 to Stn 322+00 and L300C2 Stn 311+00 to Stn 323+00 (1:5,000).



Map 11. COMC corridor, L300B4 Stn 322+00 to Stn 334+00 and L300C2 Stn 323+00 to Stn 336+00, showing subsurface tested location (1:5,000).



Map 12. COMC corridor, L300B4 Stn 334+00 to Stn 345+00 and L300C2 Stn 336+00 to Stn 343+00, showing archaeological site (1:5,000).

6.0 IMPACT ASSESSMENT

Maps 1-12 represent the most recent version of the COMC corridor when the April 2007 field survey took place. With a standard width of 30 m, variations in corridor width on the maps denote settings where cuts and/or fills are likely to be required. Two route alternates are shown for the corridor in the Rutland Siding neighbourhood around Sexsmith Road, and there are two options (i.e., L300B4, L300C2) for the route to rejoin Highway 97 at or near the new UBC interchange.

Based on the outcome of the field survey, a preliminary assessment of potential project effects on archaeological resources can be provided. As of April 2007, five protected cultural heritage sites were determined to be present within or near the portion of the COMC corridor that was inspected in April 2007. Proceeding from southwest to northeast, the conflict status of these sites is as follows:

- **DIQu-24 (Brent Mill):** The present location of this historic grist mill is an undeveloped municipal park reserve west of Dilworth Drive and south of the existing CN railway grade. The mill structure and other historic buildings are presently situated 40 m south of the southern boundary of the COMC corridor, between Stn 213+90 and 214+70. As presently envisioned, the corridor does not directly conflict with this site.
- **DIQu-21:** This pre-Contact site is situated entirely within the COMC corridor between Stn 221+60 and 222+80. The southern margin of the corridor is configured to the edge of the CN railway grade, and the steepening slope northwest of the site would appear to constrain realignment of the corridor away from the site. Thus, this is considered to represent an unavoidable conflict between the COMC corridor and DIQu-21.
- **DIQu-22:** This is another pre-Contact site, mostly situated within the COMC corridor between Stn 230+20 and 231+50. Although a small fraction of the site is outside the northern boundary of the corridor, the most significant part of the site is inside. The southern margin of the corridor is more or less configured to the CN railway grade, and the presence of a natural gas pipeline right-of-way severely limits corridor realignment options to avoid DIQu-22. For this reason, there is an unavoidable conflict between the COMC corridor and this site.
- **DIQu-202:** This is a small, pre-Contact site situated within the COMC corridor between Stn 232+50 and 232+60. The site is located at the point where the corridor begins to swing away from the CN railway grade, but becomes constrained by the presence of steep slopes and wetland habitat to the east, and the gas pipeline right-of-way and steep slopes to the west. In consideration of these criteria, the conflict between the COMC corridor and DIQu-202 is likely unavoidable.
- **DIQu-145:** This is a very small, pre-Contact site situated entirely within the L300C2 option of the COMC corridor, in the vicinity of Stn 344+40. Only two lithic artifacts were observed at this site in 2006, and none were found in 2007. The site is considered to be destroyed, and therefore the COMC project does not conflict with DIQu-145.

No archaeological or historic sites were observed in the remaining sections of the COMC corridor that were inspected during the field survey, and the likelihood that as-yet undiscovered sites exist in those settings is considered to be low.

A significant length of the COMC/McCurdy Extension corridors remains unexamined, within two private properties where access was denied in April 2007. Lands believed to exhibit high or moderate archaeological resource potential exist within the COMC corridor on at least one of these properties (i.e., COMC Stn 234+77 - 243+25; McCurdy Stn 530+72 - 530+80).

Although the field survey was guided by an appreciation of the types of traditional use that could have taken place in the project locality, the study was concerned solely with archaeological resources, and did not address the issue of traditional uses of the COMC corridor and its surrounding landscape by Aboriginal communities.

7.0 RECOMMENDATIONS AND CONCLUSION

Specific measures for mitigating impacts to heritage resources by the project are identified in the *British Columbia Archaeological Impact Assessment Guidelines* (Archaeology Branch 1998). Generally, **site conservation** by avoidance is the most cost-effective strategy for sites or portions of sites threatened with destruction. **Project redesign** is the most commonly invoked version of this option, but may be impractical if it conflicts with engineering or environmental concerns. Mitigation in the form of **systematic data recovery** (i.e., scientific excavations) is usually recommended for vulnerable significant sites or portions of sites that cannot be protected by other strategies. Archaeological **monitoring** is another type of mitigation, often recommended for construction within less-significant sites or portions of sites, to ensure that appropriate **emergency impact management** measures are carried out if unanticipated, significant archaeological remains (e.g., burial places) are encountered. Archaeological monitoring of construction activities is also done for sites where other kinds of archaeological investigations (e.g., data recovery) have been conducted. Lastly, **compensation** refers to direct monetary payments being made by a proponent to finance the costs of site inventory or other kinds of archaeological studies on lands that may not be directly affected by a particular development.

Archaeological and historic heritage resources are non-renewable, and mitigative measures such as project design changes and site protection are preferred where conflicts between proposed development projects and archaeological sites and have been identified. In situations where such measures are not practical (e.g., redesign options limited by environmental constraints), systematic data recovery is normally undertaken to salvage cultural materials from a threatened site or affected portions of a site.

This impact assessment study established that the proposed COMC corridor will cause adverse impacts to three protected archaeological sites (DIQu-21, DIQu-22, DIQu-202). The first two of these sites are rated as having moderate-to-high scientific significance, while the third is rated as having low scientific significance. Designated historic site DIQu-24 is situated south of the corridor as presently envisioned and will not be impacted by this project. Lastly, one corridor option conflicts with protected site DIQu-145, but no trace of this site remains and no adverse impact would occur as result of construction.

7.1 RECOMMENDATIONS - UNSURVEYED PROPERTIES

Two properties traversed by the COMC corridor could not be inspected by the archaeologists during the April 2007 field survey because access to those lands was denied by their respective landowners. The properties in question are as follows:

- Lot A, Plan KAP83361 @ 2750-2784 Hwy 97 N & Lot B, Plan KAP83361 @ 2786-2788 Hwy 97 N: COMC Stn 234+50 - 243+25 & McCurdy Extension Stn 0+700 - 0+950; and
- Lot 1, Plan 41723 @ 2851 Sexsmith Road: Stn 309+40 - 317+60.

- (1) Some of the terrain within these properties exhibits high or moderate archaeological potential and it is recommended that these lands be inspected by archaeologists prior to the onset of construction for the COMC Project and/or McCurdy Road Extension.

The additional field survey required for these lands could be done in accordance with Heritage Inspection Permit 2007-054 at any time until the end of 2007. If access was not obtained until after that date, a new Heritage Inspection Permit would be required.

7.2 RECOMMENDATIONS - DIQu-21

To manage potential project effects to the buried archaeological remains in the western part of DIQu-21, considered to have moderate-to-high significance, the following recommendation is made:

- (1) Relocate the COMC corridor to a less-sensitive location, such as the hillside immediately northwest of the site, which is rated as having low archaeological potential. If the COMC corridor is relocated here, additional archaeological field survey would be required to inspect the level terrace lands west and southwest of DIQu-21.

If the redesign option proposed in Recommendation #1 is not feasible from an engineering or environmental perspective, or can only be partially implemented, then the following recommendations are made:

- (2) Initiate mitigation in the form of a systematic data recovery program (archaeological excavation) to salvage a sample of cultural materials from DIQu-21. The investigation should focus upon the area of buried archaeological deposits, rather than the entire area of the site. All cultural materials recovered during the mitigation of DIQu-21 should be fully analyzed (including radiocarbon dating of suitable samples) and reported.
- (3) Following archaeological mitigation, construction activities can take place within the site in accordance with a Section 12 (Site Alteration) Permit, issued by the Archaeology Branch to the proponent and/or contractor.
- (4) Implement the Heritage Resource Contingency Plan (see below) if significant cultural materials are encountered during any land-altering activities associated with road construction after the archaeological mitigation project.

For the remainder of DIQu-21, where no buried archaeological deposits or surface artifacts were observed (i.e., the eastern part of the site), the following recommendations are made:

- (5) No further archaeological work is required in the eastern part of DIQu-21 prior to project construction.

- (6) During construction, Environmental Inspectors should implement the Heritage Resource Contingency Plan if unanticipated, significant archaeological remains are encountered at DIQu-21.

7.3 RECOMMENDATIONS - DIQu-22

To manage potential project effects to the buried archaeological remains in the southwestern part of DIQu-22, which are rated as moderate-to-high significance, the following recommendations are made:

- (1) Relocate the COMC corridor to a less-sensitive location, such as the hillside landward of the natural gas pipeline immediately north of site DIQu-22. No additional field survey should be required to inspect a revised alignment in this location, since the hillslope has low archaeological potential.

If the redesign option proposed in Recommendation #1 is not feasible for engineering or environmental reasons, or can only be partially implemented, then the following recommendations are made:

- (2) Initiate mitigation in the form of a systematic data recovery program (archaeological excavation) to salvage a sample of cultural materials from the southwestern portion of DIQu-22. The investigation should focus upon the area of buried archaeological deposits, rather than the entire area of the site. All cultural materials recovered during the mitigation of DIQu-22 should be fully analyzed (including radiocarbon dating of suitable samples) and reported.
- (3) Following mitigation, construction activities within the site can be carried out in accordance with a Site Alteration Permit.
- (4) Implement the Heritage Resource Contingency Plan if significant cultural materials are encountered during the land-altering activities associated with road construction after the mitigation project.

To manage potential impacts to the remainder of DIQu-22, where buried archaeological deposits or surface artifacts were not observed in 2007 (i.e., the eastern part of the site), the following recommendations are made:

- (5) No further archaeological work is required in the eastern part of DIQu-22 prior to project construction.
- (6) During construction, Environmental Inspectors should implement the Heritage Resource Contingency Plan if unanticipated, significant archaeological remains are encountered.

Systematic data recovery projects are conducted in accordance with a Heritage Investigation Permit, issued by the Archaeology Branch pursuant to Section 14 of the *Heritage Conservation Act*.

7.4 RECOMMENDATIONS - DIQu-24

The Brent Mill and associated heritage buildings are situated in a municipal park reserve south of the COMC corridor. The proposed corridor does not conflict with the site and no adverse impacts to the site should be incurred as a result of future highway construction. For these reasons, no resource management recommendations are necessary for this site.

7.5 RECOMMENDATIONS - DIQu-145

No cultural materials attributable to DIQu-145 were observed in 2007, and only two artifacts were found when the site was originally recorded in 2006. If the L300C2 route option was selected, conflicts with this site would be unavoidable.

- (1) Although this site is protected by the *Heritage Conservation Act*, it is considered to be destroyed, and no further actions are recommended to mitigate adverse project effects. Construction within the reported site boundary would still require a Site Alteration Permit.

7.6 RECOMMENDATIONS - DIQu-202

To manage potential project effects to site DIQu-202, the following recommendations are made:

- (1) Relocate the COMC corridor to a less-sensitive location, such as the hillside landward of the natural gas pipeline immediately west of DIQu-202. Additional archaeological field survey would be required for localized areas of level terrain on the slope, which have moderate or high archaeological potential.
- (2) If the preceding option is infeasible for any reason, no further archaeological mitigation is necessary; however, construction activities within the recorded site boundary must be carried out in accordance with a Site Alteration Permit.
- (3) Implement the Heritage Resource Contingency Plan if significant cultural materials are encountered during the land-altering activities associated with road construction.

Any land-altering activities within the boundary of a protected archaeological site must take place in accordance with a Site Alteration Permit issued pursuant to Section 12 of the *Heritage Conservation Act*. Therefore, construction activities within the protected sites identified from the COMC corridor require a Site Alteration Permit, but only one Permit would be required to allow work within all of the sites.

7.7 DEVELOPMENT OF HERITAGE RESOURCE CONTINGENCY PLAN

Survey coverage within the proposed COMC corridor was thorough, and aside from the properties to which access was denied, it is believed that no additional archaeological remains are present within the inspected lands. However, readers of this report should be aware that even the most thorough investigation may fail to reveal all archaeological remains that may exist within a proposed development area. In particular, isolated artifacts and/or individual burial places would be very difficult to identify during a field survey. To ensure that any unanticipated discovery of archaeological remains is addressed, it is further recommended that:

- (1) The City of Kelowna and/or their representatives inform its contractors that:
 - (i) archaeological remains in British Columbia are protected from disturbance, intentional or inadvertent, by the *Heritage Conservation Act*; (ii) in the event that archaeological remains are encountered, all ground disturbance in the immediate vicinity must be suspended at once; (iii) it is the individual's responsibility to inform the Archaeology Branch, as soon as possible, about the location of any archaeological remains and the nature of the disturbance; and (iv) the *Heritage Conservation Act* sanctions severe penalties for failing to comply with these requirements.
- (2) Further, the City of Kelowna should promptly inform representatives of the Westbank First Nation and Okanagan Indian Band about the particulars of any unanticipated archaeological discoveries.

To ensure that appropriate actions are taken if unanticipated, significant archaeological remains (e.g., burial places) are encountered by contractors' personnel during construction, it is recommended that contractors implement a Heritage Resource Contingency Plan during the construction phase of the COMC Project. The Heritage Resource Contingency Plan would be implemented as follows:

- (3) Contractor suspends work immediately in the vicinity of any newly-discovered archaeological remains. Work at that location may not resume until the measures described below are undertaken.
- (4) Notify the Environmental Inspector.
- (5) The Environmental Inspector would provide information regarding the archaeological remains to the proponent's archaeological consultant, and under their direction, either allow construction to resume, or notify:
 - applicable government agencies (e.g., Archaeology Branch) as required; and
 - designated representatives of the First Nations' communities.
- (6) If significant archaeological resources are found, the proponent's archaeological consultant may deem it necessary to visit the site and will, regardless of whether a site visit is required, develop an appropriate mitigation plan in consultation with the proponent and

contractors and, if necessary, First Nations' communities and appropriate government agencies.

This completes the impact assessment of the COMC corridor lands accessible in 2007. As required by the conditions of Heritage Inspection Permit 2007-054, we will send one bound copy of this report and one digital (PDF) copy on CD-ROM to Jim Pike at the Archaeology Branch, as well as to the proponents. In accordance with our normal arrangement with the First Nations' communities, the Westbank First Nation and Okanagan Indian Band will also receive copies of this report for their files.

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