



**2019-0400: Archaeological
Impact Assessment—Interim
Report**

Willow Beach Development Project,
Osoyoos, British Columbia

April 9, 2020

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Executive Summary

At the request of Willow Beach Developments Ltd., Stantec Consulting Ltd. (Stantec) undertook an archaeological impact assessment (AIA; the study) to determine the presence of archaeological resources at 202nd Avenue and Lakehead Campsite Road, Osoyoos, British Columbia (the study area). This is the location of a proposed 74-Lot subdivision and ancillary developments (e.g., proposed lagoon, park, road construction).

This AIA was initiated after a 2019 archaeological overview assessment (AOA) conducted by Stantec on behalf of Willow Beach Developments Ltd. assessed the study area as having moderate to high archaeological potential (Gauvreau 2019; Appendix A). The assessment of moderate to high potential was due to its proximity to Osoyoos Lake, in addition to eight previously recorded archaeological sites and an ethnographically known village site documented within 2 km of the study area.

The objective of the AIA was to identify the nature and extent of any archaeological resources, if present. Field assessments were carried out between February 4 to 7, 2020 with two Stantec archaeologists and one to three Osoyoos Indian Band technicians under *Heritage Conservation Act* (HCA) permit 2019-0400. Stantec submitted applications for heritage permits to both Upper Nicola Band and Okanagan Indian Band. However, no correspondence or notification of permit issuance was received from either nation.

The AIA confirmed that most of the study had high archaeological potential and identified two areas that were suitable for subsurface testing, Test Area 1, and Test Area 2. At Test Area 1, 41 shovel tests were excavated along the lakefront in the southern portion of the study area. All tests were negative for archaeological resources. Testing in Test Area 2, located in the northwest portion of the study area, was attempted but the first test was rejected due to frozen ground, and further testing was deemed unfeasible.

Subsurface testing of the area assessed in-field as having high archaeological potential was limited by efforts to avoid critical habitat for ground-dwelling and rare plant Species At Risk (SAR) based on the Species-at-Risk (SAR) Survey Report, provided by the client, (Deenik et al. 2019), as well as frozen ground, existing habitation structures, and the depth of fill and disturbed deposits in the study area coupled with the testing depths achieved using the methods employed.

To complete the AIA mechanical methods will be required to access deeper deposits and areas unsuitable for hand-testing. If additional pre-construction testing is not feasible archaeological construction monitoring is an alternative approach. However, this approach is riskier due to the potential for delays if an archaeological site is identified during construction.

No further archaeological assessment is recommended for the portions of the study area that were confirmed in field to have low archaeological potential

If the final design incorporates additional land outside of the study area, additional archaeological work for those new areas may be recommended.



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2019-0400: ARCHAEOLOGICAL IMPACT ASSESSMENT: WILLOW BEACH DEVELOPMENTS LTD., OSOYOOS, BRITISH COLUMBIA

Introduction
April 9, 2020

1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) undertook an archaeological impact assessment (AIA; the study) at the request of Willow Beach Developments Ltd., at 202nd Avenue and Lakehead Campsite Road, Osoyoos, British Columbia (the study area) (Figure 1). The study was conducted under *Heritage Conservation Act* (HCA) permit 2019-0400, issued by the Archaeology Branch of the Ministry of Forests, Lands, Natural Resource Operations and Rural Development.

The study area is a 9.32 ha area within a low-lying zone at the north end of Osoyoos Lake. The proposed development is currently at a conceptual stage but will include rezoning for construction of a Waterfront Village comprising residential, small-scale commercial, park, open space, and environmental reserve land uses (i.e., buffer zones) (Figure 3). These buffer zones are also at a conceptual stage and are proposed to protect the river systems, wetlands, lakeshore beach and riparian areas at the north end of Osoyoos Lake. A 2019 Species-At-Risk report has outlined specific Critical Habitat areas for multiple species of plants and animals (Deenik et al. 2019) (Figure 4).

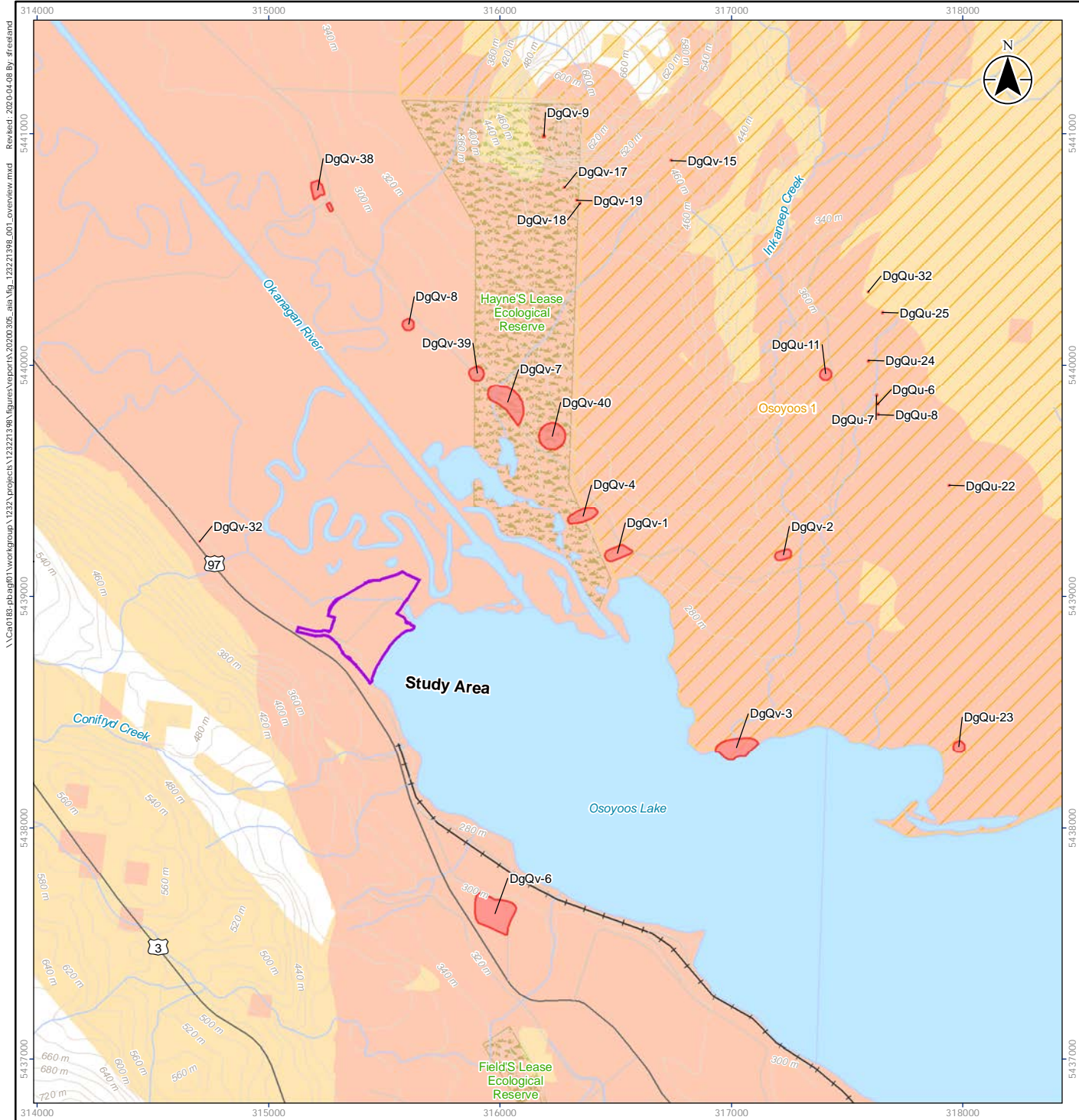
Heritage sites and objects on private and Provincial Crown land in British Columbia that predate AD 1846 are protected under the HCA, which is administered by the Archaeology Branch of Ministry of Forests, Lands, Natural Resource Operations and Rural Development. Heritage resources specifically protected by the HCA include Provincial heritage sites, burial places, aboriginal rock art, sites with evidence of human habitation or use before AD 1846, and heritage wrecks.

The study was requested to facilitate the redevelopment of the study area and the study itself was designed to satisfy the objectives of an AIA (Archaeology Branch 1998). These objectives included inspection of the study area for surface and buried archaeological resources, determination of potential impacts to archaeological resources, if present, and development of recommendations regarding the appropriate management of archaeological resources, as necessary.

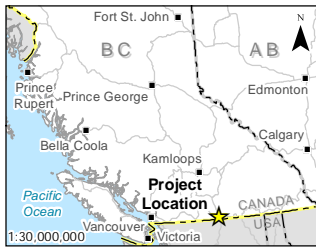
According to a review of the provincially maintained Consultative Areas Database, the Project falls within the traditional territories of 18 First Nations. Participants from Osoyoos Indian Band were present during field work. Stantec submitted applications for heritage permits to both Upper Nicola Band and Okanagan. However, no further correspondence or notification of permit issuance was received from either nation.

Field work was conducted between February 4 to 7, 2020 with two Stantec archaeologists and one to three Osoyoos Indian Band field technicians. Although First Nations assistance was part of the assessment, this study was not intended to evaluate or comment on traditional Aboriginal use of the area in which development is proposed.





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Notes
 1. Coordinate System: NAD 1983 UTM Zone 11N
 2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada

- Highway
- Local Street
- Railway
- Topographic Contour
- Watercourse
- Waterbody
- First Nations Reserve
- Park, Ecological Reserve, or Protected Area

- Study Area
- Previously Recorded Archaeological Site
- Okanagan Archaeological Potential Model**
- High Potential
- Moderate Potential

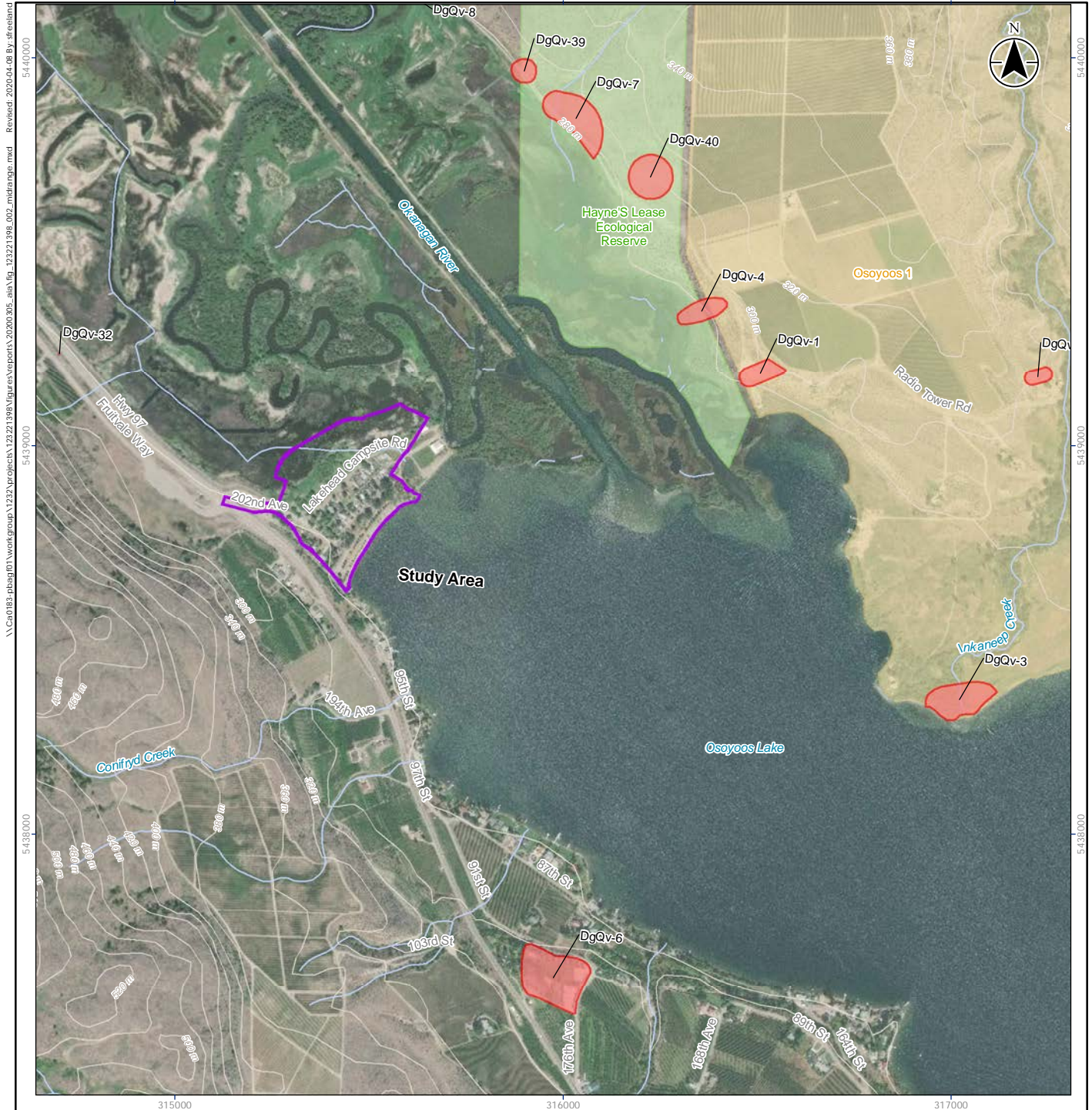


Project Location: NIS Grid: 082E03, Osoyoos Lake, Osoyoos
 Project Number: 12321398
 Prepared by: SFREELAND on 20200325
 Requested by: ETHOMPSON on 20200325
 Checked by: ICARDINAL on 20200408

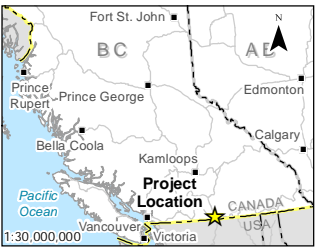
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 2019-0400 Archaeological Impact Assessment

Figure No.: 1
 Title: Study Area Overview Map

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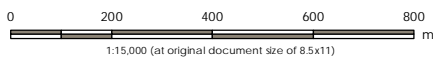


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 Revised: 2020-04-08 By: freeland
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Notes
 1. Coordinate System: NAD 1983 UTM Zone 11N
 2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada, ESRI World Imagery

- Watercourse
- Topographic Contour
- First Nations Reserve
- Park, Ecological Reserve, or Protected Area
- Previously Recorded Archaeological Site
- Study Area



Project Location: NIS Grid: 082E03, Osageos Lake, Osageos
 Project Number: 12321398
 Prepared by: SFREELAND on 20200325
 Requested by: ETHOMPSON on 20200325
 Checked by: ICARDINAL on 20200408

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 Willow Beach Development Project
 2019-0400 Archaeological Impact Assessment

Figure No.: 2
 Title:
 Study Area Midrange Map

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Background
April 9, 2020

2.0 BACKGROUND

A description of the prehistory, natural environment, ethnographic history, and Euro-Canadian history of the study area are described in detail in the 2019 AOA report (Appendix A).

2.1 PREVIOUSLY RECORDED ARCHAEOLOGICAL SITES

There are no previously recorded archaeological sites located within the proposed development footprint, however, there are eight previously recorded archaeological sites within 2 km of the study area (Figure 1 and Figure 2), Table 1. The previously recorded archaeological sites in proximity the study area are described in detail in the 2019 AOA report (Appendix A).

Table 1 Previously Recorded Archaeological Sites

Archaeological Site	Distance from Study Area
DgQv-1	900 m east
DgQv-2	1,600 m east
DgQv-3	1,400 m southeast
DgQv-4	800 m east
DgQv-7	990 m northeast
DgQv-8	1,280 m north
DgQv-39	1,100 m northeast
DgQv-40	970 m northeast

2.1.1 Archaeological Potential Model

The Okanagan Timber Supply Area Archaeological Overview Assessment (1997) overlaps with the study area and is approved for use as a planning tool by the Archaeology Branch (2008/2009 AOA Standards). The entire development footprint, as well as submerged areas extending 700 m from the shore into Osoyoos Lake have modeled high potential for the presence of archaeological resources (Figure 1). Underwater areas captured by this model reflect the history of flooding and rising lake levels caused by the construction of the Zosel Dam approximately 85 km south of Osoyoos.



Methods
April 9, 2020

2.1.2 Osoyoos Indian Band Input

Amanda Anderson of the Osoyoos Indian Band (OIB) provided Stantec with a copy of a letter dated June 15, 2016, drafted by Yvonne Weinert (Lands Manager) on behalf of Chief Clarence Louie, which detailed the results of the OIB internal preliminary office review (Referral ID: A2016.032-Zone Bylaw 2450.13&2451.21; Reference #: R-77-000653) for the proposed Willow Beach Development project area (RTS#830) (Weinert 2016). Both Weinert's letter and Anderson's recent email correspondence expressed heritage and environmental concerns for the area and presented a collection of background data relevant to the surrounding area. A historical OIB trapline was situated adjacent the project area, registered from 1928–1968. The broader wetland area continues to be used for trapping, hunting, fishing, and gathering food and medicinal plants as well as intergenerational teaching (pers. comm. Anderson, May 29–31, 2019). The OIB have also expressed concerns regarding traditional use of the area.

3.0 METHODS

3.1 ARCHAEOLOGICAL POTENTIAL EVALUATION

An AOA initiated by the client and completed by Stantec in 2019 evaluated the study area as having moderate to high archaeological potential with high potential for impacts to archaeological sites. The evaluation was based on the following criteria: 1) AOA potential model, 2) Previous archaeological studies within 2 km of the study area, 3) Landform features, 4) Proximity to resources, and 5) degree of past disturbance (Gauveau 2019).

3.2 METHODS

AIA field work was conducted by a crew of two Stantec archaeologists and one to three Osoyoos Indian Band field technicians and included a systematic pedestrian survey of the study area. Efforts were made by the field crew to avoid subsurface testing in areas identified as critical habitat for ground-dwelling SAR and rare plants based on the SAR report provided by the client, and these areas were noted during the preliminary pedestrian survey.

The southern portion of the study area which had sediment exposures and is in proximity to the lakefront was surveyed at 2–5 m transects. The northern portion of the study area was surveyed in 5–10 m transects. Survey coverage and areas of interest were recorded using a hand-held GPS unit. Surface and subsurface exposures were inspected.

Shovel tests measuring 35 cm by 35 cm were conducted in Test Area 1 and attempted at Test Area 2. All back dirt was screened through 6 mm wire mesh and observed stratigraphy recorded in a subsurface test log. Shovel tests were conducted systematically at 10-15 m intervals. Auger tests were used to determine depth of cultural deposits beyond a depth of approximately 70 cm below surface.



Results
April 9, 2020

4.0 RESULTS

4.1 FIELDWORK

4.1.1 Survey

The study area is situated at the north end of Osoyoos Lake, just west of the confluence of the Okanagan River and adjacent to Highway 97/3A. It encompasses an area of 9.32 ha and runs northwest from the shoreline to approximately 0.30 km inland on a gentle incline. The study area is surrounded by agricultural land to the northwest, a conservation area to the north and east, Hwy 97/3A to the southwest and Osoyoos Lake to the southeast.

Most of the study area was confirmed to have high potential for archaeological resources. The area of high potential is shown on Figure 4 encapsulated within the orange-lined polygon. The high potential area includes the foreshore of the lake up through the center of the property to approximately 80–90 m north of the RV trailers and outbuildings.

Two locations within the high potential area were deemed suitable for shovel-testing (e.g., clear of buildings and debris).

Test Area 1

Test Area 1 is on a relatively level raised landform adjacent to the lakeshore, which is 30 m to the southeast. The testable area stretches for approximately 280 m southwest to northeast and approximately 20 m northwest to southeast. This lakefront terrain has been terraformed. Wetlands and an established pond are in the eastern extent of this test area and is defined in the 2019 SAR Report as designated Critical Habitats for Great Basin Spadefoot and Western Painted Turtle. A Federal Critical Habitat for Short-rayed Aster encompassing a small portion of the eastern extent of the test area. Efforts were made by the field crew to avoid subsurface testing in areas identified as critical habitat for ground-dwelling animals and rare plant SAR.

Test Area 2

Test Area 2 is on a relatively level landform approximately 0.5–1 m above the wetland and lower-lying poorly-drained terrain to the northwest. There is a large wetland associated with a relict channel of the Okanagan River at the base of the slope to the northwest. This area has been disturbed by water channel construction and use as a junkyard.

The remaining portions of the study area are assessed to have low archaeological potential based on topographic attributes such as poor drainage, and a lack of prominent landforms.



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OSOYOOS, BRITISH COLUMBIA**

Results
April 9, 2020



**Photo 1 View South and West of Beachfront and Western Extent of Test Area 1, Taken from
Northeastern Extent of Testing Area**



Photo 2 View of wetlands to the north of Test Area 2



Results
April 9, 2020



Photo 3 View to the Central-Northeast Portion of Study Area Currently Occupied by R.V. Trailers and Outbuildings

4.1.2 Shovel Testing

Two locations were identified as being suitable for subsurface testing within the high potential area. Testing in the remaining high potential area was not feasible due to avoidance of critical habitat of SAR, frozen ground, existing habitation structures, and sediment depth which was beyond the reach of hand-held shovels and augers.

Test Location 1

Forty-one shovel tests were excavated in the southern region of the study area adjacent to the lakeshore; no archaeological resources were identified (Figure 4). The stratigraphy and composition of the shovel tests varied throughout and the level of past disturbance varied from minimal to significant. Auger tests were placed in the bottom of shovel tests when the depth of the test exceeded the maximum reach of the shovel (approximately 70 cm), where the water table was encountered, or where deposits were too compact for a shovel. The auger was used between approximately 60 and 150 cm depth below surface (dbs). However, culturally sterile soils were still not reached in all tests.



Results

April 9, 2020

Tests on the eastern side of the test location, characterized by ST-27, had stratigraphy that consisted of 5 cm compacted dark brown/grey fine to medium-grained silty sand, over 10 cm mottled light brown/tan/grey fine to medium-grained sand, over 8 cm dark brown/black fine to medium-grained silty sand, terminating in 80–100 cm of light tan/brown medium-grained sand that transitioned to a light reddish-brown (Photo 4). The water table was encountered between 120–125 cm dbs.

Tests within the central portion of the test location were significantly disturbed to a depth of approximately 60 cm dbs, and an example of this is shown in the photo of ST-15 (Photo 5). Tests in this area had stratigraphy that generally consisted of 5 cm of compact, organic, dark brown fine to medium-grained sand, over 6 cm mottled light tan/brown fine to medium-grained sand with trace silt, over 30 cm dark brown/black fine to medium-grained sandy silt, over 10 cm dark brown/black fine to medium-grained silty sand, terminating in 10–60 cm light tan/brown medium-grained sand. The water table was encountered at about 120 cm dbs. Disturbed sediments were recorded to approximately 46–65 cm dbs. One test, (ST-41) recovered faunal bone fragments from the northeast wall around 36 cm dbs (Photo 6). These remains are of a medium-to-large mammal, are not archaeological in nature, and were not collected.

Tests within the western portion of the test location were generally significantly disturbed to a depth of approximately 50 m dbs. Tests had stratigraphy that generally consisted of 5 cm compact, organic, dark brown/grey silty sand, over 10 cm dark brown/black silty fine to medium-grained sand-sandy/gravel with 40–60% sub-rounded pebble inclusions, over 30 cm light tan medium-grained sand with mottled dark brown/black portions appearing as banding in places with <5% sub-rounded pebbles, and 4 cm dark brown/black medium-grained sand, over 15 cm light tan medium-grained sand with <5% sub-rounded pebble inclusions, terminating in intact sterile soils at 64 cm consisting of light tan medium-grained sand that transitions to light medium reddish-brown and back to light tan/brown (Photo 7).

Test Location 2 (Attempted)

Within Test Location 2 only one shovel test was attempted but was abandoned at 13 cm dbs due to frozen and compacted ground. Although the test was not completed, the first level consisted of dark brown fine-grained silty sand with 60% gravels and sub-angular and sub-rounded cobbles and pebbles (Photo 8). This soil composition is indicative of imported fill and suggests the landform may have been artificially created.



Results
April 9, 2020



Photo 4 Stratigraphy of the SW Wall of ST-27 Showing Minimal Soil Disturbance



Photo 5 Stratigraphy of the NE Wall of ST-15 Showing Significant Soil Disturbance



Results
April 9, 2020



Photo 6 Faunal Remains Observed in ST-41



Photo 7 Stratigraphy of SE Wall of ST-4 Showing Soil Disturbance in the Form of Mottled Sediments



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OSOYOOS, BRITISH COLUMBIA**

Results
April 9, 2020



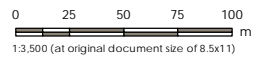
Photo 8 Rejected Test in Test Location 2





Notes
 1. Coordinate System: NAD 1983 UTM Zone 11N
 2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada, Imagery Service Layer Credits
 Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- Project Area
 - Parcel Boundary
- Project Features**
- Common Property
 - Lagoon
 - Lot
 - Park
 - Road
 - MOTI Right of Way



Project Location: NIS Grid: 082E03, Osoyoos Lake, Osoyoos
 Project Number: 123221398
 Prepared by: MYOUNG on 20190805
 Discipline Review by: RSPADY on 20190807
 GIS Review by: ICARDINAL on 20190807

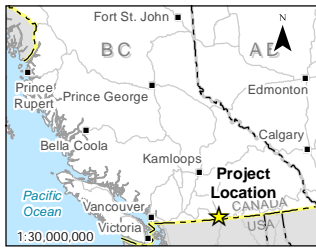
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 Willow Beach Development Project
 2019-0400 Archaeological Impact Assessment

Figure No.
3

Title
 Detailed Development Map

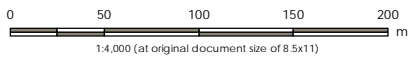


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 5438500



Notes
 1. Coordinate System: NAD 1983 UTM Zone 11N
 2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada, Imagery Service Layer Credits; Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
 3. Wildlife data digitized from species at risk report, to be used as approximate locations only

- Shovel Test - Negative
- Shovel Test - Rejected
- Test Area
- Study Area
- Area of Potential
- Federally-Designated Critical Habitat for Short-rayed Aster
- Turtle Habitat Buffer



 **Stantec**
 Project Location: NIS Grid: 082E03, Osoyoos Lake, Osoyoos
 Project Number: 123221398
 Prepared by: SFREELAND on 20200408
 Requested by: ETHOMPSON on 20200325
 Checked by: ICARDINAL on 20200408

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 Willow Beach Developments Ltd.
 Willow Beach Development Project
 2019-0400 Archaeological Impact Assessment
 Figure No.
4
 Title
AIA Results

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Evaluation of Research
April 9, 2020

5.0 EVALUATION OF RESEARCH

The field assessment encountered several limitations that resulted in the AIA of the study area not being completed. The main limitation was the presence of RV trailers and outbuildings in the central portion of the study area, as well as the presence of un-located buried utilities, and designated critical habitat areas for SAR. In addition, not all shovel tests reached culturally sterile sediments due their depth exceeding maximum depth reachable by hand-held shovel (approximately 70 cm) and the high water table present in many tests. While shovel testing was attempted in the northeastern area of potential it was not possible to continue due to frozen ground.

6.0 RECOMMENDATIONS

Further field inspection is recommended to complete the AIA in the high archaeological potential area (Figure 4).

The following options are provided in order of preference:

- Finish the pre-construction AIA using mechanical methods to reach deeper deposits and access areas unsuitable for hand-testing.
- If additional pre-construction testing is not feasible, archaeological construction monitoring is recommended. However, this approach comes with the potential for delays should an archaeological site be identified during construction.

No further archaeological assessment is recommended for the portions of the study area that were confirmed in field to have low archaeological potential (Figure 4).

If the final design incorporates additional land outside of the study area, additional archaeological work for those new areas may be recommended.



2019-0400: ARCHAEOLOGICAL IMPACT ASSESSMENT: WILLOW BEACH DEVELOPMENTS LTD., OSOYOOS, BRITISH COLUMBIA

References
April 9, 2020

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**2019-0400: ARCHAEOLOGICAL IMPACT ASSESSMENT: WILLOW BEACH DEVELOPMENTS LTD.,
OSOYOOS, BRITISH COLUMBIA**

References

April 9, 2020

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APPENDIX A

**Archaeological Overview Assessment—Willow Beach
Development Project, Osoyoos, British Columbia**



Archaeological Overview Assessment

Willow Beach Development Project,
Osoyoos, British Columbia

June 13, 2019

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ARCHAEOLOGICAL OVERVIEW ASSESSMENT

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Executive Summary

At the request of Infinity Properties Ltd., Stantec Consulting Ltd. (Stantec) conducted an archaeological overview assessment (AOA) for the proposed 74-Lot subdivision and ancillary developments (e.g., proposed lagoon, park, road construction) at Willow Beach, North End of Osoyoos Lake, Osoyoos, British Columbia (the Project). The project area is within the asserted traditional territory of Nooaitch Indian Band, Boothroyd Indian Band, Spuzzum First Nation, Skuppah Indian Band, Nlaka'pamux Nation Tribal Council, Nicola Tribal Association, Lower Nicola Indian Band, Lytton First Nation, Siska Indian Band, Cook's Ferry Indian Band, Coldwater Indian Band, Oregon Jack Creek Indian Band, Penticton Indian Band, Upper Nicola Indian Band, Okanagan Nation Alliance, Lower Similkameen Indian Band, Okanagan Indian Band, and Osoyoos Indian Band (CAD 2019).

The objectives of this AOA were to:

- Identify previously recorded archaeological sites, if present, within the project area
- Identify and assess the potential for unrecorded archaeological sites within the project area
- Identify First Nation traditional use sites and sensitive areas, if present, within or in proximity to the project area
- Assess potential impacts to recorded archaeological sites
- Determine the appropriate methods and scope of work for subsequent archaeological studies, if needed

Stantec undertook a desktop study of relevant archaeological, ethnographic, historical, and environmental data to determine if the Project is in potential conflict with recorded archaeological sites and to assess the potential for unrecorded archaeological sites within the project area. A search of the Remote Access to Archaeological Data (RAAD) application and the Provincial Archaeological Report Library (PARL) was therefore performed, and at the request of the client, the Osoyoos Indian Band whose asserted traditional territory overlaps with the project area was contacted to request information that would assist with the assessment of archaeological potential.

Since the early 1970s, minimal archaeological work (i.e., only preliminary field reconnaissance and no subsurface testing) has been conducted north of Osoyoos Lake. Although no archaeological sites have been recorded within the proposed development footprint, several have been recorded along the northeastern shoreline of Osoyoos Lake, within 2 km of the proposed project area. The Okanagan Timber Supply Area Archaeological Overview Assessment (1997) suggests the proposed development footprint has high potential for the presence of archaeological resources. The project area is an important habitat for a variety of flora and fauna, including threatened and endangered species, and it is also an important traditional use area for the Osoyoos Indian Band. Due to the project areas location within and in proximity to an active channel/ floodplain of a dynamic river, it is likely that any archaeological deposits, if present, would represent ephemeral campsites with short records of occupation, likely consisting of lithic, fire-altered rock, charcoal and faunal deposits.



ARCHAEOLOGICAL OVERVIEW ASSESSMENT

The development history and specific environmental context of the project area affect the overall potential for archaeological deposits and cultural materials to be present.

An archaeological impact assessment (AIA) is recommended for the project area prior to construction activities to determine the extent and nature of any archaeological deposits and cultural materials that may be impacted by the proposed developments, if present. It is anticipated that subsurface examination will only be required for select portions of the proposed project areas, which would be determined during the field survey component of the AIA.



Abbreviations

AIA	archaeological impact assessment
AOA	archaeological overview assessment
BC	British Columbia
BGxH1	bunchgrass biogeoclimatic zone
BP	before present
CAD	consultative areas database
CMT	culturally modified tree
HBC	Hudson's Bay Company
HCA	<i>Heritage Conservation Act</i>
LGM	late glacial maximum
OIB	Osoyoos Indian Band
PARL	Provincial Archaeological Report Library
PPhxh1	ponderosa pine subzone
RAAD	Remote Access to Archaeological Data



ARCHAEOLOGICAL OVERVIEW ASSESSMENT

Introduction
June 13, 2019

1.0 INTRODUCTION

At the request of Infinity Properties Ltd., Stantec Consulting Ltd. (Stantec) conducted an archaeological overview assessment (AOA) for the proposed Willow Beach Development Project (Figure 1) in Osoyoos, British Columbia (the Project).

Heritage sites and objects on private and Provincial Crown land in British Columbia are protected under the *Heritage Conservation Act* (HCA), which is administered by the Archaeology Branch of the Ministry of Forests, Lands, Natural Resource Operations and Rural Development. Heritage resources specifically protected by the Act include Provincial heritage sites, burial places, aboriginal rock paintings or carvings, sites with evidence of human habitation or use before AD-1846 and heritage wrecks. The Lieutenant Governor in Council may also make regulations to define the extent of types of sites protected by the *Act*.

Archaeological and historical sites are places which indicate past human occupation or use. Archaeological sites are those which can be investigated primarily by archaeological methods (i.e., excavation and the analysis of stratified natural and cultural deposits and associated heritage materials and objects) whereas historical sites can be studied not only by archaeological methods but also through the analysis of written records.

There are usually three stages to the archaeological impact assessment and review process including overview assessment, impact assessment and impact mitigation. The overview assessment is intended to identify and assess heritage resource potential or the likelihood that sites are present. The objectives of the impact assessment are the identification and evaluation of heritage resources within a proposed development area and the assessment of possible impacts by the development on these sites. Impact mitigation is any course of action that results in the reduction or the elimination of the adverse impacts of a development. Mitigation usually involves site protection, project redesign or systematic data recovery, normally involving archaeological excavation.

The present study was designed to satisfy the objectives of an archaeological overview assessment.

The objectives of this AOA are to:

- Identify previously recorded archaeological sites, if present, within the project area
- Identify First Nation traditional use sites and culturally sensitive areas, if present, within the project area
- Identify and assess the potential for unrecorded archaeological sites within the project area
- Assess potential impacts to recorded archaeological sites
- Determine the appropriate methods and scope of work for subsequent archaeological studies, if needed



ARCHAEOLOGICAL OVERVIEW ASSESSMENT

The Project
June 13, 2019

2.0 THE PROJECT





The project area comprises the proposed Willow Beach Development situated at the north end of Osoyoos Lake, adjacent to Hwy 97/3A, in Osoyoos, British Columbia (Figure 1 through Figure 3).

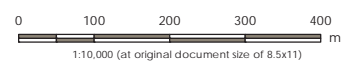
The present study focuses on a 28.06-ha area, within a low-lying zone at the north end of Osoyoos Lake. The proposed development is currently in conceptual stages and includes rezoning for construction of a Waterfront Village comprising residential, small-scale commercial, park, open space, and environmental reserve land uses (i.e., buffer zones) (Figure 3). Buffer zones are proposed to protect the river systems, wetlands, lakeshore beach and riparian areas at the North end of Osoyoos Lake.



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-  Study Area
-  Previously Recorded Archaeological Site
-  Land Parcel
-  Park, Ecological Reserve, or Protected Area



Project Location: NIS Grid: 082E03, Osoyoos Lake, Osoyoos
 Project Number: 123221262
 Prepared by: SMARSHALL on 20190604
 Discipline Review by: JHALL on 20190610
 GIS Review by: ICARDINAL on 20190605

Client/Project/Report
 Osoyoos Lake,
 Osoyoos, BC
 Willow Beach Development Project

Figure No.
2

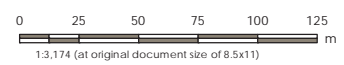
Title
**Osoyoos Lake, Osoyoos, BC
 Midrange Map**

Notes
 1. Coordinate System: NAD 1983 UTM Zone 11N
 2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada, Imagery: CRD 2017 ortho

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 Study Area



Project Location: Osoyoos Lake, BC
 NIS Grid: 082E03
 Project Number: 12321262
 Prepared by: SMARSHALL on 20190604
 Discipline Review by: JHALL on 20190610
 GIS Review by: ICARDINAL on 20190605

Client/Project/Report:
 Osoyoos Lake,
 Osoyoos, BC
 Willow Beach Development Project

Figure No.
3

Title
**Osoyoos Lake, Osoyoos, BC
 Detail Map**

Notes
 1. Coordinate System: NAD 1983 UTM Zone 11N
 2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada, Imagery: CRD 2017 ortho

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ARCHAEOLOGICAL OVERVIEW ASSESSMENT

Methods

June 13, 2019

3.0 METHODS

3.1 BACKGROUND INFORMATION REVIEW

Stantec undertook a desktop study of relevant archaeological, ethnographic, historical, and environmental data to determine if the Project is in potential conflict with recorded archaeological sites and to assess the potential for unrecorded archaeological sites within the project area. The following information sources were reviewed:

- Provincial Heritage Register through the Remote Access to Archaeological Data (RAAD) application maintained by the Archaeology Branch, last accessed May 27, 2019
- Previous archaeological studies within and near the project area accessed through the Provincial Archaeological Report Library (PARL), maintained by the Archaeology Branch, last accessed May 27, 2019
- Relevant biophysical and ethnographical data
- The Okanagan Timber Supply Area (1997) AOA through RAAD application, last accessed May 27, 2019
- Historical aerial photographs from July 19, 1930 and September 19, 1967, accessed May 31, 2019

3.2 FIRST NATIONS CORRESPONDENCE

The Osoyoos Indian Band (OIB) whose asserted traditional territory overlaps with the project area was contacted to request information that would assist with the assessment of archaeological potential. Amanda Anderson, representing the OIB, provided a copy of a letter communication dated June 15, 2016, drafted by Yvonne Weinert (Lands Manager) per Chief Clarence Louie, which detailed the results of the OIB internal preliminary office review (Referral ID: A2016.032-Zone Bylaw2450.13&2451.21; Reference #: R-77-000653) for the proposed Willow Beach Development project area (RTS#830) (Weinert 2016).

3.3 ARCHAEOLOGICAL POTENTIAL ASSESSMENT

Key factors considered in this assessment include archaeological potential ratings as indicated in the existing Okanagan Timber Supply Area (1997) AOA model, proximity to known archaeological sites, terrain and hydrological features frequently associated with archaeological sites in the region, OIB Traditional Use Sites (e.g., trap-lines, hunting and gathering, intergenerational teaching) and sensitive areas, and the nature and extent of past development (e.g., construction, dredging, fill, flooding history).



ARCHAEOLOGICAL OVERVIEW ASSESSMENT

Results

June 13, 2019

4.0 RESULTS

4.1 BACKGROUND INFORMATION REVIEW

4.1.1 Biophysical Setting

The project area is located at the North end of Osoyoos Lake, in the southern Okanagan area of BC, within a former fresh-water marsh subject to partial draining and subsequent filling, adjacent to the Osoyoos Oxbow wetlands (Cannings and Hlady 1985). The Osoyoos Oxbow wetlands comprise a floodplain of the Okanagan River channel bounded by gravel dykes, in the rain shadow of the Coast and Cascade Mountains (Booth 2001). The wetlands and adjacent area are a low-lying component of the Bunchgrass Biogeoclimatic zone (BGxH1), interspersed with vegetation typical of the very dry hot ponderosa pine subzone (PPxh1) (Lloyd et al. 1990). Regional climate consists of warm summers, cool dry winters, and minimal rainfall. The climatic conditions of the southern Okanagan enable a diverse array of floral and faunal species to thrive; diversity in species is comparable to tropical regions (Hobson and Associates 2006). The Osoyoos Oxbows are lined with deciduous woods, consisting of water birch, willow, mountain alder, black cottonwood, and trembling aspen (Cannings and Hlady 1985). Vegetated space within the project area is blanketed with common grasses, reeds, weedy forbes (i.e., clover), rose and willow and indigenous bunchgrass species (e.g., needle and thread grass, sand dropseed, sage, rabbit brush).

The nearby Osoyoos Oxbows riparian area is home to several endangered and threatened bird species, including yellow breasted chats (20% of British Columbia population), Western Screech Owl, and Lewis Woodpecker (Booth 2001). Non-anadromous (e.g., resident rainbow trout, small and large mouth bass) and anadromous (i.e., sockeye and chinook salmon) fish stocks occupy Osoyoos lake, the later supporting the varied wildlife (e.g., bears, eagles, osprey) populations that frequent the Oxbow wetlands and adjacent forested areas (Schleppe 2012). As sockeye and chinook salmon are cultural and ecological keystone species (see Paine 1969; Garibaldi and Turner 2004), they represent two of the most important fisheries in the project area.

The broader southern Okanagan region supports a varied wildlife population consisting of diverse avian, reptilian, amphibians and small and large mammalian species (McDowell 1998). Mule deer are the most relatively abundant mammals in the region; they are found throughout the parkland and forest zones particularly in the Summerland area (Anonymous 1982). Rocky Mountain elk and California bighorn sheep are present at higher elevations (McDowell 1998). The region is an important stop for migrating and wintering waterfowl but has generally low waterfowl breeding potential. The principal area of waterfowl concentration is at the mouth of Deep Creek near Peachland (Pinsent 1974).



ARCHAEOLOGICAL OVERVIEW ASSESSMENT

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The Cordilleran Ice Sheet covered the central interior during the Late Glacial Maximum (LGM) and began wasting and receding from the Southern Okanagan area around 12,000 years ago (Hodder et al. 2007). By approximately 9,500 years ago, glaciers had receded to modern levels (Ryder and Clague 1989). Following the LGM, unconsolidated deposits accumulated in the valley bottoms, glacial lakes and minor topographical features were formed (Nasmith 1962; Johnsen and Brennand 2004). There were times throughout the Holocene where the upper Thompson and Nicola Rivers were part of a drainage system that emptied into the Columbia River system through the Okanagan Valley rather than into the Fraser River (Cannings and Cannings 1996). Fulton (1969) estimated that the interior of BC became ice free, with all glacial lakes drained and modern drainages established prior to 8,900 before present (BP) and stabilized by 5,000 BP. These drainages carried silt and sand down from the alluvial fan of Vaseaux Creek (north of the project area) which accumulated at the north end of Osoyoos Lake (Nasmith 1962). In post-glacial times, Osoyoos Lake was likely created by a large segment of a stagnant ice lobe that melted rapidly; leaving a depression bordered by an alluvial fan that would have retained meltwater (Nasmith 1962).

4.1.2 Ethnographic Setting

The project area is situated within the asserted traditional territory and/or areas of interest of Nooaitch Indian Band, Boothroyd Indian Band, Spuzzum First Nation, Skuppah Indian Band, Nlaka'pamux Nation Tribal Council, Nicola Tribal Association, Lower Nicola Indian Band, Lytton First Nation, Siska Indian Band, Cook's Ferry Indian Band, Coldwater Indian Band, Oregon Jack Creek Indian Band, Penticton Indian Band, Upper Nicola Indian Band, Okanagan Nation Alliance, Lower Similkameen Indian Band, Okanagan Indian Band, and Osoyoos Indian Band (CAD 2019).

More broadly, the project area is located within Syilx (Okanagan) Nation traditional territory. A brief ethnographic summary of the Syilx is presented below. A comprehensive Syilx ethnography can be found in the work of Kennedy and Bouchard (1998); much of the information presented here is derived from their work.

Traditionally, the Syilx speak the Okanagan or nsilxcín language; part of the Interior Salish ethnolinguistic group. The Syilx occupy the lands from the Mica Creek area north of Revelstoke, British Columbia, down to the community of Wilbur in the state of Washington. From east to west they occupy the areas between Kootenay Lake and the Nicola Valley. The Okanagan Nation Alliance represents eight-member groups: the Okanagan Indian Band, the Upper Nicola Band, the Westbank First Nation, the Penticton Indian Band, the Osoyoos Indian Band, the Lower Similkameen Indian Band, Upper Similkameen Indian Band and the Colville Confederated Tribes.

As semi-nomadic hunter-gatherers, the Syilx were equally dependent on hunting, fishing, and gathering to meet their subsistence needs (Kennedy and Bouchard 1998). Four important hunting seasons reported in ethnographies describe the hunting of deer and sheep in the spring, deer, elk, sheep, and bear in the fall, deer in midwinter and sheep in late winter (Teit 1930).



ARCHAEOLOGICAL OVERVIEW ASSESSMENT

Results

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Deer seem to have been an especially important subsistence resource in the prehistoric Okanagan. The distribution of mammals throughout valley bottoms and high elevation areas would have contributed to a resource present throughout a large area. Environmental changes throughout prehistory would have been most pronounced in the valley bottoms, where already xeric conditions would be intensified by changes. In the early to mid-Holocene, low-lying areas, such as the Osoyoos Oxbow wetlands and adjacent areas would have experienced a decline in large mammal biomass because of reduced forage. Cooler, wetter conditions in the mid-Holocene would have extended mammal range, particularly of sheep (Copp 2006).

In addition to mammals, a variety of fish species were significant subsistence resources in precontact times, including Kokanee salmon, rainbow trout, Dolly Varden, and mountain whitefish. Sockeye and chinook salmon were perhaps the most important, and are referred to as n'titx^w (Chief Salmon), one of the Four Food Chiefs of the Sylix (Okanagan Nation Alliance 2017). These two species of anadromous fish played an integral role as summer and fall food, used also for social and ceremonial use and trade traditions by the Sylix (see Garibaldi and Turner 2004; Okanagan Nation Alliance 2017). Processed (e.g., smoked and dried) salmon could be stored for later use, thus a valuable resource over fall and winter seasons.

Gathered foods included Saskatoon berries, bitterroot, tree lichen, mushrooms, green shoots, tree cambium and various nuts, seeds, and berries. Roots and bulbs associated with various lilies, Wester Spring Beauties, and nodding onion were an important source of carbohydrates. Many of these items were roasted and/or dried to be stored in cache pits and consumed during the winter.

Winter congregations of semi-subterranean pit houses and/or mat lodge dwellings occurred in the sheltered creek valleys common to the area, whereas canvas or mat tepees were used in the summer when groups would disperse.

Traditional villages were typically located in proximity to large freshwater lakes and/or rivers, as well as along trade corridors throughout the southern Okanagan Valley. Two villages were established on Osoyoos Lake, one in proximity to the project area located on the eastern side of the Okanagan River at the head of the lake and the other located further south, at the town of Osoyoos (Teit 1930; Hill-Tout 1978). The contact-era village located at the head of Osoyoos lake was traditionally known as *N'Kami'p*, translating to "at the base or bottom". *N'Kami'p village* was known as the headquarters of the Osoyoos Band prior to amalgamation and relocation to the established boundaries of the Osoyoos (Inkameep) Indian Band Reservation in the 1870s and 1890s (boundaries have been subject to modifications through time) (Teit 1930:204, 207). The Osoyoos Reserves and areas around Osoyoos Lake encompass natural areas that serve as significant wildlife habitat and important areas for livestock grazing, conducting intergenerational teaching, and harvesting plants and animals (e.g. fish, mammals, birds) for food and medicines (see Weinert 2016; Hobson and Associates 2006).



ARCHAEOLOGICAL OVERVIEW ASSESSMENT

Results

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4.1.3 History

A comprehensive summary of Euro-Canadian history in the broader Okanagan Valley is available in the Heritage Resource Inventory and Impact Assessment of a Proposed four-lane Highway (Highway 97) from Penticton to Peachland (Wilson and Thomson 1985).

In the early 1800s, the first Euro-Canadians visited the Okanagan Valley as part of the fur trade. The Pacific Fur Company and the Northwest Company constructed forts at Kamloops and transported furs from the Shuswap to their respective posts on the lower Columbia. This inaugurated the fur brigade trail used annually to transport goods northward to the Shuswap and to ship out bales of furs from the Thompson's River District. The trail was the major north-south artery of commerce from 1811 until the International Boundary was drawn in 1846. The route required that the packhorses climb the sand banks north of Oliver to the broad valley known locally as Meyers Flat, and proceed north past the Twin Lakes region to the Marron Valley. By-passing the main Okanagan Valley, they proceeded to Shingle Creek and hence to the Summer land area (formerly Nicolas Prairie). The trail then ascended the Garnett Valley until it came out over Okanagan Lake in the saddle in the mountain just south of Deep Creek. The trail wound down the mountainside to cross Deep Creek at lake level, followed the shoreline until it crossed Trepanier Creek and then climbed the hillside to proceed through the valley where the Gorman brothers now have their mill, then to the head of the lake and Kamloops (Ormsby 1949; Hatfield 1975).

The gold rush initiated the entrance of large numbers of miners to the Okanagan. In 1858, hundreds of men travelled via the fur brigade trail to the rumored gold fields on Thompson's River, most of them returning to California that same year, discouraged by poor returns. Cattle herds, pack trains and even a covered wagon train accompanied these miners (Spaid 1954). Gold mining in the Okanagan, even the hard rock mines of Camp McKinney and Fairview which developed in the 1805, were not overly productive. The importance of the regional mining industry lies in the introduction of government services to the area in the 1860s. The establishment of settler communications networks connecting the Okanagan to coastal BC occurred following the introduction of settlers of the Northwest Company and Hudson's Bay Company (HBC) as early as 1821; the HBC exported hundreds of furs from the New Caledonia district (with the capital at Fort St. James) via the Okanagan route, and several of these traders sought lands in the area for cattle ranching.

By the 1860s the mining industry required greater quantities of provisions than could be carried efficiently on existing transport routes from coastal BC. One legacy of the gold rush to the Okanagan was the pack trail and wagon road constructed from Hope to Similkameen and Rock Creek in 1860 and thereafter improved considerably (British Columbia Colonial Secretary 1860). The Hope Trail provided the main artery over which early settlers of the South Okanagan and Mission Valley trailed cattle to coastal markets and packed in supplies for the next two decades. The Okanagan transportation network was further extended by government action in the gold rush.



ARCHAEOLOGICAL OVERVIEW ASSESSMENT

Results

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The gold rush coincided with the early settlement of the Okanagan. In the late 1860s early settler ranchers made their first land claims. The 1870s saw settlers entering the Valley in increasing numbers. A small but steady stream of new settlers, between two and fifteen per year, entered the Valley throughout the 1870s until in 1881 the population (designated white and Chinese) numbered 413 individuals.

Interest in the South Okanagan and adjacent districts is undoubtedly associated with gold mining developments at Granite Creek and the renewed exploration activity in the whole southern region, activity which would culminate in the 1890s in the development of quartz mining at Camp McKinney, Fairview and Hedley. There was a quickening of economic activity in the South Okanagan; retailers, hotel keepers, government officials and others rushed to the mining areas. Road contracts were established, exploration activity boomed, and largescale employment in quartz mining and milling began. This expanded economic activity provided the incentive for pre-emptors to take land and to engage in farming activities to supply the area with provisions and draught animals.

The operations of the early settlers were primarily oriented to stock raising and subsistence agriculture. A survey of agriculture in 1895 showed that west side settlers cultivated nine acres per settler, all of it in hay, although many had a few fruit trees in their extensive gardens (British Columbia 1895). They engaged primarily in cattle ranching, although the scale of operations was small. After the Penticton population expanded, some diversification occurred with dairy farming, boarding and training young British immigrants and growing orchards.

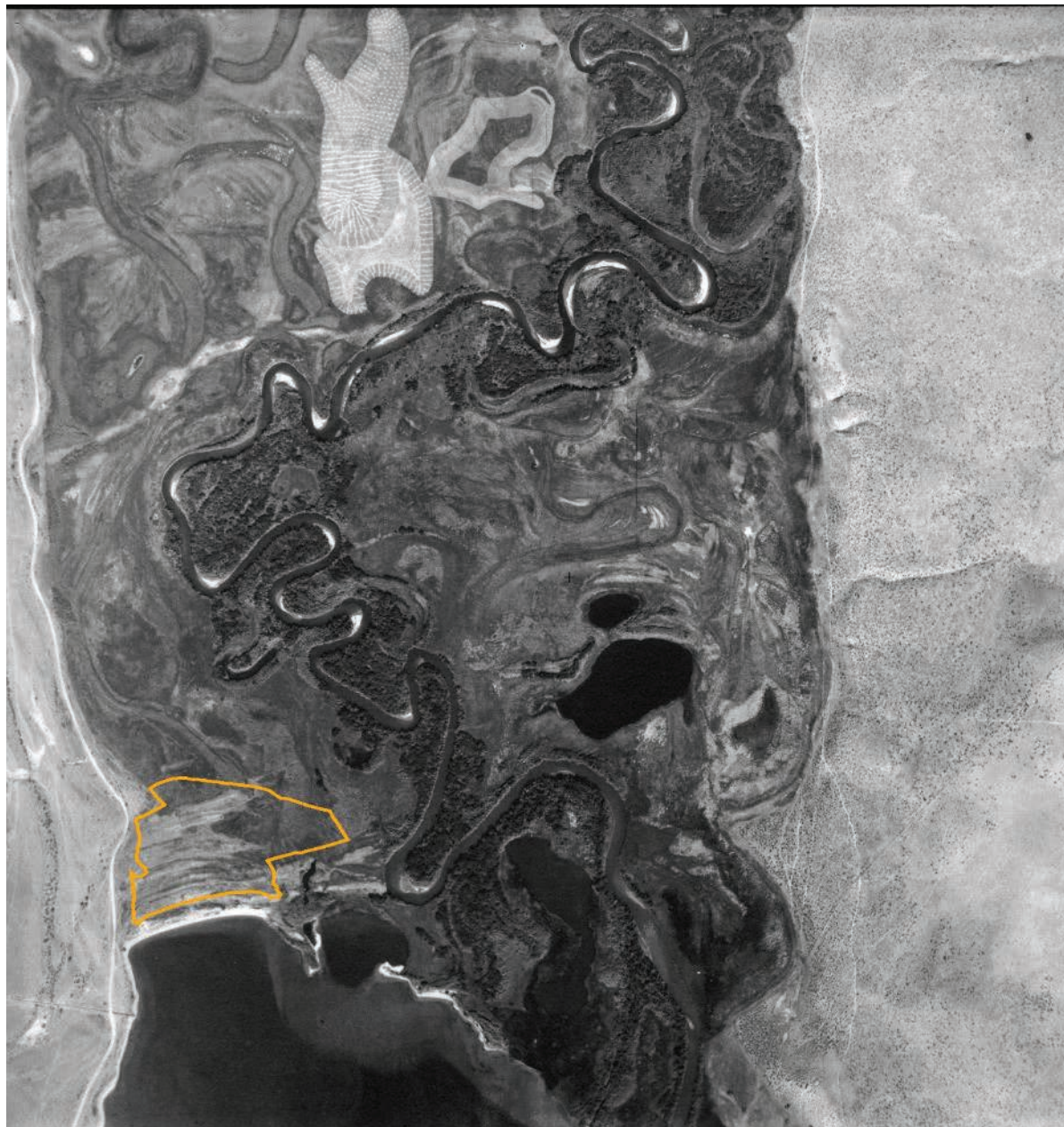
The project area, more specifically, has a long history of development and disturbance resulting from road and highway construction, irrigation and agricultural developments, farming and ranching, flooding and subsequent flood control initiatives, and urban sprawl including housing construction and utility installation (Hobson and Associates 2006). Developments began in the late 1880's when the natural watercourses were truncated for road construction intended to realize efficiencies for commercial river traffic and aforementioned trade routes. The channelization of the Okanagan River linking Okanagan and Osoyoos Lakes resulted in significant riparian habitat loss due to development and flood control measures. By the early 1900s, the construction of the Zosel Dam (used for forestry purposes; located approximately 85 km south of Osoyoos) caused water levels in Osoyoos Lake to rise beyond those attained during the LGM. The Zosel Dam was rebuilt in 1985 and continues to create seasonal localized flooding issues in southern Okanagan and areas south of the US border following snowpack melt. Photo 1 and Photo 2 show extent of developments occurring at the north end of Osoyoos lake both within and in proximity to the project area from the 1930s and late 1960s.



ARCHAEOLOGICAL OVERVIEW ASSESSMENT

Results

June 13, 2019



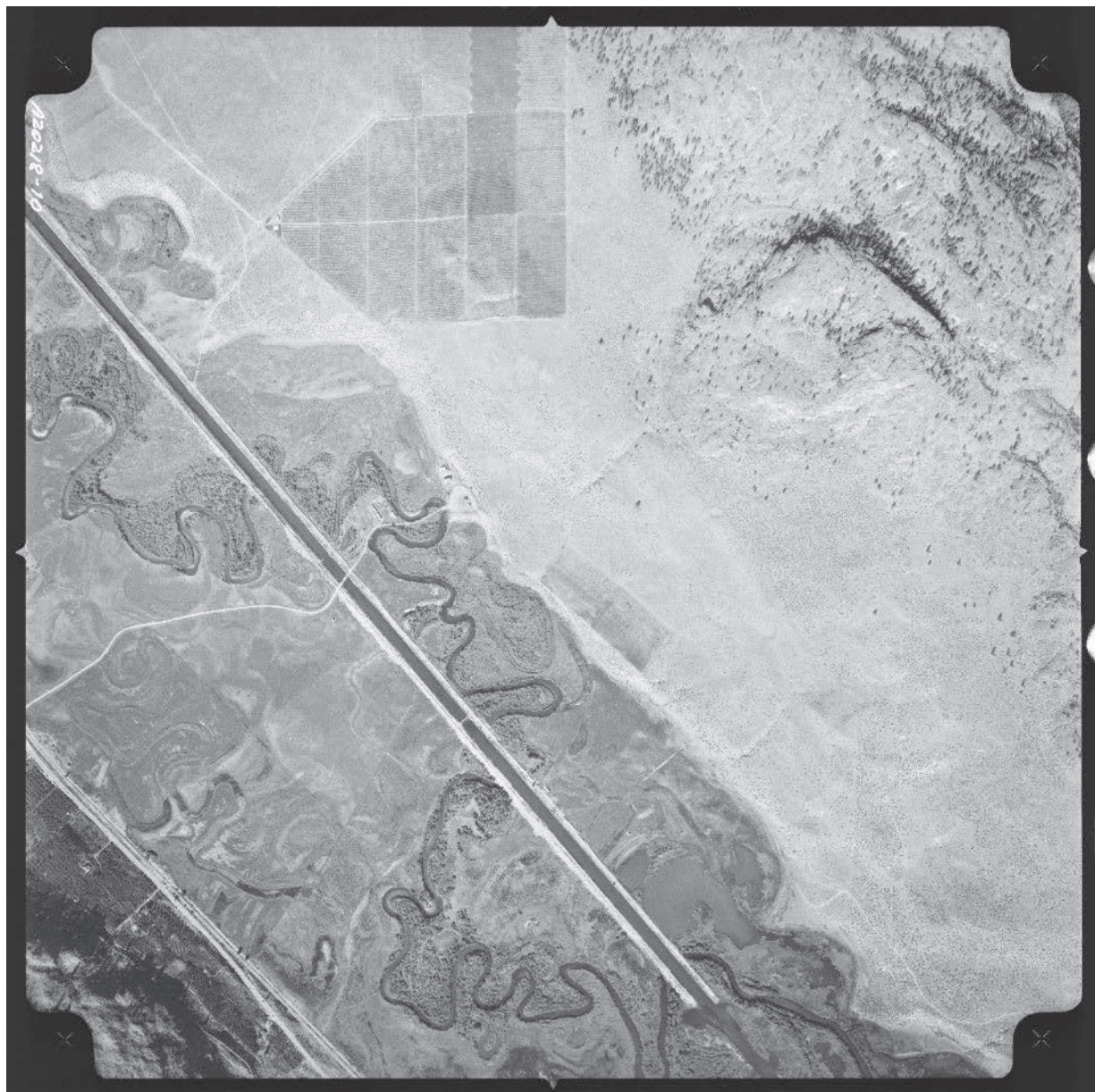
SOURCE: National Air Photo Library (NAPL), Natural Resources Canada (NRCan)—A2542-66-1930-07-19-Digital
Photo 1 Aerial Photograph Circa 1930 Showing Project Area (Orange Polygon) Situated at the North End of Osoyoos Lake, and Adjacent Osoyoos Oxbow Wetlands



ARCHAEOLOGICAL OVERVIEW ASSESSMENT

Results

June 13, 2019



SOURCE: National Air Photo Library (NAPL), Natural Resources Canada (NRCan)—A20218-10-1967-09-19-Digital Photo 2 **Aerial Photograph Circa 1967 Showing Channelization of the Okanagan River Linking Okanagan and Osoyoos Lakes, Transecting Osoyoos Oxbow Wetlands, Northeast of the Project Area**



ARCHAEOLOGICAL OVERVIEW ASSESSMENT

Results

June 13, 2019

4.1.4 Regional Prehistory

Culture histories that reference work in the southern interior of British Columbia (as part of the greater Canadian Plateau) more broadly have been developed and refined since academic archaeological research began in the region in the late 1960s. Sanger's (1969) excavations and research throughout the area detail the cultural traditions in the interior of British Columbia. Researchers focusing on the Okanagan applied observations about general trends that occurred across the Canadian Plateau. References to projectile points and other stone tools form a significant part of these works.

More recently produced prehistoric chronologies (Chatters and Pokotylo 1998; Pokotylo and Mitchell 1998; Prentiss and Kuijt 2004; Richards and Rousseau 1987) have refined and expanded upon earlier works and have generally come to a three-part division of prehistory; the Early, Middle, and Late Periods. The definition and durations of these Periods can be simplified as being associated with large scale environmental changes and distinctions between material culture assemblages associated with either population movement and density, or reaction to environmental change and associated changes in resource availability and exploitation. These Periods include a variety of cultural horizons and phases whose definitions become more complex and subject to regional variations and consideration with proximity to the Post-Contact Period. The availability of archaeological data associated with these Periods has also influenced their definition and the variety of phases and horizons within them; the Early Period and its relative lack of data appears simpler and is subject to less variation than the phases and horizons of the Late Period.

Although some researchers assert the Okanagan conforms to the generalized culture history of the Canadian Plateau (Richards and Rousseau 1987; Rousseau 2004), material culture found in this area also exhibits similarity to the culture sequences established on the Columbia Plateau in central Washington (Salo 1987; Andrefsky 2004).

Grabert's research in the Okanagan Valley (1968, 1974) assigns a general division between the northern and southern Okanagan. Archaeological material and sites in the north display more similarity to the Thompson River. Sites and material in the south show more continuity with the Columbia Plateau. Grabert splits the prehistory of the south Okanagan into four phases (1974). Like culture histories constructed throughout the Canadian Plateau, the final and latest phase of Grabert's culture history has been subject to refinement and additional definition of horizons on the basis of research that has identified more material culture and a greater number of sites than preceding phases (Copp 1979, 2006).

Regarding cultural ties to the Columbia and Fraser Plateaus, Copp (2006) describes stronger ties to the Columbia Plateau during the Early Period. Relationships with both the Fraser Plateau and the Columbia Plateau are established by approximately 4,500 years before present (BP).



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The following culture history incorporates considerations and information from Copp (1979, 2006), Chatters and Pokotylo (1998), Grabert (1974), Pokotylo and Mitchell (1998), Prentiss and Kuijt (2004), Richards and Rousseau (1987), and Rousseau (2004). Although several Horizons and phases have been described and refined throughout the Okanagan with specific definitions oriented to sub-regions within the Okanagan (Grabert 1974; Copp 2006), a generalized culture history relying on the Early, Middle and Late Periods assigned throughout the Canadian Plateau is briefly reviewed here. Dates, activities, and material culture associated with these periods are written in specific reference to sites and generally accepted date ranges for the Okanagan.

4.1.5 Early Period (ca. 12,000–7,500 Years Before Present)

The early period is defined here per Rousseau (1993) as spanning the time from final deglaciation to the Hypsithermal climatic (i.e., middle) period (see also Hebda 1982). There is a relative lack of understanding of the early period in the Southern Okanagan region primarily due to the overall lack of archaeological research and assessments in the area; most sites have been identified through surface inspection with minimal to no subsurface testing (Rousseau 1993). Recorded archaeological sites dating to the early period are therefore small and scant.

People are thought to have initially moved into the Southern Okanagan region approximately 12,000 to 11,000 years BP, following deglaciation and gradual environmental succession (i.e., floral and faunal establishment and expansion). Once the environs of the Southern Okanagan became amenable to early human occupation, populations originating from further south are hypothesized to have moved northward into the region. The terminus of the Early Period would have been characterized by an emphasis on large game hunting and increased utilization of smaller game and plant resources. Populations would have consisted of relatively small groups of hunters and gatherers moving across the landscape. During this time the valley bottoms would have been quite arid and un conducive to large game hunting. Mid-elevation areas marginal to the large valleys in the region would have supported game and are thought to have been the most commonly utilized areas during this time. No evidence for permanent villages or habitations have been associated with this period.

Tools assigned to this phase include large stemmed and leaf shaped points, leaf-shaped preforms and a high proportion of flake tools. Sites of this phase are typically encountered on high river or lake terraces. Faunal remains associated with these sites are limited and include freshwater mussel shell fragments, although large game hunting is thought to have taken place during this phase. The occurrence of freshwater mussel at early sites in the Okanagan area is a relatively early occurrence for the Canadian Plateau; utilization of molluscs is not observed at other sites to the north and west during this time.



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4.1.6 Middle Period (ca. 7,500–4,500 Years Before Present)

This period coincides with the onset of cooler climatic conditions. The beginning of this period is also associated with the climactic eruption of Mount Mazama. This eruption would have deposited significant amounts of volcanic tephra throughout the Columbia Plateau and, to a lesser extent, southern portions of the Canadian Plateau. Hunting of large and smaller game would have been accomplished by use of the atlatl dart and spears during this time. Although hunting was still a major component of this period, evidence of riverine resource exploitation increases towards the end of the period. There is little to no evidence for consistent use of permanent or semi-permanent dwellings or food and resource storage during this period, though some examples of house pits that date to approximately 4,000 years BP have been recorded.

In contrast to the early period, a wider variety of relatively large tools, greater site distribution and a more varied faunal record is associated with this phase. Tool kits include large basally notched stemmed projectile points, medium to large leaf-shaped points, mortar and pestle technology, and flake tools. Roasting pits are present at some sites. Faunal remains include freshwater fish, mussel and large mammals.

4.1.7 Late Period (ca. 4,500–200 Years Before Present)

Due to combination of better preservation, increased Indigenous population density, and increased visibility (e.g., of surface scattered deposits, exposures, culturally modified trees [CMTs]) the majority of the archaeological sites associated with Sylix prehistory throughout the Columbia and Canadian Plateaus date to the Late Period. Culture histories dealing with this period usually split it into three additional categories (Phases, Horizons etc.).

The beginning of the Late Period marks the appearance of house pits in the Okanagan. Cultural complexity and social ranking are thought to increase at this time and through the remainder of the Late Period, enabled by systematic storage of food stuffs and coordinated communal harvest of a variety of regional resources.

Toolkits of the early portion of the Late Period included large leaf-shaped points, medium sized barbed, basal notched stemmed points, microblades, ground stone celts, milling stones and bone tools. A wider variety of stone tool making material is observed during this phase, and fish and mussel shell remains are reported as abundant. Mammal bone consisting of deer, elk and mountain sheep is also prominent.

The middle portion of the Late Period generally spans 2,500 to 1,500 years BP. This period is marked throughout the plateau by the presence of stemmed and notched points (varying in size from medium to small), associated with the transition from atlatl to bow and arrow technology.

The final portion of the Late Period is generally thought of as lasting from 1,500 years BP to the contact period. This time is characterized by increasingly complex material culture assemblages that include small side and corner notched projectile points, milling stones, carved steatite items and other decorated bone and stone artifacts.



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During this time span house-pit and other cultural depression sizes and shape varieties increases to include mat-lodge depressions and ovoid, saucer-like depressions. Faunal assemblages are still dominated by large ungulates as described above; fish and freshwater mussel increase in abundance relative to earlier portions of the Late Period.

4.1.8 Previous Archaeological Studies

Minimal archaeological research has been conducted in the vicinity of the project area. Two studies conducted in the late 1900s (i.e., Roberts 1973; Brolly and Calancie 1982) and two recent studies (Okanagan Nation Alliance 2013; Fisher 2014) inform the currently known archaeological record. An AIA conducted in 2013 and 2014 for FortisBC distribution line upgrade and pole replacement program under HCA permit 2014-0093 covered the existing corridor from Hwy 97 to the Osoyoos Indian Band Reserve #1, approximately 500 m north to northeast from the project area (Fisher 2014). This AIA study resulted in the confirmation of previously recorded archaeological sites DgQv-1 and DgQv-4, refinement of boundaries for archaeological site DgQv-39, replotting of archaeological site DgQv-7, and the identification of two previously unrecorded archaeological sites, DgQv-39 and DgQv-40. Additional AIA work and/or monitoring was recommended for the wetland and adjacent areas located at the north end of Osoyoos Lake (Fisher 2014:33).

4.1.8.1 Previously Recorded Archaeological Sites

There are no previously recorded archaeological sites located within the proposed development footprint, however, there are 8 previously recorded archaeological sites within 2 km of the project area (Figure 1 and Figure 2).

DgQv-1, a pre-contact campsite with scattered surface lithics located along a lower beach at the north eastern end of Osoyoos Lake, approximately 897 m east of the project area. The site was first identified during preliminary field reconnaissance conducted by the Osoyoos Band in 1972 during the Osoyoos Lakeshore Survey. A chipped point and debitage were collected from the site in 1973 during the Inkameep Archaeology Project (HCA permit 1973-024). Site dimensions are unknown (Provincial Heritage Registry 2019).

DgQv-2, is located on the Osoyoos Indian Reserve, approximately 1,596 m east of the project area. It is a precontact habitation feature with subsurface basalt flakes and six cultural depressions (i.e., habitation features, cache pit, and depressions with unassigned functions) as well as human remains (burials). The site measures approximately 75 m in length by 75 m in width (Provincial Heritage Registry 2019).

DgQv-3, a precontact village (open site) with a house-pit, is located along the east side of the mouth of Inkameep Creek, approximately 1,413 m southeast of the project area. The location of the site was documented in Teit (1930) ethnographic writings, and it was officially recorded in 1950 during the Archaeological Survey of the Okanagan and Similkameen Valleys of British Columbia (Caldwell 1954). The site was revisited under HCA permit 1973-024 for the Inkameep Archaeology Project. No dimensions are recorded in RAAD, no further information is recorded about the site (Provincial Heritage Registry 2019).



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DgQv-4, is a precontact campsite with surface lithics; various flakes and the tip of a chipped basalt point were collected under HCA permit 1973-024 for the Inkameep Archaeology Project. The site is located approximately 815 m east-northeast of the project area. No dimensions are recorded in RAAD, no further information is recorded about the site (Provincial Heritage Registry 2019).

DgQv-7, is a precontact site with surface lithics; one stemmed point and debitage were collected under HCA permit 1973-024 for the Inkameep Archaeology Project. The site is located approximately 986 m northeast of the project area. No dimensions are recorded in RAAD, no further information is recorded about the site (Provincial Heritage Registry 2019).

DgQv-8, is a precontact site with surface lithics; a single roughly formed maul (porous stone) was collected under HCA permit 1973-024 for the Inkameep Archaeology Project. The site is located approximately 1,281 m north of the project area. No dimensions are recorded in RAAD, no further information is recorded about the site (Provincial Heritage Registry 2019).

DgQv-39, is a disturbed precontact site with surface lithics and fire broken rock, located approximately 1,100 m northeast of the project area. The site was first noted in 2013 during a PFR conducted by Okanagan Nation Alliance and was recorded in 2014 under HCA Permit 2014-0093; all identified lithics and FCR were left in situ. Anecdotal evidence suggests the site has been subject to looting and relic hunting, as well as past livestock grazing (Fisher 2014). The site measures approximately 60 m in length by 60 m in width (Provincial Heritage Registry 2019).

DgQv-40, is a precontact site with surface lithics and a single burial cairn (with inferred human remains) situated on a knoll approximately 967 m northeast of the project area. The site was first noted in 2013 during a PFR conducted by Okanagan Nation Alliance and was recorded in 2014 under HCA Permit 2014-0093; all identified lithics were left in situ. Anecdotal evidence suggests the site has been subject to looting and relic hunting (Fisher 2014). The site measures approximately 120 m in length by 120 m in width (Provincial Heritage Registry 2019).

4.1.8.2 Archaeological Potential Model

The Okanagan Timber Supply Area Archaeological Overview Assessment (1997) overlaps with the project area and is approved for us as a planning tool by the Archaeology Branch (2008/2009 AOA Standards). The entire development footprint, as well as submerged areas extending 700 m from the shore into Osoyoos Lake demonstrate modeled high potential for the presence of archaeological resources (Figure 2). Underwater areas captured by this model reflect the history of flooding and rising lake levels caused by the construction of the Zosel Dam located approximately 85 km south of Osoyoos.



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4.1.8.3 Osoyoos Indian Band Input

Amanda Anderson, representing the Osoyoos Indian Band (OIB), provided a copy of a letter communication dated June 15, 2016, drafted by Yvonne Weinert (Lands Manager) per Chief Clarence Louie, which detailed the results of the OIB internal preliminary office review (Referral ID: A2016.032-Zone Bylaw2450.13&2451.21; Reference #: R-77-000653) for the proposed Willow Beach Development project area (RTS#830) (Weinert 2016). Both Weinert's letter and Anderson's recent email correspondence expressed major heritage and environmental concerns for the project area and presented a collection of background data relevant to the surrounding area. A historical OIB trapline was situated adjacent the project area, registered from 1928–1968. The broader wetland area continues to be used for trapping, hunting, fishing, and gathering food and medicinal plants as well as intergenerational teaching (pers. comm. Anderson, May 29–31, 2019). The OIB have expressed concerns with respect to their traditional use of the area.

4.2 ARCHAEOLOGICAL POTENTIAL EVALUATION

The project area is evaluated as having moderate to high archaeological potential. This evaluation is based on the following criteria:

1. **AOA potential model:** The project area has modelled high archaeological potential identified by the Okanagan Timber Supply AOA (1997).
2. **Previous archaeology:** The eight previously recorded archaeological sites and the ethnographically known village site within 2 km of the project area demonstrate the relatively high density of human occupation in the area over the past millennia. These sites are located on higher elevation landforms, demonstrating records of short and/or repeated though infrequent use (i.e., lithic scatters) and subsurface features such as burial cairns and house depressions representing more permanent places of seasonal occupation. In contrast, the project area is located at low elevation, southwest of the 8 previously recorded sites, located directly at the mouth of the river at the north end of Osoyoos Lake; an area subject to inundation and erosional activity typical of a riverine (glacial) floodplain. The absence of recorded archaeological sites within the immediate project area does not preclude the potential for surface and/or subsurface deposits to be present. There have been no archaeological impact assessments or subsurface testing in the project area.
3. **Landform features:** Well-drained features in proximity to freshwater and resource procurement areas, including areas in proximity to in-filled channels, were often used as short-term camps, or processing areas. Due to the project area location within an active channel/ floodplain of a dynamic river, it is likely that any archaeological deposits, if present, would represent ephemeral campsites with short records of occupation, likely consisting of lithic, fire-altered rock, charcoal and faunal deposits. Surface scattered lithics and fire altered rock deposits would have likely been dispersed and/or destroyed through periodic flooding and inundation events. The topographical features present in the project area suggest that any deposits, if present, would be deeply buried.
4. **Proximity to resources:** The project area is in proximity to a significant freshwater source and body of water (i.e., Osoyoos Lake) with significant fish resources including Kokanee salmon, rainbow trout, Dolly Varden, , and mountain whitefish as well as food and medicinal plants and other game (e.g., deer) that frequent the lake edge. Areas with these resources are typically associated with small ephemeral subsistence sites (e.g., campsites with surface and subsurface lithic deposits).



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5. **Level of past disturbance:** The study area has a significant history of development and disturbance which may have impacted archaeological materials and features, if present. Any remaining archaeological materials and features are likely to be disturbed and redeposited during construction activities, and/or destroyed, and/or intact and deeply buried.

The project area's (1997) AOA potential model, lack of archaeological impact assessment (i.e., subsurface testing), record of nearby prehistoric use and occupancy, proximity to resources, topographic attributes, drainage qualities, and level of past disturbance affect the overall potential for archaeological deposits and cultural materials to be present on the surface, and suggest intact deposits may lay deeply buried underground. Based on the currently proposed development components, which are in areas assessed as having moderate to high archaeological potential, the potential for impacts to archaeological sites is high.

5.0 RECOMMENDATIONS AND CLOSURE

The project area is evaluated as having moderate to high archaeological potential.

An AIA is recommended prior to the commencement of any land altering activities to identify the nature and extent of any archaeological resources, if present. It is anticipated that subsurface examination will only be required for select portions of the proposed project area, which would be determined during the field survey component of the AIA.

These recommendations apply solely to physical archaeological evidence of past human activity.

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Personal Communications

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7.0 PERSONAL COMMUNICATIONS

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APPENDIX B

Subsurface Test Log

Test Information	Positive?	Depth below surface (cm)	Soil/Sediment Description	Comments
ST-1 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments: root rejected	
ST-2 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-3 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-4 Shovel/Auger	NO	0-5	Dark brown/grey silty organics, fine-medium grained sands	Frozen, compact
		5-16	Dark brown/black silty fine-medium grained sand-sandy/gravel	40-60% sub-rounded pebbles
		16-46	Light tan medium grained sands with mottled dark brown/black portions, sometimes appearing as banding	disturbed/imported fill, <5% sub-rounded pebbles
		46-49	Dark brown/black medium grained sand	
		49-64	Light tan medium grained sand	<5% sub-rounded pebbles, sterile soil
		64-143	Light tan medium grained sand transitioning to light-medium reddish brown back to light tan/brown	sterile, intact soils
			Additional Comments: switched to auger at 64 cm dbs	
ST-5 Shovel/Auger	NO	0-5	Dark brown/grey silty organics, fine-medium grained sand	Frozen, compact
		5-16	Dark brown/black silty fine-medium grained sand-sandy/gravel	40-60% sub-rounded pebbles
		16-46	Light tan medium grained sand with mottled dark brown/black portions, sometimes appearing as banding	disturbed/imported fill, <5% sub-rounded pebbles
		46-49	Dark brown/black medium grained sand	
		49-64	Light tan medium grained sand	<5% sub-rounded pebbles, sterile soil
		64-143	Light tan medium grained sand transitioning to light-medium reddish brown back to light tan/brown	sterile, intact soils, glass observed at 65 cm dbs, may have been knocked from side-wall
			Additional Comments: switched to auger at 64 cm dbs	
ST-6 Shovel	NO	0-4	Reddish-brown organics, fine-medium grained sand	Frozen, compact
		4-22	Dark brown/black fine-medium grained sand	Frozen, compact, 30-50% sub-rounded pebbles
		22-25	Light tan medium grained sand	
		25-32	Brown silty fine-medium grained sand	
		32-39	Banded light/dark-medium brown grained sand	
		39-60	Medium-dark brown/grey medium grained sand	
			Additional Comments: All soils disturbed, imported and/or redeposited sediments	
ST-7 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-8 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-9 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-10 Shovel	NO	0-5	Organic dark brown fine-medium grained sand	Frozen, compact
		5-18	Dark brown medium grained sand	25-30% sub-rounded pebbles
		18-20	Mottled light grey/tan/orange fine grained sandy silt	Not mottled in all walls, disturbed, imported/redeposited soils
		20-37	Dark brown medium-grained sand	
			Additional Comments: test called at 37 cm dbs due to impassible roots	
ST-11 Shovel/Auger	NO	0-6	Organic dark brown fine-medium grained sands	Frozen, compact
		6-18	Light to dark brown medium grained sand	10-20% sub-rounded pebbles
		18-25	Medium brown/grey mottled fine grained sandy silt	Black pastic at interface of layer 3 and 4
		25-50	Dark brown/black medium grained sand with banding/mottled segments of lighter coloured sand	
		50-128	Light tan/brown medium grained sand, transitioning to a light reddish-brown then back to a light tan/brown	Ground water encountered at 120 cm dbs
			Additional Comments: switched to auger at 65 cm dbs	
ST-12 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-13 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-14 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
		32-65		Disturbed/redeposited layer, brown bottle glass found at 60-65 cm dbs
			Additional Comments:	
ST-15 Shovel	NO	0-4	Organic dark brown fine-medium grained sand	Frozen, compact
		4-10	Light tan/brown mottled fine-medium grained sand with trace silt	
		10-39	Dark brown/black fine-medium grained sandy silt	
		39-50	Dark brown/black fine-medium grained silty sand	
		50-61	Light tan/brown medium grained sand	Sterile
			Additional Comments:	
ST-16 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-17 Shovel	NO	0-5	Organic dark brown fine-medium grained sand	Frozen, compact
		5-8	Light tan/brown medium grained sand	
		8-10	Dark brown/black fine-medium grained silty sand	
		10-32	Light-medium brown medium grained sand with some nodules of mottled grey/brown/orange/black fine-grained sandy silt	15-20% sub-rounded pebbles
		32-65	Light-medium brown medium grained sand with some ephemeral mottling	Disturbed/redeposited layer
			Additional Comments:	

Test Information	Positive?	Depth below surface (cm)	Soil/Sediment Description	Comments
ST-18 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-19 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-20 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-21 Shovel	NO	0-3	Organic dark brown fine-medium grained sandy silt	
		3-8	Light brown/tan fine-medium grained silty sand	
		8-17	Dark brown/grey fine-medium grained sand	40-60% sub-rounded and rounded pebbles
		17-21	Light reddish brown/orange medium grained sand	
		21-59	Light tan/brown/dark grey/black/orange mottled medium grained sand with nodules of dark brown/black fine grained silty sand	
			Additional Comments:	
ST-22 Shovel/Auger	NO	0-4	Organic dark brown/grey silty fine-medium grained sand	Frozen, compact
		4-64	Mottled light to dark brown/tan/grey/orange medium grained sand	10-15% sub-rounded pebbles
		64-85	Light grey/blue fine-grained silty sand	
		85-140	Light tan/grey/brown medium grained sand	Water-logged from 120 cm dbs
			Additional Comments: switched to auger at 64 cm dbs	
ST-23 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
				Clear glass and metal at 66 cm dbs
			Additional Comments:	
ST-24 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-25 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-26 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-27 Shovel/Auger	NO	0-5	Dark brown/grey fine-medium grained silty sand	Frozen, compact
		5-13	Mottled light-medium brown/tan/grey fine-medium grained sand	Plastic toys and 1982 penny recovered
		13-21	Dark brown/black fine-medium grained silty sand	
		21-130	light tan/brown medium grained sand, transitioning to a light reddish-brown	Encountered water table at 124 cm dbs
			Additional Comments: switched to auger at 75 cm dbs	
ST-28 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-29 Shovel/Auger	NO	0-3	Organic dark brown fine-medium grained silty sand	
		3-21	Light brown/tan/grey lightly mottled fine grained silty sand	
		21-31	Dark brown/black fine grained silty sand	Moderate to heavy organic (roots) inclusions, 40-50% sub-rounded to sub-angular pebbles
		31-36	Light brown/grey lightly mottled fine grained sandy silt	
		36-43	Dark brown/black fine-medium grained sand with trace silt	
		43-140	Light tan/brown medium grained sand, transitions to light reddish grey brown len to light grey nearest to water table	Encountered water table at 125 cm dbs
			Additional Comments: switched to auger at 67 cm dbs	
ST-30 Shovel	NO	0-5	Organic dark brown fine-medium grained silty sand	
		5-21	Light tan/brown lightly mottled fine grained sand	10-15% sub-rounded pebbles
		2-39	Dark brown/black fine grained silty sand/silty sandy gravel	Heavy organic inclusions (roots), 40-60% sub-rounded to sub-angular pebbles, <5% irregular sub-rounded cobbles
		39-56	Dark brown/black silty loam	10-15% sub-rounded pebbles, slight organic inclusions (roots)
		56-70	Light tan/brown medium grained sand	~5% sub-rounded pebbles, sterile layer
			Additional Comments:	
ST-31 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-32 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-33 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-34 Shovel/Auger	NO	0-3	Organics	
		3-9	Dark brown/black silty fine-grained sand	
		9-18	Dark brown/black fine-grained sandy silt	
		18-142	Light brown/tan medium grained sand, transitioning to light reddish-brown	Small piece of tinfoil in auger pull at 88 cm dbs
		142-150	Grey medium grained sand	Encountered water table at 150 cm dbs
			Additional Comments: switched to auger at 60 cm dbs	

Test Information	Positive?	Depth below surface (cm)	Soil/Sediment Description	Comments
ST-35 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-36 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-37 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-38 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-39 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-40 Shovel	NO		STRATIGRAPHY NOT RECORDED/NOT REPRESENTATIVE	
			Additional Comments:	
ST-41 Shovel	NO	0-4	Organics	
		4-36	Dark brown/grey fine-medium grained sand	Faunal (domestic canine?) bone fragments that appear to have come from below two sub-rounded cobbles observed extruding from NE wall
			Additional Comments: test called at 36 cm dbs due to impassible roots	
No-test 1 Shovel	NO	0-13	Dark brown fine-grained silty sand	60% gravels and sub-angular and sub-rounded cobbles and pebbles, all imported fill
			Additional Comments: Test not completed due to frozen/compact ground	