

ARCHAEOLOGY REPORT

APPENDIX  
**G**

**SOUTH FRASER PERIMETER ROAD**

**ARCHAEOLOGICAL IMPACT ASSESSMENT  
HERITAGE CONSERVATION ACT  
PERMIT 2000-068**

*Prepared for*

**Ministry of Transportation**  
Victoria, BC

*Prepared by*

**Golder Associates Ltd.**



*Archaeologically sensitive information has been removed from this report. A complete version of the report is on file with the Archaeology Branch (Ministry of Sustainable Resources) in Victoria, BC.*

August 2001

## EXECUTIVE SUMMARY

On behalf of the Ministry of Transportation (MoT), Golder Associates Ltd. (Golder) conducted an archaeological impact assessment (AIA) of the proposed South Fraser Perimeter Road (SFPR). The study was completed under *Heritage Conservation Act* (HCA) permit 2000-068 and Sto:lo Nation Heritage investigation permit 2000-10.

The SFPR is a proposed 20 km transportation corridor running generally in a west to east direction from Highway 91 to River Road along the south side of the Fraser River to Highway 1/15 (176<sup>th</sup> Street). The proposed highway would link the Port Kells Industrial Area, the Canadian National Railway (CNR) Intermodal Yard, and the Surrey Fraser Docks with the provincial highway system and, indirectly through the existing highway network, with key activity centres such as the Tsawwassen Ferry Terminal, the Vancouver International Airport, and Deltaport. The primary objective for the facility is to provide mobility for commercial vehicle traffic, although commuter traffic would also benefit from this new facility.

No new archaeological sites were identified during this study. However, four previously recorded sites exist within the proposed development area. Three of these sites, DgRr-2 (St. Mungo), DgRr-6 (Glenrose Cannery), and DgRr-22 are located at the western end of the study area. These three sites contain unique and highly significant archaeological deposits. The fourth known site, DhRq-2, is located at the eastern end of the proposed development and is said to consist of a natural accumulation of marine shell and may not be a “true” archaeological site.

As presently proposed, the SFPR will impact archaeological deposits associated with the St. Mungo site (DgRr-2) and the Glenrose Cannery site (DgRr-6). The preliminary design for the proposed SFPR does not encroach upon archaeological site DgRr-22, therefore no direct impacts are foreseen at this time. As DhRq-2 is considered to be destroyed, the SFPR project will not impact this site.

Assuming that the SFPR project proceeds as presently proposed, some form of archaeological mitigation will be required at both the St. Mungo and Glenrose Cannery sites; likely a combination of excavation and archaeological monitoring. The scale and location of such a program will be dependent upon several factors, including the nature and scale of the resource being impacted. It is expected that such mitigation efforts will be extensive.

## CREDITS

Project Manager	Andrew Mason, M.A., R.P.C.A.
Archaeologists	Andrew Mason W. Scott Lawrie, B.A. Gail Wada, B.A., Dip.T.
Field Assistants	Andrew Bak <sup>1</sup> Tina Koller <sup>2</sup> Mike Leon <sup>3</sup> Trevor Pierre <sup>4</sup> Charles Savino <sup>5</sup>
Report Author	Andrew Mason Gail Wada Kirsty Miskovich, B.A.
Artifact Analysis	W. Scott Lawrie Andrew Mason Gail Wada
Senior Technical Review	Rebecca Balcom, M.A. Principal

---

<sup>1</sup> Tsawwassen First Nation

<sup>2</sup> Tsawwassen First Nation

<sup>3</sup> Katzie First Nation

<sup>4</sup> Katzie First Nation

<sup>5</sup> Kwantlen First Nation

**TABLE OF CONTENTS**

<u>SECTION</u>	<u>PAGE</u>
1.0 INTRODUCTION.....	1
1.1 Report Format.....	1
1.2 Proposed Development.....	1
1.2.1 Planning and Multiple Accounts Evaluations Stage.....	3
1.3 Preliminary Design Stage.....	3
1.3.1 Connection to Highway 91.....	3
1.3.2 Delta Section.....	3
1.3.3 South Westminster, Bridgeview, and Port Mann Section.....	4
1.3.4 Fraser Heights Section.....	4
1.3.5 Connection to Highway 1/15.....	4
1.4 Development Schedule.....	5
1.5 Potential Impacts to Archaeological Sites.....	5
1.6 Relevant Legislation.....	5
1.6.1 Heritage Conservation Act.....	5
1.6.2 B.C. Environmental Assessment Act.....	6
1.6.3 Canadian Environmental Assessment Act.....	6
2.0 OBJECTIVES AND METHODOLOGY.....	8
2.1 Study Objectives.....	8
2.2 Methods.....	8
2.2.1 Public Consultation.....	8
2.2.2 First Nations Consultation.....	8
2.2.3 Background Research.....	9
2.2.4 Inventory.....	9
2.2.5 Analysis.....	10
2.2.6 Impact Assessment.....	10
3.0 ENVIRONMENTAL SETTING.....	11
3.1 Physical Environment.....	11
3.1.1 Glaciation and Sea Level History.....	11
3.1.2 Geology and Soil Landscape.....	12
3.2 Biological Environment.....	12
3.2.1 Biogeoclimatic Zone.....	12
3.2.2 Flora.....	13
3.2.3 Fauna.....	14
4.0 CULTURAL SETTING.....	15
4.1 Ethnographic Background.....	15
4.1.1 Subsistence and Settlement Pattern.....	16
4.1.2 Habitation Structures.....	18
4.1.3 Material Culture.....	18

4.1.4 Trails.....	19
4.2 Placenames.....	19
4.3 Archaeological Sequence of the Fraser River Delta Region.....	21
4.3.1 Old Cordilleran/Pebble Tool Tradition.....	21
4.3.2 Charles/St. Mungo Culture Type.....	21
4.3.3 Locarno Beach Culture Type.....	22
4.3.4 Marpole Culture Type.....	23
4.3.5 Developed Coast Salish Culture Type.....	24
4.4 Previous Archaeological Research.....	25
4.4.1 St. Mungo Site (DgRr-2).....	25
4.4.2 Glenrose Cannery Site (DgRr-6).....	26
4.4.3 Wet Site (DgRr-22).....	26
4.4.4 DhRq-2.....	27
5.0 RESULTS.....	28
5.1 Connection to Highway 91.....	28
5.2 Delta Section.....	29
5.2.1 St. Mungo Site (DgRr-2).....	29
5.2.2 Glenrose Cannery Site (DgRr-6).....	30
5.2.3 Wet Site (DgRr-22).....	32
5.2.4 Nelson View and Knudson Road Area.....	32
5.3 South Westminster, Bridgeview, and Port Mann Section.....	32
5.4 Fraser Heights Section.....	32
5.5 Connection to Highway 1/15.....	32
5.5.1 DhRq-2.....	33
6.0 IMPACT ASSESSMENT.....	34
6.1 St. Mungo Site (DgRr-2).....	34
6.2 Glenrose Cannery Site (DgRr-6).....	34
6.3 Wet Site (DgRr-22).....	35
6.4 DhRq-2.....	35
7.0 RECOMMENDATIONS.....	36
7.1 St. Mungo Site (DgRr-2).....	36
7.2 Glenrose Cannery Site (DgRr-6).....	36
8.0 STUDY LIMITATIONS.....	38
9.0 CLOSURE.....	39
10.0 REFERENCES CITED.....	40

**LIST OF TABLES**

Table 1	Archaeological Assessment Results in the Vicinity of the St. Mungo Site (DgRr-2)
Table 2	Archaeological Assessment Results in the Vicinity of the Glenrose Cannery Site (DgRr-6)

**LIST OF FIGURES**

Figure 1	Study Area and Proposed Development
Figure 2	Generalized Culture-Historical Model for the Strait of Georgia Area
Figure 3	Previously Recorded Archaeological Sites in Study Area
Figure 4	Prior Archaeological Investigations at DgRr-2, DgRr-6, and DgRr-22 (Owens and Vincent 1999)
Figure 5	Survey Coverage of Proposed Development
Figure 6	Detailed Survey Coverage and Subsurface Test Locations in the Vicinity of River Road and Nordel Way
Figure 7	Detailed Survey Coverage and Subsurface Test Locations in the Vicinity of the St. Mungo Site (DgRr-2)
Figure 8	Assessed Areal Extent of Archaeological Sites DgRr-2, DgRr-6, and DgRr-22
Figure 9	Detailed Survey Coverage and Subsurface Test Locations in the Vicinity of the Glenrose Cannery Site (DgRr-6)
Figure 10	Detailed Survey Coverage and Subsurface Test Locations in the Vicinity of Nelson View
Figure 11	Detailed Survey Coverage and Subsurface Test Locations in the Vicinity of Norum Crescent
Figure 12	Detailed Survey Coverage and Subsurface Test Locations in the Vicinity of Elevator Road
Figure 13	Detailed Survey Coverage and Subsurface Test Locations in the Vicinity of the Port Mann Bridge
Figure 14	Detailed Survey Coverage and Subsurface Test Locations Northwest of 161 <sup>st</sup> Street
Figure 15	Detailed Survey Coverage and Subsurface Test Locations in Ravines near Tilbury Place
Figure 16	Detailed Survey Coverage and Subsurface Test Locations in the Vicinity of the Highway 1/176 <sup>th</sup> Street Interchange

**LIST OF PHOTOGRAPHS**

Photograph 1	Stone Hand Maul Base from Private Collection (_____ River Road)
Photograph 2	Private Artifact Collection from (_____ River Road)

**LIST OF APPENDICES**

Appendix I	Glossary of Technical Terms
Appendix II	Planning and Multiple Accounts Evaluations
Appendix III	B.C. Environmental Assessment Act as it Pertains to Archaeology
Appendix IV	Canadian Environmental Assessment Act as it Pertains to Archaeology

Appendix V	Key to Figure 4
Appendix VI	Subsurface Test Data
Appendix VII	St. Mungo (DgRr-2) Artifact Catalogue
Appendix VIII	Glenrose Cannery (DgRr-6) Artifact Catalogue

## 1.0 INTRODUCTION

On behalf of the Ministry of Transportation (MoT), Golder Associates Ltd. (Golder) conducted an archaeological impact assessment (AIA) of the proposed South Fraser Perimeter Road (SFPR). The study was completed under *Heritage Conservation Act* (HCA) permit 2000-068 (Dr. Steven Acheson, Project Officer) and Sto:lo Nation Heritage investigation permit 2000-10.

Four archaeological sites (DgRr-2, DgRr-6, DgRr-22, and DhRq-2) have been previously recorded within the project area. Three of these sites, DgRr-2 (St. Mungo), DgRr-6 (Glenrose Cannery), and DgRr-22 are located at the western end of the study area. These three sites contain unique and highly significant archaeological deposits. The fourth known site, DhRq-2, is located at the eastern end of the proposed development and is said to consist of a natural accumulation of marine shell and may not be a “true” archaeological site. The Burlington Northern Santa Fe Railway (BNSFR) right-of-way parallels a large section of the proposed route, particularly in the Delta section.

### 1.1 Report Format

This report follows a modified report format for archaeological inventory and impact assessment studies (Archaeology Branch 1998). Section 1 outlines the structure of the report, describes the proposed development, and reviews legislation as it relates to the SFPR project. Section 2 states the objectives of the study and describes the methodology employed during inventory, impact assessment, and analysis. The physical setting of the study area is explored in Section 3. In Section 4, the ethnographic and archaeological contexts of the study area are described and previous archaeological research in the study area is reviewed. Section 5 describes the results of the resource inventory and Section 6 assesses the potential impacts of the proposed SFPR project. Section 7 provides resource management recommendations and Section 8 describes the limitations of the AIA study. Section 9 provides closure and references are found in Section 10. A glossary of technical terms is provided in Appendix I. Subsequent appendices (II to VIII) provide information on the Multiple Accounts Evaluation (MAE) undertaken during the planning process, heritage legislation, detailed subsurface test results, and artifact catalogue information.

### 1.2 Proposed Development

The South Fraser Perimeter Road is a proposed transportation corridor, approximately 20 km length, running along the south shore of the Fraser River, from Highway 91 in Delta, to Highway 1/15 in Surrey (176<sup>th</sup> Street) (Figure 1). The proposed four-lane divided expressway would link the Port Kells Industrial Area, the Canadian National Railway (CNR) Intermodal Yard, and the Surrey Fraser Docks with the provincial highway system and, indirectly through the existing highway network, with key activity centres such as the Tsawwassen Ferry Terminal, the Vancouver International Airport, and

Deltaport. A westbound entrance ramp and an eastbound exit ramp would be constructed from Highway 1 at Harvie Road. A westbound right in/right out connection to River Road would be developed near Centre Street, and an eastbound right in/right out connection to River Road would be developed near Delwood Drive. The primary objective for the facility is to provide mobility for commercial vehicle traffic, although commuter traffic would also benefit from this new facility (Associated 2001a).

The SFPR has been split into five sections for ease of discussion. The sections are:

#### Connection to Highway 91 at the Nordel Interchange

This section of the SFPR generally follows the existing River Road alignment from Sta. 30+83 (approximately 1 km west of the existing Nordel Way intersection) to the Alex Fraser Bridge at Sta. 43+40. The section also includes a new connecting road from SFPR Sta. 36+25 at River Road to Highway 91 at the Nordel Interchange.

#### Delta Section

The Delta section extends from the Alex Fraser Bridge (Sta. 43+40) eastward to the Delta/Surrey border (Sta. 74+50).

#### South Westminster, Bridgeview, and Port Mann Section

This section begins at the Delta/Surrey border in the west (Sta. 74+50) and travels east to Sta. 202+00, north of 112B Avenue in Surrey.

#### The Fraser Heights Section

In the west, the Fraser Heights section begins at Sta. 202+00 and travels east to Abbey Drive (Sta. 238+50). The 104<sup>th</sup>/176<sup>th</sup> Street Interchange is also in the Fraser Heights section. The section also includes the portion of the Port Kells Connector from the 104<sup>th</sup>/176<sup>th</sup> Street Interchange to 179<sup>th</sup> Street.

#### Connection to Highway 1/15

This section begins at Abbey Drive (Sta. 238+50) and heads south along 176<sup>th</sup> Street, terminating south of the Trans Canada Highway at 96<sup>th</sup> Avenue. The section includes improvements at the 176<sup>th</sup> Street/Highway 15 Interchange at the Trans Canada Highway and the Port Kells Connector from 179<sup>th</sup> Street to the existing 96<sup>th</sup> Street, east of Barnston Drive East. An eastbound exit ramp and a westbound entrance ramp to the Trans Canada Highway at the existing Harvie Road Underpass are also included.

### 1.2.1 Planning and Multiple Accounts Evaluations Stage

To identify the best route alignment for the SFPR from a variety of perspectives, a planning and MAE study was coordinated by Associated Engineering Ltd. (Associated 2001a). Existing archaeological data, provided by Golder, were incorporated into this study. The planning and MAE study was not an impact assessment study but was a mechanism used to arrive at a single alignment for the SFPR. The merits and challenges of the route alignment chosen for the preliminary design phase are addressed in this report. Golder's archaeological input into the planning and MAE study are summarized in Appendix II following a brief methodological introduction.

### 1.3 Preliminary Design Stage

The planning and MAE process (Appendix II) was used to focus the alignment options for the SFPR and resulted in the development of a preliminary design for the SFPR (Figure 1) (Associated 2001b). The SFPR preliminary design is the subject of this archaeological impact assessment study.

The preliminary design configuration of each of the five route sections is briefly described in the following sections, with additional detail provided for archaeologically sensitive sections of the SFPR. Detailed information concerning the entire SFPR route, including engineering drawings, can be found in the preliminary design report prepared by Associated (2001b).

#### 1.3.1 Connection to Highway 91

The route alignment for the SFPR connection to Highway 91 utilizes a new connecting road between River Road and Highway 91 located to the west of Nordel Way, with Nordel Way becoming a local industrial road (Figure 1). Along River Road, beginning at Sta. 30+83, the proposed alignment will essentially follow the existing River Road right-of-way with some minor improvements. Beginning at Sta. 40+00 (ca. 280 m west of Cougar Canyon Creek<sup>1</sup>), the route will be elevated to clear the existing Burlington Northern Santa Fe Railway (BNSFR) right-of-way that is located near Centre Street in the Delta section. The elevated section of the SFPR will be built on piers. The number of piers and their location has not been determined but they will likely fall within the existing River Road right-of-way.

#### 1.3.2 Delta Section

The elevated section of the SFPR ends roughly 180 m east of Centre Street at Sta. 47+23. An access road off Centre Street and between the BNSFR right-of-way and River Road is also proposed (Figure 1). This road will pass through residential lots on the north side of

<sup>1</sup> Located just west of the Alex Fraser Bridge

River Road, between the Alex Fraser Bridge and Sunbury Ravine (10453 River Road). A second access road off Centre Street is proposed for the south side of the SFPR (Figure 1). This road will run east, parallel to the SFPR, and will eventually rejoin River Road near Sta. 48+45.

As the SFPR approaches the Glenrose Cannery site (DgRr-6), west of Sunbury Ravine, the route will deviate from the existing River Road alignment by not shifting to the south. Beginning at Sta. 49+23, the configuration of the route will change to a split grade, travelling east through the Glenrose Cannery site (DgRr-6), including a portion of the "core" area where Percy (1972) and the University of British Columbia conducted excavations in the 1970s (see Matson 1976). In this area, embankment fill and retaining walls will be placed on top of the cleared but unstripped original ground surface. Lightweight fills will be used to the extent that is necessary to minimize adverse impacts to archaeological deposits that are known to exist in this area. Continuing east of Sunbury Ravine, the SFPR will traverse the steep side slope below the houses on River Road and south of the BNSFR right-of-way. Some localized excavation will be necessary in this area to found the highway fill material.

#### 1.3.3 South Westminster, Bridgeview, and Port Mann Section

The general configuration of the proposed South Westminster, Bridgeview, and Port Mann section of the SFPR is illustrated in Figure 1. As this section of the SFPR is large, complex, and not in an archaeologically sensitive area, a detailed route description is not provided. Specific route alignment and design details, including engineering drawings, can be found in reports prepared by Associated (2001a, 2001b).

#### 1.3.4 Fraser Heights Section

The general configuration of the proposed Fraser Heights section of the SFPR is illustrated in Figure 1. As this section of the SFPR is large, complex, and not in an archaeologically sensitive area, a detailed route description is not provided. Specific route alignment and design details, including engineering drawings, can be found in reports prepared by Associated (2001a, 2001b).

#### 1.3.5 Connection to Highway 1/15

The SFPR connection to Highway 1/15 at 104<sup>th</sup> Avenue consists of an improvement of the grade on 176<sup>th</sup> Street, modification of the 176<sup>th</sup> Street/Trans Canada Highway Interchange, and construction of interchange ramps at Harvie Road to support the 176<sup>th</sup> Street Interchange and to provide additional access to Port Kells. A new four-lane Port Kells connector from the SFPR to Port Kells is proposed, and Barnston Drive East at 176<sup>th</sup> Street is closed (Figure 1). Archaeological site DhRq-2 is located in this section of the SFPR, however, research suggests the site is comprised of a natural deposit of marine shell that has been destroyed by construction of the Highway 1/176<sup>th</sup> Street Interchange.

#### 1.4 Development Schedule

No decision has been made to proceed with an application for environmental approval, nor for engineering and construction to deliver the project (Associated 2001a).

#### 1.5 Potential Impacts To Archaeological Sites

A number of activities related to road construction have the potential to impact archaeological deposits. Excavations for roads, demolition, clearing, grading, paving, the installation of subsurface utilities, and other ancillary developments have the potential to impact archaeological sites by disturbing cultural deposits and features, damaging artifacts, hindering access to archaeological deposits, and destroying contextual information essential for interpreting site function and age. Less intensive activities such as landscaping may also damage archaeological deposits.

#### 1.6 Relevant Legislation

A number of pieces of legislation have bearing on the SFPR project with respect to archaeological concerns. The role and scope of the key pieces of legislation are reviewed in the following sections.

##### 1.6.1 Heritage Conservation Act

All archaeological sites, whether on Provincial Crown or private land, that predate A.D. 1846 are automatically protected under 1996 amendments to the *Heritage Conservation Act* (HCA). Certain sites, including burials and rock art sites, are protected regardless of age.

Subsurface investigation of an archaeological site or investigation with the intent to locate a site requires a permit under *Section 14* of the HCA. The Archaeology Branch (Ministry of Small Business, Tourism, and Culture) is the provincial government ministry responsible for administering the HCA, issuing permits, maintaining a database of recorded archaeological sites, and handling referrals from various development agencies.

Site protection under the HCA does not necessarily negate impact; in some cases, development proceeds following an impact assessment or other mitigative actions. With the exception of impacts occurring under a *Section 14* permit, any alteration to a known archaeological site must be permitted under *Section 12* of the HCA. A *Section 12* permit is held by the individual responsible for the site alteration and normally includes data recovery or mitigative requirements such as development monitoring or data sampling.

All applications for *Section 12* or *Section 14* HCA permits are forwarded by the Archaeology Branch to appropriate First Nations for review. A 30-day review period is provided for comments regarding the proposed methodology.

As the study area falls under provincial jurisdiction and as there are four previously recorded archaeological sites in the study area, the *Heritage Conservation Act* applies to the SFPR project.

##### 1.6.2 B.C. Environmental Assessment Act

The British Columbia *Environmental Assessment Act* was proclaimed in 1995. It prescribes a comprehensive environmental assessment (EA) review process for reviewable projects. Projects are reviewable under the *Act* when they are above certain size and impact thresholds as specified in the *EA Reviewable Projects Regulation*. For the Transportation Sector, highway projects are reviewable when they involve “a new facility, 20 contiguous km or more of paved 2 lane (or more), public highway.” The SFPR qualifies for review since it is a new project, with a total length of approximately 20 km (Associated 2001a).

With respect to heritage resources, one of the purposes of the *Act* is “to provide for the thorough, timely and integrated assessment of the environmental, economic, social, cultural, heritage and health effects of reviewable projects” (see Appendix III). Heritage resource assessment and management provisions in the *Heritage Conservation Act* are compatible with the requirements of the British Columbia *Environmental Assessment Act*.

Although there are no plans at present to proceed with an application pursuant to the B.C. *Environmental Assessment Act*, this archaeological impact assessment study was undertaken in support of an application, if and when this project proceeds.

##### 1.6.3 Canadian Environmental Assessment Act

According to the Canadian Environmental Assessment Agency (1994), an environmental assessment is required if a federal authority exercises or performs one or more of the following powers, duties, or functions in relation to a project:

- proposes the project;
- grants money or any other form of financial assistance to the project;
- grants an interest in land to enable a project to be carried out (that is, sells, leases, or otherwise transfers control of land); or
- exercises a regulatory duty in relation to a project, such as issuing a permit or licence, that is included in the Law List prescribed in the regulations to the *Act*.

Should the SFPR project proceed, it is possible that federal financial assistance will be required. Regardless, the *Fisheries Act* requirements will come into effect, thus triggering the *Canadian Environmental Assessment Act* (CEAA). The CEAA states that one of the purposes of the *Act* is “to ensure that the environmental effects” (including cultural heritage and any structure, site, or thing that is of archaeological significance) “of

projects receive careful consideration before responsible authorities take actions in connection with them” (see Appendix IV). Although the *CEAA* clearly states archaeological concerns must “receive careful consideration”, how this is to be done is not clear, given the absence of integrated and comprehensive heritage resource management legislation at the federal level (see Burley 1994). However, given that the land in question is under provincial jurisdiction, the *Heritage Conservation Act* and standards set by the Archaeology Branch will adequately address archaeological concerns connected with the SFPR project.

## **2.0 OBJECTIVES AND METHODOLOGY**

The AIA was designed to provide the data necessary to locate and evaluate archaeological sites within the proposed development area in accordance with Archaeology Branch guidelines (1998). Specific study objectives and the research methodology are outlined in the following sections.

### **2.1 Study Objectives**

The primary objectives of the AIA were to:

1. identify and evaluate archaeological resources within the proposed SFPR project area;
2. identify and evaluate impacts to archaeological resources that might result from the SFPR development; and
3. recommend viable options for managing potential adverse impacts to any identified sites.

### **2.2 Methods**

A general description of the methods used to conduct the AIA of the SFPR project is presented in the following sections.

#### **2.1.1 Public Consultation**

As part of the public consultation process, Golder participated in open houses in January 2000 to answer questions presented by the public and to discuss the objectives of the archaeological portion of the planning study for the SFPR. Display boards illustrating the alignment and connection configurations were used.

Following the open houses and prior to the archaeological field program, a letter outlining the nature of the proposed field program was sent to residents located in the project area. The letter explained the nature of the archaeological assessment and asked for permission to access properties for evaluative testing. Residents were contacted in person or by telephone prior to the archaeological evaluation of their property.

#### **2.1.2 First Nations Consultation**

The vast majority of the First Nations consultation activities for the SFPR project were undertaken by MoT personnel. A copy of Golder’s HCA permit application was forwarded to the Katzie First Nation, the Kwantlen First Nation, the Kwayhquiltam First Nation, the Musqueam Indian Band, the New Westminster Indian Band, the Sto:lo Nation, and the Tsawwassen First Nation to review and to comment upon the proposed methodology. Members of the Katzie, Kwantlen, and Tsawwassen First Nations assisted

with the field program. Mr. Andrew Bak of the Tsawwassen First Nation and Mr. Dave Schaepe of the Sto:lo Nation provided information concerning the traditional use of the study area and First Nations placenames within, or adjacent to, the SFPR project area.

### 2.1.3 Background Research

Prior to field investigations, a review of relevant cultural and environmental data was undertaken. This included published and unpublished sources dealing with local and regional history, archaeology, ethnography, and the environment. Existing archaeological site inventory forms were examined to provide information on archaeological site types, locations, and density in the study area.

### 2.1.4 Inventory

Field investigations consisted of a systematic ground surface inspection and a subsurface testing program intended to locate and assess cultural deposits or features that may be present within the study area.

During the surface inspection, select sections of the study area were examined using parallel traverses with approximately 5 to 20 metre spacing, depending on terrain, ground cover, and assessed site potential. Areas with assessed moderate to high archaeological potential, such as areas near the known archaeological sites, the Fraser River, ravines, stream crossings, and other terrain features that are generally thought to correlate with archaeological sites, were the most intensively inspected. When considered more effective, oblique or “zig-zag” traverses were employed to maximize ground coverage. When cultural materials were found, traverse spacing was reduced to examine these areas in greater detail.

Surface evidence of cultural material was sought, including but not limited to, stone, bone, antler, shell, or other artifacts, fire-altered rock, cultural features (e.g., hearths), anthropogenic soils, and historic cultural remains and debris.

Soil probes and judgmentally placed shovel tests, averaging 40 cm x 40 cm, were used to search for buried cultural deposits. Subsurface tests were excavated to glacial deposits, bedrock, or the C Horizon, where possible. All removed matrices were screened through ¼” (6 mm) mesh, and any cultural materials encountered, with the exception of fire-altered rock or historic debris, were collected. Probing and shovel testing was also conducted within the boundaries of previously identified archaeological sites to assess the nature, integrity, and significance of the deposits. Sufficient testing was carried out to determine the nature and boundaries of identified site deposits in relation to the proposed development.

### 2.1.5 Analysis

Artifacts that were collected from subsurface tests were described, measured in three-dimensions, weighed, and catalogued. Where possible, functional types (e.g., projectile point) were also indicated.

British Columbia Archaeological Site Inventory Forms were updated for each revisited site. Maps were prepared showing the proposed development area, survey coverage, shovel test locations, and the estimated boundaries of each identified site.

All artifacts, photographs, field records, and a copy of this report will be submitted to the U.B.C. Laboratory of Archaeology for curation.

### 2.1.6 Impact Assessment

All identified archaeological sites were assessed according to Archaeology Branch guidelines (1998). Site significance evaluations were based on a collective consideration of scientific, cultural, public, and economic significance criteria, with emphasis on the scientific and cultural categories.

Each identified site was assessed in terms of potential adverse impacts from the SFPR project, and recommendations are provided for appropriate impact mitigation measures where avoidance is not possible.

### 3.0 ENVIRONMENTAL SETTING

The environment, both physical and biological, has undoubtedly influenced many of the activities that contribute to the character of the regional prehistoric record. These include patterns of settlement, resource exploitation, seasonal movement, travel routes, and the behaviours these activities imply. Therefore, to gain a perspective on the prehistoric use of the study area and its environs, the appropriate environmental variables must be considered.

Archaeologists are not only better able to find sites when they understand the environmental conditions, but also to interpret them when they understand the context within which they existed. The most pertinent variables are interconnected and include the physical aspects of the land (e.g., topography or sea level history) and resource availability (e.g., flora and fauna). Linking both are the cultural activities of site selection, travel within and through the area, and resource utilization.

#### 3.1 Physical Environment

##### 3.1.1 Glaciation and Sea Level History

The topography of the SFPR project area has been transformed by geological processes over many thousands of years. For example, during the height of the Late Wisconsin glaciation, the study area was covered by up to 2 km of ice rendering the area uninhabitable. Clague et al. (1982) report that sea levels were as much as 200 m above present levels during initial deglaciation about 13,000 years ago. At about the same time, the ice began to retreat but isolated ice sheets remained until between 11,000 and 10,000 BP (Before Present, with present defined as 1950 by convention). As the ice sheets continued to recede, the land began to rebound, resulting in the emergence of the submerged coastal lowlands and the establishment of the Fraser River delta around 11,000 BP (Clague et al. 1982). By about 8,000 BP, sea levels reached a point about 12 m below present levels (Clague et al. 1982). This coincides with the initial occupation of the Glenrose Cannery site (DgRr-6) in the Delta section of the SFPR project area (Matson 1976; 1996).

Between 7,000 and 7,500 years ago, sea levels began to rise again, a trend that continued until about 5,000 to 5,500 BP, when a period of stability commenced. Clague et al. (1982) suggest that the sea had risen to within 2 m of its present level by 5,000 BP and that sea levels have remained relatively stable over the past 5,000 years, with local fluctuations limited to no more than 1 to 2 m.

These changes have a dramatic effect on archaeological site visibility as sites associated with a lower relative sea level are no longer detectable using conventional methods, while archaeological sites associated with higher sea levels are located inland, away from the

modern shoreline that most archaeologists have equated with archaeological site locations.

Today, notable landscape features with respect to the SFPR project area include the south arm of the Fraser River (north of the study area), Panorama Ridge (south of the study area), Burns Bog (west of the study area), and the Fraser River delta, roughly 18 km west of the study area.

#### 3.1.2 Geology and Soil Landscape

The study area consists of three major geological components. Starting at the western end of the project area, and continuing along the edge of the slope towards the Fraser Heights section, are pre-Vashon deposits of Quadra fluvial channel fill and floodplain deposits, combined with marine interbedded fine sand to clayey-silt. Within the low-lying areas of the South Westminster, Bridgeview, and Port Mann section are post-glacial Salish sediments comprised of lowland peat (up to 14 m deep), in part overlying Fraser River sediments. The third major geological component is in the vicinity of the Fraser Heights section, generally south of the pre-Vashon material component. In this area deposits are largely comprised of Vashon Drift, which consists of till, glaciofluvial, glaciolacustrine, and ice-contact deposits (Armstrong and Hicock 1976).

Gleysolic soil is dominant in the SFPR project area. In general, these soils occur on gently sloping and flat terrain and are often associated with marine and fluvial deposits. The gleysolic order is characterized by saturation with water for long periods. This may be caused by a high water table, heavy rainfall, or restricted drainage due to topography (Lavkulich 1978). A typical gleysolic soil is mottled bright reddish-brown at the top, as ferrous compounds are oxidized to ferric iron. Below this layer, the soil is typically grey in colour, due to reduced ferrous iron compounds.

#### 3.2 Biological Environment

As with the sea level history of the SFPR project area, biotic variability within the area has been closely tied to regional climatic conditions. The distribution of animal and vegetation communities had a significant influence on prehistoric travel, settlement, and subsistence patterns. Certain plant communities provided habitat that supported many of the species of animals used by prehistoric hunters, and particular plant species were important sources of food, fuel, and medicine.

##### 3.2.1 Biogeoclimatic Zone

The project area is located within the Coastal Western Hemlock (CWH) biogeoclimatic zone. The CWH biogeoclimatic zone covers low- to mid-elevations and is the most productive zone in British Columbia in terms of overall biomass (Jones and Annas 1978). On average, the CWH biogeoclimatic zone is the rainiest zone in British Columbia, and

features cool summers and mild winters. The mean annual temperature is about 8° C, while annual precipitation for the zone ranges between 100 and 440 cm. Within the Fraser River estuary, summers are normally warm and dry, with precipitation amounts at sea level as low as 65 cm (Schaefer 1978).

Pojar et al. (1991) provide a thorough description of the plant and animal species that are today characteristic of the CWH zone. Forests are dominated by western hemlock and Pacific silver (or amabilis) fir. Other common tree species include western redcedar, Douglas-fir (in dry areas), and Sitka spruce (in moist areas such as floodplains). The understory in the CWH zone is generally lush and contains a number of berry species important in traditional First Nation subsistence, including blueberry, salmonberry, and red huckleberry. Economically important animals include mule deer, black bear, and various species of waterfowl. Throughout the CWH zone, streams and rivers provide spawning habitat for salmon and other culturally and economically important fish species.

### 3.2.2 Flora

Western redcedar is known to have long been the primary material used by First Nations persons to produce houses, canoes, boxes, basketry, and a wide range of other utilitarian and ceremonial items. However, the establishment of western redcedar and yellow cedar in the region appears to be relatively recent, in archaeological terms, starting perhaps 6,000 years BP (Hebda 1995; Hebda and Mathewes 1984). These findings correlate with early archaeological evidence for the development of woodworking technology, which suggests that specialized woodworking tools (e.g., adzes) were not common until after about 5,000 years BP (Hebda and Mathewes 1984). Similarly, research by Brubaker (1988) shows that Douglas-fir forests only began to dominate the region about 10,000 years ago and that old-growth forests, as we know them today, have only existed for 5,000 to 7,000 years.

Plant communities in the study area for the period from 1858 to 1890 have been reconstructed by North et al. (1979) and North and Teversham (1984). The Connection to Highway 91 section of the SFPR project area contained grasses, Labrador tea, cranberry, salal, and pine, while the Delta section consisted of a coniferous forest of predominantly cedar and broadleaf maple, with Douglas-fir, alder, vine maple, and ferns occurring in smaller quantities. To the east, the South Westminster section consisted of a mixed coniferous forest on organics (i.e., cedar, pine, hemlock, spruce, Labrador tea, and cranberry), and a large cranberry marsh extending to the Bridgeview section. An alder woodland and mixed deciduous regeneration forest, combined with a mixed coniferous forest, are noted in the Port Mann section, while towards the Fraser Heights section, the area was predominantly a mixed coniferous forest of cedar, broadleaf maple, and Douglas-fir. A number of ethnographic sources indicate First Nations persons were well

aware of the plant resources within the study area and utilized them to varying degrees at least during the ethnohistoric period and likely much longer.

Today, much of the study area consists of varying levels of development, including residential housing, industrial buildings, and road infrastructure. Vegetation is dominated by grasses and other introduced plant species, with the exception of ravine/stream areas and other minimally impacted areas where native vegetation, including trees and shrubs, remains.

### 3.2.3 Fauna

While information with respect to terrestrial species that may have been available to First Nations persons in the study area prior to 8,000 BP is limited, archaeological sites, including Glenrose Cannery (DgRr-6) and St. Mungo (DgRr-2), provide an excellent glimpse at species availability from 8,100 BP to modern times. Basal layers at the Glenrose Cannery site show wapiti, deer, *canis* sp., beaver, and seal were present (Matson 1996). Fish remains from this period include salmon, starry flounder, eulachon, stickleback, sturgeon, and peamouth. Shellfish remains were dominated by bay mussel. Slightly later deposits, from both the Glenrose and St. Mungo sites, reveal a diverse range of terrestrial, marine, and avian species in the SFPR project area. Notable species include wapiti, deer, seal, salmon, starry flounder, geese, ducks, and various species of shellfish. With the exception of wapiti, which are now extinct in the area, the same species that were available to the occupants of the Glenrose and St. Mungo sites 3,500 to 5,000 years ago are still present, albeit in reduced numbers and distribution, in the study area. Detailed information concerning faunal remains for the study area over the past 8,000 years can be found in Matson (1976), Ham et al. (1984), and Boehm (1973).

#### 4.0 CULTURAL SETTING

The study area lies within the asserted traditional territories of the Tsawwassen, Musqueam, Kwayhquitlam, Katzie, Kwantlen, Sto:lo, and New Westminster First Nations. These seven groups are all speakers of various dialects of the Halq'eméylem language, a member of the Coast Salishan language family.

A generalized discussion of salient features of these groups, based on early ethnographic accounts, is provided in the following sections with emphasis upon those activities or aspects of culture that would leave physical traces in the archaeological record.

##### 4.1 Ethnographic Background

The Fraser River delta and Fraser Valley have had a long history of ethnographic research. Observations of Halq'eméylem persons were first recorded by the explorer Simon Fraser who descended the river that bears his name in 1808. Fraser's letters and journals provide a glimpse of Halq'eméylem culture at the time of his voyage (Lamb 1960).

Charles Hill-Tout conducted field research among a number of Halq'eméylem groups along the lower Fraser River, and the results of his research were published between 1895 and 1911 (Maud 1978). Hill-Tout's observations on the Kwantlen, Katzie, and Kwayhquitlam people are particularly relevant to this study as they include information on placenames and aspects of material culture (Maud 1978). Ethnographic research completed by Homer Barnett in the mid-1930s provides a source of general information with respect to Halq'eméylem groups, with specific references to the Musqueam and Tsawwassen (Barnett 1955).

Wilson Duff began ethnographic research among the Sto:lo during the summers of 1949 and 1950 to collect data for his Master's thesis (1952a). Duff spent nine weeks among the Sto:lo and later published "The Upper Stalo Indians of the Fraser River of B.C." (1952b), an ethnography that concentrated on the Tait, Chilliwack, and Pilalt people of the upper Fraser River valley. Although Duff's study concentrated on these groups, he noted much of the information was also applicable to other Sto:lo groups (Duff 1952b).

While preparing Diamond Jenness' notes on the Katzie for publication, Suttles conducted further ethnographic research among the Katzie during the summer of 1952 and subsequent visits (Suttles 1955). Jenness' earlier material and Suttles' later observations of the Katzie were published together (Jenness 1955; Suttles 1955).

During the 1960s Oliver Wells, a longtime Chilliwack resident and avocational anthropologist, published material on various aspects of Sto:lo culture (see Wells 1963, 1965a, 1965b, 1965c, 1966a, 1966b). Most relevant to this study is a posthumously

published collection of Wells' observations that includes a map of "Indian Territory", including information on habitation sites and placenames (Wells 1987).

Most recently, the Sto:lo Nation (Carlson 2001) has published a historical atlas that includes information on Sto:lo culture, including archaeological sites, spiritual sites, and placenames.

This rich assortment of ethnographic data are combined in the following sections to formulate a picture of Halq'eméylem culture during the early contact period. By using several different sources the influence of any inaccuracies or inherent biases are kept to a minimum.

##### 4.1.1 Subsistence and Settlement Pattern

The summer months were the most important in the Halq'eméylem economy due to large, predictable runs of spawning salmon in the Fraser River and its tributaries. Sockeye runs began in the Fraser River during the middle of June and peaked after mid-July when freshets had subsided. Pink salmon spawned in late August and continued through most of September. Chum salmon spawned in the Fraser River from mid-September through to December, while coho spawned in the late fall and winter in small streams that feed the Fraser River (Duff 1952b). During this time temporary fishing camps were established by First Nations groups of the study area. It is likely that a segment of the population also remained at the permanent "winter village" settlement during this time.

The fall subsistence and settlement pattern was in many ways a continuation of the summer pattern as salmon were still plentiful. By late September, however, emphasis on the salmon fishery began to wane as other economic activities, such as hunting and berrying, gathered momentum. Most hunting took place in the fall as animals tended to be fat and their young had had the summer to develop. After the salmon drying season hunters went into the mountains in search of game, often for several days. Some hunting forays could last several weeks. In these cases, hunters established base camps (Duff 1952b). Species that were hunted included deer, wapiti, black bear, and beaver. Bird species included ducks, Canada geese, bald eagles, and spruce grouse (Duff 1952b).

Plant food available in the fall included wild crab-apples and hazelnuts. Cranberries grew in Katzie territory and in other areas near the mouth of the Fraser River (Duff 1952b; Suttles 1955). The Katzie also dug wapato, a wild root vegetable, during the fall (Suttles 1955). The availability and native use of plant foods in study area has been well documented by Duff (1952b) and Turner (1975).

The fall months were likely a period of population dispersal as small task groups spread across the landscape to take advantage of a variety of resources.

Winter was the season when primary group villages were utilized and was largely a time of ceremonial activity, with less emphasis placed on subsistence activities. Stored foods, such as salmon and dried berries, were utilized (Duff 1952b; Suttles 1955). Winter village populations tended to be fluid with families often relocating to other villages or vacant locations. As a result, the best places for habitation within a group's territory would likely have been used at one time or another. Much of this population movement was motivated by the search for richer food resources or firewood. However, some movement would be due to internal friction or the desire for a change in surroundings. A few village locations, such as Yale, Hope, and Langley, were permanent due to the extremely rich resources available nearby (Duff 1952b).

Steelhead trout, which spawned in January, were caught in the winter (Suttles 1955; Wells 1987). Although most hunting occurred in the fall, bears were smoked out of their dens in the winter (Duff 1952b; Suttles 1955; Wells 1987).

In the springtime, as stored food resources would have become depleted, plant foods played an important role. The shoots of salmonberry, thimbleberry, the round stalk of the cow-parsnip, and other green shoots were eaten (Duff 1952b). The availability and native use of plant foods has been well documented and the reader is again referred to Duff (1952b) and Turner (1975) for an in-depth discussion of the availability and use of plant foods.

Eulachon, an abundant anadromous fish, enter the Fraser River during late April until the end of May (Drake and Wilson 1992; Duff 1952b; Suttles 1955b). These fish were caught in large numbers and provided an important addition to the diet. Eulachon regularly ascend the Fraser River as far as Mission but rarely further than Chilliwack. Eulachon were preserved by smoking rather than rendered into oil as was the practice of other groups on the northwest coast (Drake and Wilson 1992; Duff 1952b).

White sturgeon, a fish species that can weigh as much as 800 kg, were also consumed (Duff 1952b). Sturgeon were available year-round but were most easily obtained during June and July when they moved into shallow river sloughs to spawn (Duff 1952b). Trout also spawned in the spring and were harvested in some number (Wells 1987). By mid-June spawning sockeye would begin to appear and economic activities would again turn to the salmon fishery (Duff 1952b).

Evidence of these subsistence activities that would be visible archaeologically includes, but is not limited to, the actual food remains (i.e., midden deposits), cleared beaches, intertidal fish traps or the remains of wooden weirs (i.e., stakes and posts), and hearths related to food preservation or cooking.

#### 4.1.2 Habitation Structures

Among the Tsawwassen, Musqueam, and other groups near the mouth of the Fraser River, shed roof (single-pitch) plank houses were the most common dwelling (Barnett 1955). Plank house walls were composed of removable cedar planks held in place by parallel sets of upright poles. All of the plank houses among the Musqueam were of the shed type, or an adaptation thereof, a gabled roof structure. Some wealthier Musqueam families also had underground houses, primarily for infirm persons or for general use during extremely cold periods (Barnett 1955). The Tsawwassen used the shed roof type house exclusively.

Summer months were characterized by congregations of people at favourable fishing locations. Limited information exists concerning the nature of Halq'eméylem summer residences, however, indications are that they ranged from simple, non-descript branch lean-tos, to structures having frameworks like those for winter houses. At favourable locations, wealthier families built permanent frameworks that they covered with either planks or bark (Barnett 1955).

For temporary shelters, special roof boards were sometimes transported from location to location. However, the most common temporary shelters usually consisted of bough-covered lean-tos or were slender pole frames draped with sewn rush mats (Barnett 1955).

Structures, if present in the study area, were likely plank houses or temporary structures associated with berry collecting camps. Archaeological traces of these structures could include midden ridges, house floors (excavated and/or compacted areas of midden), post moulds, or other features.

#### 4.1.3 Material Culture

Typical household items used by Halq'eméylem groups included wrapped lattice pack baskets, redcedar bark baskets, mats, wooden dishes, and spoons made out of red alder, redcedar, or big-leaf maple, wedges and digging sticks made of western yew, redcedar canoes and harpoon poles, and yellow cedar bows and arrow shafts. Stone, bone, antler, and shell were also important raw materials and were used to make a wide variety of items including hand mauls, fish knives, harpoons, pendants, wedges, and needles.

Due to factors related to preservation, the most common artifacts recovered from archaeological sites are made of stone. This is problematic, since stone artifacts typically represent only a small proportion of the original artifact assemblage (as suggested by ethnographic data). Most non-stone artifacts are comprised of perishable materials (e.g., wood, bark, etc.) and tend to deteriorate and ultimately disappear with time unless preserved under unusual environmental circumstances such as burial or submersion in an anaerobic environment. The preservation of bone, antler, and shell items varies and is

largely dependent upon site conditions (drainage, soil, pH, etc.). Shell midden sites typically have well preserved bone, antler, and shell artifacts because the acidic calcium carbonate (H<sub>2</sub>CO<sub>3</sub>) introduced by rainfall percolating through the deposits is neutralized by the pH of the shell-rich soil.

The three archaeological sites at the western end of the SFPR project area (DgRr-2, 6, and 22) are somewhat unique as all three contain waterlogged organic materials (e.g., wooden stakes, basketry, etc.), and two of the sites contain preserved bone, antler, and shell artifacts. All three sites contain stone artifacts.

#### 4.1.4 Trails

Trail networks were integral to the aboriginal subsistence, settlement, and exchange systems in B.C. Some trails linked village sites with resource collection localities, summer camps, and special purpose sites, while others supported important exchange networks with neighbouring families or other First Nations. Although difficult to identify archaeologically, traditional ecological knowledge can sometimes help with the identification of these landscape features.

#### 4.2 Placenames

A series of Halq'eméylem placenames exist within, or immediately adjacent to, the SFPR project study area. These names are important as they demonstrate First Nations use of the study area and, in some cases, provide some indication of the range of activities that may have taken place. Both the named locations and the activities they imply are important to archaeologists as they assist with the identification and interpretation of archaeological sites. These locations are discussed in the following pages.

##### ma7Quam – Burns Bog

Burns Bog, or *ma7Quam*, is located at the western end of the SFPR project area. Bak (personal communication 2001) refers to a wide range of subsistence activities in this location including plant gathering (blueberries, cranberries, Labrador tea) and hunting (wapiti, deer, and bear). Bak also referred to a canoe portage/trail that linked the south arm of the Fraser River with Mud/Semiahmoo Bay to the south.

##### sewkw'áksen – 'drift away point' or súqweqsel – 'chipped off nose, broken'

Sewkw'áksen is described by Rozen (1979) as a campsite on the southwest side of Annacis Island/the south bank of [the Fraser] River. Ham (1984) applies the name to the St. Mungo site (DgRr-2) and describes the location as a large salmon fishing village (Ham et al. 1984 in Owens and Vincent 1999). Bak (personal communication 2001) describes this location as a campsite that was shared with the Musqueam. He also

indicates huckleberries and salmonberries were gathered at this location. Barnett (1955) indicates the Tsawwassen used this site from May until July while fishing for sturgeon on the Fraser River.

The Sto:lo Nation (Carlson 2001) associate this location with the name *súqweqsel*, which translates to “chipped off nose”, “broken”, and is in reference to that particular geographic location.

##### suqveqsum – 'Gunderson Slough'

Bak (personal communication 2001) describes *suqveqsum* (Gunderson Slough) as a source of fresh water and the site of salmon fishing activities.

##### xvmuthkvi'um – 'little Musqueam'

Bak (personal communication 2001) describes *xvmuthkvi'um* as a creek that empties under the south side of the Port Mann Bridge. Steelhead were harvested at this location in the spring and sturgeon were available in the Fraser River off the creek mouth.

##### qiqá:yt – 'resting place'

Northwest of the Bridgeview section of the SFPR project area, on the south side of the Fraser River near the Pattullo Bridge, was a campsite called *qiqá:yt* (Carlson 2001). Nelson (1927) in Rozen (1979) describes this location as a summer dwelling or camp of the Kwantlen. This location was also connected to Mud Bay/Semiahmoo Bay by a trail. Bak (personal communication 2001) describes this location as a shared campsite associated with a wide range of activities including berry harvesting.

##### c'á?c'ð??ðm

Well north of the Fraser Heights section of the SFPR project area, at the mouth of Yorkson Creek, was a village site called *c'á?c'ð??ðm* (Suttles 1955; Rozen 1979). At this location in the past, houses stood along both sides of the creek, facing the Fraser River. This area is currently part of Katzie Indian Reserve #2.

##### stéqwó:thel – 'across from, but facing you'

West of *qiqá:yt*, in the South Westminster section of the SFPR project area, was a settlement named *stéqwó:thel*. This settlement was situated on the south bank of the Fraser River at the mouth of a creek, and the name translates as “across from, but facing you” (Carlson 2001).

### Tynehead Park

Although there is not a Halq'eméylem placename for Tynehead Park, Bak (personal communication 2001) indicates the area was used for deer hunting in the past.

#### 4.3 Archaeological Sequence Of The Fraser River Delta Region

A great deal of archaeological research has taken place in the southern Strait of Georgia region, particularly in the Lower Mainland area around Vancouver. Research undertaken in the Vancouver area and the Gulf Islands has helped build a regional chronology spanning at least 8,500 years (Matson 1976, 1992). The early development of this sequence can be traced back to Borden (1950, 1968, 1970), Carlson (1960), Mitchell (1971) and Matson (1974). The archaeological sequence for the southern Strait of Georgia over the past 9,000 years is summarized in Figure 2 and is briefly reviewed in the following pages.

##### 4.3.2 Old Cordilleran/Pebble Tool Tradition

The earliest culture type identified in the archaeological record of the coast is variously referred to as Old Cordilleran (Matson 1976, 1992), the Lithic Culture Type (Mitchell 1971), the Pebble Tool Tradition (Carlson 1990; 1996), or the Protowestern Tradition (Ham 1982). This little-known period, which extends from about 8,500 to 5,500 BP, is characterized by an artifact assemblage dominated by chipped stone artifacts including cobble tools and leaf-shaped bifaces, along with other bone and antler tools (Carlson 1990; Matson 1992).

Faunal remains from the Old Cordilleran component at the Glenrose Cannery site (DgRr-6) reflect an economic pattern directed towards the hunting of land mammals, with deer and wapiti the two most important animals that were observed archaeologically. Seals, salmon, sticklebacks, eulachon, flatfish, and bay mussel were also identified in the midden deposits (Matson 1976, 1992).

##### 4.3.2 Charles/St. Mungo Culture Type

The Charles Culture Type (5,500 to 3,300 BP) may be the earliest archaeological phase directly ancestral to the ethnographically documented Northwest Coast pattern and has well-described components from three sites in the Fraser delta – St. Mungo (DgRr-2), Glenrose Cannery (DgRr-6), and Crescent Beach (DgRr-1) (Matson and Coupland 1995). This period saw a continuation of some tool types from the previous culture type and the introduction of new types including chipped stone scrapers, drills, stemmed bifaces, as well as ground slate, bone, and antler implements (Ham et al. 1984).

A well-developed woodworking technology is inferred from the presence of adzes and wedges and the remains of several large residential structures located along the Fraser

River at Agassiz and Hatzic and possibly at Fort Langley (LeClair 1976; Mason 1994; James 1990).

Pratt (1992) suggested Charles Culture faunal remains are indicative of a mixed economy where both land and sea mammals were exploited. Although salmon were exploited to some extent, specialization had not yet begun (Matson 1992). Mason (1994) has argued that the presence of several large residential structures at sites located along the Fraser River suggests specialized salmon exploitation had occurred by this period. It is doubtful that a hunting population would have required, or invested, the necessary time and energy into the large structures found at the Hatzic Rock (DgRn-23) and Maurer (DhRk-8) sites.

Eldridge (1991b) argues for intensive salmon harvesting, processing, and storage at the mouth of the Fraser River by 4,600 BP, based on the presence of intertidal stakes, thought to represent the remains of fish weirs, at the Glenrose Cannery site (DgRr-6). Eldridge further suggests that the Northwest Coast pattern was likely well established during the Charles Culture, and elements such as massive architecture, wealth accumulation, hereditary status, and social ranking were in place at this time. Cannon (1993) has argued for the presence of salmon specialization and storage technology at Namu, on the central coast, prior to 6,000 BP suggesting similar data are waiting to be uncovered along the Fraser River.

Ham et al. (1984) suggest a broader economic base may have led to a stratification in social status as evidenced by burial practices, use of labrets, and possibly cranial deformation. In contrast, Pratt (1992) suggests an egalitarian society existed despite the possible presence of status differentiation as reflected in burial remains at Tsawwassen and possibly Pender Canal.

##### 4.3.3 Locarno Beach Culture Type

The Locarno Beach Culture Type, (ca. 3,500/3,300 to 2,500 BP) is typified by a predominantly chipped stone technology with a relatively small proportion of large, thick ground stone tools. A variety of tool types are found in Locarno Beach assemblages including flaked shouldered and lanceolate stone points, microblades and cores, bilaterally and unilaterally barbed points, one-piece and composite toggling harpoon heads, woodworking tools such as abraders, grinding slabs, and wedges, large, faceted ground slate points, and thick ground slate knives (Mitchell 1990). Evidence of cordage, basketry, and other wood items have been recovered from water saturated sites in the Lower Mainland (Archer and Bernick 1990; Bernick 1991; Borden 1976; Patenaude 1983).

The small and carefully made steatite, coal, and bone artifacts characteristic of the Gulf Island complex also appear to be associated with the Locarno Beach phase, although these items are not found in all components of this period (Mitchell 1990).

Faunal remains demonstrate that people of this period utilized a varied resource base, showing a great reliance on shellfish, birds, and sea mammals; however, land mammals and fish were still of prime importance.

Evidence of large residential structures is lacking; nonetheless, the existence of these dwellings is inferred based on the nature of tools found in artifact assemblages and the evidence of large Charles Culture (ca. 5,500 to 3,000 BP) dwellings (see Mason 1994).

#### 4.3.4 Marpole Culture Type

The Marpole Culture spans the period between 2,500 and 1,400 BP (Burley 1980). Mitchell (1971) provides a synthesis of diagnostic archaeological features found within the Marpole Culture Type and has produced a list of twenty defining criteria. These criteria were later re-examined and further refined by Burley (1980).

Artifact assemblages typical of Marpole period deposits tend to be extremely varied. While many artifact types from the Locarno Beach phase are found in Marpole period assemblages, technology from the latter period can be characterized by a decrease in proportion of chipped stone tools with a concomitant increase in proportion and refinement of ground stone tools. Exclusive to the Marpole period, the non-toggling, barbed harpoon point is considered a diagnostic artifact (Mitchell 1990). Among items associated with the development of ranked society, native copper ornaments are prevalent, as are midden burials with grave inclusions such as shell or slate disc beads (Burley 1980).

Tools indicative of large-scale woodworking are typical of Marpole assemblages and, as Borden (1954, 1970) suggests, represent the type of woodworking recorded in ethnographic times. This is supported by identification of features such as large house outlines and post molds (Burley 1980). Houses were likely composed of a heavy timber frame upon which cedar planks were lashed and assembled in the row-housing style or, in later Marpole times, as extremely large single structures. Generally, Marpole villages were large and composed of houses arranged facing the shore, with midden refuse deposits between and behind the houses (Mitchell 1990).

Distinctive stone sculpture is a defining trait of Marpole assemblages. Seated human figurines, decorated stone bowls, and incised siltstone objects are a few examples of the Marpole artistic tradition. Typical motifs include “turtle-like animals with prominent eyes, snake or sea monster representations, herons and other birds, and seated emaciated humans” (Mitchell 1990).

Some archaeologists view Marpole assemblages as indicative of a major shift in subsistence practices and social organization on the Northwest Coast. For example, Burley (1980) suggests, as did others before him, that salmon were an integral component

of Marpole era society; it was the ability to dry and preserve surplus salmon that stimulated cultural change. Indeed, it has been postulated that salmon are linked to the development of large-scale, ranked societies on the Northwest Coast as the surplus of salmon resources would have allowed for the development of economic and cultural traits normally associated with chiefdoms such as “semisedentism and population aggregation” (Burley 1980).

#### 4.3.5 Developed Coast Salish Culture Type

The Developed Coast Salish Culture (1,400 to 200 BP) is directly ancestral to present Coast Salish culture and contains a single culture type, though several regional variants have been proposed. These variants include Late (Fladmark 1982; Matson 1992), San Juan (Carlson 1960), Strait of Georgia Culture Type (Mitchell 1971, 1990), Gulf of Georgia Culture Type (Ham 1982), and Stselax (Borden 1954). Defining archaeological characteristics for the culture type include small, triangular flaked basalt points; thin ground slate points and knives, unilaterally barbed bone points, usually with many enclosed barbs, composite toggling harpoon heads, and large well-made ground stone celts (Mitchell 1990).

Household and resource procurement technology typical of this period are characteristic of wide ranging subsistence practices. Fishing, hunting, plant gathering, and shellfish harvesting implements are found throughout Developed Coast Salish sites. Large collections of net weights and anchor stones are indicative of net fishing technology (Easton 1985). Woodworking implements are consistent with those found in Marpole assemblages and differ only in minor detail (Mitchell 1990).

House styles typical of this period include both row and single dwellings. Structures were likely composed of a heavy timber frame upon which cedar planks were lashed (Mitchell 1990). Refuges formed by walls or ditches, surrounding a series of temporary structures, are sometimes found in nearby association with larger dwellings.

Developed Coast Salish Culture peoples are thought to have relied on a diet of salmon supplemented with other fish, animal, and plant resources. Most archaeological sites falling within the Developed Coast Salish Culture are seasonal in nature, consequently little is known regarding the overall diet (Mitchell 1990). Seasonal assemblages indicate that shellfish and herring were of considerable importance in the spring, while salmon constituted the most important fall food resource. Deer, wapiti, and dog remains are found in Developed Coast Salish assemblages. Dog bones are usually found intact and articulated indicating they were not used for food.

Seasonal assemblages of differing faunal and floral resources and structure types indicate that social organization mirrored that of the ethnographically known Coast Salish groups. Characteristics of the Developed Coast Salish groups seen in ethnographically recorded

Coast Salish cultures include a resource economy based on a seasonal round and the presence of large winter villages. Seasonal patterns of settlement were typified by the large winter village, some large summer gathering areas, and smaller spring, summer, and fall camps (Mitchell 1990).

#### 4.4 Previous Archaeological Research

A considerable amount of archaeological research has been undertaken in the SFPR project area over the past 40+ years and as a result, there are presently twelve archaeological sites located within, or near to the proposed project area (Figure 3). As mentioned in Section 1.0 and elsewhere, four previously recorded archaeological sites are located within, or immediately adjacent to, the SFPR project study area (DgRr-2, 6, and 22, and DhRq-2). The other eight sites are location well away from the SFPR project area, generally on the Fraser River, and are not discussed further.

Recently, Owens and Vincent (1999) prepared a draft literature review for MoT that summarizes much of the known information concerning archaeological sites DgRr-2, DgRr-6, and DgRr-22. Most of these data pertain to the St. Mungo (DgRr-2) and Glenrose Cannery (DgRr-6) sites. While perhaps more accurately described as an annotated bibliography, the study compiled most of the primary data references for these sites and produced a map<sup>2</sup> (Figure 4) showing the locations of earlier archaeological studies and the site boundaries for these three sites. Appendix V contains the key to Figure 4.

Salient aspects of DgRr-2, 6, and 22, and DhRq-2 are provided in the following sections. Detailed information concerning each of these sites may be found in the primary references or in research syntheses including Matson (1976, 1996), Matson and Coupland (1995), Carlson (1990), and Mitchell (1990).

##### 4.4.1 St. Mungo Site (DgRr-2)

The St. Mungo site (DgRr-2) was first observed by Harlan Smith in 1898 but was not formally recorded as an archaeological site until 1969 (Calvert 1969 in Owens and Vincent 1999). The site is comprised of a large upland midden and an intertidal wet site component.

Major excavations were completed at this site by Calvert in the late 1960s (Calvert 1969, 1970; Boehm 1973) and in the early 1980s by Archer and Mackie (1981), then Ham (Ham et al. 1984) and Eldridge (1984). Calvert's excavation (Figure 4; Appendix V), was located opposite \_\_\_\_\_ River Road, in the vicinity of a cannery facility that has since been demolished. Excavations in the 1980s were related to the proposed construction of

<sup>2</sup> The location of Ball's (1998) AIA at \_\_\_\_\_ River Road ('D' and '23' in Figure 4) is misplotted (\_\_\_\_\_ River Road) and actually took place three lots further to the east.

the Alex Fraser Bridge and were also concentrated in the area near the cannery facility (Figure 4). Eldridge and Fisher (1991) excavated two trenches in the intertidal wet site component of DgRr-2 (Figure 4).

Cultural components that are represented at the St. Mungo site include St. Mungo (Charles), Marpole, and Developed Coast Salish. Although the earliest date associated with this site is ca. 4,500 BP, Mackie (1982) suggests an older, Old Cordilleran, component may also be present at this location.

##### 4.4.2 Glenrose Cannery Site (DgRr-6)

Similar to the St. Mungo site, the Glenrose Cannery site (DgRr-6) contains both an upland midden component and an intertidal wet site component (Figure 4). With basal cultural deposits dating to 8,100 BP (Matson 1996), the Glenrose Cannery site is one of the oldest and most significant archaeological sites in the region. Other cultural components that are represented at this site include St. Mungo (Charles) and Marpole.

During the period of initial occupation, Matson (1996) suggests Panorama Ridge, located inland from the site, may have been similar to Point Grey – a peninsula extending into the Strait of Georgia, next to the outlet of the Fraser River. As a result, for the earliest inhabitants at least, the inland (up-river) location of the Glenrose Cannery site is misleading. Matson (1996) further suggests two factors probably resulted in the use of this location – the presence of a more gradual slope than in the adjacent sections of Panorama Ridge and the presence of a freshwater stream flowing through Sunbury Ravine (Matson 1996).

Percy (1972) completed an excavation at the Glenrose Cannery site in response to the proposed construction of a parking lot at the cannery facility (Figure 4). Later excavations by U.B.C., also south of the BNSFR right-of-way (Figure 4), found archaeological deposits as deep as 5.5 m below surface in some areas (Pearson 1974; Loy 1972; Limer et al. 1972; Matson 1976). Waterlogged deposits from the Glenrose Cannery site (Figure 4) have been dated to 4,500 BP (Eldridge 1991b).

Sunbury Ravine, south of the site and below River Road, is comprised of imported fill material. Earlier in the 20<sup>th</sup> Century a wooden bridge spanned the ravine.

##### 4.4.3 Wet Site (DgRr-22)

A wet site, DgRr-22, was located on an intertidal beach between the St. Mungo and Glenrose Cannery sites (Figure 4) during a survey of Fraser River intertidal zones by Eldridge and Mackie (1993). Wooden stakes, stone artifacts, and fire-cracked rock were observed and recorded at this time. The wet site was assessed as largely destroyed although the possibility of some intact deposits existing under gravel deposits was

considered. No systematic testing was undertaken at this site and no dates for the deposits are available.

#### 4.4.4 DhRq-2

Archaeological site DhRq-2, described as a “shell deposit”, was originally recorded in 1953 by Kenyon (1953). Specifically, Kenyon described the deposits as follows.

“There is a deposit of clam and mussel shell unearthed when [a] drainage ditch [was] dug on [the] west side of [the] road. No evidence of human activity [is] associated with [the] deposit which is at least 2 feet thick and of undetermined extension. [There are] Three superior strata of sand, gravel and clay, totaling up to five feet in thickness.”

Kenyon’s site form also indicates the shell deposit was “undoubtedly a geological rather than an archaeological deposit” and that it is “unrelated to isolated [projectile] points found in [the] area.” (Kenyon 1953).

The site was reassessed in 1979 by Yip and Gose (see Ham et al. 1979), when it was determined that the site, located under the Highway 401 Interchange with Clover Valley Road (now Highway 1 and 176<sup>th</sup> Street), had been destroyed.

## 5.0 RESULTS

This section presents the results of Golder’s AIA of the SFPR project area. Areas considered outside of the potential development area were inspected less intensively, or not at all. Also, the use of site “boundaries” should be used with caution as archaeological sites do not necessarily “end” at a finite point. Small pockets of deposits, or isolated artifacts, can be difficult to locate, particularly in heavily developed areas such as the Delta section of the SFPR project area. This seems particularly true of the St. Mungo site (DgRr-2) where past research and anecdotal information (see Figure 4; Owens and Vincent 1999) suggest remains from this site may extend further than archaeological evaluations indicate.

Figure 5 illustrates the general extent of archaeological survey coverage in the SFPR project area. Other figures provide detailed information concerning survey coverage and subsurface test locations for areas that were assessed as having moderate to high archaeological potential. These areas are discussed in greater detail in the following sections. Detailed information concerning subsurface tests (shovel tests and soil probes) is provided in Appendix VI.

### 5.1 Connection To Highway 91

No previously unrecorded archaeological sites were identified in the Connection to Highway 91 section of the SFPR project area. However, archaeological deposits associated with the western end of the St. Mungo site (DgRr-2) are found in this section of the proposed highway.

Figure 4 indicates archaeological deposits associated with the St. Mungo site (DgRr-2) may extend almost as far west as Cougar Canyon Creek, located slightly west of the Alex Fraser Bridge (Sta. 42+80). The north side of River Road in this area is heavily developed and access to shovel test these properties was not obtained. Existing cut bank exposures in Cougar Canyon Creek on the north and south sides of River Road were examined but did not reveal any evidence of cultural matrices or artifacts (Figure 6). A shovel test excavated on the south side of River Road, east of Nordel Way, did not reveal cultural matrices. A low tide survey of the beach north of Nordel Way and extending to the west and east did not identify cultural materials on the beach or in existing river cut banks. Although cultural materials were not observed in the cut bank of Cougar Canyon Creek, using the creek as the western boundary of the St. Mungo site is proposed as it provides a natural break and adds a small buffer to areas known to contain cultural deposits. An anecdotal report of human remains found by a local resident in the vicinity of Cougar Canyon Creek (Eldridge 1983 in Owens and Vincent 1999) could not be confirmed.

## 5.2 Delta Section

No previously unrecorded archaeological sites were identified in the Delta section of the SFPR project area. However, archaeological deposits associated with the St. Mungo site (DgRr-2), the Glenrose Cannery site (DgRr-6), and an unnamed wet site (DgRr-22) are found in this section of the proposed highway. These three sites are discussed in the following sections.

### 5.2.1 St. Mungo Site (DgRr-2)

Earlier archaeological investigations, summarized in Figure 4, indicate archaeological deposits associated with the St. Mungo site (DgRr-2) extend from near the footings of the Alex Fraser Bridge, eastward almost to the western edge of Sunbury Ravine. Deposits extend north to the Fraser River and in the south, to the middle of River Road. A small pocket of midden was recorded by Eldridge (1983) 100 m south of the 1982 excavation area (see Ham et al. 1984). Approximately 200 m south of \_\_\_\_\_ River Road (west of Sheaves Court and north of Main Street), Ham (1983) reported encountering shell midden deposits and human remains.

Smart's (1995) AIA of \_\_\_\_\_ River Road (Figure 4) recovered three artifacts, however, reports of imported fill for landscaping raises questions about the provenience of the artifacts. In 1998, Ball (1998) completed an AIA at \_\_\_\_\_ River Road (Figure 4) and found that remaining archaeological deposits were partially disturbed. Over most of the property the integrity of archaeological deposits had been degraded as a result of historic land use. In the northwestern portion of the property, intact cultural deposits were encountered in subsurface tests (ca. 120 m<sup>2</sup>).

Garvin et al. (1993) completed an AIA along the existing BNSFR right-of-way to determine whether the installation of a fibre optic line would impact archaeological deposits in the vicinity of DgRr-2. Shovel tests and soil probes excavated south of Main Street, along the BNSFR right-of-way, did not identify archaeological materials. No shovel tests or soil probes were completed along the right-of-way between Main Street and River Road. Five shovel tests, six soil probes, and an evaluative unit completed north of River Road along the BNSFR right-of-way identified intact archaeological deposits ranging in depth from 0 to 75 cm below surface and ranging in thickness from 10 to 70 cm (Figure 4). Cultural deposits in the evaluative unit ranged between 20 and 80 cm below surface and contained 49 pieces of debitage and 1 finished tool, a basalt uniface.

Given the extent of past research in the vicinity of the Alex Fraser Bridge footings, testing was not undertaken in this area. Areas north of the BNSFR were considered intact and were not tested during this study.

The results of Golder's subsurface testing program in the vicinity of the St. Mungo site is summarized in Table 1. This table includes unconfirmed, anecdotal information provided by some local area residents. The locations of the subsurface tests are illustrated in Figure 7 (see Appendix VI).

Prior research in the St. Mungo Cannery area and the results of Golder's subsurface testing program suggest the bulk of the remaining cultural deposits associated with DgRr-2 are located east of Cougar Canyon Creek and extend eastward to the western edge of Sunbury Ravine. The deposits extend north to the south bank of the Fraser River and south to River Road. Reports by Ham (1983) and Eldridge (1983) and private artifact collections from south of River Road suggest isolated pockets, and/or redistributed midden materials, can be found beyond the core site area.

Intact archaeological remains are believed to exist in undeveloped areas near the footings of the Alex Fraser Bridge, along portions of the BNSFR right-of-way, and between the Fraser River and the BNSFR tracks. Residential lots located north of River Road likely contain both disturbed and intact pockets of archaeological material, but given the highly developed nature of most of the area, determining the extent of deposits over a wide area was not possible without the use of a backhoe. Archaeological deposits under River Road, if present, are likely a combination of intact and disturbed deposits.

Figure 8 shows the extent of core archaeological deposits associated with the St. Mungo Cannery site (DgRr-2). Artifacts recovered from subsurface tests are described in Appendix VII.

### 5.2.2 Glenrose Cannery Site (DgRr-6)

The composite map prepared by Owens and Vincent (1999) (Figure 4) indicates cultural deposits associated with the Glenrose Cannery site (DgRr-6) are located north of the Canfisco access road (\_\_\_\_\_ River Road) in the northwestern corner of Sunbury Ravine, then extend east along the toe of the slope to \_\_\_\_\_ River Road, progressively extending up the steep side slope.

Garvin et al. (1993) completed an AIA along the existing BNSFR right-of-way to determine whether the installation of a fibre optic line would impact archaeological deposits in the vicinity of DgRr-6. Between \_\_\_\_\_ River Road and the main Canfisco building at \_\_\_\_\_ River Road, three sterile shovel tests and three sterile soil probes were excavated along the BNSFR right-of-way. East of the main Canfisco building and extending east to below \_\_\_\_\_ River Road, cultural deposits were identified in three shovel tests and seven soil probes (Figure 4). Both intact and disturbed cultural deposits were encountered, ranging in depth from 0 to 100 cm below surface. The thickness of intact cultural remains ranged from 30 to 60 cm. Garvin et al. (1993) also excavated an evaluative unit along the BNSFR right-of-way below \_\_\_\_\_ River Road, approximately

6 m west of the eastern property line (Figure 4). The excavation was terminated at 2 m below surface due to safety concerns. However, a soil probe was able to determine cultural deposits continued for an additional 1.25 m to an overall depth of 3.25 m below surface. Numerous faunal remains, a human bone element, 37 artifacts, and 65 pieces of debitage were recovered.

East of the shovel tests and soil probes that contained cultural remains, an additional three shovel tests and two soil probes were excavated. No cultural deposits were identified in these tests.

The results of Golder's subsurface testing program in the vicinity of the Glenrose Cannery site are summarized in Table 2. This table includes unconfirmed, anecdotal information provided by some local area residents. The locations of the subsurface tests are illustrated in Figure 9 (see Appendix VI).

Prior research in the Glenrose Cannery area and the results of Golder's subsurface testing program suggest cultural deposits associated with the Glenrose Cannery site are the deepest and most intact in the vicinity of the BNSFR tracks, the cannery office/caretaker's house, and the shoreline. These areas were not tested as earlier studies have shown intact cultural deposits in these areas range from 40 to 550+ cm in depth. Sunbury Ravine in the vicinity of River Road has been filled and could not be evaluated. No archaeological materials were found south of River Road in Sunbury Ravine (Figure 9). The east and west slopes of Sunbury Ravine, near its mouth, appear to contain localized and disturbed cultural remains although small pockets of intact materials may also be present. Further east, along the steep side slope east of the cannery facility, artifacts and thin shell deposits have been found in a series of locations, suggesting isolated artifacts and/or small pockets of intact midden materials may be present in this area.

East of the Canfisco facility (\_\_\_\_\_ River Road), cultural deposits were observed along the beach and in the south bank of the Fraser River to a point slightly east of Sta. 62+83. This location was recorded with a global positioning system (GPS<sup>3</sup>) (N 49° \_\_\_\_\_, W 122° \_\_\_\_\_) and is considered to represent the eastern "boundary" of DgRr-6 (Figure 9).

Figure 8 shows the extent of core archaeological deposits associated with the Glenrose Cannery site (DgRr-6). Artifacts recovered from subsurface tests are described in Appendix VIII.

<sup>3</sup> NAD 83

### 5.2.3 Wet Site (DgRr-22)

Figure 4 indicates wet site DgRr-22 is located north of the proposed SFPR project and is restricted to the intertidal zone (Eldridge and Mackie 1993). Areas immediately south of DgRr-22 were examined as part of the detailed assessment of site DgRr-2 and DgRr-6. Exposed portions of DgRr-22 were examined at low tide but no other assessment work was undertaken at this site. Figures 4 and 8 show the extent of archaeological deposits associated with this wet site (DgRr-22).

### 5.2.4 Nelson View and Knudson Road Area

Ravines in the vicinity of Nelson View, Norum Crescent, and Elevator Road, at the eastern end of the Delta section, were assessed (Figures 10 to 12; Appendix VI). No cultural materials were identified in existing surface exposures or subsurface tests and no previously unrecorded archaeological sites were identified in this section of the SFPR project area.

### 5.3 South Westminster, Bridgeview, And Port Mann Section

Besides the general survey coverage of the South Westminster, Bridgeview, and Port Mann sections of the SFPR project area (Figure 5), detailed inspections were completed at a number of locations, including minor drainages near the Port Mann Bridge (Figure 13) and a ravine northwest of 161<sup>st</sup> Street in Surrey (Figure 14). No cultural materials were identified in existing surface exposures or subsurface tests and no archaeological sites were identified in this section of the SFPR project area.

### 5.4 Fraser Heights Section

Figure 5 shows the general archaeological survey coverage in the Fraser Heights section of the SFPR project area. More detailed survey and subsurface testing was undertaken in a series of ravines near Tilbury Place in Surrey (Figure 15). No cultural materials were identified in existing surface exposures or subsurface tests and no archaeological sites were identified in this section of the SFPR project area.

### 5.5 Connection to Highway 1/15

General archaeological survey coverage in the vicinity of the Connection to Highway 1/15 section of the SFPR project is illustrated in Figure 5. No previously unrecorded archaeological sites were identified, but one previously recorded archaeological site, DhRq-2, is located in this section. Detailed assessment in the presumed vicinity of this site is described as follows.

### 5.5.1 DhRq-2

As discussed in Section 4.4.4, prior studies suggest DhRq-2 is not an archaeological site, but is a natural shell deposit that has been subsequently destroyed by the construction of the Highway 1 and 176<sup>th</sup> Street Interchange (Ham et al. 1979). As an added precaution, a number of subsurface tests were completed in accessible portions of the interchange area (Figure 16). No cultural materials were identified in existing surface exposures or subsurface tests and it is assumed that this site has been destroyed. In general, this section of the SFPR project area was found to have generally low archaeological potential.

## 6.0 IMPACT ASSESSMENT

As detailed in Section 5.0, no new archaeological sites were identified during this study. However, four previously recorded sites exist within the proposed development area. Potential impacts to archaeological sites DgRr-2, 6, and 22, and DhRq-2 are described in the following sections based on the SFPR preliminary design (Associated 2001b).

### 6.1 St. Mungo Site (DgRr-2)

The SFPR will impact archaeological deposits associated with the St. Mungo site (DgRr-2). West of Centre Street, impacts will be limited to site preparation work and the excavation of footings for piers associated with an elevated roadway. Based on prior research, the potential to encounter both intact and disturbed cultural deposits, including human remains, is high in this area. East of Centre Street and extending to the eastern edge of the site, near Sunbury Ravine, road building activities associated with the proposed development will impact both intact and disturbed cultural deposits over a large area of the site. The potential to encounter human remains in this area is considered high. The proposed access road linking Centre Street with River Road will have limited impact on archaeological resources as the archaeological sensitivity of the southern portion of the proposed development area is substantially less than within areas north of River Road.

### 5.1 Glenrose Cannery Site (DgRr-6)

Beginning at the western side of Sunbury Ravine, the SFPR will traverse the side slope to the Canfisco facility parking area (\_\_\_\_\_ River Road). Road building along the side slope may impact small pockets of intact archaeological materials or may further displace or impact previously disturbed archaeological remains. In the area of greatest archaeological concern, the base of Sunbury Ravine in the vicinity of the parking area, office building, and caretaker's cottage, it is proposed that the SFPR will be built on lightweight fills to minimize impacts to the archaeological deposits on cleared but unstripped ground. This portion of the archaeological site would become inaccessible for future research.

East of this core area, the SFPR will traverse the steep side slope below the existing River Road residences and south of the BNSFR right-of-way. Some localized excavation in this area will be necessary to found the highway fill material and this could impact the archaeological deposits. Near the railway tracks, cultural deposits are both deep and significant. The proposed highway may impact some of these deposits unless lightweight fills are utilized. Further up the side slope, archaeological materials are generally diffuse although larger intact pockets of materials may also be present. Road building in this area may impact small pockets of intact archaeological materials or may further displace or impact previously disturbed archaeological deposits in this area.

**6.3 Wet Site (DgRr-22)**

As the preliminary design for the proposed SFPR does not encroach upon archaeological site DgRr-22, no direct impacts are foreseen at this time.

**6.4 DhRq-2**

As DhRq-2 is considered to be destroyed, the SFPR project will not impact this site.

**7.0 RECOMMENDATIONS**

The following sections provide general recommendations based on the SFPR project preliminary design (Associated 2001b).

**7.1 St. Mungo Site (DgRr-2)**

Assuming that the SFPR project proceeds as presently proposed, some form of archaeological mitigation will be required; likely a combination of excavation and archaeological monitoring. The scale and location of such a program will be dependent upon several factors, including the nature and scale of the resource being impacted, but it is assumed that such mitigation efforts would be extensive. Previous archaeological studies at the St. Mungo site, particularly those associated with the construction of the Alex Fraser Bridge, will likely be considered by the Archaeology Branch during any future discussions concerning mitigation strategies for this site.

Upon taking possession of lands required for the SFPR project in the St. Mungo site area, a systematic backhoe trenching program is recommended to better assess the areal extent and integrity of archaeological deposits in this area, particularly north of River Road. Such a program will provide a clearer understanding of the nature of archaeological deposits in the area, and will allow a detailed site mitigation plan to be formulated and implemented in advance of the construction of the SFPR.

**7.2 Glenrose Cannery Site (DgRr-6)**

During a meeting with the Archaeology Branch in April 2000, the possibility of building the SFPR over intact portions of the Glenrose Cannery site was discussed. While not endorsing this option, the Archaeology Branch did offer the opinion that it could be workable. A positive aspect of this option was that the Province would gain ownership of the site, thus providing protection against further disturbance.

Some form of archaeological mitigation will be required at the Glenrose Cannery site; likely a combination of excavation and archaeological monitoring. The scale and location of such a program will be dependent upon several factors, including the nature and scale of the resource being impacted.

In the base of Sunbury Ravine, the SFPR will be built on top of highly significant archaeological deposits, using lightweight fills to minimize impacts to these deposits (Associated 2001b). Prior to construction, the Archaeology Branch will likely require evidence that lightweight fills will adequately safeguard archaeological deposits in the area.

A future systematic backhoe trenching program is recommended to better assess the areal extent and integrity of archaeological deposits along the western side slope of Sunbury

Ravine at the Canfisco property and areas further east. Based on the results of this trenching program, either no further archaeological work or some form of mitigation, likely excavation and archaeological monitoring, will be required prior to, and possibly during, the construction of the SFPR in this area.

## **8.0 STUDY LIMITATIONS**

While this AIA of the proposed SFPR project is comprehensive and definitive, a number of limitations exist, primarily with respect to the St. Mungo and Glenrose Cannery sites. As detailed in earlier sections of this report, archaeological investigations at these two sites extend back several decades. In some cases, attempts to incorporate this earlier information into the present study proved challenging due to the highly variable quality of the data. Equally difficult to address were anecdotal reports of found human remains or artifacts in the general area surrounding the St. Mungo and Glenrose Cannery sites as there was no way to investigate most of these claims.

The other limitation of this study also concerned the assessment of archaeological deposits in the vicinity of the St. Mungo and Glenrose Cannery sites. The AIA relied on the cooperation of property owners within the study area for permission to enter their properties and to conduct limited subsurface testing. Not all property owners gave this permission, so minor gaps exist in survey coverage. Another limiting factor was the method used to locate and assess archaeological remains on these properties. In general, shovel tests and soil probes were used for this purpose. While typically adequate to assess archaeological sites, in some cases this approach produced mixed results given the long development history of the study area and the subsequent alterations to the landscape (e.g., excavation, grading, filling, etc.). A more fruitful approach may have been the use of backhoe trenches across a wide area, however this obviously would not have been acceptable to property owners in the area.

**9.0 CLOSURE**

This report was prepared for the exclusive use of the Ministry of Transportation. Any use, reliance, or decisions made by third parties on the basis of the report are the responsibility of such third parties. This study was not specifically designed to address issues of traditional aboriginal use of the study area and does not constitute a traditional use study. This report was written without prejudice to issues of aboriginal rights and/or title.

**GOLDER ASSOCIATES LTD.**

Andrew R. Mason, R.P.C.A.  
Senior Archaeologist

Rebecca Balcom, M.A.  
Principal

ARM/clc  
002-1702  
N:\FINAL\1700\002-1702\RPT-0619 MOT.DOC

**10.0 REFERENCES CITED**

- Apland, Brian  
1981 Annacis Highway Heritage Resources Impact Assessment. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.
- Archaeology Branch  
1998 British Columbia Archaeological Impact Assessment Guidelines (Revised Edition). Archaeology Branch, Ministry of Small Business, Tourism and Culture, Victoria.
- Archer, David and Kathryn Bernick  
1990 Perishable Artifacts from the Musqueam Northeast Site. Unpublished report on file with the Culture library, Ministry of Small Business, Tourism and Culture, Victoria.
- Archer, David and Al Mackie  
1981 The St. Mungo Cannery Salvage Project: 1981. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.
- Armstrong, J.E. and S.R. Hicock  
1976 Surficial Geology of New Westminster, B.C. (Map 1484A). Geological Survey of Canada, Ottawa.
- Associated Engineering Ltd.  
2001a Ministry of Transportation South Fraser Perimeter Road Planning and Preliminary Design Study Planning Report. Draft report prepared for the Ministry of Transportation and Highways, Burnaby.
- 2001b Ministry of Transportation South Fraser Perimeter Road Preliminary Design Study. Draft report prepared for the Ministry of Transportation and Highways, Burnaby.

Ball, Bruce  
1998 Final Report: Archaeological Impact Assessment 10295 – River Road, Delta, B.C. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

Barnett, H.G.  
1955 The Coast Salish of British Columbia. University of Oregon Monographs, Studies in Anthropology, No. 4. Eugene.

Bernick, Kathryn  
1991 Wet Site Archaeology in the Lower Mainland Region of British Columbia. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

Boehm, S.G.  
1973 Cultural and Non-Cultural Variation in the Artifact and Faunal Samples from the St. Mungo Cannery Site, B.C., DgRr-2. Unpublished Master's Thesis, Department of Anthropology and Sociology, University of Victoria, Victoria.

Borden, Charles E.  
1950 Preliminary Report on the Archaeological Investigations in the Fraser Delta Region. Anthropology in British Columbia 1:13-27.

1954 Some Aspects of Prehistoric Coastal-Interior Relations in the Pacific Northwest. Anthropology in British Columbia. 2:35-52.

1968 Prehistory of the Lower Mainland in Lower Fraser Valley: Evolution of a Cultural Landscape. Alfred H. Siemens, ed. University of British Columbia Geographical Series 9:9-26.

1970 Cultural History of the Fraser-Delta Region: In Archaeology in British Columbia New Perspectives, edited by Roy L. Carlson. BC Studies, Nos. 6 and 7, pp. 95-112.

1976 A Water-Saturated Site on the Southern Mainland Coast of British Columbia. In The Excavation of Waterlogged Sites (Wet Sites) on the Northwest Coast of North America, edited by Dale M. Croes, pp. 233-260. National Museum of Canada, Ottawa.

Breffitt, John  
1992 Monitoring Fish Enhancement at St. Mungo Cannery, DgRr-2. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

Brubaker, L.  
1988 Vegetation History and Anticipating Future Vegetative Change. In Ecosystem Management for Parks and Wilderness, edited by J. Agee and D. Johnson, pp. 50-51. Seattle.

Burley, David V.  
1980 Marpole: Anthropological Reconstructions of a Prehistoric Northwest Coast Culture Type. Department of Archaeology, Simon Fraser University Publication No. 8, Burnaby.

1994 A Never Ending Story: Historical Developments in Canadian Archaeology and the Quest for Federal Heritage Legislation. Canadian Journal of Archaeology 18:77-98.

Calvert, Gay  
1969 The St. Mungo Cannery Site: A Preliminary Report. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

1970 The St. Mungo Cannery Site: A Preliminary Report. BC Studies (6-7):54-76.

Canadian Environmental Assessment Agency  
1994 The Canadian Environmental Assessment Act Responsible Authority's Guide. Canadian Environmental Assessment Agency, Hull, Quebec.

Cannon, Aubrey  
1993 Contingency and Opportunity in the Growth of Northwest Coast Maritime Economies. Paper presented at the International Seminar on the Origins, Development, and Spread of Prehistoric North Pacific-Bearing Sea Maritime Cultures. Honolulu.

Carlson, Keith T. (editor)  
2001 A Stó:lo Coast Salish Historical Atlas. Douglas & McIntyre, Vancouver.

Carlson, Roy L.  
 1960 Chronology and Culture Change in the San Juan Islands, Washington. American Antiquity 25(4):562-586.

1990 Cultural Antecedents, in The Handbook of North American Indians, Volume 7: Northwest Coast, edited by Wayne Suttles, pp. 60-69. Smithsonian Institution, Washington, D.C.

1996 Introduction to Early Human Occupation in British Columbia In Roy L. Carlson and Luke Dalla Bona, eds., Early Human Occupation in British Columbia, pp. 3-10.

Clague, John, John R. Harper, R.J. Hebda and D.E. Howes  
 1982 Late Quaternary Sea Levels and Crustal Movements, Coastal British Columbia. Canadian Journal of Earth Sciences 19:597-618.

Drake, Allene and Lyle Wilson  
 1992 Eulachon: A Fish to Cure Humanity. U.B.C. Museum of Anthropology Museum Note No. 32. Vancouver.

Duff, Wilson  
 1952a The Upper Stalo Indians: An Introductory Ethnography. Unpublished Master's thesis, University of Washington. Seattle.

1952b The Upper Stalo Indians of the Fraser Valley, British Columbia. Anthropology in British Columbia Memoir No. 1. British Columbia Provincial Museum, Victoria.

Easton, N. Alexander  
 1985 Underwater Archaeology of Straits Salish Reefnetting. Unpublished M.A. Thesis, Department of Anthropology, University of Victoria, Victoria.

Eldridge, Morley  
 1983 Report for Heritage Conservation Act Permit 1983-41. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

1984 Archaeological Investigations at St. Mungo Cannery DgRr-2. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

Eldridge, Morley con't.  
 1991a Engineering Solutions to Erosion of the Glenrose Wet Site Component. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

1991b The Glenrose Cannery Wet Component: A Significance Assessment. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

1992 Stabilizing Erosion at Glenrose Wet Site, DgRr-6. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

Eldridge, Morley and Alexander Mackie  
 1993 Fraser River Intertidal Wet Site Survey. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

Eldridge, Morley and Tal Fisher  
 1997 St. Mungo Cannery Wet Site, DgRr-2: An Evaluation. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

Fladmark, Knut R.  
 1982 An Introduction to the Prehistory of British Columbia. Canadian Journal of Archaeology 6:95-156.

Garvin, Richard, Fedirchuk, G., and C. Lewis  
 1993 Archaeological Impact Assessment (Addendum) Starcom International Optics Corporation Blaine to Vancouver Fibre Optics Project KMP 28.0 to KMP 31.5. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

Ham, Leonard C.  
 1982 Seasonality, Shell Midden Layers, and Coast Salish Subsistence Activities at the Crescent Beach Site, DgRr 1. Unpublished Ph.D. dissertation, Department of Anthropology and Sociology, University of British Columbia, Vancouver.

Ham, Leonard C. con't.  
1983 Letter dated January 6, 1983 to Art Charlton, Heritage Conservation Branch. Unpublished letter on file with the Heritage Branch, Victoria.

Ham, Leonard C., Arlene Yip and Leila Kullar  
1984 A Charles Culture Fishing Village. The 1982/83 Archaeological Investigations at the St. Mungo Site (DgRr 2), North Delta, British Columbia. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

Ham, Leonard C., S. Yip, P. Gose and D. Rozen  
1979 The Evaluation of Archaeological Sites in the Greater Vancouver Regional District: Proposals for Management. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

Hebda, Richard J.  
1995 British Columbia Vegetation and Climate History with a Focus on 6 KA BP. Geographie Physique et Quaternaire 49(1):55-79.

Hebda, Richard J. and Rolf W. Mathewes  
1984 Holocene History of Cedar and Native Indian Cultures of the North American Pacific Coast. Science 225:711-713.

James, Malcolm  
1990 1989 Excavations, Operations 39-51, Fort Langley National Historic Park. Report prepared for Archaeological Research Services Unit, Western Region, Canadian Parks Service. Calgary.

Jenness, Diamond  
1955 The Faith of a Coast Salish Indian. Anthropology in British Columbia Memoir No. 2. British Columbia Provincial Museum: Victoria.

Jones, R.K., and R. Annas  
1978 Vegetation. In The Soil Landscapes of British Columbia, edited by K.W.G. Valentine, P.N. Sprout, T.E. Baker and L.M. Lavkulich, pp. 35-45 B.C. Ministry of Environment, Victoria.

Kenyon, W.A.  
1953 British Columbia Archaeological Site Inventory Form for Archaeological Site DhRq-2. Manuscript on file with the Archaeology Branch, Ministry of Small Business, Tourism, and Culture, Victoria.

Lamb, W.K. ed.  
1960 The Letters and Journals of Simon Fraser, 1806-1808. Macmillan of Canada: Toronto.

Lavkulich, L.M.  
1978 Climate. In The Soil Landscapes of British Columbia. Edited by K.W.G. Valentine, P.N. Sprout, T.E. Baker and L.M. Lavkulich. B.C. Ministry of Environment, Victoria.

LeClair, Ronald  
1976 Investigations at the Maurer Site near Agassiz in Current Research Reports, Number 3. Roy L. Carlson (ed.). S.F.U. Department of Archaeology, Burnaby. pp. 33-42.

Limer, Derek, Richard Pearson and Tom Loy  
1971 Preliminary Report of Excavations at the Glenrose Cannery Site (DgRr-6) October 15 to October 24 1971. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

Loy, Tom  
1972 Glenrose Cannery Project (Glenrose Cannery Site DgRr-6) Preliminary Report. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

Mason, Andrew R.  
1994 The Hatzic Rock Site: A Charles Culture Settlement. Unpublished Master's Thesis, Department of Anthropology, University of British Columbia, Vancouver.

Matson, R.G.  
1973 Progress Report on the Glenrose Cannery Site (DgRr-6). Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

- Matson, R.G. con't.  
1974 Clustering and Scaling of Gulf of Georgia Sites. Syesis 7: 101-114. Victoria.
- 1976 Prehistoric Adaptations at the Glenrose Cannery Site (DgRr-6) Fraser Delta, B.C. Canada. National Museum of Man. Mercury Series. Archaeological Survey Paper 52. Ottawa.
- 1992 The Evolution of Northwest Coast Subsistence in Research in Economic Anthropology, Supplement 6, Dale R. Croes et al., eds. JAI Press, Inc. Greenwich, Conn. pp. 367-428.
- 1995 The Old Cordilleran Component at the Glenrose Cannery Site. In Roy L. Carlson and Luke Dalla Bona, eds., Early Human Occupation in British Columbia, pp. 111-122.
- Matson, R.G. and Gary Coupland  
1995 The Prehistory of the Northwest Coast. Academic Press, Toronto.
- Maud, Ralph ed.  
1978 The Salish People. Volume III: The Mainland Halkomelem. Talonbooks, Vancouver.
- Mitchell, Donald  
1990 Prehistory of the Coasts of Southern British Columbia and Northern Washington. In The Handbook of North American Indians, Volume 7: Northwest Coast, edited by Wayne Suttles, pp. 340-358. Smithsonian Institution, Washington, D.C.
- Nelson, Denys  
1927 Place Names of the Delta of the Fraser. Unpublished manuscript on file in the Northwest Collection, Vancouver Public Library (Main Branch), Vancouver.
- North, M.A.E. and J.M. Teversham  
1984 The Vegetation of the Floodplains of the Lower Fraser, Serpentine and Nicomekl Rivers, 1859 to 1890. Syesis, Volume 17, pp. 1 to 9, plus map.

- North, M.A.E., M.W. Dunn and J.M. Teversham  
1979 Vegetation of the Southwestern Fraser Lowland, 1858 to 1880 (map). Environment Canada, Vancouver.
- Oliver, Lindsay  
1995 Found Human Remains 95-6B, 10295 River Road, Delta, British Columbia. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.
- Owens, D'Ann and Rob Vincent  
1999 Archaeological Literature Review: South Fraser Perimeter Road Project (Draft Report). Unpublished report on file with the Ministry of Transportation and Highways, Burnaby.
- Patenaude, Valerie  
1983 The Pitt River Site. Report on file with the Culture Library, Ministry of Small Business, Tourism and Culture, Victoria.
- Pearson, Richard J.  
1974 Preliminary Report of Excavations at the Glenrose Cannery Site (DgRr-6). Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.
- Percy, Richard  
1972 Preliminary Report of an Excavation Undertaken at the DgRr-6 (Glenrose) Site. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.
- Pojar, J., K. Klinka and D.A. Demarchi  
1991 Coastal Western Hemlock. In Ecosystems of British Columbia, edited by D. Meidinger and J. Pojar, pp. 95-111. B.C. Ministry of Forests, Special Report Series, No. 6. Crown Publications, Victoria.
- Powell, Bob and Ray Kenny  
1975a British Columbia Archaeological Site Inventory Form for Archaeological Site DgRr-2. Manuscript on file with the Archaeology Branch, Ministry of Small Business, Tourism, and Culture, Victoria.

Powell, Bob and Ray Kenny con't.  
 1975b British Columbia Archaeological Site Inventory Form for Archaeological Site DgRr-6. Manuscript on file with the Archaeology Branch, Ministry of Small Business, Tourism, and Culture, Victoria.

Pratt, Heather L.  
 1992 The Charles Culture of the Gulf of Georgia: A Re-evaluation of the Culture and its Three Sub-phases. Unpublished Master's Thesis, U.B.C. Department of Anthropology and Sociology, Vancouver.

Rozen, David  
 1979 Lower Fraser Valley Planning Study Ethnographic Site in the Greater Vancouver Regional District. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

Schaefer, D.G.  
 1978 Climate. In The Soil Landscapes of British Columbia. Edited by K.W.G. Valentine, P.N. Sprout, T.E. Baker and L.M. Lavkulich. B.C. Ministry of Environment, Victoria.

Smart, Brad  
 1995 Archaeological Impact Assessment 10314 River Road, Delta, B.C. Unpublished report on file with the Heritage Library (Ministry of Small Business, Tourism and Culture), Victoria.

Suttles, Wayne  
 1955 Katzie Ethnographic Notes. Anthropology in British Columbia Memoir No. 2. British Columbia Provincial Museum, Victoria.

Turner, Nancy J.  
 1975 Food Plants of British Columbia Indians, Part 1: Coastal Peoples. British Columbia Provincial Museum Handbook No. 34. British Columbia Provincial Museum, Victoria.

Wells, Oliver N.  
 1963 Khal-agh-il-til, Chief Sepass in Sepass Poems: The Songs of Y-Ail-Mihth by Eloise Street. Vantage Press, Inc., New York.

1965a Myths and Legends of the Staw-loh Indians. Self Published, Chilliwack.

Wells, Oliver N. con't.  
 1965b A Vocabulary of Native Words in the Halkomelem Language as used by the Native People of the Lower Fraser Valley, B.C. Self Published, Chilliwack.

1965c Squamish Legends. Self Published, Chilliwack.

1966a Indian Territory 1958 (map). Self Published, Chilliwack.

1966b Return of the Salish Loom. The Beaver, Outfit (296):40-45. Winnipeg.

1987 The Chilliwacks and their Neighbors. Ralph Maud, Brent Galloway and Marie Weeden, eds. Talonbooks: Vancouver.